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Global Public Investors – central banks, sovereign funds and public pensions funds – are widening their radius ever further. The policies of 750 institutions with worldwide investable assets of $37.8tn have a profound effect on global markets. They are crucially important for growth prospects, the investment climate and capital markets. In monetary, financial, trade and regulatory policies, they are deeply bound up with the international economic currents of co-operation and conflict. The 2019 annual edition, the sixth, surveys GPIs' performance and practices across a wide range of investments as well as their activities in the digital economy, sustainable investment and Islamic finance.

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With a presence in London, Singapore, Washington and New York, OMFIF is an independent forum for central banking, economic policy and public investment — a neutral platform for best practice in worldwide public-private sector exchanges. For more information visit omfif.org or email enquiries@omfif.org

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Unsettling forces of revitalisation

David Marsh
Chairman, OMFIF

Global Public Investors are navigating, and helping to shape, some blustery times. Some of the side-effects are disturbing, others reassuring. Investors are coming to terms with climate change, and joining in efforts (hitherto far from decisive) to combat it. They are tackling the invigorating and unsettling march of digital technology, the semi-revolutionary presidency of Donald Trump, renewed protectionist tendencies, the rise of China and the gradual move (back) to Asia of the world's centre of economic gravity. Symptoms of Europe's slow retreat from centre stage are the single currency travails of Germany, France and Italy, Britain's painful, frequently chaotic withdrawal from the European Union, and the trials between Russia and the West.

The world economy has been growing at above 3% per year for 30 years, with the sole exception of 2009. In the 10-year recovery phase, advanced countries have struggled to reach 2%, while developing economies have been expanding consistently above 4%. The advanced economies show large cyclical divergences and imbalances, while emerging markets are being buffeted in different ways by global forces.

The central banks that make up one-third of our $37.8tn in surveyed assets have never been so powerful – nor so vulnerable. They are bolstering and countering the disruptive influences on the world economy by maintaining interest rates far lower than during past recoveries. The US Federal Reserve has relented in its three-year march towards higher interest rates. The much-heralded world recession is nowhere in sight, but history teaches that it may be just over the horizon.

The dollar remains the pivot of the world monetary system. Its strength since 2011 – with some fragility only in Trump's first year-and-a half – displays some strong similarities to the 1990s. Trump's trade and economic policies may end up making the dollar uncomfortably strong, endangering the livelihoods of the export-dependent workers whose jobs he wishes to protect.

Reserve currency patterns, as always, are pervasively intertwined with geopolitical shifts. The US has gained favour from the dollar's No.1 status – providing international leverage, lower funding costs and political insurance against setbacks, whether caused by itself or others. The US may use its geopolitical standing and the dollar's supremacy to finance internal revitalisation and find its way back to international co-operation.

That would be benign for the world. It is neither too early nor too late to hope this will be the outcome. ✦

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Critical success factor

Partnerships and collective action are essential to achieving the connection between financial technology and sustainability.

Loh Boon Chye
Singapore Exchange

With major economic centres gravitating eastward, Asia is poised to play an increasingly pivotal role in global finance. Singapore's role as a financial hub in the heart of Asia places it in an ideal position to help shape international policies and developments. Boosted by domestic and foreign financial institutions as well as global investors, Singapore's deep and liquid capital markets provide a springboard for the fostering of emerging financial sectors and activities, such as sustainable finance and financial technology. Both of these are key drivers in securing our common future.

Sustainability has become a critical success factor for companies to ensure long-term value creation. There has been growing demand among investors for enhanced disclosure on listed companies' environmental, social and governance practices. Singapore Exchange (SGX) will continue to play its part in advancing the sustainability agenda, by connecting companies and investors in its marketplace.

New technologies such as distributed ledger, cloud computing and artificial intelligence have the potential to make a positive impact on sustainable development, by changing the way institutions deploy capital and

Reinvigorating the G20

As multilateralism wavers, co-operation on crucial issues such as international taxation is essential.

Masatsugu Asakawa
Japan Ministry of Finance

A decade after the 2008 financial crisis, the international community is at a crossroads. Trade tensions are intensifying and confidence in multilateralism is wavering. Concerns are growing over widening inequality, sapping the foundations of democracy in several countries.

The G20, which represents 85% of global GDP, bears an important mission: ensuring 'strong, sustainable, balanced and inclusive growth'. The financial crisis is behind us, though risks to financial stability remain. The group must now tackle longer-term structural issues, namely aging, global imbalances and international taxation.

People are living longer, which could have a significant impact on growth. A shrinking labour force would exert downward pressure on output and reduce investment opportunities. Rising age-related costs in public pension and health systems could deteriorate the fiscal balance. Countries with aging populations need to save today to prepare for the future.

This is not an issue confined to advanced economies; it is also affecting many emerging economies. Some of their populations are aging even more rapidly than those in developed economies. Expanding social security systems while safeguarding growth and fiscal sustainability will be challenging. Sharing best practices across the G20 community would be useful for both advanced and emerging economies.

Global imbalances have recently come to the fore of the global agenda. Heated debate between deficit and surplus economies is nothing new. But trade tensions are rising, with tariff increases and non-tariff measures materialising in many jurisdictions. The G20, under the Japanese presidency since 1 December 2018, will take a fresh look at this issue and explore policy options.

Countries' current accounts have evolved. Trade in goods, traditionally the main factor behind the current account, has given way to earnings on foreign investment and trade in services. In 2017, Japan ran a current account surplus (4% of GDP), driven mainly by earnings on foreign investments (3.6% of GDP). The UK, while running a current account deficit (4.1% of GDP), had a sizable surplus in trade in services (5.3% of GDP).

A country's current account balance, particularly the savings-investment balance, reflects the state of its economy. Global imbalances imply underlying domestic imbalances. Excessive corporate savings, resulting from subdued investment and declining labour share, weigh on growth. A social safety net with poor coverage (lack of universal health coverage, for example) could induce excessive precautionary savings by households. Overheating asset markets could generate an unsustainably high current account deficit, as observed in the run-up to the financial crisis.

invest. They will be able to increasingly access more information at lower cost and with greater efficiency, while investing across borders in a wider range of assets and products.

Partnerships and collective action are essential to achieving the connection between financial technology and sustainability. With growing global recognition of these important developments, we at SGX are delighted to give our support to OMFIF's *Global Public Investor* 2019 and to help the financial sector advance this agenda in Singapore and the region. ✦

Loh Boon Chye is Chief Executive Officer of Singapore Exchange.

International taxation is an example of successful multilateralism, facilitated by the G20, but more needs to be done. The Japanese presidency aims to make further progress, building on recent achievements. This includes the formulation and implementation of the base erosion and profit-shifting package established with the Organisation for Economic Co-operation and Development. We will also work on the automatic exchange of tax information and capacity-building in developing countries.

Our focus this year is on addressing the impact of digitalisation on the international tax system. Some countries have started to act unilaterally, reducing tax certainty. There is an urgent need for the G20 to lend its political support. Japan aims to help set out policy directions and concrete steps for a consensus-based solution.

Ahead of the G20 Osaka summit meeting at the end of June, I look forward to fostering closer international co-operation to help build a stable and prosperous world. ✦

Masatsugu Asakawa is Japan's Vice-Minister of Finance for International Affairs.

Investors must prize humility

As they tread a path full of uncertainty, investors must re-examine their historical assumptions in the light of rapid changes in technology and business models.

Lim Chow Kiat
GIC

The outlook for risk assets is one of low returns, with a path full of uncertainty. GIC's strategy has been to build a resilient portfolio and be prepared for change.

The low expected returns stem largely from low asset yields. Starting with 10-year Treasury inflation-protected securities, which currently offer a real yield of 50 basis points, one can estimate the prospective risk-free, dollar real return. In 10 years, when we look back, it will probably be 50 basis points per annum. This expected return anchors that of other asset classes as investors trade higher risks for higher returns. In the last decade, amid low bond yields, more money has been moving into riskier asset classes such as equities, real estate and private equities. Their valuations have risen, curbing prospective returns.

In the 1920s, US economist Frank Knight drew the distinction between risk and uncertainty. He defined risk as applying to situations where, while the outcome is unknown, the likelihood of possible outcomes can be quantified through standard statistical computations such as averages, standard deviation and correlations. Uncertainty, Knight said, is drastically different, applying to cases where the outcomes were unknowable and their probabilities incomputable. The distinction between risk and uncertainty is particularly germane for investors today. Markets in recent years have featured abundant liquidity and low yields. While this has suppressed volatility, it has also obscured growing uncertainty stemming from many spheres, including political, geopolitical, social and economic issues. New forces are emerging, fuelled by technological changes and the need for domestic policy reform in many countries. Their impact reaches areas of fundamental importance to investors, such as the construct of global trade and financial markets, and the sharing of value in the economy.

In this environment, investors must develop ways to re-examine and replace historical assumptions. Similarly, they must adjust their mindsets and investment assumptions when underwriting businesses in the light of rapid changes to technology and business models. Investors should prize humility. Amid the uncertainty, bouts of heightened market volatility may also occur and offer attractive opportunities. As a long-term investor, GIC stands ready to take advantage of such potential dislocations. At GIC, we emphasise one of our key investment principles – 'Prepare, don't predict.'

We investors must 'know ourselves' in terms of our investment goals, risk tolerance, preferences, strengths and weaknesses. Only then can we move forward with confidence, and respond appropriately when the unexpected happens. ✦

Lim Chow Kiat is Chief Executive Officer of GIC.

Rethinking risk strategies

Public investors are increasingly diversifying their portfolios to make up for low returns on traditional assets.

The *Global Public Investor*, now in its sixth year, contains a comprehensive ranking of assets under management for official institutions. Our research covers 750 institutions that collectively hold assets worth $37.8tn, equivalent to 43% of the world economy.

These institutions represent 183 countries across five continents, comprising 491 public pension funds, 173 central banks and 86 sovereign funds. Assets are concentrated heavily in Asia Pacific, which holds $14.3tn or 37.9% of the total. It is host to 116 GPI institutions, including some of the world's biggest asset owners, such as the People's Bank of China and Japan's Government Pension Investment Fund. Europe and North America are also important hubs for GPIs, jointly hosting 467 institutions and 45.3% of total assets. Of the remaining assets, 10.9% are held by Middle Eastern institutions, 3.8% by Latin American ones, and 2.1% in Africa.

2017 saw a record 7.6% growth in the value of assets held by GPIs. In 2018, this slowed considerably to 3.7%, or $1.4tn. Sovereign funds' assets posted the strongest growth, helped by higher oil prices, at 7.9%, compared with 4.8% for pension funds and 0.1% for central banks. Latin American sovereign funds were the exception to this trend, as challenging political conditions led to some funds being drawn down to support macroeconomic stabilisation.

This year's slowdown in GPI asset growth was driven partly by weakness in equity markets, which experienced one of the worst years since the 2008 financial crisis. GPIs invested in the asset class, such as the Swiss National Bank and GPIF, saw a drop in assets for the first time since our series began in 2014. Despite a return to dovishness among the world's major central banks over the year, public investors are concerned about a potential global downturn and its impact on their portfolios. On balance, GPIs plan to continue increasing investments in more risky asset classes. Of those surveyed, 23.5% intend to expand their equity investments and 14.7% are likely to increase allocations to corporate bonds, infrastructure and real estate. However, some are beginning to reconsider these strategies. This is in response to the low returns on traditional assets caused by years of unconventional monetary policy. 'We believe we are in a later stage of the business cycle. For that reason we reduced our equity allocation,' said one pension fund participating in the 2019 OMFIF GPI Survey.

This year's survey is the most comprehensive to date. It contains responses from central banks, sovereign funds and public pension funds to 87 questions related to reserves and asset management. These range from the decision-making process and format, to views on the safety of assets from climate, cyber and political risks. In-depth interviews of reserves management departments and analysis of publicly available annual reports complement our research. The result is a far-reaching appraisal of allocation decisions by currency, region and asset type among GPIs representing 44 jurisdictions across five continents. Collectively, they manage $17.9tn worth of assets, equivalent roughly to the size of the US economy and 47.4% of the global GPI portfolio.

Overall, the survey highlights that public investors face increasing challenges in considering the trade-off between risk and return in their allocation decisions. While there is a clear trend towards diversifying into new asset classes, this remains gradual and constrained by various obstacles including cost, board conservatism and lack of expertise. These themes, as well as GPIs' attitudes to technological, environmental and policy shifts, are further explored and analysed by the decision-makers behind these assets throughout *Global Public Investor* 2019. ✦

"Public investors face increasing challenges in considering the trade-off between risk and return in their allocation decisions. While there is a clear trend towards diversifying into new asset classes, this remains constrained by cost, board conservatism and lack of expertise.

1

Sovereign funds drive asset growth

The *Global Public Investor*, now in its sixth year, contains a comprehensive ranking of assets under management for official institutions. This year it covers 750 institutions from 183 countries across five continents, comprising 491 public pension funds, 173 central banks and 86 sovereign funds. AUM across the 750 institutions grew by $1.4tn in 2018 to $37.8tn. While above average by historical standards, at 3.7% it was still a slowdown from last year's increase of $2.6tn (7.6%). This reflects the more challenging investment and macroeconomic landscape facing global public investors. Still, GPI assets stand at their highest level since OMFIF began compiling records in 2013-14. In their search for yield, public investors have increasingly embraced risky assets, boosting valuations in recent years.

For the second year in a row, assets grew on aggregate in all three GPI institution types. However, there was more variation in 2018 compared with the previous year's broad-based growth. Sovereign funds saw the largest relative increases, with AUM up $632bn. At 7.9%, this was significantly greater than the percentage growth of public pension fund assets (4.8%), while central bank reserves grew by just 0.1% (compared with around 8% in 2017).

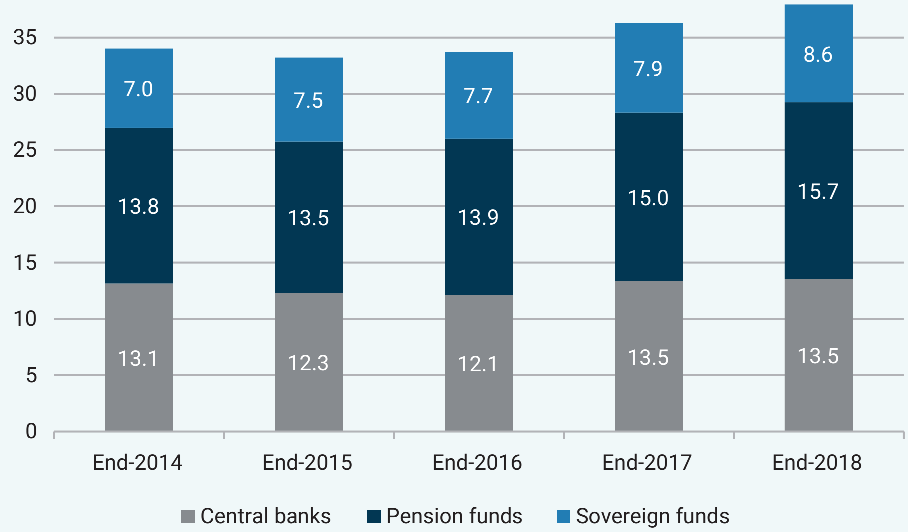
The overall figures mark important regional differences. Sovereign funds experienced the strongest growth in AUM, but nearly all of that was accounted for by Asia and the Middle East. European, North American and African sovereign funds also saw modest growth, while Latin American sovereign fund assets declined by almost 16%. Having performed most strongly last year, Europe was the only region where assets grew across all three institution types, albeit modestly at 3% in aggregate terms.

Middle Eastern and North American GPIs experienced the most pronounced increase in assets, propelled by sovereign funds and public pension funds. This helped these regions increase their share of the global total, at the expense of Asia. Still, Asia retains the greatest concentration of GPIs, with 116 institutions (of 750 worldwide) owning almost 38% of all GPI assets.

> GPI assets stand at their highest level since OMFIF began compiling records in 2014. In their search for yield, public investors have increasingly embraced risky assets, boosting valuations in recent years.

Total global public assets up by $1.4tn

Assets under management by institution type, $tn



Source: OMFIF analysis

Asset growth concentrated in North America and Asia

2

Together, North America, the Middle East and Asia Pacific account for 83% of the total $1.4tn increase in assets across all 750 global public investors.

North American pension funds grew by $522.7bn, with 12 funds posting double-digit percentage-point expansion. While 80.2% of this growth is concentrated in US funds, this growth would still not be enough to cover the country's unfunded public pension liabilities, estimated to be around $1.4tn. Of 190 US funds, 22 registered a decline in assets. In contrast, all Canadian pension funds showed growth despite last year's stock market decline.

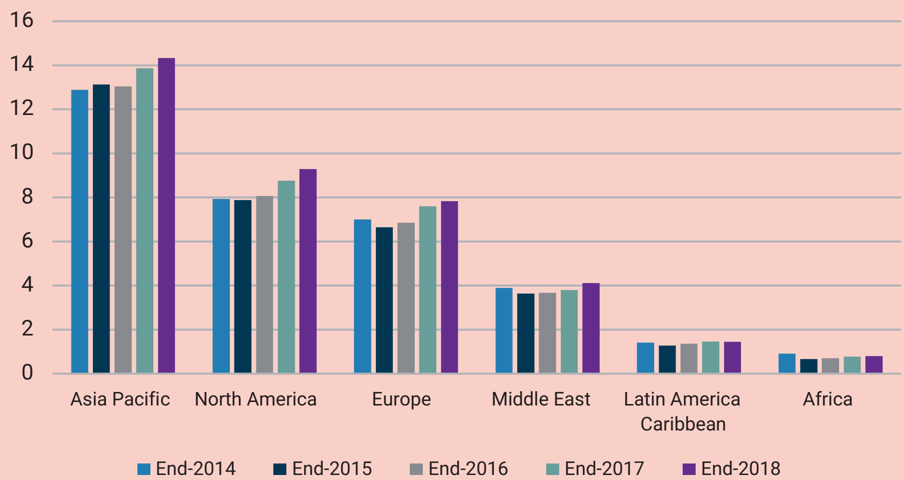
In the Asia Pacific region, net asset growth was $270.9bn. Sovereign fund assets increased by $286.7bn, offsetting a decline in the region's central bank reserves of $32.1bn. Around 57% of sovereign fund growth was attributable to Chinese assets alone, while 28% came from from Singaporean holdings. Pension funds in the region performed more modestly, pulled down by a 6% slide in Japan's Government Pension Investment Fund. With half of its investment assets allocated to equities, the world's largest pension fund suffered from 2018's global equity decline.

The Middle East's assets grew by 8.4%, the largest percentage increase in any region, exceeding their end-2014 levels for the first time. The change was driven by growth in sovereign fund holdings, up to $2.9tn from $2.6tn in 2017, indicating gains from oil price recovery. The biggest riser was Mubadala Investment Company, although its portfolio expansion of $99.8bn is due primarily to its absorption of the Abu Dhabi Investment Council's assets in 2018. The consolidation of assets is part of the country's efforts to streamline its funds, coming not long after Mubadala's merger with the International Petroleum Investment Corporation in the previous year.

Middle Eastern central banks contributed significantly to growth in the region. Qatar Central Bank's reserves doubled to $30.4bn, marking a return to normal after dropping to $15bn in 2017 as a consequence of strained diplomatic relations with other Arab states. The Central Bank of Iraq's holdings increased to $64.6bn from $48.9bn in 2017. ✦

GPIs in North America and Asia post significant gains

Assets under management by region, $tn



Source: OMFIF analysis

> With half of its investment assets allocated to equities, Japan's Government Pension Investment Fund suffered from 2018's global equity decline.

3

Four funds responsible for 28% of increase all GPI assets

Of the $1.4tn rise in GPI assets in 2018, around half ($686.8bn) can be attributed to just 10 institutions. Four – China Investment Corporation, Mubadala Investment Company, the US Military Retirement Fund and the Kuwait Investment Authority – were responsible for 28% of the increase ($379.9bn). Higher oil prices and increasing allocations towards real assets in the light of 2018's low interest rate environment bolstered institutional asset growth.

Among the top four absolute risers, MIC posted the greatest percentage increase (79%) owing to the merger of assets under management in mid-2018 with the Abu Dhabi Investment Council. China Investment Corporation's total assets increased by 16%, thanks to significant returns on state-owned capital and Belt and Road-dominated overseas investments.

The Military Retirement Fund's assets grew 12%. US Treasury inflation-protected securities comprise 75% of the fund's portfolio, with the remainder in Treasury bills, overnight investment certificates, notes and bonds. A combination of increased pension contributions and a reversal of the bear-market run on US treasuries in the last quarter of 2018 added $84bn to the fund's value. The Kuwait Investment Authority recorded an increase of $68bn (13%). The recovery in the oil price in 2018 and the state's fiscal consolidation efforts during periods of lower liquidity have boosted KIA's assets.

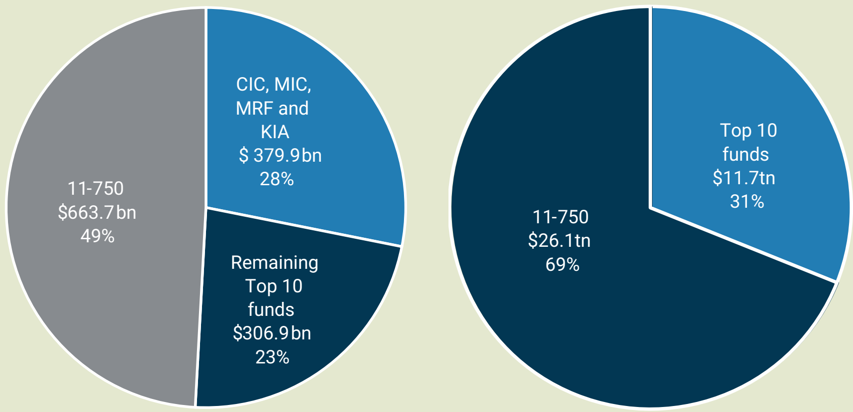
The 10 largest funds account for 31.1% of GPI assets, slightly lower than last year's 31.5%. All others in the Top 10 rankings showed increases in assets, excluding Japan's Government Pension Investment Fund and the Swiss National Bank.

The Japanese GPIF's asset decline ($87bn) was a consequence of a policy shift made in 2014, when the fund increased investments in riskier assets, such as stocks, in hopes of making better returns. The Nikkei, Japan's domestic equities benchmark, fell 17% in the last quarter of 2018, reflecting investors' apprehension over the escalating China-US trade conflict.

> "Higher oil prices and increasing allocations towards real assets in the light of 2018's low interest rate environment bolstered institutional asset growth.

Four funds lead global asset growth
Increase in total assets, 2017-18, $bn and % of total

Ten biggest funds hold almost one-third of assets
Total GPI assets, end-2018, $tn and % of total



Sources: OMFIF analysis

Central banks move into equities and corporate bonds

4

Central banks increased their investment allocation to corporate bonds and equities while maintaining a large share of government bonds, the OMFIF asset allocation analysis 2019 suggests. Central banks have expanded their equity allocation to 10%, a surprising move in the light of recent market volatility. The share of investment in corporate bonds increased to 7% amid rising concerns about credit quality in US and European markets. The trend is most visible among Asian central banks, where corporate bond and equity allocations stand at 8% and almost 10%, respectively.

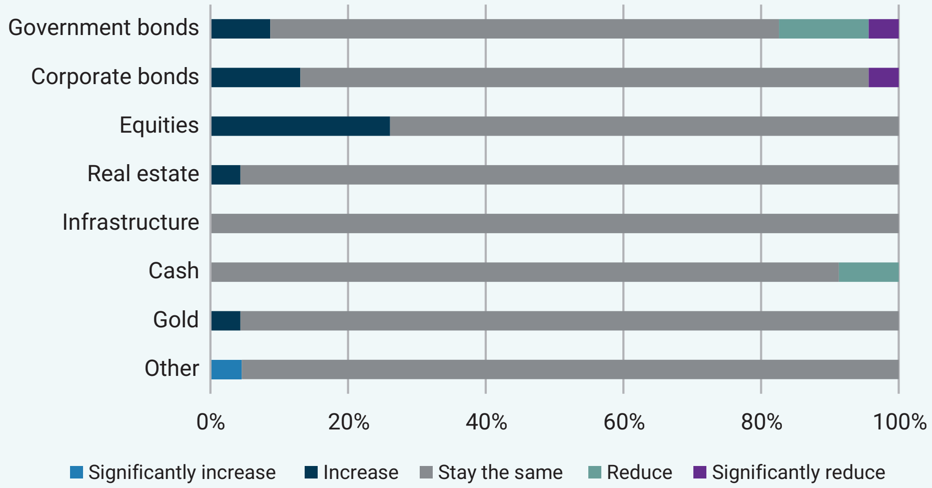
This indicates a shift towards flexible, diversified allocation strategies among central banks and is likely to continue over the medium term. A quarter of central bank respondents plan to increase their allocation to equities in the next 12-24 months, while 15% would be prepared to do the same with corporate bonds. This move was most pronounced among European central banks, and least visible among Latin American monetary authorities.

While sovereign and pension funds have significant allocations to private equity, central bank portfolios covered in the OMFIF asset allocation analysis 2019 have only a combined 0.1% in real assets, private equity and high-yielding bonds. As much as central banks might be searching for yield in the current environment, the reluctance to invest in high-risk, illiquid, but high-return assets will probably remain unchanged. Only one central bank respondent to the OMFIF GPI Survey 2019 indicated any plans to increase its allocation to real estate or infrastructure.

Still, real assets remain popular among public investors. This is due in part to the low returns available on fixed income products, but also because real assets simply tend to perform extremely well. Three-quarters of survey respondents indicated real assets had performed 'significantly better' than other investments. As a result, 92% do not expect to exit their real-asset investment if and when monetary policy normalises. ✦

Central banks plan to raise bond and equity holdings

In the next 12-24 months do you plan to increase, reduce or maintain your allocation?, % of central bank responses



Source: OMFIF GPI Survey 2019, Institutions' annual reports, OMFIF analysis

> A quarter of central bank respondents plan to increase their allocation to equities in the next 12-24 months.

5

Dollar dominates, but renminbi exposure growing

Despite doubts over the dollar's global reserve currency status, the possibility of a meaningful challenger emerging over the medium term is seen as remote by this year's survey respondents. Based on the OMFIF GPI Survey 2019, conducted between January-April, any changes in public investors' currency allocation will occur only gradually and over the long term.

The dollar remains dominant in global cross-asset currency allocation, representing around 70% of our central bank sample's currency exposure, followed by the euro (14.1%), pound (2.9%) and yen (1.5%). The renminbi's share remained low at 0.7% of cross-institutional currency exposure. Respondents' holdings of the renminbi remain low at 1.1%. Non-traditional developed market currencies, such as the Danish and Norwegian krone, were also popular among central banks surveyed this year, especially in Asia and Europe.

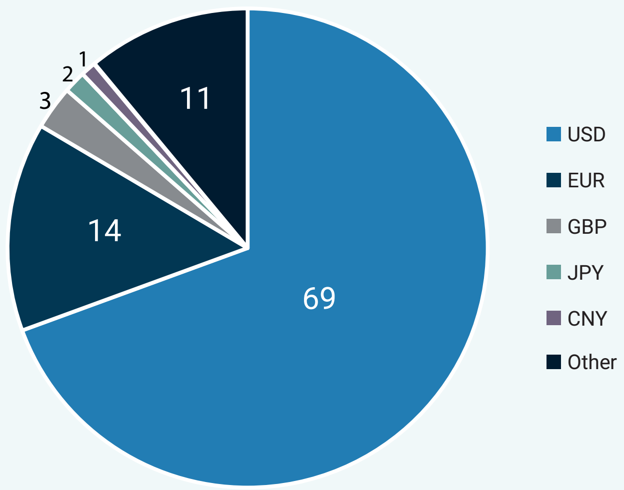
Few respondents indicated they had plans to alter their currency exposures over the next two years. Most respondents intend to keep their present allocations to the pound, yen and Swiss franc unchanged, with more than 80% signalling they would be keeping their euro and renminbi allocations stable. The dollar is expected to face the greatest degree of change, with 14% of respondents suggesting they would increase their allocation and another 11% saying they would reduce it. Overall, this change is likely to appear insignificant.

However, one-fifth of respondents indicated they were likely to increase their exposure to the renminbi over a longer time horizon. Nearly all institutions surveyed expect the renminbi's relevance as a reserve currency to grow in the long run, and 59% plan to increase their exposure to it over this period. Although institutional investors are looking at the renminbi closely, current allocations indicate that any increases will happen slowly.

> The dollar remains dominant in global cross-asset currency allocation, representing around 70% of our central bank sample's currency exposure.

Dollar dominance unabated among central banks

What % of your active (unhedged) currency exposure is allocated to the following currencies?, weighted average for central bank reserves portfolios



Source: OMFIF GPI Survey 2019, Institutions' annual reports, OMFIF analysis

Large-scale appetite for euro area safe asset

6

The debate over the future of European integration has continued unabated. Policy-makers and financial professionals are eager to break the sovereign bond 'doom loop' that exacerbated this decade's debt crisis. One answer would be to introduce a euro area 'safe asset'. The results of the OMFIF GPI Survey 2019 indicate interest remains high, with more than 80% of investors suggesting the idea should be explored further. When asked what the defining features of a supranationally-issued euro area safe asset should be, investors identified 'high credit quality', 'high liquidity' and 'very high credit rating' as the three most important properties. At the same time, GPIs did not seem especially concerned about the simplicity or transparency of any such construct, nor about its collateral value, all of which were ranked as among the least important factors.

This is driven in part by dynamics in the euro area's fragmented national sovereign debt markets. Global public investors are attracted to European sovereigns mainly owing to their low credit risk (46% identified this as 'very important') and their high liquidity (42%).

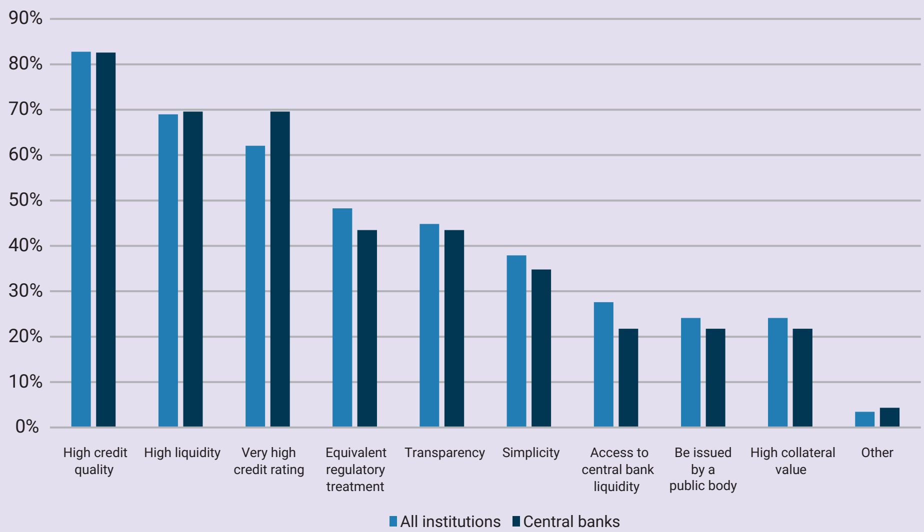
Investors' allocation to European sovereign debt sheds light on the rationale behind safe asset discussions. Around 45% of GPIs noted that their current allocation to euro area government securities was 'below' the weight of the euro area economy, and a further 45% noted theirs was above. The former is driven by supply-side factors as well as information costs: several respondents suggested information costs for smaller countries prevented them from increasing their allocation to euro area securities. The latter indicates a continuing and persistent demand for more stable, safe assets from the euro area.

Some respondents expressed concern that these assets could reduce the size and liquidity of national markets. Several investors suggested a safe asset, without further fiscal integration, would leave all parties wanting more. A safe asset would work 'only when the debt represents liability of fiscal union and such a union is at least double-A-plus,' as one European national central bank put it. Nevertheless, a sizeable number of respondents – 41% – suggested there would be no drawbacks to increasing the supply of high-quality supranational assets in the euro area. ✦

> Policy-makers are eager to break the sovereign bond 'doom loop' that exacerbated the euro area debt crisis.

Credit quality and liquidity the most desired safe asset features

What should be the main properties of a European supranational safe asset?, % who selected an option as 'important' or 'very important'



Source: OMFIF GPI Survey 2019

7

Central banks' gold purchase rise to 50-year high

Last year saw the largest gross gold purchase figure among central banks in more than half a century. Official institutions added 651.5 tonnes of gold to their reserves in 2018, up 74% from 2017. Central banks opened 2019 with a similar flurry of purchases, buying 163.3 tonnes in the first quarter. The identity of major buyers has remained largely the same: Russia, Turkey and Kazakhstan continue to make the bulk of purchases, as they did in 2018 and 2017. After pausing purchases in 2017, China has bolstered its gold holding over the course of 2018-19, adding 10 tonnes last year and 33 to date this year.

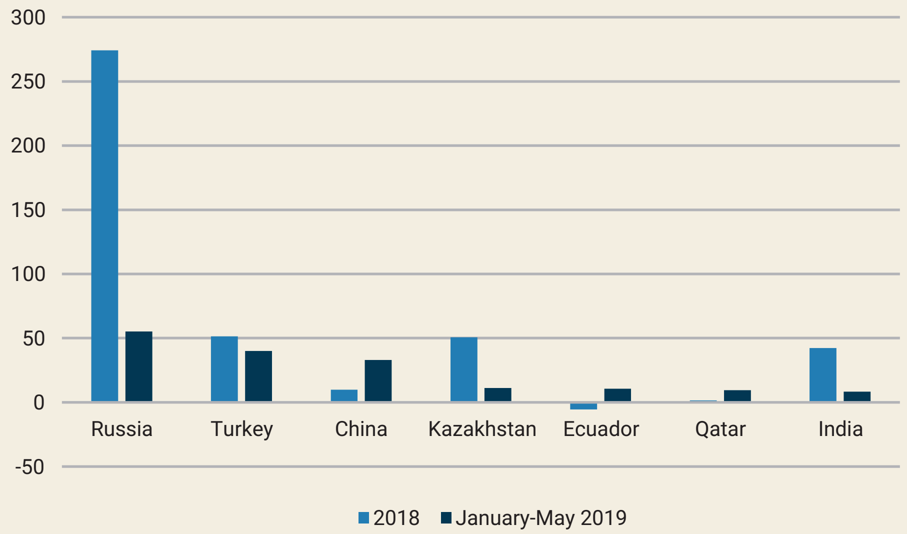
While Russia, Kazakhstan and Turkey made up 94% of total gold purchases in 2017, their share of global central bank demand has fallen to 58%. This points to a greater desire among other official institutions to diversify their reserve holdings. Hungary, for example, increased its reserves 10-fold over the course of 2018. As of May 2019, world central bank gold reserves stand at just under 34,000 tonnes. This resulted in total gold demand rising 4% last year from 2017's figure, despite fluctuations in the gold price in several major currencies and outflows from exchange-traded funds and other investment vehicles.

The OMFIF GPI Survey 2019 suggests the underlying rationale for central bank gold demand may be shifting. Gold's historical position is typically most important for former gold standard economies, yet it is a growing factor in Asian public investors' asset allocation. Almost half of respondents from the Asia Pacific region identified 'historical position' as an important or very important influence in their gold allocation. This is almost the same level as among European institutions (64%). Among central banks globally, gold's role as an inflation hedge is declining in importance: only 10% identified this issue as important or very important. Rather, safe haven and diversification properties are prominent influences. Headline risk is the dominant obstacle to gold demand among respondents, with 29% identifying it as 'very important'. ✦

> "Among central banks globally, gold's role as an inflation hedge is declining in importance: only 10% identified this issue as important or very important.

Russia, Turkey lead bullion buying

Central bank gold purchases 2018-19, tonnes



Source: World Gold Council, OMFIF analysis

Lagging climate focus in reserves management

8

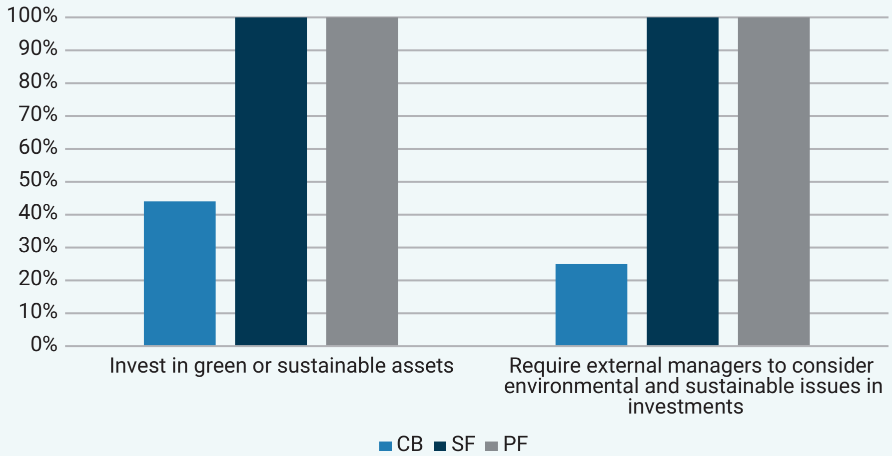
Motivated by the potential risks of climate change to financial stability, central banks have displayed great momentum over the past year on the sustainability agenda. Between March 2018-April 2019, more than 20 central bankers delivered speeches on climate change. Meanwhile, in just over a year the Network for Greening the Financial System has grown from eight founding members to 36 central banks and supervisors. The NGFS, recognising climate change as a source of financial risk, has been proactive in issuing recommendations regarding developing data, taxonomies and disclosures, and integrating climate risks in supervision and portfolio management.

However, when it comes to reserves management, the OMFIF GPI Survey 2019 shows that central banks are lagging behind other types of public investors. Less than half of the central banks in our sample said they were actively investing part of their reserves in green or sustainable assets, compared with almost all pension and sovereign funds. Several central banks cited the inability of such sustainable assets to meet their liquidity thresholds, as well as wider issues regarding sustainability criteria and lack of data. Some central banks hold green assets as part of their monetary policy operations. The European Central Bank holds around a quarter of all eligible publicly-issued green bonds and nearly one-fifth of private sector green bonds in its asset purchasing programme.

Pension and sovereign funds tend to consider environmental, social and governance criteria as 'important' or 'very important' when it comes to the guidelines given to their external managers, compared with just a quarter of central banks. This can take the form of divestments as well as active investments in green assets. For example, the world's largest sovereign fund (and fourth-largest GPI), Norway's $1tn Norges Bank Investment Management, this year decided to sell some of its holdings in energy companies that explore for and produce oil and gas.

Central banks lag behind other GPIs in sustainable investment

Do you invest in green or sustainable assets?, % of 'Yes' responses and Do you require your external managers to consider environmental and sustainable issues in their investments?, % who selected option 'somewhat important' or 'very important'



Source: OMFIF analysis

> Pension and sovereign funds tend to consider environmental, social and governance criteria as 'important' or 'very important' when it comes to the guidelines given to their external managers.

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Global investment imbalances widen to new record

The global gap between creditors' and debtors' net international investment positions stretched in 2018 to $33.8tn. Imbalances have been widening every year since 2000. This reflects primarily the increase in debtors' net liabilities, which rose collectively by 7.8%. Meanwhile, creditors' net assets rose by 4.4%.

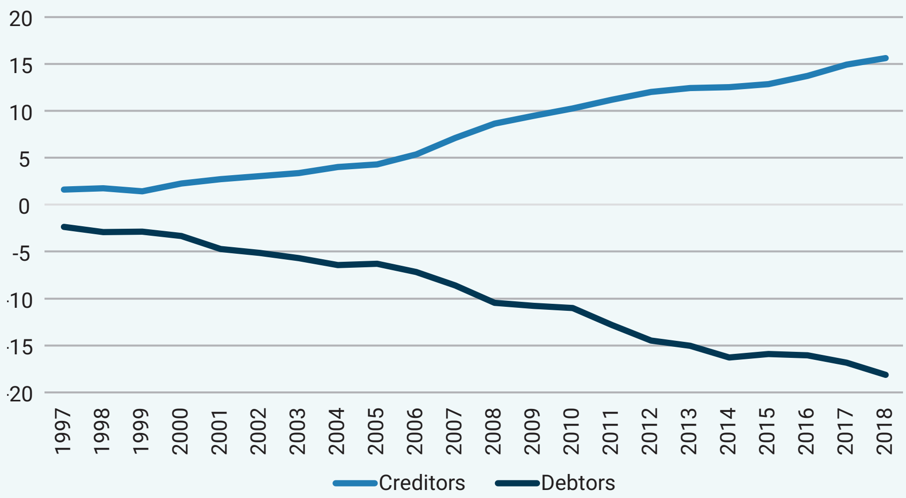
The overall widening of debtors' NIIP was driven mainly by the US, Mexico and UK. If those three countries were excluded from the calculations, the rest of the debtors would improve collectively their NIIP by 8.9%. The US saw the biggest increase at $1.9tn, or 25%. This reversed the 2017 reduction in net liabilities, setting a new record for the world's largest debtor of $9.6tn (the previous record was $8.2tn in 2016). This was impelled largely by the strength of the dollar in the latter part of 2018, which led to a decline in the value of foreign assets while liabilities shifted only marginally. In contrast, the UK's NIIP widened due to a large increase in liabilities, especially financial derivatives. These shifts were counteracted to an extent by a narrowing of other debtors' positions, notably France (by 38%), Brazil (by 22%) and Turkey (by 23%).

The widening of NIIPs among creditors was more broad-based. Among the 10 largest, only China, Hong Kong and Norway narrowed their positions. Japan, Germany and many others saw an increase in net foreign assets. In the case of China, foreign direct investment reached a new record of $1.9tn, surpassing FDI in Canada, Ireland, Japan, Switzerland and France. However, the sustainability of this trend is questionable. Western economies are tightening their rules for Chinese investment, especially in technology and strategic assets. In August 2018, the US Congress passed the Foreign Investment Risk Review Modernisation Act, which empowers the until-now largely inactive committee on foreign investment to examine a wide range of deals. Since its creation in 1975 and until 2011, CFIUS blocked just one deal. Recently though, it has become more active in issuing warnings and stopping transactions. ✦

"The overall widening of debtors' NIIP was driven mainly by the US, Mexico and UK.

Creditors and debtors widen global investment imbalances

Net international investment positions, $tn



Source: International Monetary Fund Balance of Payments, OMFIF analysis

Low-yield environment still challenging public investors

10

As of 1 May 2019, more than 20 top-graded government bonds were yielding negative returns, including reserves management staples such as Japan's 10-year issue. This environment presents great challenges for public institutions. Central banks tend to focus on safety and liquidity as investment objectives; 68% of central banks identified capital preservation as their most important goal in the OMFIF GPI Survey 2019. Yet return remains important to reserves managers, especially where operations are particularly exposed to the public spotlight.

Around 40% of central banks responded that they were taking more risks given the interest rate environment, a figure higher than the average across all public investment institutions. This share was highest among European central banks (just above 50%) and lowest among African monetary authorities (0%).

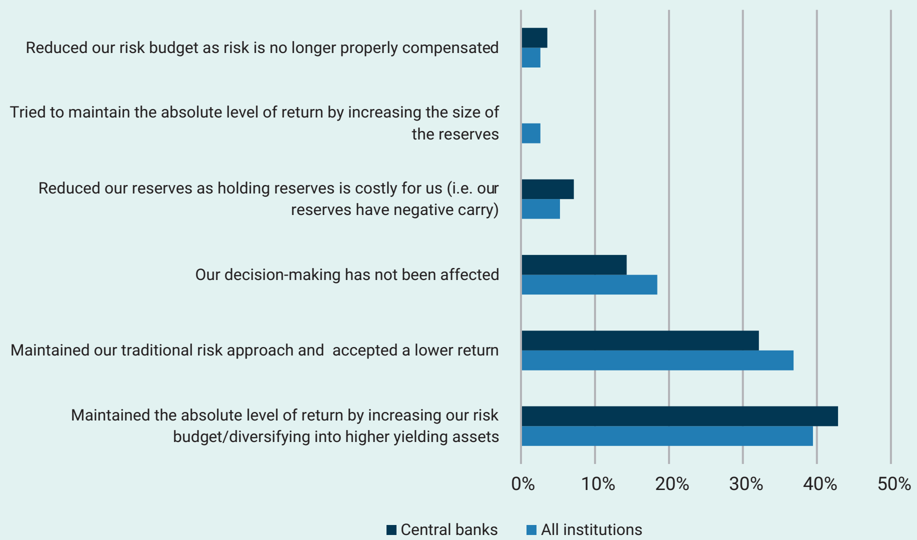
Public investors were clearly divided on this issue. Asked how they had responded to the low-yield environment, 43% said they had sought to increase their risk budget and diversify into higher-yielding assets. A similar share, 37%, indicated they had simply accepted a lower return.

Low yields have inspired diversification into riskier, non-traditional asset classes. Of the central banks surveyed, 54% invest in corporate bonds, and 36% invest in equities. Asked why they had sought out new reserve assets, 62% of total respondents indicated 'increasing risk-adjusted returns' as a main motivation, followed by risk and volatility reduction (49%). While return has always been relatively low-ranking in terms of reserve management objectives, 88% of central bank respondents suggested that returns were either 'vital' or 'important' to their central bank in monetary terms, underscoring the challenge posed by the low-yield environment in traditional reserve assets.

However, respondents did not anticipate that low yields and a dearth in returns would remain among the most significant long-term challenges for reserve managers. Only 23% of respondents selected 'national developments, such as exchange rate policy or needs for returns' as their top concern for the future. International political and economic developments, such as geopolitical risk or the rise of the renminbi's reserve status, were identified as far more important. ✦

Almost half of central banks have increased risk budget

How has the extremely low level of yields of traditional reserves assets in recent years affected your decision-making?, % of responses



Source: OMFIF GPI Survey 2019

> Around 40% of central banks responded that they were taking more risks, a figure higher than the average across all public investment institutions.

1 Market environment

Macroeconomic influences
Global flows
Digital economy

✧ Macroeconomic influences

Predicting the next global recession

Many signs point to an impending worldwide economic slowdown, and although it is impossible to pinpoint when it will occur, policy-makers can prepare for it through informed choices and decisions.

John (Iannis) Mourmouras
Bank of Greece

> The world economy is experiencing a late cycle, not yet the end of the cycle.

Global growth slowed significantly in 2018 compared to 2017. The major driver behind this was the lagged impact of tightening financial conditions, particularly in China, as well as the effect of trade tensions on business sentiment and investment. Overall, 2018 was one of the most difficult years in several decades for global financial markets, in terms of the number of asset classes that recorded negative annual performances. It remains to be seen now whether the world is moving on from a difficult period, or about to enter an even more precarious one.

The global economy faces several major risks. An intensification of trade restrictions could come at a high cost to global investment, jobs and living standards. Chinese growth may experience a sharper slowdown than expected. And, there is persistent uncertainty over when the UK will leave the European Union, and the nature of the future trading relationship between the two blocs in the short- and medium-term.

Warning signs

An usually prolonged period of economic expansion followed the 2008 financial crisis. Given that this has been one of the longest post-war economic recoveries on record, market analysts fear another recession is looming.

There is evidence of a slowdown – but not a recession – in the US, euro area and other advanced economies. The US growth rate is expected to decelerate to 2.3% in 2019, from 2.9% last year. Real GDP growth in the euro area was surprisingly sluggish in the second half of 2018, showing increased divergence among the largest euro area countries. Euro area growth is projected to drop to 1.1% in 2019 from 1.8% last year.

In any case, the question is whether the world is better equipped than it was a decade ago to tackle a global economic recession.

Last year, advanced economies had divergent growth rates and therefore adopted different stances on monetary policy. This trend seems to be reversing, as monetary authorities shift towards a more dovish bias in response to weakening economic momentum.

The US Federal Reserve surprised markets with its highly accommodative message and announcements during its March meeting. Most Federal Open Market Committee members forecast that the central bank's interest rate will remain at 2.5% throughout 2019, despite their projection in December 2018 for two 25 basis-point hikes this year.

In March, the European Central Bank's governing council also took a more accommodative stance than investors anticipated. It maintained its key rates, deposit rate and refinancing rate, at minus 0.4% and 0% respectively. The ECB extended its forward guidance on its key rates, indicating that it now expects them 'to remain at their present levels at least through the end of 2019, and in any case for as long as necessary' (previously it had indicated 'through the summer of 2019').

Preparing for the future

In a highly integrated world economy, policy coordination is even more essential to mitigate the adverse effects of global shocks.

The last financial crisis demonstrated clearly the importance of fiscal space. A well-designed package of mutually-supporting fiscal and structural measures, coupled with persistently low interest rates, can reinforce the benefits of each policy and mitigate the short-term side-effects of other measures.

This time may be different. The US economy has been expanding for an unusually long period of time. There is limited room for manoeuvre in terms of monetary policy. The macroeconomy is complicated by cross-currents between tariffs and trade wars on one side, and fiscal stimulus and tax cuts on the other.

It is impossible to predict the future, but it is possible to prepare for it through informed choices and decisions. The world is clearly better prepared to face a recession than it was in 2008. As for when this might happen, the world economy is experiencing a late cycle, not yet the end of the cycle. ✦

John (Iannis) Mourmouras is Senior Deputy Governor of the Bank of Greece.

✧ Macroeconomic influences

Overcoming the 'secular stagnation' trap

Investors are adapting gradually to low global growth rates, but policy-makers must move away from the misguided notion of returning growth 'back to normal'.

Torbjörn Hamnmark
Tredje AP-fonden

> Monetary policy-making is no longer focusing on counter-balancing the business and credit cycle.

Interest rates are the subject of much debate among policy-makers. There is disagreement over what the neutral rate of interest is and why it has declined in the last few decades. Some are questioning whether negative interest rates and other unorthodox policy measures are needed in times of recession. These topics will be discussed for years to come. This will result in a new monetary policy paradigm.

Developments in policy-making will have an impact on investment returns and are therefore key considerations for long-term investors. It is difficult to predict the direction policy-making will take, but there are a few projections, as well as lessons to be drawn from the past.

The world's population is expected to grow by 50% before the end of this century. This entails significant economic opportunities and challenges, particularly as our planet's resources become scarcer. The world's growth rate is expected to reach close to zero in the same time frame. In the past, economic growth has been correlated highly with population growth. Population growth peaked in the late 1960s, which coincides with the historical peak of global economic growth. In 1966, the five-year average world GDP growth was 5.8%. The latest data-point is closer to 2.5%. Since the 1960s, the world population growth rate has fallen at a slower pace, to 1% from 2%.

In advanced economies such as the US, Germany, Japan and Sweden, productivity growth has slowed in a fairly synchronised way, to below 1% from around 3% over a 50-year period. The 'tiger economies' of the 1980s and 1990s (South Korea, Taiwan, Hong Kong, and Singapore) are following a similar pattern. Productivity growth rates in China and India are still high as these countries grow into modern economies. However, this will not continue in the long-term.

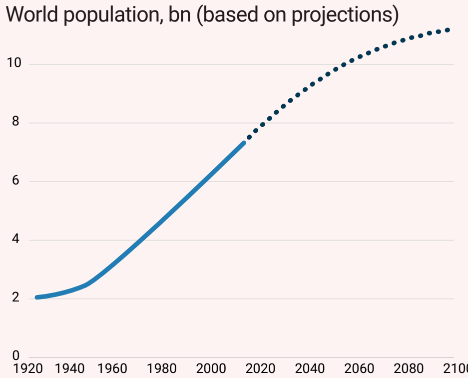
Productivity trends

In the decade leading up to the 2008 financial crisis, inflation was low and the world growth rate was rising. Some called it a 'goldilocks economy'. This happened despite a dip in the global population growth rate. Productivity growth did not decline however, as China invested heavily to enter the world economy. The strong global credit build-up preceding the crisis is likely to have helped. These factors have faded over the past decade and global productivity growth risks falling back into the historical pattern observed for the G10 economies.

Financial markets have aligned themselves gradually with lower economic growth. Long-term interest rates have been falling steadily. Long-term real rates are now close to zero in developed markets. This is only influenced partly by monetary policy since the crisis. Equity risk premia can still be estimated to be around 4-5%. Still, lower growth means lower investment returns. There is little room for mistakes by investors and pension funds.

World population to grow above 10bn by 2050

World population, bn (based on projections)



Source: UN Population Division (2015 revision) Medium Projection

Lower global growth has strong policy implications. It presents a challenge for underfunded welfare systems and infrastructure investment needs. Policy-making today seems to be guided by a notion of returning growth 'back to normal'. This is misguided and could lead to a further fall in productivity growth and possibly inflation. Monetary policy-making is no longer focusing on counter-balancing the business and credit cycle. It has fallen instead into the 'secular stagnation' trap, as growth remains negligible. This will need to change for the world economy to get back on track, with lower growth but more stable financial conditions. ✦

Torbjörn Hamnmark is Head of Strategic Asset Allocation at Tredje AP-fonden – Third Swedish National Pension Fund. The opinions expressed are personal and not the official view of Tredje AP-fonden.

✧ Macroeconomic influences

Why central banks can get back to normal

Structural reforms are the key to showing central bank policy normalisation can be overcome even by countries with little or no fiscal space.

Valentin Lazea
National Bank of Romania

"Major central banks are reluctant to normalise monetary policy sooner rather than later, for fear of derailing already feeble economic growth.

After years of unorthodox monetary policy in advanced economies, there are calls to return to positive interest rates. The first reason is pragmatic: the need to build up ammunition to be used in a future crisis. The second is economic: a world of negative real interest rates penalises savers and promotes inefficient investments.

But major central banks are reluctant to normalise monetary policy sooner rather than later, for fear of derailing already feeble economic growth. Another concern is growing public debt, perceived as a major vulnerability.

Country analysis

To assess whether these fears are well-grounded, we analysed 10 economies: the US, Japan, Germany, France, Italy, Greece, the Czech Republic, Hungary, Poland and Romania. Three of these central banks (the US Federal Reserve, Czech National Bank and National Bank of Romania) have taken steps towards normalisation. The US had led the way. The results are encouraging: in all three countries, by end-2018 economic growth was around 3% or higher. Clearly, monetary policy normalisation does not lead necessarily to an economic slowdown.

These three countries' public debt has decreased. Between 2016-18, it fell marginally in the US to 106.1% of GDP from 106.8% and in Romania to 37.2% from 38.8% of GDP. The Czech Republic saw a more significant drop, to 33.2% from 36.8%. It follows that policy rate normalisation can co-exist with a reduction of government debt.

Protecting growth

The fundamental question to be asked, then, is how to normalise monetary policy without harming growth or incurring more debt. One way is to relax fiscal policy. It is true that two of the three countries' government primary balance (net borrowing excluding interest paid on public debt) has worsened. In the US, the primary balance is minus 2.9% of GDP, compared to minus 2.3% in 2016. Romania's primary balance is minus 2.3%, down from minus 1.3%. However, the Czech Republic's primary balance has improved, rising to 2.2% of GDP from 1.5%. Attributing higher growth exclusively to monetary or fiscal policy is oversimplistic. This reasoning overlooks an additional factor – structural reforms.

Many of the countries we sampled have no room for fiscal relaxation. Either their debt-to-GDP ratios are too high (as is the case in Japan, Greece and Italy), or their government primary balance is negative (as in France).

For all the countries in the sample, the important conclusion is that, in the absence of monetary and fiscal stimuli, economic growth is best promoted by structural reforms. This can be illustrated by the examples of Germany and Greece; in the last years they have built large positive government primary balances.

US reaches positive interest rates

Main macroeconomic indicators, December 2018

Country	GDP* (% change)	Gov't primary* balance (% of GDP)	Monetary policy rate (%)	Real interest rate (%)	Gov't debt (% of GDP)
USA	2.9	-2.8	2.3	0.7	106.1
Japan	1.1	-3.3	-0.1	-1.5	238.2
Euro area:					
Germany	1.9	2.2	0	-2.1	59.8
France	1.6	-0.9	0	-1.9	96.7
Italy	1.2	1.8	0	-2.2	130.3
Greece	2.1	3.5	0	-1.2	188.1
Other EU:					
Czech R	3.1	2.2	1.8	-0.6	33.2
Hungary	4	0.1	0.9	-3	71.3
Poland	4.4	0.1	1.5	-1	49
Romania	4	-2.3	2.5	-0.5	37.2

Sources: IMF, World Economic Outlook, National Banks
* = estimated, **= 3 months Libor, Euribor, Pribor, etc.

A rise in interest rates, or positive rates, tends to accompany an increase in public debt. But this is not the only factor that comes into play. Public debt is correlated positively with the primary deficit (hence the need to reduce or eliminate it, like many of the countries in our sample did). It is correlated negatively with seigniorage (the difference between the value of money and the cost to produce it) and with the rate of economic growth.

Essentially, challenges from central bank policy normalisation can be overcome even by countries with little or no fiscal space. It is futile to postpone the process indefinitely. ✦

Valentin Lazea is Chief Economist at the National Bank of Romania. The views expressed are the author's and they do not necessarily imply the official position of the NBR.

✧ Macroeconomic influences

Decreasing yields as households build wealth

Global investors should expect disappearing returns in aging societies where people favour bank savings over equity investments.

Genzo Kimura
Government Pension Investment Fund, Japan

> In mature societies the market for loans is crowded and banks are struggling increasingly to find borrowers.

Japanese Prime Minister Shinzō Abe will set a new record in November, when he marks 2,887 days in office. He will become the longest-standing Japanese leader in history since Tokugawa Shogunate's rule ended in 1868. In May this year, the Heisei era came to a close as Emperor Akihito abdicated and his son, Prince Naruhito, ascended the throne. This is a historic time for Japan. The question is whether it will be transformative, in a country known for its stability. Economist Simon Kuznets described Japan as an exceptional nation, after it developed rapidly following the second world war. The country's growth was miraculous, but it is unrealistic to expect it to continue in this manner. It is more reasonable to expect trend growth to remain around 1%, for two reasons. First, Japanese manufacturers are investing increasingly abroad. Second, population dynamics stabilised the inflation outlook at nearly 0%, resulting in ultra-low interest rates as part of Tokyo's inflation target strategy.

The median age in Japan is 47, the oldest in the world. Italy and Germany are the second and third oldest, both with a median age of 46 years old. This longevity has led naturally to an accumulation of wealth as people prepare for life after retirement. The Government Pension Investment Fund of Japan is part of this wealth accumulation, as we are the buffer fund for the national pension payment system.

In 2017, the pension system received JPY29tn as a levy from employers and employees. They each contributed 9.15% of employees' wages. At the same time, JPY23tn was paid out to retired workers. The remaining amount was deposited to the GPIF, which holds more than JPY150tn in assets. According to the Bank of Japan's flow of funds data, households' assets were around JPY1,800tn in 2018, 80% more than in 1990.

Money overflow

This suggests that as households increase their assets, financial institutions are able to purchase more bonds, and yields decrease in accordance with households' wealth accumulation. This is particularly the case in Japan, where people tend to put their assets into bank deposits and life insurance, and banks and insurance companies invest significantly in bond markets. Since 1990, 10-year yields have dropped consistently, falling below 1% in 2010. Negative yields are becoming more common in Europe and Japan. In mature societies the market for loans is crowded and banks are struggling increasingly to find borrowers. Many of them have seen their profits slashed due to negative interest rates and enhanced liquidity.

Global investors should expect disappearing returns in aging societies where people favour bank savings over equity investments. This is not because of unconventional monetary policy, but because the aggregate volume of money has expanded, and few are willing to borrow money if interest rates are higher than inflation. In short, money deficiency will disappear in matured societies. Ultra-low yields are here to stay.

The average age in Japan will peak in this forthcoming era. This will be a demographic turning point. After that, interest rates will be restored to positive. ✦

Genzo Kimura is Economist at the Government Pension Investment Fund, Japan.

✧ Macroeconomic influences

The ghosts of public debt past

Italy's troubles can be traced to excessive growth in public spending in the 1970s and 1980s. From the 1990s, the growth of public debt can be explained by the so-called 'snowball effect', rather than poor fiscal responsibility.

Claudio Bruno and Edoardo Reviglio
Cassa Depositi e Prestiti

> The Italian economy is in a vicious cycle. Low growth is associated closely with high public debt.

Italy has the world's third largest public debt. With the exception of the 1970s and 1980s, its public debt to GDP ratio increased mostly due to the difference between nominal growth and the average cost of debt, (the so-called 'snowball effect') rather than a lack of fiscal responsibility.

Italy has been among the euro area's most fiscally virtuous countries, recording primary surpluses in the last 26 years (1992-2018), except in 2009. During the 1970s and 1980s, the country's public debt increased significantly, mostly because public finances were managed badly. Since then, the national debt has risen due to low nominal growth and high interest rates. The larger the debt, the more powerful the negative contribution of the snowball effect.

The Italian economy is in a vicious cycle. Low growth is associated closely with high public debt. In a fiscally responsible country, debt can be reduced by higher nominal growth rates. However, 26 years of tight fiscal policy did little to foster growth. Nevertheless, the Eurosystem's conventional and non-conventional measures to lower substantially public debt interest rates helped tremendously. It was a great example of fiscal policy by monetary means.

Only by going back to 1960 may one understand why the ghost of public debt has been haunting Italy's economy and still hampers its potential. Back then, the country was experiencing an economic boom, with 5% annual growth despite a rather neutral fiscal policy stance. Inflation was moderately low and the debt to GDP ratio remained below 40% throughout decade, below the European Union average.

In 1971, economic growth began to slow, and in 1973 the oil crisis raised inflation dramatically. It soared to 19% in 1974 from 5.2% in 1972. Taking their cue from the US, and despite high inflation, Italian governments pursued expansionary fiscal and monetary policies. They increased public spending and kept real interest rates negative. Facing high deficits and new financing requirements, the Banca d'Italia committed to monetise government bonds not placed on the market, leading to a massive devaluation of the lira. Interest rates remained much lower than nominal growth, pumped up fictitiously by soaring inflation levels. By the 1980s, this method of financing public deficit became unfeasible, after the US changed its approach to lowering inflation.

Record deficit

The Banca d'Italia stopped monetising public debt. As a result, interest paid on the Italian debt rose to 9.1% of GDP in 1989, from 4.5% of GDP in 1980. The debt to GDP ratio increased by 35 percentage points, reaching 89% in 1989. Under a five-party coalition government led by Bettino Craxi (1984-88), Italy racked up an annual deficit of 10%. During that period, Germany and France increased taxes by 10%. In the absence of EU fiscal rules, Italian politicians increased expenditures, partly by displaying 'rent-seeking behaviour' and partly due to the long tail of the social reforms enacted in the 1970s.

During the 1992 European monetary system crisis, interest paid on public debt peaked at 12.6% of GDP. The debt to GDP ratio increased by another 22 percentage points to 117% in 1994 from 95% in 1991. Latterly, Italy pursued massive fiscal consolidation policies, recording primary surpluses of 5% of GDP in the period 1995-99. As Italy looked likely to join the European monetary union, interest rates began to converge downwards. By the time the single currency was introduced, Italy's debt to GDP ratio was down to 102% and stabilised in the following years, dropping below the psychological threshold of 100% in 2007. A major contribution to this result was privatisation.

The 2008 financial crisis threatened to destroy the previous decade's legacy. Despite primary surpluses, average growth was not enough to put public debt back on track. Following a wave of speculative attacks in 2011, Italy witnessed a sharp rise of interests paid on debt. Its debt to GDP ratio jumped to above 130% in 2014, to then stabilise at those levels in the following years.

To summarise, the Italian public debt to GDP ratio depends strongly on the difference between nominal GDP growth and interests paid on debt, despite a virtuous fiscal policy stance. Therefore, Italy is vulnerable to factors that are only partially within its control. ✦

Claudio Bruno is Senior Economist and Edoardo Reviglio is Chief Economist at Cassa Depositi e Prestiti.

✧ Macroeconomic influences

Cross-border finance to overcome crises

Regional financing arrangements are a key component of the global financial safety net, along with foreign reserves, bilateral swap lines and the International Monetary Fund.

Yasuto Watanabe
Asean+3 Macroeconomic Research Office

Increasing the use of regional currencies will mitigate exchange rate risks against the dollar, and help reduce the amount of foreign reserves needed as a liquidity buffer.

Many parts of the world are covered by regional financing arrangements. These can mobilise resources for countries facing temporary liquidity problems. One such arrangement is the Chiang Mai Initiative Multilateralisation, which evolved from a system of currency swaps among Asian economies after the region's 1997-98 financial crisis. The Association of Southeast Asian Nations+3 Macroeconomic Research Office serves as its surveillance arm. Such financing arrangements are a key component of the global financial safety net, along with foreign reserves, bilateral swap lines and the International Monetary Fund.

Over the past three years, Amro has assisted the CMIM in carrying out tests with the IMF in the Asean+3 region. These tests are intended to improve the operational readiness of CMIM facilities. In 2018, Amro helped Asean+3 to conduct the first CMIM periodic review. This was a milestone in reinforcing the CMIM's role as a regional financing arrangement and a pillar of Asia's financial safety net.

Deepening regional integration

The ratio of intraregional trade and financial transactions in the Asean+3 region is increasing and relations between member economies are deepening. Intraregional trade among Asean+3 countries accounts for around half (47%) of their total trade. Despite a downturn in global investment, intraregional foreign direct investment among these economies quadrupled to $202bn in 2016 (55% of their total FDI) from around $50bn in 2002. Demand for cross-border financing is rising, with total cross-border assets held by Asean+3 countries having grown more than 10-fold since 2001.

As global economic trends change rapidly, the bloc must redouble efforts for economic integration and enhance the role of regional financing arrangements. With growing protectionist tendencies in major economies, there is a need to strengthen intraregional connectivity to improve the area's resilience against external shocks.

Bilateral swap arrangements have developed rapidly between Asean+3 countries. They amount to around $320bn, larger than the CMIM ($240bn). Member states' foreign currency reserves have increased since the Asian financial crisis to more than $6tn. These function as the first line of defence against crisis. However, this substantial accumulation of dollar-denominated foreign reserves could cause volatility in international capital movements by creating excessive global dollar liquidity.

Authorities in the region have worked on promoting the use of local currencies in trade and investment. Regional trade and investment rely heavily on the dollar, although intraregional transactions have grown significantly. Increasing the use of regional currencies will mitigate exchange rate risks against the dollar. It will also help reduce the amount of foreign reserves needed as a liquidity buffer. Last year, Amro collaborated with experts from the region to explore the possibility and modality of using local currency in the CMIM for liquidity support.

Since 2016, policy-makers behind these regional financing arrangements have held regular high-level dialogues and seminars on strengthening the global financial safety net. Amro signed memorandums of understanding with the European Stability Mechanism and the Fondo Latinoamericano de Reservas in 2017 and 2018, respectively. Bilateral discussions with the Eurasian Fund for Stabilisation and Development are underway.

Each arrangement has its own function and characteristics, and can learn from others. For example, the Eurasian Fund for Stabilisation and Development is moving towards enhancing its institutional arrangement. Policy-makers are carrying out reforms to the ESM that encompass extended surveillance, crisis management, and a broader scope of financing in times of need. In December 2018 the Asean+3 members began a discussion on the future direction of the CMIM. It may be worthwhile for the regional economies to consider introducing ESM-type functions and initiatives, such as stabilisation mechanisms.

In an interconnected global economy, financial crises are bound to recur, although it is impossible to predict when and where. Nevertheless, the world must be equipped to deal with a changing global financial environment. That is why regional financing arrangements must learn from peers that have confronted and overcome crises. ✦

Yasuto Watanabe is Deputy Director of the Asean+3 Macroeconomic Research Office.

✧ Macroeconomic influences

Managing foreign exchange reserves

Central banks often hold foreign exchange reserves in different tranches so that policy objectives can evolve as reserve accumulation grows.

Jonathan Grosvenor
Asian Development Bank

> The People's Bank of China has the largest reserves, at more than $3tn, followed by Japan.

Global foreign exchange reserves reached $11.48tn in the second quarter of 2018, according to the International Monetary Fund. The dollar continues to be the dominant currency, accounting for 62.3% of central bank holdings, while the euro represents 20.3%. Holdings of yen and of sterling stand at around 5%, while the Canadian dollar, renminbi and Australian dollar represent less than 2% each. Gold is excluded from the IMF data, although precious metals in some cases represent a significant part of reserve assets.

Close to $7.5tn of the world's reserves are held by emerging and developing economies. The People's Bank of China has the largest reserves, at more than $3tn, followed by Japan. Much of the growth in Asian foreign reserves has occurred since the Asian financial crisis of 1997-98, when the region suffered severe economic dislocation and currency value fluctuations. Today, the 10 largest central banks in Asia account for more than 57% of global foreign reserves.

Tranched reserves

Central banks often hold foreign exchange reserves in different tranches so that policy objectives can evolve as reserve accumulation grows.

A liquidity tranche is dedicated to meeting on-demand requirements, usually by holding the most risk-averse instruments, with liquidity being prized above returns. Conventional thresholds for reserve adequacy encompass measures of import cover, short-term debt service and broad money supply. This often involves enough funds to cover foreign currency debt up to 12 months. The liquidity tranche portfolio typically holds short-duration, ultra-conservative government bonds.

Reserves held in excess of the liquidity tranche but still within the reserve adequacy threshold may be dedicated to an investment tranche. This second tranche provides an additional precautionary buffer, and although it is less likely to be drawn immediately, liquidity and safety will still prevail in determining risk appetite. Longer duration government bonds are often preferred.

The high level of foreign exchange reserves in some jurisdictions leads typically to the adoption of a long-term tranche. With low expectations of drawdown, alternative investment strategies may be pursued, and external fund managers may be hired to generate higher returns.

Excess reserves have in some cases resulted in the establishment of sovereign funds. With diverse investment strategies, often including a focus on illiquid assets such as real estate, commodities, private equity or infrastructure, sovereign funds display a variety of governance models, but tend to differ from central banks in their mission and purpose. While excess reserves dedicated to sovereign funds are intended for long-term investment, experience has shown that countries claw back regularly from these savings pools to solve short-term imbalances.

The loose monetary policies and quantitative easing of central banks in high-income countries has driven down returns from the more conservative foreign reserve investment assets. The European Central Bank's asset purchase programme expanded beyond government bonds to include corporate bonds, asset-backed securities and covered bonds. By 31 October 2018, the ECB held €176.3bn in corporate securities, of which 44% were rated triple-B-plus or below. This has had an impact on pricing and liquidity in primary and secondary corporate bond markets.

Even those central banks without QE programmes face a shrinking eligible asset universe combined with low or even negative returns. This has been one of the drivers of central bank diversification strategies into equities and other alternative asset categories. Central banks have increasingly bolstered returns by branching out into emerging market external and local currency debt, commodities, high yield debt, private equity, derivatives and real estate. If market conditions remain benign, these diversification strategies tend to pay off, but when the tide goes out and interest rates rise, such asset categories suffer more than orthodox investments, such as liquid, short-term government bonds.

Many central banks suggest that there will be no reversal of such strategies now that interest rates are rising, but time will tell – especially if equities and other asset returns continue to come under fire. ✦

Jonathan Grosvenor is Head of Treasury Client Solutions at the Asian Development Bank.

OMFIF Special report

China and urbanisation

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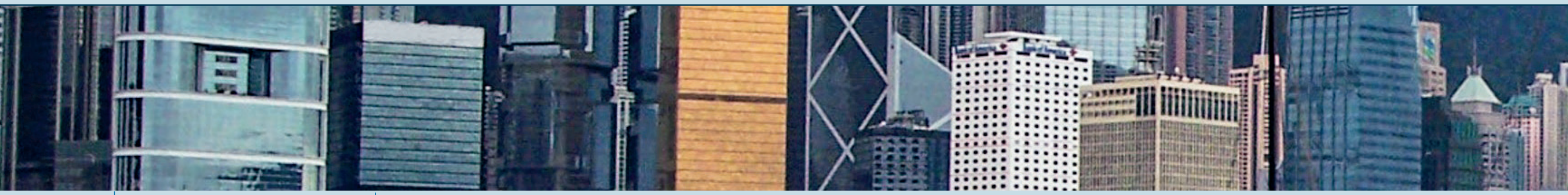
China's decision to promote city clusters of previously unimaginable size may be the most significant story in urbanisation today. Estimates suggest the 19 clusters will comprise 800m people by 2030, and by then account for 80% of China's GDP.



↘ China and urbanisation

‘City clusters’ propel Chinese growth

Gary Smith
Member, Barings Investment Institute

China’s decision to promote city clusters of previously unimaginable size may be the most significant story in urbanisation today. Cities have long been recognised for their role in boosting productivity, but interaction among clusters of cities can enhance these benefits. China has embraced city clusters as a key element in its efforts to manage a slowing economy.

The most striking of these efforts is the ‘Greater Bay Area’, encompassing Guangzhou, Shenzhen, Hong Kong and Macau and containing a larger population than the UK. Even with President Xi Jinping championing the model, however, its prospects for success will depend on the government’s ability to integrate more fully the factors of production. This will involve ensuring labour and capital can move across the different jurisdictions to make the most of what each city offers.

There will be winners and losers amid these new urban dynamics, but investors should remain watchful of the consequences of the massive infrastructure plans on real estate prices, as well as expanded services that an integrated workforce will demand.

China’s new urban strategy

As cities grow – and grow closer together – economists and urban planners have been exploring how they can interact with one another for the better. Chinese planners are harnessing this growth through new infrastructure, especially transport systems, both within and among cities. China is challenging the definition of a city’s optimal size, envisioning clusters around Beijing and Shanghai as large as 130m and 152m people, respectively.

In 1978, following decades of centrally planned policies that championed peasant life, Deng Xiaoping, then China’s paramount leader, signalled a change of direction. He launched what he called ‘socialism with Chinese characteristics’, allowing some limited market forces to propel growth. Since then, around 600m people have moved to cities from the countryside. One measure of this new approach to urbanisation is that China has risen from nowhere to today having eight of the world’s 20 largest buildings, and 12 cities with populations greater than 7m.

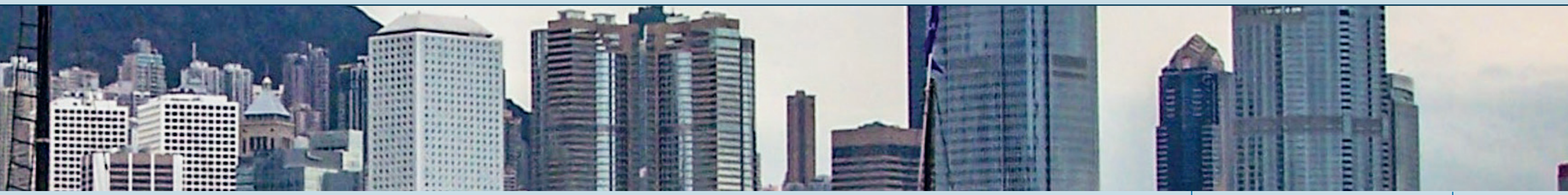
As China dismantled its Maoist economic model, it underwent an accelerated evolution towards an economy dominated by the service sector, a process that had taken hundreds of years in the West. China’s urbanisation rate jumped to 58% in 2017 from 18% in 1978. The contribution of service industries to the GDP of Beijing more than doubled between 1978-2003, while the contribution from manufacturing correspondingly fell by half. This rotation to services helped make cities more productive, and signalled a transition to higher value-added economic activity.

“The contribution of service industries to the GDP of Beijing more than doubled between 1978-2003, while the contribution from manufacturing fell by half. This rotation to services helped make cities more productive.

Clustering was already underway when Xi presided over the announcement of China’s formal decision to embrace cluster cities as part of the ‘National New Urbanisation Plan’ in March 2014. The leading three are Beijing-Tianjin-Hebei, the Yangtze River Delta cluster around Shanghai, and the Greater Bay Area. Some estimates suggest the 19 clusters will comprise 800m people by 2030, and by then account for 80% of China’s GDP.

The Greater Bay Area represents a massive urban agglomeration that would on its own be one of the largest 20 nations in the world. It has been lavished with political attention from the top, and was cited as a national priority in Xi’s 2019 new year’s message.

Chinese policy-makers are setting trends with important consequences for economic productivity, urban planning and social welfare. The Chinese city cluster plan, and the Greater Bay Area in particular, will test where the beneficial limits to agglomeration might be. As China’s



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economic growth rate slows during the transition from low to middle income status, any productivity benefit will become even more valuable.

Cities foster growth, and bigger cities foster faster growth. By current estimates, the 50% of the world's population that lives in urban areas produces around 80% of total output. Economists have long recognised the advantages of grouping economic activity more closely together. Pools of specialised workers raise the levels of their own skills, while innovations are shared more easily and diffused more quickly. An estimate from the Organisation for Economic Co-operation and Development suggests that a doubling of a city's population should boost productivity by 2%-5%.

That being said, even economists who recognise the benefits of urban clusters caution against using public investment to try and create momentum where 'natural affinities do not exist'. They call the Chengdu-Chongqing cluster 'forced', with two largely independent cities separated by 300km of largely unoccupied and hilly land.

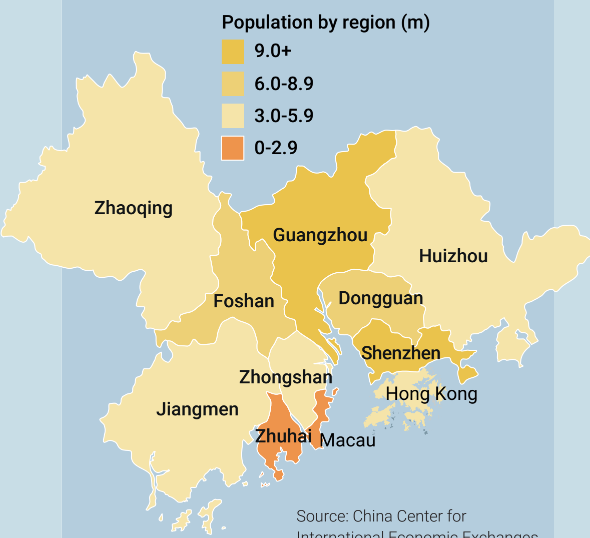
A major responsibility for planners is the provision of appropriate transportation links. Many cities grew on rivers, or coasts, when a key need was the transportation of natural resources or the access to water for industrial production or goods transportation. Over time new forms of transportation such as rail and road have reshaped the urban landscape. A key to unlocking efficiencies in the labour market is that employers will have access to a wider array of workers and skillsets, meaning that transport options must cater for long and short journeys, as well as changing travel patterns.

Population
67m

Combined GDP in 2017:
$1.5tn

Area
56,000km²

Expected GDP by 2030:
$4.6tn



Source: China Center for International Economic Exchanges

Challenges for the Greater Bay Area

For Chinese authorities, the main challenges in making the most of this urban cluster involve infrastructure, administration and people.

In September 2018, Hong Kong joined China's high-speed rail network. The following month the 55km bridge and tunnel joining Hong Kong to Macau and on to Zhuhai opened. The key projects for the Greater Bay Area will feature two additional bridges across the Pearl River delta, including one linking Shenzhen to Zhongshan, and a third runway at Hong Kong airport. Further plans are in place for 56 rail and metro stations, as part of a proposal to extend the regional network by 40% by 2022. The Greater Bay Area is also home to five major airports, and three of the world's largest seaports.

Economists expect the area to play a major role as a launching point for the Belt and Road initiative, China's effort to expand its economic influence and engagement westward to the Middle East, Africa and Europe. Ambitious plans for upgrading the ports in Guangzhou and Shenzhen will help consolidate the country's influence over key maritime routes.

The region's cities are at markedly different stages of development, with Macau's GDP per capita around 10 times larger than that of Zhaoqing and Jiangmen. Closer economic ties may help close these gaps.

> A major responsibility for planners is the provision of appropriate transportation links. Many cities grew on rivers, or coasts, when a key need was the transportation of natural resources or the access to water for industrial production or goods transportation.

China and urbanisation

> “The journey from Hong Kong begins with vehicles travelling on the left, switching to the right-hand side of the road when driving over (or under) water designated as belonging to the People’s Republic, and then back to the left when reaching Macau.

Regional officials face administrative obstacles to the free movement of people and capital across distinct legal systems and currencies. Hong Kong, as a special administrative region, is not due to be incorporated into the People’s Republic of China until 2047, with Macau joining two years later. In this respect, there is no similarity to the other Chinese clusters – and no global precedent.

The bridge to Macau and Zhuhai embodies these challenges. The journey from Hong Kong begins with vehicles travelling on the left, switching to the right-hand side of the road when driving over (or under) water designated as belonging to the People’s Republic, and then back to the left when reaching Macau. Today a driver requires three separate insurance documents, and three driving licences or permits to complete the journey from Hong Kong to Macau and on to Zhuhai. Mercifully, the tolls are in one currency, the mainland’s renminbi. Vehicle usage numbers for the bridge to date have been modest.

Beyond infrastructure and administration, the Greater Bay Area must also create incentives to encourage greater movement of its massive labour force. Different standards of living and cultural preferences, as well as different regulations, mean easy flows of labour are neither immediate nor automatic. Hong Kong residents, for example, should welcome the opportunities to find work where living costs are not exorbitant. At the same time, however, they enjoy much lower income taxes (15%) than their counterparts on the mainland (an average of 35%).

Although some labour market mobility measures are being implemented, employment policies and visa requirements across the Greater Bay Area differ. There are differences in professional licensing, and many professional

Infrastructure projects key to creating a connected city cluster around Greater Bay Area

Major transport infrastructure projects between the cities of the Greater Bay Area

qualifications are not recognised, including for architects, structural engineers, lawyers and doctors. This will slow workforce integration.

Plans have been floated for market liberalisation in sectors such as legal, logistics and finance, as have plans for the mutual recognition of professional qualifications. The concept of 'one examination, three certifications' needs to become reality sooner rather than later. Furthermore, border crossing procedures must be simplified if these markets are to maximise the labour mobility dividend.

Embracing urbanisation

Any urban project on such a massive scale will have multiple implications for investors. Even if Chinese authorities are slow to solve administrative and legal differences, the expansion of infrastructure will inject new dynamism across the region. Beyond roads and bridges, there will be upgrades in electricity, telecommunications and other urban infrastructure.

Hong Kong property is prohibitively expensive owing to stringent planning controls, low interest rates and restricted land supply. Since 2008, house prices have doubled while incomes have (in real terms) remained stable. It is unsurprising that older people from Hong Kong are looking at lower prices in Zhuhai as a retirement opportunity.

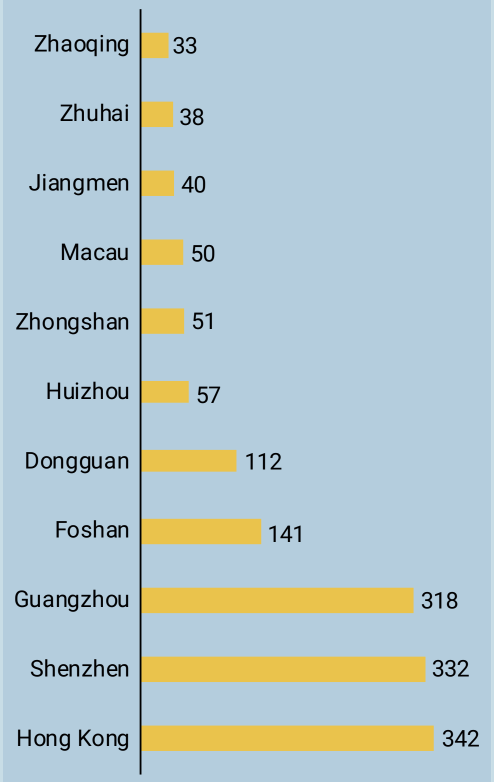
If the market mechanism operates without hindrance, it will encourage differentiated land-use. Dongguan and Foshan (with higher exposure to traditional manufacturing industry) have cheaper rents than Guangdong and Shenzhen. Of course, not all prices will rise at the same rate, and some may even adjust downwards in the face of competition that is more easily accessible via a new bridge or tunnel.

There will be opportunities for new services to encourage and support a more integrated labour force. Hong Kong residents, in particular, will be looking for familiar levels of healthcare and education if they resettle on the mainland. More affluent workers from across the region will be looking for expanded choices around financial services, leisure and entertainment.

After decades of resisting migration from the countryside to cities, China has embraced the economic benefits of urbanisation while addressing its challenges on an unprecedented scale. Economists have focused on the importance of building the right transport infrastructure and integrating labour markets. In the Greater Bay Area, Chinese authorities face the additional challenge of generating expanded economic activity across distinct legal and administrative borders.

Hong Kong largest economic area in region

GDP for 11 largest cities in Greater Bay Area, 2017, $bn



Source: CEIC, HSBC research

At the macroeconomic level, investors will be watching closely to see if the city cluster plan generates enough productivity gains to overcome the slowing in the economy's potential rate of output. At the sectoral level, they will monitor the impetus that the plan gives to the rebalancing of the economy towards consumption, and how this translates into opportunities around infrastructure, real estate and services.

The political need for success is high, and sponsorship from Beijing means there will be expansive resources to make the cluster cities work. Beyond waiting for the broader numbers on growth and productivity, however, signs of success may be as simple as watching rising traffic levels on the Hong Kong-Macau-Zhuhai bridge. ✦

Gary Smith is Member of the Barings Investment Institute.

“Even if Chinese authorities are slow to solve administrative and legal differences, the expansion of infrastructure will inject new dynamism across the region.

✧ Global flows

Integrating countries into wider economy

Global value chains present opportunities for developing countries, but automation may threaten jobs if demand does not offset technology's labour-saving impact.

Robert Koopman
World Trade Organisation

> The rise of the digital economy could, however, open a range of new opportunities for small firms to play a more active role in global value chains.

The growth of global value chains has slowed since the 2008 financial crisis, but it has not stopped. Between 2000-07, GVCs, especially ones where goods, parts or components crossed borders multiple times, expanded at a faster rate than GDP. During the financial crisis, there was naturally some retrenchment of GVCs, followed by quick recovery (2010-11). Most recent data for 2017 show that complex GVCs grew faster than GDP.

Value chains remain largely regional, but they are not static. Between 2000-17, intra-regional GVC trade increased in Asia, reflecting in part upgrading by China and other Asian economies. In contrast, intra-regional GVC trade in Europe and North America decreased slightly relative to inter-regional GVC trade. This reflects stronger linkages with Asia. China has emerged as an important hub in traditional domestically produced final goods trade and simple GVC networks. Meanwhile, the US and Germany remain the most important hubs in complex GVC networks.

Accounting for global value chains shows that trade has not been a significant contributor to declines in manufacturing jobs in advanced economies. Employment gains in services have offset losses in manufacturing. However, the effects of trade can vary considerably across regions and individuals with different skill levels, compounding regional disparities and labour market polarisation driven by other factors such as automation.

The emergence of GVCs has offered developing countries opportunities to integrate in the global economy with important impacts on jobs and income. Integration can have additional benefits for the wider economy, as most jobs are generated through upstream domestic supply chains.

Across the developing world, demand for skilled labour is rising. GVCs reinforce this trend by supporting more complex industrial organisation and by relying on complementary skill-intensive services inputs. The impacts of technological change and increased productivity on employment linked to GVCs have been offset by growing consumer demand.

Policies for helping domestically-owned firms become technologically independent do not deliver necessarily upgrading. Some might refer to this as 'techno-nationalism', the idea that a stronger national identity and sense of pride can be derived from homegrown innovation. Instead, policy-makers should encourage firms to be full partners in global technology sectors and to pursue open source innovation solutions.

Automation might threaten developing country employment in the long-term if consumption does not increase fast enough to generate sufficient additional labour demand to offset technology's labour-saving impact. In the near-term however, automation is not going to reduce dramatically the attractiveness of low-wage destinations, especially for labour-intensive tasks that require human dexterity, such as in the apparel industry. While automation does not pose immediate risks, governments need to develop a comprehensive digital strategy to maximise the gains from GVCs.

Although small and medium-sized enterprises represent the vast majority of firms worldwide, their participation in international trade remains limited relative to their share of overall economic activity and employment. The rise of the digital economy could, however, open a range of new opportunities for small firms to play a more active role in global value chains.

New research finds that whether a firm has a website facilitates the participation of manufacturing SMEs in GVCs and trade. In particular, such SMEs are more likely to use foreign inputs for production and export their output. Further, information and communication technology connectivity is found to be more important for small firms than for large ones in whether or not a firm participates in trade.

However, SMEs continue to face important challenges integrating into GVCs. There is a need to combine investment in ICT infrastructure and human capital with trade policy measures. Moreover, it is necessary to enhance the business environment and facilitate access to finance and logistics. And, innovation and research and development must be promoted. Improving the availability of data would also help to better understand and integrate SMEs in GVCs. ✦

Robert Koopman is Chief Economist and Director of the Economic Research and Statistics Division at the World Trade Organisation.

✧ Global flows

Growth beyond trade

Barriers to trade are no longer the main strategic impediments to economic integration, and more sustainable avenues to growth have emerged. Asia Pacific is leading the way in promoting structural reforms.

Rebecca Sta Maria
Asia-Pacific Economic Co-operation Secretariat

“In the pursuit of balanced, sustainable and inclusive growth, policy-makers need to look to other avenues in addition to trade, such as domestic consumption and services.

It is important to recognise that tensions in US-China trade did not arise simply from surpluses and deficits. They are also about structural issues, driven by questions on how countries will adapt to the data- and technology-driven economy of the future.

The Asia-Pacific Economic Co-operation forum is made up of 21 economies located around the Pacific. Its membership includes both developing and advanced economies; the forum's diversity offers many perspectives in solving different problems. Apec is associated primarily with trade and is known for its goal to achieve free and open trade and investment among its member economies. However, since the 2008 financial crisis, the emphasis has shifted towards achieving balanced, sustainable and inclusive growth. Through mechanisms like Apec, Asia-Pacific economies have achieved unprecedented growth in the last 30 years. During this period, trade among members grew seven-fold thanks to lowered trade costs and average tariffs, which have been reduced to less than 6% from 17%. This has contributed to significant poverty reduction and the expansion of the middle class.

But the world is changing. Unlike in past decades, barriers to trade are no longer the main strategic impediments to economic integration, in part because of past successes in toppling them. Globalisation as we know it is slowing down, and trade is less reliable as a driver of growth. It has been replaced by domestic consumption as the stronger and more stable source of growth among Apec and some other Asian economies. Trade growth lagged behind GDP growth between 2012-16. Since Apec was established in 1989, there have only been two other years during which regional trade growth was lower than GDP growth: in 2001, after the 'dot-com bubble' burst, and in 2009 following the financial crisis.

Future drivers of growth

In the pursuit of balanced, sustainable and inclusive growth, policy-makers need to look to other avenues in addition to trade, such as domestic consumption and services. They must harness future drivers of regional growth, like green technology and the digital economy. It is important to invest in people – through education and health, for example – so they can benefit from the new opportunities that these future growth areas offer.

Apec is a voluntary forum; it does not host negotiations or enforce any rules. Instead it serves as a safe place where members can identify and address common problems. Because its outcomes are non-binding, there is more willingness to propose bold, new ideas. Members take up the best ideas unilaterally, across the board or as part of binding agreements.

Structural reforms

A recent example is the Cross-Border Privacy Rules system. It consists of guidelines endorsed by Apec members to ensure protection and privacy for consumer and business data. More than a third of the forum's members have adopted and implemented these rules unilaterally. The system was written into the US-Mexico-Canada agreement, which was signed by the three countries last year.

Increasingly, discussions in Apec are focusing on much-needed structural reforms. These include policies to promote more equitable distribution of economic gains, ease industries into environmental sustainability, and help governments and other institutions adapt to the disruptive nature of digital technology.

These initiatives can spread and benefit more people. They demonstrate the work that needs to be done at the regional and multilateral levels. This work should anticipate the world's most pressing needs and offer solutions vetted through many perspectives and grounded in thoughtful co-operation. ✦

Rebecca Sta Maria is Executive Director of the Asia-Pacific Economic Co-operation Secretariat.

✧ Global flows

Transforming Africa

The African Continental Free Trade Agreement and advances in capital market integration have the potential to accelerate the process of structural transformation and shift the global distribution of assets.

Hippolyte Fofack
African Export-Import Bank

“US and European government securities accounted for more than 90% of public AUM in Africa in 2018. Nations elsewhere in the world have opted for a more globally inclusive approach to asset allocation.

With many global institutional investors loath to distribute significant portions of their portfolios towards Africa, resource flows into the region have not been commensurate with the scale of its development challenges and has led to a dearth of capital to finance infrastructure and trade.

Africa's history of economic marginalisation is long, but may be at a turning point. The African Continental Free Trade Agreement (AfCFTA), which entered into force this year, will establish one of the world's largest free trade areas. It has the potential to raise the competitiveness of African economies, accelerate their structural transformation and diversify their sources of growth and trade. It will improve the overall external balances of African countries, strengthen the financial wherewithal of regional institutional investors, and ultimately attract a higher share of global assets under management to the Africa.

Foreign investors largely shun Africa. The region received $40bn in foreign direct investment in 2018, less than 3.4% of global FDI flows. By way of comparison, more than 42% ($502bn) was invested in developing Asia, while North America received 22% ($263bn). More than 12% ($149bn) flowed to Latin America and the Caribbean.

Africa has been marginal on the asset side as well. Even in the recent favourable economic environment of synchronised global expansion – when rallying equities supported the growth of sovereign assets to $37.8tn in 2018 from $36.2tn in 2017 – less than 3% ($795bn) originated from African institutional investors. An even smaller share of growth associated with strong equity asset valuations accrued to African sovereign and corporate entities. Most opted to sustain high rates of investment in fixed income, even as yields in sovereign bonds decreased significantly in a zero-lower-bound interest-rate environment.

The structure of African economies and fragmentation of small markets and exchanges have shaped the uneven distribution of global capital flows and assets. A sizeable share of AUM by African institutional investors are the reserves of central banks, comprising around 57% of total public AUM in the region in 2018. African public pension and sovereign funds accounted for the rest, at 31% and 12%, respectively. Despite the slight recovery from the end of the commodity super-cycle, African central bank reserves are still below pre-crisis levels. The reserves stood at a regional average of $466.5bn at end-2018, down from their $553.6bn peak in 2013.

The allocation of international public AUM has been highly uneven, with few global institutional investors and reserve managers investing in Africa or financing growth opportunities in the region's real sector. According to the OMFIF GPI Survey 2019, respondents allocated less than 1% of their portfolios to African assets in 2018. The bias against African economies in the allocation of assets is driven not only by the narrowness of mandatory limits on foreign assets imposed on institutional investors, or the concerns of foreign investors with the persistent uncertainties to returns across the region. African public investors have largely favoured foreign assets in their portfolio allocation strategies as well.

African central banks favour investing outside of the continent. US and European government securities accounted for more than 90% of public AUM in Africa in 2018, according to the OMFIF survey. Nations elsewhere in the world have opted for a more globally inclusive approach to asset allocation, investing a significant share of their central bank reserves in asset classes from both developed and developing economies. But African central banks have followed the opposite strategy, positioning the region as an outlier in the global distribution of asset allocation.

Even during the zero-lower-bound quantitative-easing era of falling yields on top-rated fixed income assets in advanced economies, the same outsourcing strategy informed most African institutional investors' asset allocations. On average, these institutions allocated less than 1.5% of combined AUM to infrastructure financing, even though Africa's infrastructure is consistently singled out as one of the greatest constraints to growth and economic development. In contrast, global public investors took a more aggressive stance in the sectoral and geographical diversification of their portfolios in other regions, significantly increasing investment in less liquid alternatives to achieve higher inflation-adjusted returns on long-term infrastructure investments offering stable returns over longer periods.

Integrating exchanges
Institutions are promoting initiatives to halt the fragmentation of African capital markets and transform them into effective instruments in the global competition for capital. These include establishing a pan-African stock exchange through the African Securities Exchanges Association. The African Exchanges Linkage Project, as it will be called, aims to harmonise trading rules as well as settlement cycles and listing fees across Africa's leading exchanges. The Committee of Southern African Development Stock Exchanges is fostering the integration of capital markets among South African Development Community member countries by promoting the harmonisation of trading, clearance and settlement procedures.

Though not as comprehensive as Africa's development challenges and the highly competitive global environment require, the integration of national exchanges is making a difference. The SADC exchanges have harmonised their listing requirements, and cross-border trade is on the rise. In addition to reducing the cost of trading across the continent and raising liquidity to boost investor confidence, Africa's capital market integration could address the perennial challenge of scale inefficiencies and offer investors more diverse products and services.

The diversification of financial ownership associated with greater market integration brings other benefits, most notably economic growth and risk-sharing, also referred to as 'development finance' and 'diversification finance', respectively. These are closely related, especially in the early stages of economic development where competing priorities rhyme with resource constraints. Besides attracting more public investors, the risk-sharing associated with increasing economies of scale has the potential to pool more domestic and global resources for long-term investment in support of economic integration and structural transformation.

But liquidity risk and the highly-inflated risk perception that have clouded investment decisions and deterred investors are also a reflection of the current structure of African economies. These countries still depend heavily on primary commodities and raw materials for growth, fiscal revenue and foreign exchange earnings. On average, commodities account for more than 70% of exports for more than three-quarters of African nations. For most, the accumulation of wealth has been undermined by the long-term deterioration of commodity terms of trade, especially where growth has been highly correlated with commodity cycles.

The correlation between economic growth and commodity cycles has exposed Africa to recurrent risks of adverse terms of trade shocks and global volatility. The end of the commodity super-cycle in 2014 induced significant costs in terms of growth, macroeconomic management and wealth accumulation. The depletion of foreign reserves in the face of rising twin deficits and sustained capital outflows exacerbated the shortage of foreign exchange liquidity, especially in heavily natural resource-dependent economies.

The deepening financial integration of African economies is unlikely to mitigate the problem of highly-inflated perception of risk, despite the potential of such integration to mitigate liquidity risks through resource pooling and risk-sharing. That overall risk perception has its source in the real sector. It is associated with the stickiness of colonial development models of resource extraction sustaining the high correlation between growth and global commodity cycles.

The AfCFTA, which gives governments a platform to establish institutional arrangements for effective public-private partnerships, has the potential to accelerate the process of structural transformation and boost intra-African trade in a region where cross-border trade of higher-value manufactured goods dwarfs that of primary commodities. The transformation the agreement promises could fundamentally shift risk perception in Africa and change the dynamics of wealth accumulation and asset allocation. The free trade area will establish a market of 1.2bn people with a GDP of $2.5tn and a consumer and business spending base of $4tn.

In addition to increasing market efficiency and raising competitiveness by offering greater opportunities for economies of scale, the AfCFTA will ease and shift the composition of trade and investment flows into Africa. While FDI flows into fragmented African markets were once directed primarily towards extractive industries, the shift to a more integrated model will create inherent →

> " In addition to reducing the cost of trading across the continent, Africa's capital market integration could address the perennial challenge of scale inefficiencies and offer investors more diverse products.

> Africa's population is projected to double to 2.5bn by 2050. That would put more than 26% of the world's working-age population in Africa and sustain the growth of pension funds and public AUM.

economies of scale. Preliminary estimates suggest the AfCFTA will significantly expand industrial production and trade, with cross-border trade growing more than 52% in the agreement's first 20 years. By expanding intra-African trade and industrial production, the agreement would act to absorb negative global shocks. Multinational businesses are already responding, with Volkswagen and Peugeot announcing their intention to build manufacturing and assembly plants in Kenya and Rwanda.

In addition to diversifying the sources of growth and exports to build resilience against global headwinds, increasing the trade of higher manufacturing goods has other benefits for public investors. Manufactured goods are less vulnerable to fluctuating global prices than extractive goods, and the expected shift in the composition of trade is likely to improve the external balance of African nations. This will reduce the perennial risk of the shortage of foreign exchange liquidity crippling exchanges and deterring investors. The sustained accumulation of foreign reserves associated with the diversification of sources of growth and trade will likewise strengthen the financial wherewithal of African central banks and sovereign funds.

The process of structural transformation and industrialisation triggered by the AfCFTA could shift the global distribution of AUM, specifically through the changing dynamics in the world of pension funds and the rate of growth of AUM by African institutional investors. Two factors will be at play. The first is the expected growth of per capita income, fuelled by increasing labour-intensive employment opportunities in the production of manufactured goods, which are less vulnerable to fluctuating prices and commodity cycles. The second is the projected growth of Africa's population, expected to double to 2.5bn by 2050. That would put more than 26% of the world's working-age population in Africa and sustain the growth of pension funds and public AUM.

These shifts will set the region on a path to a more sustainable tax base and per capita income growth. This is possible because manufactured goods are largely produced by small and medium-sized enterprises, which are responsible for more than 80% of Africa's employment and 50% of GDP. Though these businesses have struggled to integrate global values chains and raise their share of the highly competitive global market, the AfCFTA provides the framework for SMEs to tap into regional export markets to grow their balance sheets, enhance their competitiveness and eventually draw on robust regional value chains to integrate global ones.

The improvement of external balances enjoyed by the first generation of industrialised economies in Europe and North America highlighted the benefits of structural transformation for per capita income growth and wealth accumulation. Asia's rise is the result of the successful implementation of export diversification models. If these trends hold true in Africa, the rise of labour-intensive manufacturing will accelerate the migration from informal towards more formal sectors of employment, propelling the growth of domestic savings and pension funds.

Between 2005-19, the aggregate public pension funds of countries in the Asia Pacific region increased significantly, achieving growth of 130%, to $3.9tn from $1.7tn. Countries in that region account for more than 25% of AUM in world pension funds. African pension funds account for only $90bn, less than 0.6% of world pension AUM. In an era of deepening economic and financial integration in Africa, however, Asia provides a model for bolstering African pension funds' robustness.

Strict enforcement

Successful economic transformation and competition for global savings will depend on the capacity of emerging African industries to strengthen their competitiveness to take full advantage of new opportunities. Prioritising the reduction of tariffs on intermediate goods used in the production of final goods will be key to the growth of these corporations. Their expansion will call for strict enforcement of antidumping, countervailing and safeguard measures, as well as remedial actions against imports causing material injury to nascent industries.

These policies will boost incentives for businesses to source inputs from within the continent and support the expansion of manufacturing. But adopting a legal framework for common investment rules to facilitate cross-border investment and drive industrialisation during the second phase of the AfCFTA will be another important step towards addressing supply-side constraints and boosting intra-African trade. Capitalising on Africa's young working population to raise per capita income sustainably will be critical, and contingent upon rising employment opportunities in the formal sector. This will require more investment in human capital to raise productivity and create a virtuous development circle, in which countries' economic structures are invariably endogenous with their endowment structures. ✦

Hippolyte Fofack is the Chief Economist of the African Export-Import Bank.

✧ Global flows

Crackdown on foreign investment

Many countries are beginning to rethink their foreign investment strategies, and are adopting new approaches to their review processes.

Efraim Chalamish
Duff & Phelps

“Transactions like the bid by China’s Midea Group for German robot-maker Kula AG prompted Europe to rethink its foreign investment strategy.

Many western economies have reformed their foreign investment review rules. The new regulations will increase mandatory filing of proposed acquisitions, cover more transactions covered, and present a strict approach to the investment process. This move is designed to address global concerns on investments in ‘strategic assets’ and national security threats, especially driven by US-China trade and investment tensions. This could come at a cost to sovereign financial entities.

The European Parliament approved recently a co-operation mechanism among European Union countries to better screen foreign investments in ‘critical infrastructure’ (including finance) and ‘critical technologies’. Transactions like the bid by China’s Midea Group for German robot-maker Kula AG, and the blocked acquisition of German machine-tool manufacturer Leifeld Metal Spinning AG by a Chinese buyer, prompted Europe to rethink its foreign investment strategy.

For several years, sovereign investors took advantage of regulatory loopholes in Europe to circumvent regulatory issues they faced in the US. Washington and Europe share strategic concerns, particularly in the light of the security transatlantic partnership. Therefore, this regulatory arbitrage contradicted joint national interests.

The EU’s new approach does not include a comprehensive review, screening, or a blocking mechanism of foreign investment. Rather, it consists of a coordination system where member states collect data and share information. The investment approval process will remain in the hands of national governments.

The US has followed a more rigid path. It was the first country to adopt a comprehensive national security approach to governmental review of foreign investment. Following the 2008 financial crisis and several attempts by foreign nations to acquire strategic assets, many others, such as Germany, the UK and Australia, followed the US model.

The Committee on Foreign Investment in the US has changed dramatically its foreign investment review mechanism. President Trump’s new economic policies have expanded this work significantly. Consequently, Chinese investments in the US declined by 90% last year, a combination of negative signalling in the US and restrictions on capital flows in China. As Washington plans to review all foreign investments in strategic industries, the government has been collecting industry feedback to make sure the new rules are applied properly. The regulatory reforms and the changing macroeconomic environment have already affected the way sovereign investors structure their foreign direct investments.

Technology investments

Many sovereign funds have increased their technology investments in recent years. This is part of their strategy to increase alternative investments and other non-correlated assets, and help transform their own economies by investing in disruptive technologies. From ‘foodtech’ to artificial intelligence, start-ups and mature tech companies are turning to sovereign financial vehicles to raise seed money or larger follow-up rounds.

However, this strategy depends on the basic proposition that markets are open and tech exports can flow freely, allowing disruptive innovation to grow and flourish. The recent trend of declining tech exports and rising trade barriers is alarming. Many sovereign tech holdings, as a result, may not grow as fast as expected, questioning valuation, financial modelling and expected returns.

The rising standards of foreign investment reviews by sovereign entities and the impact of national security on their cross-border transactions are just some of the factors that make sovereign FDI growth more challenging. Structural reforms and restrictions on capital flows have reduced the liquid funds available to sovereign institutions for global investments. For example, the China Investment Corporation has reduced dramatically its foreign investments after the Chinese government pressured it to invest locally instead.

As they become the largest institutional investors globally, providing liquidity to markets and closing the infrastructure financing gap, sovereign institutions are likely to make an important contribution to the policy-making debate on the limits of foreign investment in infrastructure and other strategic assets. ✦

Efraim Chalamish is Senior Adviser at Duff & Phelps and Professor at New York University.

✧ Global flows

China's surprising trade weapon

The way in which Beijing, through its manipulation of the global soyabean market, has gained short-term leverage over its major economic rival, the US, may prove instructive for future trade disputes.

Brad Setser
Council on Foreign Relations

"The US-South America soy spread became the most visible indicator of the state of the trade war.

China's tariffs on US soyabeans have emerged – surprisingly – as the most prominent source of Chinese trade leverage. Leverage comes usually from targeting final, not intermediate goods. Soyabeans are ultimately an input into the production of pork and poultry.

In general, tariffs on commodities are ineffective. A Brazilian bean is a near-perfect substitute for a US bean. China's tariffs on US oil, for example, had a limited impact; other countries were willing to step in and buy. There is a reason why products like scotch (and American whiskey) tend to end up as the first casualties of any trade skirmish. They are high value final goods, and discretionary consumer purchases at that. But China needed to target a large US export after President Donald Trump reasoned that Washington had leverage because China imported little from the US, and therefore couldn't match its tariffs dollar for dollar. Imposing tariffs on US aircraft was not an option. That would raise the price Chinese airlines had to pay on planes that would be imported from either the US or Europe.

China's tariffs on soyabeans proved effective in the short term. US beans started to sell at a significant discount to those of Brazil and the US-South America soya spread became the visible indicator of the trade war. American farmers stored much of their harvest rather than selling at a discount. China drew down its stocks in addition to buying from Brazil and Argentina. Trade in beans fell.

Short-term market power

China had market power – at least in the short run. China accounts for around two-thirds of global soyabean imports. The US accounts for close to one-third of global exports. Brazil now accounts for nearly 50%. Chinese demand exceeds the total exports of either Brazil and the US. The US and Brazil tend to split the Chinese market.

China's decision to impose a 25% tariff on US soyabeans could have had a minimal effect – tariffs would raise domestic Chinese prices, but have only a modest impact on the global market. The other one-third of the global market would buy all of the US harvest, and the two-thirds of global supply that isn't the US would supply the Chinese market. That is what might have happened in the long run, together with more complex substitutions —pigs can be fed on corn rather than soymeal, farmers can substitute other crops for soya, and European rapeseed could be exported to China while Europe imported more US soya. In the months after China's soya tariff, Argentina emerged suddenly as a large export destination for US soya. It is the world's third largest soya exporter, with a particularly large business exporting processed soyabeans. China prefers to do its own processing. But the Argentines were happy to sell their raw beans to China and import US beans for re-export. US soya exports to Europe have doubled.

To incentivise the rest of the world to buy US beans that normally would have gone to China, the US offered them at a discount. That discount has since essentially disappeared in the medium term. Part of the reason is China's state soyabean importers have started buying US beans. But it also reflects the absence of spare supply in Brazil: large Chinese purchases had depleted inventories, and, even with higher imports from Brazil, China's total imports were down.

China's consumers bore some of the cost of their country's tariffs. All else equal, the price of Brazilian beans was probably pushed up a bit. But this impact was modest. The obvious impact of the tariffs was a fall in US prices, not a rise in Brazilian prices. Most of the cost was borne by the exporter. Brazil emerged victorious, with higher export volumes. Argentina did as well, though its capacity to export more of its own beans was limited by its poor harvest. The biggest winners, though, were probably the world's other soyabean importers, who could now get US beans at a discount to the global market price. Commodities are still commodities – one bean is as good as another, no matter its origin– even if in this case, the presence of a big, almost monopoly, purchaser had substantial market power in the short run.

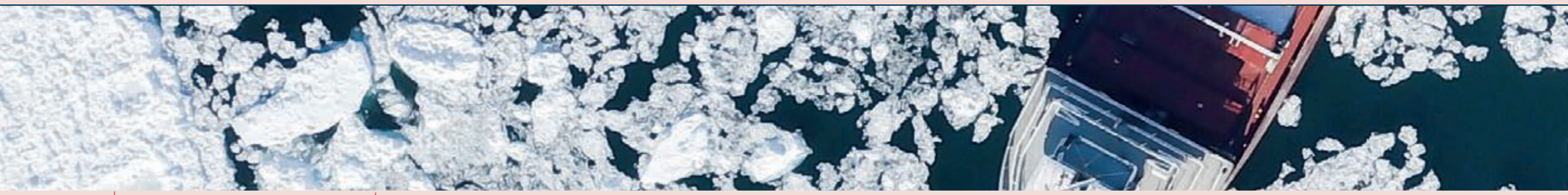
In the longer term, China is likely to be interested in a more diversified supply base. This should expand opportunities for other northern hemisphere producers. Russia and Ukraine stand out. And the US, which historically has exported 60% of its soya crop to China, has an incentive to diversify its export markets. The way China gained short-term leverage over the US may prove instructive for future trade disputes. ✦

Brad Setser is Steven A. Tananbaum Senior Fellow for International Economics at the Council on Foreign Relations.

OMFIF Special report

Global flows

Amid trade tensions between the US, China and Europe, world investment flows are falling victim to the tide of protectionism. As global investment imbalances have widened to a new record, western economies are introducing new rules for investment screening.



Global flows

Global protectionism extends to investment

Danae Kyriakopoulou
Chief Economist & Director of Research, OMFIF

Adam Cotter
Director & Head of Asia, OMFIF

A weak macroeconomic backdrop, rising trade tensions and protectionism, and shifts in global value chains all weighed on global investment flows in 2018. Global foreign direct investment flows fell by 27% over the year to $1.1tn, according to the Organisation for Economic Co-operation and Development. This extended a decline of 16% in 2017. As a share of GDP, FDI inflows in 2018 stood at their lowest level since 1999 (see Figure 1). This was driven largely by corporate income tax reform in the US, which created an incentive for US parent companies to repatriate earnings held with foreign affiliates. China also recorded a decline in FDI outflows, for the second year in a row, stemming from increasing restrictions on its outbound investment operations as well as a slowdown in domestic growth.

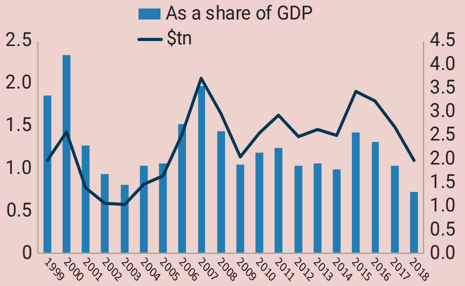
Among recipients, Europe was hit particularly hard. According to OECD data, flows into European Union countries declined by 20%. This was driven by disinvestments in Ireland and Switzerland probably linked to the US tax changes. Another factor was a drop in investment into the UK, owing to the uncertainty over the country's exit from the EU.

Separate data from the United Nations Conference on Trade and Development for the wider European region show FDI inflows declining in 2018 by 73% to $100bn – their lowest level since the 1990s. Spain and the Netherlands were exceptions, seeing FDI inflows increase over the year. According to the OECD, the Netherlands now ranks third in terms of FDI recipients worldwide, overtaking the UK and behind only the US and China. Meanwhile, UNCTAD data show growth in FDI inflows into Spain especially strong at 269%, bringing Spain into the top 10 FDI host economies for 2018. Developing countries also saw an increase in FDI, particularly Indonesia and Thailand in emerging Asia, and South Africa and Egypt in Africa, according to UNCTAD.

Analysing net financial flows (such as FDI) together with fluctuations in exchange rates and asset valuations provides the full picture of global investment positions. In 2018 the global gap between creditors' and debtors' international investment positions reached a new record of $33.8tn, in line with the trend of imbalances widening every year since 2000 (see Figures 2 and 3). This shift was fuelled by a combination of a strong dollar, weak equity markets, political uncertainty in the UK and Europe, and weakening macroeconomic prospects, especially in China.

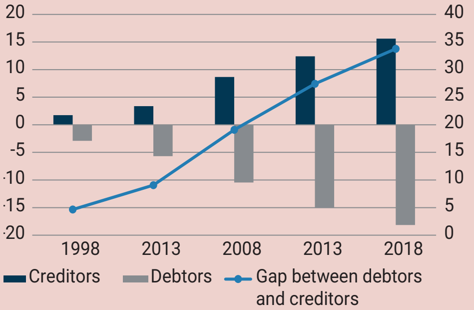
> “In 2018 the global gap between creditors' and debtors' international investment positions reached a new record of $33.8tn.

Figure 1: Global foreign direct investment flows weaken
Foreign direct investment inflows, $tn (LHS) and % of global GDP (RHS)



Source: OECD, OMFIF analysis

Figure 2: Global investment imbalances widen
NIIPs, creditors v. debtors (RHS) and global gap (LHS), $tn



Source: International Monetary Fund Balance of Payments, OMFIF analysis

US, UK and Mexico widen debtor positions

This year's move in international investment positions was propelled by an increase in debtors' net liabilities, particularly the US, UK and Mexico. Overall debtors' net liabilities rose by 7.8%, but had these three economies been excluded, debtors' net liabilities would have fallen by 8.9%.

Among debtors, the US saw the biggest increase at $1.9tn, or 25%. This reversed last year's reduction in net liabilities and set a new record for the world's largest debtor of $9.6tn (the previous record was $8.2tn in 2016). This was largely driven by the strength of the dollar in 2018, which led to a decline in the value of foreign assets. The ICE US Dollar Index, a measure of the currency against a basket of six others, was up 4.5% over the year, making up partly for last year's 10% drop. Overall the value of foreign assets held by the US decreased by $2.4tn. Liabilities fell moderately in comparison, by $408bn.

Global stock markets performed poorly, amid concerns over the macroeconomic environment and tightening monetary policy, reducing foreign holdings of US equity. The Dow Jones fell 5.5%, the S&P 500 was down 6.2% and the Nasdaq declined 4%, making 2018 the worst year for stocks since 2008.

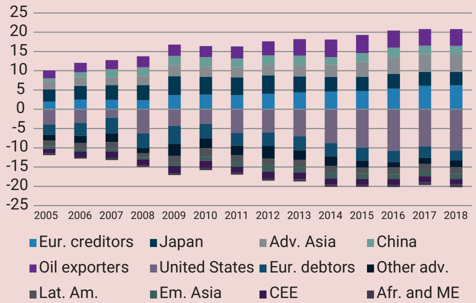
As a central feature of the underlying trends, both direct and portfolio investment assets recorded large drops. Lending assets grew marginally while reserve assets stood broadly steady. Overall, the US maintains its position as the key hub for global capital flows and an important centre for global public investors. Close to 27% of GPIs examined in this report are located in the US, managing more than one fifth of all GPI assets (see Figure 4). That makes the US the largest single country by level of assets (at $7.6tn), well ahead of the second largest GPI hub (China, with $4.6tn) and third largest (Japan, with $3.1tn). It is also home to the world's second and third largest pension funds, the Military Retirement Fund (with AUM at $813.9bn) and the Federal Employees Retirement System (with AUM at $687.5bn). Only Japan's Government Pension Investment Fund is larger in the global ranking of public pension funds.

In contrast, the UK's NIIP widened because of a significant increase in liabilities, especially financial derivatives. The current account deficit increased over 2018. Meanwhile, the brief boost in exports and earnings on British investments abroad from sterling's depreciation in 2017 did not carry through to the following year. The country's economy had a difficult year in 2018, with slowing growth, rising interest rates (to their highest level since the 2008 financial crisis) and continued political uncertainty. A further drop in the pound in future would risk additional capital flight. With the value of UK investments owned by foreigners exceeding significantly the value of UK-owned overseas investment, this could have a considerable impact.

The rate of return on such investments also matters. Even with a negative NIIP, a country can still enjoy an investment income surplus if the rate of return on capital owned overseas exceeds the rate earned by foreign investors on domestic assets. However, as a result of Brexit uncertainties, FDI has been declining. This suggests a worrying shift not only in the level of the NIIP but also its composition. The source of external financing is moving ↘

> Global stock markets performed poorly, amid concerns over the macroeconomic environment and tightening monetary policy, reducing foreign holdings of US equity.

Figure 3: Prime US role in global imbalances
Global NIIPs, % of global GDP, by region



Source: International Monetary Fund Balance of Payments, OMFIF analysis

Figure 4: Most debtors narrow positions, US notable exception
NIIPs, % of GDP, top six creditor economies

Country	NIIP ($bn) 2018	NIIP ($bn) 2017	NIIP (% of GDP) 2018	NIIP (% of GDP) 2017	GPI Top 750 ranking 2019: GPI assets ($bn)	GPI Top 750 ranking 2019: % of Top 750	GPI Top 750 ranking 2019: No. of GPIs
US	-9,627	-7,725	-47%	-40%	7,622	20.2%	199
Spain	-1,117	-1,173	-78%	-90%	85	0.2%	2
Australia	-689	-756	-49%	-54%	820	2.2%	17
Mexico	-620	-560	-51%	-49%	361	1.0%	4
Brazil	-503	-642	-27%	-31%	589	1.6%	4
Ireland	-490	-527	-132%	-162%	30	0.1%	3

Source: International Monetary Fund Balance of Payments, OMFIF analysis

↘ Global flows

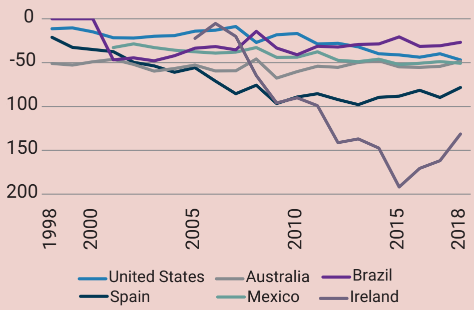
> “Germany maintained a positive albeit narrowing net debt security holdings balance for the second year in a row. This indicates that German holdings of foreign bonds still exceed foreign investors’ holdings of German bunds.

away from the more stable and long-term types of investment, into shorter-term loans and bank deposits that are helping finance consumption and domestic investment.

In Mexico, broad-based liabilities decreased by $10bn, while assets fell by $18bn. With an 11% increase in net liabilities, it is now the world’s fourth-largest debtor after the US, Spain and Australia, overtaking Ireland, Brazil, France and India. These shifts in the US, UK and Mexico were counteracted to an extent by a narrowing of other debtors’ positions, notably France (by 38%), Brazil (by 22%) and Turkey (by 23%) (see Figure 5). In terms of NIIP as a share of GDP, only the US and Mexico saw this ratio increase, by 18% and 3% respectively, while in France it decreased by 42%.

Figure 5: Brazil and Ireland narrow net foreign debt ratio

NIIP, % of GDP, top six debtor economies



Source: International Monetary Fund Balance of Payments, OMFIF analysis

China reduces liabilities

Creditors’ net assets rose by 4.4%. This reflected a general rise of net foreign assets, including for the world’s two largest creditors, Japan and Germany, whose NIIP increased by around $193bn each (see Figure 6). Germany maintained a positive albeit narrowing net debt security holdings balance for the second year in a row. This indicates that German holdings of foreign bonds still exceed foreign investors’ holdings of German bunds.

Canada, the Netherlands and Singapore also saw big NIIP increases at $37bn, $50bn and $32bn respectively. The boost in Singapore’s net foreign assets, driven by FDI, helped propel into the list of the world’s top-five creditor nations, taking over the spot previously occupied by Switzerland. As a share of GDP only Japan saw an increase in its NIIP among the top 10 creditors. Germany, Taiwan, Switzerland and the Netherlands saw marginal declines, while for Saudi Arabia, Norway, Hong Kong and China, NIIP as a share of GDP narrowed by double-digit levels. Germany is now by a relatively wide margin the world's No.2 foreign creditor, the only European nation in the top five.

China’s NIIP declined in absolute terms. The value of China’s net foreign assets declined for the second year in a row as liabilities rose more than assets. Following a 7% decline, China’s net foreign assets stand at $1.7tn. Chinese FDI assets reached a new record of $1.9tn, surpassing this year those of Canada, Ireland, Japan, Switzerland and France. However, there are question marks over the sustainability of this trend as western economies tighten their rules on Chinese investment, especially

Foreign investors move towards China

Although the MSCI China All Shares index fell 18.8%, foreign inflows maintained momentum throughout the second half of 2018 as China A-shares gained partial inclusion in the benchmark MSCI emerging market index. With expectations of an enduring trade conflict built in, low valuations helped spur foreign investors to channel a record $9bn into Chinese equities.

Since the country’s investment quota programmes began, China’s State Administration of Foreign Exchange has awarded $101.1bn in qualified foreign institutional investor quotas to 287 licence holders. The scheme operates in tandem with its renminbi equivalent (RQFII) and the more recent ‘stock connect’ programmes that facilitate two-way investment with other markets.

Safe has lifted the QFII threshold to $300bn from $150bn after three years of reforms to the scheme. Also in 2019, China issued additional outbound quotas to five domestic firms after nearly a year of non-issuance. The QFII system serves as one of the major channels for foreign investors to make investment in China’s domestic financial market.

in technology and strategic assets. Aside from FDI and loans, other Chinese foreign assets saw a drop, including portfolio investment. Overall the value of Chinese foreign assets increased by around $175bn, but this was more than offset by an increase in liabilities, particularly in loans and debt and securities portfolio investment. Among other creditors, only Hong Kong and Norway experienced a similar trend as China, with their positions narrowing by around 8% each.

Figure 6: Japan, Germany and Singapore increase net assets
NIIPs, % of GDP, top six creditor economies

	NIIP ($bn)		NIIP (% of GDP)		GPI Top 750 ranking 2019		
Country	2018	2017	2018	2017	GPI assets ($bn)	% of Top 750	No. of GPIs
Japan	$3,102	$2,909	62%	60%	3,134	8.3%	8
Germany	$2,318	$2,124	58%	58%	321	0.8%	3
China	$1,693	$1,814	13%	15%	4,629	12.2%	3
Hong Kong	$1,302	$1,421	359%	425%	464	1.2%	3
Taiwan	$1,181	$1,181	200%	207%	640	1.7%	4
Singapore	$836	$804	232%	263%	1,319	3.5%	4

Source: International Monetary Fund Balance of Payments, OMFIF analysis

Chinese leverage, international tensions

As the shifts in the last year, especially in the FDI and portfolio investment fields, show, China's importance as an investment hub and a source of capital for the rest of the world is growing in line with its steady ascent as the world's No.2 economy. In no more than a decade or so the Middle Kingdom will, on present trends, incontrovertibly surpass the US in terms of GDP. Behind China's $1.7tn NIIP lie a multitude of intriguing developments. How China and the rest of the world deal with what could be three potent factors of dominance – economic size, volume of creditor holdings, and technological leadership in key spheres – is heading to be a major geopolitical theme.

Over the past decade, Chinese flows of capital abroad have changed pace and direction in clear fashion, throwing up a string of economic, political and industrial challenges for the West. During a period of maximum current account surpluses running at up to 10% of GDP, Beijing had little choice but to buy semi-passively massive quantities of US Treasury bonds, shoring up the US's 'exorbitant privilege' of running the world's principal reserve currency. After foreign exchange reserves passed $1tn in 2006, and especially following the 2008 financial crisis, Chinese decision-makers moved increasingly to switch away from policies of indirectly subsidising the US taxpayer. Coinciding with shrinkage of China's current account surpluses, the country shifted to a much more strategic deployment of its foreign assets.

Advancing beyond earlier efforts to secure and safeguard supplies of raw materials and oil, China has been moving progressively its foreign surpluses into value-creating equity holdings in infrastructure ventures and technology companies abroad. These investments include placements within the Belt and Road initiative, which embodies outright strategic characteristics. The aims include extending throughout Eurasia China's apparatus for financial supervision and regulation – a vital prerequisite for policing China's foreign holdings, and building up the renminbi's position in international payments and investments.

China's shift has been in marked contrast to the outcome in a country with outwardly similar net foreign assets, Germany, where much of the build-up of foreign assets in the past 10 years has been in non-interest-bearing central bank credits of dubious longer-term credit quality within European economic and monetary union.

Gaining extra leverage and value from foreign investments, including portfolio acquisitions and direct investment, has been part of a bid to emulate the successes of the US and other Anglo-Saxon countries in borrowing from abroad at relatively low rates of interest and investing externally at significantly higher rates of return. Unsurprisingly, the changes have led to tensions, seen not just in the brittle relationship with the US, but also in the unease in large parts of Europe, Africa and Asia over China's foreign assets build-up. Worries over Beijing's access to sensitive technologies and critical infrastructure have been a cause for disquiet. China's Belt and Road accord with Italy in April 2019 kindled discord with other EU members, as well as the US, accelerating calls for a common policy to prevent Chinese control of strategic assets. Britain's highly visible policy to court Chinese investment in areas like nuclear power and infrastructure has already led to concern within and outside the UK. Divergence between the US and Europe over the Chinese telecommunications company Huawei has been just one of the consequences.

West tightens rules for foreign investment screening

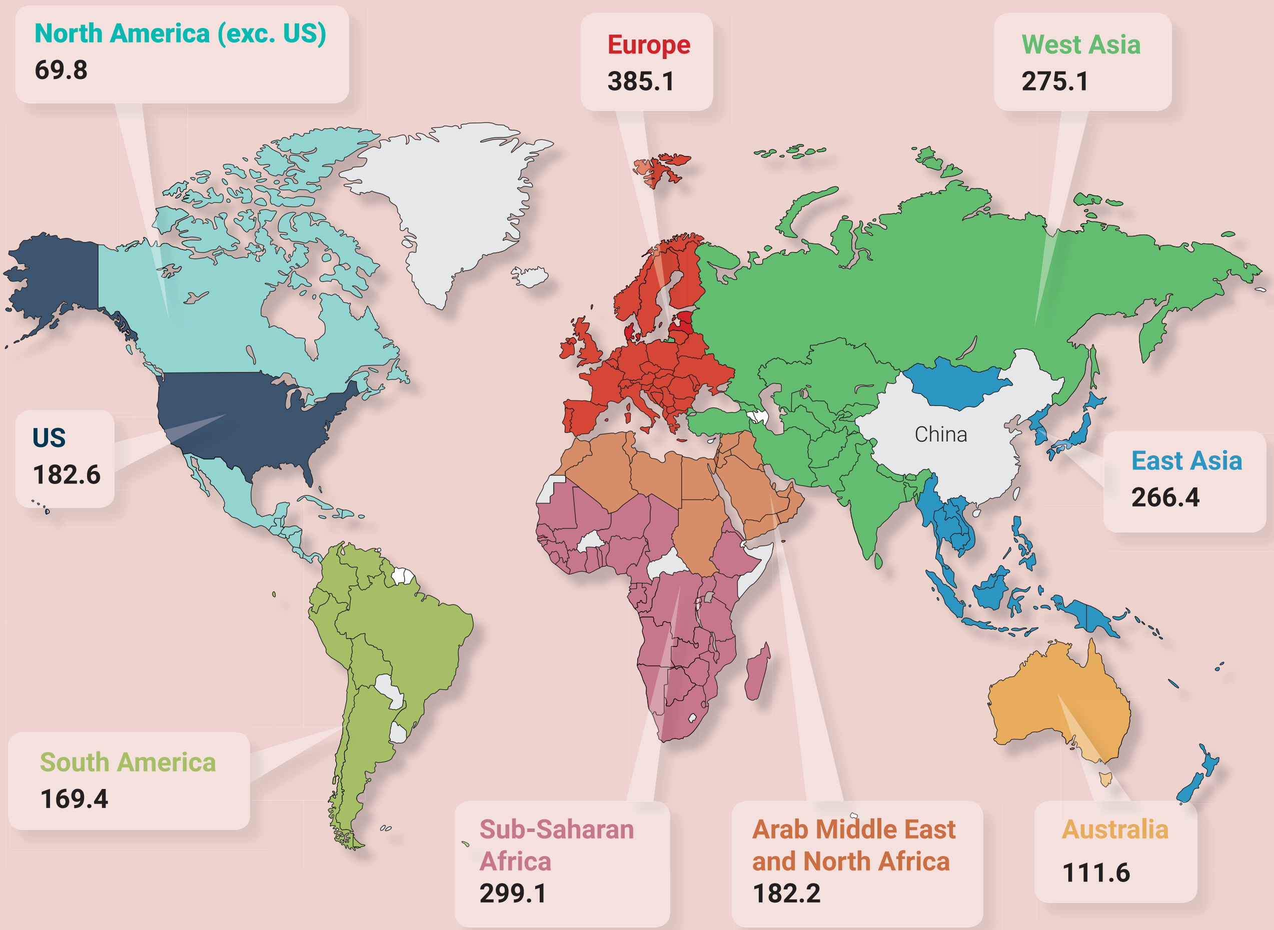
These changes in China's capital flows framework have been taking place against a tense geopolitical backdrop. In 2018, President Trump imposed three rounds of tariffs on China. The third and biggest

"Advancing beyond earlier efforts to secure and safeguard supplies of raw materials and oil, China has been moving progressively its foreign surpluses into value-creating equity holdings in infrastructure ventures and technology companies abroad.

Global flows

China investing heavily worldwide

Combined Chinese foreign investment and construction activity 2005-18, $bn



Largest recipients of Chinese investment
2005-18, $bn

US	**179.9**
Australia	**94.5**
UK	**80.8**
Switzerland	**60.9**
Brazil	**57**
Canada	**53.6**
Germany	**41.2**
Singapore	**33**
Russia	**29.2**
France	**25.5**

Countries with largest Chinese construction activity
2005-18, $bn

Pakistan	**40.6**
Nigeria	**36.4**
S. Arabia	**30.5**
Indonesia	**27.7**
Malaysia	**25.7**
UAE	**23.9**
Algeria	**23**
Ethiopia	**22.5**
Iran	**21.6**
Bangladesh	**21.3**

Source: American Enterprise Institute, OMFIF analysis

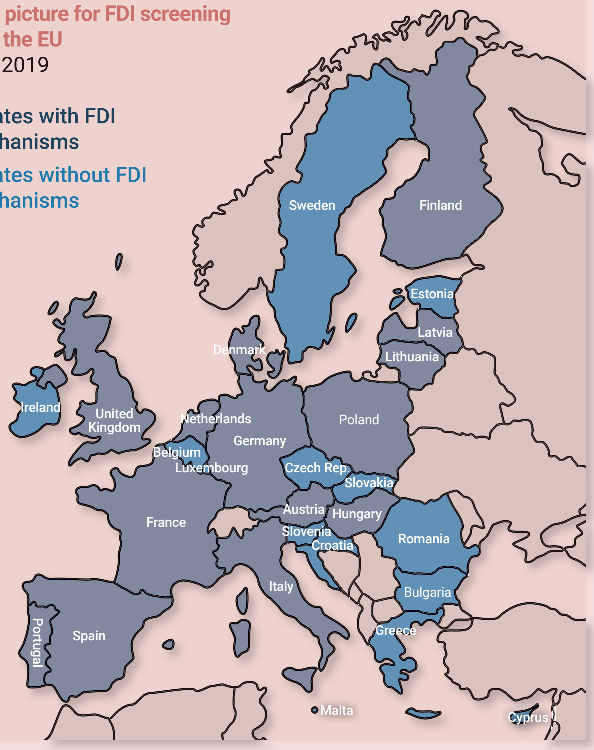
tranche on $200bn worth of Chinese goods came into effect in September. Beijing has retaliated with $110bn worth of tariffs on US goods produced mainly in Trump-supporting districts, including cars and agricultural produce such as soya beans (see article on p.44). However, it has proven more difficult for China to respond on an equal scale, given that its annual imports from the US total only around $130bn (compared with more than $500bn of exports to the US).

In January 2019, in the absence of a new trade deal Trump threatened to raise tariffs to 25% from 10%. Talks between Washington and Beijing later resumed, and over March and April an agreement appeared likely to emerge. But by early May, Trump reiterated his threat, and also warned he would

Figure 7: Mixed picture for FDI screening mechanisms in the EU
As of February 2019

EU member states with FDI screening mechanisms

EU member states without FDI screening mechanisms



Source: European Commission

extend the 25% tariff to a further $325bn worth of goods, thus subjecting all Chinese imports to US tariffs. So far, the tariffs have covered industries ranging from aerospace goods, automobiles, communications technology and robotics, in a bid to hinder Beijing's 'Made in China 2025' initiative to boost its manufacturing and technology base.

The US and others in the West are realising that protectionism need not be confined to trade. Countries possess several broader investment policy instruments with which to address scepticism over Chinese technological and strategic advances.

Last year, both the US and Europe moved to tighten rules on screening foreign investment, especially in technology and strategic assets. Though it was not stated explicitly, this was targeted at Chinese foreign investment. The most important policy change in the US came in August 2018, when the US Congress passed the Foreign Investment Risk Review Modernisation Act, empowering the Committee on Foreign Investment to examine a wide range of deals. CFIUS was created in 1975 by President Gerald Ford's executive order to simply study foreign investment. Its remit was expanded in 1988, when Congress empowered it to scrutinise mergers and acquisition deals with foreign buyers, a move motivated by fears over Japanese investment. It remained a largely obscure government agency throughout most of its history. It entered the spotlight in 2006, when it approved Dubai Ports World's acquisition of six US ports, a deal that was blocked subsequently by Congress. The scope of CFIUS's authority was further strengthened of the Foreign Investment Security Act in 2009. Its activity picked up further under the Obama administration. More recently, CFIUS raised national security concerns over the $121bn acquisition of Qualcomm by Singapore-based Broadcom, given Qualcomm's role in developing 5G.

Firrma's purpose is 'to address growing national security concerns over foreign exploitation of certain investment structures which traditionally have fallen outside of CFIUS jurisdiction'. Its mandate includes reviewing non-controlling investments and foreigners serving on boards with access to non-public technical information. It applies to any deal that 'could pose a threat to US technological superiority or national security', particularly from 'countries of special concern'.

The EU is also scaling up its FDI screening, in response to increased levels of foreign investment into sensitive sectors. Chinese FDI into the EU reached a record high in 2016, prompting the German, French and Italian governments to write to the European Commission in February 2017, asking it to redraw the rules on foreign investment. Two years later, in March 2019 the European Parliament published a new framework for screening FDI. This came into force the following month and will be applicable to all member states from October 2020. It is the first EU measure to screen FDI on the grounds of security and public order, in line with the US and Japan, as well as China itself.

While FDI approval still lies with EU member states, the new framework is a clear indication of the direction Brussels is taking. It is also beginning to influence individual countries' stances. Among the 28 members, 14 already have their own FDI screening mechanisms (see Figure 7), and others, including the UK, are considering strengthening theirs.

No specific sectors are defined in the framework, but the grounds of security and public order are most likely to affect the areas of infrastructure (particularly energy and transport), communications and information technology, food security and technology (especially robotics, artificial intelligence and biotechnology). The impact will be sizeable. According to calculations by the Mercator Institute for China Studies, if the screening framework had been in place in 2018, as much as 83% of Chinese investments worth more than €1m could have been investigated under the regime.

Global flows

> China's dissatisfaction with the dollar-orientated international monetary system has been accompanied by a clear programme for reinforcing usage of its currency beyond its borders.

Separating public sector from corporate interests

These changes have been sparked by an increasing number of high-profile Chinese corporate acquisitions. Even though China's international holdings have become increasingly 'privatised' because of a rise in non-official investments abroad and fall in the currency reserves, the Huawei example shows the sensitivity over the demarcation line between Chinese public sector and corporate interests. The Beijing authorities retain strong sway over foreign exchange outflows, with currency controls used as a direct instrument for fine-tuning investment flows. These efforts have included sporadic crackdowns on employment of overseas assets in fields such as entertainment companies, sports clubs, real estate and hotels as the authorities have sought to counter volatility in foreign exchange outflows and potentially destabilising declines in reserve holdings. Overall, the investment policy has reinforced the country's desire to gain access to high value-added sectors. This is an intrinsic part of a long-term Chinese progression away from an investment- and export-led economy towards greater focus on consumption to satisfy the demands of a growing cohort of middle class Chinese. This shift is generally welcome for the equilibrium of the world economy – but perturbations along the way are inevitable.

Challenging the dollar

The evolving pattern of foreign investment has been closely tied up with long-term internationalisation of the renminbi, an issue that goes to the heart of the power relationship with the US. China's dissatisfaction with the dollar-orientated international monetary system has been accompanied by a clear programme for reinforcing usage of its currency beyond its borders. Facilitating the renminbi's progression to become, over time, the No.2 reserve and market currency after the dollar brings responsibilities, and some residual risks. This has run in parallel to efforts towards strengthening China's own financial markets and banking infrastructure to allow foreign investors steadily increasing access to onshore investments. Risk review and mitigation are essential – Beijing is well aware that loss of monetary control was one of the reasons for the progressive weakening of the former Nationalist regime that led to the Communist takeover in 1949. But enhancing the renminbi's external role has economic and political benefits, not least in allowing excess savings to be channelled abroad into value-creating investments that can be drawn down as China's demographic aging and its economic transition continues.

Enabling Chinese market participants to diversify risk, finance investment more efficiently and benefit from deeper markets abroad brings China clear advantages. Shifting into longer-term investment deployment not only backs the rebalancing of the economy but also offsets the volatility of portfolio flows often associated with capital flight. Even as greater political and regulatory scrutiny led to a drop in 2018 investments in the US and Europe, the Belt and Road has opened a wider and ever more international Chinese platform.

Chinese investors and financiers are set to become an ever-bigger force globally. Lenders such as the China Development Bank will be flexing their muscles on the international stage. The rise of the Asian Infrastructure Investment Bank, with strong participation by western countries (with the notable exception of the US), sets down a clear signal of China's willingness to challenge the hitherto western-dominated consensus on development finance. As the AIIB's clout expands, there will be further interactions of both positive and negative kinds with established development and financing bodies.

Fresh evidence of China's expanding cross-border influence in banking and finance will emerge in coming years. Necessary consolidation of the European banking sector is already attracting significant attention from China. With post-crisis restructuring of the banking industry leading to a rise in the global dominance of US investment banks, it may be only a question of time before Chinese banks consider taking stakes in or even trying to assume control over some pivotal institutions in Europe. The quickly abandoned merger talks between the No.1 and No.2 German lenders, Deutsche Bank and Commerzbank, will accelerate speculation of cross-border mergers, in which Chinese entities may play a central role. The widespread controversy over Belt and Road projects may foreshadow more political wrangles.

The influence of China's foreign investment motivations on the West's strategic, security and foreign policy interests will gain ever greater attention. Positive outcomes are certainly possible. But to achieve that, greater clarity about the genuine intentions and interests of China and the West will be needed, as well as considerable international statesmanship – a commodity that has been, in recent years, in short supply. ✦

Danae Kyriakopoulou is Chief Economist and Director of Research, and Adam Cotter is Director and Head of Asia at OMFIF. Research assistance was provided by Bhavin Patel, Senior Economist and Head of Fintech Research at OMFIF.

Global capital flows in 2018, top 25 economies by sum of assets and liabilities, $bn

			Assets					Liabilities				Total foreign assets and liabilities (% of GDP)
	Total foreign assets ($tn)	Total foreign liabilities ($tn)	FDI	Portfolio -Equity	Portfolio -Debt Securities	Loans & other	Foreign reserves	FDI	Portfolio -Equity	Portfolio -Debt Securities	Loans & other	
US	25.4	35.1	7,528	7,826	3,455	6,140	449	8,518	7,454	11,284	7,859	295
Luxembourg	12.9	12.8	6,301	2,294	2,426	1,836	1	5,512	4,624	1,312	1,384	37,355
Netherlands	9.7	9.1	6,123	905	976	1,669	38	5,009	893	1,629	1,570	2,061
Germany	9.8	7.5	2,386	1,146	2,153	3,922	198	1,691	694	1,989	3,083	431
UK	14.2	14.5	2,129	2,109	1,303	8,523	155	2,221	1,969	2,507	7,848	1,017
Hong Kong	5.5	4.2	2,102	1,002	594	1,357	424	2,229	451	91	1,415	2,663
China	7.3	5.2	1,899	270	228	1,759	3,168	2,762	684	412	1,335	93
France	7.8	8.1	1,887	796	1,914	3,045	167	1,280	683	2,635	3,518	574
Switzerland	4.9	4.0	1,751	688	654	977	789	1,551	956	131	1,323	1,253
Japan	9.2	6.1	1,667	1,655	2,427	2,208	1,265	282	1,616	1,555	2,668	309
Ireland	6.2	6.8	1,638	1,254	1,903	1,446	5	1,635	3,095	486	1,550	3,491
Canada	3.6	3.2	1,399	1,171	366	615	84	968	482	1,123	674	402
Singapore	3.8	3.0	1,021	603	618	1,307	287	1,481	163	56	1,324	1,900
Belgium	2.2	2.0	960	361	384	513	27	904	190	446	479	800
Spain	2.2	3.3	740	327	398	709	71	836	321	916	1,239	390
Italy	3.1	3.2	668	953	624	689	153	550	232	1,067	1,317	302
Australia	1.8	2.5	533	503	291	450	57	725	387	909	502	307
Sweden	1.5	1.5	485	421	136	399	60	437	247	426	354	538
Russia	1.3	1.0	433	6	63	370	468	497	154	54	264	142
Brazil	0.9	1.5	400	33	7	88	375	762	305	190	237	128
South Korea	1.5	1.1	388	262	194	273	404	231	437	231	208	162
Austria	1.0	1.0	329	127	204	299	23	308	64	341	253	426
Denmark	1.1	0.9	283	289	189	243	71	182	184	251	242	551
Norway	1.6	0.8	231	731	420	199	63	179	101	267	286	570
Mexico	0.6	1.1	211	37	17	129	176	544	135	348	109	140

Source: International Monetary Fund Balance of Payments, OMFIF analysis

✧ Digital economy

Guardians of stability in digital economy

We must stick to realistic expectations about fintech: cryptographic machines will not replace currencies; strong balance sheets will not become irrelevant in financial intermediation.

Ewald Nowotny
Oesterreichische Nationalbank

> An important message for financial education efforts by central banks is for the public to beware of techno-deterministic fairy tales.

Digitalisation can strongly affect the supply structure of the financial sector, but also consumer needs and the structure of demand. Advances in financial technology put the value chain in banking in the spotlight. In this turbulent context, central banks as guardians of stability have three main roles.

First, central banks provide orientation as neutral economic advisers. They help people understand the potential, limits and risks of technologies in the financial context. Technology can support, but cannot replace currencies or financial institutions.

The business of banks and other financial players is to absorb financial risks for their customers by providing financial guarantees. Purely technical platforms without owners underpinning them with strong balance sheets may complement or use such guarantees by intermediaries, but they will not replace them.

An important message for financial education efforts by central banks is for the public to beware of techno-deterministic fairy tales. Opportunities from technological innovation must be grasped while keeping in mind their risks. The most spectacular innovations are not always the most promising, and innovation must be associated with sound economics to become useful.

Second, central banks, in their capacity as providers of market infrastructure, continuously adapt to new developments in the payment sector. In most European Union countries, cash remains popular, but the variety of available non-cash payment services is rising. Payment services have been a focus of recent fintech activity, contributing to an unbundling of services associated with payments.

We should expect a decisive shift regarding user requirements. Digitalisation increases demand for payments in real time. European authorities promote innovation in this area through two initiatives. Through the updated EU Payment Services Directive, European regulators facilitate access for new entrants in the payment market, such as by enabling customers to give non-bank payment service providers access to their bank accounts under appropriate circumstances. In addition, the Eurosystem has developed a new infrastructure through which payment service providers can develop instant payment solutions for customers. The new Target Instant Payment Settlement service went live at the end of 2018.

The euro is the first major currency offering instant payments in central bank money, underpinning the first-class status of the euro area financial market.

With respect to blockchain, market participants are experimenting with applications intended to streamline processes in post-trade infrastructure. From the perspective of central banks as infrastructure providers, blockchain technology does not meet security and efficiency standards required for central bank systems at the current stage of development.

Third, central banks as guardians of financial stability provide regulatory and supervisory frameworks for beneficial innovation.

Borderless business

Several emerging fintech business models do not fit existing regulatory frameworks. This creates legal uncertainty, room for regulatory arbitrage and financial stability risks. Not least because of the borderless nature of digital business, it is important to have international coordination on these issues.

The progress of digitalisation will bring many changes to the financial sector. A key challenge is to stick to realistic expectations: cryptographic machines will not replace currencies; strong balance sheets will not become irrelevant in financial intermediation. Innovation is successful when it develops new solutions that create economic value by meeting or creating effective demand, or by cutting costs. A supportive environment for innovators combines vision with economic realism to avoid unwarranted waves of financial euphoria that end unhappily.

Central banks must be aware of how best to use latest technological developments in the financial sector. Where central banks differ from most tech-orientated stakeholders is their strong focus on the 'fin' aspect of the 'fintech' phenomenon. That focus should remain paramount. ✦

Ewald Nowotny is Governor of Oesterreichische Nationalbank.

✧ Digital economy

Accelerating central banks' digital growth

Making progress on diverse technology issues at central banks, in collaboration with fintech specialists, will benefit the financial industry and foster innovation.

Thierry Bedoin
Banque de France

> Blockchain technology can enable the various actors in the financial system to interact more quickly and easily with each other and with the central bank.

Innovation can help regulators achieve their ultimate objective of financial stability. Fulfilling new needs will lead to higher consumer satisfaction, which in turn will increase confidence in the financial sector, benefiting financial stability.

That is why in the Banque de France and French Prudential Supervision and Resolution Authority (ACPR) develops initiatives to encourage agile interaction with innovative players in the financial sector.

The ACPR Fintech-Innovation hub was established in June 2016. This small, agile and tech-friendly team, open to all, enables informal and direct contact between financial technology specialists and the supervisor. More than 400 fintech entrepreneurs have met with the hub since its inception. Making further progress on issues as diverse as artificial intelligence, anti-money laundering technologies, analysis of internal risk models and compliance of commercial practices will benefit the financial industry and foster innovation.

Last year the Banque de France opened the new premises of Le Lab. As an open space for meetings and collaborative work, this innovation centre brings together representatives from the central bank, start-ups, fintech companies, institutional players and academics to experiment with new concepts and technologies.

The aim of Le Lab is to assist the Banque de France with its digital transformation, and to test and develop solutions that draw on innovative technologies, such as AI and blockchain. In less than two years, Le Lab has already conducted more than 25 experiments.

Asserting leadership

Blockchain technology can enable the various actors in the financial system to interact more quickly and easily with each other and with the central bank. The Banque de France is evaluating the potential applications of this technology.

The central bank has already implemented a simple use case, consisting in sharing with banks the Single Euro Payments Area creditor credentials register. In the euro area a company wanting to perform a direct debit on their customers' bank accounts needs a SEPA creditor identification number, and gets it through its bank. The Banque de France delivers and securely records this identifier within the blockchain. That way, credentials are issued in minutes rather than days. This solution was first experimented with in Le Lab with the help of a start-up. We then developed the application by coding the role of the Banque de France in the form of smart contracts in the blockchain. It went live in December 2017.

Digitisation is also opening our data to the outside world. The Banque de France through its Open Data Room (with bureaus in both Paris and New York) provides researchers with more than 700m anonymised economic series. Remote access will be proposed soon. The Banque also gives access to its economic statistics in open data mode through the Web-Stat website and has contributed, in liaison with the French Centre for Economic Research and Its Applications and General Commissariat for Strategy and Foresight, to the opening of the DBnomics public database of data.

We strongly believe that the only way forward for any institution is to enter the digital era resolutely, and to adapt whatever necessary internally and change its relationships with its environment to reap all the potential benefits. Central banks must assert their leadership in the digital sphere to foster innovation and financial stability.

Thierry Bedoin is Chief Digital Officer at the Banque de France.

✧ Digital economy

Spreading the role of data science

It is not enough to use the right algorithms on the right datasets with the right infrastructure. There needs to be an understanding of what the results mean for human decision-making.

David Roi Hardoon
Monetary Authority of Singapore

"Analytical and technical expertise in machine learning and network analysis algorithms are fruitless without a clear understanding of the issues on the ground.

Alan Turing, the father of theoretical computer science and artificial intelligence, introduced in 1950 the concept of the 'Turing test' to determine whether machines can think intelligently like humans. Turing wrote, 'We can only see a short distance ahead, but we can see plenty there that needs to be done.' Fast forward to today, and we are still grappling with this concept.

Data science is the business of algorithmically deriving insight from data. This is not the same as AI, where the insights and data themselves are inherently not 'intelligent'. Data scientists work to obtain data-driven insights in a smarter, more systematic way.

This requires four essential components, which are the building blocks for any successful data science venture. First is getting the data in order. This involves not only an understanding of the data, but also the necessary processes surrounding them. Second is deploying the appropriate tools or technological capabilities. This includes machine learning, natural language processing and network analysis algorithms, to find out what the data are saying about patterns and behaviour. The third element is putting in place the necessary infrastructure to facilitate the first two components. Finally, and by far the most important, is training people with the relevant skillsets. It is not enough to use the right algorithms on the right datasets with the right infrastructure. There needs to be an understanding of what the algorithms are doing and what the results mean for human decision-making. This goes beyond the science of data cleaning and understanding the maths behind the algorithms. It is the art of contextualising the output of these algorithms to improve predictions of consumer behaviour.

Key lessons

These four components are interconnected. A decision made on one component will impact all the others. They are foundational, and must form part of a structure that weaves each of them with the organisation's needs and expectations. While the objectives of data science differ between organisations, there are key lessons that are consistent regardless of industry. Institutions often wonder whether they need a dedicated analytics unit, or if individuals trained in data science should be embedded within existing teams and functions. The reality is there is no right or wrong answer.

Analytical and technical expertise in machine learning, natural language processing and network analysis algorithms are fruitless without a clear understanding of the issues on the ground. Conversely, staff trained in data science and embedded in teams across the organisation without sufficient coordination are likely to duplicate work of a similar nature. Therefore, regardless of the operating model, it is important to establish efficient ways of performing tasks. At the Monetary Authority of Singapore, we term this a 'hub-and-spoke' strategy. We have a dedicated analytics group supporting and supported by all departments.

In 2017, when MAS established the Data Analytics Group, now part of the newly-created Technology Group, we emphasised from the start that data science is not the domain of any single department or group. Instead, it should be part of all operations, notwithstanding that some techniques would require deep expertise that only a few in the organisation possess. The requirements of data science will vary from task to task, person to person, team to team and organisation to organisation – it is not a one-size-fits-all approach.

Any organisation that seeks to sharpen its analytical capabilities must accept and embrace change. When the typewriter was invented in the 1860s and started to be sold for business correspondence, typing was a rare, specialised skill. Now, it is considered a basic requirement of many jobs. Technological advancement will happen no matter what. Change must be embraced. Technology will no doubt change the nature of current jobs, but it will not eradicate them. There will be an abundance of jobs – some of which have yet to be invented.

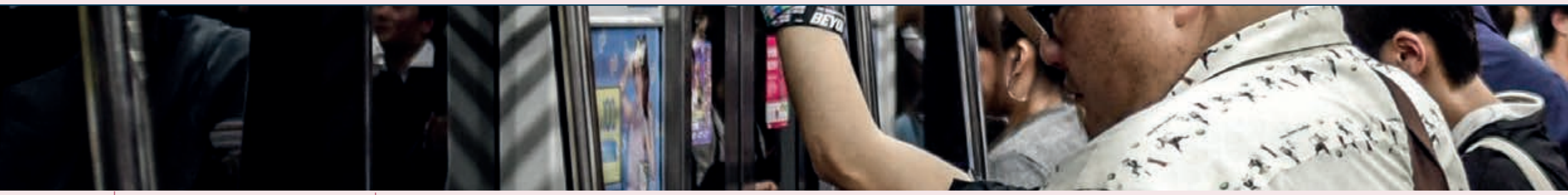
People will continue to play an important role in contextualising data science. They will still need to look at the output of complex machine learning algorithms, interpret the results and analyse what implications there are for decision- and policy-making. Data provide the path to insights. But, ultimately, people make the decisions. ✦

David Roi Hardoon is Chief Data Officer at the Monetary Authority of Singapore.

OMFIF Special report

Central bank communications

Social media has become a pillar of central banks' communications strategies. These institutions employ a broad array of tools, from music videos to Twitter polls, to engage with audiences.



Central bank communications

Central banks take on social media

Danae Kyriakopoulou
Chief Economist & Director of Research, OMFIF

Pierre Ortlieb
Economist, OMFIF

The profile of and public interest in central banks have grown significantly over the past few years. They have been described as 'the only game in town' and 'masters of the universe'. Their toolkits have grown to enable them to respond more effectively to financial crises. But increased public attention brings more scrutiny, and calls for greater legitimacy and accountability. Some pundits have suggested curtailing (or even ending altogether) central bank independence.

Trust is central bankers' most valuable resource. In today's environment, safeguarding and building trust has become one of the most pressing issues facing central banks. Their communications practices offer one avenue for doing so. This includes use of innovative instruments. As a result, central banks are increasingly using social media to reach the public directly. In December 2018, a study by the Pew Research Centre showed that social media sites for the first time surpassed newspapers as sources of news for people in the US – one-in-five adults consume news on social media, compared with 16% for newspapers.

Television remains the most popular at 49%. Social media is the primary news source for young people, being the preferred medium for 36% of those aged 18-29. Central banks are taking note. 'Public language has become shorter, sharper and shriller, with higher impact and wider reach, aided and abetted by new media,' remarked Andy Haldane, the Bank of England's chief economist in an 11,500-word-long speech on the evolution of central bank communications: 'Twitter, as a media medium, ticks every one of these boxes: personalised, socialised, distributed, short, sharp and shrill.'

> "The most recent chapter in central banks' evolutionary history has been increased openness and transparency about their actions, monetary, macro- and micro-prudential.
>
> Andy Haldane, Chief Economist and Member of the Monetary Policy Committee, Bank of England

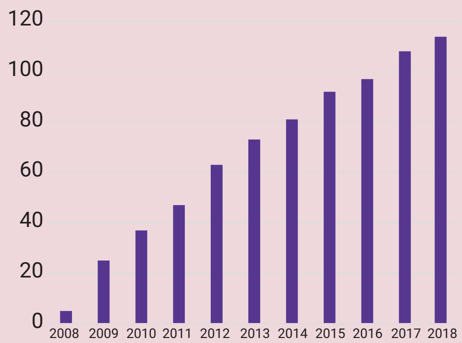
Central banks take on Twitter

'Statement Regarding June 9 Meeting on Over-the-Counter Derivatives', read the first ever central bank tweet. It came from the Federal Reserve Bank of New York on 10 June 2008, the bank having joined Twitter that day, just a few months before the collapse of Lehman Brothers. The New York Fed was in fact the second central bank to join Twitter; the Bank of Canada joined a week earlier on 2 June but did not publish its first tweet until 13 June. The Bank of Nigeria and Federal Reserve Bank of Richmond joined shortly after, in September of that year, with the Banco de Guatemala's joining in December bringing the total number of central banks active on Twitter at the end of 2008 to five. Since then, a further 109 central banks have joined Twitter, with the central banks of Jamaica, Zambia and Spain being the latest additions in October 2018 (see Figure 1).

Collectively, central banks on Twitter represent 102 jurisdictions and 61% of all monetary institutions,

Figure 1: Number of central banks on Twitter grows by factor of 23 in past decade

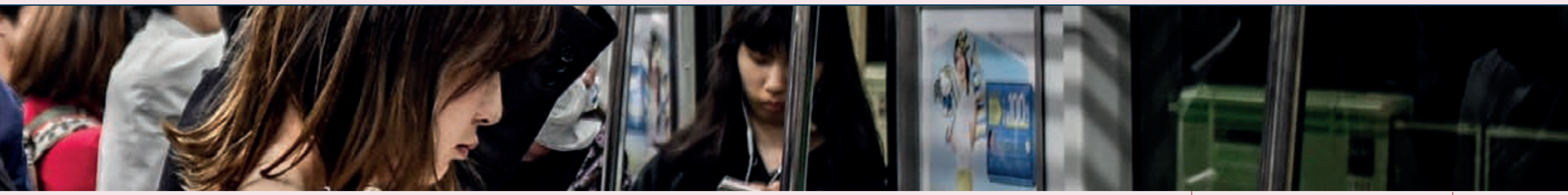
Central banks with active Twitter handles



Source: Twitter, OMFIF analysis

and have close to 7m followers. For comparison, President Trump has 60m individual followers, while former President Barack Obama has 106m individual followers. CNN Breaking News has more than 55m followers.

The list includes the world's largest and most important central banks for financial markets such as the US Federal Reserve and its 12 regional Feds,



the European Central Bank and all but two euro area national central banks (Greece and Luxembourg being the two exceptions), the Bank of England, Bank of Japan, Reserve Bank of India and Swiss National Bank. The People's Bank of China is a notable absentee. Among these six major central banks, the BoE, Fed and ECB were first to join in 2009, but the RBI has been the most active with an average of six tweets per day, followed by the ECB with 3.7, compared with around two for central banks on average. Trump by comparison tweets around 10 times per day (see Figure 4).

Twitter appears to be the most popular social media platform for central banks, with 114 active on the platform compared with around 24 on Instagram. Many central banks engage with the public through YouTube videos, with Bank Negara Malaysia, the San Francisco Fed, Dallas Fed and Bank of Uganda the most active with more than 300 videos each.

Bank Indonesia is Twitter's most followed central bank, with more than 660,000 followers. Since joining in June 2010, its has posted around 18,000 tweets, almost all in Indonesian. Banco de México comes second with around 635,000 followers, and has posted close to 24,000 tweets (almost all in Spanish) since joining in October 2009. The US Fed, ECB and RBI complete the top five (see Figure 5). In per capita terms, the central banks with most followers are those of the Maldives and Bermuda, with around 33 followers per 1,000 citizens, perhaps indicating a high external level of interest in their operations. The Maldives Monetary Authority has published 69 videos on YouTube on subjects ranging from the history of its currency to identifying counterfeit notes, and from central bankers' speeches to explainers on prices, jobs and monetary dynamics. Some of these have also appeared on the country's TV channels. Meanwhile, the central banks of Mexico, Saudi Arabia, Malaysia, Peru, Colombia and Venezuela appear in ↘

Top tweets by Fed and CBN deal with fines and misconduct

Fed announces cease and desist order against U.S. operations of Deutsche Bank AG; fines firm $41 million: go.usa.gov/xN59B

Federal Reserve @federalreserve
9:32pm - 30 May 2017

#CBN Slams N2.4bn fine on Standard Chartered, N1.8bn on Stanbic IBTC, N1.2bn on Citibank, N0.25bn on Diamond Bank. All to also refund a total of $8.134bn for breaching Nigeria's forex regulations on MTN's illegal capital repatriation.

Central Bank of Nigeria @cenbank
5:52pm - 29 Aug 2018

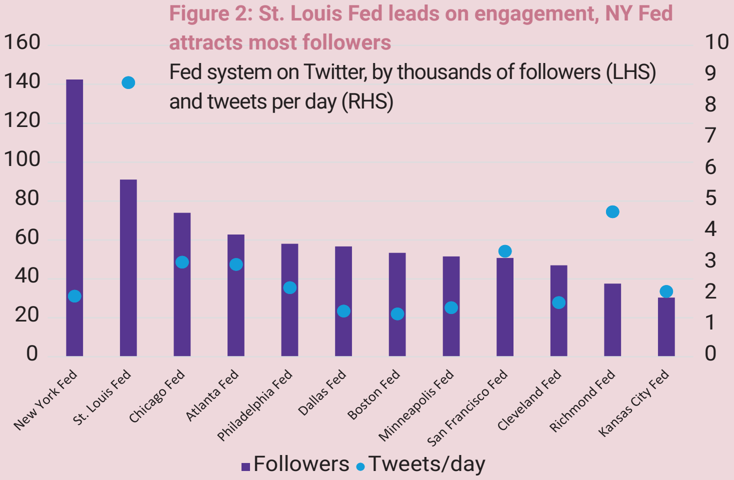
> "There are few Federal Reserve blogs. The Atlanta Fed has one. The New York Fed has one and we have Twitter. We have Facebook. So, we're still a little bit old-fashioned, but I think social media does provide a really convenient way to communicate quickly to a group of people.
>
> Ben Bernanke, former Chairman, Federal Reserve Board of Governors

The Federal Reserve System on Twitter

In the Federal Reserve System, the New York Fed controls the Twitter handle with the most followers, at 143,000. This is still less than half that of the Fed (512,000) but well above that of the second highest regional Fed (St. Louis, at 91,000) and the overall average for the remaining regional Feds (52,000). This can be partly explained by its first-mover advantage, since the New York Fed was the second central bank to join Twitter, as well as the relatively large population and financial and digital literacy levels in the parts of the country for which it is responsible. The popularity of the St. Louis Fed, in spite of its being one of the last to join Twitter from the Federal Reserve System, probably reflects its high rate of activity. With close to nine tweets per day, it is the world's most active monetary authority on Twitter (see Figure 6).

Figure 2: St. Louis Fed leads on engagement, NY Fed attracts most followers

Fed system on Twitter, by thousands of followers (LHS) and tweets per day (RHS)



Central bank communications

> 'We need to break through the noise and filters by trying and testing various approaches, mediums and channels in order to arrive at the best possible solution to inform the public as widely as possible.'
>
> Sharon Donnery, Deputy Governor, Central Bank of Ireland

the Twitter top-10 in terms of both absolute numbers of followers and followers per capita.

Levels of engagement vary greatly. Despite being the third most followed central bank on Twitter, the Fed's top-retweeted tweet only got 492 retweets. In comparison, the Central Bank of Nigeria's top tweet was retweeted 2,200 times, even though it has half the number of followers of the Fed.

Europe and the Americas are the regions with most central banks on Twitter, with 35 out of 46 central banks in Europe active on the platform, and 25 out of 32 in the Americas. Meanwhile, fewer than half of central banks in Asia (18 out of 39), Africa (17 out of 41) and the Middle East (7 out of 15) are active on Twitter.

Overall, emerging market central banks, and particularly those from Latin America, appear to be the most active on Twitter, with the central banks of El Salvador, Mexico, Ecuador, Argentina and Costa Rica all in the top 10 in terms of frequency of tweets.

Economic data, polls and music videos

Central banks differ widely in how they use their Twitter presence. Some, such as the Bank of Japan, tend to share simple links to data-heavy economic releases, while others, such as the European Central Bank, engage with their audience more actively by participating in Q&As.

Our analysis of the words most frequently used by central banks on Twitter illustrates this variety (see Figure 3). The Bank of England, for instance, most commonly uses active, inclusive terms: its most frequently used word since 2013 is 'see', with 'find' in seventh place, 'read' in 21st, and 'watch' 27th. Other central banks tend to use words most associated with a policy goal or comparative advantage: 'fintech' appears as the 15th-most used word by the Monetary Authority of Singapore, while emerging market central banks most concerned with reserves management tend to tweet about currency developments or exchange rates. As a result, the

> 'In Jamaica, whether you're communicating about a glass of juice, or beer, or you are communicating complex monetary policy, music helps the communication effort.'
>
> Nigel Clarke, Finance Minister, Jamaica

terms 'GBP', 'USD' and 'euro' all appear in the top eight words most referenced by the Central Bank of Sri Lanka and Central Bank of Kenya.

Few central banks tweet frequently about inflation or prices. In our sample of English-language central bank accounts, 'inflation' appears in the top-10 most used words only once, as the South African Reserve Bank's most used term. Yet almost all central banks tweet about their banknotes enthusiastically. The Bank of England has used hashtags celebrating its new issues liberally, including 'thenewfiver' 95 times and 'newtenpoundnote' 60 times. A tweet presenting the new Chf1,000 note is the Swiss National Bank's most retweeted post ever.

Based on the most liked and most retweeted posts of major central banks, social media audiences seem to be developing an interest in unexpected financial areas. The most retweeted tweets of the Fed and Central Bank of Nigeria, among others, refer to legal measures and fines enacted against major financial institutions – Deutsche Bank and Stanbic respectively (see 'top tweets' on previous page).

Twitter users are most responsive to tweets dealing with credit and money creation in modern economies. The ECB's most liked and retweeted post deals with the question of how central banks 'create' money to pay for quantitative easing programmes. Similarly, the SNB's second most popular tweet is a link to a speech entitled 'How money is created by the central bank and the banking system'. The Bank of England's most-liked is a survey asking followers what the future of money might look like, with almost 17,000 responses.

There is a thematic pattern on display in user engagement. Central banks may use the popularity of these tweets to inform their understanding of the issues that most interest and affect their constituents. Twitter's 'poll' feature, such as the one employed by the BoE, or live 'Question and Answer' sessions can be used to drive direct public engagement. The ECB frequently invites the public

to submit questions to members of its executive board by using the #AsktheECB hashtag. Users are invited to submit questions at a specific time, with the central banker available for a period of around 45 minutes to answer questions as they appear live. Questions have ranged from issues regarding QE to the choice of colour for ECB President Mario Draghi's tie.

The Bank of Jamaica, having joined Twitter only in October 2018, has attracted attention for its innovative use of social media. In September 2017, as part of Jamaica's economic reform programme, a new medium-term inflation-targeting ↘

Figure 3: Most frequent terms
Terms used most often by central banks

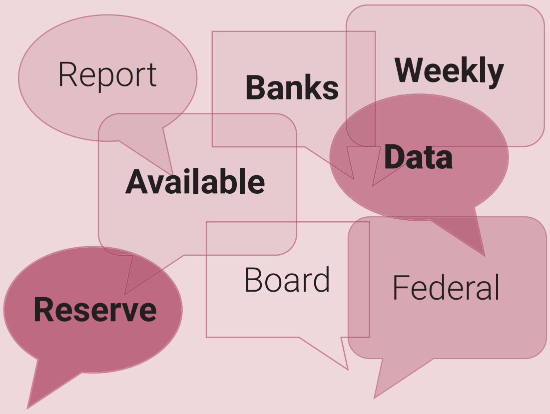
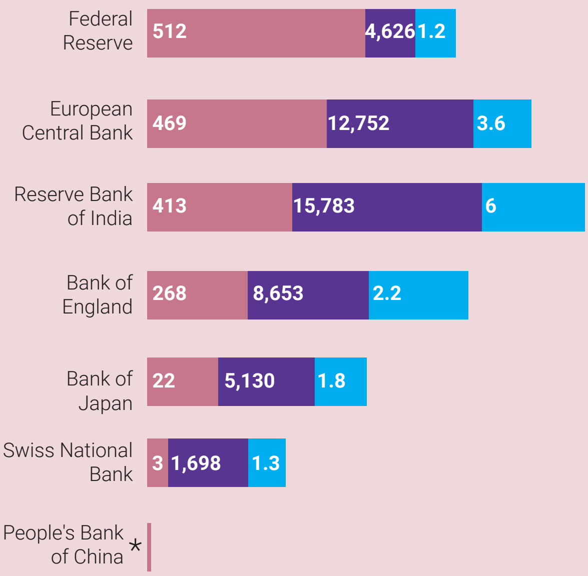


Figure 4: Key stats for major central banks
Followers (thousands), Tweets, Tweets / day



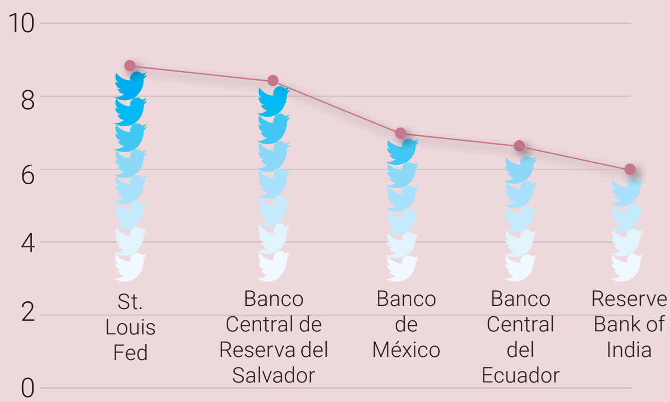
* PBoC not on Twitter
Source: Twitter, OMFIF analysis

Figure 5: Bank Indonesia most followed
Followers of central banks

660k	Indonesia	269k	UK
634k	Mexico	247k	Venezuela
513k	US	233k	Malaysia
470k	EU	230k	Nigeria
413k	India	174k	Kenya
293k	Colombia	162k	Peru
292k	Saudi Arabia	148k	Canada
291k	Brazil		

Source: OMFIF

Figure 6: Americas dominate top five most active
Tweets per day



Source: Twitter, OMFIF analysis

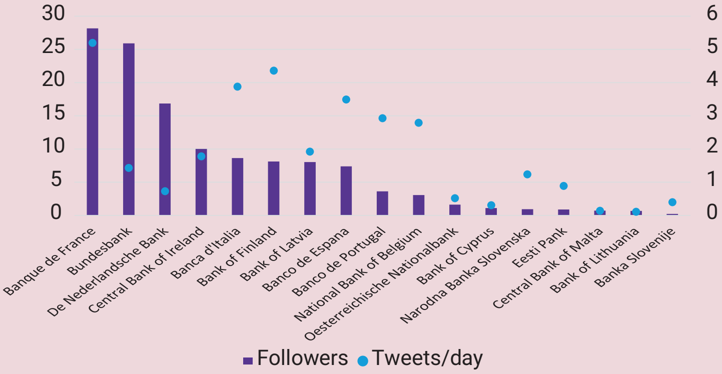
↘ Central bank communications

The Eurosystem on Twitter

The European Central Bank is one of the world's most followed central banks with more than 470,000 followers, almost four times as many as all those of all the national euro area central banks combined. The Banque de France is the most active Eurosystem central bank and one of the most active worldwide, with more than five tweets per day on average (compared with less than four for the Banca d'Italia and ECB). It is also the most popular central bank in the currency area with more than 28,000 followers, closely followed by the Bundesbank with 25,000 followers.

Figure 7: France and Germany the euro area's most followed

Eurosystem central banks on Twitter, by thousands of followers (LHS) and Tweets per day (RHS)



Are you on Twitter?

Interested in central banking?

You can subscribe to OMFIF's public list of all active central banks to see what's happening in the central banking world here: https://twitter.com/OMFIF/lists/central-banks.

You can follow the OMFIF Twitter account on @OMFIF and the authors of this report: @DKyriakopoulou @Pierreppo

monetary framework was set for the central bank. In response, the Bank of Jamaica has created a series of videos featuring reggae music to explain the new framework. Some central banks are also using Twitter to attract new staff, with the Bank of Canada having a separate Twitter handle dedicated to recruitment @BoC_Jobs.

Central banks, including the ECB and Bank of Jamaica, have from time to time engaged in more 'light-hearted' tweets, such as wishing their followers a Happy Valentine's Day declaring that 'the marginal returns of spending time with you will never diminish' and that 'I love you like the ECB loves stable prices'.

Institutional and individual use of social media

Current central bank governors are scarce on social media. Exceptions include Olli Rehn, governor of the Bank of Finland and contender to succeed Draghi at the ECB. Rehn maintains a well-cultivated feed covering everything from the implications of Finnish GDP growth to the music of Jeff Beck.

Increasingly, however, retired central bank governors and senior staff have taken to social media to share their views. Vítor Constâncio, former ECB vice-president, has taken to social media to offer commentary on developments in the euro area and global economy. Erikki Liikannen, former head of the Bank of Finland, has engaged in similar activity, alongside sharing pictures of scenic Finnish landscapes.

Social media activity has become a pillar of central banks' communications strategies. They employ a broad array of tools, from music videos to Twitter polls, to engage with audiences. The trust this seeks to create underpins the independence and legitimacy of modern central banks. From the perspective of financial markets, these practices provide further insight into the thinking and priorities of central banks. As Draghi noted in 2014, central bank communications 'are actually a monetary policy tool in itself'. This is not limited to forward guidance or technical speeches, but includes day-to-day interactions with constituents.

Social media can open much-needed two-way communication avenues for central banks. The use of social media increasingly informs policy-making itself. In 2015, then-Fed Chair Janet Yellen instituted a research programme examining the degree to which non-traditional statistics – such as Google search trends and the frequency of certain terms or hashtags on Twitter – could be used to gauge economic sentiment and inform forecasts. Central banks' use of social media is multidimensional and intensifying rapidly. ✦

Danae Kyriakopoulou is Chief Economist and Director of Research, and Pierre Ortlieb is Economist at OMFIF. **The authors thank Stefan Berci, Communications Manager at OMFIF, for his assistance with this report.**

✧ Digital economy

'Rules of the game' for digital currencies

Numerous precursor policy points must be answered to advance the issuance of central bank digital currencies. At the core of this issue lies the key question: why issue a CBDC at all?

Arif Ismail
South African Reserve Bank

" An electronic store of value, backed by a central bank and largely risk free, appears great in theory. Whether it can be put successfully into practice is the key question.

The frenzy around cryptocurrencies has, for the time being, died down; the potential behind some of the underlying cryptographic techniques and technology has not. One topic that has drawn much attention from policy-makers is the application of a new form of money – central bank digital currencies.

A CBDC is different from cash, in that it is electronic. It is different from money currently held in central bank accounts, as the public may be able to access it. A CBDC, then, may combine primary features: it is a liability on the central bank balance sheet, is digital, is universally accessible, and may be an electronic token-based bearer instrument. Such an electronic store of value, backed by a central bank and largely risk free, appears great in theory. Whether it can be put successfully into practice is the key question, given the competing commercial electronic payment systems already in play.

To build successful payment systems, the construct of 'schemes' is important. These are broader than centralised infrastructure common to modern payment systems that enable interoperability. Schemes encompass the legal, governance, marketing and commercial 'bridge', and provide the strategic motive, underlying value proposition, brand and 'rules of the game'. Examples of such schemes include UnionPay, SEPA Direct Credits, Swish, iDEAL, Visa, Mastercard and many more. These are vital to cement in users' minds the utility of the payment service being consumed.

A CBDC then cannot simply be a contrasting store of value from commercial bank deposits. It will require payment instruments and channels to access the store of value and a scheme to connect consumers to the service. The greater the variety of the offered transaction sets, and the more integrated and seamless the user experience, the more probable the growth of the scheme. AliPay, the Chinese payment scheme, is an example of such growth, shaping these practicalities into the scheme proposition.

Nuanced perspectives

If CBDCs are to advance, central banks that aim to trial them will have to answer a great many practical questions. These institutions will need to employ enough suitably skilled digital expertise to shape scheme-related matters. They would have to codify the 'rules of the game' – whether the central bank would only offer peer-to-peer services, or peer-to-business as well – and decide who will design and operate the CBDC scheme, as well as how best to incentive these developers and ensure the scheme can compete with other electronic payment initiatives. Likewise, the intermediaries involved, including banks, non-bank retailers and mobile network operators, must decide whether they prefer CBDCs as a store of value over other electronic options. The central bank must also consider whether it could suffer marked reputational risk if the CBDC scheme fails.

There are numerous difficult policy points that must be answered to advance the issuance of CBDCs. At its core lies the key question: why issue a CBDC at all, and what policy problem is being addressed? Intertwined with this are myriad practical questions. If these are largely unanswered or left in the hands of commercial entities, the idea of a CBDC may be terminated before it begins. The matter is beyond technological choices or the issue of centralised or decentralised technical architecture.

Difficult questions are at stake regarding value propositions, commercialisation and consumer choice. For CBDCs to progress, central banks will have to make considerable efforts to answer these questions in ways that pay attention to the nuanced complexity of the subject matter. They may have an advantage in an asset that is backed by the central bank, offers potential offline, real-time transactions and brings e-currency to any citizen demanding the instrument. Thoughtful yet creative construction of the scheme, aligned with a central bank's mandate, may see CBDC move beyond theory and into practice. ✦

Arif Ismail is Head of Fintech at the South African Reserve Bank. The views expressed in this article are his own and do not necessarily reflect those of the central bank.

✧ Digital economy

Innovation in cross-border payments

New, easy-to-implement technology is enabling more reliable real-time payments that benefit both financial institutions and their customers.

Laetitia Moncarz
Swift

“Many of the problems normally associated with cross-border payments, such as delays and a lack of traceability, are not technology-related.

The introduction of Swift ‘global payments innovation’ has not only resulted in the digitisation of cross-borders payments; it has given customers the ability to speed up these payments and track them end-to-end.

While many initiatives fail due to a lack of active participants, the success of cross-border payment initiative is determined by the scale and depth of its reach. Easy to implement, Swift gpi is gaining traction with both international and local banks. Other players in the payments sector, such as market infrastructures, corporates and technology companies, have also adopted Swift gpi.

Many of the problems normally associated with cross-border payments, such as delays and a lack of traceability, are not technology-related. Business process frictions, including compliance, liquidity needs and reporting requirements, are usually responsible. Swift gpi is designed to address these issues. More than $300bn is now sent daily via gpi, with 50% of Swift gpi payments delivered within 30 minutes and 40% credited within five minutes, many in just seconds. This creates marked advantages for firms focused on global trade.

Strong support and endorsement from Swift gpi banks in competitive markets like China have resulted in an increased visibility of the service.

China’s cross-border interbank payment system, supported by the People’s Bank of China, facilitates the use of the renminbi for international payments. It acts as a bridge between China and the rest of the world. The system is gpi-enabled, extending the service’s end-to-end tracking and speed to cross-border payments into and out of China. The system has contributed to increased opportunities for product innovation in the global renminbi market.

Real-time payments the new norm

Real-time payment infrastructures are defined by their immediate (or close to immediate) interbank clearing following a transaction. In Australia, the round-the-clock availability of its New Payment Platform will allow banks and corporates to send payments in Australian dollars even after the daily cut-off time (which has traditionally been influenced by the closing time of real-time gross settlement in the country). In most cases, the implementation of real-time infrastructures is driven by central banks. One of the benefits, on top of improved user experience, is the decreased use of cash and cheques.

The world is moving to real-time for domestic payments. In Asia Pacific, a number of real-time payments systems are already in place, including Promptpay in Thailand, Fast and Secure Transfers in Singapore and Hong Kong’s Faster Payment System. Malaysia has implemented its own real-time platform, RPP.

While real-time payment infrastructures exist mainly to support domestic transactions, initiatives such as ‘Swift gpi instant’ combine the speed of gpi cross-border payment flows with the key benefits of real-time systems. By linking gpi to a domestic instant payment system, financial institutions are not bound by rigid settlement cut-off times. This is particularly useful for cross-border payments which typically involve different time zones.

Following a successful trial last year in Australia with its New Payment Platform and with banks from Singapore, China, Australia and Thailand, the gpi instant service is being tested in other markets such as Singapore with the real-time Fast and Secure Transfers platform.

Rise of multi-sided platforms

The introduction of multi-sided platforms is likely to continue as they become the preferred business model for financial institutions. With the launch of application programming interfaces, overlay services by third parties will become more easily available to different users such as corporates, payment service providers and asset managers. End users will enjoy greater access to multi-networks. A new proof-of-concept to trial ‘gpi Link’, a gateway to connect ecommerce and trading platforms with Swift gpi, was announced in January 2019. It will connect gpi members to multiple ecommerce platforms and introduce the benefits of gpi – payment initiation, end-to-end payment tracking, payer authentication and credit confirmation. The gateway will allow continuous monitoring and better control of payment flows and the subsequent movement of goods by these platforms, towards global integration and interoperability. ✦

Laetitia Moncarz is the Director of Payments Markets, Southeast Asia Region at Swift.

✧ Digital economy

Digital solutions for financial inclusion

In Asia and the Pacific, new technologies such as big data and artificial intelligence and the rapid expansion of mobile banking are helping deliver financial services to economically marginalised communities.

Lotte Schou-Zibell
Asian Development Bank

"Trust is a powerful driver of customer behaviour. New digital financial products and services should therefore be designed with data protection and cybersecurity integrated from the outset.

In Asia and the Pacific, 90% of poor households have no access to financial services. Banks and other financial institutions consider them to be high-risk and low-profit customers. As a result, millions of people cannot access the credit needed to buy a home or build assets, or buy insurance to protect them from catastrophic loss, or even maintain a simple savings account. Despite this, most poor, disadvantaged and unbanked people are financially active. However, this engagement is often limited to risky and expensive 'recycling' of money from one informal source to another.

If Asia and the Pacific – home to more than half of the world's 1.7bn unbanked adults – are to unlock their full economic potential and improve the lives of the poorest and most vulnerable, it is crucial to connect these marginalised populations with the broader economy.

New technologies like artificial intelligence, big data and blockchain, as well as the rapid expansion of mobile-phone banking, are helping deliver financial services to unbanked communities. But around 1bn people globally still have no legal form of identification. Millions more have forms of identification that cannot be reliably verified or authenticated, leaving them financially and socially excluded. Most of these people live in Africa and Asia, and more than one-third are under 18.

Many of the financially and socially excluded live in remote and rural areas. Without access to affordable and reliable internet and electricity, financial services won't reach them. An interim solution is to provide systems that will still work when offline and can update later when connected to the internet.

Trust and innovation

Interoperability enables people to make payments to anyone else in a convenient, affordable, fast, seamless and secure way through a single transaction account and using any device. This means a customer need only maintain one account – whether a bank or an e-money account – to be able to transact with anyone conveniently and affordably.

Inclusivity demands that all qualified financial service providers be able to participate effectively in the system. This fosters greater competition and spurs innovation.

Interoperability requires co-operation among authorities to promote safe and efficient financial market infrastructure and international standards. It requires collaboration and implementation at the industry level. Complex arrangements and business rules are required to implement interoperable payment solutions.

Trust is a powerful driver of customer behaviour. New digital financial products and services should therefore be designed with data protection and cybersecurity integrated from the outset. Authorities must establish clear legal and regulatory standards and guidelines to ensure consumers are adequately protected.

Lack of financial and technical literacy is a major reason for lack of access to finance in rural communities and among women. Policies to enhance financial inclusion, especially through technology, should involve more active financial literacy and education programmes.

Financial services and products are good only if they are being used. Yet many providers still struggle with high account dormancy, customer dropouts and otherwise limited service usage. Services and products must meet the real needs of individual users.

They should be intuitive to activate and use, deliver promised features and be affordable. Given the expanding access to mobile devices, mobile banking should be a key tool to closing gender gaps, particularly on financial access.

Discussion often stops with access to credit or opening a bank account. We need to talk more about microsavings, remittances, pensions and insurance. Financial inclusion constitutes access, use and quality of a range of financial products and services from multiple providers.

In all these issues, the integration of behavioural economics can fine-tune existing services and provisions to help improve the effectiveness of financial education, ensure customer centricity and deliver financial products and services that resonate with people, and thus make a difference in bringing together supply and demand. ✦

Lotte Schou-Zibell is Chief of the Finance Sector Group, Sustainable Development and Climate Change Department at the Asian Development Bank.

✧ Digital economy

Financing the internet of things

New technologies will shape fresh opportunities for capital markets. Their adoption may be years away, but investors must explore now how these can optimise financial decisions.

Christopher Smart
Barings Investment Institute

> If new technologies help improve transparency, cut costs and predict problems of large and complex physical operations, then there should be a measurable shift in the assessment of financial risk and return as well.

At its heart, finance is the balance of risk against potential return. People with money take the measure of people who need money and decide whether the potential payoff is worth the effort. Since the appearances of calculating machines, lenders and investors have developed new ways to crunch numbers and draw inferences based on financial results. Today, new technologies allow complex physical operations to be monitored in real time and with unprecedented precision. Most impressive, algorithms now use repetitive operational analysis of past correlations to make more reliable predictions.

The internet of things is often associated with consumer gimmicks like a toothbrush that tracks dental hygiene or a refrigerator that warns of soured milk. But this transformative technology, sometimes dubbed the 'fourth industrial revolution' or 'industry 4.0', is already deeply embedded in large industrial operations. It is being used to reduce costs, improve safety and extend asset lives. Operational breakdowns can be foreseen, accidents avoided, and maintenance streamlined. What has yet to occur on a significant scale, however, is the sharing of these operational benefits with those who provide the loans, leases, insurance or equity investment.

Fundamental adjustments to existing models

Widespread adoption of many of these technologies may still be years away. Nevertheless, now is the time for investors to explore how a more sophisticated and systematic integration of 'internet of things' technology can optimise financial decisions. Investors should determine how, if a wide range of physical operations can be monitored and analysed in real time, it can improve the returns on loans, insurance or other investments. They should look into the new pools of capital it could open and that would otherwise be more risk averse. And, they should also assess if this technology will allow more reliable monitoring of the environmental and social consequences of investments.

Sensible investing requires calibrating properly the risk involved in the outlay of money to the size of the potential return. Traditionally, calculations and probabilities have measured mainly risk and potential return based on inputs from markets and historical financial statements. Increasingly, combinations of technologies permit granular and simultaneous monitoring of the physical world. Affordable sensors, mobile telecommunications and cloud storage are broadly available. They have made the remote gathering, transmission and storage of vast amounts of data about complex operations unremarkable and inexpensive. Data algorithms, or 'machine learning', turn these data streams about the past and present into increasingly powerful predictions about complex operations.

General Electric monitors the operation of its jet engines globally and in real time, amassing millions of data flows on performance through different routes and weather conditions in a single day. When sensors signal impending problems, an airline can arrange to have the right part in the right city at the right time, ready for replacement. This can cut unscheduled disruptions by as much as 25%, eliminating unexpected downtime and reducing fuel consumption by 10%-15%. Royal Dutch Shell deploys similar technology in Nigeria to monitor pipeline pressure, temperature and flow. The company reported that it nearly doubled its return on investment through reductions in downtime. Caterpillar embeds connected sensors in everything from forklifts to engines. Mining customers can optimise their routing, undertake more tasks remotely and extend operations through the night. The result reduces fuel consumption, improves safety and saves money.

There are still obstacles to the broad adoption of these technologies. Many require fundamental adjustments to existing business models. Others are delayed by uncertainty around data protection rules. Still, the benefits from these technologies are already astonishing and the potential remains even more tantalising.

For the financial world, the transformation is in its early stages, but the basic proposition is simple. If new technologies help improve transparency, cut costs and predict problems of large and complex physical operations, then there should be a measurable shift in the assessment of financial risk and return. If the status and condition of collateral can be tracked, then it becomes easier to expect lower losses on a loan or a lease contract. If the physical shipments of goods can be followed through their global supply chains, then payments can be released more quickly and tie up less working capital. If the operation and maintenance of a distant factory or power plant can be monitored, then it becomes possible to hold less in reserves and improve cash flow.

With concerns mounting around the environmental, social and governance dimensions of investment and finance, the ability to monitor physical conditions or operations at a distance brings additional benefits. Investors who had relied almost entirely on financial reports to assess the status of their projected returns can tap into new data feeds to monitor and predict results along some of these other dimensions.

The 'industrial internet'

The ability to monitor energy savings reliably and immediately, as well as trends in carbon emissions when gauging the environmental risks around an investment, will be especially powerful. More automation and remote operation can dramatically improve worker safety, too. For investors whose mandates include economic development, some early business models employ this technology in remote developing countries, reducing risk and tapping into new sources of finance.

The benefits from these technologies are not unalloyed; the path to progress is never smooth. Many obstacles will slow and complicate their adoption and integration into improving operations. Even more hurdles will delay their adoption and dilute any potential benefits for the financial world. If data is the key to capturing these benefits, there remain great uncertainties around the data itself. This includes who has the rights to it. In addition, it remains to be seen how the data will be secured to protect personal privacy, as well as the security of critical national infrastructure or major industrial operations. Another unknown is how easily data will flow across borders.

For the 'industrial internet' – essentially, the internet of things for manufacturers – the most probable winners may be the data science specialists. They are the technological equivalent of the makers of picks and shovels that built the early US railways and ultimately fared better than the train operators themselves.

Industrial manufacturers may, over time, deliver more efficient and safer operations with these new data gathering and analysis techniques. But these advantages may soon become standard features that all competitors will be expected to provide. The durable advantages, therefore, may accrue to those who can offer the best analytics across a range of equipment or operations.

On the financing side, the benefits are accruing where large numbers of transactions or operations can be monitored, tracked and compared. This is why technology is already changing the economics of trade finance, car insurance and equipment leasing. These profits are likely to grow as those who provide the finance become more versed in the predictive algorithms and risks. If they can protect pricing power, they will capture the profit. If they pass savings to customers, they may grow market share.

Like so many structural changes in technology, these will evolve slowly at first and then very rapidly. Eventually, the first adopters may lose their edge, but the late adopters may be left behind altogether. ✦

Christopher Smart is Head of the Barings Investment Institute.

“For the 'industrial internet' – essentially, the internet of things for manufacturers – the most probable winners may be the data science specialists.

Digital economy

Lessons from China's digital growth

China's digital infrastructure has improved significantly, and now broadly matches that of advanced economies, reflecting continued support from the central government.

Ben Shenglin
Zhejiang University

> Beijing's wish to forge 'smart' and 'wireless' cities has propelled China's soaring internet penetration rate and the increased prevalence of mobile internet in the country.

Over the past decade, China has grown into a world leader in many digital industries. It has emerged as one of the world's largest investors in and adopters of digital technologies, and is a foremost contributor to global e-commerce, accounting for more than 40% of global transactions.

A confluence of factors has contributed to this, including China's large and young market. This enables rapid commercialisation of digital business models and the growth of a rich digital system expanding beyond a few technology giants. Equally important is China's fast-growing digital infrastructure.

A 2018 study by Ali Research and KPMG identified five key components of digital infrastructure: internet penetration rate; number of mobile phone users; average internet speed; mobile phone affordability; and mobile data affordability. The study identified digital infrastructure as one of the five core determinants of digital development. This is probably the factor that central and regional government in China most actively support.

China's digital infrastructure has improved significantly over recent years, and now is broadly in line with that of advanced economies. A 2016 report from the China Internet Network Information Centre, under the auspices of Beijing's ministry of industry and information technology, reported there are more than 800m internet users in China, with an internet penetration rate of 57.7%. China's growing infrastructure reflects continued government support as an investor, developer and advocate.

Infrastructure investment

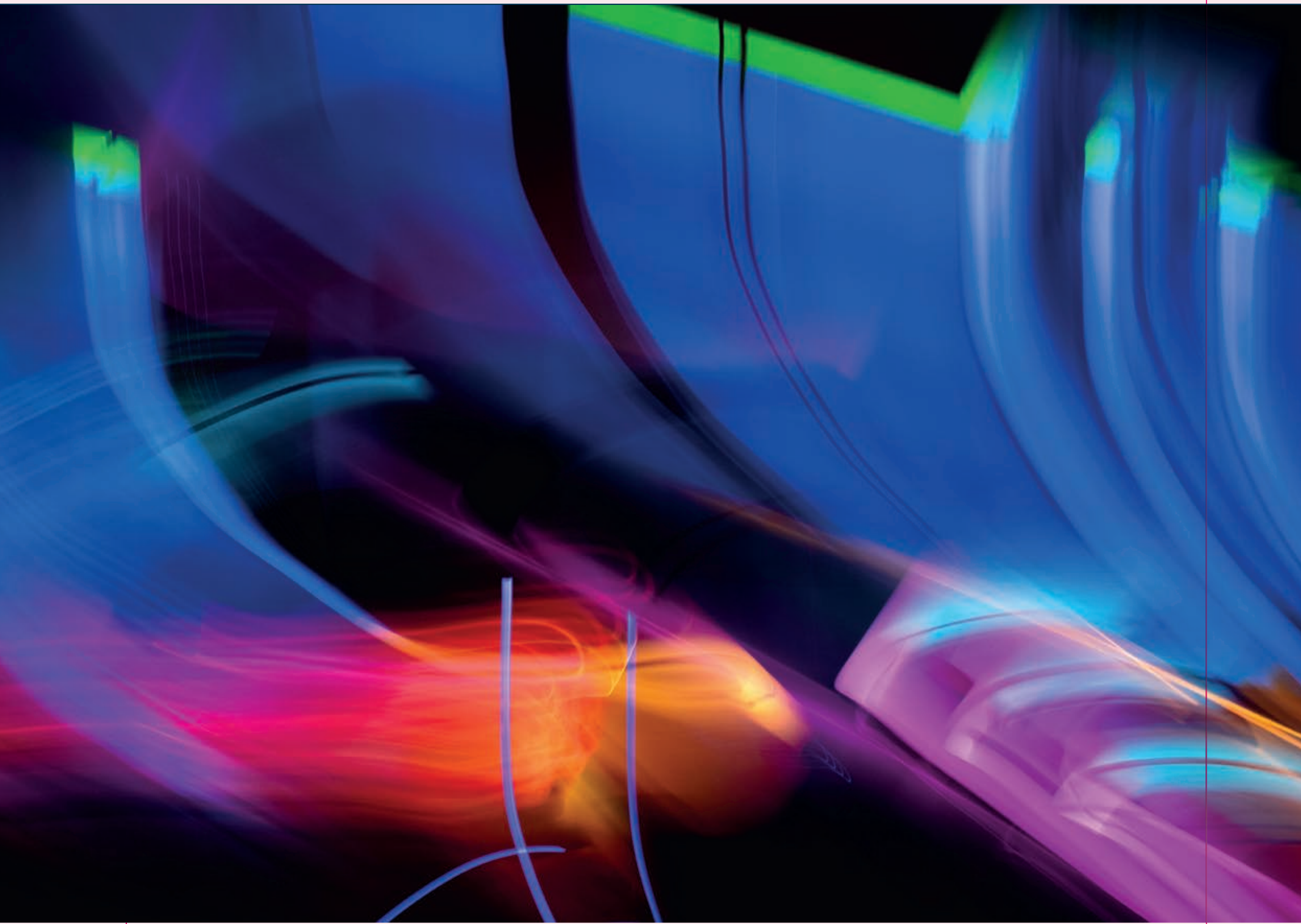
The government's wish to forge 'smart' and 'wireless' cities has propelled China's soaring internet penetration rate and the increased prevalence of mobile internet in the country. Its 13th Five-Year Programme outlines a series of plans, from building a new generation of information infrastructure and upgrading traditional industries, to using advanced digital technologies to promote mass entrepreneurship.

Additionally, the government's 'Three-Year Guidance for Internet Plus Artificial Intelligence Plan' announced in 2016 stipulates that various government institutions can provide funding for specific projects from budgets controlled by central and regional governments. These funds can be used to build an AI application market valued at more than Rmb100bn ($15bn) by developing nine major areas connected to AI, including smart-home appliances, intelligent cars, wearable devices and smart terminals.

Measures such as tax deductions and state-endorsed start-up funds have also been implemented since 2014 to facilitate citizen engagement in mass entrepreneurship and innovation. The government has approved the registration application of many technology incubators and set up others offering generous funding to encourage innovation. It has also embraced new digital technologies, such as the integration of 'Internet Plus' (whereby information technologies are applied to more traditional industries), in government services. State-owned enterprises including China Mobile, China Unicom and China Telecom plan to spend up to $180bn over seven years on infrastructure for what will be the world's largest 5G mobile network, further enabling the commercialisation of new technologies.

The development of China's digital infrastructure can be attributed to many forces, particularly government-empowered initiatives including centralised national strategies, continued investment in innovative technologies, provision of tax deductions and state-endorsed start-up funds, and SOEs' contribution to the commercialisation of new technologies. While at the early stages of development the government adopted a light-handed approach to regulation, so as not to stifle innovation unwittingly, it has and should become more proactive about shaping healthier digital development through supervision and enforcement. ✦

Ben Shenglin is Professor and Dean of the International Business School and Academy of Internet Finance at Zhejiang University. Luo Man, a PhD student at the university, contributed to this article.



OMFIF Special report

Digital currencies

The needs of central banks and financial markets are constantly evolving. There is significant potential for central bank digital currencies to play a powerful role in upgrading incumbent centralised payment and settlement systems.

↘ Digital currencies

Central banks speed up digital trials

Bhavin Patel
Senior Economist and Head of Fintech Research, OMFIF

Pierre Ortlieb
Economist, OMFIF

The use of cryptocurrencies in the retail domain is underpinned by participants' desire to decentralise the monetary system. Much of the motivation behind non-sovereign currencies stems from the 2008 financial crisis, when the perceived failure of central banks and regulators to protect consumers spurred considerable distrust in the financial system.

From a central bank perspective, privately issued cryptocurrencies are not currencies. The usability of these crypto-assets diminishes as they become speculative vehicles with volatile purchasing power. Central bank digital currencies, denominated in an established fiat currency, could overcome this fundamental barrier.

In the retail sector, a digital version of a sovereign fiat currency could bring great efficiency gains and policy benefits. Such an innovation could employ all the technical benefits of a cryptocurrency, while also inheriting all the underlying trust of a sovereign currency. But many questions must be answered before any significant progress can be made.

In the wholesale domain, the prospects for digital payments or electronic tokens seem capable of delivering significant benefits to interbank processes. Implementation is certain in the near future, with central bank trials delivering improving results. Still, numerous practical and regulatory issues must be addressed.

> “A 2018 OMFIF-IBM report on digital currencies noted that 38% of institutions questioned sought to use a wholesale CBDC as part of coming upgrades to their RTGS platform.

Motivations for wholesale CBDCs

Wholesale CBDCs are limited to a select group of financial market participants and aim to enhance the efficiency and reliability of payment settlement systems. Existing systems apply a range of mechanisms to ensure settlement and finality: correspondent banking networks implement cross-border transactions, deferred net settlement systems sustain liquidity netting and setting, and real-time gross settlement frameworks remove counterparty risk and ensure finality.

Yet the needs of central banks and financial markets are constantly evolving. A 2018 OMFIF-IBM report on digital currencies noted that 69% of central banks surveyed found significant problems with cross-border payment systems, while 38% of institutions questioned sought to use a wholesale CBDC as part of coming upgrades to their RTGS platform. A 2019 study by the Bank for International Settlements found that payments safety and efficiency were the two most important issues that central banks considered in their motivations for issuing wholesale CBDC. There is significant potential for CBDCs to play a powerful role in upgrading incumbent centralised payment and settlement systems.

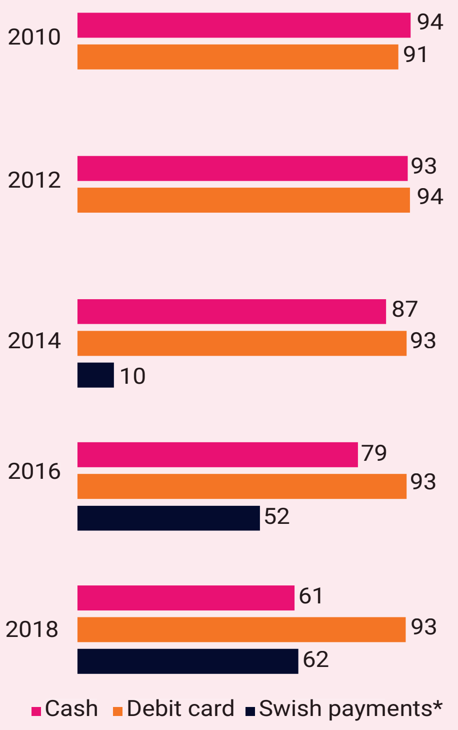
While all central bank respondents to the 2019 BIS survey replied that they were researching wholesale CBDCs, few have actively designed a token or launched a pilot programme. Some central banks have undertaken technological testing as part of their research; the Bank of Japan-European Central Bank 'Project Stella', which entered its second phase in 2018, conceptualised and examined the delivery of securities settlement in a distributed ledger technology environment.

Several other projects have taken greater strides. The Bank of Thailand's 'Project Inthanon', described by the central bank as a 'new way of conducting interbank settlement', was initiated in late 2018 with the aim of developing a proof-of-concept and completing a full launch in 2019. The BoT is working with Thai commercial banks to develop a wholesale CBDC for domestic transfers using R3's Corda platform as a foundation. Participants suggested in February 2019 that, in early trials, DLT had engendered substantial efficiency gains. Subsequent phases to be conducted over the course of 2019 include testing for coupon payments, interbank trading and bond redemptions, as well as a phase examining interoperability with legacy platforms, with a view to a full launch later in the year.

In similar vein, the South African Reserve Bank's trials in 'Project Khoka' have resulted in the forthcoming launch of a full, private, permissioned, cloud-based distributed ledger platform for foreign exchange payment and settlement. Initial phases testing the capacity of a potential DLT-based network were a success: Khoka was able to process a day's volume of trades in under two hours with full privacy and finality achieved. Other central banks testing or trialling digital currency projects include the Monetary Authority of Singapore ('Project Ubin') and Bank of Canada ('Project Jasper').

Despite the enthusiasm for and success of some central bank projects, there remain significant regulatory and legal uncertainties around wholesale CBDCs. For one, in many cases it is unclear who will have authority and oversight on a permissioned ledger. In OMFIF's 2018 report, survey respondents suggested that regulators should have to have a node on the network, and that strict privacy rules would have to be in place. Similarly, legal interoperability with existing principles for financial market infrastructures, outlined by the BIS, is far from certain. Finally, if central banks relax permissions so that nodes outside a country's jurisdiction can participate in a wholesale DLT platform, concerns may arise over whether the network could be used to circumvent capital controls and other restrictions. These and other issues must be addressed thoroughly by central banks planning on issuing a wholesale CBDC.

Figure 1: Cash transactions fall as electronic and digital payments favoured in Sweden
Which means of payment have you used in the past month?, % of responses



Source: Riksbank, OMFIF analysis, Note: Respondents can choose more than one option.*Swish payments, introduced in 2014, is a mobile payments platform

Context for retail CBDCs

A retail CBDC can be defined as a digital bearer asset issued by a central bank for the purpose of retail payment and settlement. Under this construct, the central bank would essentially give the public direct access to its balance sheet.

Each central bank may have differing motivations to issue a retail CBDC. Much will depend on their national and operational context, including their mandates and the characteristics of the economies in which they operate. The specific use case would be unique for each country, but the categories can be grouped broadly into advanced economies, emerging markets and small island economies.

In advanced economies, the declining use of physical cash in retail payments is compelling central banks to consider the societal costs of a cash-free future. Additionally, a retail CBDC can potentially offer retail depositors safer savings through holding an account with the central bank. The risk of default or loss of funds would be lower in those circumstances than storing savings in domestic commercial bank accounts.

Sweden's e-krona project seeks to provide a digital alternative in a society where cash makes up only 2% of GDP (the ratio is 10% in the euro area).

> "There is the risk of financial exclusion in cases where populations who do not adopt CBDCs are left entirely unintegrated and are further marginalised from the digital payments system.

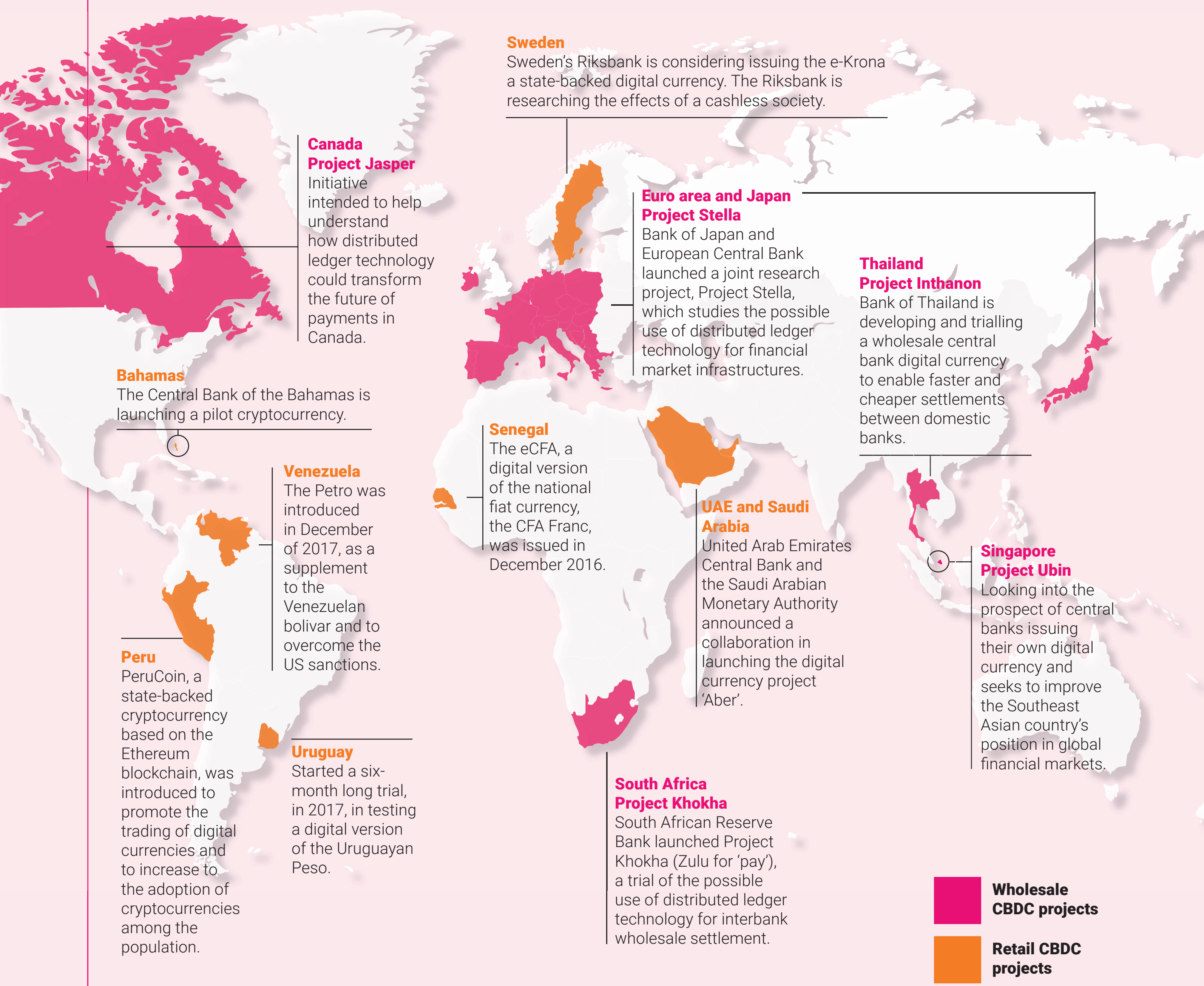
↘ Digital currencies

Cash is becoming a less popular means of payment in Sweden, with debit card and mobile payments gaining popularity (see Figure 1). Similarly, the UK's 'Access to cash' report, produced with Bank of England support, predicts that cash will fall to 16% of payments by 2027 from 34% today.

So far, cash-free payments have been facilitated by financial technology solutions provided by private sector actors. If central banks are unable to fulfil satisfactorily their obligation as sovereign guarantor during the transition to a cashless society, commercial banks providing cashless solutions could wield greater control over the money supply.

For emerging markets, offering a retail CBDC may offer means to meet financial inclusion targets. In theory it should incentivise greater participation in the banking sector. But there is the risk, too, of greater financial exclusion in cases where populations who do not adopt CBDCs become further

Central bank digital currency projects



Source: OMFIF analysis
Note: List is not exhaustive

marginalised. Remittance payments are another important use case. High costs, averaging 7.2% for a $200 transaction, force many migrant workers to seek informal channels of money transfer, increasing their pay-out risk. A CBDC can potentially reduce the average transaction costs for remittances (down to less than 1% for a $200 transaction), reduce risk and allow for real-time settlement. Aside from facilitating faster and cheaper domestic and cross-border payments, retail CBDCs also offer improved anti-money laundering and know-your-customer functionalities, deterring tax evasion and corruption.

Small island economies that are dollarised or otherwise dependent on external currencies can find opportunities in a retail CBDC system. These countries incur relatively high maintenance costs, as they lack economies of scale in the distribution and printing of their currencies. By employing CBDCs, they can potentially reduce the frictions and costs associated with physical cash storage, transport and management in the banking system. These island countries can promote their economies as they gain greater control of their monetary system, allowing them to dictate their own monetary policy, independent of any anchor or adopted foreign currencies.

In March 2019 the Central Bank of The Bahamas and IBM World Wire announced 'Project Sand Dollar', a pilot programme for a blockchain-based CBDC. The purpose of project is to modernise and streamline the country's financial system, reduce service delivery costs, increase transactional efficiency and improve the overall level of financial inclusion in communities throughout the archipelago. The Eastern Caribbean Central Bank announced a similar project a few days after the Bahamas.

Central bank policy

Monetary policy implementation could become more effective with the help of CBDCs. By making retail CBDCs interest bearing, central banks can overcome the monetary lag in the transmission mechanism. Monetary easing could become more effective, as central banks could potentially escape the zero-lower bound, a key benefit the Bank of Canada has highlighted in its CBDC trials. However, the prospect of a central bank applying a negative interest rate directly to people's cash seems improbable, given the social and moral implications. 'Helicopter money drops' – the name given to central bank steps to inject money directly into the economy – can also become more effective, as CBDCs can be sent directly to users.

Financial stability, however, is a concern. Commercial banks could become disintermediated unless they provide a deposit rate above that of the risk-free rate offered by the CBDC. This raises the risk of a run on bank in times of crisis or when deposits carry default risk. However, it can be argued that financial stability would be improved for holders of CBDC accounts, as these would seem to be a risk-free alternative to the private sector.

Considerations for the future

For a retail CBDC, blockchain technology may not hold the same potential as it does in a wholesale setting. For high-volume, small-value payments that dominate retail transactions, existing blockchain technology is not scalable or efficient enough to meet requirements. The consensus mechanism in a decentralised blockchain, which includes proof-of-work or proof-of-stake, requires significant energy. Different blockchain technologies are being created that require less energy and could be scalable, but so far these have not met the necessary conditions in central bank trials.

Blockchain may not be necessary altogether. In principle, trust underpins central bank money, yet blockchain is most useful when parties in a system do not trust each another. A variety of non-blockchain based systems are running trials to find a retail CBDC solution. One such example is eCurrency – a Dublin-based CBDC provider – which works off central banks' existing infrastructure to run digital currencies.

There is no shortage of practical and regulatory issues. One concerns the degree of privacy that consumers will have in transacting, given that central banks can potentially see every transaction. Another relates to whether there will be an impact on fractional reserve banking and credit production, and whether this could mean lower liquidity requirements for retail banks. Others issues include decisions on transaction limits to mitigate anti-money laundering, the circumvention of capital controls if retail CBDCs can move across borders, the interaction between different cross-border retail CBDC systems, changing regulations, and developing new processes to mitigate any unforeseen risks from a new system.

Central banks are beginning to take retail CBDCs more seriously, and their research, trials and experiments are accelerating. However, many questions remain to be answered before we witness full implementation of CBDCs in any major economy. ✦

Bhavin Patel is Senior Economist and Head of Fintech Research, and Pierre Ortlieb is Economist at OMFIF.

“ Monetary policy implementation could become more effective with the help of CBDCs. By making retail CBDCs interest bearing, central banks can overcome the monetary lag in the transmission mechanism.

2 Asset allocation

Shifting business models
Policy and regulation

2019 Asset allocation survey

A snapshot of latest trends in asset allocation and decision-making processes

GPIs cautiously embrace new trends in asset management

Global public investor portfolios reflect these institutions' relatively conservative attitudes and preference for highly liquid and safe instruments. However, challenged by low yields on traditional assets, central banks, sovereign funds and public pension funds are continuing to revise their investment strategies and mandates, enabling them to embrace alternative asset classes, albeit cautiously. These include allocations to emerging market currencies, real assets and sustainable investments.

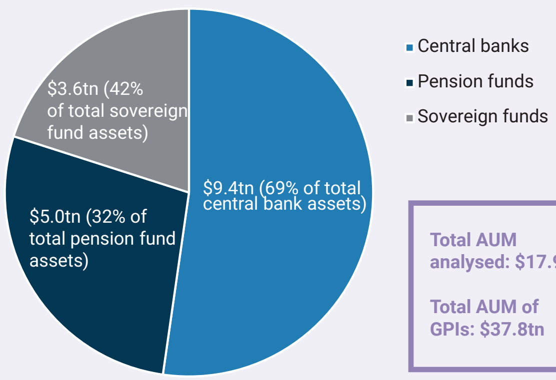
Public investors' appetite for rising allocations in real assets and sustainable investments appears to be continuing. However, faced with an increasingly uncertain macroeconomic and policy environment, some are considering a return to safety and are planning to increase investments in more traditional and highly liquid assets.

This year's OMFIF GPI survey is the most comprehensive to date. It collects responses to 87 questions from representatives of reserves management and investment management departments at central banks, sovereign funds and public pension funds from 44 jurisdictions collectively managing $17.9tn. The questions relate to issues ranging from the processes and formats in which decisions are made, to transparency and the communication of decisions related to such activities and issues around reserves adequacy. It examines GPIs' attitudes towards specific asset classes, the development of a euro area safe asset, as well as gold and currency investments. Finally, the survey covers GPIs' views on the shifting balance between risk and return, as well as their assessment of future challenges for reserves managers, including shifts in technology, cybersecurity threats and the safety of assets from climate risks and policy uncertainty.

The results presented in this report are a combination of analysis of the OMFIF GPI Survey 2019, complemented by in-depth interviews with reserves management departments and analysis of institutions' annual reports. They reflect the allocation decisions of public investment institutions with total assets under management of $17.9tn, representing 47% of the total $37.8tn AUM of all global public investors (see Figure 1).

Figure 1: Allocation analysis details

Breakdown of institution types examined in asset allocation analysis, AUM $tn and % of total, by institution type



Total AUM analysed: $17.9tn

Total AUM of GPIs: $37.8tn

Source: OMFIF GPI Survey 2019

Liquidity, safety and return

Public investors' reserves management practices follow a variety of guiding principles differing by jurisdiction and institution type. In sovereign funds and public pension funds, asset allocation decisions are guided primarily by a target return in percentage terms, with 50% of public pension funds and 67% of sovereign funds surveyed by OMFIF declaring this as their dominant investment objective (see Figure 2). This reflects these institutions' investment philosophies and strategies. A public pension fund representative remarked, 'Our investment philosophy is best described as a high real return target to add value to the pension system over time. Returns are achieved through investments exposed to risk and risk premia.'

A reference portfolio and the rate of inflation are important considerations for public pension funds, with 25% of such institutions surveyed choosing these options, compared with 17% for sovereign funds. Public pension funds are increasingly concerned with making a societal impact with their investments, with one respondent saying, 'Financial return goes hand in hand with societal return. Where possible, we would like to make an impact.' For some public pension funds, this is explicitly defined and linked to specific objectives, with one respondent stating, 'We would like to make an impact in four areas: water, climate change, food security and access to healthcare.'

Sovereign funds in many cases also have an explicit mission to invest in their jurisdiction's development. One respondent said, 'We invest in projects of public and general economic interest for the country. We play an institutional role, fostering long-term promotional activities and preserving households' savings to support the economy. We also support the economic system to make up for limitations of the market by applying investment logic that combines strong financial discipline, based on the economic sustainability of the initiatives, with the ability to promote projects that serve the country well. In that sense, we operate with a long-term perspective and in a complementary manner to the financial system.'

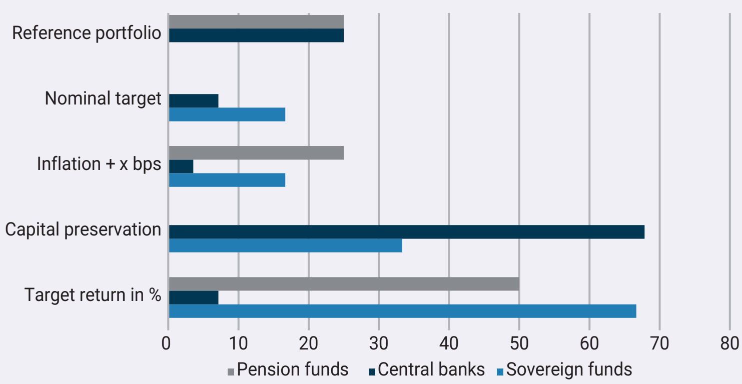
The need for capital preservation is another popular investment objective among sovereign funds, with 33% of institutions selecting it as such. This is also the dominant choice for central banks: 68% of those in our sample declared 'capital preservation' as their main investment objective, though motivations differ. For some, it is strongly linked to the exchange rate arrangement, with one respondent saying that 'being a central bank that functions under a currency board arrangement, safety is top priority.' In other cases, the choice of priorities can be more nuanced, with another central bank respondent stating, 'Reserves are primarily held for precautionary motives – to be available for use when needed. This means that the balance among capital preservation, liquidity and return is a function of reserve adequacy.'

Only 7% of central banks said they are guided by the principle of a target return, the same proportion as said they are guided by a nominal target. In virtually all cases, profitability and returns will be considered as factors by central banks only once security and liquidity are covered. According to one central bank, 'We manage our foreign exchange reserves to ensure safety and liquidity. Having satisfied these objectives, yield enhancement is considered.' This is reflected in central banks' investment strategies, with one respondent saying, 'In order to preserve the value of its invested assets, the bank places tight restrictions on investing in assets with high credit risk. We maintain a high level of liquidity by investing in assets that can be promptly liquidated in the global financial markets.'

However, several central banks in our sample remarked that the balance between these objectives has shifted as the size of reserves has grown. 'At the moment, part of the philosophy is derived from the size of the reserve portfolio. As there are perhaps more reserves than would be needed, some of our investments are seeking return on the cost of liquidity,' said one central bank from Europe. A central bank in the Middle East stated, 'As the size of our reserves has increased, the balance has shifted in the direction of a greater emphasis on return.' Meanwhile, some central banks explicitly divide their portfolio in tranches. According to one respondent, 'The gross reserves are separated into two tranches, the liquidity and investment tranches. The liquidity tranche is the portion of reserves set aside for any external financial shocks that may require their immediate use. The investment tranche is guided by the need to mitigate the cost of holding reserves and its composition is determined on a risk-return basis in order to generate returns.' Another central bank follows a similar

> We assume capital markets are fairly efficient most of the time, but that our characteristics (long time horizon, high risk bearing capacity) provide us with an opportunity to harvest risk factors and delivers returns relative to our benchmark.
>
> Sovereign fund

Figure 2: How GPIs map out investment policies
What is your investment objective?, % of total responses

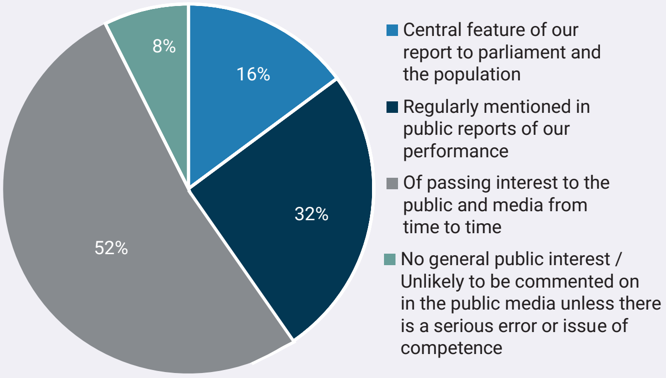


Source: OMFIF GPI Survey 2019

2019 Asset allocation survey

Figure 3: Reserves management in the public eye

What is the public profile of your reserves management operation?, % of central bank responses



Source: OMFIF GPI Survey 2019

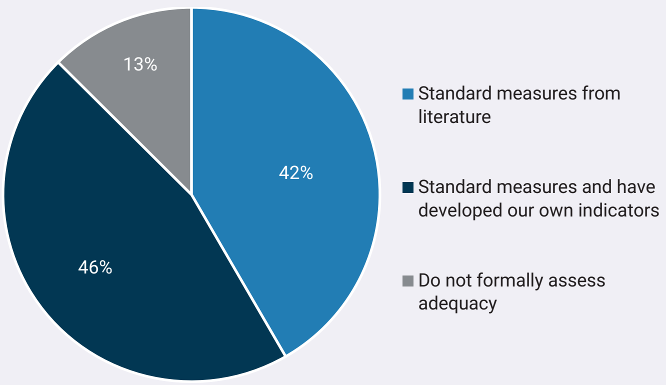
> "The two main obstacles [in expanding to new asset classes] are: obtaining approval for products where new risks are involved; lack of resourcing to undertake the necessary IT development work.
>
> Central bank

practice, saying, 'We define liquidity tranches and portfolio benchmarks within our investment universe. Reserve portfolio benchmarks reflect the maximum expected return subject to strict risk criteria set by the reserves committee. This benchmark serves as a framework of reference for the management of each one of the portfolios, and subsequently we assign passive and active mandates to improve the efficiency and diversification of the portfolio.'

Several respondents said they assume markets to be close to being perfectly efficient, and that they do not attempt to time the market or engage in security selections. In that context, one central bank said, 'We prefer the use of market-cap weightings in most cases' and another that, 'We follow a "no view" or "market-neutral" approach during estimations. There are no personal views, expectations, or any other input from individuals taken into consideration during the numerical optimisation process.' Still, investment committees and board direction remain important guiding principles for central banks. 'Qualitative criteria and preferences of the decision-makers are used when choosing investable assets and deciding among portfolios with similar or practically identical quantitative characteristics,' said one central bank.

Figure 4: Divergent approaches to measuring reserves adequacy

How do you measure reserves adequacy for your central bank?, % of central bank responses



Source: OMFIF GPI Survey 2019

Transparency and reserves adequacy

It has taken time for public investors to come fully into the public eye. Sovereign funds are a recent evolution in investment practice, for instance, and central banks began engaging meaningfully with their constituent publics only in the 1990s. Our 2019 survey suggests GPIs are now well aware of how important they are to their national political and economic landscapes, and how much their reserves management can impact the way voters and decision-makers perceive them. As one respondent noted, 'As an independent central bank managing monetary policy through an inflation-targeting regime, for which credibility is of critical importance, we are highly sensitive to the need to insure that investment returns on the reserves portfolio enhance [our] reputation.'

Of the central banks surveyed, 16% suggested that their reserves management is 'central' to the way they are perceived by the public, with another 32% adding that it is 'regularly mentioned in public reports' (see Figure 3). This underscores the growing importance of reserves management in national political discourses.

When asked about the importance of their operations in non-monetary terms, 50% of institutions replied that reserves management is 'central' to their 'strategic objectives and public reputation'. As highlighted in the communications special report on page 57, central banks have been reaffirming their commitment to transparency.

In monetary terms, central banks underlines that reserves management is continuing to grow in importance. Almost 90% of central banks indicated returns from reserves management are 'crucial' or 'important' to them. Significantly, 40% of respondents added they are convinced by the continued case for reserve accumulation. In the words of one central bank respondent, 'Given volatility of the value of the adequacy indicators, gradual foreign exchange reserves accumulation seems to be reasonable.' This suggests the importance of reserves management will continue to grow, both in volume and in public prominence. Fittingly, central banks are keeping a closer eye on the status and dynamics of their own reserves, employing new tools and in-house indicators to monitor internal developments. Almost half of central banks indicate they have developed their own instruments to measure reserves adequacy, with only 13% of respondents saying they do not formally assess their reserves (see Figure 4).

Choice architecture

Responsibility for the day-to-day management of reserves in global public invesetors lies in most cases (65%) with the head of the reserves department. For some larger institutions, unit leaders in middle management look after the day-to-day management of reserves, as is the case for around 30% of institutions in our survey. In only around 5% of institutions are reserves managed by a board member, including in some sovereign funds and central banks. In most cases, investment committees support boards.

On average, these committees comprise eight individuals, but the range varies greatly. There can be as few as three committee members, as is the case in one central bank surveyed, to as many as 20 in another. The seniority of the investment committee can also vary, in some cases including 'several board of governors members and other related heads of departments', according to one central bank, and in others involving members from the Treasury department or government (for example, where reserves are managed jointly by the central banks and Treasury, as occurs in some jurisdictions). In several cases the central bank governor appoints members directly, while in others appointments are made by a broader group, usually involving the central bank board or governor's executive committee.

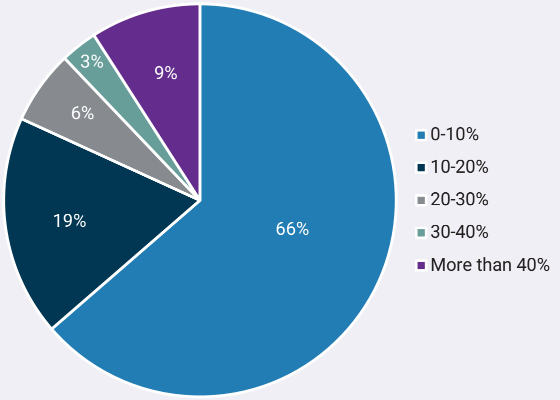
When asked about the process of selecting committee members, institutions highlighted that they aim to attract members from different departments to encourage diversity of experience and opinion. According to one respondent, 'Members are selected from different units of the central bank in order to have a diverse cognitive representation.'

Several central banks and other public institutions stated they have policies in place to ensure conflicts of interest do not arise, while some require investment committee members to sign letters of loyalty each year. Others said while they do not have such explicit policies, they have not encountered these situations and that if they did they would assume 'the member in question would refrain from voting on a particular subject'.

Decisions tend to be taken collectively – just under two-thirds of respondents said that formal committee decisions are undertaken by a majority vote, with under one-third following a unanimous vote format. The remaining few institutions use other methods to make decisions, with most in that group reporting that the committee acts in an advisory capacity, with the committee head or president making the final decision.

Figure 5: Little reliance on external managers among GPIs

What % of your total portfolio is managed by external managers?, % of total responses



Source: OMFIF GPI Survey 2019

Members' tenures tend to vary greatly. In some cases appointments are for long multiyear periods (the highest in our sample being eight years), but the average tenure is between two and three years. Usually no incentives are offered for being part of the committee, while members tend to be held accountable in various ways. Some institutions said committee members' performance is measured against strategic or tactical benchmarks, while others reported that committee performance is evaluated as part of annual review processes. On average the committees meet just over once a month, though in some jurisdictions they meet as rarely as three times a year and in others as often as weekly.

The reserves management departments of most public investors (59%) tend to be fairly small, involving up to 25 individuals. A further 32% of such departments have 26-75 employees, with the remaining 9% being even larger. Part of reserves are managed externally, but this is a small proportion on average. For most GPIs (66%), only up to 10% of reserves are managed externally, while one in four have up to 30% of reserves managed externally. Only 12% of respondents said more than 30% of reserves are managed externally (see Figure 5).

Safety guides priorities

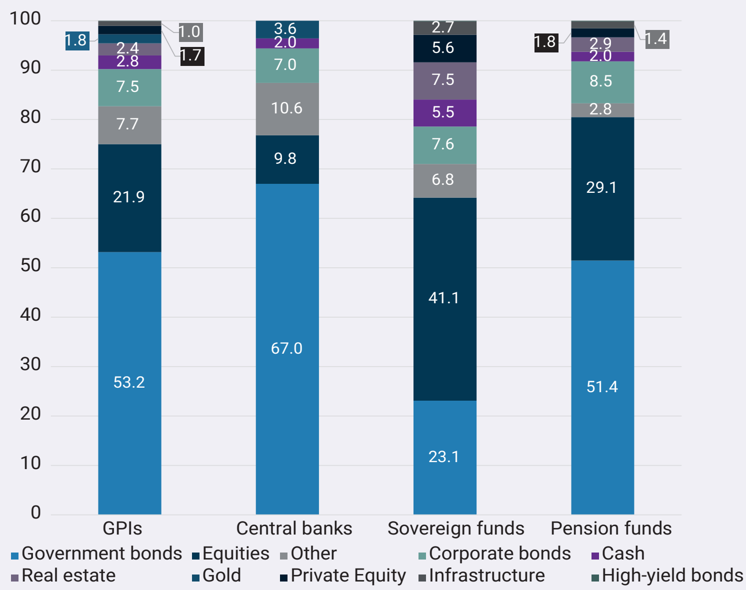
Official institutions remain fairly conservative investors. Just over half (53%) of assets managed by central banks, sovereign funds and public pension funds examined in this year's asset allocation analysis are in government bonds, mostly in developed markets. Equities are the second-most popular asset class (22%), followed by corporate bonds (8%), ↘

> It is our belief that in an ideal case neither the philosophy nor overall investment objectives should be revised frequently; while shorter term market developments might dictate the need to tweak asset allocation somewhat, those should not distract from the longer-term investment objectives.
>
> Central bank

2019 Asset allocation survey

Figure 6: Fixed income dominates but equities gaining ground

Asset composition, % of total portfolio



Source: OMFIF GPI Survey 2019

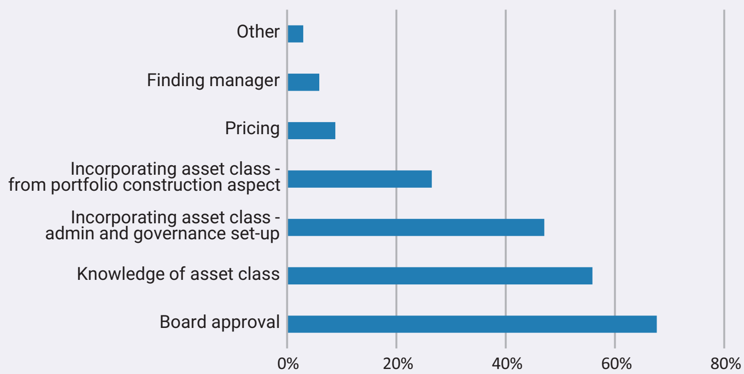
> We maintain lower duration than pre-crisis; increased reserves diversification to seven from three currencies has supported returns.
>
> Central bank

again mainly concentrated in developed markets. Alternatives such as real estate, infrastructure and private equity account for around 5%, while less than 2% of total GPI reserves are in gold and a further 3% in cash. The rest is in 'other categories', including high-yield bonds (see Figure 6).

However, the overall shares mask important differences across institution types. In our sample, central banks are the most conservative. When asked whether they invest in non-traditional assets classes, 32% of central banks responded they do not invest in them at all, while each public pension and sovereign fund surveyed does invest in non-traditional assets.

Figure 7: Boards regarded as obstacle to asset class diversification

What are the greatest obstacles reserve managers face in introducing new asset classes?, % of total responses



Source: OMFIF GPI Survey 2019

Some central banks are legally prohibited from investing in anything but highly liquid asset classes. Conservative attitudes among central bankers can be a hurdle for reserves management departments that wish to move towards non-traditional asset classes – 74% of central banks surveyed cited 'gaining board approval' as an important obstacle to introducing new asset classes (see Figure 7). One reserves management department reported that while it was making a case to invest in equities and the legal counsel of the central bank approved such a prospect, the decision was blocked by the board, which disagreed with the counsel's assessment.

This compares with 50% for sovereign funds and 40% for public pension funds that invest in non-traditional assets. The percentages are not easily comparable, as public pension and sovereign funds are already invested in most non-traditional asset classes, and so the obstacles faced would in most cases involve asset classes that central banks are very far away from considering.

Insufficient knowledge of an asset class was the second-most popular obstacle when expanding to new asset classes, with 56% of GPIs choosing this option. Challenges with incorporating the asset class were often cited as obstacles, both in terms of administration and governance set-up costs (47% of GPIs) as well as from a portfolio construction perspective (26%). Pricing and finding the right external manager did not feature high up GPIs' lists as obstacles to introducing new asset classes.

Cautious embrace of risk continues

When asked about the frequency with which they revise their investment objectives, the dominant response among our sample (64%) was that these tend to be fairly stable, reviewed on a less-frequent-than-annual basis. A further 26% reported that they review these objectives annually, with the remaining 10% reviewing them every six months or quarterly. Other institutions said that, while they do not follow a regular review process, recent volatility has meant 'there has never been a two-year period in which we would not review the strategy'.

There are signs that GPIs' relatively conservative approach is changing, especially among central banks. When asked about their thinking on return v. risk, 39% of central bank respondents said they are taking on more risk to pursue greater returns. The low-yield environment connected to traditional assets is motivating this shift into more risky assets. When asked how low yields on traditional reserves assets have affected decision-making, 43% of central banks said they had increased their risk budget and diversified into higher yielding assets. A further

37% stated they had accepted lower returns, while 14% said it had not affected their decision-making. Meanwhile, when asked the reasons for diversifying reserves, 57% of central banks said this was driven by increasing risk and adjusted returns, with 54% citing risk and volatility reduction. Capital preservation was another popular explanation, with 43% of central banks citing it as a reason for diversifying reserves (see Figure 8).

When asked explicitly about amendments to risk frameworks resulting from the current market environment, only 22% of central banks said theirs had been changed. One central bank reserves manager explained their risk management framework had been strengthened 'by introducing three lines of defence: a business unit, a risk unit, and an internal audit.' Another respondent said, 'New asset classes have been included and reporting has been improved', that 'New methodologies have been adopted', and 'Asset and liability management-type analysis has been started'. Another central bank reserves management department said it has improved its risk management methods on an individual risk-factor basis in response to the 2008 financial crisis by 'strengthening the analysis of market indicators, and of the credit of individual issuers, as well as concentration risk management.' It stated it has further 'improved its market risk assessment models so as to strengthen its tail risk management, and the method for liquidity risk measurement.'

Among non-traditional asset classes, corporate bonds, equities and emerging market currencies are the most common among central banks, with 54%, 36% and 29% of central banks having some positive allocation to each respectively. But the shares allocated are still small.

Central banks' highest allocation is to government bonds, at around 67% of their total portfolio, compared with 23% for sovereign funds and 51% for public pension funds. Only around 7% of the reserves of central banks surveyed by OMFIF are allocated to corporate bonds, compared with 8% and 9% for sovereign and public pension funds, respectively.

Sovereign funds lead all institutions in allocation to alternatives (real assets and private equity), with 16% of assets in the asset class compared with 6% for public pension funds and 0% for central banks surveyed. Central banks are the most enthusiastic when it comes to gold, allocating 4% of their portfolio to the precious metal, compared with minimal allocations for sovereign and public pension funds.

The divide is starkest in respect of equities: only 10% of central bank reserves among those surveyed are in equities, compared with around 41% for sovereign funds and 29% for public pension funds.

As is publically reported, the Swiss National Bank and Bank of Israel are notable exceptions, investing heavily in equities. Worries about a potential stock market correction, however, are creating problems. Equities overall performed poorly in 2018, reflecting macroeconomic concerns and tightening monetary policy.

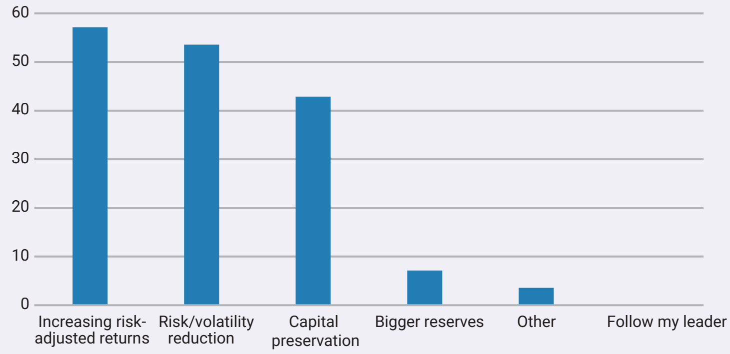
Despite this, 24% of public investors plan to expand their equity investments (see Figure 9). The trend was particularly strong among central banks and public pension funds, with more than a quarter of these institutions surveyed planning to increase their allocation to equities over the next 12-24 months.

Government bonds and cash were less popular asset classes, with 26% and 15% of GPIs planning to reduce or significantly reduce their portfolio allocations respectively. In the case of government bonds this was partly offset by the 9% of GPIs who ↘

> Equities are more risky than government bonds per se, but by including reasonable amounts of different investment products we can actually decrease the total risk of a bond portfolio.
>
> Central bank

Figure 8: Explaining changes in reserves management

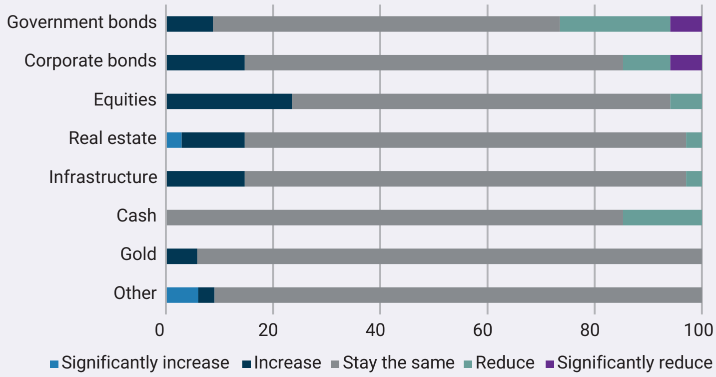
What is/has been the main reason for the diversification of reserves?, % of central bank responses



Source: OMFIF GPI Survey 2019

Figure 9: Equity investments on the rise

In the next 12-24 months do you plan to increase, reduce or maintain your allocation to the following asset classes?, % of total responses



Source: OMFIF GPI Survey 2019

2019 Asset allocation survey

> When deciding on allocation... we would be looking for high credit quality that could deliver sufficient returns; diversification and liquidity are probably of secondary importance.
>
> Central bank, on European sovereign debt allocation

said they plan to increase their allocation. The outlook for corporate bonds appears neutral, with 15% of respondents intending to increase their allocation (including 13% of central bank respondents) and 15% planning to reduce or significantly reduce investments.

Developing a euro area safe asset

This year's GPI survey seeks to uncover the reasons why investors hold euro area government securities, as well as the properties and benefits they would want to see in a supranational euro 'safe asset'.

GPIs indicated their primary reason for investing in euro area sovereign debt was its high credit quality and liquidity. While investors were not put off by the potential returns from these assets – an unsurprising conclusion, given the unprecedentedly low yield levels in the European sovereign debt market – they also did not seem especially concerned with currency, asset class or geographical diversification. Only around 20% of respondents identified each of these features as 'important' or 'very important'.

A large disparity emerged between the minimum required and most frequently held ratings on sovereign bonds held by GPIs. By identifying the minimum required rating on euro area sovereign debt securities public investors hold, we sought to identify the minimum credit rating any hypothetical supranational safe asset would have to have. Similarly, investigating the most frequently held credit rating provides an additional layer of insight into why GPIs hold these securities. In the case of the former, 46% of central banks and 43% of GPIs generally can hold at least lower medium-grade securities, just a notch above non-investment grade or 'junk' bonds. Only around 5% of respondents suggested they were required to hold 'prime' securities, with a further 20% required to hold high-grade bonds by virtue of their mandate or legal framework.

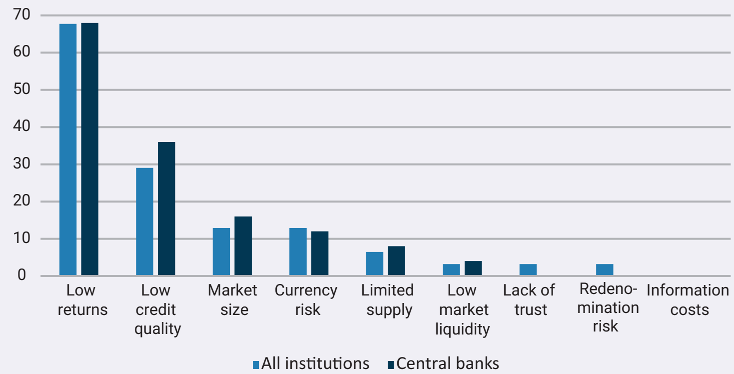
As for the most frequently held credit rating on euro area sovereign debt, GPIs indicated they most frequently held high-grade debt (50%), with a further 33% most frequently holding prime quality securities. The implications are clear: liquidity and credit quality are significantly more important than any potential returns or investment justifications for holding this debt. This was reflected in the obstacles to further investment in the euro area that GPIs identified. Almost 70% of respondents suggested that 'low returns' were the most important or a very important barrier to further investments in European sovereign debt, far outweighing any other choice (see Figure 10).

Drawing distinctions between liquidity and credit quality proved more difficult. When asked to distinguish between the two variables in the context of 'risk free assets' generally, GPIs suggested credit quality was slightly more important than liquidity (18% suggested the former outweighs the latter, 5% vice versa), whereas 77% of respondents said both were equally important (see Figure 11).

To translate these concerns into policy considerations, we asked respondents to share their views on the benefits, drawbacks and properties of a potential supranationally-issued euro area safe asset. The most important benefits identified were the creation of a highly liquid market and an increase in the supply of top-rated bonds, reflecting current tensions and dynamics in European sovereign bond markets. But investors also suggested the issuance of a new supranational asset may reduce the liquidity and size of national markets. That being said, a significant number said there would be no drawbacks to the issuance of a supranational euro

Figure 10: Yield squeeze dominates investors' concerns

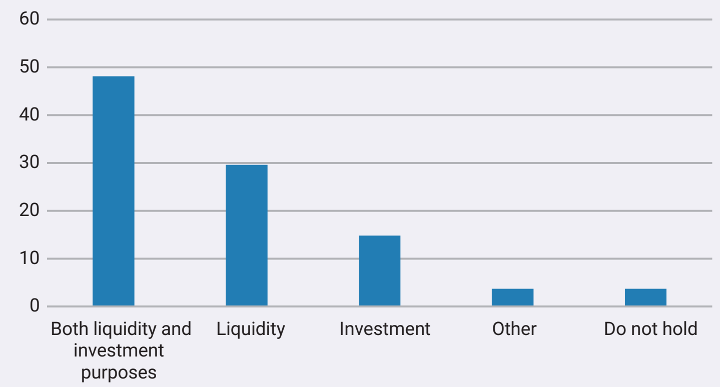
Are any of the following reasons relevant obstacles for increasing your allocation to sovereign debt securities issued by euro area countries?, % of responses



Source: OMFIF GPI Survey 2019

Figure 11: Liquidity crucial to euro area holdings

What is the primary motivation for any holdings of sovereign debt securities issued by Euro area countries?, % of total responses



Source: OMFIF GPI Survey 2019

area safe asset, and 81% expressed support for further exploration of this project. Yet, in the words of one respondent, this safe asset would remain plagued by a 'lack of credibility' unless accompanied by significant reform and further integration of the economic and monetary union architecture.

North America and Europe attract most investments

In terms of their broader regional distribution, GPIs allocate around 92% of their assets to developed markets (see Figure 12). This is in line with the inherently conservative aims of most public investors, and may also reflect the emerging market volatility experienced in 2018.

The bulk of this allocation is in North America and Europe, which account for around 86% of GPI assets in our sample. Emerging markets in Africa and Latin America are underrepresented, making up just 0.2% of central bank holdings and only around 0.5% of total GPI portfolios examined. This distribution is not expected to change significantly in the medium term.

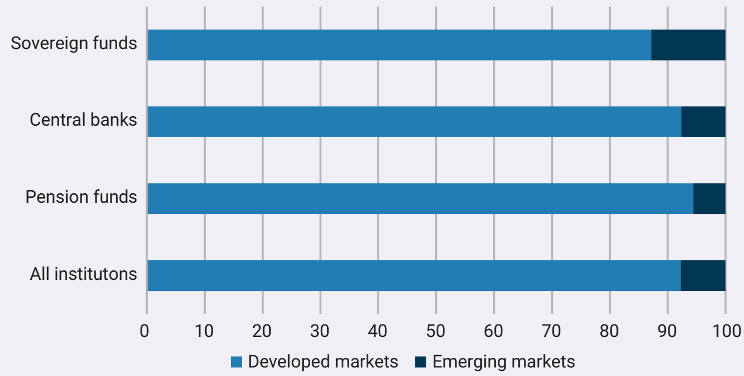
Investors are most enthusiastic about North America and Asia, each being identified by around 20% of respondents as locations in which they would 'increase' or 'significantly increase' their allocation. Conversely, investors suggested they are likely to reduce or significantly reduce their allocation to European markets, with around 12% claiming they were likely to do so in the next 12-24 months. Yet most GPIs suggested they would keep their regional allocations unchanged (see Figure 13).

The same holds true for currency allocations, which are poised to remain roughly unchanged for the coming years. Despite geopolitical and trade uncertainty, central banks remain overwhelmingly committed to the dollar. Our survey results suggest this is unlikely to change.

Central banks display the most conservative approach, with 75% saying they are overwhelmingly likely to keep their allocation constant to all currencies. Sovereign funds suggested they are most likely to move away from traditional reserve currencies (such as the dollar and euro) and into more adventurous territory in the medium term, underscoring their different investment objectives. The dollar is expected to face the greatest degree of change overall, with 14% saying they would increase their allocation and another 11% suggesting they would reduce theirs. Similarly, while a net share of respondents suggested they would increase their allocation to the renminbi, a small portion indicated they would reduce their holdings over the 12-24 month horizon (see Figure 14). This stands in contrast to previous years, in which respondents usually only indicated they would increase their allocation.

Figure 12: Vast gap between developed and emerging market allocation

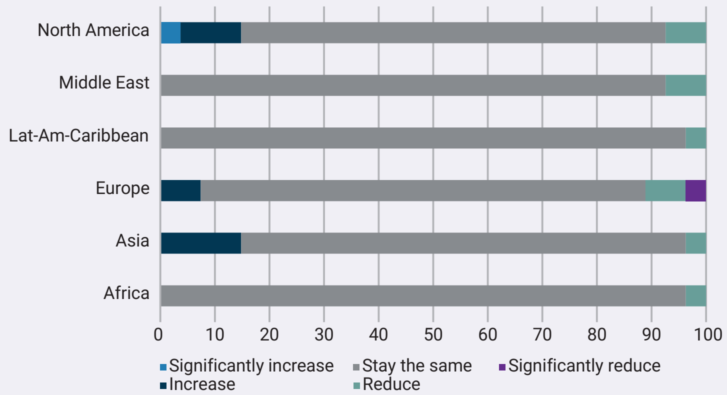
Share of investment portfolio by market type, weighted average % of total portfolio



Source: OMFIF GPI Survey 2019

Figure 13: Geographical distribution likely to remain broadly unchanged

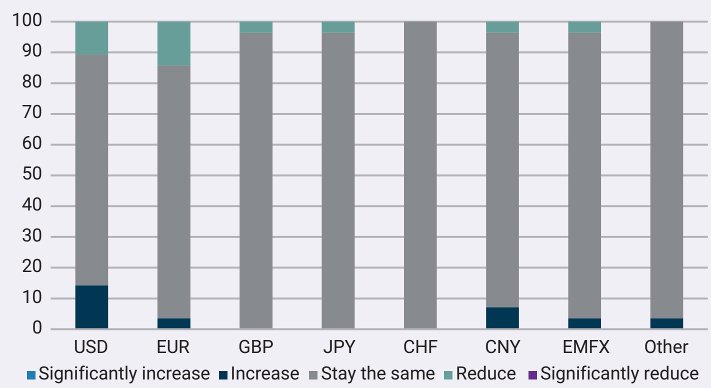
In the next 12 24 months do you plan to increase, reduce or maintain your regional allocation to..., % of total responses identifying each option



Source: OMFIF GPI Survey 2019

Figure 14: Stability expected for major currency allocations

Over the next 12-24 months, are you planning to increase, reduce or maintain your exposure to the following currencies?, % of total responses



Source: OMFIF GPI Survey 2019

2019 Asset allocation survey

> Not all central banks are simply allowed to invest in real assets; the reserves are for monetary policy reasons, not for financing projects and economies.
>
> Central bank

Real estate and infrastructure maintain popularity

Real assets remain popular with GPIs. More than two-thirds of respondents who can invest in real assets claimed to have increased or significantly increased their allocation to the asset class over the past three years.

Infrastructure is more popular overall, with around 14% of eligible GPI portfolios allocated to the asset class, compared with 8% for real estate. This mostly reflects the views of sovereign funds and public pension funds. Among central banks, only 8% of those surveyed invest in the asset class. Often this reflects regulations out of the control of reserves managers, as many central banks are prohibited from investing in relatively illiquid assets.

In our sample, 76% of central banks responded that they are not allowed to invest in real assets at all because of mandate constraints, with a further 12% not allowed to invest because of laws and regulations. Only 4% of central banks surveyed can invest in real assets without restrictions, with the remaining 8% allowed to invest but restricted in the amount and type of assets in which they can invest. Looking ahead, only 4% of these central banks said they plan to increase allocation to real estate, and none plan to increase their infrastructure allocation.

Of those GPIs not currently allowed to invest in real assets, 78% said that they do not expect rules governing such investments to change in their jurisdiction or specifically for their fund, while 59% said that if laws and regulations were changed to enable them to invest in real assets, they would still not consider doing so.

Others are responding to changes to their mandates, with one sovereign fund reporting, 'We have increased allocation to real assets as they are key to the development of the country.' Public investors are also going deeper into the asset class as they gain more expertise. One central bank investing in the asset class said 'we started with unlisted fund structures, and have moved onto exchange-traded funds as well on a small scale.' Overall, the most popular ways for GPIs to access real assets are private markets and private equity, with 71% and 79% of investors accessing the asset class in these respective means. Publicly listed assets were moderately popular, preferred by 36% of investors. Unlisted assets tend to dominate in the case of infrastructure, with 62% of GPIs investing in them, compared with 38% who invest in both listed and unlisted assets. The opposite is true for real estate: 38% invest in unlisted only, with 62% investing in both listed and unlisted.

Between 20%-25% of investors said they access real assets through mutual funds and real estate investment trusts. Most of these holdings are concentrated in Europe, followed by North America. This reflects mainly the views of European public investors that hold assets domestically. A respondent stated that the public pension fund they represented had increased their allocation and is adding international real estate to its portfolio. However, most real assets (64%) remain domestically held.

The main motivation for GPIs to invest in this asset class is diversification, closely followed by 'good income prospects'. Most survey respondents (75%) said real assets had performed 'significantly better' relative to cash over the past year, with a further 17% saying they had performed 'slightly better', and the final 8% stating they performed equally well. Variables such as 'higher yield' and 'hedging' were less relevant.

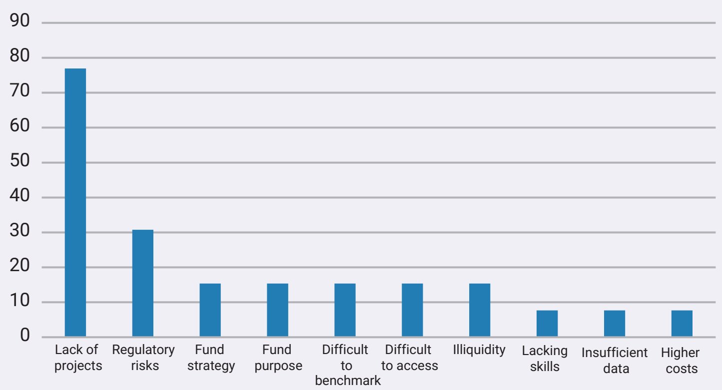
There is still a long way to go: one public pension fund said, while they started investing in infrastructure several years ago, they have not reached their target strategic weight. Looking ahead, 15% of respondents plan to increase their allocation to real estate and infrastructure. Within the smaller sample of GPIs already investing in the asset class, 58% plan to increase investments in real assets.

This trend is here to stay. When asked whether they expect to exit some of their real asset investments as monetary policy normalises and yields on traditional asset classes rise, 92% of GPIs gave a negative response. However, there are obstacles for further momentum to take hold.

The greatest reported challenge faced by public investors in accessing real assets is the availability of good-quality investment opportunities, both in terms of projects suitable to their own risk/return objectives as well as the availability of a pipeline more broadly.

Figure 15: Lack of projects main issue for real asset opportunities

What are the biggest challenges when investing in real assets?, % who selected option as 'important' or 'very important'



Source: OMFIF GPI Survey 2019

Some investors referred to the lack of secondary market liquidity as another obstacle when investing in real assets, as well as the broader illiquidity of the asset class (see Figure 15).

On the regulatory side, one sovereign fund stated that 'Basel and Solvency regulations discourage banks and insurers to hold infrastructure assets', hindering the asset class's development. They recommended recalibrating the Capital Requirements Directive IV and Solvency II directive, favouring more long-term investments. The impermanence and inconsistency of regulations were also cited as obstacles, as were changes in tariffs and taxes. The same is true of policy uncertainty around trade and immigration, which has had an impact on construction costs in certain jurisdictions, with the effects being felt across real assets. The complexity of administrative regulation of real assets was also cited. Public investors were less worried about issues with costs or the shortage of either data or knowledge to assess the asset class.

Incorporating ESG criteria

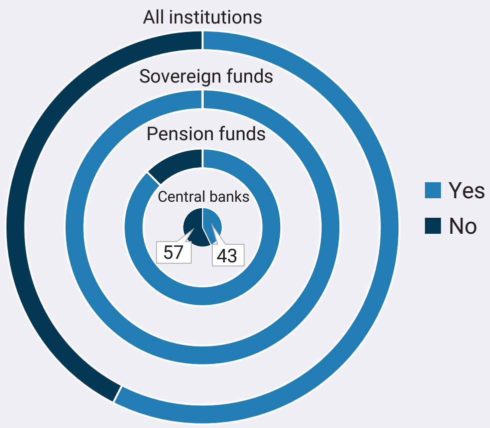
As with real assets, the desire of GPIs to integrate environmental, social and governance criteria in their investment decisions is a trend that has carried through this year. All sovereign funds and 88% of public pension funds surveyed said they invest in green or sustainable assets.

The story is different for central banks. Despite these institutions' growing interest in the climate agenda, evidenced by the establishment of the Network for Greening the Financial System, central banks' rhetoric is not being matched with action. Fewer than half of central banks surveyed invest part of their reserves in green or sustainable assets (see Figure 16). This partly reflects constraints on the types of asset classes central banks can purchase. Among central banks in our sample who do not currently invest in green or sustainable assets, one-third are prevented by their mandate from doing so. However, some reported they are looking to revise their mandates to enable them to allocate greater shares of their portfolios to such assets. Even so, this may not always be possible. The lack of supply for suitable projects and the relatively underdeveloped nature of the asset class was cited as a barrier to investment, as green assets often fail to meet public investors' liquidity and maturity thresholds.

ESG criteria are becoming more important in respect of outsourcing portfolios to external managers. Most public pension and sovereign funds consider ESG criteria 'important' or 'very important' with regards to guidelines for external managers, compared with just one-quarter for central banks. This can take the form of divestments as well as active investments in green assets. Green bonds dominate, with 74% of institutions surveyed who invest in green assets choosing this instrument. Green equities were the second-most popular asset, chosen by 48% of respondents. However, the understanding of sustainability among public investors may differ, as allocations reported in the survey do not always match the data on climate-aligned or certified investments.

Respondents reported challenges with investing in sustainable assets. Among those who do not currently invest, the most popular reason for doing so was that it does not fit with the current fund strategy, while insufficient data also cited by several respondents (see Figure 17). Others said they are 'still thinking about it' and that 'this will be part of future discussions'.

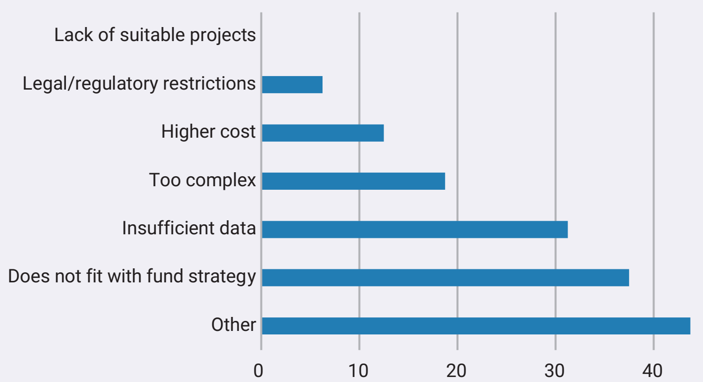
Figure 16: Uneven commitment to sustainability
Do you invest in green or sustainable assets?, % of responses



Source: OMFIF GPI Survey 2019

> Key challenges include the absence of (i) a harmonized definition, (ii) a classification system and (iii) transparency and accountability in company data.
>
> Central bank, on obstacles to the adoption of ESG assets

Figure 17: Strategy and knowledge among main obstacles to ESG investment
Why do you not invest in green/sustainable assets?, % of total responses



Source: OMFIF GPI Survey 2019

2019 Asset allocation survey

> More liquid asset classes such as fixed-income and money market securities are preferred. Gold price volatility in the short-term is another factor which makes this asset class less attractive.
>
> Central bank on gold allocation

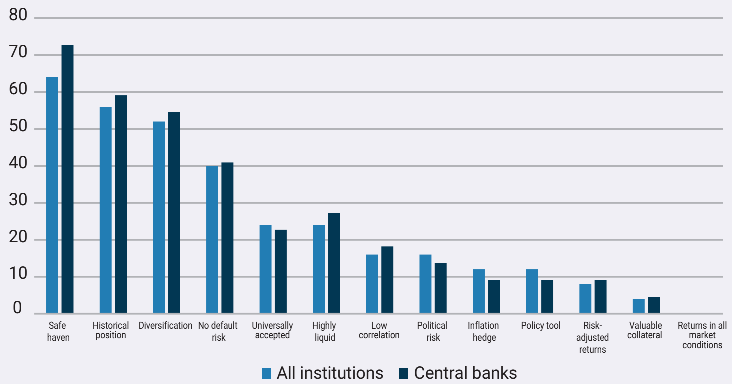
Around 55% of GPIs surveyed said they plan to 'increase' or 'significantly increase' their green investments, with green bonds being the most popular option.

Historical legacy underpins gold allocation

This year's survey shows that the rationale behind gold purchases is steadily changing. Inflation is declining in importance among public investors in the context of gold, and surprisingly among central banks in particular. Only 12% of survey respondents indicated they used gold as an inflation hedge. Meanwhile, 60% indicated that gold's safe haven status and historical position were particularly important reasons for investment (see Figure 18). Most developed market central banks tend to hold gold for historical reasons as well, a priority not shared by public investors from Africa or Latin America.

Figure 18: Threat of inflation declining in importance; diversification key

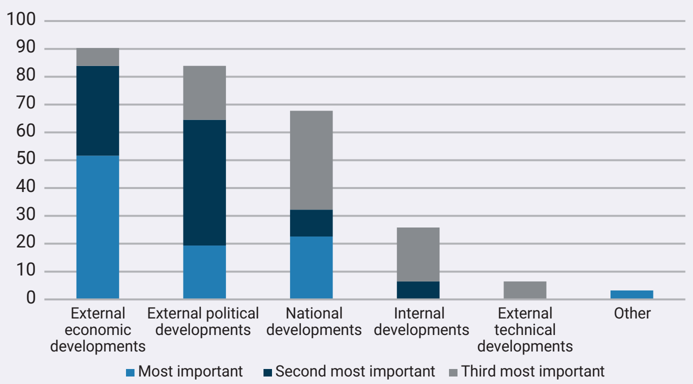
What are the main factors influencing your gold allocation?, % who selected option as 'important' or 'very important'



Source: OMFIF GPI Survey 2019

Figure 19: External vulnerabilities worry GPIs

What do you think are the top three considerations on the way your reserves are managed in the future? Rank them 1, 2, and 3, % of total responses



Source: OMFIF GPI Survey 2019

Most of the investors in our survey directly invest in physical gold (92%), with 4% each in the three asset categories of mining, futures and mutual funds. The popularity of physical gold goes together with the metal's legacy status and its inability to generate consistent yields. European institutions tend to hold the most gold – with one-third of institutions from the region allocating more than 16% of their portfolio to it – while North American and Middle Eastern institutions, the Federal Reserve notwithstanding, tend to hold the least gold.

Respondents shared their views on the forces impeding their access to the gold market. They were most concerned with the headline risks associated with investing in gold, as well as the market's volatility. Both options were identified as important by around 30%-35% of investors.

External risks worry GPIs

We asked global public investors to identify the key themes impacting asset allocation and reserves management over their longer-term horizon. Respondents were asked to rank different dimensions of strategic change – external and internal developments, political and economic concerns – according to their order of priority

GPIs feel most vulnerable to external changes, with more than 50% selecting external economic developments, such as changes in the world economy or in the reserve status of various currencies, as the most important variable likely to affect their decision-making (see Figure 19). In parallel, a roughly equivalent share selected external political developments – continuing trade conflict, for example, or geopolitical shifts – as their second-most pressing concern. Meanwhile, technical developments, such as cyber attacks or other forms of technological change, were not regarded as significant, with just 6% selecting it as their third-most important worry. The same holds true for internal developments, such as staffing constraints or outdated IT infrastructures.

To scrutinise more closely the external economic developments at the heart of investor disquiet, we asked respondents to identify their stance towards the future role of the renminbi, both on a global level and with respect to their own reserves management practices. A revealing disparity emerged: while almost all GPIs suggested the role of the Chinese currency would increase (90%), only 31% indicated they would increase their allocation towards it over a long horizon, with another 59% indicating they would seek greater involvement (see Figure 20).

This suggests some hesitation over the openness of the Chinese economy, with one respondent noting that 'to increase exposure, [we] need capital markets to be more open and [have a] better legal framework – it is cumbersome to get the contracts.'

The survey results suggest that public investors, and central banks in particular, have been slow to adapt to new technological developments. Despite the rising frequency of cyber attacks worldwide, almost 30% of central banks have yet to implement changes to their cybersecurity framework, and a further 10% do not consider cybercrime a significant threat to their reserves management operations (see Figure 21). Nonetheless, most institutions have adopted new measures – one central bank respondent noted they had made 'large investments in resilience', both for cybersecurity and business recovery capabilities.

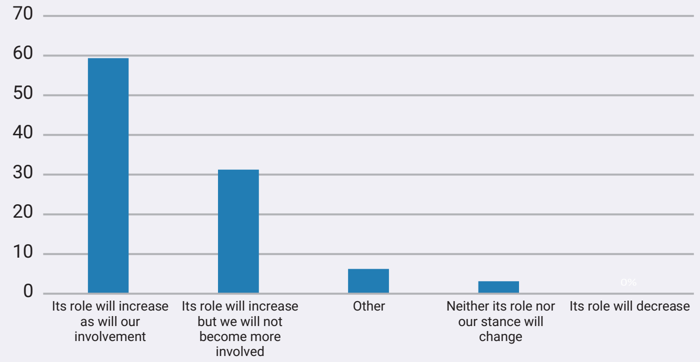
The picture is more unsettling when it comes to the application of big data analytics and artificial intelligence to investment and reserves management. Of the institutions surveyed, 83% have yet to consider or apply AI to their reserves management systems, compared to the mere 7% who use these technologies in their operations (see Figure 22). None of the central banks surveyed indicated they currently use any of these tools in their reserves management, though several indicated they are weighing various approaches and options. One institution said they were 'working on an agenda to study the best uses of those techniques in reserves management, [and] expect to implement some related projects in the coming years.' Forthcoming changes have the potential radically to alter the nature of reserves management.

The survey shows that the public investment sector is growing and changing at a slow, steady pace. GPIs are embracing more risk in their asset and currency and allocations, but obstacles including cost and board approval hinder the speed of these shifts. Central banks are waking up to the pending threat of climate change, but diversifying into green and sustainable assets only sluggishly. Technological advancement remains a key macroeconomic and geopolitical variable for GPIs, but adoption of updated defences and innovative investment management techniques has been gradual. If global economic uncertainty rises further, GPIs will have to react quickly and draw on the experience of the past decade to produce intelligent, considered responses.✦

The authors are Danae Kyriakopoulou, Chief Economist and Director of Research, and Pierre Ortlieb, Economist at OMFIF. We are grateful to the following individuals for their views and advice in preparing the survey questions: John Nugée, Gary Smith and Elliot Hentov from the OMFIF Advisers Network, and Markus Schuller from Panthera Solutions.

Figure 20: Investors cautious over involvement in renminbi

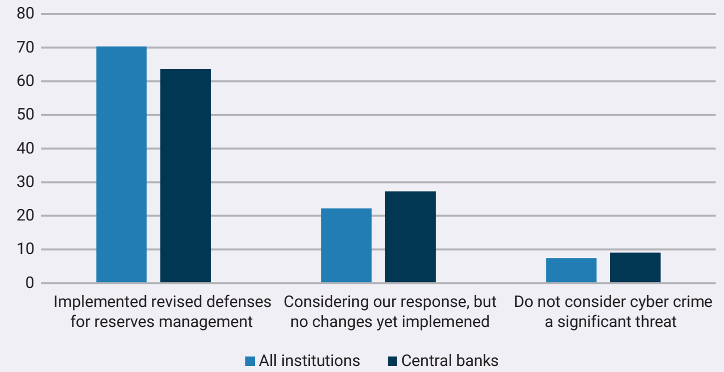
How do you see the role of the renminbi as a reserve currency developing and how will you respond?, % of total responses



Source: OMFIF GPI Survey 2019

Figure 21: Cyber defence build up underway

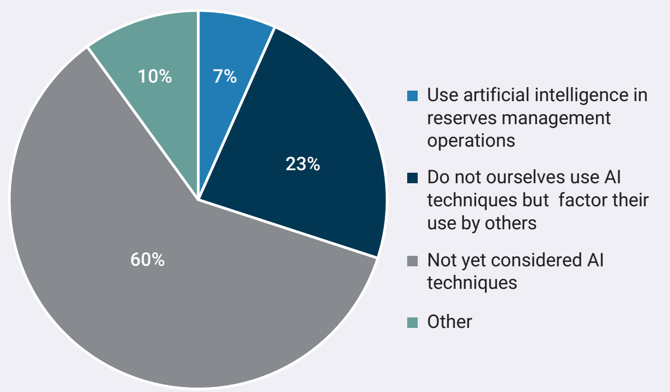
How have you responded to the threat of cyber crime?, % of responses



Source: OMFIF GPI Survey 2019

Figure 22: Global public investors lagging behind in the AI deployment

What approach does your institution employ in applying big data, artificial intelligence and machine learning to investment management?, % of total responses



Source: OMFIF GPI Survey 2019

✧ Shifting business models

Splitting portfolio to meet central bank needs

The Bank of Mauritius has overhauled its reserves management operations to ensure they are modern, fit for purpose and resistant to potential risks.

Yandraduth Googoolye
Bank of Mauritius

> With developed markets' sovereign yields entrenched near zero, it has become increasingly difficult to generate enough returns on foreign exchange reserves to offset the cost of monetary policy operations.

Reserves management is one of the core functions of the Bank of Mauritius. We determine the composition of the official foreign reserves and work to ensure returns, security and liquidity.

Following the 2008 financial crisis, the BoM embarked on a process of reserve accumulation. It now has reserves of around $6.5bn. With developed markets' sovereign yields entrenched near zero or even in negative territory, it has become increasingly difficult to generate enough returns on foreign reserves to offset the cost of monetary policy operations.

Therefore, starting 2015, we began modernising our reserves management. With assistance from the World Bank and Bank for International Settlements, the BoM initiated its first strategic asset allocation exercise. This comprised setting risk and return targets for the entire reserves portfolio as well as dividing it into tranches with different risk and return profiles. The strategic asset allocation is reviewed annually.

To ensure the availability of reserves in case of shocks, and as part of setting appropriate investment priorities, an assessment of what constitutes an adequate level of reserves is performed each year. The reserves portfolio is split into three tranches: working capital, liquidity and investment. The working capital tranche handles any potential daily cash flow needs and usually has a one-month investment horizon or less. The liquidity tranche's main objective is to replenish the working capital tranche when it is drawn down and is made up of liquid assets that can be disposed of at short notice. Its investment horizon is typically set at 12 months. Any excess reserves beyond those in the working capital and liquidity tranches are allocated to the investment tranche, which has a longer investment horizon and aims to generate higher returns while remaining liquid.

Capacity building

In order to meet our objectives and given the market outlook, we decided in 2015 to appoint external managers to oversee part of our reserves.

Along with an improved investment management process, the BoM has focused on establishing a sound governance structure and improving oversight of our investment and risk management framework. The board of directors sets the risk tolerance and investment horizon and approves all eligible asset classes, as well as the overall risk budget under the strategic asset allocation strategy. An investment committee has been set up and meets regularly to manage reserves effectively, monitor risks and review the latest market developments. There is a clear separation of duties between the front, middle and back offices. An independent risk management team has been created to work closely with portfolio managers to ensure risk limits are not breached. It plays an active role in the portfolio construction process.

To support reserves and risk management, there are continuous efforts to develop infrastructure and support systems. The BoM brought in a global custodian and invested in multi-asset order and execution management systems as well as financial workstations. This will allow us to connect to global capital markets. It will create more efficient work flows between the portfolio and risk management teams, as well as the payments and settlements systems and accounting groups. The bank has invested in a post-trade connectivity solution to ensure the smooth transition of trade flows from the order management system settlement platforms. This is expected to enhance portfolio and risk management, optimise work flows, enhance compliance procedures and contain overall operational risks.

In restructuring and enhancing reserves management, the BoM places strong emphasis on continuous capacity building for staff in reserves management, global macro trading and research, and risk management. ✦

Yandraduth Googoolye is Governor of the Bank of Mauritius.

✧ Shifting business models

Room for private equity

Investing during a late-cycle phase requires a balancing act between defensive positioning and agile portfolio management. In this environment, the usual investment rules do not apply.

Katrina King
QIC

"Investors need to remain focused on the bigger picture, rather than being swept along by the noisier short-term market movements and debate on when, and if, a recession will hit."

The signals are unmistakable. All major indicators over the past 12 months point to the late phase of a prolonged economic cycle, with the risk of a recession decidedly on the rise. During this uncertain time, investors need to remain focused on the bigger picture, rather than being swept along by the noisier short-term market movements and debate on when, and if, a recession will hit. Now is when managers should consider the defensiveness of portfolios to minimise risks in the event of a recession. However, adopting a completely defensive stance with a 100% cash allocation may be a premature and costly mis-step, as a late cycle can be extended. This perspective has gained traction since the start of 2019 as central bankers have taken a dovish stance, giving the economy room to continue its expansion.

Portfolio diversification, through the addition of bonds, commodities or gold, is another well-trodden defensive path, but it may offer a false sense of security as equity correlation assumptions may not always hold true. If there's one rule the Queensland Investment Corporation advocates when investing in this late cycle environment, it is that the usual rules don't apply.

We recently examined the impact on a portfolio on an equity downturn under three scenarios: do nothing, sell to buy bonds, or hedge via equity options. The last was the clear winner, effective under a range of debt/equity correlation assumptions.

Aim for quality

The quality of portfolios is another vital element to successfully weathering this late cycle phase. In this cycle, investment-grade credit has an important place, especially if the goal is to increase fixed-income allocations. While well-researched credit names are more likely to make it through a recession intact, market-to-market risk can be mitigated by balancing towards non-cyclical names.

Further, in this post-financial crisis and post-quantitative easing world, standard government bond benchmarks warrant reconsideration. Benchmarks with heavy weights to negative yielding bonds may not offer the anticipated protection in risk-off scenarios. Tailored benchmarks or sub-indices may be more appropriate. Those investors who hold their nerve, set high standards and do not rush to rebalance real assets are likely to benefit. For instance, when consumer sentiment lags, retailers and other tenants focus on high-quality locations which act as a commercial or community hub, ensuring significant foot traffic. Real assets, such as real estate, and retail-led and mixed-use town centres, could be a beneficial addition to portfolios.

Active management

Combining this long-term investment mindset with active management can bear fruit in infrastructure investments, especially in strategic core assets such as gateway airports and ports, which can weather turbulent times. Historically, this active approach has delivered robust returns through the cycle. The defensive characteristics of these infrastructure assets produce highly predictable cash flows that are protected by regulation or long-term inflation-linked contracts.

This element of active management plays a role in quality, private equity opportunities. PE not only out-performs public equity markets on average, but improves the performance of a business beyond the market's daily gyrations. Moreover, this outperformance is cyclical. QIC found PE returns tend to lag during expanding markets but outperform listed equities more than average in late-cycle environments, offering attractive return diversification. By focusing on the quality of the assets and experience of the manager, PE assets can continue to perform regardless of what's happening in the market.

When investing in this late cycle phase, it is important to monitor developments closely. Rather than bunkering down, investors should reposition portfolios so they strike a balance between liquid assets and exposure to quality real assets. This will provide an element of protection while granting opportunities from stable cashflows which can weather changes in the economic cycle. After all, no one knows how long this cycle will continue and when the slowdown will occur. ✦

Katrina King is General Manager – Research and Product Innovation at QIC.

✧ Shifting business models

Avoiding the pitfalls of behavioural bias

Credit managers tend to rely heavily on tracking error as a means of assessing portfolio risk, an issue that could be avoided through the establishment of a careful and deliberate portfolio construction process.

Josh Lohmeier
Aviva Investors

> A manager who consistently outperforms when markets are good but underperforms when they are weak may be under the influence of an overly optimistic behavioural bias.

Many factors can explain return attribution differences in credit portfolio returns – duration, interest rate positioning and, most importantly, sector allocation and security selection.

Solid fundamental credit research is a cornerstone of any successful corporate bond management strategy. Most managers generate most of their excess returns through sector allocation and security selection. However, many of them do not place enough weight on the importance of portfolio construction.

A manager who consistently outperforms when markets are good but underperforms when they are weak may be under the influence of an overly optimistic behavioural bias. Many corporate credit managers fall into this trap mostly because their portfolios are over-weighted toward lower quality (or lower-rated credit risk) issues. As a result, the excess returns generated by most corporate bond managers are correlated highly to the direction of credit spreads. Credit portfolio managers should be able to establish relative value between lower- and higher-risk bonds. This should help them decipher if the potential returns of risky bonds match the additional investment risk assumed within a portfolio.

Credit managers tend to rely heavily on tracking error as a means of assessing portfolio risk. This results in an anchoring bias to an inefficient benchmark. While it is important to be aware of portfolio tracking error, investors should bear in mind its limitations as a tool in portfolio construction.

All too often it is used as a tether by portfolio managers. If benchmark indices are inefficient, then deviations from the benchmark should be beneficial by reducing risk or improving portfolio returns. However, deviating from a benchmark is often viewed as 'taking risk' rather than reducing it or improving risk-adjusted returns.

Looking beyond benchmarks

Frequently, portfolio managers end up owning a security they do not particularly like, in a sector with an unfavourable outlook, simply because the issue is a large contributor to the benchmark. Therefore, adding tracking error can sometimes be beneficial. If a portfolio manager holds an unfavourable view of a security or sector, they should feel confident in avoiding that part of the market. Instead, they should look for other areas with similar levels of risk, volatility and macro drivers in which to invest in order to offset the underweight.

All investment-grade fixed income managers face behavioural biases and misconceptions in risk analysis. If not recognised and properly accounted for, these obstacles can hamper a manager's ability to outperform consistently over an investment cycle. However, by approaching these challenges proactively and creating systems and solutions to fix them, credit managers can take advantage of these limitations and increase returns.

One of the most effective yet misunderstood ways to address these pitfalls is through the establishment of a careful and deliberate portfolio construction process. An effective process allows credit managers to look beyond the effects of behavioural bias and reduce the negative impacts of certain inhibiting risk metrics. A process that does not account for these characteristics will leave credit managers and investors vulnerable to downside risk.

There is value in looking at metrics like tracking error. However, these metrics should not be the sole or primary focus, given the constraints they place on a portfolio manager.

An effective portfolio construction process allows a credit manager to take advantage of the structural inefficiencies in the credit markets, while still benefiting from a strong bottom-up and fundamentally-based credit idea generation process.

Managers who implement a process which is free from the constraints of a traditional benchmark-linked approach are likely to offer returns that outperform through every stage of an investment cycle, and as a result are highly likely to be uncorrelated to the many peers who do follow such an approach. ◆

Josh Lohmeier is AIA Investment Officer and Head of North American Investment Grade Credit at Aviva Investors. Follow the link below to read an Aviva Investors report on corporate bond portfolio construction.
https://thinktank.omfif.org/avivainvestors

✧ Shifting business models

Leveraging long-term equity

A long-term investment strategy helps to hold steady through industry cycles and adapt properly to new, beneficial technologies.

Stéphane Etroy
Caisse de dépôt et placement du Québec

"Our focus has shifted to sustainable long-term revenue growth, operational improvement and governance.

Interest rates have remained low for the better part of the past decade in most advanced economies. For public institutional investors, this has provided both opportunities and challenges. Cheap financing facilitates investment in costly infrastructures. These are needed around the globe because of demographic and economic growth or due to years of neglect and underfunding by local governments. But low interest rates are an issue for pension fund administrators that traditionally relied heavily on fixed income portfolios, whose performance is aligned closely with official benchmark rates. The Caisse de dépôt et placement du Québec manages funds primarily for public and parapublic pension and insurance plans in Quebec. It is one of Canada's leading institutional fund managers and invests in major financial markets, private equity, infrastructure, real estate and private debt. Our home market is a mature economy with a limited investment market compared to global markets. The US and Europe offer scale and opportunities to invest in leading companies. Their sophisticated financial markets generate intense competition for investment opportunities. Our globalisation strategy also targets a limited number of emerging markets into which capital is deployed gradually and patiently alongside our local partners.

Long-term strategy for long-term objectives

We have no material reason to focus on yearly returns; our actuarial obligations are predictable and therefore require a return on investment over decades, not years. This long-term outlook enables CDPQ to hold steady through industry cycles and adapt properly to new technologies.

The development of a new product, service, process, software or brand is often slow and tedious. For entrepreneurs, frequent changes in private equity owners are distracting to the management team and costly in terms of transaction costs.

A long-term investment strategy helps to conclude successfully transactions with companies that require substantial investment, but whose growth strategy is planned over many years. There is considerable value to be found in innovation, research and development. Most businesses have not integrated all the existing technologies that could benefit them substantially. This process often disturbs long-established practices and falls into regulatory grey zones. It is a long-term endeavour.

This approach requires a different way of thinking. CDPQ's international private equity division is more akin to an industrial investor than a financial one. Our focus is not 'multiple arbitrage' (increasing returns through playing the difference between entry and exit valuation earnings multiples). Nor is financial engineering (using debt leverage to increase equity returns) at the centre of our portfolio management strategy. The impact of the two over a 10-year holding period is marginal. Our focus is more sustainable long-term revenue growth, operational improvement and governance.

As an active minority investor, CDPQ negotiates governance in line with our level of ownership. The intent is not to manage the company, but to influence positively the management team and co-investors. Consequently, our operating partners are key members of the international private equity team. They manage the portfolio, interact with chief executives and boards, leverage CDPQ's global network and steer value creation initiatives.

This heightened level of commitment toward invested companies and the sustained involvement it requires brought CDPQ to develop a business-owner mindset.

This approach cannot be applied to all types of businesses. A successful globalisation strategy depends on choosing wisely which locations to focus on for deployment. Similarly, a successful private equity strategy depends on choosing wisely in which sector and industry to invest. Considering that CDPQ's depositors need stable, steady returns on their funds, the international private equity team focuses on business driven by macro trends in health, technologies, financial services and clean industry.

In a competitive market, an investor must differentiate itself. Capital is a commodity. At CDPQ, differentiating ourselves means providing sustained support to business founders, entrepreneurs, management teams and equity partners over the long-term. This is how our international private equity team intends to thrive and create value during the next decade. ✦

Stéphane Etroy is Head of Private Equity at Caisse de dépôt et placement du Québec.

✧ Shifting business models

The end of Libor

The London interbank offered rate has been a cornerstone of global financial markets, but work on alternative risk-free rates is proceeding at full speed.

Edwin Latter
Financial Conduct Authority

“Much more needs to be done to make sure that market participants plan for a transition move away from Libor. There is a huge role here for the public sector.

The London interbank offered rate (Libor) has been a cornerstone of global financial markets. Five years ago, the future of Libor was not up for discussion. The Financial Stability Board’s Official Sector Steering Group published its first report in July 2014, and official sector authorities made recommendations to strengthen Libor (and other interbank rates) together with the development of new risk-free rates.

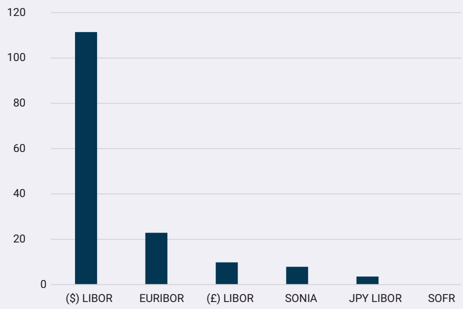
Three years later, in July 2017, Andrew Bailey, chief executive officer of the Financial Conduct Authority, made clear that the future of Libor was not guaranteed. The rate’s long-term survival was in doubt due to the thinness of underlying market activity and submitter banks’ discomfort in continuing to submit based on expert judgement. He announced that the authorities were discussing with the Libor panel banks an agreement to sustain the rate voluntarily until the end of 2021. This built on the good work that was already being done by the administrator, ICE Benchmark Administration, and the panel banks to meet new regulatory requirements in place since 2013. Libor was, temporarily, stabilised.

Work on alternative risk-free rates is proceeding at full speed. More than 10 private sector working groups focused on interest rate benchmark reforms have been convened by central banks around the world. For Libor, each currency now has at least one alternative rate that can be used when Libor disappears. The risk-free rates are based on either the unsecured or secured wholesale overnight lending market, overnight being the maturity at which transactions in these markets are concentrated. Recent data show how the secured overnight financing rate (the US risk-free rate of choice) and sterling overnight index average (Sonia, the UK rate) are based on hundreds of daily market transactions averaging around $750bn and £45bn, respectively. By comparison, transactions feeding into the calculations of three- and six-month sterling Libor average only £187m and £87m per day, respectively.

These factors matter a great deal because, put simply, Libor is one of the most important numbers in the world. Estimates of its use vary, but they are all in the hundreds of trillions of dollars. It is not only the raw value of contracts referencing the rate which is worrying, but the breadth of its use. Libor has found its way not only into loans or derivatives, but into tax calculations, credit cards and even into regulatory requirements.

Given this importance, one would expect transition to be high on the industry’s agenda. This is the case for many large firms. But some have not yet addressed this task with the priority it requires. While awareness of the exposure of individual firms has grown substantially, this was from a near zero base and remains patchy. Much more must be done to ensure that more market participants plan for a move away from Libor.

Libor remains benchmark rate for international lending
Key interest rate benchmarks, 2018 notional traded value, $tn



Source: ISDA, OMFIF analysis

There is a role here for the public sector to help with outreach in local markets. Many central banks are already providing support to industry working groups, administering risk-free rates and engaging in international forums. Securities regulators are working together internationally through the International Organisation of Securities Commissions.

However, some jurisdictions are only just starting to consider the consequences of transition. While markets are global and interconnected, they also have their own peculiarities. Alongside financial regulators, central banks are best placed to make assessments and ask their supervised firms to do their homework.

Risk-free rate demand growing

Central banks should engage with market participants to test their awareness of the fragility of Libor. They are in a strong position to use their network of connections to distribute information and gather feedback and intelligence. It is possible to draw on the experience of other jurisdictions to expedite the drafting of a clear road map and deliverables. Progress can be tracked through regular supervision activities and by requesting relevant firms' detailed plans. This is a step that the UK authorities took in September 2018 through a 'Dear CEO Libor letter' sent to CEOs of major banks and insurers. Results should be available in the coming months. The Hong Kong Monetary Authority issued a similar letter at the beginning of March 2019.

The good news is the move has started. Demand for risk-free rate products is growing. Since June 2018 there has been more than £14bn of new floating rate note issuance linked to the UK's Sonia benchmark and $46bn linked to the US's Sofr. But the buy side, including public-sector investment vehicles, needs to be on board as well. All have an important role to play as key adopters of risk-free rate-linked products. Supply will follow demand, and investors can lead the way. Sovereign funds, pension funds and banks' treasuries can catalyse a virtuous circle.

The transition will not be easy. Overnight rates are very different from Libor, which sets interest payments in advance, most commonly over three or six months. This appears to be particularly important for some corporates that need to know – or at least are accustomed to the practice – their cash flow in advance. Last summer the Financial Stability Board published a statement identifying some role for term rates set in advance, should they be available, recognising that an overnight risk-free rate may not be optimal in all cases. However, to support financial stability, the Financial Stability Board noted that their use should in general be limited to only some cash products. The authorities' expectation is that most contracts, and in particular derivatives, will embrace the risk-free rates based on overnight transactions.

In many ways, new transactions will be the easy part. Markets must also deal with the large numbers of contracts which may still be outstanding when Libor ends. Derivatives contracts, which are by far the largest share of the notional outstanding, should be dealt with by signing the new International Swaps and Derivatives Association protocol providing robust arrangements for contracts to 'fall back' to alternative rates.

Many other contracts, including bilateral agreements, bonds and securitisations, will need more active interventions from counterparties. Trade associations have highlighted this problem to the relevant working groups and authorities. Many are working with their members to find solutions. In the UK, the Loan Market Association has been heavily involved in the drafting of 'New and legacy loan transactions referencing sterling Libor', a paper which seeks to establish market conventions for loan market participants who continue to reference Libor in new and legacy loan transactions.

Libor's days are numbered and transition to alternative rates is necessary. While parts of the market are already on board, the rest must follow. Central banks and sovereign funds have a key role to play in making sure that the discontinuation of one of the most important numbers in the world does not create unacceptable consequences, at home and abroad. ✦

Edwin Latter is Director of Markets and Wholesale Policy at the UK Financial Conduct Authority.

“Demand for risk-free rate products is growing. Since June 2018 there has been more than £14bn of new floating rate note issuance linked to the sterling overnight index average and $46bn linked to the US's secured overnight financing rate.

People behind the assets
The men and women who oversee investment trends

The investment influencers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1: **Ernest Addison** Governor, Bank of Ghana

Ernest Addison is governor of the Bank of Ghana. He was previously the central bank's director of research. He left that role 2011 to join the African Development Bank, where he worked until his appointment in March 2017. Since then, Ghana has experienced a significant improvement in its balance of payments position, and inflation has reached and remained at record lows, despite an early 2019 uptick.

2: **Hajia Aisha Dahir-Umar** Director General, Nigeria National Pension Commission

Haija Aisha Dahir-Umar took over as acting director-general of the Nigeria National Pension Commission in 2016. Since she took office, enrolment rates in the contributory pension scheme have risen, and she has introduced a slew of new measures aimed at retirees – such as workshops on pension fund administration and other activities to facilitate the transition to retirement.

3: **Yngve Slyngstad** Chief Executive Officer, Norges Bank Investment Management

Yngve Slngstad has been chief executive officer of Norges Bank Investment Management since 2008. Despite a difficult global macroeconomic environment over the course of 2018 the bank caught the investment community's attention with two critical asset allocation decisions. First, it announced it would raise the share of equities in its portfolio to around 70% to improve performance in the low-rate environment. Second, it declared it would begin divesting from certain oil and petroleum shares, which make up 1.2% of its portfolio.

4: **Kristian Fok** Chief Investment Officer, CBUS Super

CBUS Super is Australia's $33.6bn pension fund for the construction and building industry. As chief investment officer, Kristian Fok has sought to strike a delicate balance between financial return and sustainable development. Assets under management have doubled over the past five years, resulting in the decision last year to move a raft of assets into in-house management. Similarly, CBUS is collaborating on a host of green projects with the Australian green investment bank, such as its flagship clean energy mixed-use real estate development in central Melbourne.

5: **Philip Lane** Executive Board Member, European Central Bank

Philip Lane served as governor of the Central Bank of Ireland between 2015-19. He oversaw a period of muted inflation and solid growth in the Irish economy, and is widely regarded as one of the more dovish members of the European Central Bank's Governing Council. He has led the European Systemic Risk Board's safe asset task force since 2016. On 1 June 2019, succeeded Peter Praet as the ECB's chief economist.

6: **Janice Dunn Lee** Acting Chief Executive Officer, United Nations Joint Staff Pension Fund

Appointed to the United Nations Joint Staff Pension Fund board in January 2019, Janice Dunn Lee previously served in a range of roles across the UN and the Organisation for Economic Co-operation and Development. Under Dunn Lee's tenure so far, the UNJSPF has taken strides towards socially responsible investment, including increases in its green bond portfolio. This has been complemented by the development of new data analytics approaches to better evaluate its portfolios' social and environmental risk characteristics.

7: **Rachel Elwell**
Chief Executive Officer, Border to Coast Pensions Partnership

Rachel Elwell joined Border-to-Coast Pensions Partnership in December 2017, tasked with managing its organisational and investment strategies. The multi-billion-dollar pension pool is the product of the consolidation of UK pension schemes. This move has led to administrative and financial challenges, such as the exigencies of property pooling processes. Border to Coast recently announced a renewed £500m focus on private equity, targeting exposure across developed and emerging markets.

8: **Juan José Echavarria**
Governor, Banco de la República, Colombia

Juan José Echavarria has been governor of the Banco de la República I Colombia since January 2017. This follows a long career in academia and in the Colombian government. Echavarria's tenure has seen a spike in investment in Colombia, driven by a favourable fiscal and monetary stance. Meanwhile, the country remained relatively unscathed by the market turbulence that affected other emerging markets in 2018. Inflation has remained stable despite some lingering pressures. Annual inflation has slowed to around 3.1%, close to the central bank's 3% target.

9: **Anastasia Titarchuk**
Interim Chief Investment Officer, New York State Common Retirement Fund

Anastasia Titarchuk was named Chief Investment Officer of the New York State Common Retirement Fund in July 2018. She joined the NYSCRF in 2011 and previously served as director of absolute return strategies. Titarchuk was praised widely for the success she achieved in this role, including a 9.8% return in the 2013-14 fiscal year, 423 basis points above its benchmark.

10: **Alia Al-Tameemi**
Executive Director, Kuwait Investment Authority

Aliah Al-Tameemi joined the Kuwait Investment Authority in 2018 to run its private equity department. The most senior woman at the fund, she has been described as the 'iron lady of private equity'. KIA has traditionally preferred to invest through private equity (and/or venture capital) rather than through direct investment, making her role particularly important. The firm's alternative investments make up around 27% of its total assets under management of $592bn.

11: **Liu Wei**
Chairman, National Social Security Fund of China

Liu Wei took charge of China's National Social Security Fund in April 2019, having previously served as vice-minister of finance since early 2017. The 58-year-old takes over at a time of uncertainty. A significant funding gap has emerged in the Chinese pension system, estimated at Rmb56.6tn ($8.4tn) by the China International Capital Corporation. There is mounting pressure for the fund to raise its investment returns as the country's population ages. Between 2000-17, the national fund averaged a return of 8.4%.

12: **Nestor Espenilla (1958-2019)**
Former Governor, Bangko Sentral ng Pilipinas

Nestor Espenilla, the late governor of the Bangko Sentral ng Pilipinas, passed away earlier this year at the age of 60. Espenilla, who joined the BSP in 1981 as a debt analyst, was praised widely for his stringent approach to banking supervision, as well as for his efforts to improve financial inclusion by digitalising payment systems, including the establishment of the national retail payment system.


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New regulations
Rules and reforms

Regulations refined

China continues to liberalise bond market

Despite China's 15% share of global GDP, the renminbi accounts for a mere 1.8% of global reserve holdings. Chinese officials have sought to increase the renminbi's role in the global currency system, most notably by opening their domestic bond market to foreign buyers. Foreign investors hold only 6% of the total Chinese government bond market.

Over the course of the past year, China took several steps to expand its role in global reserves. The 'Bond Connect' programme implemented in 2018 reduced restrictions on foreign investors in China. While its success has been damped by defaults and technical issues around payment delivery, foreign holdings of Chinese bonds grew by 62.7% between July 2017-May 2018. This coincided with China's inclusion in the Bloomberg Global Aggregate Bond Index in early 2018, another critical development that caused foreign holdings to surge. This complements previous steps, such as the Qualified Foreign Institutional Investor designations of 2002 and 2011, which granted foreign investors quotas for bonds issued in dollars and renminbi respectively.

RBNZ implements structural change

Over 2018 the Reserve Bank of New Zealand approved and implemented two crucial organisational changes. First, a 'Policy Targets Agreement' that went into effect in March 2018 added employment maximisation to the RBNZ mandate, in addition to the existing task of keeping future annual consumer price index inflation between 1%-3% over the medium term. While the RBNZ was among the first central banks to secure independence and codify its price stability objective, it now joins a rising swell of institutions adopting dual mandates.

RBNZ Governor Adrian Orr announced the formation of a new monetary policy committee, a result of the first phase of New Zealand's formal review of the Reserve Bank Act. Its new MPC will consist of between five and seven members, comprising mostly internal staff alongside some select external candidates.

NBIM begins fossil fuel divestment

Norway's $1tn sovereign fund – the world's largest – was initially created to invest North Sea oil and gas profits. Yet in early March 2019, Norges Bank Investment Management announced it would divest from oil and gas exploration, while maintaining shares in companies that have renewable energy divisions. NBIM maintains stakes of 2.4% in Shell and 2.3% in BP respectively. Overall, relevant oil and gas assets make up around 1.2% of its equity holdings.

The move came of advice delivered to the Norwegian government by Norges Bank in 2017, which suggested that volatility in commodity markets made divestment financially prudent. NBIM had previously divested from coal companies in 2015. In January 2018, Ireland became the first country to pass a national fossil fuel divestment bill.

Khazanah splits into two strategic branches

Malaysia's Khazanah announced a major restructuring in late 2018, splitting the fund up into two distinct commercial and strategic arms. Khazanah has traditionally been a more strategic investor, holding key domestic assets such as Malaysian Airlines, Telekom Malaysia and Malaysia Airports. The shift towards a more commercial strategy is driven in large part by the country's broader fiscal stance. The government's fiscal deficit, as well as the debts accrued as a result of the 1MDB controversy, have forced Khazanah to devote renewed focus to providing real returns for the government.

Khazanah will aim to provide returns of three percentage points above inflation over a rolling five-year period through its new commercial arm. The sale of the fund's 16% stake in IHH Healthcare in late 2018 underlines the government's desire to monetise existing assets and diversify national revenue sources. This will be part of a broader commercial portfolio restructuring which will enhance exposure to a wider array of geographies and asset classes.

UK pension fund consolidation continues

In late 2018 the UK government announced a consultation on the consolidation of defined benefit pension schemes. The British defined benefit market is highly fragmented. According to the Pension Protection Fund's Purple Book, there are 5,588 such schemes in the UK, with 36% having fewer than 100 members and a further 44% with fewer than 1,000. Similarly, more than 1,000 of UK funds have less than £5m in assets under management.

The Department for Work and Pensions has argued that encouraging a well-managed UK 'superfund' industry would provide significant efficiency gains. First, it would allow pooled schemes to staff properly their own internal investment officers and trim costs. Second, funds would provide greater security to savers, both by increasing capital buffers and reducing risks coming from potential employer insolvencies.

UAE changes enhance central bank power

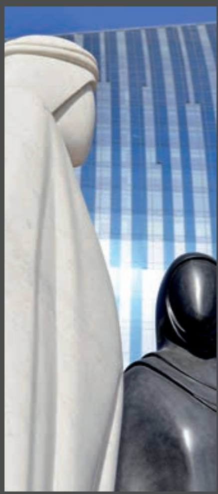
In late 2018, the United Arab Emirates updated its decade-old central banking framework with legislation ushering in wide-ranging changes. The law includes new banking oversight powers applicable to domestic financial bodies. These will be subject to more detailed classification and closer scrutiny. It grants the UAE central bank new prudential supervision authority, including substantial discretionary powers. This is complemented by measures to improve consumer protection, including new confidentiality standards, as well as penalties to non-compliant local financial institutions.

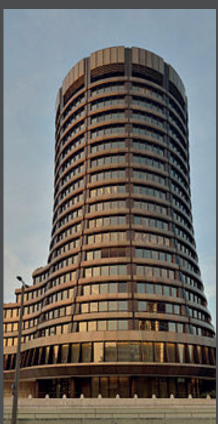
The new law significantly increased the central bank's paid-up capital, by $5.5bn. In addition, the central bank received permission to establish a general reserve fund up to four times the size of this capital, a measure designed to aid currency stability. The legislation also allows the central bank to standardise and harmonise Islamic finance activities, building on the existing Higher Sharia Board established in 1985.

Antitrust and competition discourse flares up

Transatlantic pressure to tackle firm consolidation and the dangers of monopolistic power has risen over the past year. The European Union blocked a potential merger of Siemens and Alstom, citing concerns about a loss of competition in the signalling and high-speed train markets. In the US, a new federal task force will investigate potentially anticompetitive conduct by technology companies including Facebook and Amazon. In the telecommunications industry, US law-makers have vocally opposed a potential merger between T-Mobile and Sprint.

The implications for global public investors are vast. For one, the growing prominence of horizontal shareholding may come under fire as an anticompetitive practice. Regulatory action may come into conflict with shareholder rights. In addition, the increasingly popular practice of public investor co-investment may become subject to greater scrutiny. The possibility of collusion between public and private investors engaging in private equity to reduce purchase prices is one form this may take. Overall, legal and regulatory approaches to market competition are becoming more stringent, a trend which GPIs should heed. →





Bulgaria guarantees central bank independence

As part of the EU Accession Treaty, adoption of the euro is a long-term obligation for Bulgaria. In 2018, the government introduced a series of changes to its central banking and regulatory frameworks designed to meet standards required for entry into the European exchange rate mechanism and eventual entry into the euro area.

The Bulgarian legislation overhauls the structure of banking supervision, including the appointment of a new deputy governor as banking supervisor, stronger oversight of non-bank financial institutions, and more authority for the European Central Bank in Bulgarian financial policy. This includes the precondition that the Bulgarian National Bank 'be obliged to adopt any measure in relation to credit institutions requested by the ECB', as well as entry into the single supervisory mechanism and the single resolution mechanism.

Netherlands pension funds 'future-proof' national system

The new Dutch financial assessment framework (FTK), introduced in 2015 and implemented over the past four years, showed contrasting signs of strain and success over the past 12 months. Several Dutch pension funds reported inflation-linked benefit increases for the first time in years, as new rules introduced as part of the FTK mandate that funds only pay out indexation-related rises if their coverage ratio is at least 110%.

Lacking coverage ratios have become a more widespread phenomenon because of an extension of the permitted pension fund recovery period introduced as part of the FTK, with the effects only being felt over the past two years. The legislation extended the recovery period to five years, allowing many funds with funding shortfalls to postpone recovery measures. Funds with a coverage ratio between 90%-110% were not obliged to implement discounts. At the same time, however, they are not allowed to grant inflation-linked increases. Law-makers will review the return and coverage assumptions over the next two years.

New Basel framework

The Basel Committee on Banking Supervision announced the final pieces of the new 'Basel IV' framework in late 2018 and early 2019. The new rules will establish more stringent conditions for internal risk models, probably yielding higher capital requirements for most stress-tested institutions. This will have a notable effect on European banks, as these are more likely to use internal models to calculate exposure compared to their Asian or US counterparts.

Other measures announced include a more comprehensive set of Pillar 3 disclosure requirements. Despite applying mostly to US firms with more than $250bn in assets, these new requirements cover a wide range of regulatory issues including credit risk, leverage ratios and capital distribution constraints. This rulebook will have significant implications for global credit quality, capital management and portfolio strategy for GPIs.

Federal Reserve begins policy review

In November 2018, with the US economy performing well and inflation close to target, the Federal Reserve announced it would begin a review of the mechanisms, tools and communication strategies it uses. While the Fed's mandate and its 2% price stability target are to be taken as given, the review will consider all practices used to meet said target. It will involve engagement with and outreach to stakeholders across the US, including town hall-style gatherings with relevant representatives of critical constituencies.

The timing of the review is striking. The Fed is under increasing pressure from political forces to alter its monetary policy stance and mandate. Rising uncertainty about the value and influence of key monetary policy variables, as highlighted by Fed Chair Jerome Powell at the 2018 Jackson Hole conference, has contributed to the urgency of this strategic review. Furthermore, greater awareness of the Fed's pivotal role in the world economy since the 2008 financial crisis has stoked tensions in some markets where reliance on the dollar is increasingly regarded as a constraint on growth or stability. The Fed will present its findings in the first half of 2020. ✦

✧ Policy and regulation

Poland to stand strong in face of slowdown

Economic growth in Poland is increasingly inclusive. Almost all Polish regions are among the fastest to catch up with the EU average GDP per capita.

Adam Glapiński
Narodowy Bank Polski

“High economic growth has been driven by robust consumption, buoyed by favourable labour market conditions, and, more recently, an increase in investment, boosted by EU funds.

Global economic conditions appeared to weaken in the months leading up to 2019, sending worrying signals on economic prospects worldwide. There were numerous potential triggers of a global downturn, including a slowdown in China and unexpectedly weaker growth in the euro area.

These concerns may eventually prove overblown. Regardless, policy-makers would do well to examine carefully their economies' vulnerabilities to external shocks. In Poland, this led to encouraging conclusions, mainly thanks to the domestic economy's strong foundations.

Outstanding growth

Poland has enjoyed outstanding growth for many years. Its GDP growth was 5.1% in 2018, the third fastest in the European Union. Last year was the 27th in a row of economic expansion. It concluded a decade of exceptionally strong cumulative growth. At 37%, it was almost three times faster than in the euro area. Poland's GDP per capita in terms of purchasing power parity in 2018 was around 60% that of its German equivalent, up from 40% when Poland joined the European Union in 2004.

Importantly, economic growth in Poland is increasingly inclusive. Almost all Polish regions are among the fastest to catch up with the EU average GDP per capita. The country saw the most significant decrease in poverty and social exclusion rates over the past decade than any other country in the bloc.

High economic growth has been driven by robust consumption, buoyed by favourable labour market conditions, and, more recently, an increase in investment, boosted by EU funds. In spite of a slowdown in global trade, exports proved supportive, helped by the competitiveness of Polish products, and geographical and commodity diversification of our overseas sales. Over the coming years, GDP growth is expected to slow, but is likely to stay relatively robust. According to the Narodowy Bank Polski's most recent projections, the economy will grow by 3.5%-4% between 2019-21.

Strong economic growth does not entail rising economic imbalances or inflation. On the contrary, inflation in Poland is one of the lowest in central and eastern Europe. According to the European Commission's 'Alert Mechanism Report 2019', Poland is one of the most stable economies in the EU. Along with favourable labour market conditions, Poland has achieved remarkable progress on its external balance and internal indicators. The trade balance has been positive for several years and has helped reduce Poland's external debt. Likewise, the negative net international investment position – the legacy of earlier capital inflows – has been narrowing. Bank lending has been growing in line with nominal GDP, and growth in house prices in 2018 was close to the EU average.

Room for manoeuvre

It is important to bear in mind that global conditions may worsen in the coming years. However, given Poland's largely conservative monetary and fiscal policies, it has room to accommodate large external shocks.

On fiscal policy, the government deficit reached a record low in 2018. Public debt, running below 50% of GDP, is expected to continue declining over the coming years. This is due mainly to robust economic conditions and reduced tax avoidance. This provides space to support the economy in case of a recession. The government has already announced fiscal measures to provide a cushion against the forecasted slowdown.

In recent years, the NBP has kept short-term market interest rates significantly above zero, contrary to the other EU member states. This has proved effective for securing financial and macroeconomic stability without hindering growth. Therefore, unlike in many other countries, the central bank has room for manoeuvre in the face of unexpected shocks. Given that Poland is not in the euro area, a floating exchange rate may also be of help.

The Polish economy's strong foundations are likely to shield it from adverse developments abroad. And even if the global slowdown becomes more severe, there is space to accommodate as necessary and protect national growth. ✦

Adam Glapiński is President of Narodowy Bank Polski.

✧ Policy and regulation

Working through differences

Since 2015, local government pension schemes for England and Wales have been required to pool investment management, enabling them to share knowledge and experience.

Dawn Turner
Brunel Pension Partnership

“The Responsible Investment Cross Pool Group has representatives from all eight pools and serves as a forum for sharing and enabling leadership.

In 2015, the 89 English and Welsh administering authorities of the UK’s Local Government Pension Scheme were instructed to pool investment management. The aim was to gain value from economic scale in terms of cost savings, while maintaining performance, improving governance and increasing the capability and capacity for investment in infrastructure.

There are now eight pools. Each has developed its own way forward as a reflection of the shared vision and desire of the underlying partner funds. The London Pension Collective Investment Vehicle and the Local Pensions Partnership were the first pool companies to become authorised by the Financial Conduct Authority, in October 2015 and April 2016, respectively. They represent the diversity and spectrum of arrangements in place. London CIV provides investment opportunities for 32 LGPS London local authorities funds. LPP has three LGPS investor funds and provides pensions administration services to more than 580,000 members across LGPS, police and firefighters’ pension schemes.

Brunel created a pool company with an outsourcing investment operating model. It gained FCA authorisation in March 2018. We have 10 partner funds (Avon, Buckinghamshire, Cornwall, Devon, Dorset, Environment Agency, Gloucestershire, Oxfordshire, Somerset and Wiltshire) with £30bn in assets under management.

It was important from the start for Brunel clients to understand what they would get from pooling. The UK Treasury ‘Green Book’ lays out how to evaluate a high risk, strictly timetabled, high value project within the public sector. Brunel followed this guidance and formed a comprehensive business case. This proposed that benefits of £550m could be achieved over a 20-year period, with breakeven coming through, on average, in 2023. Most assets would transition to Brunel by 2021, with some illiquid assets remaining as legacy until fruition of the investment.

We worked with our 10 funds to design the investment portfolios that would meet their diversified investment strategies, while achieving economic scale and create opportunities for improved performance. In the process, 12 investment principles were agreed that laid the clear foundation of how Brunel should approach investing and management of assets.

Varied portfolios

The 25 portfolios and services have made it easier for Brunel to focus from the start on what our LGPS shareholder clients want. This covers both private and listed markets. The company was officially formed by the 10 shareholders in July 2018. At that time, the Brunel team consisted solely of our eight board members. We submitted our application to the FCA in September 2017 and procured strategic operational partners such as State Street for administration and custodian services. We have implemented our passive equity portfolios, UK and low volatility active equity portfolios in listed markets. We have also begun our first round of private market investments and management in infrastructure, secured income, private equity and property.

A review against the business case in autumn 2018 identified projected savings above expectation of around £200m to 2036 and allowed for recruitment of additional staff to further strengthen the Brunel team. We are now about one-third of the way through transitioning the management of the £30bn in assets under management. We have achieved good economies of scale regarding fee savings. It is too early to talk about performance.

Our journey has been aided through maintaining strong collaborative relationships with other pools as well as the individual LGPS funds within the pools. The pools have supported each other and continue to do so; we benefit from our joint knowledge, experience and strengths. One example is the Responsible Investment Cross Pool Group – this has representatives from all eight pools and serves as a forum for sharing, learning, challenging, consulting and enabling leadership.

Pooling requires participants to have a heart for collaboration, clear common goals and a willingness to work hard for rewarding results that will take time to realise fully. ✦

Dawn Turner is Chief Executive Officer of Brunel Pension Partnership.

✧ Policy and regulation

Safeguarding central bank independence

The fresh wave of criticism against central bank independence is particularly worrying in emerging markets whose institutions are more vulnerable to tensions.

Javier Guzmán Calafell
Banco de México

“This is a time to reflect on what actions are needed to improve public understanding of the role of central banks and the importance of their independence.

The broad turn towards central bank independence can be traced back to the 1970s and 1980s. Many countries were experiencing high inflation. Therefore, attention focused on overcoming ‘time inconsistency’, a problem inherent to monetary policy. This is the risk that policy-makers, for political reasons, will aim for short-term gains through expansionary policies, since their costs will not be visible immediately. Proposals to enhance central bank independence emerged as a viable device to face these challenges.

The case for independence has strong underpinnings, but there has been growing doubt over its merits. This was initially a consequence of the monetary policy response to the 2008 financial crisis, particularly in the largest advanced economies. First, amid low inflation, some argued central bank independence was no longer justified. Second, as major central banks implemented quantitative easing measures, there were concerns these institutions would end up shaping fiscal policy, which is beyond their remit. Third, greater central bank involvement in financial stability raised doubts about entrusting them with too many endeavors, and on the consistency of these tasks with independence. Fourth, detractors of independence identified it as an obstacle to coordinate monetary and fiscal policies, while also worrying about the distributional implications of quantitative easing.

The case for independence

These arguments are paradoxical. In the absence of an adequate and timely reaction by fiscal and structural policies in the aftermath of the financial crisis, monetary policy became the only tool to bolster the world economy. There are also strong indications that, without independence, central banks would probably not have been able to undertake the measures needed to face the crisis.

Central bank independence is still needed in a low-inflation environment. Inflation declined partly as the result of the recessionary effect of the financial crisis. There are other factors helping to contain inflation, but their future potential impact is uncertain. Trade-offs with financial stability goals have always existed, as well as incentives to consider them. Consistency of public finances with central banks’ goals is the key issue for proper coordination between fiscal and monetary policies. This does not imply, though, that central banks should be stripped of their independence. Over the long run, the distribution of resources owes mostly to fiscal, structural and institutional factors.

Fresh criticisms against central bank independence have come to the fore recently. These are politically motivated and their dissemination across both advanced and emerging market economies is alarming. They are again the result of developments following the financial crisis and have found widespread support among those disenchanted with globalisation. This is particularly worrying in emerging markets, since their institutional frameworks are more vulnerable to tensions.

Failing to protect central bank independence would cost the economy dearly, especially in emerging markets. Their central banks’ primary mandate – price stability – would be jeopardised. This could entail a return to time-inconsistent monetary policies, with potentially severe macroeconomic and financial implications.

Many arguments support central bank independence. To deal effectively with price pressures, institutions need a long-term perspective, insulated from political considerations. They should be able to respond quickly to changing conditions, and have the technical competence and credibility to do so. Central bank independence has been key to stabilising long-term inflation expectations and overcoming episodes of distress in many countries. Destroying the institutional framework that has made these achievements possible would be irrational.

Granted, central bank independence must be accompanied by checks and balances. Clear and transparent goals must be in place, and central banks must be held accountable. Existing concerns cannot be ignored. This is a time to reflect on what actions are needed to improve public understanding of the role of these institutions and the importance of their independence. Elected officials usually define central banks’ mandates and the mechanisms to ensure accountability. However, central banks should ensure that policies implemented are fully consistent with their mandates, and continuously evaluate means to enhance their transparency and accountability. ✦

Javier Guzmán Calafell is Deputy Governor at the Banco de México. The views and opinions expressed in this document are the sole responsibility of the author.

✧ Policy and regulation

Government intervention set to linger

The presence of governments in markets has stopped being an extraordinary circumstance, and we are likely to see much more during the next downturn.

Alexander Petrov
State Street Global Advisors

"While 'shock and awe' interventions often bring markets to their senses and restore price discovery, gradual and predictable interventions may actually undermine it by introducing a price-insensitive buyer.

Analysts expected 2019 to be the year of balance sheet normalisation, but recent developments have made such central bank exits from markets less probable. As of 2018, the top four developed market central banks own around 25% of government debt issued by their governments; they are unlikely to shed this asset pool soon. Besides the maxim that 'entering is easier than exiting', several other lessons can be drawn from such government programmes over the past 20 years, of which quantitative easing is only a recent version.

There are four different motivations which determine the speed and size of governments' purchases of financial assets, as well as the length of time the assets are held. First, governments may pursue higher public ownership in certain industries, typically to advance nationalisation. New Zealand's railway nationalisation in 2008 is a rare example.

Second, governments may receive assets as a by-product of bailing-out distressed companies during a crisis. The 2008 financial crisis contained several cases: the US government's Troubled Asset Relief Programme targeted many industries, including banks and automakers. The government often ends up both with shares of the entity itself and with separate holdings of some of those entities' former assets. The Federal Reserve set up two different vehicles to hold the financial assets of AIG, a major insurer that ultimately was nationalised. Such assets are normally disposed of as soon as is practicable, subject to the government making no nominal losses and typically over a three to five year horizon.

Third, governments may pursue 'shock and awe' interventions by purchasing a notable share of a specific domestic asset class to restore financial stability. The Fed's purchases of commercial paper in 2009 and the Hong Kong Monetary Authority's intervention into its equity market in 1998 are good examples. The disposals are usually hindered by vast amounts of assets held but helped by the fact that the purchases happen at ultra-low valuations.

Fourth, interventions may constitute monetary policy, where central banks purchase assets to expand the monetary base. Those happen gradually, and their unwinding is also aligned with monetary policy objectives. The predictable nature of the purchases allows the issuers to adjust to the new demand pattern, and the effects on price discovery can be significant. The Bank of Japan is conducting purchases of government debt, corporate bonds and equities. The holding horizon of such assets can extend beyond a decade and, unlike Treasuries, central banks can be subject to mark-to-market losses on their portfolios, complicating both their management an eventual disposal.

Stretching into decades

While 'shock and awe' interventions often bring markets to their senses and restore price discovery, gradual and predictable interventions may actually undermine it by introducing a price-insensitive buyer. That can be partly mitigated by the use of broad-based vehicles. For instance, while the BoJ's corporate bond purchases may induce investors to second-guess the BoJ, the use of exchange-traded funds for equity purchases keeps the central bank at arm's length from security selection.

For all the distortion, interventions may provide unique opportunities for innovative financial market reform. Hong Kong's intervention paved the way for the creation of Asia's first ETF and transformed retail participation in the equity market.

While emergency interventions can be unwound under careful management over two or three years, monetary purchases can stretch into decades. Key elements of TARP were unwound by early 2014, while the unwinding of QE has barely begun in the US and is nowhere in sight in Japan or Europe.

Portfolios obtained during interventions need to be managed while held, even if the overall amount stays the same. The HKMA adjusted the mix of its holdings to match changes in the index, while the US Treasury actively managed its Agency MBS portfolio.

Policy innovations cannot be uninvented. The special-purpose vehicles the Fed created to conduct the interventions are active; mortgage-backed securities, untouched by the Fed before 2008, will remain a balance sheet tool for the near future, and the HKMA kept one-third of acquired equities within its exchange fund permanently. Governments' market presence has stopped being an extraordinary circumstance, and we are likely to see much more during the next downturn. ✦

Alexander Petrov is Senior Strategist in the Global Macro Policy Research Group at State Street Global Advisors.

✧ Policy and regulation

Cleaning up India's banking system

Prime Minister Narendra Modi's government has introduced reforms to clean up India's banking system, burdened with non-performing assets.

Meghnad Desai
OMFIF

"There are plans to merge some of the country's largest banks, bringing together five or six at a time, rather than maintaining a system with 29 separate entities.

Following a period of fragility, the Indian rupee has become one of the more resilient emerging market currencies. In 2013, then-US Federal Reserve Chairman Ben Bernanke announced the central bank would phase out purchasing bonds. This sparked the so-called taper tantrum, as investors, in a panic, rushed to sell their bonds. As a result, the rupee fell sharply against the dollar, reaching an all-time low. At the time, India was relatively new to handling dollar debt for its corporations and inexperienced in receiving foreign investment.

In the five years since, India has experienced a surge in capital flows, both as foreign institutional investment and foreign direct investment. Thanks to the 'automatic route' introduced by Prime Minister Narendra Modi, FDI does not require approval by the government or the Reserve Bank of India.

At the same time, the Modi government is cleaning up the domestic banking system. The state-owned banking sector is burdened with significant amounts of non-performing assets. There are plans to merge some of the country's largest banks, bringing together five or six at a time, rather than maintaining a system with 29 separate entities. India's banks will be among the world's biggest.

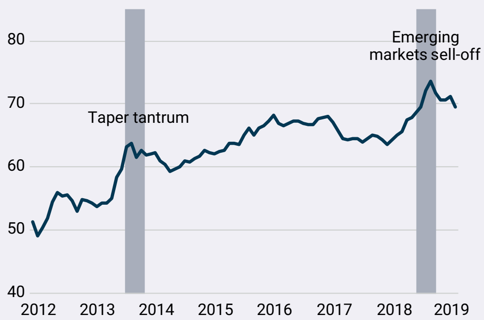
Twin reforms

Creditors have struggled to attach assets, a legal process by which property owned by the debtor must be transferred to the creditor or sold for the benefit of the latter. The Indian judicial system is known for its extensive delays. In response, the Insolvency and Bankruptcy Code and the National Company Law Tribunal were introduced in 2016. The twin reforms strengthen the position of creditors vis-à-vis debtors and reduce delays engineered by the debtors. One consequence was the insolvent Essar group being instructed to sell its steel plant to Arcelor Mittal.

As a result of these initiatives, the cost of capital is expected to fall, while credit conditions will improve. This will ensure a steady annual growth rate of around 7%-8%. Inflation is already under control.

However, the rupee is not yet fully convertible. Restrictions remain on transferring money in and out of the country. India is conservative on that front and will relax the rules only slowly. It does not aim to make the rupee a leading currency. The

Resilient rupee recovers from fluctuations
Indian rupee to $ exchange rate



Sources: Thomson Reuters Datastream, OMFIF analysis

economy remains vulnerable to oil prices, but this is not causing any serious problems. New Delhi holds around $400bn in reserves and the rupee is stable. India's strategy is not to peg its currency against the dollar and defend it, but to smooth the fluctuations according to the market. One can rely on this policy to continue. ✦

Lord (Meghnad) Desai, a Labour peer, is Emeritus Professor of Economics at the London School of Economics and Political Science, and Chair of the OMFIF Advisers Council.

3 Asset classes

Traditional assets
Multicurrency investment
Infrastructure and real estate
Gold
Sustainable investment
Islamic finance

✧ Traditional assets

Index-inclusion risk for emerging markets

Benchmark-driven investors can be more sensitive to changes in global financial conditions than other investors. For emerging markets, this could contribute to destabilising economic effects.

Rohit Goel, Robin Koepke, Fabio Natalucci, Evan Papageorgiou and Jeff Williams
International Monetary Fund

> Flows driven by emerging market benchmarks are around three to five times more sensitive to global risk factors than the balance of payments measures of portfolio flows.

The past decade has seen a significant rise in the importance of asset managers for portfolio flows to emerging markets and a commensurate increase in the prominence of emerging market benchmark indices. Funds benchmarked to the most widely-followed emerging market bond indices have quadrupled in the past 10 years to $800bn. Moreover, the number of countries in JPMorgan's emerging market bond index has doubled to more than 70 since 2007, with the inclusion of many countries that have issued in international bond markets for the first time.

As a result, the behaviour of benchmark-driven investors has increasingly influenced portfolio flows to emerging markets. An investment fund is 'benchmark driven' if the allocation of its portfolio across countries is guided by the country weights in a benchmark index, as discussed in the International Monetary Fund's April 2019 Global Financial Stability Report and supporting annex. According to recent estimates, benchmark indices account for around 70% of country allocations of investment funds.

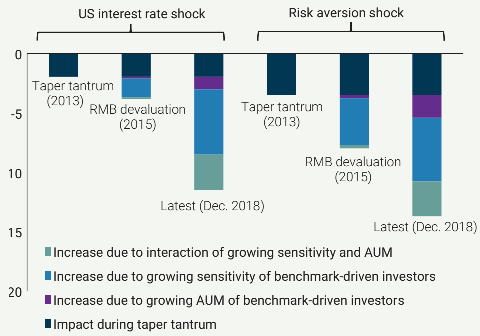
The evidence suggests active funds have been behaving more like passive funds in recent years, with a decline in the average tracking error of active emerging market bond funds.

Destabilising effects

Inclusion in major benchmark indices provides countries with access to a larger and more diverse pool of external financing. But benchmark-driven investors can be more sensitive to changes in global financial conditions than others. As a result, a larger share of benchmark-driven investments in total portfolio flows could increase the risk of excessive inflows or outflows unrelated to countries' economic fundamentals. This could, in some cases, have destabilising effects.

Analysis in the GFSR shows that flows driven by emerging market benchmarks are around three to five times more sensitive to global risk factors than the balance of payments measures of portfolio flows. For example, a one standard deviation increase in the Chicago Board Options Exchange volatility index (which corresponds to a 3.5 percentage point increase) reduces invested assets of benchmark-driven emerging market bond investors by 2% on average, compared with 0.5% for total portfolio bond flows. A combination of heightened sensitivity to external factors and growing assets under management means that outflows from benchmark-driven funds in response to a given shock can be much greater now than was the case only a few years ago. Estimated outflows in response to a one standard deviation interest rate shock using 2013 data are around $2bn, whereas this figure is close to $11.5bn using the latest estimated sensitivity and assets under management.

Outflows in response to shocks greater than in 2013
Outflows from one standard deviation shock, $bn



Source: IMF staff estimates

As the amount of passive and benchmark-driven investment rises, the benefits of index membership may be tempered by financial stability risks for some countries. Enhanced transparency by index providers, such as on eligibility criteria for index inclusion and advance communication of forthcoming index changes, can help promote greater consistency and reduce flow volatility. Issuers should strive for index inclusion where prudent and avoid introducing fragmentation and concentration risks by premature or partial inclusion of debt instruments in international bond indices. ✦

Rohit Goel is Financial Sector Expert, Robin Koepke is Economist, Fabio Natalucci is Deputy Director, Evan Papageorgiou is Deputy Division Chief, and Jeff Williams is Senior Financial Sector Expert in the Monetary and Capital Markets Department of the International Monetary Fund.

✧ Traditional assets

Turning uncertainty into opportunity

The best thing investors can do in the face of uncertainty is accept there are things they cannot predict. We always run our own underwriting, which allows us to prepare for all eventualities.

Clara Chan
Hong Kong Monetary Authority

“Investments should not be limited to a single asset class or region – it is important to diversify, because the legal, tax and regulatory framework can change unexpectedly.

The best thing investors can do in the face of uncertainty is accept there are things they cannot predict. They must pay attention to trends, as well as gauge risks and decide how best to manage them.

A sound investment strategy requires planning. This is determined by investment objectives, such as capital preservation or growth, fulfilment of statutory duties, or long-term liabilities. Additional complications may come into play when investors have other considerations in mind, such as market development and impact investing. While these are valid priorities, they are generally highly dynamic and difficult to quantify. As such, it is wise to set objectives early on, and ensure they are outlined clearly.

Discipline is required, along with an array of parameters including pricing, return and capital structure. Investors must not compromise their information rights, and must preserve their veto power, which can serve as a safety net. There is a need to ensure the interests of all partners are aligned. Moreover, investments should not be limited to a single asset class or region – it is important to diversify, because the legal, tax and regulatory framework can change unexpectedly.

Collaborative setup

Due diligence is crucial. At the Hong Kong Monetary Authority, we always run our own underwriting. This allows us to prepare for all eventualities. Through our collaborative setup, the portfolio and risk management teams assess investment opportunities jointly. They identify threshold issues and potential pressure points. Then, the two teams compile separate reports to ensure impartiality and due process. When appropriate, we generate new ideas and discuss them confidentially with our industry network. This way, we can share new ideas and pioneer investment structures, while keeping an open mind and staying open to suggestions.

Creative risk management

The HKMA manages downside risks by shaping its deals creatively. This enables us to select the ideal capital structure and include appropriate protection, such as put and call options. This was particularly useful when the UK defied market expectations by voting to leave the European Union in June 2016. Following the referendum, we were able to renegotiate certain deals to our benefit.

Private market investing is an intense and dynamic game. It is essential that honest discussion, human wisdom and insight feed into decision-making and monitoring processes.

As 2019 unfolds, investors must err on the side of caution, keeping an eye on market volatilities and risks. But they should also remain attentive to the potential investment opportunities these uncertainties may bring. ✦

Clara Chan is Chief Investment Officer (Private Markets) at the Hong Kong Monetary Authority.

✧ Traditional assets

Dynamics of dollar liquidity

In the dollar-centric global financial system, there has been insatiable international demand for safe financial assets, but their limited availability has exacerbated instability.

Joseph Hoefer
Barings Investment Institute

> If the euro and renminbi become more prominent, this could lead to a safer and more stable international monetary system that alleviates the safe asset shortage and dependence on the dollar.

The 'mighty dollar' is both a blessing and a curse. Ample liquidity is a prerequisite for the efficient functioning of global financial markets, and the dollar is an integral component of the global financial architecture and its stability. In the aftermath of the 2008 financial crisis, however, integrated markets and massive central bank intervention have created new risks for investors that may require policy-makers to consider a fresh co-operative approach. Closer coordination could lessen financing shocks, boost growth and provide greater capital mobility in ways that facilitate a more efficient allocation of capital and improved systemic risk sharing.

Global liquidity conditions – and dollar liquidity in particular – reflect the ease of securing financing throughout the global financial system. Consequently, the demand for and availability of dollars has a direct impact on the cost of funding in other currencies. Central bank intervention played a significant role in addressing the 2008 financial crisis. As a result, international bank lending flows became increasingly sensitive to US monetary policy. This happened even as the composition of international capital flows shifted to foreign debt securities and away from bank lending.

Of the loans that were being made, international lending moved toward better capitalised banking systems to alleviate default worries that escalated during the crisis. This heightened the sensitivity of other economies to US monetary policy. In this dollar-centric system, there has been insatiable global demand for safe financial assets. The limited availability of safe assets has helped push interest rates to historically low levels and increase macroeconomic instability.

Excesses in global liquidity can contribute to the build-up of unsustainable asset valuations and leverage, while liquidity shortages can undermine stability and growth. These cycles tend to vary with changes in risk, valuation and leverage. Imbalances are often hard to detect and, due to the high level of financial integration, minor disruptions can ripple throughout the entire liquidity system.

International policy-makers face a delicate task as they balance domestic policy objectives and global financial stability. Investors should consider three broad scenarios.

First, there is the existing 'muddle through' approach, which may result in long-term protracted shifts. This feels a lot like the current 'lost decade', where the global economy has become dependent on central bank balance sheets while growth, inflation and returns remain low. Shifts in growth and liquidity have created cycles within the broader cycle as the post-crisis recovery has been stymied by the euro area crisis, China's devaluation, the oil price collapse and, most recently, the Federal Reserve's attempt to tighten policy and reduce its balance sheet.

The second scenario is another crisis that forces a rapid response and immediate retrenchment. Some may view this as the reset that should have happened in 2008, but a sharp adjustment at the whims of market forces seems both politically and socially unpalatable.

Third, we could hope for a more co-operative framework, similar to the postwar Bretton Woods understanding, which may lead to the rise of multiple global reserve currencies. It seems unavoidable that the euro and renminbi will, eventually, play a more prominent role in the global financial system. This is probably a long way off, but such an evolution could lead to a safer and more stable international monetary system that alleviates the safe-asset shortage and dependence on the dollar.

In some respects, the global economy has outgrown its antiquated international monetary system. Global imbalances contribute to increasing financial pressures, asset liability mismatches and suboptimal liquidity conditions. Policy-makers could do much more to address risks that lead to rising correlations among asset prices, but for now investors will have to live with them. ✦

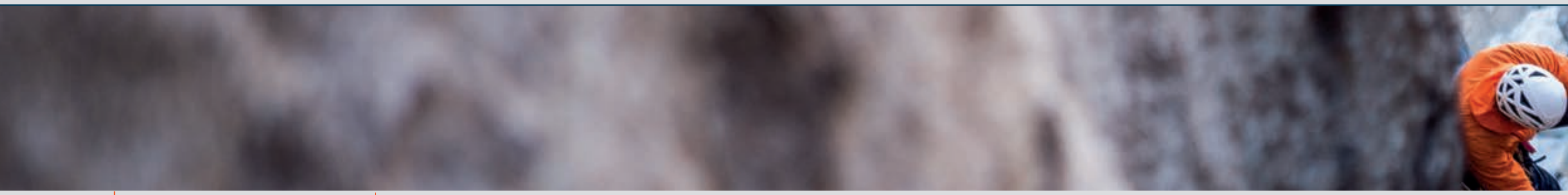
Joseph Hoefer is Member of the Barings Investment Institute.

OMFIF Special report

Risks in reserves

With

STATE STREET GLOBAL ADVISORS



↘ Risk in reserves

Asset allocation in global reserves

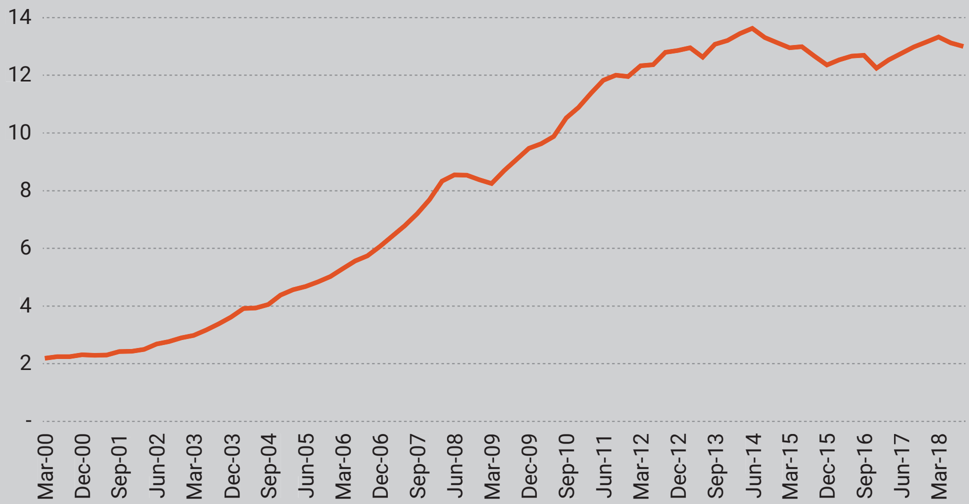
While public interest in central banks over the past decade has centred on their unconventional monetary policy, important shifts have been taking place with regard to their role as investors and reserves managers.

Global central bank reserves grew quickly at the start of the millennium, rising to around $8tn in 2008 from just over $2tn in 2000. They continued to rise steadily after the 2008 financial crisis to reach a peak of close to $14tn in 2014 (see Figure 1). This was followed by a slight and short-lived dip driven by the drawing down of reserves by the People's Bank of China, and a subsequent recovery beginning in 2016. According to the latest data in this year's *Global Public Investor*, central bank reserves stand at $13.5tn as of 2018, making them one of the largest public investor groups. For comparison, sovereign funds manage $8.7tn while public pension funds (almost three times as many institutions as central banks) manage $15.7tn.

The composition of central bank reserves tends to be relatively opaque. A recent study by OMFIF and State Street Global Advisors, 'How do central banks invest?', attempted to bridge existing data gaps by conducting a bottom-up estimate of the global reserve portfolio as of 2017. Using a mix of public and private information, this study focused on the balance sheets of 30 large reserves holders. Together, they manage $10.7tn in reserve assets, or more than 80% of global central bank reserves. Based on the composition of their collective portfolio and some further data from the International Monetary Fund and the World Gold Council, qualitative adjustments were made for the

Figure 1: Global central bank reserves stabilise at around $13.5tn

Estimated total global official reserves, $tn



Sources: IMF COFER database, World Gold Council, Central Bank of the Republic of China (Taiwan), State Street Global Advisors and OMFIF analysis

> Capital preservation and liquidity are of major importance, while return is solely a soft target – Respondent 2019 OMFIF GPI survey

With STATE STREET GLOBAL ADVISORS

profile of the remaining central banks to estimate the total tally.

This special report complements these findings with additional data from the 2019 OMFIF GPI survey, conducted with public investment managers. It provides a parallel understanding of central bank asset allocation, while looking at the more qualitative considerations affecting decision-making.

Central banks as asset owners

Both the size of official reserves and their composition have changed considerably since 2000, particularly in recent years.

In the past, central banks have had narrow reserves mangement objectives. These can be summarised as exchange rate management and backing domestic currency (if applicable); maintaining external liquidity and promoting market confidence; supporting the government in external debt management; and maintaining emergency reserves. This informs the traditional approach to reserves management, governed by the objectives of safety, liquidity and return, in order of priority.

Safety and liquidity remain the clear priorities, with 81.6% of assets held primarily in so-called liquidity instruments to address the first two objectives (deposits, high-grade bonds and, by some definitions, gold). However, as the size of reserves has grown, the focus on return has increased. This has contributed to the diversification of central bank reserves portfolios, with 14.9% allocated towards investment instruments (equities and return-enhancing bonds), which are held predominantly to satisfy the return objective.

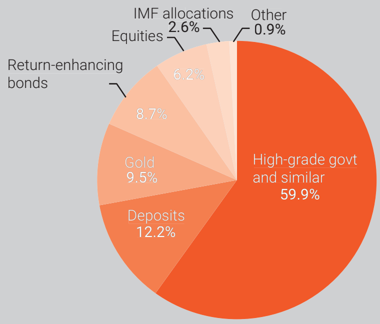
A further 2.6% are IMF allocations which represent the countries' relationships with the institution. The remaining 0.9% are mainly derivatives.

Liquidity instruments: Safety remains a priority

In line with the liquidity and safety objectives, high-grade sovereign bonds issued in reserve currencies, gold and deposits have historically been popular reserve instruments. They still constitute the bulk of the global reserves portfolio (almost 82%, see Figure 2). Among the 30 largest holders of securities, 16 invested nearly exclusively in these liquidity instruments, according to the OMFIF-State Street Global Advisors study. This is corroborated by the OMFIF GPI survey, which covers a broader group of central bank securities holdings, representing 69% of total central bank reserves. It shows that 69% of reserves are held in developed country government bonds, 9% in cash and 10% in gold. Collectively, they account for 88% of central bank holdings.

Figure 2: Sovereign bonds make up bulk of assets

Asset class, % of $13tn total, end-2017



Source: National central banks, IMF, State Street Global Advisors and OMFIF analysis

Deposits

The most liquid instruments are deposits, which stood at $1.6tn in 2017, making up 12.2% of the global reserves portfolio. This share has fluctuated in the past two decades but never exceeded 20%, according to IMF data. More than 60% of deposits are held with other central banks and the Bank for International Settlements, a form of cash unavailable to other public investors. Some of these constitute arguably indirect sovereign bond exposure, as the ultimate deposit-taking central bank must have a corresponding asset, usually a treasury bond. That leaves around $600bn in commercial bank deposits, used by central banks seeking higher deposit rates, using their deposits for custody and trading purposes, or without access to the full range of official deposits.

High-grade sovereign fixed income

High-grade sovereign and quasi-sovereign bonds are the key tool to meet safety and liquidity objectives. They carry the lowest credit risk and are one of the most liquid markets. Moreover, they are available in all potentially desirable currencies.

"In response to the low yield environment and increasing foreign exchange reserves as a result of QE, we have diversified our asset allocation as a way to enhance return and spread out risk in our portfolio – Respondent, 2019 OMFIF GPI survey

↘ Risk in reserves

> Gold price volatility in the short-term makes it a less attractive asset class for central banks. The main reserve currencies do not face a risk big enough to motivate us to invest in gold.
> – Respondent, 2019 OMFIF GPI survey

They made up 59.9% of the total portfolio in 2017 (or 68.1% of reserves excluding gold and IMF allocations). In nominal terms, this amounts to $7.9tn (see Figure 3), underscoring the significant role central bank ownership of sovereign bonds plays in global finance.

While these assets carry generally the lowest credit risk, the average credit rating has deteriorated over the past decade. This investment category includes highly-rated (usually AA and AAA, occasionally lower) government debt. It also includes the debt of government agencies (government-owned institutions issuing debt under a government guarantee, such as KfW, the German state-owned development bank) and supranational institutions (such as the European Investment Bank or the International Bank for Reconstruction and Development).

Supranational bonds are popular with central banks, which are estimated to have held as much as a third of all supranational issuance in 2017. This compares with around 18% of pure sovereign bonds. That year, central banks (mostly in emerging markets) held $6.9tn of these assets in their reserve portfolios. High-grade sovereign bonds also accounted for more than $9tn on domestic monetary balance sheets (mostly in developed markets through quantitative easing). As such, central banks on aggregate held almost 43% of all high-grade sovereign bonds. Accounting for the holdings of other public investors, around half of all high-grade sovereign debt is recycled on a sovereign balance sheet elsewhere.

On top of increased credit risk, the ultra-low or negative yields on vast swaths of the sovereign market have proved a major challenge. Many emerging market central banks set domestic policy rates at levels which exceed high-grade bond yields, creating negative 'carry'. The traditional approach to reserves is to manage the high-grade bond portfolio to an internal benchmark, with a fixed duration achieved through diversified holdings across the relevant segment of the yield curve. Some central banks manage duration more actively and deviate from the target more frequently. The main source of volatility is usually the currency risk, which they take on by managing the currency composition of their portfolios. Often, however, neither currency nor duration management proves sufficient to offset the cost of negative 'carry'.

Gold: Importance of history

To a lesser extent, gold is also liquid and safe. The extent of their gold holdings distinguishes central banks from both public and private asset owners. Gold is a commodity with a volatile price and no associated income stream. Usually, such assets are popular with investors with higher-risk budgets and more diversified portfolios.

These investors normally favour commodities as forming a sliver of the alternatives portfolio. For example, at year-end 2016 public pension funds had

Figure 3: Central banks favour government bonds
Asset classes, $bn and % of total (2017)

Asset classes	Holdings, $bn	% of total
Total official reserves	13,261	**100.0%**
IMF reserve positions + special drawing rights	347	**2.6%**
Gold	1,265	**9.5%**
Securities, deposits and other investments	11,649	**87.8%**
Deposits	1,618	12.2%
Securities	9,914	74.8%
High-grade government and similar	7,943	**59.9%**
Government	6,875	51.8%
Supranational	364	2.7%
Agency/guaranteed	704	5.3%
Return-enhancing bonds	1,152	**8.7%**
Asset-backed	459	3.5%
Investment grade corp bonds	670	5.0%
High-yield bonds	-	0.0%
Emerging market debt	24	0.2%
Equities	819	**6.2%**
Developed market equities	781	5.9%
Emerging market equities	38	0.3%
Other	117	0.9%

Source: National central banks, IMF, State Street Global Advisors and OMFIF analysis

0.5% of their assets in commodities, including gold. In contrast for central banks, 9.5% of official reserves were held in gold (on market prices) by year-end 2017. Within the sample studied in the 2019 OMFIF GPI survey, 84% of central banks hold gold in their reserves, to a widely varying extent. Most hold less than 5% of reserves in gold, with 16% allocating a 6%-15% share to gold, and a further 16% allocating a greater share. Most central banks – 92% – access this asset by investing directly in physical gold. The World Gold Council estimates that official holders are in possession of over 17% of all gold ever mined.

There are historical reasons behind gold allocation, with many countries having adopted a gold standard before the second world war. After 1945, the yellow metal continued to play an important role in the Bretton Woods international monetary system. After Bretton Woods came to an end in 1971, gold lost the last of its formal monetary features and became, in some ways, a pure commodity.

The countries that previously held gold as a form of official monetary instrument have retained most of it. Specifically, developed economies with now-floating exchange rates constitute 53% of the global economy, but hold only 14% of global reserves. Their share in official gold, however, is 68% (see Figure 4). Excluding these central banks from estimations, the share of gold in global reserves drops to 3.9%, which is much more in line with a conventional multi-asset portfolio. According to a respondent to the 2019 OMFIF GPI survey, 'Gold is illiquid and has no use. It is very sensitive to buy and sell gold, the public pays much more attention than with any other asset class. But if there is a problem with use of currencies, then it is unclear what the role of gold will be.'

Gold's legacy status is further confirmed by the fact that most of these countries have not touched their gold holdings in years. On a tonnage basis, 57 out of 188 official institutions surveyed by the WGC have not changed their gold allocation by a single ounce in the past 10 years – including the US, Italy, Switzerland, Japan and the Netherlands, which together hold 44% of all official gold.

Central banks continue to buy net new amounts of gold. The total holdings of gold in tonnage are at their highest level since the 1990s, with some central banks continuing to buy it. The present trend took off after the 2008 financial crisis, as central banks increased their gold holdings by 14%. Given appreciation in the gold dollar value, this amounted to a 67% increase in dollar terms. As a result, the share of gold in global reserves at around 10% has stabilised since 2008.

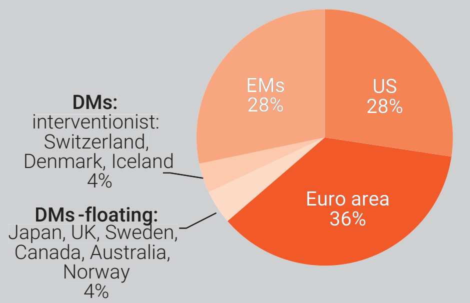
The net purchases are dominated by a few key players. Collectively, central banks bought 3,712 tonnes of gold and sold 409 tonnes in 2008-17. Russia and China together accounted for more than two-thirds of purchases on a gross basis and more than three-quarters on a net basis (see Figure 5). This pattern, supported in part by geopolitical factors, supports gold's reserve asset status, showing its role exceeds that of a pure commodity.

Investment instruments: Increased focus on return

The 1998 Asian financial crisis led many emerging markets to accumulate intentionally official reserves to guard against potential balance of payments crises. This resulted in excess reserves. Among 55 emerging market economies for which the IMF conducts its reserve adequacy analysis, 30 had excess reserves at year-end 2017, by 58% on average.

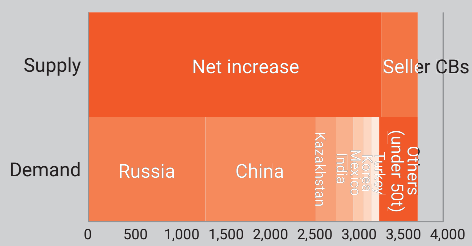
The 'adequate' reserves are considered to be sufficient to meet the worst-case scenario requirement for reserves in a balance of payments crisis. For excess reserves, central banks can

Figure 4: Developed economies hold most gold
Central bank gold holdings, by country and country groups, % of global total, end-2017



Source: World Gold Council, State Street Global Advisors and OMFIF analysis

Figure 5: China and Russia lead gold purchases
Central bank net purchases of gold, 2008-17, tonnes



Source: World Gold Council, State Street Global Advisors and OMFIF analysis

> To enhance our yield, we invest in credit products, which in our case mean covered bonds in the euro area and agency mortgage-backed securities in the US. – Respondent, 2019 OMFIF GPI survey

Risk in reserves

> In response to extremely low yields (on traditional reserves assets), we are investing increasingly in euro-denominated securities from emerging market countries such as China. – Respondent, 2019 OMFIF GPI survey

refocus on return – the third reserve management objective. According to the representative of a central bank's reserves management department, 'Part of our investment philosophy is derived from the size of the reserve portfolio. With more reserves than needed, some of our investments are seeking a return on the cost of liquidity.' While different central banks have different risk tolerance, this portion can be managed on a risk-return basis, rather than just complying with safety and liquidity requirements. This has led to a fairly widespread embrace of riskier asset classes.

This 'excess reserves' investment tranche formed around 15% of reserve portfolios in 2017. In an earlier study by State Street Global Advisors for year-end 2016, it was estimated that central bank 'investment tranches' – the space available for investment instruments – was around 15%. As central banks do not utilise their risk budgets in full, one can infer that the available space has grown, perhaps closer to 20%. The 2019 OMFIF GPI survey suggests up to 39% of central banks have taken on more risk as a result of the low-yield environment.

Restricted options

Even so, in 2017, only six central banks, comprising 43% of global reserves, held 80% of total investment instruments. The breadth of adoption, however, has increased significantly. Among the 30 large reserve holders sampled in the OMFIF-State Street Global Advisors study, 17 held return-enhancing bonds and 11 invested in equities. In other words, central banks, as investors, have responded to the policy signals of other central banks and have sought out higher-yielding assets in the era of quantitative easing.

Even if pure considerations of reserve adequacy allow for more flexibility, many central banks are subject to a restricted choice of reserve instruments for legacy or governance reasons. For instance, the 1934 Reserve Bank of India Act stipulates that the RBI may invest in debt instruments representing sovereign/sovereign-guaranteed liabilities, but prohibits investment in riskier assets such as equities. Thus, investment into new asset classes often requires governance changes at the central bank level, particularly if an external manager is needed.

Despite all these limitations, the balance between the three classic reserve management objectives has shifted decisively, and many central banks have diversified into new asset classes. While the data provide only a snapshot of global reserves at one point in time, they represent significant, rapid changes among reserves managers.

Investment instruments are tilted towards bonds, with return-enhancing bonds constituting 8.7% and equities 6.2% of investment instruments in 2017 (see Figure 3). Our results for 2017 suggested that the bulk of the risky fixed income allocation was in investment-grade corporate debt (5% of total) or asset-backed securities (3.5%). Similarly, the equity portion was nearly entirely in developed markets (5.9% of total), with only a residual in emerging markets stocks (0.3% of total). According to the 2019 OMFIF GPI survey, the regional breakdown of this allocation is equally conservative: 96% of the corporate bond allocation is located in developed markets.

Our study with State Street Global Advisors found no evidence of any central bank investing in high-yield debt, and only a marginal figure for emerging market debt.

According to the survey, holdings of emerging market debt make up only 8% of the total portfolio. Most of them comprise central bank stakes in the Pan Asia Bond Index Fund, which invests in local currency government and quasi-government bonds in eight Asian markets. The rest are a mix of hard-currency and local-currency emerging market debt, which are negligible in global terms.

This near-exclusive focus on developed markets clearly matches the desired currency composition of the foreign reserves portfolio. According to IMF Currency Composition of Official Foreign Exchange Reserves data, nearly all foreign reserves are in developed market currencies. Even excluding the People's Bank of China – the world's largest reserve holder and an institution unable to hold renminbi assets in foreign reserves – the total share of developing market currencies in remaining central bank reserve portfolios is close to 95%. The OMFIF GPI Survey 2019 confirms the overwhelming allocation to the dollar and euro, in spite of the interest in renminbi reserve assets, which is likely to rise in coming years.

Turning to asset-backed securities, central banks are estimated to hold around $460bn in total. This is a wide asset sector and few central banks disclose their holdings in full. The estimated share of dollar-denominated bonds is fairly high, in line with currency composition of reserves. It is probable that a substantial share of those are US agency mortgage-backed securities. These are similar to treasuries in credit risk but have a different duration risk due to their complex cash-flow profile.

Further, the estimated share of central banks holding investment-grade corporate debt is around the same as for asset-backed securities, at around $670bn, or just over 3% of the global market. Some of the most diversified central banks hold them alongside other asset classes in a full multi-asset portfolio. In other cases, central banks which are prohibited from, or have decided against, equity investments use investment-grade credit to gain private sector exposure. Like equities, however, there are governance and reputational risks involved in those investments. A single default, even if negligible in balance sheet terms, may set back the public case for diversification of reserves.

Taking on equity risks

While central banks' share of total equity holdings was and remains small and constitutes a far smaller presence in global markets (under 2% in 2017, 2.5% in 2019), its significance cannot be overstated. Equities expose central banks to the risk of higher capital losses than other asset classes. Further, equities require an active decision on exit as they cannot be ran off passively. Finally, they set up more complex governance issues than bonds, as central banks become shareholders with voting power. Whether they use it or not is a different matter. The previous State Street Global Advisors study estimated that, as of 2016, 90% of central bank equities were indexed. This number is unlikely to have changed materially as the indexed approach to holdings is one way to mitigate governance risks. On the other hand, the ability of passive investment to meet ESG standards fairly easily through customised strategies, combined with the growing, increasingly refined supply of these products, mean that their prominence in central bank holdings may rise in the future.

Illiquid private market assets will probably remain a rarity in central bank portfolios. Governments wishing to build exposure to such asset classes normally do so through sovereign funds, and we expect central banks to stick to liquid assets in their official reserves, even as the appetite for higher-risk instruments continues to increase.

Overall, the diversification of reserve assets is fully underway and the official reserves portfolio is becoming increasingly complex. The embrace of risk assets, particularly equities, stands in contrast to the usual timidity of classic reserve management. The past decade has been favourable to risk assets, so this strategic shift has not been tested in periods of prolonged equity drawdowns or multiple defaults in bond markets. Yet this report also highlights how central banks have become significant capital markets participants in their own right, holding around 43% of all high-grade sovereign paper as of December 2017. This raises important questions over bond market liquidity, fiscal financing capacity, and future research.

Elliot Hentov is Head of Policy Research, and Alexander Petrov is Senior Strategist in the Global Macro Policy Research Group at State Street Global Advisors. Danae Kyriakopoulou is Chief Economist and Director of Research, and Pierre Ortlieb is Economist at OMFIF. **In this special report, we complement the findings of an earlier OMFIF- State Street Global Advisors study on 'How do Central Banks Invest?' with additional data from the OMFIF GPI Survey 2019, conducted with public investment managers. It provides a parallel understanding of central bank asset allocation, while looking at some of the more qualitative considerations affecting decision-making. The quantitative measures of asset allocation may differ slightly from the results of the OMFIF 2019 GPI survey, as the original OMFIF-State Street Global Advisors study covered a different time period (using data from end-2017) and employed a different methodology, using bottom-up estimation as opposed to a broad-based survey.**

> We have used external managers to access more complex asset classes. – Respondent, 2019 OMFIF GPI survey

✧ Multicurrency investment

Swings in world reserve currencies

The case for reserves diversification may be growing. The financial outlook is becoming more complex and there is growing monetary policy divergence.

John Nugée
OMFIF

> Currency diversification provides protection against the value of the reserves being unduly affected by any one currency changing in value sharply, as well as investment opportunities.

For central banks, the question of which currencies to hold in the reserves is a critical one. And like so much else in reserves management, the choice of which currencies the reserves should be invested depends, ultimately, on the reserves' purpose.

For countries with a specific use for the reserves, for example to back a fixed currency regime or to service foreign currency borrowing, the issue is usually well-determined. Thus a central bank whose currency is pegged to currency X will find it sensible to hold a high proportion of X in its reserves, while the central bank of a country which has borrowed in currency Y will aim to hold Y in its reserves. This can lead to central banks holding almost exclusively one currency in their reserves, and will be the case even if currency X or Y are not usually considered reserve currencies by the wider central banking community. Thus the various smaller countries of the common monetary area in southern Africa will tend to hold quantities of South African rand in their reserves, reflecting their currencies' pegs to the rand, whereas Nepal and Bhutan will tend to hold Indian rupees.

For central banks where the main impetus for the investment of the reserves is more wealth-orientated, for example the preservation of the real value of the reserves or the achievement of a target rate of return, such a one-dimensional strategy is seldom optimal. Most central banks prefer a more diverse approach, with a range of currencies represented in their reserves.

There will always be a need for one or perhaps two dominant reserve currencies, to provide a stable store of value, liquid markets and a safe payment system.

Currently this role is played by the dollar in most of the world, with the euro used instead by those countries close to but not in the euro area. Both meet all three of the demands of a currency, namely as a store of value, unit of account and transaction medium.

But there is value in holding other currencies to provide diversification, protection against the value of the reserves being unduly affected by any one currency changing in value sharply, and investment opportunities as the reserves managers can fine tune the allocation between currencies. And if enough central banks hold a currency for these purposes, and the currency offers liquid markets and sufficient variety of financial instruments to invest in, then the currency is accorded minor reserve status.

Case for diversifaction

There are four currencies that can be said to have this 'minor reserve' status: the yen, renminbi, Swiss franc and sterling. All have a place as a diversifier in a reserves portfolio, even though at the moment not one can rival the dollar or euro as a major reserve currency.

Moreover, the case for diversification in reserves may be growing. The global financial outlook is becoming more complex as different parts of the world economy are growing at different rates, and, after a period when central banks acted largely in unison, there is growing divergence in monetary policy. Both of these are likely to lead to greater movement in exchange rates, even between the major currencies of the world.

However, it is not only economics that is driving exchange rate volatility and changing the relative attractiveness of currencies. Financial markets also respond to the political backdrop, and investors must increasingly factor into their calculations an element of political uncertainty. None of the major currencies is totally without political overtones.

For some countries, the possibility of US financial sanctions may lead them to be wary of overreliance on dollars as their chosen transaction medium. For any country that, whether for justified reasons or otherwise, fears that it might incur US displeasure, it would be suboptimal to be wholly reliant on dollar payment systems for its international transactions.

For other countries, there may be concerns that the euro has still not wholly been able to shake off doubts over its long-term future. The political and economic situation in a number of member states, Italy in particular, is a potential cause for concern. Elections (both nationally and in the European Parliament) will continue to offer interesting contests between traditional pro-European Union parties and a new nationalist and populist sentiment.

China's ambitions

Of the minor reserve currencies, the one most investors expect to grow in status over time is the renminbi. The size of China's economy, its growing international presence and, not least, the large number of countries wishing to be seen to respect Beijing's stated ambitions of becoming a major regional financial power are combining to increase the share of renminbi in international reserves. It is shortly expected to become the third most widely held reserve currency after the dollar and euro.

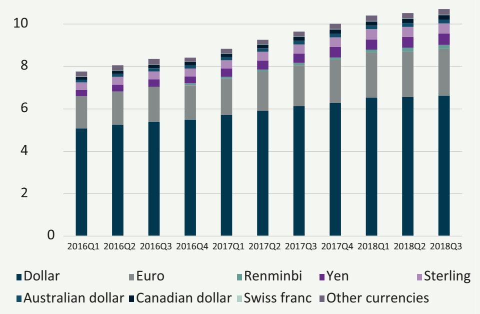
But some have expressed reservations. The renminbi is still not wholly free of either capital controls or official oversight, and Chinese President Xi Jinping has shown that he is not afraid to take his country into a more confrontational stance with others, for example over trade issues as well as international security. That the renminbi will become a major reserve currency in due course is widely agreed; that it will not do so in the immediate future also seems probable.

For sterling, the UK's departure from the EU – whenever and however it takes place – may lead to considerable volatility in the currency's value over the next couple of years.

It is a commonplace that 'a year ago the investment challenge was easier, and a year from now it will be obvious what one should have done, but right now, markets are uniquely difficult to predict.' It was ever thus. But for reserves managers, the current political and economic conjunction, and the potentially greater volatility in exchange rates between the major currencies, offers great opportunities. The pursuit of diversification from the two major currencies, the dollar and euro, into the lesser reserve currencies such the renminbi, pound, Swiss franc and yen will become even more important.

Central banks continue to increase their reserves

Total allocated foreign exchange reserves, $tn



Source: International Monetary Fund, OMFIF analysis

We are already seeing this reflected in a growing move of central bank reserves into renminbi, and many expect sterling also to attract renewed interest from reserves managers. Whatever the current UK and European uncertainties, sterling's status as a reserve currency is likely to continue. ✦

John Nugée, a former Chief Manager of Reserves at the Bank of England, is Senior Adviser to OMFIF.

> Investors must increasingly factor into their calculations an element of political uncertainty. None of the major currencies is totally without political overtones.

✧ Multicurrency investment

A common asset to anchor EU markets

The adoption in the euro area of a high-quality supranational asset would make up for the structural scarcity of safe assets in the monetary union.

Gabriele Giudice
European Commission

> A common safe asset would reduce risk in the banking system while supporting diversification.

A truly European safe asset would underpin a more stable and prosperous euro area.

A higher supply of a homogeneous, high-quality supranational asset would make up for the structural scarcity of safe assets in the euro area. It would overcome the fragmentation of their supply along national jurisdictions, which plays a destabilising role during periods of market tensions. This asset would provide a common yield curve that would better reflect expectations and financing conditions, and could be shaped more easily by monetary policy operations. It would ease the conduct of open market operations and allow the European Central Bank to use its policy toolkit more effectively.

A European safe asset would facilitate the completion of the banking union. Negotiations on a common deposit insurance are blocked by disagreements on how to mitigate the links between banks and their governments (known as the 'sovereign bank nexus'). There are calls for a reform of the regulatory treatment of sovereign exposures. This could encourage investors to diversify into foreign government securities rather than investing mainly domestically. But it could lead to financial instability in the transition phase and higher risk in banks' balance sheets. The introduction of a common safe asset would mitigate such risks while supporting diversification, as banks' portfolios would naturally shift towards the European asset.

The common safe asset would be an anchor for capital markets in Europe. It would provide a single term structure for risk-free interest rates that could serve as pricing benchmark for asset valuations. This would contribute to the creation of an integrated and liquid European market for corporate funding. Widespread holdings of the common safe asset and a shift of higher-return national bonds into long-term investors' portfolios, such as of pension funds and insurers, would reduce the impact of investors selling off risky assets to purchase safer ones in times of market stress.

Simple safe asset for Europe

To be viable legally and politically, the construction of the safe asset should avoid any mutualisation of debt or the transfer of risk from one member state to another. Each country should be fully responsible for its own debt and the consequences of its fiscal policies. It should reduce the risk of moral hazard. Depending on its design, the introduction of a common safe asset could increase the incentives for responsible fiscal and economic policies by making any additional debt issued by sovereigns subject to higher funding costs, while possibly reducing the average costs.

Even supporters of a European safe asset are sceptical that it could be introduced in the near- to medium-term. Many observers point to the legal and political limitations that apply to models involving mutualisation (such as a fully-fledged eurobonds or blue bonds), as they require a European Union Treaty change. On the opposite end, constructions involving financial engineering, such as sovereign bond-backed securities, are criticised on technical grounds, based on their behaviour in periods of distress.

Lesser-known constructions should be explored, including 'e-bonds'. These involve a European common issuer (such as an existing supranational institution) raising funds and providing bilateral senior loans to the member states, which would take priority over other debt. This is consistent with the 'no-bail-out' Treaty requirement. Member states would use these funds only to re-finance the rollover of their existing debt, improving liquidity management. Recent analysis suggests that without affecting the outstanding stock, nor changing the volume of debt in the euro area, this approach could deliver a European supranational safe asset of similar if not higher safety than the Bund. This would fill an important liquidity gap on short-term maturities without hurting the Bund's AAA status, nor the capacity of vulnerable member states to fund themselves regularly and conveniently. Whether such a construction may be able to fulfil all the necessary technical, legal and political conditions remains to be seen. Should it reach that high bar, a European safe asset would no longer be a chimera. ✦

Gabriele Giudice is Head of the Unit for Economic and Monetary Union Deepening and Macroeconomy of the Euro Area at the European Commission's Directorate General for Economic and Financial Affairs. The views expressed are the author's alone and do not necessarily correspond to those of the institution of affiliation.

✧ Infrastructure and real estate

Attracting institutional funds to Asia

Of the $110bn of Asia Pacific infrastructure financing in 2018, less than 15% was financed by bonds. But circumstances are beginning to change.

Rajeev Kannan and Rohit Dhir
Sumitomo Mitsui Banking Corporation

"Active capital markets will give infrastructure project developers more financing choices in Asian markets and make stakeholders more comfortable with looking at mini-perm financing structures.

Commercial banks, export credit agencies and multilateral agencies have traditionally been the mainstay of infrastructure financing in Asia. Of the $110bn of Asia Pacific infrastructure financing in 2018, less than 15% was financed by bonds, with most of those being corporate bonds, according to data from analysts IJGlobal. But circumstances are changing.

In recent years, three large independent power producers from Indonesia have tapped into the Rule 144a/Regulation S markets for significant amounts of non-recourse project bonds, establishing these bonds as an important source of long-term debt in Asia. Regulation S refers to the SEC's legal standard for issuing offshore, equivalent to Rule 144a. Rule 144a is a Securities and Exchange Commission rule issued in 1990 that modified a two-year holding period requirement on privately placed securities by permitting qualified institutional buyers to trade these positions among themselves.

Investment grade ratings and stable payment track records of sovereign-owned offtakers in countries like Indonesia have influenced the market. With a long-enough operating history, an established debt service track record and investors' hunger for yield, these projects can attract significant attention from a diverse pool of investors and geographies. Long-tenor infrastructure financing allows institutional investors to match better their liability profile, diversifying portfolios away from traditional sectors and borrowers while offering attractive credit characteristics.

Another recent milestone was a $458m collateralised loan obligation Regulation S-type transaction by Singapore's Clifford Capital, backed by cashflows from a portfolio of 37 project finance loans from across Asia and the Middle East. This was one of Asia's first CLO issuances to be backed by cashflows from project finance loans. Its execution has helped to establish this as an 'on-tap' platform for attracting institutional funds into Asia infrastructure financing, and also as an outlet for banks to recycle capital.

Active local and offshore markets

These issuances have raised awareness of Asian project finance as an attractive asset class in the global investing community. Issuers and project developers in Asia have benefited from the longer tenor, more flexible and competitive structure and terms afforded by capital markets.

However, capital market issuance has generally been limited to operating projects and mostly entailed take-out of existing financing arrangements with part recapitalisation. This is understandable, as investors have generally been reluctant to take on construction risk.

To provide a viable source of primary financing for greenfield projects and to supplement banks and export credit agencies' financing would still require getting investors comfortable with certain critical issues. Most importantly, there must be an understanding and acceptance of construction risk for projects both by investors and rating agencies, which can have impact a project's credit rating. Credit enhancement from mandated lead arrangers and export credit agencies could help mitigate some of these issues, as has been done in other regions.

It is also necessary to resolve negative carry and intercreditor issues. Staggered bond issuance is one option to mitigate the negative carry. While this is not especially common, it has been used in other countries. Another aspect that could help is the deepening of local currency bond markets in key markets like Indonesia and Vietnam. Markets like Malaysia, Thailand and India already have active local currency capital markets.

Ultimately, it is active capital markets, both local and offshore, that will give infrastructure project developers more financing choices in Asian markets and make stakeholders more comfortable with looking at mini-perm financing structures with multiple take-out and refinancing options, as are commonly seen in mature markets. It would also enable banks to incur lower funding and capital charges, leading to the availability of additional financing capacity to an infrastructure sector that needs significant amounts of capital. ✦

Rajeev Kannan is Executive Officer and Head, and Rohit Dhir is Deputy General Manager of the Investment Banking Department, Asia at the Sumitomo Mitsui Banking Corporation.

✧ Infrastructure and real estate

Infrastructure financing's missing link

A new platform hopes to act as the missing link between savings in developed economies and the infrastructure needs of developing countries.

Boo Hock Khoo
Credit Guarantee and Investment Facility

"CGIF focuses on developing local currency bond markets to mobilise savings towards corporates and projects.

The question of why the trillions of private savings in developed economies are not financing infrastructure in developing countries is often met with the same stale answer – there are not enough good projects.

There are plenty of good projects. But most earn local currency revenues that do not match the currency of the savings accumulated in more mature economies. Without a way to hedge this mismatch, no project in this predicament can really be any good.

The Credit Guarantee and Investment Facility acts as a regional guarantor. It focuses on developing local currency bond markets to mobilise savings towards corporates and projects. This makes things easier for indigenous investors, but due to debilitating foreign exchange risks, foreign savers are reluctant to invest in local currency bonds. A new approach for the use of guarantees to help bridge private savings in developed economies and infrastructure development is needed.

Riding on CGIF's experience, a new guarantee platform is under development for infrastructure financing. The Infrastructure Investors Partnership is one of the key new projects of the Asian Bond Markets Initiative medium-term road map 2019-22. ABMI, launched in December 2012 by Asean+3 (10 Asean member states and their three partner countries, China, Japan and Korea), has been a driving force in developing local currency bond markets in the region and promoting regional financial co-operation and integration.

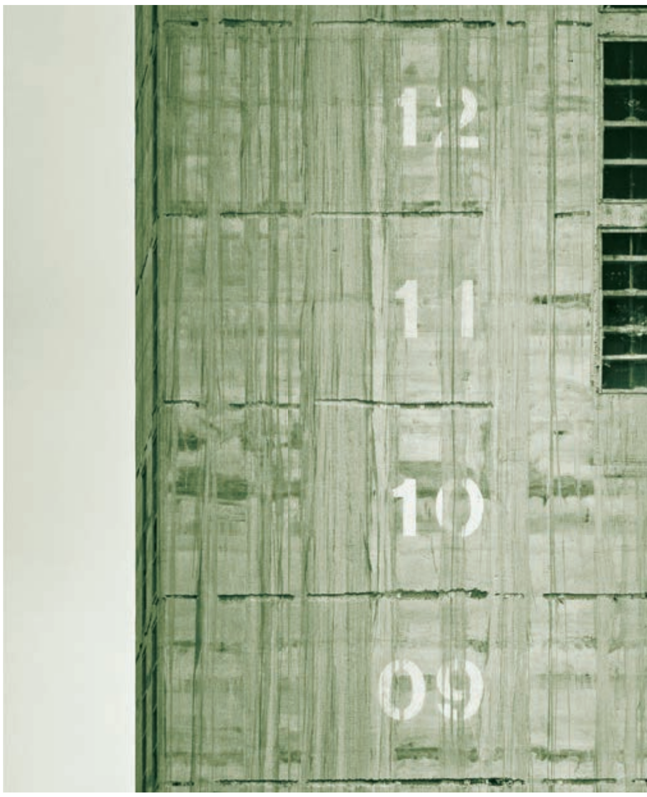
This innovation comes from a new form of public-private partnership to mobilise savings in developed economies and pool capital to take on project financing risks in emerging economies. The capital contributed by the governments in developed economies serves to absorb losses ahead of private savings in the platform's guarantee portfolio.

With this cushion of first-loss equity support from public funds, the platform will issue 'mezzanine bonds' (debt which ranks after other loans) to long-term savers (such as pension funds and insurance companies) in these mature economies, in their home currencies. This will create a deeper pool of capital to back up local currency guarantees issued by the platform to infrastructure projects in developing countries.

The platform's guarantees will fund projects in developing countries through domestic pools of savings, either directly via local bond markets or indirectly via banks. This way, countries can boost their local financial markets' capacity to absorb risk from infrastructure projects, crucial for many emerging economies falling behind on their infrastructure plans.

Institutional investors in mature economies will have valuable opportunities to be involved in infrastructure financing in emerging economies without taking foreign exchange risks. The bonds issued by the platform are expected to achieve sufficiently high credit ratings with conservative leverage and strong risk management of the platform. As such, they will offer an attractive risk and return proposition to cautious investors in their own home currencies.

This solution is possible because the use of guarantees separates 'funding' and 'risk-taking'.



Unlike direct debt funding, foreign exchange risks dissipate with the use of guarantees – a contingent liability which crystalises only upon a claim or loss event at the platform.

So, if the projects it guarantees are well-developed and financed with the matching currencies and adequate long-term debt, preferably at fixed rates, their risk profiles change dramatically to more acceptable levels. A Moody's study on unrated project finance loans reveals a 10-year cumulative default rate of 6.7% and an average recovery rate of 79.5%, with almost two-thirds of the cases recovering 100%.

Without lending directly to the projects, concerns on low sovereign ratings and high transferability and convertibility risks are muted. The projects will essentially be tapping indigenous savings in matching currencies when raising debt.

The protection offered will allow domestic savers in developing economies to undertake more long-term debt financing. As observed by CGIF, the risk absorption capacity for projects in developing financial systems will need time to mature even where the local markets are well-developed. Local banks do not have enough capital to intermediate such large sums of savings for long-term requirements. In many emerging economies, it will take time to build up large pools of local savings.

Asians are prolific savers but their savings are often invested in developed economies, even if some of them are recycled to fund regional investments in dollars. The platform will be a key step for developing economies to be free from the stranglehold of borrowing in dollars, paying high risk premiums, and foreign exchange risks.

With this platform, we hope to invigorate policy-makers to start building the missing link that is so crucial to addressing the region's massive and growing infrastructure gap. ✦

Boo Hock Khoo is Vice-President, Operations at the Credit Guarantee and Investment Facility.

“This new platform's innovation comes from a new form of public-private partnership to mobilise savings in developed economies and pool capital to take on project financing risks in emerging economies.

✧ Infrastructure and real estate

Infrastructure deficit must be addressed

Asia Pacific's significant infrastructure deficit poses a serious threat to attaining the United Nations 2030 agenda for sustainable development. It is essential for countries to leverage private investment.

Shixin Chen
Asian Development Bank

There are still around 350m people without access to electricity, 300m people with no access to safe drinking water and more than 1bn people without basic sanitation.

Meeting the burgeoning demand for infrastructure in the Asia Pacific region is essential to achieve many of the United Nations' sustainable development goals. In the past few decades, the region has taken great strides in developing its power, transport, water and sanitation and telecommunication infrastructure. However, there are still around 350m people without access to electricity, 300m people with no access to safe drinking water and more than 1bn people without basic sanitation. This significant infrastructure deficit poses a serious threat to attaining the UN 2030 agenda for sustainable development. The world's growing and ageing population, rapid urbanisation and technological advances, along with air pollution and climate vulnerability, will only increase demand for quality infrastructure. It must be inclusive, green and climate-resilient.

Based on UN estimates, achieving the SDGs by 2030 requires $3.9tn to be invested annually in developing countries alone. Currently, around $1.4tn is being invested each year. The public sector accounts for close to 70% of infrastructure investment in Asia Pacific. There is potential for much larger private investments, but weak bankability and a perceived mismatch between risk and return impede growth.

The public sector is expected to remain a major source of financing for infrastructure and services. It can increase domestic sources by reducing subsidies and increasing and improving tax collection. It can make its expenditure more efficient through improved governance and by taking full advantage of modern information technology. Attracting larger private investments will require more up-front public support to strengthen the regulatory environment and boost the number of bankable projects ready for investment.

New institutions, such as the Asian Infrastructure Investment Bank and the New Development Bank, will invest in infrastructure alongside traditional multilateral development agencies such as the Asian Development Bank and the World Bank. However, given their modest size, they are unlikely to make a big difference. By leveraging their deep knowledge in infrastructure financing and higher risk appetite, they can help attract private investment, especially in frontier markets. They can also work closely with the private sector to identify areas in which to replicate past success. This includes renewable energy, where last year the private sector invested $270bn (or more than 90% of total investments).

The public sector is forming new alliances and partnerships with non-traditional investors who can help it access capital. These investors, including pension funds, sovereign funds and philanthropic organisations, have portfolios that surpass their investment needs. They have displayed recently a burgeoning interest in projects generating social and environmental benefits, such as gender equality, alongside financial returns.

Building stronger partnerships with these diverse players and linking investments to an individual investor's specific return, risk and impact profile can help unlock this much needed investment pool. There are encouraging signs and progress across a few sectors, especially health and education, which can be expanded and replicated in other areas.

Given the size of the Asia Pacific's population and its share in the world economy, the global outcome of the SDGs depends in large part on the region's success. The current infrastructure deficit threads through many of these goals. As the region with the fastest growing greenhouse gas emissions, it will also shape global efforts to address climate change.

Progress on achieving the SDGs has so far been subdued, but Asia Pacific has reasons to remain optimistic. The region's total investment needs are a small percentage of its economies' savings. It has embraced the UN goals and all key players – public, private, traditional and non-traditional – are focused on finding new and innovative ways to achieve them.

The Asian Development Bank's 'Strategy 2030' embraces the ideals of the SDGs. Accelerating the development of green infrastructure is central to overcoming Asia Pacific's current deficit. The ADB will add value by sharing knowledge, leveraging and catalysing new and established sources of financing, and forming partnerships with non-traditional players to bring in new sources of financing. We are committed to expanding our private sector operations, particularly in frontier markets in low-income countries. ✦

Shixin Chen is Vice-President, responsible for operations in the South Asia and Central and West Asia Departments at the Asian Development Bank.

OMFIF Special report

Infrastructure and real estate

As the global demand for infrastructure continues to grow, public investors are struggling to meet funding needs. But before the private sector can close the gaps, the investment environment must mature.

↘ Infrastructure and real estate

Kat Usita
Deputy Head of Research, OMFIF

Filling global infrastructure gaps

As the global demand for infrastructure will only continue to grow, the investment environment around it must mature for the private sector to close funding gaps.

Private sector participation in infrastructure is not new, but the need for it is greater and much more apparent now than before. The World Bank maintains a database of nearly 7,000 projects in low- and middle-income countries that were funded either completely or partly by private investment over the last three decades. From 1990-2016, these projects amounted to $1.6tn of investments. While this does not include private investment in high-income countries, it is a miniscule amount compared to the $94tn needed to fill the world's infrastructure needs by 2040 based on the Global Infrastructure Hub's estimates.

The attention to infrastructure demand grew significantly in the last decade. Rising populations and rapid urbanisation across the globe put focus on the inadequacy of built assets to support such growth. Meanwhile, in more developed countries, aging infrastructure networks highlighted the importance of continuously maintaining and upgrading built assets. Governments have historically controlled infrastructure development, but are now more vocal about needing the private sector not just to build physical assets, but to finance them as well.

Efforts to measure and quantify these infrastructure needs in a robust, comprehensive way coincided with the decline in interest rates following the 2008 financial crisis. This generated more awareness of infrastructure and interest in its potential as an alternative source of yield that could help diversify portfolios. Institutional investors and their long-term liabilities seem ideally matched to infrastructure's longer investment horizon. However, some sovereign and pension funds still struggle to invest in this sector. Investors remain unable – or unwilling, if able – to include infrastructure in their portfolios (see Figure 4).

> “Efforts to measure and quantify these infrastructure needs in a robust, comprehensive way coincided with the decline in interest rates following the 2008 financial crisis.

In the OMFIF GPI Survey 2019, respondents from central banks, sovereign funds and public pension funds were asked whether they were allowed to invest in real assets, which includes infrastructure. Of these, 60% indicated that they were not permitted to, either because of prevailing laws and regulations or because their fund mandate did not allow it. Among those currently barred from investing in real assets, 59% said that they would not consider it even if the relevant rules changed positively. On the other hand, those that invest in real assets allocate 24% to this asset class on average, of which 85% is invested specifically in infrastructure.

Some regulations on infrastructure investments are changing. Norway's finance ministry announced in April that it is allowing the country's Government Pension Fund Global to be invested in unlisted renewable energy infrastructure. Norges Bank, which manages the world's largest sovereign fund through Norges Bank Investment Management, plans to start with low-risk investments in developed markets. The cap on the fund's environment-related investments was raised to Nok120bn from Nok60bn, equivalent to about 1.4% of its Nok8.6tn assets.

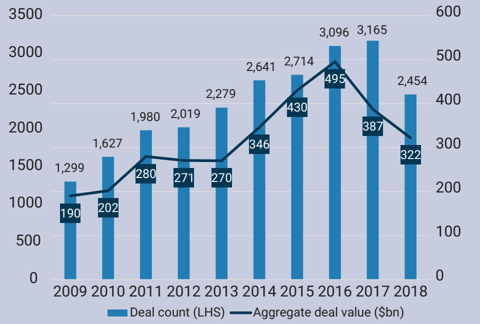
The announcement makes clear that Norway's new policy is not part of a broader climate strategy. It is a diversification push rather than a fulfilment of environmental, social and governance mandates. Because of the GPFG's size, NBIM's investment choices could influence other institutional investors who are considering a foray into unlisted infrastructure.

Risky business, real returns

Infrastructure contracts have long durations, reflecting both the lengthy periods of construction and the number of decades during which the facility is expected to operate. As a result, the payment for

Figure 1: Infrastructure deals dip despite persistent funding gap

Deals announced globally, 2009-18



Source: Preqin, OMFIF analysis

the service it produces – which in most cases either falls wholly on the consumer, or is subsidised by the government – is pegged to inflation. This protects the facility's revenue stream from fluctuating price levels and ensures a predictable cash flow. For example, toll roads may charge user fees that are linked to the consumer price index or a similar metric. In some cases, the peg is less explicit, such as when regulators adjust electricity rates in inflationary conditions.

Inflation protection compensates for risks inherent to infrastructure. Apart from having long life cycles, built assets are immoveable, making them susceptible to a range of geographic and political risks that can affect price levels. Infrastructure projects also have extremely high upfront costs compared to other investment opportunities. In certain cases, such as when operation and maintenance is part of the infrastructure deal, capital injections are required over the facility's lifespan.

Still, infrastructure manages to bring solid returns because of its monopolistic quality and inelastic demand. Transport infrastructure, for example, serves specific routes and locations that make it either physically impossible or simply unprofitable for potential rivals to replicate. Social infrastructure, such as hospitals and schools, tends to have a monopoly over specific communities. Users of these facilities are unlikely to significantly change their behaviour even during inflationary periods or other changes in economic conditions.

When asked if real assets perform better than other investments, 75% of respondents to the OMFIF GPI Survey 2019 agreed, saying they performed significantly better. An additional 17% said real assets perform slightly better than other investments (see Figure 2).

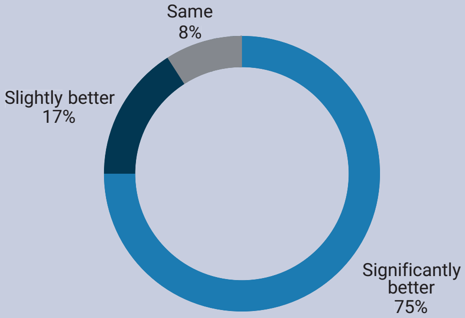
In an ideal world, direct private investment would be the quickest way to fill unmet infrastructure needs. One way is through public-private partnerships, which have emerged as a popular model for governments to grant concessions to private entities to finance and construct infrastructure facilities. However, this requires high levels of capital that very few institutional investors can allocate by themselves. It would also typically entail partnering with a construction firm or other similar corporate to deliver the actual physical asset.

Even for institutional investors with enough assets for direct investments, evaluating the financial viability of infrastructure projects can be difficult. Conducting due diligence is challenging and costly, as every infrastructure and subsector comes with its unique set of risks. Risks associated with an airport on an island would differ from a railway in a busy metropolis, and even more so from a powerplant. Often, investors lack in-house expertise to assess these and end up having to rely on the evaluations of external advisers.

For smaller institutional investors with little or no experience in infrastructure, asset pooling would make more sense to increase investing capability. The UK's Pensions Infrastructure Platform was set up in 2011 to help pension schemes channel investments into UK infrastructure assets through infrastructure funds. Aside from consolidating ↘

Figure 2: Real assets show real returns

How have your real assets performed relative to other investments?, % of total responses



Source: OMFIF GPI Survey 2019

> “Even for institutional investors with enough assets for direct investments, evaluating the financial viability of infrastructure projects can be difficult.’

Infrastructure and real estate

> The complex and bespoke qualities of infrastructure can mean vastly different risks and returns based on size, industry or sector, geographic location, stage of development, and other aspects.

investment power, this method allows pension schemes to benefit from the infrastructure expertise and experience of PIP's investment managers. By investing in infrastructure funds, institutional investors can access unlisted infrastructure even if they lack the internal expertise or resources to assess projects unilaterally.

A more common but even less direct manner of investing is through listed infrastructure. Becoming a shareholder of a publicly listed infrastructure company allows investors to gain exposure to the sector, while enjoying relative liquidity and committing a relatively minimal level of investment. Investors also have the option of buying corporate or project bonds issued by these companies. Because they are traded on exchanges, more transparency can be expected when it comes to background information and pricing.

A weakness of listed infrastructure products is that they tend to perform similarly to other asset classes, especially equities, as they are exposed to stock market volatility. Some companies or their corporate bonds may also be tagged as infrastructure even if their infrastructure-related activities form only a small part of the business or project. For these reasons, investing exclusively in listed infrastructure might not reap the expected diversification benefits.

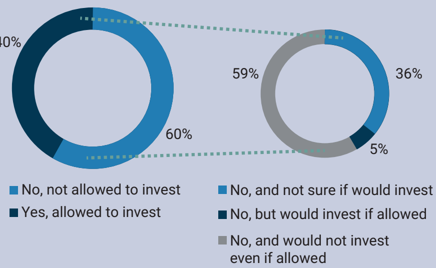
Pension funds in Australia and Canada have been investing in infrastructure since the 1990s, and are often considered solid examples of how institutional investors could approach the sector. Canadian funds are known for having pioneered direct investing in infrastructure projects. Australian funds started investing in infrastructure through listed companies and funds, as well as through PPPs. Investing in unlisted infrastructure has also become popular for pension funds in both countries.

Figure 3: Renewable energy projects top list of deals
10 biggest infrastructure deals announced, 2018

Asset	Location	Investor	Deal size ($bn)
Innogy	Germany	E.ON SE	24.1
Direct Energie	France	Total	16.5
SCANA Corporation	US	Dominion	15.0
WestConnex Motorway	Australia	Abu Dhabi Investment Authority, AustralianSuper, Transurban Group	6.9
TDC Group	Denmark	ATP, Macquarie Infrastructure and Real Assets, PFA Pension, PKA AIP	6.4
Hornsea Project One	UK	Global Infrastructure Partners	6.0
Techem	Germany	Caisse de dépôt et placement du Québec, Ontario Teachers' Pension Plan, Partners Group	5.4
Naturgy Energy Group S.A.	Spain	CVC Capital Partners	4.7
Duqm Refinery Project	Oman	Kuwait Petroleum Corporation, Oman Oil Company	4.6
Uniper	Germany	Fortum	4.5

Source: Preqin, OMFIF analysis

Figure 4: GPIs still unable to invest in real assets
Are you allowed to invest in real assets? (LHS) and Would you consider investing in real assets if laws and regulations allowed you to? (RHS), % of responses



Source: OMFIF GPI Survey 2019

Building benchmarks

A long-running issue that hinders institutional investment from infrastructure is the lack of adequate benchmarks. Performance benchmarks act as a point of reference, allowing investors to compare investment performance with the market. Compared to other asset classes, it has been difficult to benchmark infrastructure investments because of the dearth of comparable data. The complex and bespoke qualities of infrastructure can mean vastly different risks and returns based on size, industry or sector, geographic location, stage of development, and other aspects. This complicates any attempt to build a robust, reliable index for infrastructure investments that can be used in benchmark construction.

Indices for listed infrastructure are more readily available, as they are just a subset of a wider existing index. The FTSE, MSCI, S&P and Dow Jones, among others, all offer their versions of infrastructure indices. There are fewer such indices available for unlisted infrastructure, and those available focus usually on a specific region or industry.

Access to robust and reliable comprehensive global indices for infrastructure, especially in the unlisted space, can address concerns regarding performance measurement – a critical task in asset allocation. With the gap between infrastructure demand and available funding persistently wide, the need to channel institutional assets into this sector is as urgent as ever. ✦

Kat Usita is Deputy Head of Research at OMFIF.

Key infrastructure deals involving Global Public Investors, 2018-19

Institution	Description	Size ($m)	Date
Ontario Municipal Employees Retirement System	Canadian pension fund OMERS purchases a 10% interest in toll road concessionaire 407 International Inc from SNC-Lavalin Group.	2,430	April 2019
Kuwait Investment Authority	KIA reportedly agrees to buy out the UK's North Sea Midstream Partners, an oil and gas firm, through its London-based infrastructure arm Wren House.	1,700	July 2018
Canada Pension Plan Investment Board	CPPIB purchases an undisclosed stake in Aqua America, a US water company.	750	March 2019
California Public Employees' Retirement System	CalPERS commits to the Golden Reef Infrastructure Trust managed by Australia's QIC.	600	October 2018
Universities Superannuation Scheme	UK pension fund USS announces plan to acquire KCOM, an IT and communications company.	504	April 2019
Virginia Retirement System	The US pension fund invests in two major infrastructure and real estate funds, Blackstone Real Estate Partners IX and Global Infrastructure Partners Fund IV, at $200mn each.	400	January 2019
Stichting Pensioenfonds ABP	Dutch fund ABP invests in the Smart City Infrastructure Fund managed by Whitehelm Capital.	280	November 2018
Teachers' Retirement System of the State of Illinois	TRS Illinois invests in Macquarie European Infrastructure Fund 6, which will target utilities, transportation, communications and renewable energy assets.	224	March 2019
GIC	Singapore's sovereign fund GIC and investment firm KKR acquire a 42% stake in infrastructure investment trust India Grid Trust. The fund also acquires a 10% stake in port operator Terminal Investment Limited for an undisclosed amount.	142	May 2019
Caisse de dépôt et placement du Québec	CDPQ agrees to buy a 30% stake in the main operating subsidiary of Vertical Bridge Holdings, LLC, the largest private owner and operator of communications infrastructure in the US.	Undisclosed	April 2019

✧ Infrastructure and real estate

Filling Asia's ESG investment gap

Catalysing investment strategies for infrastructure that take into account environmental, social and governance issues in emerging markets presents several difficulties.

Courtney Lowrance
Asian Infrastructure Investment Bank

"More private capital should be mobilised for infrastructure investment, particularly in emerging markets.

The Asian Infrastructure Investment Bank is prioritising the mobilisation of private sector capital required to meet the world's infrastructure demand. Investments must be directed towards quality infrastructure that will achieve the United Nations' sustainable development goals and honour the 2015 Paris climate accord. Two challenges must be addressed. First, more private capital should be mobilised for infrastructure investment. Second, there is a need to establish meaningful environmental, social and governance benchmarks for infrastructure investors.

A core part of our strategy is to identify ways to make investing in emerging market infrastructure more attractive to the private sector. As a first step, we are mandating an asset manager to construct the AIIB Asia ESG enhanced credit managed portfolio, where we will invest $500m in infrastructure-related corporate bonds, including quasi-sovereign bonds and green bonds.

Catalysing ESG investing strategies for infrastructure in emerging markets in Asia presents several difficulties. ESG investing is well-established in Europe and North America, but is largely absent in Asia, and analyst coverage of corporate bonds in emerging markets is in its infancy. Of the $22.9tn total assets under management that are defined as socially responsible investments, only 2% are from Asia.

Investors of corporate bonds, in contrast to equities, focus on the credit worthiness of the issuer and its ability to repay debt. More attention must be paid to event risks (often ESG-related) that can dominate an issuer's credit-worthiness and exposure to credit rating downgrades. Issuers in emerging markets are potentially more exposed to ESG risks, and Asian issuers are more likely to have unconventional governance structures that are misaligned with ESG frameworks from Europe and North America.

Engagement strategies vary between fixed income and equities asset classes. Bondholder rights differ from shareholder rights, and engagement opportunities for bondholders can be more limited than shareholders who can exercise voting rights or attend the annual general meeting of an issuer. In practice, investors typically have engagement teams working across asset classes and interact with companies where they have debt and equity holdings.

Markets initiative

AIIB aims to address these issues through the ESG markets initiative, in partnership with our portfolio's asset manager. This initiative can be organised into four key pillars. First, our objective is to develop a proof of concept and demonstrate to other like-minded investors the potential of ESG investing in emerging market infrastructure. Once we establish a track record with the portfolio over the next 12-18 months, we hope to open the fund to other investors. In parallel, we are talking to index providers with the aim of developing an ESG enhanced infrastructure index for Asia emerging markets.

Second, to catalyse the development of ESG strategies for fixed income, AIIB will work with research partners to share insights on emerging issues and key trends that drive ESG investing in infrastructure in Asia.

Third, expanding ESG ratings coverage of issuers in Asia is an important step in the creation of a dedicated Asia emerging markets ESG enhanced infrastructure index. A key component of the ESG markets initiative will be working with partners to enhance transparency and disclosure in the market.

Fourth, deepening the debt capital markets in emerging markets in Asia and improving the understanding of ESG will require capacity-building of all market participants. Through the ESG markets initiative, AIIB will work with implementation partners to build capacity in selected local markets through workshops and other industry events.

Addressing Asia's enormous infrastructure needs, poverty issues and environmental and social challenges will require new types of financing models and instruments. Hopefully the AIIB ESG markets initiative can make a significant contribution to this effort. ✦

Courtney Lowrance is Principal Environment Specialist at the Asian Infrastructure Investment Bank.

✧ Infrastructure and real estate

Private sector a partner in development

Less than $141bn of Indonesia's $338bn infrastructure financing requirement will come from state budgets. The rest is expected to come from state-owned enterprises and the private sector.

Harold Tjiptadjaja
PT Indonesia Infrastructure Finance

> In public-private partnerships, risks concerning any infrastructure project should be allocated to the party most able to deal with each particular risk.

For the period up to 2030, the Asian Development Bank estimates that emerging Asian countries will need $26tn in infrastructure financing to maintain their growth momentum, eradicate poverty and respond to climate change. Around 56% is allocated to power and 32% to transportation. The remainder is allocated to telecommunications (9%) and water and sanitation (3%). The ADB assumes that only 40% will be financed and funded from state budget, with the private sector expected to fill the remaining 60%.

Indonesia's 'National Medium Term Development Plan 2015-2019' states that the total financing requirement for infrastructure development is around $338bn. Of this, less than $141bn will be financed through national and regional state budgets, with the rest expected to come from state-owned enterprises and the private sector. The government must find ways to attract private sector companies as partners in development.

Efficiency and innovation

Some projects undertaken by the private sector require government support. This can take the form of guarantees, viability gap funding or an availability payments mechanism. Viability gap funding involves a cash contribution from the government that reduces the private sector's investment cost, hence increasing the profitability of the underlying project. The availability payments mechanism concerns fixed payments from the government as remuneration for the provision by the private company of the infrastructure, which removes market risk from the project. Any other support can also be provided by the government to reduce the project risk and/or to enhance return on investment.

The cost of funding for government debt is lower than that for the private sector, as the government's default risk is significantly lower than the private sector's. This higher funding cost for the private sector, all things being equal, should increase the cost of the provision of the infrastructure. This should then be compensated for by the efficiency and innovation that characterises private sector practices. Shorter and simpler decision-making processes might strengthen the arguments to encourage greater private sector involvement in infrastructure projects.

The private sector must take into account at least two key factors when considering becoming involved in projects. The first relates to risks and risk allocation, and the second to the requisite return that must be generated to accept those risks. In public-private partnerships, risks concerning any infrastructure project should be allocated to the party most able to deal with each particular risk. For example, for land acquisition risk, one of the biggest for infrastructure projects, especially in emerging countries, the private sector prefers that the government assumes this risk, as it involves regulation and land reform. A similar risk pertains to permits and licenses, which are best procured by the state through government contracting agencies.

Public-private collaboration

Bringing the private sector into infrastructure projects raises several challenges. First, these projects usually involve a huge amount of investment, long payback periods, government procurement process and relatively lower (though stable) yields. Second, they involve many stakeholders from the government acting as a regulator and, in some cases, as offtaker. Private companies may determine whether other sectors besides infrastructure offer a better balance of risk against reward.

One option for private companies that do wish to participate in infrastructure financing is asset recycling programmes, whereby operating infrastructure projects are tendered to the private sector, either through concession mechanisms or asset sales. Through these programmes, for the government, capital will be recycled and used for the development of new, greenfield infrastructure projects.

Ultimately, building infrastructure is not solely the responsibility of the government and requires close collaboration and strong support from the private sector to expedite development and enhance national economic competitiveness. ✦

Harold Tjiptadjaja is Managing Director and Chief Investment Officer at PT Indonesia Infrastructure Finance.

✧ Infrastructure and real estate

Reaping rewards by recycling assets

After it successfully leased large portions of its highways, India is looking to expand its programme for monetising public infrastructure through transactions with private sector investors.

Sujoy Bose
National Investment and Infrastructure Fund of India

"Large international institutional investors are keen to invest in Indian infrastructure, and these assets are well-aligned to their interests.

India is one of the fastest growing major economies. A rising and briskly urbanising population, coupled with improved living standards, have resulted in rapidly growing demand for infrastructure. The ministry of finance estimates that the country must invest $200bn in infrastructure development annually. At the present pace of actual investments, there is an annual investment deficit of around $90bn.

Over the past decade, the private sector has contributed to just over a third of the overall infrastructure investments in India. It has contributed to the majority of investments in telecommunications, electricity generation, ports and airports. Private participation has been prominent in the roads sector. India's national highways development programme has attracted commercial capital through public-private partnerships and hybrid structures.

PPP schemes are the prevalent approach to bring in private capital to develop public infrastructure. Another way to attract commercial investments is by monetising brownfield public infrastructure assets. Under this scenario, a private investor buys temporarily the rights to a revenue-generating public infrastructure asset. They are responsible for maintenance and operations of the asset and can earn revenues from it. These are typically long-term arrangements, lasting between 30-100 years. In most cases, governments receive payment upfront.

Assess monetisation success in many countries

Several countries have undertaken successful public infrastructure monetisation programmes. In the US in the mid-2000s, tolled expressways were leased to private investors for around $1.8bn and $3.8bn in Illinois and Indiana, respectively. In 2014, the Australian federal government initiated an asset-recycling initiative as part of a broader national infrastructure growth package. Between 2014-18, more than 10 such transactions were carried out over five Australian states, yielding close to Aud52bn. The country's electricity networks generated the most revenue; three assets were leased for 99-year periods for a total of Aud34bn.

In early 2018, the National Highways Authority of India offered rights to operate and collect revenues from road assets under a 'toll-operate-transfer' model. The project covered nine sections of national highways, extending over 648 kilometres, for 30 years. This effort drew enthusiasm from large international investors, thanks in part to how the project was structured. The highway sections on offer served as key transport links, with an established operating and tolling history. They provided diversification across two states in India. The contract provided for two planned adjustments to the concession term, shielding investors from uncertainties in traffic build-up. Following competitive bidding, the combined project was awarded for an upfront consideration of close to $1.5bn, the country's single largest highway infrastructure transaction.

Interest in India

Asset monetisation is relevant for India for several reasons. First, it has a large and growing stock of revenue-generating public infrastructure assets. It is estimated that more than 6,500km of road length are under the management of the NHAI and close to 5,000km of new highway projects are awarded for development each year. Second, while the traditional PPP model for infrastructure investments has contributed substantially to infrastructure development, private sector appetite for such projects has dwindled in recent years. Government agencies are therefore looking to infrastructure recycling to boost resources for new development. Large international institutional investors are keen to invest in Indian infrastructure, and these assets are well-aligned to their interests.

India's infrastructure assets monetisation programme is set to create important opportunities for global institutional investors. The bidding process was recently undertaken to award 50-year contracts to operate six airports. The government is making efforts to identify additional sectors that would be ripe for monetisation. These are likely to include power transmission lines, gas and oil products pipelines, telecom towers, port terminals and public warehousing facilities. The deciding factors are consistent and long-term revenue streams, the possibility for investors to enhance substantially commercial returns, and improved asset utilisation. ✦

Sujoy Bose is Chief Executive Officer and Managing Director of the National Investment and Infrastructure Fund of India.

✧ Infrastructure and real estate

Impact of upgrading infrastructure

Improving roads helps cut down travel time between cities, boosting their population's well-being and resulting in GDP gains and increases in bilateral trade.

Sergei Guriev and Nathaniel Young
European Bank for Reconstruction and Development

> A one-hour reduction in travel times between two provincial centres increases their bilateral trade by around 6%.

The European Bank for Reconstruction and Development helps its countries of operation transition to sustainable market economies. To achieve this, private sector investment is essential. Therefore, we work mostly with private firms and banks rather than with governments and state-owned enterprises. However, we also invest in cross-border, national and municipal infrastructure. Companies are more likely to invest in well-connected and integrated markets, as lower costs of accessing larger markets will increase returns on investment.

We evaluate systematically the impact of infrastructure investments. In our 'Transition Report 2017-18', we examined the impact of major upgrades to Turkey's road network on domestic trade and regional economic outcomes. Segments of single-carriage roads were divided into multi-lane motorways. As of 2015, these dual carriageways accounted for 35% of Turkey's roads, up from 10% in 2002. The upgrades improved safety and increased road capacity, allowing motorists to travel more reliably at higher speeds.

We estimate that owing to the upgrades, the average travel time between Turkey's 81 provincial cities fell to five hours in 2015, down from six and a half hours in 2005. Those cities located the farthest apart benefited from the largest reductions in travel times, with some cities separated by a road distance of 1,500 kilometres or more achieving savings of five hours.

To estimate the impact of the upgrades on trade, we estimated a gravity model of trade that relates changes in bilateral trade to changes in the time-costs of those bilateral trades, accounting for the trading partners' economic size. We found that a one-hour reduction in travel times between two provincial centres increases their bilateral trade by around 6%. That translates to an increase of $4.6m per year in trade flows for an average pair of cities. Roughly every dollar invested in roads generates an additional 20 cents in annual domestic trade.

Turkey is one of the few large countries in the EBRD region. The median EBRD country has a population of 6m and a median nominal GDP $45bn. For member states, the most important infrastructure investments should promote cross-border – rather than cross-regional – connectivity.

In our 'Transition Report 2018-19', we focused on the role that geography, population density and trade across short and long distances play in determining economic growth and well-being. We assessed the impact on the Western Balkans of €7.6bn of investments (40% of which came from the EBRD) in roads and railways.

The real GDP per capita of countries receiving direct investments is expected to increase by around 2%-2.5% by 2040. Economic modelling predicts that the upgraded routes help retain local populations, boosting productivity and attracting further trade. The benefits of higher incomes and greater consumption increase well-being by around 1%-1.4%. To maintain these economic gains, it is important to improve environmental standards and solve local transit issues.

The most ambitious infrastructure investment project is the Belt and Road Initiative. There is substantial uncertainty over its scale and scope, and over the standards investors will have to follow. Similar to our findings in the Western Balkans, we estimate the greatest gains will benefit those communities close to the rail and road upgrades. By 2040, Uzbekistan, Kazakhstan and Mongolia could see additional increases to their GDPs of 6%, 4.5% and 4% respectively under the most extensive potential investment scenarios. These gains reflect improved access to international markets in these landlocked economies. The GDPs of Hungary, Russia, Slovakia and Turkey are expected to increase by around 3% under the same investment scenario.

Overall, our analysis implies that modern infrastructure investment – at least in the EBRD regions – can deliver both economic growth and enhanced quality of life. ✦

Sergei Guriev is Chief Economist and Nathaniel Young is Principal Economist at the European Bank for Reconstruction and Development.

✧ Infrastructure and real estate

A new fund for Europe

The creation of a new European social bond would help EU member states meet their infrastructure needs without exacerbating public debt.

Romano Prodi and Edoardo Reviglio
High-Level Task Force on Investing in Social Infrastructure in Europe

"More than 90% of social infrastructure is funded through public budgets."

Since 2007, investments in the European Union – both public and private – have fallen by 20%. As much as 75% of the reduction in public investments is due to the collapse of works carried out by local administrations. These represent on average around two-thirds of total European public investment.

A decline in investment of such magnitude creates inevitably disaffection among citizens towards governments and the EU. It weakens social cohesion and does little to combat poverty. It means fewer work opportunities for artisans and local businesses. This trend must be reversed immediately to prevent the relationship between politics and citizens from deteriorating further.

The so-called 'Prodi report', authored by the high-level task force on investing in social infrastructure in Europe (of which we were members), estimates that in the EU-28, around €170bn is spent each year on social infrastructure in the health, education and social housing sectors. The minimum infrastructure gap is around €100bn-€150bn per year, which represents a total gap of €1.5tn in the period 2018-2030.

The report proposes innovative solutions to finance health, education and social housing at a sustainable cost for European public finances. More than 90% of social infrastructure is funded through public budgets. Most of the time, direct contracts are financed by long-term loans. Thanks to quantitative easing, the spreads between member states have been reduced significantly. But this will not last forever, and local authorities' debt offers little room for manoeuvre.

Two issues therefore arise. The first concerns the possibility of investments that do not weigh on public debt. The second is to ensure that the weakest countries and those most in need of social infrastructure can finance it at a lower cost.

Suppose a municipality or region needs to invest in social infrastructure but has no fiscal space. It can decide to implement it through innovative forms of institutional public-private partnerships. If the construction risk is transferred to the private individual it will not weigh on public debt. The local administration will pay for the work through an 'availability fee' which will affect expenditures year after year, but not its debt. Costs can be kept down by a national or European grant, public guarantees or tax incentives. Fiscal space can be provided through a 'special clause for social investments'. Contributions in kind can be made using local public heritage assets (land or buildings, for example). An institutional 'technical assistance' system can ensure that risks and profits are well distributed between the public and the private sectors. This solution, known as 'blending', helps contain debt.

Some EU countries are desperately in need of infrastructure and growth, but are penalised by their credit rating. The creation of a European Fund for Social Infrastructure would address this. It would issue European social bonds to all member states. The bonds would have a high rating and mitigate the risks associated with certain projects. This would solve largely the problem of sovereign spreads.

The Fund would have a technical assistance network to assist administrations in building 'European' quality economic and financial plans. Long-term investors would contribute to its capital through shares and European social bonds. This would help meet these investors' demand for infrastructural finance instruments.

In 1993, then-European Commission President Jacques Delors introduced Eurobonds. There are two main differences between these and the Euro social bonds we propose. First, the Fund does not require a guarantee from member states. It manages uncertainty by 'tranching' securities according to their riskiness. Second, the Fund would limit itself to social infrastructure and specialise in sectors with specific characteristics. The markets, along with the European Investment Bank and national development banks, would remain in charge of economic infrastructure. ✦

Romano Prodi and Edoardo Reviglio were Chair and Member, respectively, of the European Commission's High-Level Task Force on Investing in Social Infrastructure in Europe.

✧ Gold

Reserves managers favour gold post-crisis

In the light of lingering economic and geopolitical uncertainty, central bank gold accumulation has reached new highs over the last 10 years.

György Matolcsy
Magyar Nemzeti Bank

"When tensions are running high, more and more central banks are looking for ways to prepare for the economic downturn. Gold can be exactly that safe haven asset central banks are searching for.

Central bank gold accumulation has reached new highs since the 2008 financial crisis. One of the strong sources of this demand comes from international reserve trends. Global official reserves have risen considerably to $11.4tn from $7.4tn during the past decade. This, combined with the low-yield environment of recent years, paved the way for gold purchases.

The second source of demand arises from the wish of some central bankers to diversify their official reserve assets. As the assets under management of central banks rose sharply, so did the need for more diversified and sophisticated reserves management. The correlation of gold to other assets in portfolios is low, or even negative in some cases, holding the yellow metal in official reserves greatly benefits diversification.

The third source of demand is rooted in geopolitics. Dominance of the dollar in reserves management has a long history and the exorbitant privilege it provides the US has been criticised by many countries, although being the prime reserve currency can have its drawbacks as well. Recent gold accumulation by China and Russia can be justified by economic policy reasons. These countries have been trying to reshape the global political landscape for a long time and to create a more balanced, multipolar world order. Substituting dollar assets in reserve portfolios with gold can be seen as an attempt to achieve this goal.

Increased uncertainty in financial markets and the real economy might have led to additional gold investments. After years of high economic growth, soaring asset prices, abundant liquidity and depressed market volatility, bonds and equities have started to show erratic price movements. These developments are driven by the fears of overvalued financial markets, decreased liquidity due to contractionary monetary policies and worsening economic outlooks. Nowadays, most economists are concerned about possible looming recessions. When tensions are running high, more and more central banks are looking for ways to prepare for the economic downturn. Gold can be exactly that safe haven asset central banks are searching for.

Central banks favoured gold investments in the last decade and are expected to do so in the near future. In Hungary's case, most of the international trends are relevant to the Magyar Nemzeti Bank. The MNB reviewed and overhauled its gold reserve strategy in a multistage process. As a result, the central bank decided to repatriate its existing gold reserves from London in March 2018 and then increased it 10-fold to 31.5 tonnes during the autumn of that year. The final size of the gold reserve was influenced by two factors: the historical gold reserve levels of Hungary, and a peer-group review among other central and eastern European countries.

The Hungarian economy's external vulnerability fell significantly in the past couple of years, while reserve adequacy was ensured by a comfortable margin. This created the opportunity to diversify further the reserves by purchasing gold.

The first steps towards diversification at the MNB were taken more than a decade ago. Before the 2008 financial crisis, the central bank managed its foreign reserves in two currencies, the euro and the dollar, mostly invested in high-quality government bonds. Today, the MNB denominates its reserves in six currencies – adding the yen, pound, Australian dollar and renminbi to the group – with a diversified asset allocation. Gold perfectly complements the investment strategy of the foreign exchange reserve. Prior to last year's purchase, the MNB had 0.4% of its reserves allocated to gold. Today the share of gold makes up 4.5%, in line with other non-euro area CEE countries.

Hungary is highly integrated into the world economy, hence it cannot be safeguarded completely from global shocks. The MNB must prepare for an adverse international economic environment through its reserves management decisions. Gold, given its unique attributes, is an apt candidate for additional investments in this period of uncertainty. As for Hungary, purchasing gold and transferring it to a domestic location conveys the message of increasing public trust, both domestically and internationally, and providing stability to the economy. ✦

György Matolcsy is the Governor of Magyar Nemzeti Bank.

✧ Gold

Demand at post-Bretton Woods high

Gold is an increasingly attractive asset for central banks in both market and emerging economies, owing to strategic shifts growing geopolitical uncertainties.

Shaokai Fan
World Gold Council

“Central banks made net purchases of 651.5 tonnes of gold in 2018, dwarfing the 374.8 tonnes purchased during the previous year.

In 2018, central bank gold buying reached its highest level since the end of the Bretton Woods system in the early 1970s. Central banks made net purchases of 651.5 tonnes of gold in 2018, dwarfing the 374.8 tonnes purchased during the previous year. Central banks have been net purchasers of gold since the 2008 financial crisis. But last year's record purchases stood out not just because of their scale, but because of the diversity of buyers.

Historically, countries such as Russia, Kazakhstan and Turkey were among the most consistent buyers, making regular monthly purchases. Central bank gold demand had been concentrated largely among these countries for several years. By 2018 however, it had become significantly more diverse. Poland and Hungary became the first European central banks to make substantial gold purchases in decades. They were joined by India, the Philippines and Thailand, which re-entered the gold market after several years of inactivity.

The People's Bank of China began to report gold purchases again after a two-year absence. The change in central banks' gold buying behaviour, both in terms of the quantity purchased and the diversity of active banks, may signal an important shift in their attitudes towards gold, as well their perception of the broader strategic environment.

Precautionary reserves

The build-up of foreign exchange reserves overall and the need to rebalance reserve asset portfolios may be a key factor behind the increase in gold activity. Central bank foreign exchange reserves reached a peak of $13tn in 2013, up from $2tn in 2000. This reflects a desire to hold higher levels of precautionary reserves to protect against crises. It is also a side-effect of managed currency regimes. As the gold price remained fairly flat in recent years, gold's share in total reserves has fallen and some central banks may be rebalancing to return to their preferred strategic level.

The pick-up in central bank gold buying may also be rooted in strategic reasons. In 2018, Russia purchased 274.3 tonnes of gold, the highest level of annual net purchases on record and the fourth consecutive year of purchases greater than 200 tonnes. This enormous accumulation of gold is in direct response to pressure from financial sanctions imposed by the West.

Gold has become a strategically important asset. As Dmitry Tulin, first deputy governor of the Central Bank of the Russian Federation, said last year, gold is a '100% guarantee from legal and political risks.' The substantial increase in Russian gold holdings has been accompanied by an equally substantial decrease in the country's holdings of US Treasuries, reflecting the Bank of Russia's long-standing policy of de-dollarisation.

Furthermore, the heightened level of geopolitical and economic risks in both emerging market and advanced economies may be underpinning demand for gold as a strategic asset. The Cboe volatility index, often described as the market's fear gauge, jumped to its highest level since mid-2015 in 2018, highlighting investor disquiet.

The world economy is changing, with China now the world's largest economy on a purchasing-power parity basis. China has been internationalising the renminbi since 2009. It seems inevitable that its use in international trade will grow once certain conditions are fulfilled, most notably the continued opening of China's capital account. The real question concerns timing. The shift to a new international monetary system could be destabilising and dollar-negative due to hot money flows. Some central banks may be buying gold now as a hedge against both. Magyar Nemzeti Bank, the Hungarian central bank, cited the fact that gold 'may play a stabilising role and act as a major line of defence under extreme market conditions or in times of structural changes in the international financial system' as a motivation behind its recent 10-fold increase in gold reserves.

Gold has always been a mainstay in central bank reserve portfolios. But it is possible the growing levels of uncertainty and complexity in the world are prompting central banks to increase gold holdings in record amounts, whether as an automatic reaction to rebalance their portfolios or as a strategic decision to guard against an increasingly unpredictable future. ✦

Shaokai Fan is Director, Central Banks and Public Policy at World Gold Council.

OMFIF Special report

Gold

Gold has become an increasingly important strategic asset, not only for currency protection or reserves diversification, but as a tool in geopolitical calculus. Central banks have become active purchasers of the precious metal.

↘ Gold

Pierre Ortlieb
Economist,
OMFIF

Gold purchases align with China's rise

The extent of central bank gold holdings distinguishes them from other public investors, such as public pension and sovereign funds. The World Gold Council states that official institutions hold around 17% of gold. As part of OMFIF's study with State Street Global Advisors (see p.109) on trends in global reserves management, we estimate that, while public pension funds hold only around 0.5% of their assets in commodities in general, 9.5% of global official reserves were allocated to gold as of end-2017. As of year-end 2018, gold made up 10.5% of global central bank reserves, down slightly from 10.6% in the fourth quarter of 2017.

The most significant holders of gold are those economies that used to hold it for policy reasons. Developed economies with now-floating exchange rates make up 53% of the global economy and hold 68% of the global official gold share. Most of these economies have kept their share stable over the past decade – the US, Italy and Switzerland, for instance, have not changed their tonnage holdings of gold. However, some central banks have been active gold purchasers. The trend started around the time of the 2008 financial crisis and grants key insight into the strategic importance of gold as a reserve asset and foreign policy tool.

> In Russia, heightened tensions with the West over the 2014 annexation of Crimea have sparked a desire to reduce dependence on the dollar and limit its exposure to US currency risk and Washington's sanctions. Russia's central bank has cut significantly its holdings of US Treasury bonds and increased its demand for gold and other assets.

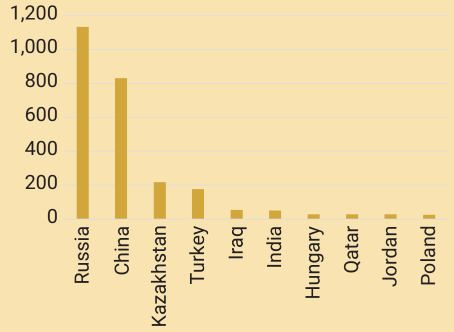
Shifting centre of the global economy

Since the 2008 financial crisis, the centre of global economic gravity has continued to shift eastwards. China has been responsible for around one-third of global GDP growth since 2014 – the last time the US accounted for a similar share of global growth over a multiyear period was in the early 1980s. China provided around 70% of global investment growth in 2016.

The shift of economic weight towards Asia (see Figure 2) will probably continue, strengthening the rationale for holding larger amounts of renminbi in central bank reserves. The internationalisation of the renminbi need not affect gold a priori. However, in the course of a general move towards diversifying international reserve holdings, there is likely to be a clear role for gold. One reason is that China has no wish to be unduly dependent on either the dollar or the euro.

This comes in addition to strategic policy changes gradually implemented in China to grant foreign investors greater access to the domestic bond market. These moves began in 2002, as the 'qualified foreign institutional investor' programme allowed investors to gain access to mainland Chinese bond markets. This was initially capped using an allocation on dollar-denominated bonds, which was revised upwards and updated to include renminbi-denominated securities in 2011. The introduction of the China interbank bond market in 2016 and the bond connect system in 2017 furthered this gradual opening, providing foreign investors direct access to the onshore bond market. Quota limits were lifted and entry procedures were significantly streamlined. From April 2019, Chinese government bonds have been included in the Bloomberg Barclays Global Aggregate Index, an indicator which serves as one of

Figure 1: Belt and gold initiative
Central bank gold purchases, January 2014-May 2019, tonnes



Source: World Gold Council, OMFIF analysis

the main measures of global investment grade debt. Earlier, from June 2018, China A-shares were added to the leading MSCI emerging markets index, which 'captures large- and mid-cap representation across 24 emerging markets countries'. These moves have accompanied the pull of economic and financial gravity from West to East and enhanced uncertainty about the status of reserve assets

The dollar- and euro-negative effects of the broader regionalisation of reserve assets implies a greater reliance on gold. This will take time to materialise: while China accounts for almost 20% of global GDP and more than 10% of global trade, the renminbi makes up only 1.8% of central bank reserves. To a large extent this reflects the renminbi's limited convertibility, China's relatively closed capital account and its history of running large current account surpluses. Each of these limits the extent to which a currency is likely to become a reserve asset. Yet China has already undertaken significant reforms to its capital account, suggesting that foreign holdings of Chinese bonds, and assets more generally, will grow. This in turn has positive ramifications for gold.

Gold will probably play a greater role during a potential transition period between different reserve currency constellations. This is likely to be a period of substantial fluctuation in currency values as markets seek a new equilibrium. The attraction of gold, an asset which is nobody's liability, should stand out: investing would denote no political bias and should minimise foreign exchange fluctuations. For central banks, concerned with preserving value and naturally politically cautious, gold is likely to prove a haven from currency storms.

Gold along the Belt and Road

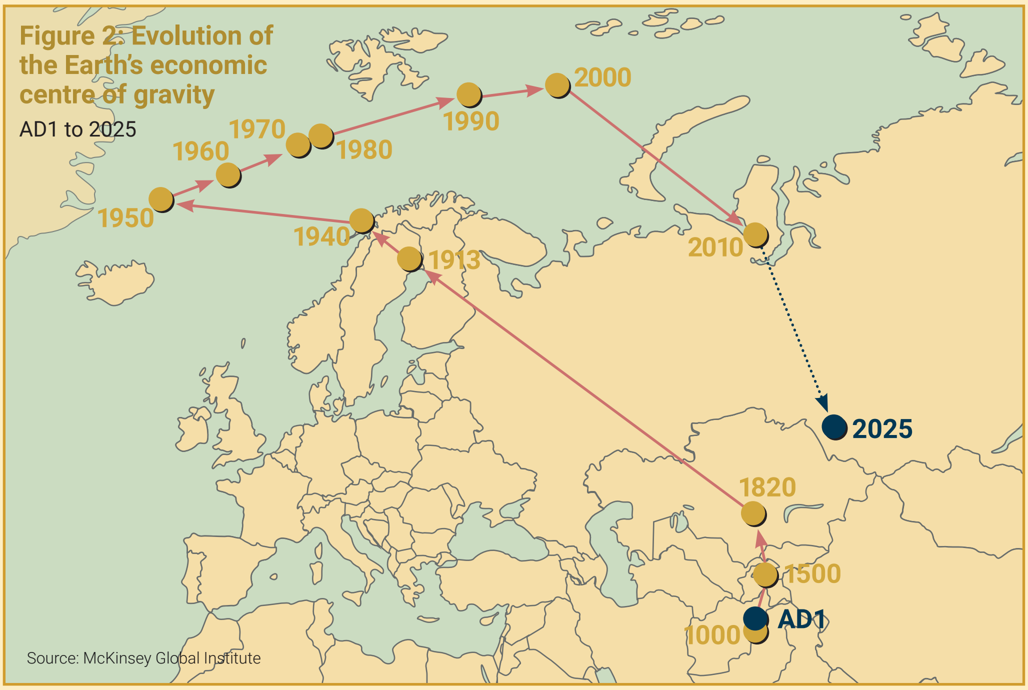
2018's largest gold purchasers are shown in Figure 1: Russia, Turkey, and Kazakhstan, as well as several other countries in the list, are participants in China's Belt and Road initiative, and have built up or maintained close ties with Beijing. Among the top five non-Chinese central banks that have added to their gold reserves since mid-2014 (Russia, Kazakhstan, Turkey, Qatar and Tajikistan), all have substantial and strengthening economic ties with Beijing.

These countries have multifaceted motivations for increasing their gold holdings: hedging against political risks and sanctions (Russia and Qatar), trends in oil and gas markets (all except Turkey), currency stabilisation (Turkey), and holding gold as a strategic asset (Kazakhstan and Tajikistan). ↘

> “The top five non-Chinese central banks that have added to their gold reserves since mid-2014 (Russia, Kazakhstan, Turkey, Qatar and Tajikistan), all have substantial and strengthening economic ties with Beijing.

Figure 2: Evolution of the Earth's economic centre of gravity

AD1 to 2025



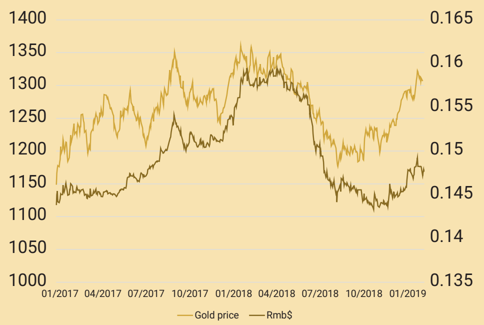
Source: McKinsey Global Institute

Gold

> For China itself, gold has taken on an increasingly important strategic role. It has been the world's largest producer of gold for more than a decade and has been among the top five buyers of the yellow metal for a similar span.

Figure 3: Connection between gold price and renminbi

Gold price per troy ounce ($, LHS), and Rmb exchange rate ($, RHS)



Source: Bloomberg, OMFIF analysis

Both Hungary and Poland recently boosted their gold holdings significantly following rapprochement with China. In addition to the Belt and Road, they were among the first participants in renminbi-denominated debt issuance (since 2015). Both are embroiled in controversy with the European Union over domestic political and social developments and are keen to demonstrate that they have alternatives to closer relations with Brussels.

Gold as a foreign policy asset

Hungary and Poland are not alone in their use of gold as a tool in balancing relations with China and the West. In Russia, heightened tensions with the West over the 2014 annexation of Crimea have sparked a desire to reduce dependence on the dollar and limit its exposure to US currency risk and Washington's sanctions. Russia's central bank has cut significantly its holdings of US Treasury bonds and increased its demand for gold and other assets. As well as rebalancing its reserves portfolio out of dollar assets, this strategy involves reducing Russia's dependence on European markets for its exports and seeking alternatives to western-led institutions for financial assistance. China has been the focus of its attention, providing further motivation for Russia to hold non-dollar assets, including gold, with which to transact with Beijing.

For China itself, gold has taken on an increasingly important strategic role. It has been the world's largest producer of gold for more than a decade and has been among the top five buyers of the yellow metal for a similar span. There is some uncertainty over the exact extent of China's gold holdings. While the WGC indicates that China holds 1,852.5 tonnes of gold in its reserves (2.4% of its total foreign exchange holdings), this figure is only updated every few years by authorities at the People's Bank of China. In 2018, China purchased 10 tonnes of gold, and it has already added 33 more to its reserves in 2019. This makes China the third-largest buyer after Russia and Turkey so far this year. There are indications that the real volume is significantly higher than reported – for instance, domestically mined gold is likely to have been placed into official accounts but not have been labelled as such yet.

Recent macroeconomic and trade pressures suggest an additional geopolitical dimension to China's use of gold: the renminbi-dollar exchange rate closely followed the price of gold over the course of 2018.

The gold price in renminbi terms has been quite stable, moving in a quite narrow range of Rmb8,200-Rmb8,400 per ounce and decreasing only by 1.4% from April 2018 to mid-August 2018, the dollar price of gold dropped by 9.9% over the same period. At the same time, facing US tariffs imposed on Chinese products, the renminbi declined around 9% against the dollar (the dollar-renminbi exchange rate has risen 9.2%) in four months since its lowest level on 11 April 2018.

Similar patterns were visible in other commodities markets, such as platinum or copper. There was a much stronger relationship between commodities price movements in dollar terms and the renminbi-dollar exchange rate in 2018 than in previous years. Whereas platinum and copper prices in renminbi terms between April and mid-August 2018 declined by 3.2% and 2.4%, respectively, the dollar price of these commodities declined by 11.8% and 10.9%, following a 9% drop of the renminbi against the dollar.

This renminbi depreciation undermined the effect of US tariffs by lowering the prices of Chinese products in dollar terms, allowing China to maintain relatively stable export levels. In addition, tracking the gold price in dollar terms through the renminbi limits the effect of foreign exchange risk on gold portfolios. Given that Chinese consumers are significant holders of gold, maintaining stable gold prices would prevent wealth erosion and thereby limit the impact of the trade war on China. The possible use of gold as a foreign economic policy tool visible in these exchange rate moves highlights the layered strategic importance of gold.

Geopolitical calculus

Gold has become an increasingly important strategic asset, not only for currency protection or reserves diversification, but as a tool in trade conflict and geopolitical calculus. Given these patterns and any uncertainty in the macroeconomic environment, gold's status is likely to rise, and demand for the yellow metal will continue increasing. ✦

Pierre Ortlieb is Economist at OMFIF.

✧ ESG investment

Green finance integral to central banks

Central bankers must work together across borders to encourage sustainable growth around the world, such as through the Network of Central Banks and Supervisors for Greening the Financial System.

Frank Elderson
De Nederlandsche Bank

“Financial institutions would suffer significant losses if there was a sudden shift in climate policy.

Greening the financial system is integral to central banks' mandate. The 2008 financial crisis made this clear. The prosperity experienced prior to the crisis was untenable, and the current economic model is still not sufficiently sustainable. It is impossible to achieve lasting growth while disregarding the well-being of future generations.

Central bankers are responsible for sustainable financial stability – a pillar of growth and a key defence against financial crises. They must therefore pay close attention to issues around climate change. Climate and environmental risks threaten the financial sector at both the macroeconomic (financial stability) and microeconomic levels (in terms of the financial soundness of banks and households).

Adopting climate-friendly policies

Central banks have a role to play in greening the financial system and the economy. They could act at the national level by better understanding and identifying the channels through which climate and environmental risks could impact the stability of the domestic financial sector. Some central banks have conducted thematic reviews on climate risks affecting their countries' financial sector. De Nederlandsche Bank has published three studies: ‘Time for Transition’, ‘Sustainable investment in the Dutch pension sector’ and ‘Waterproof?’.

A DNB stress test showed that financial institutions would suffer significant losses if there was a sudden shift in climate policy. This justifies preventative action by central banks; greening the economy also means mitigating the risks of an unsustainable and natural resource-intensive ‘brown economy’. Central banks and supervisory authorities could provide guidance to the financial sector to ensure climate risks are embedded in a sound risk management framework.

Besides their supervisory role, central banks could adopt a climate-friendly approach to asset management. This includes setting sustainable rules for investment decisions, such as the integration of environmental, social and corporate governance factors in the counterparty framework and in risk limits, and banning ‘brown’ investments. On 20 March 2019, DNB became the first central bank to sign the principles for responsible investment. In so doing, the bank commits itself to integrating six environmental, social and governance principles in its investment practices.

Finance is globalised and climate change is a worldwide threat, therefore central banks should act together. The Network of Central Banks and Supervisors for Greening the Financial System, which I am proud to chair, was established in December 2017. It supports co-operation and oversees the allocation of capital towards greener economic activities.

The NGFS published its first progress report in October 2018. This summarises the preliminary findings of a stock-taking exercise of national and international initiatives. On 17 April 2019, it presented its first comprehensive report, ‘A call for action’, containing six non-binding recommendations to reach the goals set in the 2015 Paris climate agreement. Four concern central banks and supervisors, calling for the integration of ESG principles in own-reserves management and for climate risks to be embedded in supervisory work. This includes filling data gaps and building in-house capacity and knowledge. The remaining two recommendations, intended for policy-makers, call for a clear taxonomy and disclosure practices.

The growing number of NGFS members – 36 at the time of writing – is evidence of central banks' global awareness of their role in greening the economy. It is therefore no longer an issue of legitimacy regarding public financial institutions' mandate, but rather a reflection on how this mandate could be reinforced to accelerate the response to this global, demanding and urgent challenge. ✦

Frank Elderson is Executive Director of Supervision at De Nederlandsche Bank and Chair of the Network of Central Banks and Supervisors for Greening the Financial System.

✧ ESG investment

A new climate risk policy framework

There is a need to establish appropriate risk policy framework for managing and examining the macrofinancial impact of the transition to a sustainable low-carbon economy.

Diwa Guinigundo
Bangko Sentral ng Pilipinas

> The shift towards a low-carbon economy will entail significant macrofinancial risks that need to be managed carefully.

Central banks are in a strategic position to mobilise mainstream finance to tackle climate change. Their policies can facilitate the shift to a more sustainable low-carbon economy, driven by the confluence of technological innovation, market reaction and climate policy.

Private investors are starting to take a closer look at how environmental risks might impinge on their portfolios. The transition phase to limit the global temperature rise to 2°C above pre-industrial levels has profound financial implications. Firms have a duty to protect the value of their investment by addressing proactively climate-related risks and opportunities. Similarly, regulators must ensure they are able to mitigate the systemic ramifications of climate-related risks on the financial sector and on the economy's stability and long-term prospects.

But there is one big challenge. The magnitude of asset revaluation requires a coordinated response across the investment value chain. Climate change could result in significant value creation, as well as considerable losses. Studies estimate that without mitigation efforts, the value of global financial assets could drop by $2.5tn-$24.2tn.

The trend toward low-carbon technologies will 'strand' a large part of fossil fuel assets, meaning they will lose their value prematurely. Losses could range from $1tn-$4tn. The magnitude of financial risk differs across low-carbon and pollution-intensive carbon activities. The shift towards a low-carbon economy will entail significant macrofinancial risks that need to be managed carefully. Therefore, minimising abrupt, disruptive changes in economic activities requires a flexible and prudent policy framework. Linking scientific data to analytical models for prudential risk assessment is crucial. However, there are no standard classifications to guide this undertaking.

There is a need to establish a prudential framework for assessing and quantifying the macrofinancial impact of climate change and of the transition to a low-carbon economy. This requires an integrated approach to modelling the dynamic interactions between the global economy, climate change and environmental policies. However, the tools and methodologies that embed the behaviour of the financial system in environmental models are still in their infancy.

The issue of climate change as prudential risk is palpable in the Philippines. The United Nations Office for Disaster Risk Reduction ranks the country fourth in the world in terms of occurrences of natural disasters. Between 1995-2005, there were 274 recorded disasters. The cost of replacing physical assets and income lost to extreme weather events has material consequences on the economy.

The Bangko Sentral ng Pilipinas recognises that ecological sustainability is an important pillar of inclusive growth. Sustainable finance is a potent instrument to bridge the economic divide. BSP policies and regulations promote shared value through financial inclusion. However, to develop a regulatory framework for sustainable finance, financial institutions must incorporate environmental, social, and governance standards, as well as environmental and social risk management, in all their operations.

In 2013, the central bank joined the Sustainable Banking Network. Organised under the auspices of the International Finance Corporation, it is aimed at advancing good practices on sustainable finance, including the issuance of green and sustainability-themed bonds. Through our partnership with the IFC, we completed a scoping study on the extent of industry experience and interest in adopting ESRM. Results indicated that local bankers had moderate awareness, very limited experience, and mixed perceptions about the business case of adopting ESRM. Nonetheless, many believed in the merits of practicing sustainable finance as good corporate citizens and for institutional reputation. In May 2017, BSP signed a memorandum of understanding with the IFC on improving risk assessment tools and conducting awareness and peer-learning activities.

Prudential risk arising from climate change can be unpredictable. Therefore, the regulatory framework must be flexible. Financial institutions must work together to develop sufficient capacity to assess data on the risks and opportunities presented by climate change. This should lead to more decisive action as part of an overall risk management framework. ✦

Diwa Guinigundo is Deputy Governor of the Bangko Sentral ng Pilipinas.

✧ ESG investment

A climate Minsky moment

Central banks must contend with the tragedy of the horizon: by the time it is clear that climate change is creating risks and costs that we want to reduce, it may be too late to act.

Sarah Breeden and Andrew Hauser
Bank of England

"Average global incomes could be reduced by as much as a quarter by the end of the century if limited or no action is taken.

If climate change is not addressed, its effects could be catastrophic, bringing serious costs to the economy and risks to the financial system.

Physical risks arise from damage to property, land and infrastructure from weather-related events such as heatwaves, droughts, floods and rising sea levels. These are not just risks for the future. Inflation-adjusted insurance losses from such events have increased fivefold in recent decades.

Transition risks arise from changes in climate policy, technology and market sentiment as we adjust to a lower-carbon economy. The timing and form of transition is inherently uncertain. But here, too, risks are already materialising. Tightening energy efficiency standards are impacting property markets. Credit risks associated with the low-carbon transition are emerging in the automotive and energy sectors.

The Bank of England, alongside other central banks and supervisors through the Network for Greening the Financial System, has been working to deepen its understanding of the risks that climate change poses to the financial system.

These risks are far-reaching, foreseeable and, most importantly, require action now. The carbon released today is creating the physical and transition risks of tomorrow. Climate change therefore represents the tragedy of the horizon: by the time it is clear that climate change is creating risks and costs that we want to reduce, it may already be too late to act.

Measuring the risks that climate change poses to the economy and to the financial system is a complex task. Myriad possible climate pathways – with different physical and transition effects – need to be translated into economic outcomes and financial risks. But to minimise those future financial risks we need to take different decisions today.

Sizing risk

The Bank, which chairs the NGFS macrofinancial workstream, is working with industry and other regulatory authorities to source data, build intellectual capacity, develop new toolkits and identify best practice.

Studies show that average global incomes could be significantly reduced, perhaps by as much as one-quarter by the end of the century, if limited or no action is taken. Most estimates are probably conservative – particularly since the models are partial, heavily dependent on assumptions, and do not capture well the non-linearities that are a key feature of the most recent climate analysis.

Other studies have focused on the impact from the transition on the financial system through 'stranded assets', those that will be worth less as the world transitions to a low-carbon economy. The estimated losses are large – \$1tn-\$4tn when considering fossil fuels alone, or up to \$20tn when looking at a broader range of sectors.

Even at the bottom ends of these ranges, losses represent a material share of global financial assets. A climate Minsky moment, where asset prices adjust quickly with negative feedback loops to growth, seems possible.

The Bank is taking these risks into account. First, in our role as a supervisor, we have published expectations for how banks and insurance companies should enhance their approach to managing the financial risks from climate change. Second, the Financial Policy Committee will assess risks to the financial system from climate change, including whether climate-related factors should be included in a future biennial exploratory scenario. Finally, we are considering the implications of climate change for the Bank's own operations. This work will need to ensure the purpose of our core operations as a central bank is preserved, while taking account of the financial risks from climate change.

These risks could be significant and we cannot allow the tragedy of the horizon to create paralysis. The case for action is clear and the window for an early and orderly transition is finite and closing. It is for all of us to act now or risk the unaffordable, a climate Minksy moment. ✦

Sarah Breeden is Executive Director for International Banks Supervision, and Andrew Hauser is Executive Director for Markets at the Bank of England.

✧ ESG investment

Climate change as prudential risk

Once policy-makers accept climate change as a prudential risk, several options are open to them, from climate-related stress testing to promoting low-carbon financing.

Aziz Durrani
South East Asian Central Banks Research and Training Centre

“Since 2017 the PBoC has incorporated green finance into its macroprudential assessment system, including incentives for commercial banks to increase their stock of green credit and green deposits.

Climate change has two direct impacts on the financial system, and should therefore be deemed a prudential risk. First, people experience the physical effects of pollution from carbon-intensive industries and forest burning. The associated increase in global temperatures contributes to shifting weather patterns and a higher frequency of extreme weather events. These cause destruction, displacement and death, and disrupt manufacturing capabilities, trade flows and supply chains. This affects growth and financial stability. Institutions that have insured or lent to individuals and corporations affected by such occurrences will see higher levels of claims and losses in those portfolios. Central banks and regulators therefore need to consider the impact that the physical effects of climate change will have on institutions they regulate and the wider financial system.

Second, society is experiencing transition effects as it moves towards low-carbon alternatives. Industries that rely heavily on fossil fuels are facing greater public scrutiny and regulatory burdens. Credit ratings and share prices for coal companies have fallen dramatically. A similar situation could occur to oil, gas and car companies that fail to adapt. This would affect the network of companies and individuals that support such industries. Institutions that are lending against and insuring affected organisations may see higher levels of claims, as well as lower collateral values and higher non-performing loans and losses. They will need to update their lending policies and systems to account for these risks, or suffer financial losses and reputational damage.

Central banks take action

In December 2016 the Financial Stability Board's task force on climate-related financial disclosures called for businesses to disclose climate impacts and opportunities. The task force also asked for evidence of governance on climate risk at the levels of board and management, and of processes in place to manage these issues. A few central banks and regulators have been building on this. Several low- and medium-income countries are implementing regulatory instruments to facilitate the move to a low-carbon economy. China, India, Pakistan, Bangladesh, Vietnam and Indonesia have introduced mandatory prudential instruments to channel credit away from high-carbon industries and towards low-carbon sectors.

In 2012, Beijing approved a policy goal for establishing an ‘ecological civilisation’. A key part of this was the expansion of green finance, where China is now a leading global player. The People's Bank of China has taken steps to promote green financial development through a combination of macroprudential and monetary policy. Since 2017 the PBoC has incorporated green finance into its macroprudential assessment system, including incentives for commercial banks to increase their stock of green credit and green deposits. The PBoC has been a strong proponent of the rapidly expanding domestic green bond market.

The Bank of England was another early adapter. It reviewed the UK insurance sector's exposure to climate-related risks in 2015, and later did the same for the UK banking sector. It concluded that climate change presented financial hazards through increased credit, market and operational risks. The Bank's financial policy committee will now consider the macroprudential implications of financial risks from climate change. Its stress-testing programme may in future include climate-related scenarios.

The Australian Prudential Regulation Authority announced in February 2017 that climate risk is a foreseeable and material threat to financial institutions and an ‘important and explicit’ part of the agency's considerations. Directors who fail to consider and disclose climate-related risks could be held liable for breaching their statutory duty of care and diligence under the Corporations Act. Apra is increasing the emphasis on stress-testing for organisational and systemic resilience in the face of adverse shocks. It expects to see more sophisticated scenario-based analysis of climate risks at the firm level and is incorporating this into its system-wide stress-testing.

De Nederlandsche Bank has undertaken studies of the Dutch financial system. These showed that there were wider systemic risks emanating from carbon-intensive sectors, some of which were already crystallising. The DNB is embedding climate-related risks into its supervisory approach and further developing climate-related stress tests.

Taking account of risks

Monetary and regulatory institutions are starting to take account of climate change-related risks, but they could go much further in adapting their regulations accordingly. For example, under the Basel III regulatory framework, low-carbon lending is categorised generally as higher risk. Such loan facilities typically have longer tenors, and exhibit higher refinancing risks and lower liquidity. In addition, they are vulnerable to sudden policy changes.

Conversely, the higher risks of lending to carbon-intensive businesses are not accounted for explicitly under the Basel framework, granting them an implicit advantage. The concepts of 'brown-penalising' and 'green-supporting' factors have been suggested to bridge this gap. These could be applied to capital requirement calculations to account better for climate-related financial risks inherent in carbon-intensive lending. Such factors could result in higher capital requirements for carbon-intensive assets, which would redirect lending to low-carbon financing.

China has already implemented such a framework, and banks are required to hold less capital for green loans than for other types of lending. Nevertheless, implementing such factors carries risk, since reducing capital requirements for bank loans to low-carbon industries may lead to increased risk-taking, and potentially arbitrage. Banks may approve riskier low-carbon loans with higher returns to benefit from the reduced capital cost compared with loans with the same risk characteristics to more carbon-intensive industries, which would carry higher risk weights.

A supplement to this could be to introduce a carbon-based capital buffer that would apply to carbon-intensive loans or sectors that banks have lent to. This would remove some of the inherent biases in the system towards lending to carbon-intensive industries, while facilitating a move to low-carbon lending.

Another avenue that regulators are exploring is climate-related stress-testing. Modelling scenarios that address a variety of transition paths to a low-carbon economy can help to determine climate change's potential impact on individual firms and the financial system. A climate stress test, however, presents severe difficulties over modelling climate-related scenarios, as well as assessing the impact of second-order effects. Central banks struggle to model the dynamic interactions between individuals, firms, the economy and the financial system, domestically and globally. Trying to add in global climate change factors and environmental policies on top of these will be difficult.

However, we should not give up thinking about and running such scenarios. Once regulatory bodies and firms place such stress scenarios on the agenda and take them seriously, there will be a corresponding rise in the necessary expertise to handle these challenges. As such, financial institutions, central banks and regulatory authorities will need to start fostering more robust modelling approaches, along with greater sophistication in data collection, extraction and analysis. In any event, the process of outlining such scenarios will mean firms and their regulators will have to think more explicitly about the implications of climate change.

An additional policy tool would be to widen further and promote green and low-carbon financing options. The green bond market is already worth in excess of $250bn and is growing rapidly. Banks can provide capital market access for green bond issuers or can invest in the green bond market themselves. Several banks have started issuing green bonds, with the proceeds used for developments with environmental benefits. This will encourage further investment in low-carbon industries and projects.

Once climate change is accepted as a prudential risk, there are several options open to monetary policy-makers. Much debate will be needed on actions to take to encourage low-carbon financing. The choice lies with each individual nation. It is evident, however, that doing nothing is not a viable option. +

Aziz Durrani is Senior Financial Sector Specialist, Financial Stability and Supervision at the South East Asian Central Banks Research and Training Centre.

"Modelling scenarios that address a variety of transition paths to a low-carbon economy can help to determine climate change's potential impact on individual firms and the financial system.

✧ ESG investment

Understanding credit risk

For investors, a clearer understanding of the credit implications of environmental, social and governance factors helps to determine whether their risk-return objectives are aligned with their sustainability goals.

Mervyn Tang
Fitch Ratings

> The analysis of ESG risks is evolving rapidly with the increasing availability of data and growing expertise, but often with substantial uncertainty and complexity.

Public investors, like many of their private counterparts, are placing greater emphasis on incorporating environmental, social and governance principles into their strategies. However, 'ESG investing' encompasses several distinct objectives. Some may look to have a positive social impact by investing in businesses that contribute to a more sustainable world economy. Others may look to improve long-term risk-return outcomes. Often, investors want to do both.

These objectives can be aligned when the factors making an issuer more sustainable also support its credit profile. For example, a utility company with a less carbon-intensive business model, all else being equal, could be less exposed to tightening regulations restricting carbon dioxide emissions. However, the relationship is far from straightforward in the world of credit. Guarantees and other support structures can divorce the credit risk of a particular issuer from the consequences of their less sustainable practices. ESG factors also need to be considered in the context of other credit-relevant determinants, such as an issuer's financial resilience, to understand the impact on the overall credit profile.

Fitch has introduced an integrated scoring system that shows which ESG factors are relevant to individual credit rating decisions. It currently assesses corporates, financial institutions and sovereigns, with other asset classes to follow. The scores do not make value judgements on whether an entity engages in good or bad ESG practices. Rather, they draw out the 'E', 'S', and 'G' risk elements that influence the credit rating decision. Fitch's credit-focused approach differs from ESG score or rating providers that assess issuers based on broader concepts of sustainability.

Analysis of the ESG relevance scores has provided credit-relevant ESG insights across sectors and geographies. For example, analysis of scores for corporates found that board independence, concentrated ownership and transparency were the most common governance issues in emerging markets. Operational failures and complex group structures were more relevant in developed markets. The scores also identified ESG trends affecting credit ratings, such as heightened regulatory scrutiny over conduct and money laundering for financial institutions.

Evolving risks

Aside from recent trends, the scores highlighted where ESG elements are a well-established part of Fitch's ratings methodologies. Governance has long been integral to Fitch's sovereign analysis. The composite of the World Bank's governance indicators hold the largest weight of any variable in our Sovereign Rating Model. As scores are updated, they offer a picture of how ESG risks evolve over time.

For investors, a clearer understanding of the credit implications of ESG factors helps to determine whether their risk-return objectives are aligned with their sustainability goals. The distinction may also help policy-makers better target their policy decisions. Credit risk could be a particularly important factor when considering options to manage the consequences on macroeconomic and financial stability from climate-related risks.

The analysis of ESG risks is evolving rapidly with the increasing availability of data and growing expertise, but often with substantial uncertainty and complexity. How a transition to a lower-carbon economy may affect the credit risk of an issuer depends not just on its own business model and carbon footprint. The nature and time horizon of associated policies and technological change, as well as the broader macroeconomic consequences, are also crucial elements. Investors' views may vary considerably for many of these factors. Fitch's approach is designed to offer investors the opportunity to examine, discuss and challenge opinions about how ESG considerations affect rating decisions.

Fitch's primary mandate is to provide insightful and timely credit opinions for investors that are transparent and capable of being both challenged and defended. The introduction of ESG relevance scores is a substantial step forward in enhancing transparency for investors, and for the broader discussion around ESG and credit. ✦

Mervyn Tang is Head of ESG Research, Sustainable Finance at Fitch Ratings. Follow the link below to find out more about how Fitch Ratings measures ESG relevance scores.
https://www.fitchratings.com/site/esg

OMFIF Special report

Central banks and climate change

The global central banking community spent the last decade repairing the financial system after the international banking crisis. Now, it is turning its attention increasingly to the longer-term challenge of improving the climate resilience of the financial system and the wider economy.

↘ Central banks and climate change

Danae Kyriakopoulou
Chief Economist & Director of Research, OMFIF

Addressing climate risks to economies

The past year has seen unprecedented levels of public interest in the effects of climate change on our economies and societies. This was evidenced by the birth of the Extinction Rebellion movement and the rise of 16-year old activist Greta Thunberg. In October, William Nordhaus won the Nobel prize in economics for his work on the economic modelling of climate change. That same month, the United Nations Intergovernmental Panel on Climate Change issued alarming warnings. And for the third consecutive year, the World Economic Forum's annual report, presented in Davos in January 2019, counted three environmental risks – all associated with climate change – among the top five global risks in terms of both likelihood and impact. In April 2019, not-for-profit organisation Positive Money launched a petition calling on the Bank of England to step up its efforts to address climate change. Titled '#GreentheBoE', it gathered more than 4,000 signatures in a matter of hours.

New frontier for central banks

As these events indicate, climate change is a matter that extends beyond activists, governments, and private companies. Central banks, banks and insurance companies are realising increasingly the need to take climate change into account in their decision-making and the reasons go beyond mere window-dressing. In December 2017 during the One Planet summit and at the initiative of the Banque de France, eight institutions from four continents set up the Central Banks and Supervisors Network for Greening the Financial System. Chaired by Frank Elderson, executive director for supervision at De Nederlandsche Bank, the group has since grown to 36 members from 29 jurisdictions. Collectively, they cover around 31% of the world population and almost half of global GDP and global greenhouse emissions (see Figure 1). They supervise two thirds of the world's global systemically important banks and insurers. The network also includes observer and stakeholder members such as the Bank for International Settlements, the World Bank, the Organisation for Economic Co-operation and Development, and OMFIF.

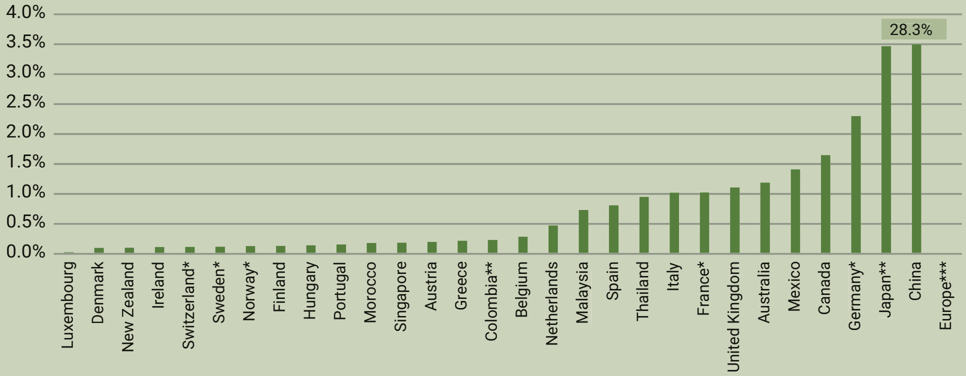
Central bankers' deepening interest in the subject is reflected in the growing number of speeches on issues related to climate change. These range from its impact on the economy, financial stability and monetary policy, to the development of green finance instruments and ratings. Between April 2018-March 2019, there were 21 central bank speeches on these subjects (see Figure 2). Of these, all but two were made by members of the NGFS, with the majority of speeches coming from the Eurosystem (13, including three from the European Central Bank), and the remaining coming from Asia (three), the UK (four), and Africa (one). Banque de France Governor François Villeroy de Galhau went as far as calling climate risks 'the new frontier for central banks, comparable to the financing of growth and major infrastructures in the 19th century or the management of great financial crises in the last 100 years'.

The motivation for central banks is manifold, stemming from the need to understand and explain the potential impact of climate change on the macroeconomy and more specifically, on financial stability and monetary policy. Central bankers must also assess the effects of climate change on the financial sector, as the industry mix changes to facilitate the transition to a climate-resilient economy.

Entire industries, households and businesses are likely to be affected as countries transition to low-carbon models. Economies will have to bear the cost of adaptation to a warmer climate, including increasing spending on equipment such as air conditioning and resilient infrastructure such as seawalls, which would divert resources from

Figure 1: NGFS members' jurisdiction jointly responsible for nearly half of global carbon emissions

Members of the Central Banks' and Supervisors' Network for Greening the Financial System (as of April 2019), by central bank jurisdiction, % of global carbon emissions



Source: Banque de France NGFS Secretariat, Global Carbon Atlas, OMFIF analysis
*These jurisdictions are represented on the NGFS by both the central bank and the supervisory authority
**These jurisdictions are represented on the NGFS by the supervisory authority only
***Three cross-border European institutions are members of the NGFS: the European Central Bank, the European Banking Authority, and the European Insurance and Occupational Pensions Authority

productive capital accumulation. This suggests that climate-related risks will be a source of financial risk. These therefore fall within the mandates of central banks and supervisors to ensure the financial system remains resilient. As Bank of Greece Governor Yannis Stournaras remarked, 'Financial stability without a sustainable growth model is simply inconceivable.'

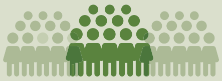
Reflecting these concerns, the NGFS is structured around three workstreams. The first, chaired by the People's Bank of China, centres on microprudential

Figure 2: Central bankers' speeches on sustainability in 2018-19*

Name	Position**	Institution	NGFS member?	Date
Sabine Lautenschläger	Member of the Executive Board	European Central Bank	Yes	17/04/2019
Frank Elderson	Executive Director of Supervision	De Nederlandsche Bank	Yes	17/04/2019
Sarah Breeden	Executive Director of International Banks Supervision	Bank of England	Yes	15/04/2019
Yannis Stournaras	Governor	Bank of Greece	Yes	03/04/2019
Guy Debelle	Deputy Governor	Reserve Bank of Australia	Yes	12/03/2019
Margarita Delgado	Deputy Governor	Banco de España	Yes	12/03/2019
Patrick Njoroge	Governor	Central Bank of Kenya	No	20/02/2019
Philip Lane	Governor	Central Bank of Ireland	Yes	05/02/2019
François Villeroy de Galhau	Governor	Banque de France	Yes	28/11/2018
Yves Mersch	Member of the Executive Board	European Central Bank	Yes	27/11/2018
Mark Carney	Governor	Bank of England	Yes	21/11/2018
Benoît Cœuré	Member of the Executive Board	European Central Bank	Yes	09/11/2018
Yannis Stournaras	Governor	Bank of Greece	Yes	01/10/2018
Frank Elderson	Executive Director of Supervision	De Nederlandsche Bank	Yes	04/09/2018
Veerathai Santiprabhob	Governor	Bank of Thailand	Yes	23/07/2018
Norman Chan	Chief Executive	Hong Kong Monetary Authority	No	14/06/2018
Olli Rehn	Deputy Governor	Bank of Finland	Yes	13/06/2018
Klaas Knot	President	De Nederlandsche Bank	Yes	06/04/2018
François Villeroy de Galhau	Governor	Banque de France	Yes	06/04/2018
Mark Carney	Governor	Bank of England	Yes	06/04/2018
Sarah Breeden	Executive Director of International Banks Supervision	Bank of England	Yes	19/03/2018

*Speeches between March 2018-April 2019 ** Applies to position at the time the speech was given, may not necessarily be current position

NGFS members' jurisdictions cover:



31%
of the global population
Source: United Nations, 2017

45%
of global greenhouse gas emissions
Source: Global Carbon Budget, 2017

2/3
Supervision of the global systemically important banks and insurers
Source: Financial Stability Board, 2018

44%
of the global GDP
Source: World Bank, 2017

↘ Central banks and climate change

> If we are to fulfil our mission of safeguarding monetary and financial stability, it is a strategic priority for us to address the challenges posed by climate change for the financial system.
>
> Philip Lane, Governor of the Central Bank of Ireland

Figure 3: Selected initiatives by international financial agencies linked to climate change

Actor	Initiative
G20	Sustainable Finance Working Groups
United Nations	Principles for Responsible Investment
Financial Stability Board	Task Force on Climate-Related Financial Disclosures
OECD	Green Finance and Investment Centre
World Bank	Sustainable Banking Network
EU	Action Plan on Sustainable Finance
Central Banks/ Supervisors	Network for Greening the Financial System
Supervisors/ Regulators	Sustainable Insurance Forum

Source: Various sources

supervision. It aims to identify best practice in analysing climate-related risks to individual institutions, including the disclosure of such risks. The second, chaired by the Bank of England (see Sarah Breeden and Andrew Hauser's contribution on p.41), focuses on quantifying climate-related risks at a macroeconomic level, including macro stress tests and scenario analyses. The third workstream, chaired by Germany's Bundesbank, addresses the role of central banks in scaling up green finance, including integrating environmental, social and governance criteria in their operational activities and management of official reserves.

While central banks have certainly shown the greatest momentum, they are not the only financial system players pursuing initiatives linked to climate change. The Financial Stability Board, OECD, UN, World Bank and European Union are also leading the charge with initiatives focused on disclosures, the development of green taxonomies, and principles for responsible investment (see Figure 3).

Climate risks to the economy

Climate-related risks translate to financial risks in at least three ways. First, through the manifestation of 'physical risks', such as the increased frequency of extreme weather events that may damage property and infrastructure and disrupt trade and economic activity. Gradual temperature changes could affect the value of assets. For the banking sector, these may be felt directly through the exposure of mortgage books to flood risk, or for globally active banks, through the impact of natural disasters on sovereign bond ratings and country risk.

Such costs are becoming visible as the frequency of natural disasters has increased dramatically. Around 850 natural loss events occurred in 2018 including floods, tropical cyclones, wildfires and earthquakes in the US, Japan and elsewhere, incurring a total cost of $160bn, according to MunichRE's NatCatService.

Second, there are liability risks for parties that have suffered losses from the effects of climate change and seek compensation from those they hold responsible. Weather-related insurance losses have increased almost five-fold to an average of around $50bn per annum so far this decade from an average of around $10bn per annum in the 1980s (see Figure 5). Meanwhile, the global insurance protection gap remains sizeable. The uncertainty associated with climate scenario analysis complicates the challenge of modelling implications for insurers' liabilities.

Households and businesses will be affected too, as they could face more expensive or more curtailed insurance policies. In 2016, the insurance industry launched the Sustainable Insurance Forum, a network of 23 insurance regulators sharing knowledge and best practice on how to consider climate risk in insurance supervision. De Nederlandsche Bank hosted in April 2018 the first ever International Climate Risk Conference for supervisors.

Third, there are transition risks as households, businesses and industry sectors face costs, valuation losses and disruptions from the adjustment to a low-carbon economy. These risks are longer-term and less visible, and have yet to materialise. As such, they may not carry a strong sense of urgency.

However, inaction will come at a high price. The more sudden and disorderly the transition, the greater the costs. Signatories to the Paris climate agreement have committed to reduce carbon emissions by 45% from 2010 levels over the next decade to reach net zero by 2050. Meanwhile, the EU has committed to a 40% reduction in emissions by 2030 compared with 1990 levels and to attaining carbon neutrality by 2050.

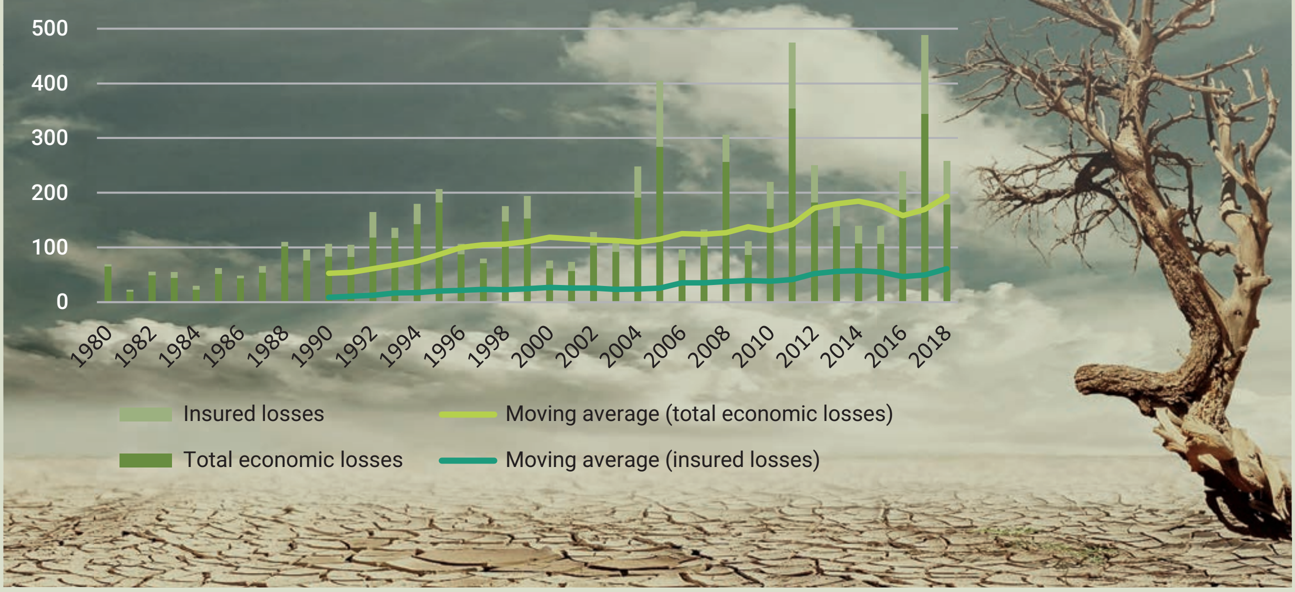
Governments are already taking action, by

Figure 4: NGFS recommendations, April 2019

Recommendation 1	Integrating climate-related risks into financial stability monitoring and micro-supervision
Recommendation 2	Integrating sustainability factors into own-portfolio management
Recommendation 3	Bridging data gaps
Recommendation 4	Building awareness and intellectual capacity and encouraging technical assistance and knowledge-sharing
Recommendation 5	Achieving robust and internationally consistent climate and environment-related disclosure
Recommendation 6	Supporting the development of a taxonomy of economic activities

Source: NGFS

Figure 5: Global weather-related losses show worrying upward trend
Overall and insured losses for natural loss events worldwide, $bn, annual and 10-year moving averages



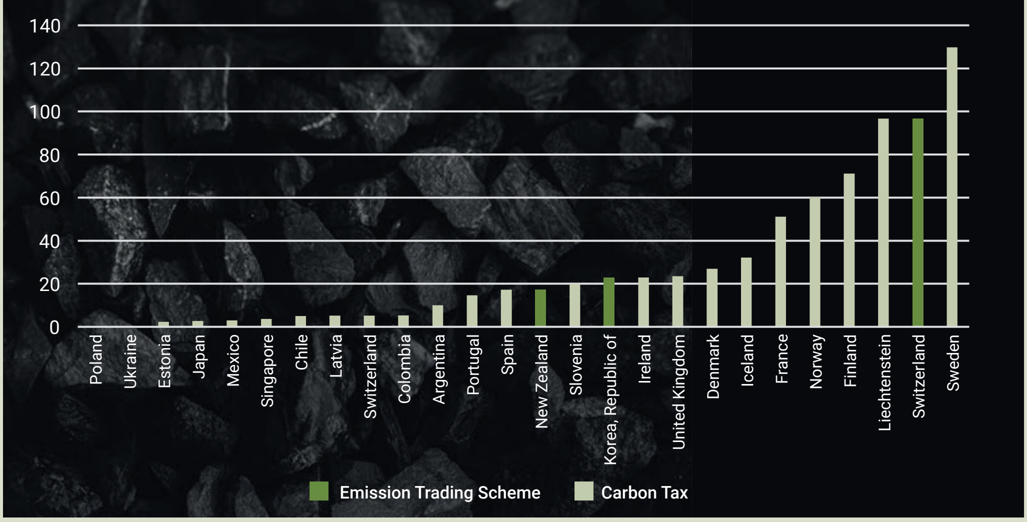
Source: MunichRe NatCatSERVICE database, OMFIF analysis

introducing carbon taxes and emissions trading schemes to help 'internalise the externality' of excessive carbon emissions. Carbon taxes are highest in Sweden, at close to $130 per tonne, with Norway and Finland also pricing carbon high at above $50 per tonne. This compares with taxes below $20 per tonne for non-European jurisdictions that have implemented carbon taxes or emissions trading schemes (see Figure 6).

As such initiatives take hold, their impact is not only felt in the atmosphere but also on financial markets. For example, the combined market capitalisation of the top four US coal producers has fallen by 95% since the end of 2010. A similar change has occurred in German utility firms hit by changes in domestic energy policies, including the phasing out of nuclear energy and the move to renewables.

Meeting the Paris targets will require a substantial

Figure 6: Carbon taxes highest in Nordics
Carbon price per tonne in jurisdictions with carbon taxes or emission trading schemes, $



Source: World Bank Carbon Pricing Dashboard, OMFIF analysis

> We invest in green because we see it as a driver of long-term value, in addition to wanting to do the right thing.
>
> Norman Chan, Chief Executive, Hong Kong Monetary Authority

↘ Central banks and climate change

> We should not be obliged to promote green finance by granting banks preferential capital treatment if this is not justified by the specific risks linked to green finance.
>
> Sabine Lautenschläger, member of the ECB executive board

reallocation of capital. Some of the transition will happen in existing firms and industries, and the rest through new firms and new industries unburdened by legacy assets and technologies. As remarked by Central Bank of Ireland Governor Philip Lane, 'The balance between these two forces will be crucial in determining the balance between debt and equity in financing the transition, since start-ups naturally require more equity finance than incumbent firms'.

Irrespective of the level of public subsidies directed at supporting new sectors and products, households will have to bear at least some of the costs of the transition, such as retrofitting homes to reduce energy consumption, or higher spending on transportation as the balance shifts from private cars to other types of transport.

While their individual impacts will be significant, the three types of risk (physical, liability and transition) are linked. A smoother and more predictable transition path would help minimise transition risks to financial stability. But a slower transition could increase the likelihood of physical and liability costs. Conversely, too rapid a transition, while necessary to limit the likelihood of physical and liability risk, may not be desirable either. As Bank of England Governor Mark Carney remarked, 'success is failure' in that scenario, as too rapid a movement towards a low-carbon economy could risk creating a 'climate Minsky moment' and materially damage financial stability. The analytical work to develop an understanding of the trade-offs and the desirable path forward is crucial.

Supervising climate risk

To address these risks, central banks and supervisors are recognising the need for micro- and macroprudential instruments. The ECB this year identified formally climate-related risks as one of the key threats facing the banking sector. Bank of Finland Governor Olli Rehn recognised that, 'Correct pricing and supervision of financial risks stemming from climate change and other environmental hazards are needed, both for sustainable economic development and a well-functioning financial system'.

The first step in supervising such risks is to understand their size and likelihood. Regulators recognise the need for identification and disclosure of exposures in the financial sector, what can be considered a 'snapshot' of risks. So far, 250 companies representing $6.5tn in market capitalisation and financial institutions (banks, insurers, asset managers) and responsible for $80tn of assets have committed to apply the recommendations on disclosures by the Task Force for Climate-Related Financial Disclosures.

At the same time, dynamic, forward-looking carbon stress tests, so-called 'videos of risks', are needed to ascertain the size of probable losses of financial institutions' portfolios, with firms setting out the resilience of their strategy in different climate-related scenarios.

But while there is broad agreement among regulators on the need to develop taxonomies, enable disclosures, and monitor risks through rigorous scenario analysis and stress testing, there is less harmony when it comes to views on how to address these through microprudential and macroprudential regulation.

The need for macroprudential regulation follows the recognition that losses from certain climate-related scenarios could lead to declines in the capital and solvency ratios tracked by prudential regulators. These stem from market risks and credit risks, as well as structural changes and uncertainty associated with climate change. The optimal allocation and risk management strategies in the design of equity and bond portfolios may have to be reassessed.

One way of correcting the misalignment between current regulation and the need to transition to a low-carbon economy would be to enhance governance frameworks such as Basel III to ensure they reflect climate-related financial risk concerns. This would involve strengthening capital and liquidity requirements such as the liquidity coverage ratio, the net stable funding ratio, the leverage ratio, and capital and countercyclical capital buffers. In addition, it would require bolstering the supervisory elements of Basel III by adding climate-related stress tests, and reinforcing risk disclosure and market discipline.

Reviewing macroprudential tools in more detail, these can be categorised in those relating to capital, lending limits, liquidity and reserves. The first could take the form of countercyclical capital buffers, sectoral leverage ratios, or capital adequacy ratios with 'green supporting factor' or 'brown penalising factor'. The People's Bank of China already deploys a GSF, used to incentivise the presence of green loans in banks' portfolios. However, European central bankers are sceptical, highlighting that 'green does not mean risk-free,' (François Villeroy de Galhau) and that 'such risks cannot be disregarded without jeopardising financial stability' (Olli Rehn). Substantial further evidence is needed to create a strong enough rationale for such policies.

Lending limits can take the form of maximum credit ceilings or minimum credit floors. In the case of liquidity, instruments range from liquidity coverage

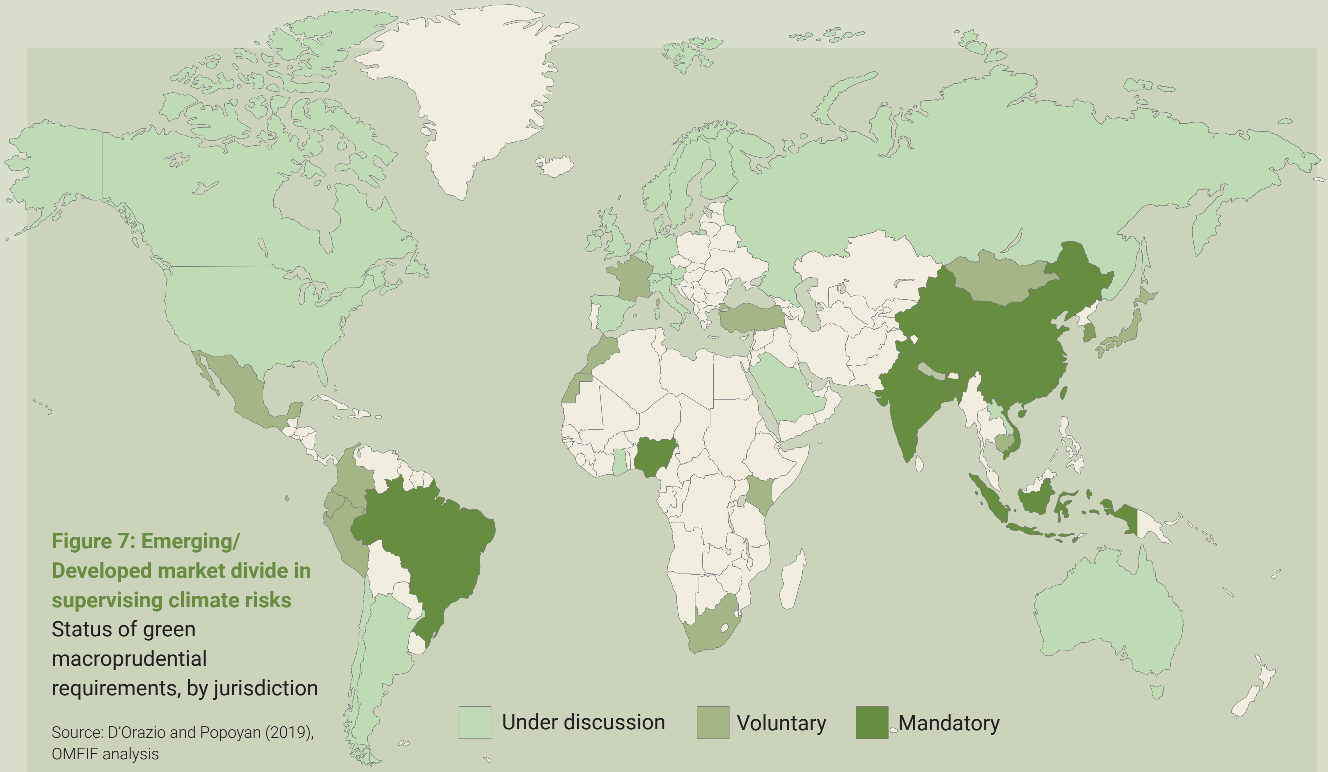


Figure 7: Emerging/ Developed market divide in supervising climate risks
Status of green macroprudential requirements, by jurisdiction

Source: D'Orazio and Popoyan (2019), OMFIF analysis

ratios to net stable funding ratios. Finally, there can be differentiated reserve requirements.

There is a great variety of green prudential instruments, but a clear divide between emerging and advanced economies. Lending limits are the most popular instrument, and are mandatory in Bangladesh, India, Nigeria, Brazil, Laos, Vietnam and Korea. They are and under discussion in Denmark, Ecuador, Japan and Kenya. Climate-related stress tests are obligatory only in China, and under consideration in France and the Netherlands. Risk disclosure and risk assessment are under discussion in Colombia, Indonesia, Pakistan, Peru, South Africa, Switzerland and Turkey (see Figure 7).

Climate change and monetary policy

While their mandates tend to focus on the medium-term inflation outlook, central banks consider routinely the policy implications of long-term events such as demographic and technological shifts and their effects on labour force participation and the broader macroeconomy. Climate change poses similar challenges in terms of the uncertainty associated with its repercussions on monetary policy, but it displays a distinctive set of characteristics that sets it apart from other types of shifts.

First, it is far-reaching in breadth and scope, affecting all agents across different geographies and sections of the economy. Second, climate risks are foreseeable. While there is a high degree of uncertainty regarding their nature, this is no excuse for inaction. It is clear that some combination of physical and transition risk will materialise eventually. As ECB Executive Board Member Sabine Lautenschläger remarked, 'Climate change will not adapt to our research schedules'. Third, climate change is effectively irreversible; there is no technology available to undo the concentration of greenhouse gas emissions in the atmosphere. And, finally, shifts related to climate change are distinctive in that they are endogenous. Their future magnitude and likelihood depend on the actions of today. As Villeroy de Galhau remarked in April 2018, 'It is delusional to think that when risks become perceptible, everyone will be able to cut their exposures at the same time and in an orderly fashion.'

With regard to monetary policy, the impact of climate change will be felt most directly through the physical risk channel. The increase in the frequency and severity of weather shocks is likely to raise the volatility of inflation, sectoral relative price levels, and output.

When met with such negative supply-side shocks, central banks will generally face a trade-off forcing them to prioritise stable prices over output. Left unchecked, climate change can complicate further the identification of shocks relevant for the medium-term inflation outlook and make the occurrence of such trade-offs more frequent. Moreover, climate change will probably spark structural shifts that will

> "While the effects and risks of climate change are relevant factors for the Federal Reserve to consider, it is not in a position to use monetary policy actively to foster a transition to a low-carbon economy.
>
> Glenn Rudebusch, executive vice-president of the economic research department at the Federal Reserve Bank of San Francisco

Central banks and climate change

Green quantitative easing

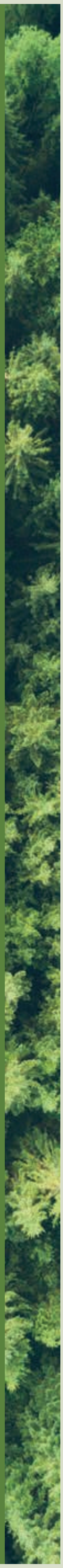
Central bankers are hesitant to integrate climate considerations into their unconventional monetary operations. Their growing interest in the climate change agenda has encouraged calls for 'green quantitative easing'. This would involve suspending asset purchases in high-carbon sectors and instead favouring bonds which fund green projects. But central bankers have expressed concern over how such a practice could undermine the instruments' effectiveness.

At the same time, the NGFS acknowledged in its first progress report in October 2018 that 'climate- or environmental-related criteria are not yet sufficiently accounted for in internal credit assessments or in the models of credit agencies' which many central banks rely on for their operations. Olli Rehn, then-deputy governor of the Bank of Finland, remarked in June 2018 that 'Sustainability considerations should be better reflected in the key tools for decision-making by market actors and policy-makers, such as benchmarks and credit ratings.' This reveals an uncomfortable contradiction for central banks like the ECB which, as a member of the NGFS, is seen as admitting that risk is accounted for improperly in the current ratings system while at the same time using that system to decide which assets to buy in its asset purchase programme.

> "The asset purchasing programme is a tool for macroeconomic stabilisation, not microeconomic reallocation.
>
> Yves Mersch, Member of the ECB Executive Board

Still, while there is no explicit environmental target in the ECB's APP, the bank has purchased green bonds both under the corporate sector and public sector purchase programmes. It holds around a quarter of eligible publicly-issued green bonds and around a fifth of private sector green bonds, in line with the share of holdings across the totality of its programme-eligible bonds.

Other central banks may be simply prohibited from even considering green QE as an option. According to Glenn Rudebusch, executive vice-president at the economic research department of the Federal Reserve Bank of San Francisco, 'Green quantitative easing is an option for some central banks but not for the Fed, which by law can only purchase government or government agency debt'. While sovereign green bonds have been issued, these represent a very small asset category.



impact the underlying path of potential output – a crucial variable for monetary policy-making.

Through the transition risk channel, the economic transformation required to address the climate change challenge will involve a shift in relative prices, especially in energy prices. This could risk destabilising medium-term inflation expectations. Such changes should not only be considered as part of the long-term horizon framework. Prices, equities and long-term financial asset valuations will also depend on expected future conditions, so even climate risks decades away can have near-term financial consequences.

Central banks have been reluctant to acknowledge the link between climate change and monetary policy. The April 2019 NGFS comprehensive report only went as far as stating that the Network 'considers exploring the interaction between climate change and central banks' mandates (beyond financial stability) and the effects of climate-related risks on the monetary policy frameworks, paying due regard to their respective legal mandates.' Among NGFS members, only one central bank, the People's Bank of China, has a dedicated policy to promote green finance via monetary policy. François Villeroy de Galhau, one of the central bankers leading this agenda, remarked that 'Monetary policy has to remain neutral to ensure proper functioning through its transmission channels; it cannot be targeted towards achieving specific social or sectoral impacts'.

At a time when central bank independence is under attack over unconventional monetary policies, this scepticism may reflect unwillingness to take on an agenda that may be interpreted as political. In a speech on climate change and central banking in November 2018, Yves Mersch, executive board member at the ECB, warned that 'The bigger threat to price stability over the long run does not lie in relative price changes, but rather in a loss of independence by central banks following a situation in which they have ventured far into a political agenda with distributional consequences.'

Financing the climate transition

Tasked with safeguarding financial and price stability, central bankers tend to focus on the risks that climate change poses. But when it comes to reserves management, climate change presents investment opportunities for central banks and other global public investors.

According to the OECD, a $90tn investment is needed by 2030 to finance the green transition. This is to promote the development of technologies such as carbon capture and storage, and electricity generation from renewable sources. A separate study by the IPCC from October 2018 estimates that the world needs to spend $900bn annually until 2050 on energy-related mitigation investments to limit global warming to 1.5 degrees. The European

Commission estimates that €180bn are required over 2021-30. Should these figures not be met, the so-called 'climate debt', as referred to by Rehn, will accumulate. Public investment can address such needs. For example, the European Fund for Strategic Investments has a mandate to invest 40% of its €500bn capacity in green investments. Most of the adjustment costs, however, will fall on the private sector.

The green finance market has grown rapidly in the past decade. The European Investment Bank issued the world's first green bond in 2007. Since then, the global climate-aligned bonds market has swelled to $1.45tn in 2018, according to the Climate Bonds Initiative. Last year, around $168bn worth of green bonds were issued, compared with $162bn in 2017.

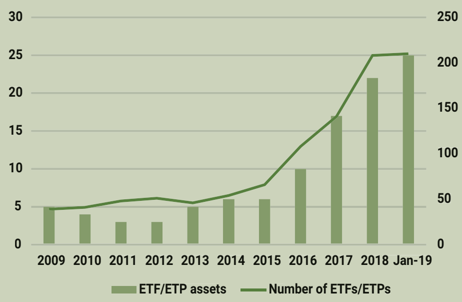
This market also includes sovereign green and blue bonds. Poland issued the first sovereign green bond in 2016, followed by France, Fiji and Nigeria in 2017. Belgium, Indonesia, Lithuania and Ireland followed in 2018. That year, the Seychelles launched the world's first sovereign blue bond, a pioneering financial instrument designed to support sustainable marine and fisheries projects.

However, green bonds represent a miniscule share of the overall fixed income market, accounting for less than 2% of global debt issuance. This suggests that green bonds need to be scaled by a factor of at least 10 to provide the required investment in renewable energy, energy efficiency and low-emission vehicles. Moreover, sources of finance must be extended beyond green bonds to products such as green loans, securitisation, covered bonds, derivatives, crowdfunding platforms and private equity. The success of the climate transition depends on it.

Investors, including GPIs, are moving to sustainable exchange-traded funds and exchange-traded products. These are reaching record levels

Figure 8: Assets invested in ESG ETFs and ETPs at record high

ESG ETFs and ETPs (RHS) and assets, $bn (LHS)



Source: ETFGI, OMFIF analysis

having grown six-fold to 210 in 2019 from just 39 in 2009. Assets invested in these funds and platforms have reached a record level of $25bn from around $5bn in 2009 (see Figure 8).

However, policy-makers and the financial sector are also becoming aware increasingly of the trade-offs between the rapid expansion in the sector, and the need to maintain rigorous standards and avoid so-called 'greenwashing'. Patrick Njoroge, governor of the Central Bank of Kenya, speaking on the role of the Nairobi Stock Exchange as a green finance hub, warned, 'We cannot accept, or afford, to give cover to those who only wish to burnish their greenwashing credentials'.

Greening reserve portfolios

Central banks are attempting to act on their climate rhetoric by integrating sustainability criteria into their operations and portfolio management, with the euro area leading the charge. For example, the Central Bank of Ireland designed its new headquarters to be energy efficient. The bank's governor, Philip Lane, has called on the central banking community to make greater use of communications technologies to cut down on travel to international meetings.

Meanwhile, the Banque de France in March 2018 adopted a responsible investment charter to 'improve the contribution of own funds and pensions portfolios to the environmental transition.' In April 2019, it announced to plans to disclose the climate-risk exposures of its funds and pension portfolios, the first central bank to do so. The ECB has worked to foster sustainable investment in its non-monetary policy portfolios including its pension fund, which has delegated proxy voting for equity investment to managers that have signed up to the principles for responsible investment.

In addition to pension portfolios, as long-term investors, central banks have an important role to play in the development of green finance through their investment portfolios and reserve allocation. Norman Chan, chief executive of the Hong Kong Monetary Authority, speaking at the 2018 green and social bond principles annual conference, said, 'As a long-term investor, HKMA considers risk and return over a long horizon. We believe looking at an investment proposal through the ESG lens would complement our normal risk-return analysis, and help unveil the long-term value and risk of an investment'.

The Central Bank of Ireland also takes ESG criteria into account when managing its portfolio. The equities component of its portfolio is managed in line with the PRI as well as with the World Health Organisation's framework convention

> "The transition path poses challenges, but also opportunities. Particular industries and communities are exposed to the costs of changes in the climate while others may benefit from that transition. But it may not be possible for the winners to compensate the losers in a way that leaves no one worse off.
>
> Guy Debelle, Deputy Governor of the Reserve Bank of Australia

↘ Central banks and climate change

on tobacco control. It is preparing an ESG policy for its bond portfolio, which already includes 10 green bonds valued at €221m. In January 2019, De Nederlandsche Bank signed the UN PRI and adopted a responsible investment charter. Suomen Pankki - Finlands Bank has also applied responsible investment standards to its portfolio management.

However, not all central bank reserves management practices match the climate agenda's strong momentum. Less than half of central banks responding to the 2019 OMFIF GPI survey reported they were investing part of their reserves in green or sustainable assets. This compares with almost all pension funds and sovereign funds we surveyed.

Often, central banks are more constrained than other types of GPIs in terms of what asset classes they are eligible to purchase. Several central banks also cited lack of supply, remarking that 'in our investment universe there is a limited supply of green bonds.' Others referred to the inability of sustainable assets to meet their liquidity and maturity thresholds. One central bank stated that 'very long durations of green bonds are problematic when our bond duration is very short.'

Conservatism and difficulty convincing internal stakeholders were also mentioned as barriers to investing in sustainable assets. Nevertheless, one central bank remarked that 'current mandates and available assets in which to invest restrict opportunities… but we are seeking to change our mandates to open up the green investment universe.'

Among central banks in our sample which do not currently invest in green or sustainable assets, a third are prevented by their mandate from doing so. A further third highlighted wider issues with sustainability criteria and lack of data, and with the transparency and accountability of company data.

ESG criteria are gaining importance when it comes to outsourcing portfolios to external managers. Most pension and sovereign funds consider ESG criteria as 'important' or 'very important' with regards to guidelines to external managers, compared with just a quarter for central banks. This can take the form of divestments as well as active investments in green assets, as explored in the special report on sustainable investment in last year's Global Public Investor.

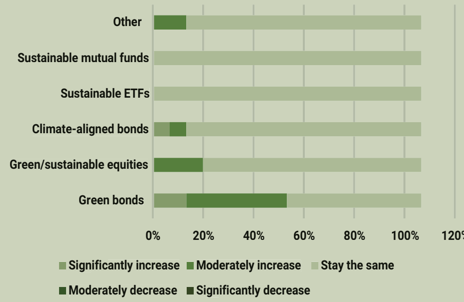
The world's largest sovereign fund (and fourth-largest GPI in our ranking), Norway's $1tn Norges Bank Investment Management, this year decided to sell some of its holdings in energy companies that explore for and produce oil and gas. This entailed the exclusion of 150 oil and gas exploration companies, worth €7.5bn. However, the fund opted to retain stakes in fossil fuel companies involved in renewable energy, such as Shell and BP. This highlights the nuances behind the simplistic green/brown distinction. Investments in the brown sector may be more effective in facilitating the transition due to the scope of the benefits of switching.

When investing in green assets, green bonds are the dominant instrument for GPIs. They were chosen by 79% of those surveyed who invested in green assets. Within the same sample, 11% purchased climate-aligned bonds and 42% invested in green equities. Still, these allocations represent a small share of GPIs' overall portfolios, with green equities representing around 37% of all equity investments and green bonds representing around 16% of all bonds.

Looking ahead, around 60% of GPIs surveyed by OMFIF stated that they plan to 'increase' or 'significantly increase' their green investments. Green bonds were the most popular option, with 53% of respondents planning to 'increase' or 'significantly increase' their exposure to the asset class, compared with 13% for climate-aligned bonds and 20% for green and sustainable equities (see Figure 9).

Figure 9: Green bonds continue to dominate sustainable asset market

How do you plan to change your allocation to the following assets in the next 12-24 months? % of responses by asset type



Source: OMFIF GPI Survey 2019

> “The systematic oversubscription of green bonds at issuance shows there is a lack of green financial products.
>
> François Villeroy de Galhau, Governor, Banque de France

Limits of central banks

Central banks are serious about climate change. They are making commendable strides to adapt regulation and supervision practices to guard against risks and facilitate the transition to a low-carbon economy. But these initiatives are not enough, nor can they be a substitute for an ambitious climate agenda led by governments, businesses and individuals. Many players acting together will be essential for the future. ✦

Danae Kyriakopoulou is Chief Economist and Director of Research at OMFIF.

Key sustainable investment developments involving public institutions in 2018-19

Institution	Description	Date
Network of Central Banks and Supervisors for Greening the Financial System	The NGFS, which was set up in December 2017 by the Banque de France with eight members, published its first comprehensive report in April 2019, building on its first progress report from October. As of April it has 36 members.	April 2019
Norges Bank Investment Management	Norway's sovereign fund excluded 150 oil and gas exploration and production companies, worth €7.5bn, from its $1.1tn portfolio. However, the Fund said it would retain stakes in fossil fuel companies involved in renewable energy.	March 2019
Dutch National Bank	The DNB became the first central bank to sign the United Nations' principles for responsible investment. It launched a responsible investment charter, and committed to incorporating six ESG criteria in its investment practices.	March 2019
Första AP-fonden	Swedish pension fund AP1 divested from nuclear weapons, tobacco, coal and oil sands industries following the introduction of new investment guidelines.	January 2019
ABP	Europe's largest pension fund, Dutch ABP, completed its divestment of €4bn in nuclear arms manufacturers and tobacco producers in 2018, making a 20% (€700m) profit.	January 2019
European Bank for Reconstruction and Development	The EBRD approved plans for a €250m direct investment framework for green and sustainability bonds targeted at financial institutions.	December 2018
Republic of Seychelles	Seychelles launched the world's first sovereign blue bond, a pioneering financial instrument designed to support sustainable marine and fisheries projects.	October 2018
National Treasure Management Agency	Ireland's NTMA issued the country's first sovereign green bond, a 12-year bond raising €3bn.	October 2018
UK pension funds	The UK Department for Work and Pensions introduced new regulations for pension funds, to come into effect in October 2019. These require trustees to disclose how much they take into account ESG factors when making investment decisions.	September 2018
World Bank Group, European Investment Bank, Amundi and others	The Global Green Bond Partnership was set up to support efforts by sub-national entities such as cities, regions, private companies and financial institutions to accelerate the issuance of green bonds.	September 2018
United Nations	The UN Environment Programme Finance Initiative set up the tobacco-free finance pledge to encourage divestments from tobacco. Those who have signed up to the pledge include Sweden's AP4 and the Ontario Teachers' Pension Plan.	September 2018
European Investment Bank	The EIB raised €500m from a 7.5-year sustainability awareness bond whose proceeds will be used to finance investments in clean water supply, sanitation and flood protection.	September 2018
Government Pension Investment Fund	Japan's $1.4tn pension fund – the world's largest – selected two of its carbon-friendly indices as the benchmark for its ESG strategy: the S&P Global Ex-Japan LargeMidCap Carbon Efficient Index and the S&P/JPX Carbon Efficient Index.	September 2018
California pension funds	The US senate passed Bill No.964 requiring Calpers and Calstrs to report publicly on the climate-related financial risk of their public market portfolio from 2020.	August 2018
European Commission	The technical expert group on sustainable finance started developing a green taxonomy, EU green bond standards and benchmarks for low-carbon investment strategies.	July 2018
Republic of Lithuania	Lithuania became the seventh country to issue a sovereign green bond, raising €68m with a 10-year deal. Proceeds are aimed at improving energy efficiency in residential properties.	June 2018

✧ ESG investment

Advancing ESG standards in China

China's asset management industry is proliferating, and institutional investors will be critical to the sustainable development of the country's financial sector and the uptake of environmental, social and governance standards.

Wallace Yu
China Investment Corporation

“Although China has not enacted any specific legislation on responsible investment, a consensus around the benefits of such investment has gradually arisen in the finance sector.

In China, incorporating environmental, social and governance standards in investment decisions is reaching new heights.

Both domestic and international capital markets will continue to play an essential role in financing China's green transition and growth. To achieve the goals of its 13th five-year plan, China will need at least Rmb3tn-Rmb4tn (more than 4% of GDP) of green investment per annum between 2015-20. Of these funds, at least 85% will come from the private sector.

China's asset management industry is proliferating. Asset owners, especially large institutional investors, will be critical to the sustainable development of the country's financial sector.

Asset owners' investment practices can signal to the broader industry the value of green and sustainable capital development. Persuading such large investors to incorporate ESG criteria in their investment decisions will have a positive impact on the asset management industry as a whole.

Although China has not enacted any specific legislation on responsible investment, a consensus around the benefits of such investment has gradually arisen in the finance sector. Several studies examining the correlation between ESG considerations and financial performance confirm this. The Shanghai and Shenzhen stock markets have established a new benchmark, dubbed the 'CSI 300 Green Leading Stock Index'. Promoting the inclusion of ESG standards in investment decisions in China is both a top-down guiding and regulatory process, as well as a bottom-up one that can demonstrate the economic benefits of sustainable development.

Policy recommendations

There are several ways in which the uptake of ESG standards by Chinese investors can be encouraged more broadly and deeply. Guiding principles can be issued to explain to institutional investors and their investment managers how best to implement a green financial system. Industry associations, such as the Asset Management Association of China and Insurance Asset Management Association of China could issue sustainable investment standards to steer member institutions to contribute to the development of Chinese green finance.

A unique ESG steward code for pension funds can be established to encourage invested companies to abide by and to disclose their ESG practices and performance. Pensions represent the long-term interests of the people as well as the long-term interests of many large institutional investors. Relevant government regulators and agencies issue rules requiring pension and investment managers to incorporate ESG standards systematically and explicitly in their decision-making and communication methods.

Regulators can ensure and monitor the effectiveness of companies' mandatory environmental disclosure frameworks, with an aim to align these with international ESG standards. The stock market supervisor, for example, can continuously enhance their requirements to promote information disclosure on ESG issues, such as by incorporating ESG factors into the framework of companies' annual reports and proposing a unified financial evaluation system.

The supply of green and sustainable investment products must expand so as to meet market demand. With the help of the China's aforementioned asset management and insurance asset management associations, capital market participants should develop more green investment product options for institutional investors, with a focus on long-term sustainable goals.

Supporting investor education and ESG research is essential to promote sustainable investment and operational capabilities. The two associations mentioned above can help investor training and provide support for the industry in developing vocational education, analytical tools and training. Implementing these types of proposals will greatly benefit China's financial sector, as well as set a worthy example for other large economies the world over.✦

Wallace Yu is Portfolio Manager at China Investment Corporation, Committee Member of Beijing Youth Federation, Committee Member of Hong Kong Financial Services Development Council, and AsiaGlobal Fellow at the University of Hong Kong.

✧ ESG investment

Climate issue requires more risk-taking

Private investors tend to lack the expertise and risk appetite to invest in renewable energy, but governments have a key role to play in introducing innovative risk mitigation instruments that can help address this

Paul Curnow
Baker McKenzie

“Between 2013-16, institutional and private equity investors contributed less than 1% each to global renewable energy investment.

The share of renewables in primary energy supply must increase to 65% in 2050 from 15% in 2015 in order to limit the rise in global mean temperature to below two degrees Celsius, in line with the Paris climate agreement. This transition to clean energy will require investment of $25tn in renewables, which necessitates tripling the current annual investment in these energy sources.

Institutional investors are already scaling up their investments in renewables to diversify their portfolios from volatile financial markets. Doing so also fulfils sustainability and corporate social responsibility goals in response to pressure from end-investors. A survey conducted by the Octopus group, a fast-growing UK fund management business, found that investors are predominantly satisfied with the performance of their renewable energy investments, and allocations to renewable energy are likely to almost double over the next five years to 7.1% from 4.4%, representing $210bn.

Not surprisingly, mergers and acquisitions and initial public offerings in the renewables sector are expected to increase. José Morán, chair of Baker McKenzie's global energy, mining and infrastructure group, explains, 'As the world's energy mix transitions to electricity, electric vehicles and batteries proliferate, and sustainability becomes an increasingly critical focus, more energy companies will invest in renewables.' Despite these trends, institutional and private equity investors contributed less than 1% each to global renewable energy investment between 2013-16. It peaked in 2015 at $3bn for institutional investors and $2bn for private equity investors.

Barriers to investment

While certain innovations are making renewable energy more affordable than many traditional energy sources, more needs to be done to improve the risk profile for institutional investors.

A key barrier to investment is uncertainty in energy prices. Government subsidies often boost revenue for investors. However, these may not be locked in for the life of the asset. There is a policy risk that subsidies and other incentive programmes may be phased out as the price of renewable energy generation falls. A further risk to stable revenue flows is the potential for limitations in transmission infrastructure or in grids' capacity for renewable energy.

Unless projects are of sufficient scale, investors may consider transaction costs too high to justify parting with their capital. These barriers to investment are often compounded by a lack of in-house resources and experience in the renewable energy sector. Renewable energy projects may also be subject to more general problems including liquidity issues, risks in securing refinancing and volatile foreign exchange rates where financing and revenue originates in different currencies.

But the market is starting to respond with innovative solutions to improve the risk profile of investing in renewable energy. To meet investor demands for long-term contracts that provide some guarantee as to stable revenue, mechanisms such as green bonds and corporate power purchase agreements are being used to bridge the revenue gap. Corporate PPAs, between a generator and the end corporate customer, can be viewed as an electricity pricing 'control tool' or 'green hedge'. These offer the opportunity to manage long-term pricing risk by securing a longer-term supply or hedge arrangement.

Public climate finance from multilateral and bilateral sources is starting to step in to mitigate the early-stage project development risk and bridge the pricing gap to attract private sector investment. Governments, and public money more generally, have a key role to play in introducing innovative risk mitigation instruments – across sovereign, currency, pricing and project risks – that can help scale-up private sector investment. However, the extent of the climate challenge requires much faster-paced innovation. Public investors should take more risk in testing new mechanisms that can encourage more institutional investors to finance clean energy. ✦

Paul Curnow is Partner and Co-Head of the Global Renewable Energy Industry Group at Baker McKenzie.

✧ ESG investment

Green bonds in emerging economies

Development banks must help fund and draw attention to countries' efforts on environmental, social and governance projects.

Rafael del Villar
Banco de México

> The trend towards ESG analysis in emerging market debt is supported by a rapid increase in the quantity and quality of information available.

To keep climate risks in check, mitigating global greenhouse gas emissions is essential. There is an urgent need for change in the energy, transport and agriculture sectors, as mitigation in other sectors is more difficult and likely to take more time. Advances in electricity generation have enhanced the competitiveness of renewable energy technologies, even compared to the cheapest traditional technologies.

In the last 10 years, the cost of electricity generated by photovoltaic cells has decreased by around 90%, and continues to drop. Producing renewable electricity makes economic sense in many countries. The cost of storing electricity has also fallen dramatically. In a few years, this could transform urban transportation and improve significantly cities' air quality and overall quality of life. In agriculture, silvopastoral farming – which combines agriculture and grazing with wood production – is being recognised increasingly as beneficial for both the environment and farmers. Implementing these changes requires large investments, but the underlying fundamentals are in place.

Financial institutions must account adequately for the transition risks in different economic activities and ensure that financial products are tailored to different projects. In this regard, it is helpful to establish frameworks that facilitate coordination among authorities and stakeholders. Several countries, such as China, the Netherlands and the UK, already have dedicated task forces. In emerging countries, such task forces could be made more efficient through the participation of multilaterals.

Some projects are short-term and require loans over just one to six years. This demand can be met by commercial banks. But many projects, such as clean energy, wastewater treatment or solid waste management, are long-term. Repayment is spread out generally over 20 years. In emerging countries like Mexico, development banks need to step in and provide loans. They can draw attention to debtors' capacities in the environmental, social and governance sector, in order for a market to develop for green bonds issued by municipalities or local governments.

ESG in emerging markets

Innovations by institutional investors, banks and multilaterals have the potential to redirect the allocation of capital towards green projects. There is growing recognition of international initiatives that are promoting actively the disclosure of ESG- and climate-related information. These include the United Nations' principles for responsible investment, the Task Force on Climate-Related Financial Disclosures, and Climate Action 100+.

JP Morgan asserts that 98% of the issuers of bond indices in emerging markets have ESG data. However, they are incomplete and sometimes not comparable. The trend towards ESG analysis in emerging market debt is supported by a rapid increase in the quantity and quality of information available. Advances in big data and artificial intelligence can facilitate both the collection and analysis of this information.

Indices that reward strong ESG fixed-income performers (such as Blackrock) or low carbon emitters (such as Amundi) are powerful tools to promote efficient green and sustainable projects. Individual investors will not support environmentally friendly activities if this means sacrificing returns. The cost of being left out of an increasingly important ESG index is thus borne entirely by emerging market investors – a robust incentive to improve their ESG rating. ✦

Rafael del Villar is Chief Adviser to the Governor at the Banco de México.

✧ ESG investment

Hong Kong as a green finance hub

As China embraces the green economy as a pillar of its development strategy, Hong Kong is going from strength to strength in promoting its capital markets as a green finance hub for sustainable development.

James Lau
Government of the Hong Kong Special Administrative Region

"A major initiative in our multi-pronged approach is the establishment of a government green bond programme with a borrowing ceiling of Hkd100bn.

As an international financial centre, Hong Kong may be better known for its top ranking globally for funds raised through initial public offerings for six of the past 10 years. It is also the largest offshore renminbi centre and the premier asset and wealth management centre in Asia. Among the top 100 banks in the world, nearly 80 operate in Hong Kong. Thirteen of the world's top 20 insurers are present in the territory. As China champions sustainable development, Hong Kong is building on its traditional strengths and fast gaining momentum as a hub for green finance.In 2017, China was the biggest investor in renewable energy globally, representing more than 45% of total investments. The country accounts for around 60% of global solar cell production, and is number one in the world in terms of both the growth rate and existing stock of electric vehicles.

China has also emerged as a leader in green finance. Under its G20 presidency in 2016, it launched the G20 green finance study group, co-chaired by the People's Bank of China and the Bank of England. The G20 leaders' meeting in Hangzhou in September 2016 recognised for the first time the importance of green finance. This played a critical role in bringing this concept into the mainstream.

Chinese banks have developed more than 50 green credit products, financing energy efficiency, emission reductions and new energy projects. Thirty provinces have initiated pilot programmes for mandatory pollution liability insurance. The goal is to address environmental degradation by internalising the cost of pollution and climate-related risks.

China is a popular destination for investments in the manufacturing, innovation and deployment of renewable energy technologies. Hong Kong is a centre for private investments in these projects and has also played host to the initial public offerings of Chinese companies in the sector.

Green bonds spell opportunity

The development of green bonds in particular holds much promise in China and spells opportunity for Hong Kong. In 2017, China's green bond issuance that aligned with international green bond definitions totalled around $23.5bn. The corresponding figure for 2018 was $31.2bn, around 18% of the global market and second only to the US. The Hong Kong government envisions a new role for Hong Kong as a regional hub for green finance. A major initiative in our multipronged approach is the establishment of a government green bond programme with a borrowing ceiling of Hkd100bn ($12.8bn). It will finance projects with environmental benefits under Hong Kong's public works programme. This will encourage more issuers to arrange financing for their green projects and grow the local green investor base.

The Hong Kong Quality Assurance Agency has launched a green finance certification scheme for bonds in line with global best practices. On top of this, the government has launched a green bond grant scheme and pilot bond grant scheme that provide subsidies to attract more bond issuance in Hong Kong.

In 2018, around $11bn worth of green bonds was issued in Hong Kong. Issuers included entities from Hong Kong (17%), mainland China (64%) and abroad, as well as multilateral development banks (15%), such as the World Bank, Asian Development Bank and European Investment Bank. According to the Climate Bonds Initiative, the Hong Kong Exchanges and Clearing Limited was ranked first in Asia in the green bond trading venue league table in 2018. This attests to the strengths of our financial platform and the growing prominence of Hong Kong as a centre for green finance, not only for China but also for the rest of Asia and the world.

Concerted policy initiatives to move towards a sustainable economy will remain a global trend. As China embraces the green economy as a pillar of its development strategy, Hong Kong is going from strength to strength in promoting its capital markets as a green finance hub for sustainable development. We are confident that this momentum will continue and multiply, helping to make our world greener. ✦

James Lau is Secretary for Financial Services and the Treasury of the Hong Kong Special Administrative Region Government.

✧ ESG investment

Green bonds setting investment records

The global fixed income market has significant potential for facilitating the transition to a sustainable future, with the green bond market expected to grow at least 20% by end-2019.

Frank Scheidig
DZ BANK

> Green bonds are one of the most promising investment vehicles to support the transition to a sustainable future, and could help to close the sustainable financing gap.

The global fixed income market plays a key role in the sustainable development of the world economy and society at large. With an estimated volume of more than $100tn, this market bears significant potential for facilitating the transition to a sustainable future. Green bonds are one of the most promising investment vehicles to support this, and could help to close the sustainable financing gap.

In 2007, the European Investment Bank opened a new market with its climate awareness bond. Since then, the green bond market has grown considerably. In November 2017, the new issuance volume surpassed $100bn for the first time. In 2018, green bond volumes broke through the $100bn mark two months earlier than the previous year, reaching $167.3bn by end-December. DZ BANK's head of sustainable bonds and finance predicts the market will grow by at least 20% by the end of 2019, exceeding $200bn in value.

The young global green bond market bears significant potential for innovation. One example is the eppf (standing for 'european primary placement facility'), a fintech industry platform for bond issuance. It reduces complexity and costs in a novel way. Fixed income is the last bastion of slow and manual processes, and a patchwork of partial solutions. Costs are multiplied and efficiency eroded. Companies, banks and investors rent most of their equipment, from cars to cloud platforms. With eppf, they can also rent the full value chain for fixed income capital markets services.

Green bonds are not yet considered a separate asset class; there is no legislation pertaining specifically to them or the use of their proceeds. This legal vacuum has been filled by a series of principles from non-governmental organisations and industry groups. However, these are not legally binding. Applying the bond proceeds towards green projects is not a contractual obligation, and neither is reporting commitments. Underwriters, generally, do not carry out 'green' due diligence, and therefore risk being liable for mis-selling. Investors cannot prevent the bond from being greenwashed or becoming 'brown' after issuance. When issuing green bonds through eppf, it is a contractual obligation for proceeds to be spent on climate projects.

Green compliance

The eppf innovation represents an independent platform, and as such provides independent verification. Transparency is mandatory and a legal covenant. Green covenants are entered into only between eppf and the borrower. The platform has a duty to monitor these covenants and will carry out green compliance tasks. Borrowers will need to comply fully with green covenants, and eppf has the power to default the bond if they are not met. Borrowers and underwriters are therefore not at risk of mis-selling. Borrowers are better protected from greenwashing accusations.

The eppf platform provides access to a centralised data hub. As a neutral party, it will review communications to investors and make regular external reviews compulsory. The use of proceeds is ring-fenced automatically in a separate compartment. Tracking and review mechanisms are requirements. eppf works with recognised green and social metric providers and auditors. Transparency is the cornerstone of the market's development, particularly as it becomes more diverse and hence more complex.

We believe the current trend is 'green goes rainbow', as issuers go beyond the pure environmental perspective. Varieties of social and governance bonds are gaining popularity.

According to the Climate Bonds Initiative, there was a significant rise in the issuance of sustainability, SDG and social bonds in 2018, underscoring increasing label diversification. Preliminary statistics from the CBI show the overall sustainable bond market grew by 13% between 2017-18, to $226.1bn from $199.3bn.

Our head of sustainable bonds and finance expects global issuance of sustainable bonds to grow by around one-third, exceeding $300bn in 2019. Representing a share of around two-thirds of issuance, the green bond market is likely to continue setting records. ✦

Frank Scheidig is Global Head of Senior Executive Banking at DZ BANK.

✧ ESG investment

Blue bonds next investment frontier

Increasing pollution, warming and acidification threaten oceans' ability to provide precious resources and ecosystem services. Systemic change is required to maintain ocean-related livelihoods.

Ingrid van Wees
Asian Development Bank

" Blue bonds may hold the key for improving ocean health by accelerating investments and facilitating vital partnerships between governments, businesses and maritime ecosystems.

Blue bonds may hold the key for improving ocean health by accelerating investments and facilitating vital partnerships between governments, businesses and maritime ecosystems.

Oceans account for 80% of the planet's biodiversity, generate 70% of the world's oxygen, and are the planet's largest carbon sink. They absorb more than 20% of carbon produced and up to 93% of excess heat from global warming. Clouds from the oceans' evaporation supply fresh water to our flora and fauna. There is no green without blue.

Analysts increasingly recognise how indispensable healthy marine ecosystems are for the food security and livelihoods of billions. In the coming decade, sustainable marine energy, marine biotechnology, coastal tourism, transport and food production could offer unprecedented development and investment opportunities.

Increasing pollution from human activity, as well as ocean warming and acidification as a result of climate change, threaten oceans' ability to provide precious resources and ecosystem services. In the past 50 years we have lost half our coral reefs and mangrove forests, almost halved the size of marine populations, and quadrupled the size of ocean dead zones. By 2050, we could lose 90% of coral reefs and have more plastic in the ocean than fish.

The Asian Development Bank estimates that $1.7tn is needed each year for infrastructure development and climate change mitigation in the Asia Pacific region. In addition, the Convention on Biological Diversity suggests that actions to sustain the oceans require a one-time investment of $32bn and further annual investment of $21bn. However, such large investments cannot be met by increased government and donor budgets alone. Private sector finance must be unlocked, supported and leveraged through various financial products.

Raising awareness

Blue bonds are the new frontier. With green bonds entering the economic mainstream, the blue bond market is next in line to finance ocean health-related investments. Thematic bonds allow issuers to broaden their investor base and reach the retail segment, as well as raise awareness and serve as a communication tool between issuers and investors, corporate issuers and consumers to show their responsibility for their products' complete value chain.

Significant differences between green and blue investments call for innovative finance mechanisms to support blue bond issues. Economic returns from reducing marine plastic-pollution, marine ecosystems rehabilitation and sustainable fisheries tend to be lower than, for instance, renewable energy, and positive impacts on fish stock and marine life regeneration will take time to materialise. Some returns may mainly benefit future generations, while others benefit the global community and cannot be captured exclusively by current investors. Like some green investments, the extent might not yet be fully understood, given the complexity of marine ecosystems.

Given these particular investment characteristics, a plain-vanilla bond structure would not be suitable. The development of an appropriate bond structure depends on the revenue structure and repayment source of the bond. The activities to be financed, as well as the risk sharing arrangement and risk premium, depend largely on the institutional arrangements. Public and private sector investments in marine reserves, sustainable fishing practices, and reducing plastics and other types of ocean pollution could be financed through 'avoided cost' or a 'tax-backed' models. The risk profile of the bond can be improved by the means of first-loss tranches and guarantees.

Multilateral development banks and other international financial institutions must work together with their partners from governments, commercial banks and institutional investors for developing the blue bond market. They can also issue such bonds to finance investments in ocean health matched with blue private investments, or provide technical assistance.

Systemic change is required to maintain and grow ocean-related economies and livelihoods, while restoring and protecting the marine environment. By scaling up action and accelerating blue investments, we can continue to co-exist and benefit from our oceans for years to come. ✦

Ingrid van Wees is Vice-President for Finance and Risk Management at the Asian Development Bank.

✧ ESG investment

Thinking beyond economic growth

Using GDP growth to measure progress is misguided and has come at a steep cost to the planet; a new, multi-dimensional approach to assess well-being is needed.

Hamza Ali Malik
United Nations Economic and Social Commission for Asia and the Pacific

“The developing Asia-Pacific region needs to invest, on average, an additional $1.5tn per year during the period 2016-30 to achieve the United Nations' sustainable development goals by 2030.

When assessing the strengths and prospects of an economy, policy-makers and private investors alike look almost exclusively at GDP growth. The unprecedented pace of growth in GDP, since the mid-20th century, has facilitated considerable economic and social progress. But it has come at a steep cost. GDP growth-centric progress has exerted enormous pressure on the social fabric of societies and deepened inequalities. It has also brought about dramatic changes in the climate and biosphere. These challenges are undermining countries' future economic and social progress and threatening mankind.

Policy-makers must stop equating growth in GDP with improvements in the living conditions of ordinary people, and acknowledge that it is a poor proxy for broader human well-being. The preoccupation with increasing GDP is rooted in three beliefs. First, that maximisation of consumption or income is a principle goal of individual human activity and source of utility or satisfaction. Second, that society's welfare can be evaluated by considering the sum total of utilities of all individuals. And third, that there is agreement in society on such a welfare criterion.

Transformative agenda

The adoption of the transformative 2030 Agenda for Sustainable Development in 2015 by governments across the globe is perhaps the most ambitious attempt to pursue multi-dimensional well-being, social inclusiveness and environmental sustainability thus far. Its 17 sustainable development goals form a shared vision of humanity – people, planet, prosperity, peace and partnership. This development paradigm is more focused on the quality of development rather than just the quantity.

Recent research by the United Nations Economic and Social Commission for Asia and the Pacific indicates that at the current rate of progress, the Asia-Pacific region is unlikely to reach any of the UN goals. To establish a framework for investments across all SDGs, ESCAP's 'Economic and Social Survey for Asia and the Pacific 2019' proposes five major investment areas. First, investments are needed to achieve basic human rights through no poverty and hunger. The second area we identified is developing human capacities through health, education and gender. Third, investment is required to increase the provision of enabling infrastructure, covering transport, information and communications technology, and water and sanitation. We must secure our future through clean energy and climate action. Lastly, we should live in harmony through sustainable consumption and production and conservation of nature.

The approach defines investment more broadly to include expenditures that deliver future returns, such as investment in human capacities and environmental quality. It links goals, required interventions, and investment needs. The analysis goes beyond 'price tag' estimates and serves as a useful tool for policy-makers in operationalising the goals according to their national priorities. The results show that the developing Asia-Pacific region needs to invest, on average, an additional $1.5tn per year during the period 2016-30 to achieve the SDGs by 2030.

This is equivalent to approximately 5% of the region's GDP in 2018. People- and planet-related interventions would account for most of the additional investment, with $669bn needed to support basic human rights and develop human capacities, and $590bn to secure humanity's future and live in harmony with nature. The remaining $196bn would be for enabling infrastructure. Total required investments may decline if countries harness synergies and address trade-offs through integrated planning and coordinating interventions across all goals. Similarly, enhancing investment efficiencies, including through institutional and policy reforms, and making good use of new technologies will also help bring costs down.

GDP growth is just a contingent means to an end, not an end in itself. The end should be the implementation of a more holistic and multi-dimensional notion of human well-being that is consistent with planetary health. ✦

Hamza Ali Malik is Director of the Macroeconomic Policy and Financing for Development Division at the United Nations Economic and Social Commission for Asia and the Pacific.

✧ ESG investment

Greening the world's cities

Deteriorating urban infrastructure degrades citizens' quality of life, increases greenhouse gas emissions and prevents communities from adapting to climate change.

Nandita Parshad
European Bank for Reconstruction and Development

"Cities account for around 70% of energy use and three-quarters of greenhouse gas emissions.

At the European Bank for Reconstruction and Development, we strive to promote the creation of sustainable market economies. Part of our green economy transition initiative focuses on the urban sector, to help countries grow and manage their cities in a sustainable way through the 'Green Cities' programme. Owing to a legacy of high carbon intensity in their economies, most countries in the EBRD region lag behind other economies in transitioning to a green economy.

Cities represent one of the greatest opportunities to address meaningfully climate change, air pollution and environmental degradation. Globally, they account for around 70% of energy use and three-quarters of greenhouse gas emissions; these figures are set to rise. Cities host most of the infrastructure vulnerable to climate change. This is particularly true for EBRD cities, where deteriorating or obsolete urban infrastructure is degrading citizens' quality of life, increasing greenhouse gas emissions and preventing communities from adapting to climate change.

Trigger investment

In 2016 we launched EBRD Green Cities to finance environmental and climate-related infrastructure investments. The programme is centred on a 'trigger investment' as the first green project undertaken by a city. This runs in parallel to a green city action plan, which comprises 35 indicators to identify the environment challenges faced by a city and prioritises the type of investments required to address their mitigation. Beyond the investments, the action plan defines meaningful and targeted policy recommendations and, where appropriate, assists with capacity building at the city-owned utility level.

The project has a flexible financing structure. The most common lending structure is direct to governments, municipalities or municipal-owned utility companies. The framework does also accommodate, however, private sector lending, with public-private partnerships and lending to energy companies being the most commonplace structure.

Exceeding expectations

EBRD Green Cities has exceeded expectations, with €350m committed across 16 projects (16 cities across 12 countries) to date. The Banja Luka district heating project in Bosnia and Herzegovina is a perfect example of how the initiative works. The loan was direct to the city and paid for its equity contribution for a new district heating company, Eko Toplane Banja Luka. This was used to finance two biomass boilers. This project served as the 'trigger investment' under EBRD Green Cities. There will probably be further investments in district heating, with a focus on the distribution network.

EBRD Green Cities has expanded to a €1bn facility, which will allow repeat investments and expansion across the countries of operation. Our ambition is to scale this up to 100 EBRD green cities to be supported over the next five years.

Our shareholders see the project as key to transitioning to decarbonised economies. It will help us to deliver on our commitment to scale up green finance to achieve €4bn per year by 2020, or 40% of annual business. Other institutions are gradually coming on board, with many government and donor organisations supporting the green city action plans, while others are providing grants and concessional loans, as co-financing, for investments identified as part of this process.

Ambitions remain high for EBRD Green Cities. We are confident that we can continue to deliver on these plans, through innovation, an increased focus on localised renewables and remaining at the cutting edge of climate finance. This effort is backed by a large team of highly qualified bankers, technical specialists and policy experts, whose skillset and dedication to the task ensure EBRD Green Cities will fulfil expectations. ✦

Nandita Parshad is Managing Director of the Sustainable Infrastructure Group at the European Bank for Reconstruction and Development.

✧ Islamic finance

Islamic finance keeps up with global trends

As it keeps pace with global trends such as fintech and socially responsible investing, the Islamic finance sector is developing a more Islam-friendly economic system.

Etsuaki Yoshida
Japan Bank for International Co-operation

“There are several socially responsible investing sukuk, including a green sukuk launched by the Indonesian government.

Over the last decade, Islamic finance has developed a global presence and is no longer limited to Muslim-majority countries. The UK, Singapore, Luxembourg, Hong Kong and South Africa have all issued Islamic sovereign bonds. A key feature of Islamic finance is that it prohibits lenders from collecting interest.

Islamic bonds, known as 'sukuk', are a popular fund-raising instrument for governments and corporates in Muslim-majority countries. Many of these countries export oil and gas in the Middle East, and the sharp fall of commodity prices in 2014 prompted governments to issue sukuk to fill the fiscal gaps.

Sukuk transactions often list a 'special purpose company' as the superficial issuer of a debt security. This allows investors to generate a cash flow and replaces the coupon of conventional bonds. Governments are rarely listed on sukuk they have issued. Occasionally, a sovereign wealth fund issues sukuk on behalf of the government. This is a way to exclude deals from a country's national budget and debt profile. Mumtalakat, the sovereign wealth fund of the Kingdom of Bahrain, issued sukuk recently, in a deal market participants believe was intended for government financing. However, the issuer is officially the 'Mumtalakat Sukuk Holding Company', which to the untrained eye can be misleading.

Promoting Islamic values

Financial technology is set to have a considerable impact on Islamic finance and is growing rapidly in retail financial services. There are already a number of fintech-based financial services, such as Bank Negara Malaysia's recently launched Investment Account Platform. It is an Islamic crowdfunding platform for small and medium-sized enterprises involving local Islamic banks. There are also Islamic cryptocurrencies, such as OneGram and GOLDX.

Improved network capabilities made possible by fintech will facilitate 'waqf', a practice involving charitable donations of cash and tangible assets – typically a building or a plot of land – to Muslim organisations. Moreover, blockchain can enhance transparency, which is one of the core values of Islam. Therefore, technology will contribute to the development a more Islam-friendly economic system, with a stronger emphasis on religious values in financial transactions.

There are several socially responsible investing sukuk, including a green sukuk launched by the Indonesian government and sustainable bonds issued by Khazanah Nasional, the Malaysian sovereign fund. These are not intended solely to promote Islamic values; they are part of the wider, global social finance trend. Equality and poverty alleviation are important in Islam, and there are many Islamic microfinancing institutions. The World Bank's International Finance Facility for Immunisation has used sukuk to raise funds for its programmes. Islamic finance is keeping pace with the global social finance trend. ✦

Etsuaki Yoshida is Director and Senior Economist for the Country Credit Department at the Japan Bank for International Co-operation. The views expressed herein are those of the author alone and do not necessarily reflect those of Japan Bank for International Co-operation.

✧ Islamic finance

Mobilising sukuk for development

Socially responsible sukuk can play a major role in addressing threats to the environment and society and mobilising capital to meet global sustainable development goals.

Mohamad Akram Laldin
International Sharia Research Academy

> The International Finance Facility for Immunisation issued the first socially responsible sukuk in 2014, raising $500m for children's immunisation in the world's poorest countries.

Islamic finance is, in theory, centred on ethical practices. However, this has been hindered by a conventional, profit-driven mindset among stakeholders and lack of expertise. Furthermore, the sector is still in its infancy.

Some criticise Islamic finance for overlooking the philosophical foundation of Islamic economics, which emphasises social justice, ethical finance and well-being. There have been efforts to address this, including in Islamic capital market products and particularly in sukuk issuance.

After the 2008 financial crisis, Islamic finance emerged as an alternative to conventional finance. Sukuk is the fastest growing instrument in this area; by 2016 sharia-compliant bonds had reached $74.8bn in value. It is especially popular in Malaysia, which accounts for 46% of the world's total sukuk issuance.

Socially responsible investing is a growing trend in sukuk issuance. The proceeds of such bonds are used to finance environmentally friendly projects. SRI strategies aim to avoid controversial industries such as tobacco, gambling, alcohol and arms companies, instead seeking out companies engaging in social justice, environmental sustainability and green energy.

This development is in line with Islamic finance's increasing convergence with various streams of ethical finance such as environmental, social and corporate governance investing, the United Nations principles for responsible investment and value-based intermediation initiated by the Bank Negara Malaysia.

The International Finance Facility for Immunisation issued the first socially responsible sukuk in 2014, raising $500m for children's immunisation in the world's poorest countries through Gavi, the Vaccine Alliance. This landmark transaction is aligned directly with the UN's sustainable development goals, one of which aims to end preventable deaths of new-borns and children under five years old by 2030.

In 2015, the Malaysian government's sovereign wealth fund, Khazanah Nasional Berhad, issued its first socially responsible sukuk, dubbed 'sukuk Ihsan'. It targeted exclusively institutional investors. Proceeds were channelled to Yayasan AMIR, a not-for-profit organisation which works to improve the accessibility of quality education in Malaysian government schools. It has reached over 65,000 students and 83 trust schools across 10 states in Malaysia. This shows that Islamic finance products such as sukuk Ihsan can be used positively as a means to provide funding for people's well-being.

Another Malaysian SRI sukuk, valued at RM250m, was issued to partly finance the construction of a large-scale solar plant in Kudat, Sabah. Later, Quantum Solar Park launched the world's largest green sukuk, valued at RM1bn to fund the construction of Southeast Asia's largest solar photovoltaic plant project in three regions: Kedah, Melaka and Terengganu.

There have been remarkable developments in the SRI sukuk market in other countries. Last year, Indonesia issued $1.25bn worth of green sukuk. The uptake in green sukuk to finance renewable energy projects is due to several factors, including an increase in such projects (particularly on solar energy), low capital costs and the fact that they are sharia-compliant.

SRI sukuk can play a major role in addressing threats to the environment and society. They can help to mobilise resources to realise the SDGs. The purpose of sharia is, after all, to ensure the general public's well-being and protect them from harm. ✦

Mohamad Akram Laldin is Professor and Executive Director at the International Sharia Research Academy for Islamic Finance.

✧ Islamic finance

Steps to broaden Islamic capital markets

Developing deep local capital markets, and complementing these with new technologies, is a priority for core Islamic finance countries.

Mohamed Damak
The Gulf Bond and Sukuk Association

> A more inclusive approach for standard setting is required. The process would bring together issuers, investors, regulators and sharia scholars to help shape the market's future direction.

S&P Global Ratings anticipates total sukuk issuance of $105bn-$115bn this year compared with $114.8bn in 2018 and $120.6bn in 2017. We attribute the drop in the volume of issuance to several factors, including lower global liquidity levels, high geopolitical risk, and the more complex process for sukuk issuance compared with conventional bonds.

We expect oil prices to average $60 per barrel in 2019 and anticipate higher financing needs for core Islamic finance countries. However, they will probably continue to prefer conventional international bond issuance over sukuk.

Three initiatives could restore the attractiveness of the sukuk market to issuers in core Islamic finance countries and beyond. First, the standardisation of sharia interpretation and legal documentation. Second, the development of local sukuk markets. And three, the use of technology to support this agenda.

The standardisation of sharia interpretation is progressing, albeit slowly. The broader adoption of the Accounting and Auditing Organisation for Islamic Financial Institutions standards is helping, although some proposals can open the door to unforeseen risks. A more inclusive approach for standard setting is required. The process would bring together issuers, investors, regulators and sharia scholars to help shape the market's future direction.

Path to success

The absence of broad and deep local sukuk markets in most core Islamic finance countries (except Malaysia) is a weakness. It makes these countries rely almost exclusively on their (limited and occasionally volatile) banking systems to finance their economies. Complementing them with broad, deep and local capital markets is a priority for several core Islamic finance countries.

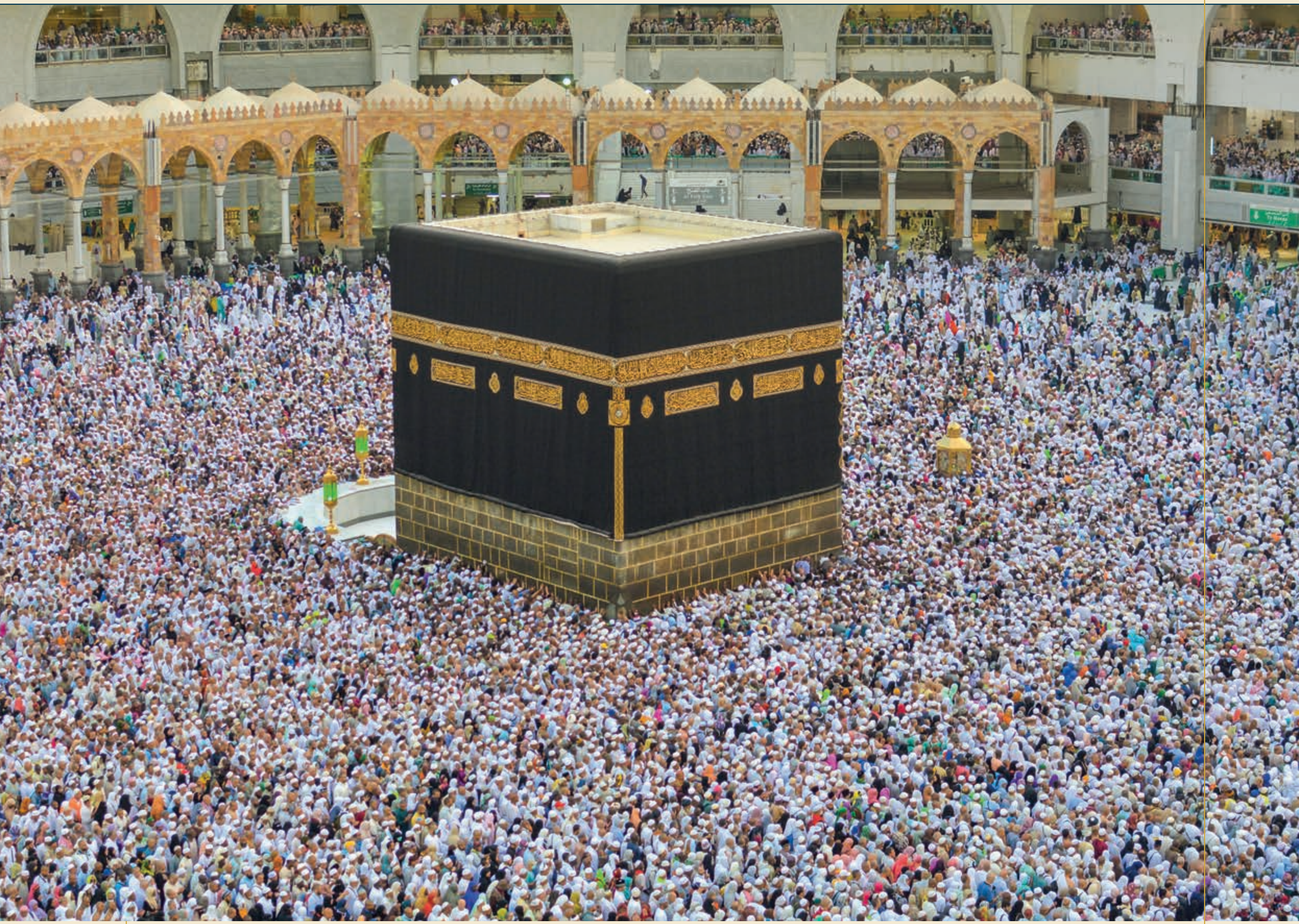
The path to success consists of pushing both sukuk offer and demand. For the former, standard legal documents and incentives (such as tax relief) for taking the sukuk route are essential. In the absence of corporate income tax in some core Islamic finance countries, the authorities could develop other types of incentives, such as requiring Islamic financing for specific government projects or waiving other government levies if the financing instrument is sukuk. Countries could require some of the top public sector investors to hold a minimum of Islamic instruments in their asset mix.

Sharia scholars and investors have often criticised the opacity of the sukuk issuance and returns process, as well as the difficulty in tracking the underlying assets or cash flows generated without regular external financial disclosure and post-issuance sharia audits. This is where blockchain and smart-contract protocols could make a difference. For example, in an ijara transaction (similar to a lease), cash collection is relatively straightforward and depends on a single economic agent, the sponsor, acting in its capacity as servicing agent.

However, in complex transactions, such as when external parties lease the underlying assets, tracking cash flow movements may be more difficult. As a result, some stakeholders might question the sharia compliance of such transactions if, for example, the sponsor goes beyond its contractual obligations and injects additional liquidity to avoid acceleration of repayment or default. Blockchain can facilitate the traceability of the assets and recording of cash flows in a transparent and easily reconcilable way that shows any alterations. Overall, this means assets and cash flows would be easier to trace, enabling prompt corrective action if needed.

A real-time register of sukuk holders would mean information can circulate more smoothly. Moreover, the technology could enable the automatic execution of certain clauses in sukuk documentation, such as the triggering of early dissolution if a certain percentage of investors agree. This would ultimately help accelerate the resolution of sukuk and, in some cases, prevent lengthy and uncertain legal proceedings since the parties' original understanding and intent will be documented in smart contracts. ✦

Mohamed Damak is Chair of the Islamic Finance Practice Group at the Gulf Bond and Sukuk Association and Global Head of Islamic Finance at S&P Global Ratings.



OMFIF Special report

Islamic finance

While corporate sukuk continue to make up the largest share of the market, the total value of outstanding sovereign sukuk increased by 42% between 2017-18; the previous year's increase was 13%.

↘ Islamic finance

Sukuk concentrated, but climbing

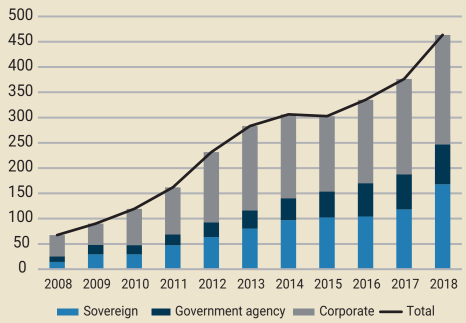
Bhavin Patel
Senior Economist and Head of Fintech Research, OMFIF

In 2018 sukuk issuance increased by 27%, bringing the total outstanding of these sharia-compliant bonds to $464bn (see Figure 1). While corporate sukuk continue to make up the largest share of the market (47%), sovereign issues are accelerating. The total value of outstanding sovereign sukuk increased by 42% between 2017-18; the previous year's increase was 13%. However, while the market has experienced a sevenfold increase over the last decade, it remains a tiny fraction (0.4%) of the global fixed income market, underlining the potential for growth. Malaysia still propels the international sukuk market, accounting for more than half of total sukuk outstanding. Saudi Arabia, the US and Indonesia follow, making up 37% of the market (see Figure 2).

Islamic finance-related assets comprise 30% of total Malaysian bank assets and takaful (Islamic insurance) products make up 10% of the country's insurance market. Bank Negara Malaysia and the government supported the industry's expansion through product and infrastructure development, institution-building and by establishing a robust regulatory framework. Additionally, Malaysia's sharia-compliant financing scheme has facilitated greater funding to support the growth of small and medium-sized businesses. The scheme has lowered financing rates for SMEs by two percentage points compared to traditional methods.

Figure 1: Sovereign sukuk issuance accelerates in 2018

Amount outstanding of sukuks by sector, $bn



Source: Thomson Reuters, OMFIF analysis

Sukuk issuers benefit from Malaysia's three-year extension of the double tax deduction for additional expenditure incurred for sukuk issued under ijarah (rent and acquisition) and wakalah (agency and operator agreement) principles. Other cost savings for sukuk issuers include reduction in professional fees relating to due diligence, drafting and preparation of prospectus, as well as various fees charged by Securities Commission Malaysia and Bursa Malaysia.

The US has not implemented any similar policies to spur Islamic finance domestically, but is the third-largest sukuk issuer. Although no domestic projects were funded by sukuk in 2018, the US has been a gateway for many Middle Eastern and Asian issuers to reach investors in the world's largest economy. Seven corporate and agency sukuk, totalling $9bn, were issued in the US last year. Saudi Arabian and Indonesian companies accounted for $2.8bn of the sukuk and all proceeds were remitted back to finance projects in each country's respective jurisdiction.

Gulf Co-operation Council countries still make up the largest sukuk market, accounting for 60% of all sukuk outstanding in 2018. Sovereign issues in the region dominate and sukuk continued to be favoured over conventional bonds for state financing, a trend that started in 2017.

Arab countries filling funding gaps

The short-term liquidity problems faced by GCC countries and other economies in the Middle East and North Africa since the collapse of the oil price in 2014 have seen these countries turn to sukuk markets to fill their funding gaps. That being said,

> "Malaysia still propels the international sukuk market, accounting for more than half of total sukuk outstanding. Saudi Arabia, the US and Indonesia follow, making up 37% of the market.

a recovery in the oil price and more effective fiscal consolidation measures significantly reduced their funding needs last year. This explains the slowing of MENA's sovereign issues, which fell 38% in 2018.

Over 2019, debt refinancing and an anticipated fall in oil prices, which analysts expect to occur in the second half of the year, will boost sukuk issuance by 25% in the region, according to Standard and Poor's. It estimates that 44% of all new issues will go towards refinancing maturing-long term debt, a strategy that the GCC has deployed since fiscal pressures rose in 2014.

Accessing international debt markets has been important for GCC countries to meet their funding needs, diversify funding sources and reduce liquidity pressures in their banking systems. Qatar, Bahrain and Oman have mostly focused on debt issuance rather than asset drawdowns. Saudi Arabia has seen a more equal split between issuing debt and liquidating part of their assets, while the United Arab Emirates and Kuwait have mostly drawn down assets.

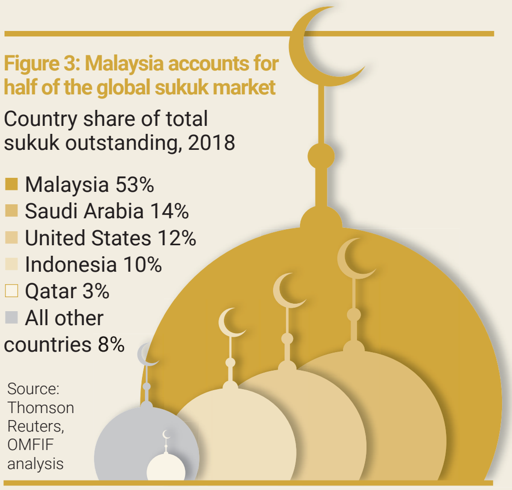
This strategy of avoiding drawing down reserves to plug fiscal deficits, coupled with the recent increase in oil prices, explains the strong performance of Middle Eastern sovereign funds in 2018. The assets under management of these institutions rose by 11.5% last year.

Setting standards

A long-standing problem constraining the expansion of Islamic finance is the lack of standardisation of its rules. In product structure, documentation, financial reporting and the interpretation of sharia principles, the lack of standardisation adds time and complexity to processes.

Figure 3: Malaysia accounts for half of the global sukuk market

Country share of total sukuk outstanding, 2018



Source: Thomson Reuters, OMFIF analysis

The codification of Islamic finance rules for international actors would help mitigate confusion among investors and limit the number of cases where sharia-compliance is questioned. Especially as new segments of Islamic finance emerge, such as green sukuk and financial technology applications, it is essential that innovation not be impeded by a lack of robust regulation.

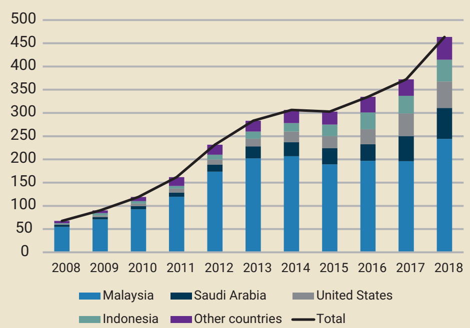
International bodies are supporting initiatives to improve standardisation. In 2018, Malaysia's Islamic Financial Services Board and the Bahrain-based Accounting and Auditing Organisation for Islamic Financial Institutions agreed to co-operate on establishing prudential, sharia, accounting and governance standards. GCC countries' desire to develop their domestic capital markets has incentivised regulatory developments in the region, and this process looks set to accelerate throughout 2019. The GCC aims to encourage the private sector to fund capital investment projects, reducing the reliance on government financing.

Multilateral co-operation is needed to overcome regulatory dissonance across borders. Policy-makers around the world must collaborate to create uniform standards, definitions and interpretations of Islamic finance principles. ✦

Bhavin Patel is Senior Economist and Head of Fintech Research at OMFIF.

Figure 2: Malaysia dominates sukuk markets

Amount outstanding of sukuks by country of issue, $bn



Source: Thomson Reuters, OMFIF analysis

> The short-term liquidity problems faced by GCC countries and other economies in the Middle East and North Africa since the collapse of the oil price in 2014 have seen these countries turn to sukuk markets to fill their funding gaps.

↘ Islamic finance

$3.5tn
Total amount Islamic finance is expected to grow to by 2021

$1.3bn
Amount raised by Indonesia with world's first sovereign green Islamic bond

1,162
Shariah scholars, representing financial institutions in 52 countries

42%
Increase in sovereign sukuk outstanding in 2018

60%
GCC's share of sukuk outstanding globally in 2018

The principles of Islamic finance

Islamic sharia law, meaning a 'clear path to be followed and observed', does not dictate general principles, but aims to deal with specific cases of transactions and sets out rules to govern them.

Prohibitions

The prohibition of riba is the essential principle governing Islamic finance. Riba represents the unearned excess or profit gained in relation to a transaction derived from the passage of time, and extends to all forms of interest.

Other tenets include the prohibition of gharar, which translates broadly to deceit, risk, fraud and uncertainty. Under this principle, all parties to a contract must have all knowledge of its subject matter and financial outcome. Maysir and qimar, which are forms of gambling, are also prohibited.

Lastly, sharia-compliant financial transactions cannot include haram, or 'forbidden', products.

Sharia-compliant techniques

Profit and loss sharing is the foundation of Islamic financing and aims to promote equitable income distribution. Under the rules of riba, lenders do not charge a premium for their investment, but instead act as a partner to the debtor.

Musharakah involves a partnership where two or more parties provide capital to finance a project or own real estate or a movable asset. The share of profits are pre-agreed, and losses are shared according to the ratio of capital contributed.

Mudarabah differs as there is only one investor who supplies the capital to an agent or manager. The share of profits is mutually agreed before the investment, but losses fall solely on the financier.

Murabaha is an asset purchase transaction where a party purchases an asset from a third party at the request of a client, and then resells the asset to the client while deferring payment to a pre-agreed date. The sale price includes the original acquisition price and a mark-up.

Ijarah relates to the leasing of an asset. The contract involves the sale of the right to use an asset for a period of time. The leaser remains the owner of the asset and can therefore repossess it in case of non-payment.

Salam is an agreement where delivery occurs at a future date in exchange for spot payment. A vital condition is for the payment to be made in full at the time of initiating the contract.

Istisna is a newer concept, where a commodity can be transacted before it comes into existence. Nothing is exchanged at the time of contracting, though the parties agree to future obligations.

Sukuk

Sukuk are bonds that comply with sharia principles. They are structured so that premiums are based on the performance of the underlying asset, meaning they do not infringe riba. The issuer of the sukuk pays the holder an agreed amount of the revenue created from the asset. ✦

Key transactions in Islamic finance involving public institutions in 2018

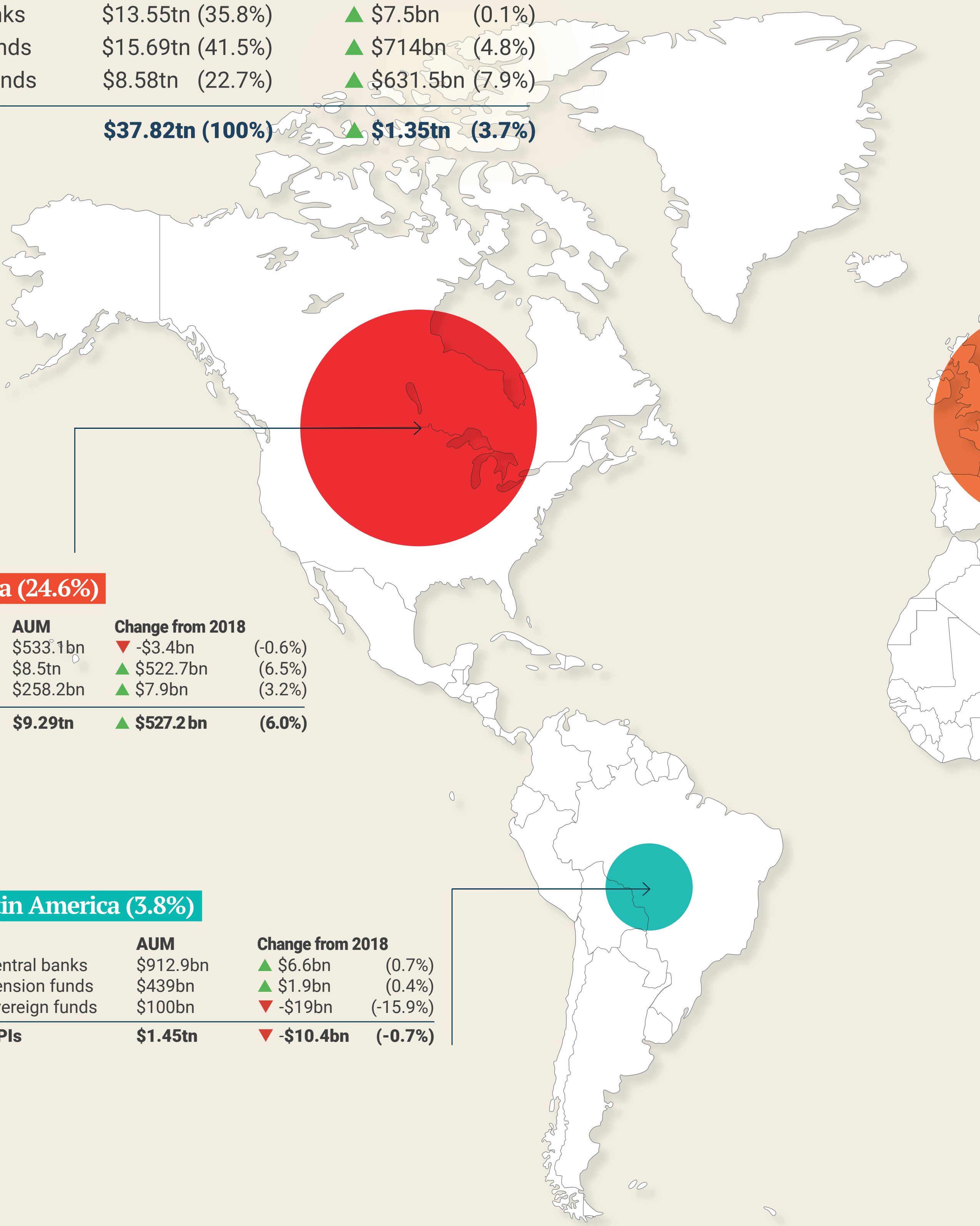
Institution	Description	Transaction size ($bn)	Date (2018)
Republic of Indonesia	Indonesia issued the world's first-ever green sukuk. The wakalah transaction is the first under the country's 'Green Bond and Green Sukuk Framework'. The proceeds will be used for budget allocation, subsidies or project funding of eligible green projects across a broad range of sectors that promote the transition to a low-emission economy and climate resilient growth, including mitigation, adaption and biodiversity.	1.3	March
Kingdom of Saudi Arabia	Saudi Arabia issued sovereign bonds to finance its budget deficit in the light of low oil prices and to cover its currency funding needs. Ten separate sukuk were issued, mainly denominated in the riyal, with maturities ranging between five- to 10- years. The January and April 2018 issuances were the largest recorded over the year.	13	January - October
Government of Qatar	Qatar issued six ijarah-based sukuk, with maturities between three to six years. This amounted to less than half the issuance in the corresponding period of the previous year.	2.4	March - November
Government of Turkey	Turkey issued sovereign bonds to support capital inflows over 2018. It made nine separate issuances of ijarah sukuk, six denominated in euros and three in lira, with maturities of one and two years.	1.8	February - December
Government of Nigeria	The Nigerian government will issue sovereign bonds to finance infrastructure and tge construction of roads across the country's six geopolitical zones. The ijarah sukuk is denominated in naira and has a maturity of seven-years.	0.3	December
Government of Malaysia	Malaysia issued four sukuk, the proceeds of which will be used by the central bank to purchase commodities, which it will then sell at a mark-up under a murabaha agreement. It also issued four 'treasury' sukuk to establish an Islamic benchmark yield curve.	11.8	January - September
The Islamic Corporation for the Insurance of Investment and Export Credit and the Republic of Turkey	Public-private partnership on the Çanakkale 1915 suspension bridge. The Islamic structuring was complex given the nature of the project and of the government support arrangements, all of which were subject to Turkish law.	0.2	June
Bank Indonesia	The central bank issued 24 sukuk to support secondary market liquidity. These were relatively small, with tenors ranging from one week to one year. Despite previous issues, many investors retained their sukuk until maturity. The central bank explained that further issuance was therefore needed to improve liquidity in the interbank market.	1	January - December


750

4 Databank

GLOBAL DISTRIBUTION OF GPI ASSETS

Total GPIs	Total AUM 2019 ($tn)	Total change from 2018	
173 Central banks	$13.55tn (35.8%)	▲ $7.5bn	(0.1%)
491 Pension funds	$15.69tn (41.5%)	▲ $714bn	(4.8%)
86 Sovereign funds	$8.58tn (22.7%)	▲ $631.5bn	(7.9%)
750 GPIs	**$37.82tn (100%)**	**▲ $1.35tn**	**(3.7%)**



North America (24.6%)

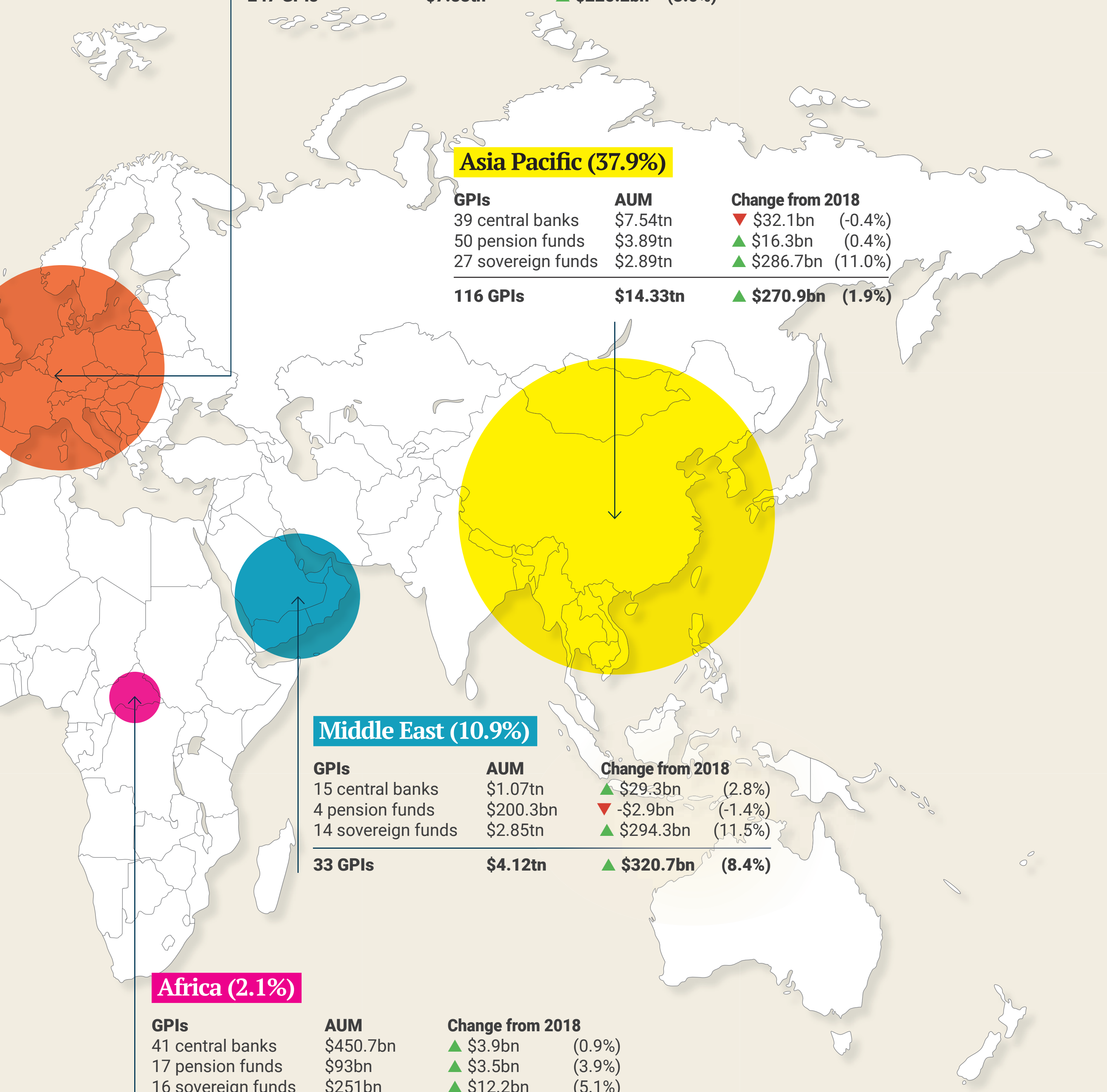
GPIs	AUM	Change from 2018	
2 central banks	$533.1bn	▼ -$3.4bn	(-0.6%)
209 pension funds	$8.5tn	▲ $522.7bn	(6.5%)
9 sovereign funds	$258.2bn	▲ $7.9bn	(3.2%)
220 GPIs	**$9.29tn**	**▲ $527.2bn**	**(6.0%)**

Latin America (3.8%)

GPIs	AUM	Change from 2018	
30 central banks	$912.9bn	▲ $6.6bn	(0.7%)
21 pension funds	$439bn	▲ $1.9bn	(0.4%)
9 sovereign funds	$100bn	▼ -$19bn	(-15.9%)
60 GPIs	**$1.45tn**	**▼ -$10.4bn**	**(-0.7%)**

Europe (20.7%)

GPIs	AUM	Change from 2018	
46 central banks	$3.04tn	▲ $3.2bn	(0.1%)
190 pension funds	$2.56tn	▲ $172.6bn	(7.2%)
11 sovereign funds	$2.22tn	▲ $49.4bn	(2.3%)
247 GPIs	**$7.83tn**	**▲ $225.2bn**	**(3.0%)**



Asia Pacific (37.9%)

GPIs	AUM	Change from 2018	
39 central banks	$7.54tn	▼ $32.1bn	(-0.4%)
50 pension funds	$3.89tn	▲ $16.3bn	(0.4%)
27 sovereign funds	$2.89tn	▲ $286.7bn	(11.0%)
116 GPIs	**$14.33tn**	**▲ $270.9bn**	**(1.9%)**

Middle East (10.9%)

GPIs	AUM	Change from 2018	
15 central banks	$1.07tn	▲ $29.3bn	(2.8%)
4 pension funds	$200.3bn	▼ -$2.9bn	(-1.4%)
14 sovereign funds	$2.85tn	▲ $294.3bn	(11.5%)
33 GPIs	**$4.12tn**	**▲ $320.7bn**	**(8.4%)**

Africa (2.1%)

GPIs	AUM	Change from 2018	
41 central banks	$450.7bn	▲ $3.9bn	(0.9%)
17 pension funds	$93bn	▲ $3.5bn	(3.9%)
16 sovereign funds	$251bn	▲ $12.2bn	(5.1%)
74 GPIs	**$794.7bn**	**▲ $19.5bn**	**(2.5%)**

TOP 10 RANKING BY REGION

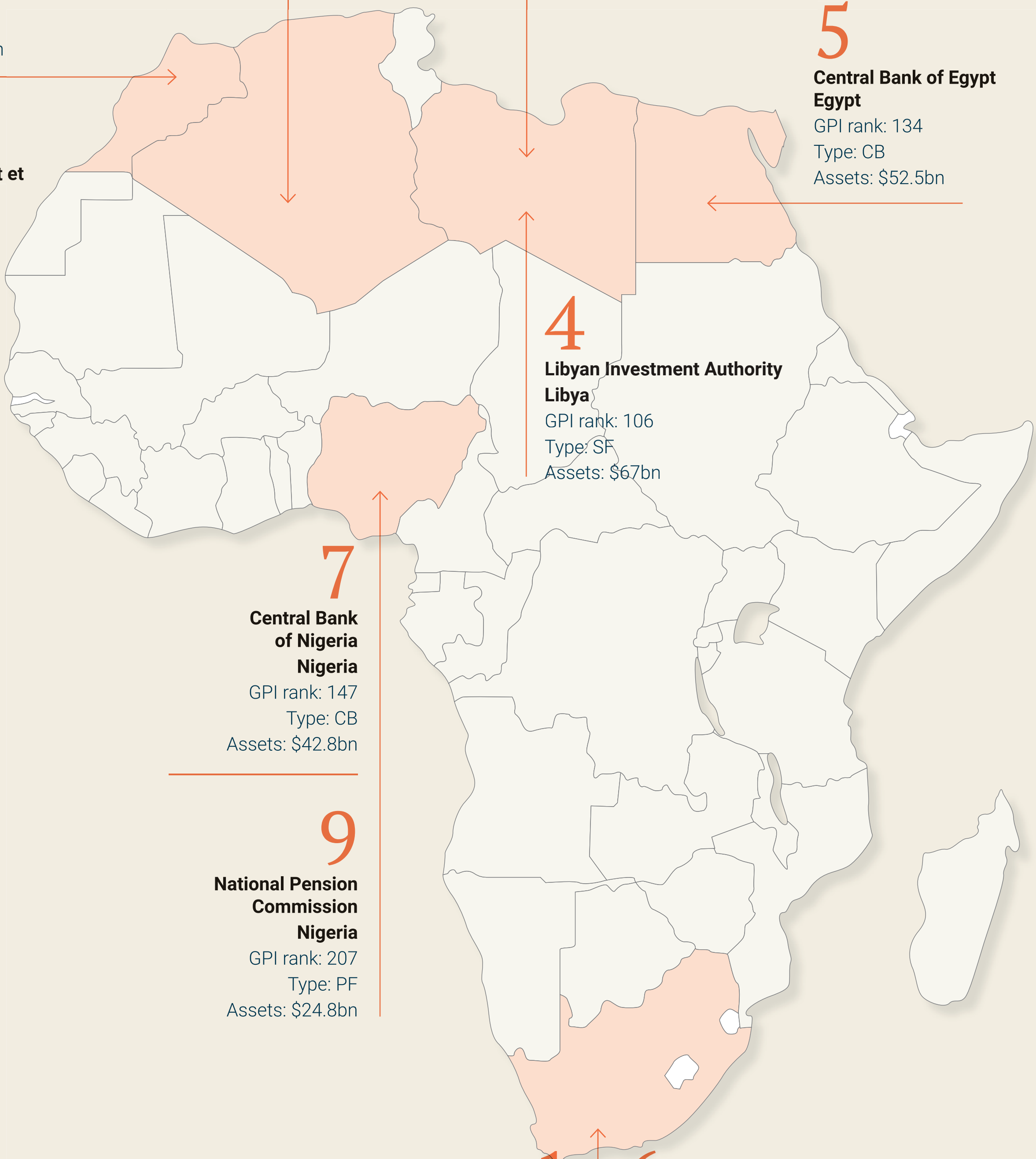
10
Bank Al-Maghrib
Morocco
GPI rank: 209
Type: CB
Assets: $24.5 bn

2
Banque d'Algérie
Algeria
GPI rank: 78
Type: CB
Assets: $93.6bn

3
Central Bank of Libya
Libya
GPI rank: 87
Type: CB
Assets: $84.9bn

5
Central Bank of Egypt
Egypt
GPI rank: 134
Type: CB
Assets: $52.5bn

8
Caisse de Dépôt et de Gestion
Morocco
GPI rank: 205
Type: PF
Assets: $25bn



4
Libyan Investment Authority
Libya
GPI rank: 106
Type: SF
Assets: $67bn

7
Central Bank of Nigeria
Nigeria
GPI rank: 147
Type: CB
Assets: $42.8bn

9
National Pension Commission
Nigeria
GPI rank: 207
Type: PF
Assets: $24.8bn

Africa

Total assets held by Top 10:
$623.8bn

1
Public Investment Corporation
South Africa
GPI rank: 52
Type: SF
Assets: $157.1bn

6
South African Reserve Bank
South Africa
GPI rank: 138
Type: CB
Assets: $51.6bn

Asia Pacific

Total assets held by Top 10: **$9.69tn**

Europe

Total assets held by Top 10: **$4.65tn**

1

Norges Bank Investment Management
Norway
GPI rank: 4
Type: SF
Assets: $1.16tn

2

Swiss National Bank
Switzerland
GPI rank: 8
Type: CB
Assets: $787.6bn

3

Caisse des Dépôts et Consignations
France
GPI rank: 13
Type: SF
Assets: $499.9bn

4

Stichting Pensioenfonds ABP
Netherlands
GPI rank: 15
Type: PF
Assets: $494.8bn

5

Central Bank of Russia
Russia
GPI rank: 17
Type: CB
Assets: $468.5bn

6

Cassa Depositi e Prestiti
Italy
GPI rank: 20
Type: SF
Assets: $433bn

7

Pensioenfonds Zorg en Welzijn
Netherlands
GPI rank: 36
Type: PF
Assets: $235bn

8

Deutsche Bundesbank
Germany
GPI rank: 44
Type: CB
Assets: $200.1bn

9

Bank of England
UK
GPI rank: 46
Type: CB
Assets: $197.4bn

10

Banque de France
France
GPI rank: 50
Type: CB
Assets: $174.9bn

Latin America Caribbean

Total assets held by Top 10: **$1.22tn**

2
Banco de México
Mexico
GPI rank: 48
Type: CB
Assets: $176.4bn

9
Banco de la Republica Colombia
Colombia
GPI rank: 129
Type: CB
Assets: $54.3bn

1
Banco Central do Brasil
Brazil
GPI rank: 25
Type: CB
Assets: $374.7bn

3
Comisión Nacional del Sistema de Ahorro para el Retiro
Mexico
GPI rank: 51
Type: PF
Assets: $173bn

4
Fundo de Garantia por Tempo de Serviço
Brazil
GPI rank: 56
Type: PF
Assets: $143.4bn

10
Caixa de Previdencia dos Funcionários do Banco do Brasil
Brazil
GPI rank: 136
Type: PF
Assets: $51.9bn

7
Banco Central de Reserva del Perú
Peru
GPI rank: 119
Type: CB
Assets: $59.7bn

6
Banco Central de Chile
Chile
GPI rank: 109
Type: CB
Assets: $65.5bn

8
Sustainability Guarantee Fund
Argentina
GPI rank: 120
Type: SF
Assets: $59.6bn

5
Banco Central de la República Argentina
Argentina
GPI rank: 107
Type: CB
Assets: $65.8bn

Middle East

Total assets held by Top 10: **$3.4tn**

10
Bank of Israel
Israel
GPI rank: 66
Type: CB
Assets: $115.3bn

2
Kuwait Investment Authority
Kuwait
GPI rank: 10
Type: SF
Assets: $592bn

9
Central Bank of Iran
Iran
GPI rank: 62
Type: CB
Assets: $124.9bn

3
Saudi Arabian Monetary Authority
Saudi Arabia
GPI rank: 14
Type: CB
Assets: $496.6bn

5
Public Investment Fund
Saudi Arabia
GPI rank: 30
Type: SF
Assets: $290bn

4
Qatar Investment Authority
Qatar
GPI rank: 29
Type: SF
Assets: $320bn

1
Abu Dhabi Investment Authority
United Arab Emirates
GPI rank: 6
Type: SF
Assets: $828bn

7
Mubadala Investment Company
United Arab Emirates
GPI rank: 38
Type: SF
Assets: $226.5bn

8
Dubai World
United Arab Emirates
GPI rank: 49
Type: SF
Assets: $175.3bn

6
Investment Corporation of Dubai
United Arab Emirates
GPI rank: 37
Type: SF
Assets: $233.8bn

North America

Total assets held by Top 10: **$4.24tn**

6
Canada Pension Plan Investment Board
Canada
GPI rank: 27
Type: PF
Assets: $355.8bn

7
Caisse de Dépôt et Placement du Québec
Canada
GPI rank: 32
Type: PF
Assets: $270bn

1
Military Retirement Fund
US
GPI rank: 7
Type: PF
Assets: $813.9bn

2
Federal Employees Retirement System
US
GPI rank: 9
Type: PF
Assets: $687.5bn

3
Thrift Savings Fund
US
GPI rank: 12
Type: PF
Assets: $567.8bn

4
US Monetary Authorities
US
GPI rank: 19
Type: CB
Assets: $449.2bn

5
California Public Employees' Retirement System
US
GPI rank: 24
Type: PF
Assets: $379.2bn

8
California State Teachers' Retirement System
US
GPI rank: 34
Type: PF
Assets: $254.4bn

9
Civil Service Retirement System
US
GPI rank: 35
Type: PF
Assets: $249.1bn

10
New York State Common Retirement Fund
US
GPI rank: 39
Type: PF
Assets: $218.6bn

DISTRIBUTION OF GPI ASSETS

Figure 1: US, China maintain asset volume lead
Distribution of assets by country, $tn, % of total

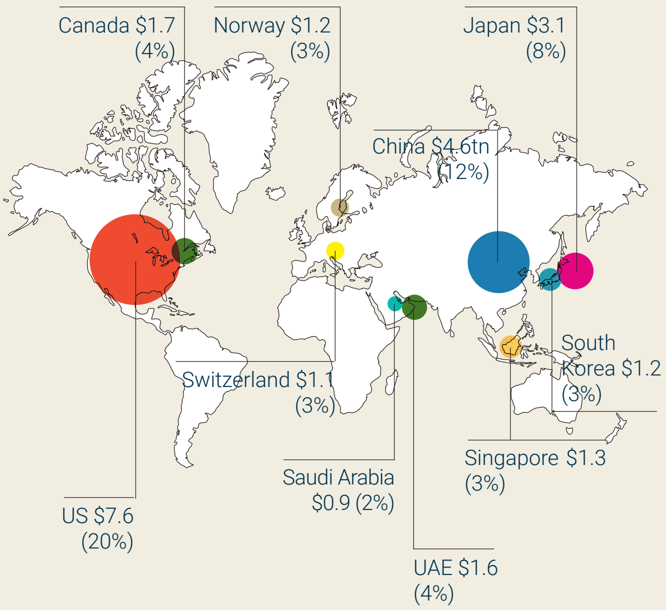
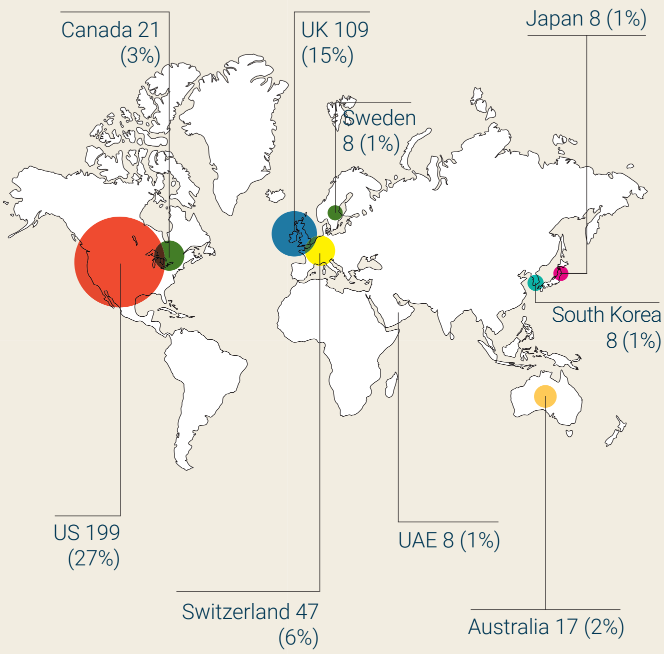


Figure 2: US, UK have greatest number of GPIs
Distribution of GPIs by country, % of total



TOP 10 RANKING CHANGES

Biggest fallers ▼

Top five GPIs by fall in level of assets on previous year

Rank	GPI Rank	Change on 2018	Institution	Country	Region	Type	Assets $bn	%change on 2018	$bn change on 2018
1	2	▼ -4	Government Pension Investment Fund	Japan	AP	PF	1363.8	-6%	-86.5
2	1	▶ 0	People's Bank of China	China	AP	CB	3351.9	-2%	-69.7
3	35	▼ -4	Civil Service Retirement System	US	NA	PF	249.1	-9%	-25.7
4	8	▼ -1	Swiss National Bank	Switzerland	EU	CB	787.6	-3%	-24.4
5	45	▼ -9	Local Government Officials	Japan	AP	PF	198.0	-9%	-19.7

Highest climbers ▲

Top five GPIs by rise in level of assets on previous year (excludes GPIs in top ten ranking)

Rank	GPI Rank	Change on 2018	Institution	Country	Region	Type	Assets $bn	%change on 2018	$bn change on 2018
1	38	▲ 24	Mubadala Investment Company	UAE	ME	SF	226.5	79%	99.8
2	10	▲ 1	Kuwait Investment Authority	Kuwait	ME	SF	592.0	13%	68.0
3	30	▲ 5	Public Investment Fund	Saudi Arabia	ME	SF	290.0	29%	66.0
4	12	▶ 0	Thrift Savings Fund	US	NA	PF	567.8	12%	62.2
5	26	▶ 0	Temasek	Singapore	AP	SF	364.2	12%	40.1

THE TOP 750 GPIs RANKED

Rank and change on 2018		Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
1	▶ 0	People's Bank of China [1]	China	AP	CB	3351.92	-2%	1948
2	▶ 0	Government Pension Investment Fund	Japan	AP	PF	1363.75	-6%	2006
3	▶ 0	Bank of Japan [2]	Japan	AP	CB	1322.04	4%	1882
4	▶ 0	Norges Bank Investment Management [3]	Norway	EU	SF	1060.98	0%	1990
5	▲ 1	China Investment Corporation [4]	China	AP	SF	941.42	16%	2007
6	▼ -1	Abu Dhabi Investment Authority	UAE	ME	SF	828.00	0%	1976
7	▲ 1	Military Retirement Fund	US	NA	PF	813.90	12%	1984
8	▼ -1	Swiss National Bank	Switzerland	EU	CB	787.56	-3%	1907
9	▶ 0	Federal Employees Retirement System	US	NA	PF	687.47	7%	1987
10	▲ 1	Kuwait Investment Authority	Kuwait	ME	SF	592.00	13%	1953
11	▼ -1	National Pension Service	South Korea	AP	PF	579.24	4%	1987
12	▶ 0	Thrift Savings Fund	US	NA	PF	567.81	12%	1986
13	▲ 1	Caisse des Dépôts et Consignations	France	EU	SF	499.92	6%	1816
14	▼ -1	Saudi Arabian Monetary Authority	Saudi Arabia	ME	CB	496.59	0%	1952
15	▲ 1	Stichting Pensioenfonds ABP	Netherlands	EU	PF	494.84	7%	1922
16	▼ -1	Central Bank of the Republic of China (Taiwan)	Taiwan	AP	CB	479.20	2%	1924
17	▲ 2	Central Bank of the Russian Federation	Russia	EU	CB	468.50	8%	1990
18	▼ -1	Hong Kong Monetary Authority	Hong Kong	AP	CB	452.09	-2%	1993
19	▼ -1	US Monetary Authorities [5]	US	NA	CB	449.21	0%	1913
20	▶ 0	Cassa Depositi e Prestiti	Italy	EU	SF	432.98	5%	1850
21	▲ 1	Bank of Korea	South Korea	AP	CB	403.69	4%	1950
22	▲ 2	GIC Private [6]	Singapore	AP	SF	398.00	11%	1981
23	▼ -2	Reserve Bank of India	India	AP	CB	397.79	-3%	1935
24	▲ 1	California Public Employees' Retirement System	US	NA	PF	379.17	11%	1995
25	▼ -2	Banco Central do Brasil	Brazil	LA	CB	374.71	0%	1964
26	▶ 0	Temasek [7]	Singapore	AP	SF	364.19	12%	1974
27	▲ 1	Canada Pension Plan Investment Board	Canada	NA	PF	355.75	11%	1997
28	▲ 1	National Social Security Fund	China	AP	SF	335.86	12%	1997
29	▼ -2	Qatar Investment Authority	Qatar	ME	SF	320.00	0%	2005
30	▲ 5	Public Investment Fund	Saudi Arabia	ME	SF	290.00	29%	1971
31	▼ -1	Monetary Authority of Singapore	Singapore	AP	CB	287.67	3%	1971
32	▶ 0	Caisse de Dépôt et Placement du Québec	Canada	NA	PF	270.00	4%	1965
33	▶ 0	Central Provident Fund	Singapore	AP	PF	269.11	12%	1955
34	▶ 0	California State Teachers' Retirement System	US	NA	PF	254.35	8%	1913
35	▼ -4	Civil Service Retirement System	US	NA	PF	249.14	-9%	1920
36	▲ 2	Pensioenfonds Zorg en Welzijn	Netherlands	EU	PF	235.02	10%	1969
37	▶ 0	Investment Corporation of Dubai	UAE	ME	SF	233.84	9%	2006
38	▲ 24	Mubadala Investment Company [8]	UAE	ME	SF	226.49	79%	2002
39	▲ 2	New York State Common Retirement Fund	US	NA	PF	218.55	7%	1786
40	▲ 3	Ontario Teachers' Pension Plan	Canada	NA	PF	210.13	4%	1990
41	▲ 1	Bank of Thailand	Thailand	AP	CB	205.69	2%	1942
42	▲ 3	Employees' Provident Fund	Malaysia	AP	PF	201.48	7%	1991

Rank and change on 2018	Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
43 ▲ 1	State Board of Administration of Florida	US	NA	PF	201.10	5%	1943
44 ▼ -4	Deutsche Bundesbank	Germany	EU	CB	200.12	-4%	1957
45 ▼ -9	Local Government Officials	Japan	AP	PF	197.96	-9%	1962
46 ▶ 0	Bank of England [9]	UK	EU	CB	197.36	7%	1694
47 ▲ 4	Teacher Retirement System of Texas	US	NA	PF	176.94	7%	1937
48 ▶ 0	Bank of Mexico	Mexico	LA	CB	176.42	1%	1925
49 ▶ 0	Dubai World	UAE	ME	SF	175.30	0%	2006
50 ▼ -3	Banque de France	France	EU	CB	174.85	-1%	1800
51 ▼ -1	Comisión Nacional del Sistema de Ahorro para el Retiro	Mexico	LA	PF	172.96	4%	1994
52 ▲ 4	Public Investment Corporation [10]	South Africa	AF	SF	157.10	9%	1911
53 ▲ 1	Commonwealth Superannuation Corporation	Australia	AP	PF	155.24	4%	1911
54 ▼ -1	Banca d'Italia	Italy	EU	CB	153.81	1%	1893
55 ▲ 2	Arbejdsmarkedets Tillægspension	Denmark	EU	PF	143.87	6%	1964
56 ▼ -4	Fundo de Garantia por Tempo de Serviço	Brazil	LA	PF	143.35	-6%	1966
57 ▼ -2	Česká národní banka	Czech Republic	EU	CB	142.91	-4%	1993
58 ▲ 2	Bureau of Labor Funds [11]	Taiwan	AP	PF	141.46	10%	2014
59 ▲ 5	Public Sector Pension Investment Board	Canada	NA	PF	138.19	13%	1999
60 ▲ 9	Korea Investment Corporation	South Korea	AP	SF	134.10	21%	2005
61 ▶ 0	Washington State Investment Board	US	NA	PF	130.00	1%	1981
62 ▼ -4	Central Bank of Iran	Iran	ME	CB	124.93	-6%	1960
63 ▲ 2	New York State Teachers' Retirement System	US	NA	PF	121.71	4%	1921
64 ▼ -5	Bank Indonesia	Indonesia	AP	CB	120.65	-7%	1953
65 ▲ 2	Narodowy Bank Polski	Poland	EU	CB	117.87	3%	1945
66 ▲ 2	Bank of Israel	Israel	ME	CB	115.33	2%	1954
67 ▲ 6	British Columbia Investment Management Corporation	Canada	NA	PF	112.32	8%	1999
68 ▼ -2	General Organisation for Social Insurance	Saudi Arabia	ME	PF	111.73	-4%	1932
69 ▲ 11	State of Wisconsin Investment Board	US	NA	PF	111.10	20%	1951
70 ▲ 6	Ohio Public Employees' Retirement System	US	NA	PF	110.17	11%	1935
71 ▲ 4	Future Fund	Australia	AP	SF	109.04	5%	2006
72 ▶ 0	Pension Fund Association	Japan	AP	PF	107.71	3%	1967
73 ▲ 1	Bank Negara Malaysia	Malaysia	AP	CB	101.50	-3%	1959
74 ▲ 5	Central Bank of the UAE	UAE	ME	CB	99.50	4%	1980
75 ▲ 3	North Carolina Treasurer [12]	US	NA	PF	98.18	0%	1941
76 ▲ 29	Sjunde AP-fonden	Sweden	EU	PF	94.70	33%	2001
77 ▶ 0	Employees' Provident Fund Organisation	India	AP	PF	94.25	-5%	1951
78 ▼ -7	Bank of Algeria	Algeria	AF	CB	93.57	-11%	1962
79 ▼ -9	Central Bank of the Republic of Turkey	Turkey	EU	CB	93.03	-14%	1931
80 ▲ 5	Universities Superannuation UK	UK	EU	PF	91.33	12%	1974
81 ▲ 26	National Development Fund of Iran	Iran	ME	SF	91.00	34%	2011
82 ▲ 4	Bayerische Versorgungskammer	Germany	EU	PF	90.94	12%	1995
83 ▼ -2	Minnesota State Board	US	NA	PF	90.17	1%	1980
84 ▲ 4	Teachers' Retirement System of the City of New York	US	NA	PF	88.33	9%	1917
85 ▼ -1	Oregon Public Employees Retirement System	US	NA	PF	86.45	5%	1946
86 ▲ 1	Ontario Municipal Employees' Retirement System	Canada	NA	PF	86.29	6%	1962
87 ▲ 3	Central Bank of Libya	Libya	AF	CB	84.90	7%	1956
88 ▼ -6	Bank of Canada	Canada	NA	CB	83.93	-3%	1935

Rank and change on 2018	Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
89 ▲ 4	Victorian Funds Management Commission	Australia	AP	SF	83.22	9%	1994
90 ▼ -1	State Teachers Retirement System of Ohio	US	NA	PF	82.69	3%	1919
91 ▼ -8	Bangko Sentral ng Pilipinas	Philippines	AP	CB	80.88	-3%	1993
92 ▲ 5	Alberta Investment Management Corporation [13]	Canada	NA	SF	80.00	9%	2008
93 ▼ -2	European Central Bank	Euro System	EU	CB	79.70	1%	1998
94 ▲ 5	Qsuper	Australia	AP	PF	77.59	6%	1913
95 ▲ 8	Massachusetts Pension Reserves Investment Management	US	NA	PF	77.24	7%	1986
96 ▲ 4	Michigan Retirement	US	NA	PF	76.93	6%	1943
97 ▼ -5	Virginia Retirement System	US	NA	PF	75.80	-3%	1942
98 ▲ 6	Teachers' Retirement System of Georgia	US	NA	PF	75.60	6%	1943
99 ▲ 7	New York City Employee Retirement System	US	NA	PF	75.30	7%	1920
100 ▼ -2	Banco de España	Spain	EU	CB	75.12	3%	1782
101 ▼ -7	New Jersey Division of Investment	US	NA	PF	72.11	-5%	1962
102 ▼ -6	Samruk-Kazyna JSC	Kazakhstan	AP	SF	71.65	-4%	2008
103 ▲ 11	Permodalan Nasional Berhad	Malaysia	AP	SF	71.34	10%	1978
104 ▼ -9	Danmarks Nationalbank	Denmark	EU	CB	70.83	-6%	1818
105 ▼ -3	National Public Service Personnel Mutual Aid	Japan	AP	PF	68.01	-5%	1947
106 ▲ 2	Libyan Investment Authority	Libya	AF	SF	67.00	0%	2006
107 ▲ 21	Central Bank of Argentina	Argentina	LA	CB	65.79	19%	1935
108 ▲ 8	United Nations Joint Staff	US	NA	PF	65.60	2%	1949
109 ▲ 2	Banco Central de Chile	Chile	LA	CB	65.52	-2%	1925
110 ▲ 3	Public Institute for Social Security	Kuwait	ME	PF	65.05	-1%	1976
111 ▲ 28	Central Bank of Iraq	Iraq	ME	CB	64.56	32%	1947
112 ▲ 6	Queensland Investment Corporation	Australia	AP	SF	64.39	2%	1991
113 ▲ 2	Alaska Permanent Fund Corporation	US	NA	SF	63.94	-1%	1976
114 ▼ -2	Norges Bank	Norway	EU	CB	63.24	-5%	1816
115 ▲ 14	Banque Publique d'Investissement	France	EU	SF	61.90	13%	2012
116 ▲ 9	Pennsylvania Public School Employees' Retirement System	US	NA	PF	61.13	7%	1917
117 ▲ 4	Sveriges Riksbank	Sweden	EU	CB	60.51	-3%	1668
118 ▲ 1	Illinois Teachers Retirement System	US	NA	PF	60.29	-4%	1939
119 ▼ -2	Central Bank of Peru	Peru	LA	CB	59.66	-5%	1922
120 ▼ -19	Sustainability Guarantee Fund	Argentina	LA	SF	59.60	-18%	2008
121 ▲ 3	Hydro-Quebec Pension Fund	Canada	NA	PF	59.39	2%	1944
122 ▲ 1	Kuntien eläkevakuutus	Finland	EU	PF	59.20	1%	1988
123 ▼ -14	National Welfare Fund	Russia	EU	SF	58.10	-13%	2008
124 ▼ -2	Kazakhstan National Fund	Kazakhstan	AP	SF	57.72	-6%	2000
125 ▲ 13	State Bank of Vietnam	Vietnam	AP	CB	57.13	15%	1951
126 ▶ 0	Los Angeles County Employees Retirement Association	US	NA	PF	56.30	1%	1938
127 ▲ 6	Tennessee Consolidated Retirement System	US	NA	PF	55.26	6%	1972
128 ▲ 12	Régie des rentes du Québec	Canada	NA	PF	54.34	12%	1965
129 ▲ 1	Banco de la Republica Colombia	Colombia	LA	CB	54.31	1%	1923
130 ▼ -20	Reserve Bank of Australia	Australia	AP	CB	53.61	-20%	1959
131 ▲ 10	UniSuper	Australia	AP	PF	53.54	11%	2000
132 ▲ 4	First State Super	Australia	AP	PF	53.25	5%	1992
133 ▼ -1	Régime de retraite des employés du gouv. [14]	Canada	NA	PF	52.84	0%	1973
134 ▲ 8	Central Bank of Egypt	Egypt	AF	CB	52.52	10%	1961

Rank and change on 2018	Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
135 ▼ -8	Banque du Liban	Lebanon	ME	CB	52.36	-5%	1964
136 ▼ -5	Caixa de Previdencia dos Funcionários do Banco do Brasil	Brazil	LA	PF	51.93	-2%	1904
137 ▼ -3	Maryland State Retirement and Pension System	US	NA	PF	51.80	0%	1941
138 ▼ -1	South African Reserve Bank	South Africa	AF	CB	51.64	2%	1921
139 ▼ -4	1Malaysia Development Berhad	Malaysia	AP	SF	51.40	0%	2008
140 ▲ 4	Colorado Public Employees' Retirement Association	US	NA	PF	50.59	13%	1931
141 ▲ 8	Connecticut Retirement Plans & Trust Funds	US	NA	PF	46.86	9%	1999
142 ▲ 3	Texas Permanent School Fund	US	NA	SF	46.52	5%	1854
143 ▲ 4	New York City Metropolitan Transportation Authority	US	NA	PF	45.14	2%	1953
144 ▲ 27	Emirates Investment Authority	UAE	ME	SF	45.00	32%	2007
145 ▲ 6	Public School Retirement Systems of Missouri	US	NA	PF	43.80	6%	1945
146 ▲ 9	Indiana Public Retirement System	US	NA	PF	43.56	7%	2011
147 ▲ 19	Central Bank of Nigeria	Nigeria	AF	CB	42.84	18%	1958
148 ▼ -5	Japan Mutual Aid Association of Public School Teachers	Japan	AP	PF	42.47	-8%	1971
149 ▼ -3	Banca Naţională a României	Romania	EU	CB	42.14	-5%	1880
150 ▲ 9	Nevada Public Employees Retirement Systems	US	NA	PF	41.99	7%	1947
151 ▼ -3	Tredje AP-fonden	Sweden	EU	PF	41.27	-4%	2001
152 ▲ 10	Arizona State Retirement System	US	NA	PF	40.79	6%	1912
153 ▲ 11	Pensionskasse des Bundes PUBLICA	Switzerland	EU	PF	40.66	10%	1921
154 ▲ 7	Retirement Systems' of Alabama	US	NA	PF	40.65	4%	1939
155 ▼ -5	Fjärde AP-fonden	Sweden	EU	PF	40.52	-5%	2001
156 ▲ 13	Utah State Retirement System	US	NA	PF	40.28	14%	1910
157 ▶ 0	Turkiye Wealth Fund	Turkey	EU	SF	40.00	0%	2016
158 ▼ -2	De Nederlandsche Bank	Netherlands	EU	CB	39.95	-2%	1814
159 ▲ 9	British Columbia Municipal Pension Plan	Canada	NA	PF	39.83	11%	2000
160 ▼ -2	Brunei Investment Agency	Brunei	AP	SF	39.30	0%	1983
161 ▲ 6	State Oil Fund of the Republic of Azerbaijan	Azerbaijan	AP	SF	38.99	9%	1999
162 ▼ -8	Andra AP-fonden	Sweden	EU	PF	38.68	-5%	2001
163 ▼ -11	Fonds de Réserve pour les Retraites	France	EU	PF	38.56	-6%	2001
164 ▼ -11	Illinois Municipal Retirement Fund	US	NA	PF	38.44	-6%	1939
165 ▲ 7	British Transport Police Superannuation Fund	UK	EU	PF	37.69	11%	1970
166 ▼ -3	Compenswiss - Fonds de compensation AVS	Switzerland	EU	PF	37.52	0%	1948
167 ▼ -7	Första AP-fonden	Sweden	EU	PF	37.49	-4%	2001
168 ▲ 5	Central Bank of Kuwait	Kuwait	ME	CB	37.13	10%	1969
169 ▲ 1	PensionDanmark	Denmark	EU	PF	36.90	4%	1993
170 ▲ 10	Health Employees Superannuation Trust Australia	Australia	AP	PF	35.89	13%	1987
171 ▲ 13	Kumpulan Wang Persaraan	Malaysia	AP	PF	34.88	20%	2007
172 ▲ 25	National Pension System Trust	India	AP	PF	34.29	28%	2008
173 ▲ 3	Local Authorities Pension Plan	Canada	NA	PF	34.18	4%	1962
174 ▲ 3	Iowa Public Employees Retirement System	US	NA	PF	34.04	4%	1985
175 ▼ -10	Khazanah Nasional Berhad	Malaysia	AP	SF	33.69	-8%	1993
176 ▼ -2	BVK Personalvorsorge des Kantons Zürich	Switzerland	EU	PF	32.74	-2%	1926
177 ▲ 4	South Carolina Public Employee Benefit Authority	US	NA	PF	32.64	3%	1945
178 ▲ 5	Mississippi Public Employees' Retirement System	US	NA	PF	32.59	7%	1944
179 ▼ -1	State Super	Australia	AP	PF	32.16	0%	1996
180 ▼ -5	Bangladesh Bank	Bangladesh	AP	CB	32.02	-4%	1971

Rank and change on 2018		Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
181	▲ 4	Folketrygdfondet	Norway	EU	PF	31.92	10%	1967
182	▲ 8	Magyar Nemzeti Bank	Hungary	EU	CB	31.25	11%	1924
183	▼ -1	National Bank of the Republic of Kazakhstan [15]	Kazakhstan	AP	CB	30.93	1%	1993
184	▼ -5	The Private School Mutual Aid System	Japan	AP	PF	30.38	-6%	1998
185	▲ 91	Qatar Central Bank	Qatar	ME	CB	30.35	102%	1973
186	▲ 10	Versorgungsanstalt des Bundes und der Länder	Germany	EU	PF	29.90	11%	1929
187	▲ 11	Government Pension Fund Norway	Norway	EU	SF	29.35	10%	1967
188	▲ 6	Greater Manchester Pension Fund	UK	EU	PF	29.34	8%	1891
189	▲ 6	Pennsylvania State Employees' Retirement System	US	NA	PF	29.29	8%	1923
190	▲ 9	Texas County and District Retirement System	US	NA	PF	29.16	11%	1967
191	▼ -5	Bulgarian National Bank	Bulgaria	EU	CB	28.83	1%	1879
192	▲ 15	ERAFP	France	EU	PF	27.99	14%	2003
193	▲ 10	Strathclyde Pension Fund	UK	EU	PF	27.78	9%	1974
194	▼ -5	Employees' Retirement System of Texas	US	NA	PF	27.75	-2%	1947
195	▼ -7	Texas Municipal Retirement System	US	NA	PF	27.59	-3%	1947
196	▲ 5	Nationale Banque de Belgique	Belgium	EU	CB	27.30	5%	1850
197	▲ 9	Government Pension Fund	Thailand	AP	PF	27.29	10%	1997
198	▲ 12	Teachers Retirement System of Louisiana	US	NA	PF	27.25	12%	1936
199	▼ -8	Central Bank of Uzbekistan	Uzbekistan	AP	CB	27.08	-4%	1991
200	▲ 12	Uniform Pension Savings Fund	Kazakhstan	AP	PF	26.44	11%	2013
201	▼ -1	Massachusetts State Retirement Board	US	NA	PF	26.25	1%	1993
202	▲ 2	New Zealand Superannuation Fund	New Zealand	AP	SF	25.91	3%	2001
203	▼ -11	National Railroad Retirement Investment Trust	US	NA	PF	25.70	-7%	2001
204	▼ -11	Banco de Portugal	Portugal	EU	CB	25.59	-7%	1846
205	▲ 6	Caisse de Dépôt et de Gestion	Morocco	AF	PF	24.99	3%	1959
206	▼ -1	Central Bank of Turkmenistan	Turkmenistan	AP	CB	24.91	-1%	1991
207	▲ 2	National Pension Commission	Nigeria	AF	PF	24.80	2%	2014
208	▲ 9	San Francisco Employees' Retirement System	US	NA	PF	24.56	10%	1922
209	▼ -7	Bank Al-Maghrib	Morocco	AF	CB	24.47	-5%	1959
210	▲ 6	British Columbia Public Service	Canada	NA	PF	24.38	8%	2000
211	▲ 4	Oesterreichische Nationalbank	Austria	EU	CB	24.28	6%	1816
212	▲ 6	Funds SA 19	Australia	AP	SF	24.13	8%	1995
213	▲ 6	Ireland Strategic Investment Fund [16]	Ireland	EU	SF	24.13	8%	2001
214	▶ 0	Government Employees Superannuation Board	Australia	AP	PF	23.99	4%	1939
215	▼ -7	New Mexico State Investment Council [17]	US	NA	SF	23.97	-2%	1957
216	▲ 6	New York State Deferred Compensation Plan	US	NA	PF	23.52	12%	1974
217	▲ 3	Illinois State Universities Retirement System	US	NA	PF	23.27	5%	1941
218	▲ 12	Jamsostek	Indonesia	AP	PF	22.95	14%	1977
219	▲ 4	Emergency Services and State Super	Australia	AP	PF	22.51	7%	1986
220	▲ 7	British Broadcasting Corporation Pension Trust	UK	EU	PF	22.00	8%	1957
221	▲ 7	World Bank Staff Retirement Plan	US	NA	PF	21.83	8%	1975
222	▼ -1	Texas Permanent University Fund	US	NA	SF	21.52	2%	1876
223	▲ 12	Fonds de Compensation de la Sécurité Sociale	Luxembourg	EU	PF	21.37	11%	2004
224	▲ 2	Government Service Insurance System	Philippines	AP	PF	21.33	4%	1936
225	▼ -1	Los Angeles Fire and Police Pensions	US	NA	PF	21.33	2%	1899
226	▲ 5	Kentucky Teachers' Retirement System	US	NA	PF	21.26	7%	1938

Rank and change on 2018	Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
227 ▲ 5	MP Pension	Denmark	EU	PF	21.05	6%	2008
228 ▲ 11	National Bank of Ukraine	Ukraine	EU	CB	20.88	11%	1839
229 ▲ 15	West Midlands Pension Fund	UK	EU	PF	20.59	12%	1974
230 ▲ 6	Pensionskassen For Sygeplejersker	Denmark	EU	PF	20.55	7%	1899
231 ▲ 9	Ontario Pension Board	Canada	NA	PF	20.43	8%	1920
232 ▲ 22	New York City Deferred Compensation Plan	US	NA	PF	20.34	16%	2004
233 ▼ -4	Autoridade Monetária de Macau	Macau	AP	CB	20.28	0%	1999
234 ▲ 8	Super SA	Australia	AP	PF	20.12	7%	1927
235 ▼ -1	Ontario Public Service Employees Union	Canada	NA	PF	20.04	3%	1911
236 ▲ 12	State General Reserve Fund	Oman	ME	SF	20.00	11%	1980
237 ▲ 4	Hrvatske narodne banke	Croatia	EU	CB	20.00	6%	1990
238 ▼ -1	Public Service Pension Fund	Taiwan	AP	PF	19.70	4%	1943
239 ▲ 6	Ordu Yardımlaşma Kurumu	Turkey	EU	PF	19.60	7%	1961
240 ▼ -2	Kansas Retirement System for Public Employees	US	NA	PF	19.50	3%	1962
241 ▲ 11	Oklahoma Teachers Retirement System	US	NA	PF	18.87	7%	1943
242 ▲ 5	Nebraska Public Employees Retirement Systems [18]	US	NA	PF	18.81	4%	1945
243 ▲ 22	Fundo de Estabilização da Segurança Social	Portugal	EU	PF	18.62	16%	1989
244 ▲ 5	Alaska Retirement Management Board	US	NA	PF	18.61	5%	1961
245 ▲ 5	Montana Board of Investments	US	NA	PF	18.60	5%	1993
246 ▲ 9	Illinois State Board of Investment	US	NA	PF	18.60	7%	1969
247 ▼ -14	Fundação dos Economiários Federais	Brazil	LA	PF	18.58	-5%	1977
248 ▲ 5	West Yorkshire Pension Fund	UK	EU	PF	18.55	6%	1974
249 ▲ 2	Employee Retirement System of Georgia	US	NA	PF	18.37	4%	1950
250 ▲ 6	Valtion Eläkerahasto	Finland	EU	PF	18.19	5%	1990
251 ▲ 7	Connecticut Teachers' Retirement Board	US	NA	PF	17.95	5%	1955
252 ▼ -27	Reserve Bank of New Zealand	New Zealand	AP	CB	17.81	-14%	1934
253 ▲ 10	Pensionskasse Stadt Zürich	Switzerland	EU	PF	17.69	9%	1913
254 ▲ 8	State Employees' Retirement System of Illinois	US	NA	PF	17.65	6%	1944
255 ▲ 19	Korea Teachers Pension	South Korea	AP	PF	17.44	13%	1974
256 ▲ 1	Central Bank of Oman	Oman	ME	CB	17.39	2%	1974
257 ▲ 10	Public Employee Retirement System of Idaho	US	NA	PF	16.99	7%	1963
258 ▲ 13	Los Angeles City Employees' Retirement System	US	NA	PF	16.90	8%	1937
259 ▲ 10	State of Hawaii Employees' Retirement System	US	NA	PF	16.85	7%	1926
260 ▲ 15	Arkansas Teachers' Retirement System	US	NA	PF	16.79	10%	1937
261 ▲ 5	Public Employees' Retirement Association of New Mexico	US	NA	PF	16.66	4%	1985
262 ▼ -1	Petroleum Fund of Timor-Leste	Timor-Leste	AP	SF	16.51	-2%	2005
263 ▲ 10	West Virginia Consolidated Public Retirement Board	US	NA	PF	16.39	6%	1961
264 ▲ 13	Taspen	Indonesia	AP	PF	16.18	9%	1960
265 ▼ -19	Banco Nacional de Angola	Angola	AF	CB	16.15	-11%	1926
266 ▲ 2	Orange County Employees Retirement System	US	NA	PF	15.77	-1%	1944
267 ▼ -3	Banco Central del Uruguay	Uruguay	LA	CB	15.65	-3%	1967
268 ▲ 43	Mumtalakat Holding Company	Bahrain	ME	SF	15.40	45%	2006
269 ▲ 12	Lærernes Pension	Denmark	EU	PF	15.35	9%	2013
270 ▲ 12	Maine Public Employees Retirement System	US	NA	PF	15.24	8%	1945
271 ▲ 8	School Employees Retirement System of Ohio	US	NA	PF	15.02	5%	1937
272 ▲ 12	Central Bank of West African States	West African System	AF	CB	14.94	13%	1959

Rank and change on 2018	Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
273 ▲ 7	South Dakota Investment Council	US	NA	PF	14.85	5%	1971
274 ▼ -4	Central Bank of Jordan	Jordan	ME	CB	14.75	-6%	1964
275 ▲ 3	Fondo de Estabilización Económica y Social	Chile	LA	SF	14.74	0%	2007
276 ▲ 22	National Bank of Cambodia	Cambodia	AP	CB	14.63	20%	1954
277 ▼ -5	Ohio Police and Fire Pension Fund	US	NA	PF	14.60	-6%	1965
278 ▲ 9	Employees Provident Fund	Sri Lanka	AP	PF	14.13	8%	1958
279 ▲ 7	Louisiana State Employees' Retirement System	US	NA	PF	13.93	6%	1947
280 ▲ 8	Transport for London Pension Fund	UK	EU	PF	13.80	9%	1942
281 ▲ 12	North Dakota Retirement and Investment Office	US	NA	PF	13.70	10%	1989
282 ▲ 20	Social Security Corporation	Jordan	ME	PF	13.47	15%	1977
283 ▶ 0	Bernische Pensionskasse	Switzerland	EU	PF	13.35	-2%	1905
284 ▲ 8	Kentucky Retirement Systems	US	NA	PF	13.21	6%	1958
285 ▲ 12	Pensionskasse Basel-Stadt	Switzerland	EU	PF	13.05	7%	2000
286 ▲ 14	National Bank of Serbia	Serbia	EU	CB	12.87	8%	1884
287 ▼ -2	CPEG Caisse de prévoyance de l'Etat de Genève	Switzerland	EU	PF	12.86	-2%	2014
288 ▲ 3	National Managing Holding Baiterek	Kazakhstan	AP	SF	12.83	2%	2013
289 ▲ 17	Alberta Teachers' Retirement Fund Board	Canada	NA	PF	12.81	12%	1939
290 ▶ 0	San Diego County Employees Retirement Association	US	NA	PF	12.75	1%	1939
291 ▲ 10	Banco de Guatemala	Guatemala	LA	CB	12.75	8%	1945
292 ▲ 2	British Coal Staff Superannuation Scheme	UK	EU	PF	12.72	3%	1947
293 ▼ -4	New Mexico Educational Retirement Board	US	NA	PF	12.60	0%	1983
294 ▲ 1	International Monetary Fund Staff Retirement Plan	US	NA	PF	12.59	2%	1944
295 ▲ 8	Caisse de Pension de l'Etat de Vaud	Switzerland	EU	PF	12.57	9%	1952
296 ▲ 3	Public School Teachers' Pension & Retirement Fund of Chicago	US	NA	PF	12.28	3%	1895
297 ▲ 8	Missouri State Employees' Retirement System	US	NA	PF	12.22	6%	1957
298 ▲ 9	Water and Power Employees' Retirement Plan	US	NA	PF	12.01	7%	1938
299 ▲ 15	Cook County Annuity & Benefit Fund	US	NA	PF	11.76	13%	1926
300 ▼ -57	State Bank of Pakistan	Pakistan	AP	CB	11.71	-37%	1947
301 ▲ 7	Subsidsed Schools Provident Fund	Hong Kong	AP	PF	11.45	6%	2000
302 ▲ 10	Merseyside Pension Fund	UK	EU	PF	11.43	8%	1972
303 ▼ -7	Central Bank of Cuba	Cuba	LA	CB	11.35	-8%	1948
304 ▲ 22	Instituto Mexicano del Seguro Social	Mexico	LA	PF	11.20	17%	1943
305 ▲ 12	Aargauische Pensionskasse	Switzerland	EU	PF	11.07	9%	1908
306 ▲ 10	Tyne and Wear Pensions Fund	UK	EU	PF	11.06	8%	1974
307 ▲ 18	Ircantec	France	EU	PF	11.03	15%	1971
308 ▼ -4	Suomen Pankki	Finland	EU	CB	10.77	-7%	1811
309 ▲ 29	Public Service Pension Plan	Canada	NA	PF	10.77	17%	1947
310 ▲ 33	South Yorkshire Pension Fund	UK	EU	PF	10.72	25%	1974
311 ▲ 2	Oklahoma Public Employees Retirement System	US	NA	PF	10.68	2%	1964
312 ▼ -2	Public Officials Benefit Association	South Korea	AP	SF	10.68	0%	1952
313 ▲ 16	San Bernardino County Employees' Retirement Association	US	NA	PF	10.23	8%	1945
314 ▼ -5	Coal Mines Provident Fund	India	AP	PF	10.21	-5%	1948
315 ▲ 18	Lancashire County Pension Fund	UK	EU	PF	10.18	10%	1983
316 ▲ 11	Delaware Public Employees' Retirement System	US	NA	PF	10.15	7%	1970
317 ▲ 19	Nilgosc	UK	EU	PF	10.08	10%	1950
318 ▲ 14	Kåpan Pensioner	Sweden	EU	PF	10.04	8%	1992

Rank and change on 2018	Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
319 ▲ 4	General Organisation for Social Insurance Bahrain	Bahrain	ME	PF	10.04	4%	1976
320 ▲ 27	Instituto Guatemalteco de Seguridad Social	Guatemala	LA	PF	10.02	22%	1985
321 ▼ -3	Fondo de Reserva de Pensiones	Chile	LA	SF	10.01	0%	2006
322 ▼ -3	Russian Direct Investment Fund	Russia	EU	SF	10.00	0%	2011
323 ▲ 11	Sacramento County Employees' Retirement System	US	NA	PF	9.83	6%	1937
324 ▼ -3	IFC Asset Management Company	US	NA	SF	9.80	0%	2009
325 ▲ 6	The National Insurance Board of Trinidad and Tobago	E. Caribbean System	LA	PF	9.78	4%	1971
326 ▲ 28	Social Security Fund	Panama	LA	PF	9.78	23%	1941
327 ▲ 15	Arkansas Public Employees Retirement System	US	NA	PF	9.67	10%	1957
328 ▲ 2	Social Security System	Philippines	AP	PF	9.58	1%	1957
329 ▼ -9	Basellandschaftliche Pensionskasse	Switzerland	EU	PF	9.58	-3%	1921
330 ▼ -70	Fondo de Reserva Seguridad Social	Spain	EU	PF	9.56	-44%	1990
331 ▲ 4	Military Mutual Aid Association	South Korea	AP	PF	9.44	3%	1984
332 ▲ 9	Employees' Retirement System of Rhode Island [19]	US	NA	PF	9.25	5%	1936
333 ▲ 6	La Caisse Marocaine des Retraites	Morocco	AF	PF	9.16	2%	1930
334 ▲ 11	St.Galler Pensionskasse	Switzerland	EU	PF	9.12	9%	2014
335 ▼ -20	Banco Central de Bolivia	Bolivia	LA	CB	8.95	-13%	1928
336 ▲ 10	New Hampshire Retirement System	US	NA	PF	8.91	7%	1967
337 ▲ 12	Contra Costa County Employees' Retirement Association	US	NA	PF	8.91	10%	1945
338 ▲ 6	Lothian Pension Fund	UK	EU	PF	8.85	5%	1994
339 ▼ -17	Banco Central de Venezuela	Venezuela	LA	CB	8.83	-9%	1939
340 ▲ 38	Fundo de Segurança Social de Macau	Macau	AP	PF	8.75	30%	2011
341 ▲ 9	San Diego City Employees' Retirement System	US	NA	PF	8.73	8%	1927
342 ▲ 16	Essex Pension Fund	UK	EU	PF	8.70	12%	1974
343 ▲ 9	Local Government Super	Australia	AP	PF	8.62	7%	1997
344 ▲ 11	Hampshire Pension Fund	UK	EU	PF	8.60	9%	1974
345 ▼ -17	Wyoming Retirement System	US	NA	PF	8.51	-10%	1953
346 ▼ -9	Nepal Rastra Bank	Nepal	AP	CB	8.26	-10%	1956
347 ▲ 19	Missouri Local Government Employees Retirement System	US	NA	PF	8.22	11%	1967
348 ▲ 11	District of Columbia Retirement Board	US	NA	PF	8.21	6%	1998
349 ▲ 7	Central Bank of Kenya	Kenya	AF	CB	8.20	4%	1966
350 ▲ 1	Da Afghanistan Bank	Afghanistan	ME	CB	8.19	1%	1939
351 ▼ -11	Central Bank of Trinidad & Tobago	Trinidad and Tobago	LA	CB	8.11	-9%	1964
352 ▲ 15	Alameda County Employees' Retirement Association	US	NA	PF	8.10	10%	1985
353 ▲ 15	Bank of Botswana Pension Fund	Botswana	AF	PF	8.08	11%	1998
354 ▲ 41	Government Employees Pension Service	South Korea	AP	PF	8.01	39%	1960
355 ▼ -7	Bank of Greece	Greece	EU	CB	8.00	-2%	1927
356 ▲ 6	National Bank of the Republic of Belarus	Belarus	EU	CB	7.81	2%	1990
357 ▲ 6	Permanent Wyoming Mineral Trust Fund	US	NA	SF	7.81	2%	1945
358 ▲ 12	Kent County Council Superannuation Fund	UK	EU	PF	7.78	8%	1974
359 ▼ -2	Banco Central del Paraguay	Paraguay	LA	CB	7.74	-2%	1952
360 ▲ 4	Luzerner Pensionskasse	Switzerland	EU	PF	7.65	1%	2000
361 ▲ 16	Banco Central de la República Dominicana	Dominican Republic	LA	CB	7.63	12%	1947
362 ▲ 12	Pension Fund for Nurses and State Employees	Iceland	EU	PF	7.58	9%	1996
363 ▲ 6	Fairfax County Retirement Systems [20]	US	NA	PF	7.53	4%	1955
364 ▲ 9	Montana Public Employee Retirement Administration	US	NA	PF	7.53	7%	1975

Rank and change on 2018			Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
365	▼	-5	Bernische Lehrerversicherungskasse	Switzerland	EU	PF	7.53	-3%	1818
366	▲	5	Banco Central de Costa Rica	Costa Rica	LA	CB	7.50	5%	1950
367	▲	9	London Pensions Fund Authority	UK	EU	PF	7.48	9%	1989
368	▲	4	Government Institutions Pension Fund	Namibia	AF	PF	7.13	0%	1989
369	▲	21	Cheshire Pension Fund	UK	EU	PF	7.13	20%	1974
370	▲	15	Boston City Retirement System	US	NA	PF	6.99	15%	1923
371	▲	25	Demographic Reserve Fund	Poland	EU	PF	6.93	20%	2002
372	▲	12	Nottinghamshire Local Government Pension Scheme	UK	EU	PF	6.91	9%	1888
373	▼	-20	Central Bank of Sri Lanka	Sri Lanka	AP	CB	6.86	-14%	1950
374	▲	8	Centralna Banka Bosne i Hercegovine	Bosnia and Herzegovina	EU	CB	6.81	5%	1997
375	▲	4	Revenue Regulation Fund	Algeria	AF	SF	6.70	0%	2000
376	▲	4	Central Bank of Azerbaijan Republic	Azerbaijan	AP	CB	6.67	0%	1992
377	▼	-12	Bank of Botswana	Botswana	AF	CB	6.66	-11%	1975
378	▲	31	Lietuvos Bankas	Lithuania	EU	CB	6.56	29%	1990
379	▲	20	Bank of Central African States	Cntrl African System	AF	CB	6.47	15%	1972
380	▲	13	East Riding Pension Fund	UK	EU	PF	6.40	9%	1966
381	▲	8	Bank of Mauritius	Mauritius	AF	CB	6.35	6%	1967
382	▼	-1	Seðlabanki Íslands	Iceland	EU	CB	6.33	-4%	1961
383	▼	-8	Bank of Ghana	Ghana	AF	CB	6.19	-11%	1957
384	▲	13	Derbyshire County Council Pension Fund	UK	EU	PF	6.17	7%	1974
385	▲	13	Avon Pension Fund	UK	EU	PF	6.15	10%	1974
386	▲	34	Staffordshire Pension Fund	UK	EU	PF	6.13	27%	1974
387	▲	18	Los Angeles City Deferred Compensation Plan	US	NA	PF	6.03	15%	1983
388	▲	12	Hertfordshire County Council Pension Fund	UK	EU	PF	6.01	10%	1974
389	▼	-2	Oman Investment Fund	Oman	ME	SF	6.00	0%	2006
390	▲	2	Heritage and Stabilisation Fund	Trinidad and Tobago	LA	SF	5.97	2%	2000
391	▲	3	East Bay Municipal Utility District Pension Fund	US	NA	PF	5.93	1%	1986
392	▼	-9	Fondo de Estabilización Fiscal	Peru	LA	SF	5.77	-10%	1999
393	▲	29	Bank of England Pension Scheme	UK	EU	PF	5.76	20%	1694
394	▲	50	Národná banka Slovenska	Slovakia	EU	CB	5.66	43%	1993
395	▲	12	Central Bank of Myanmar	Myanmar	AP	CB	5.64	8%	1990
396	▲	34	Houston Police Officers' Pension System	US	NA	PF	5.60	25%	1947
397	▼	-11	Banque Centrale de Tunisie	Tunisia	AF	CB	5.55	-8%	1958
398	▲	13	Previs Personalvorsorgestiftung Service Public	Switzerland	EU	PF	5.53	10%	1958
399	▲	5	Pula Fund	Botswana	AF	SF	5.52	5%	1994
400	▲	17	North East Scotland Pension Fund	UK	EU	PF	5.51	12%	1999
401	▲	11	Ventura County Employees' Retirement Association	US	NA	PF	5.50	9%	1946
402	▲	8	Devon County Council Pension Fund	UK	EU	PF	5.46	8%	1974
403	▲	10	Leicestershire County Council Pension Fund	UK	EU	PF	5.45	9%	1974
404	▼	-3	Botswana Public Officers Pension Fund	Botswana	AF	PF	5.42	2%	2001
405	▲	13	West Sussex Pension Fund	UK	EU	PF	5.42	12%	1974
406	▲	8	Surrey Pension Fund	UK	EU	PF	5.42	9%	1974
407	▲	12	Philadelphia Public Employees Retirement System	US	NA	PF	5.40	12%	1956
408	▼	-5	City of Milwaukee Employees' Retirement System	US	NA	PF	5.40	2%	1937
409	▼	-7	Sanabil Investments	Saudi Arabia	ME	SF	5.30	0%	2009
410	▲	22	Central Bank of Ireland	Ireland	EU	CB	5.22	18%	1943

Rank and change on 2018	Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
411 ▲ 4	Teesside Pension Fund	UK	EU	PF	5.20	5%	1922
412 ▲ 4	Montgomery County Employees' Retirement System	US	NA	PF	5.19	5%	1965
413 ▼ -22	Benki Kuu ya Tanzania	Tanzania	AF	CB	5.04	-15%	1966
414 ▲ 10	Istituto di previdenza del Cantone Ticino	Switzerland	EU	PF	5.04	6%	2009
415 ▼ -9	Kantonale Pensionskasse Solothurn	Switzerland	EU	PF	5.04	-3%	1957
416 ▲ 17	Colorado Fire & Police Pension Association	US	NA	PF	5.02	14%	1980
417 ▲ 8	Fundo Soberano de Angola	Angola	AF	SF	5.01	6%	2012
418 ▲ 11	Tayside Pension Fund	UK	EU	PF	4.95	9%	1994
419 ▲ 9	Environment Agency Pension Funds	UK	EU	PF	4.93	8%	1974
420 ▲ 26	Caisse de Prévoyance du Personnel de l'Etat de Fribourg	Switzerland	EU	PF	4.88	25%	1930
421 ▶ 0	Municipal Employees' Annuity & Benefit Fund of Chicago	US	NA	PF	4.84	0%	1921
422 ▲ 5	Alberta Pension Services Corporation	Canada	NA	PF	4.83	3%	1995
423 ▶ 0	Central Bank of Yemen	Yemen	ME	CB	4.81	0%	1971
424 ▼ -16	Aizkraukles Banka Latvija	Latvia	EU	CB	4.79	-7%	1993
425 ▲ 9	Norfolk Pension Fund	UK	EU	PF	4.78	9%	1974
426 ▶ 0	Banco Central de Honduras	Honduras	LA	CB	4.77	1%	1950
427 ▲ 4	Fresno County Employees' Retirement Association	US	NA	PF	4.76	7%	1945
428 ▲ 10	CAP Prévoyance	Switzerland	EU	PF	4.67	11%	2009
429 ▲ 6	Kern County Employees' Retirement Association	US	NA	PF	4.63	6%	1945
430 ▲ 6	East Sussex Pension Fund	UK	EU	PF	4.52	5%	1974
431 ▲ 16	North Yorkshire Pension Fund	UK	EU	PF	4.48	15%	1974
432 ▲ 8	San Mateo County Employees' Retirement Association	US	NA	PF	4.40	9%	1944
433 ▲ 16	Jacksonville City Retirement System	US	NA	PF	4.39	14%	1937
434 ▲ 5	Dallas Employees' Retirement Fund	US	NA	PF	4.38	8%	1943
435 ▲ 6	CP VAL, PK WAL	Switzerland	EU	PF	4.38	9%	2010
436 ▲ 17	CDP Equity [21]	Italy	EU	SF	4.37	16%	2011
437 ▲ 5	Caisse de pensions de la fonction publique du Canton de Neuchâtel	Switzerland	EU	PF	4.29	8%	1950
438 ▲ 10	Rhondda Cynon Taf Pension Fund	UK	EU	PF	4.28	11%	1974
439 ▼ -2	Houston Firefighters' Relief & Retirement Fund	US	NA	PF	4.26	0%	1937
440 ▲ 3	Montana Teachers' Retirement System	US	NA	PF	4.18	5%	1937
441 ▲ 26	Louisiana Parochial Employees' Retirement System	US	NA	PF	4.15	25%	1953
442 ▲ 12	Sjätte AP-fonden	Sweden	EU	PF	4.02	8%	2001
443 ▲ 35	National Bank of Ethiopia	Ethiopia	AF	CB	3.99	31%	1906
444 ▲ 1	Zuger Pensionskasse	Switzerland	EU	PF	3.98	0%	1858
445 ▲ 13	Maryland Supplemental Retirement Agency	US	NA	PF	3.97	12%	1974
446 ▲ 10	Bankës së Shqipërisë	Albania	EU	CB	3.89	8%	1992
447 ▲ 8	Cambridgeshire Local Government Pension Scheme	UK	EU	PF	3.89	7%	1974
448 ▲ 11	Dorset County Pension Fund	UK	EU	PF	3.81	8%	1974
449 ▲ 15	Nashville & Davidson County Met, Government Ret. System	US	NA	PF	3.77	10%	1963
450 ▲ 13	Buckinghamshire Pension Fund	UK	EU	PF	3.76	9%	1974
451 ▲ 1	Pensionskasse Thurgau	Switzerland	EU	PF	3.74	-1%	2006
452 ▲ 10	Durham County Council Pension Fund	UK	EU	PF	3.74	8%	1974
453 ▲ 8	Greater Gwent Pension Fund	UK	EU	PF	3.72	7%	1974
454 ▲ 11	Suffolk Pension Fund	UK	EU	PF	3.69	8%	1974
455 ▲ 14	National Provident Fund	Fiji	AP	PF	3.62	11%	1966
456 ▲ 16	Worcestershire Pension Fund	UK	EU	PF	3.61	13%	1946

Rank and change on 2018	Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
457 ▶ 0	Banco Central de Reserva de El Salvador	El Salvador	LA	CB	3.57	0%	1961
458 ▼ -7	Bank of Jamaica	Jamaica	LA	CB	3.55	-7%	1961
459 ▲ 22	Bank of Mongolia	Mongolia	AP	CB	3.55	18%	1991
460 ▲ 8	San Jose City Police & Fire Department Retirement Plan	US	NA	PF	3.50	6%	1961
461 ▲ 18	AHV-IV-FAK	Liechtenstein	EU	PF	3.49	15%	1958
462 ▲ 8	Chicago Policemen's Annuity & Benefit Fund	US	NA	PF	3.49	8%	1922
463 ▲ 11	Cumbria Local Government Pension Scheme	UK	EU	PF	3.42	10%	1974
464 ▼ -4	Autoriti Monetari Brunei Darussalam	Brunei	AP	CB	3.41	-2%	2011
465 ▲ 10	Solomon Islands National Provident Fund	Solomon Islands	AP	PF	3.41	9%	1988
466 ▲ 10	Bank of Uganda	Uganda	AF	CB	3.36	8%	1966
467 ▲ 10	Caisse Intercommunale de Pensions	Switzerland	EU	PF	3.35	10%	1924
468 ▲ 12	National Bank of Georgia	Georgia	EU	CB	3.29	8%	1919
469 ▲ 15	San Antonio Fire & Police Pension Fund	US	NA	PF	3.29	13%	1919
470 ▲ 25	Narodna Banka na Republika Makedonija	Macedonia	EU	CB	3.28	17%	1991
471 ▲ 11	Dyfed Pension Fund	UK	EU	PF	3.25	8%	1974
472 ▲ 1	Alabama Trust Fund	US	NA	SF	3.24	3%	1985
473 ▲ 13	Fife Pension Fund	UK	EU	PF	3.23	11%	1994
474 ▼ -3	Detroit Policemen & Firemen Retirement System	US	NA	PF	3.20	0%	1938
475 ▲ 17	Wiltshire Pension Fund	UK	EU	PF	3.20	14%	1950
476 ▲ 23	Asabri	Indonesia	AP	PF	3.15	15%	1971
477 ▲ 10	Oxfordshire Pension Fund	UK	EU	PF	3.15	8%	1974
478 ▼ -12	Banco de Moçambique	Mozambique	AF	CB	3.10	-8%	1975
479 ▲ 9	Northamptonshire Local Government Pension Scheme	UK	EU	PF	3.10	7%	1974
480 ▲ 5	Kentucky Public Employees' Deferred Compensation Authority	US	NA	PF	3.10	6%	1993
481 ▲ 21	PKH	Norway	EU	PF	3.06	13%	2013
482 ▲ 26	Houston Municipal Employees Pension System	US	NA	PF	3.06	15%	1943
483 ▲ 6	Falkirk Pension Fund	UK	EU	PF	3.06	7%	1994
484 ▲ 9	Wandsworth Pension Fund	UK	EU	PF	3.01	7%	1974
485 ▼ -2	Santa Barbara County Employees' Retirement System	US	NA	PF	3.01	3%	1937
486 ▲ 8	Banca Naţională a Moldovei	Moldova	EU	CB	3.00	7%	1991
487 ▲ 18	Gloucestershire Local Government Pension Fund	UK	EU	PF	2.99	11%	1974
488 ▲ 15	San Joaquin County Employees' Retirement Association	US	NA	PF	2.93	9%	1946
489 ▲ 26	Manhattan & Bronx Surface Transit Operating Authority	US	NA	PF	2.93	14%	1962
490 ▲ 10	Lincolnshire County Council Local Government Pension Scheme	UK	EU	PF	2.92	7%	1974
491 ▲ 16	Bedfordshire Pension Fund	UK	EU	PF	2.90	9%	1974
492 ▲ 12	Kantonale Pensionskasse Graubünden	Switzerland	EU	PF	2.90	8%	2008
493 ▲ 48	Public Employees Contributory Retirement Scheme	UK	EU	PF	2.88	28%	1967
494 ▲ 36	Employees Provident Fund	Nepal	AP	PF	2.85	21%	1959
495 ▲ 2	Baltimore County Employees' Retirement System	US	NA	PF	2.84	3%	1945
496 ▲ 2	Fort Worth City Employees' Retirement Fund	US	NA	PF	2.84	3%	1945
497 ▲ 22	TAP Brunei	Brunei	AP	PF	2.83	12%	1992
498 ▲ 15	Oklahoma Firefighters Pension & Retirement System	US	NA	PF	2.83	9%	1908
499 ▼ -9	Kantonale Pensionskasse Schaffhausen	Switzerland	EU	PF	2.80	-2%	2006
500 ▲ 16	Berkshire Pension Fund	UK	EU	PF	2.78	9%	1974
501 ▲ 16	Cardiff and Vale of Glamorgan Pension Fund	UK	EU	PF	2.76	8%	1974
502 ▲ 49	Banco Central del Ecuador	Ecuador	LA	CB	2.74	26%	1927

Rank and change on 2018	Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
503 ▲ 9	Baltimore City Fire & Police Employees' Retirement	US	NA	PF	2.74	4%	1962
504 ▲ 14	Somerset County Council Pension Fund	UK	EU	PF	2.73	8%	1974
505 ▲ 17	Warwickshire Pension Fund	UK	EU	PF	2.71	11%	1974
506 ▼ -15	Seattle City Employees' Retirement System	US	NA	PF	2.71	-5%	1929
507 ▲ 4	Phoenix City Employees' Retirement System	US	NA	PF	2.70	3%	1991
508 ▼ -7	Partnership Fund	Georgia	EU	SF	2.69	-1%	2011
509 ▲ 39	National Social Security Fund	Uganda	AF	PF	2.67	22%	1985
510 ▼ -4	State Capital Investment Corporation	Vietnam	AP	SF	2.65	-1%	2005
511 ▼ -2	Austin City Employees' Retirement System	US	NA	PF	2.64	0%	1941
512 ▲ 12	Gwynedd Pension Fund	UK	EU	PF	2.59	7%	1974
513 ▲ 7	Fairfax County Educational Empl. Supplementary Ret. System	US	NA	PF	2.59	4%	1973
514 ▲ 11	Oklahoma Police Pension & Retirement System	US	NA	PF	2.57	7%	1907
515 ▲ 6	Iowa Municipal Fire & Police Retirement System	US	NA	PF	2.57	4%	1992
516 ▲ 12	Marin County Employees' Retirement Association	US	NA	PF	2.56	9%	1937
517 ▲ 10	Swansea Pension Fund	UK	EU	PF	2.56	7%	1974
518 ▲ 19	Highland Council Pension Fund	UK	EU	PF	2.51	10%	1994
519 ▲ 17	Shropshire County Pension Fund	UK	EU	PF	2.45	7%	1974
520 ▲ 18	Denver Employees Retirement Plan	US	NA	PF	2.43	8%	1963
521 ▲ 14	Caisse des Dépôts et Consignations	Tunisia	AF	SF	2.43	5%	1816
522 ▲ 24	Cornwall Pension Fund	UK	EU	PF	2.40	9%	1974
523 ▲ 42	Costa Rican Social Security Fund	Costa Rica	LA	PF	2.39	22%	1941
524 ▲ 26	Clwyd Pension Fund	UK	EU	PF	2.38	9%	1974
525 ▲ 19	Lembaga Tabung Angkatan Tentera	Malaysia	AP	PF	2.38	7%	1984
526 ▼ -3	Bank of Haiti	Haiti	LA	CB	2.37	-2%	1979
527 ▲ 26	Personalvorsorgekasse der Stadt Bern	Switzerland	EU	PF	2.36	10%	1910
528 ▲ 3	National Insurance Fund	Barbados	LA	PF	2.34	0%	1967
529 ▲ 29	Special Forces Pension Plan	Canada	NA	PF	2.32	11%	2001
530 ▲ 12	Missouri Dept. of Transport. and Highway Patrol Employees' Ret. Syst.	US	NA	PF	2.31	3%	1955
531 ▲ 16	Caisse de pensions du personnel communal	Switzerland	EU	PF	2.31	5%	1895
532 ▲ 17	Arlington County Employees' Retirement System	US	NA	PF	2.31	6%	1981
533 ▲ 19	Pennsylvania Municipal Retirement System	US	NA	PF	2.30	6%	1943
534 ▲ 20	Pensionskasse des Kantons Schwyz	Switzerland	EU	PF	2.29	8%	2013
535 ▼ -39	Banco Central de Nicaragua	Nicaragua	LA	CB	2.26	-18%	1961
536 ▲ 9	Cincinnati Retirement System	US	NA	PF	2.26	1%	1984
537 ▲ 6	Stanislaus County Employees' Retirement Association	US	NA	PF	2.26	1%	1948
538 ▼ -5	Central Bank of Armenia	Armenia	EU	CB	2.25	-3%	1993
539 ▲ 242	NSW Generations Fund	Australia	AP	SF	2.24	N/A	2018
540 ▲ 43	Bank of Papua New Guinea	Papua New Guinea	AP	CB	2.21	28%	1973
541 ▼ -1	Newham Pension Fund	UK	EU	PF	2.21	-2%	1972
542 ▲ 13	Louisiana Municipal Police Employees Retirement System	US	NA	PF	2.19	5%	1973
543 ▲ 48	Lembaga Pengelola Dana Pendidikan	Indonesia	AP	SF	2.19	33%	1945
544 ▲ 16	Tampa Police & Firefighters' Pension Fund	US	NA	PF	2.17	6%	1948
545 ▲ 10	National Bank of the Kyrgyz Republic	Kyrgyzstan	AP	CB	2.16	3%	1991
546 ▼ -20	Bank of Namibia	Namibia	AF	CB	2.15	-10%	1990
547 ▼ -37	Central Bank of Bahrain	Bahrain	ME	CB	2.15	-18%	2006
548 ▼ -19	Dallas Police & Fire Pension System	US	NA	PF	2.11	-10%	1989

Rank and change on 2018	Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
549 ▲ 17	London Borough of Camden Pension Fund	UK	EU	PF	2.11	8%	1974
550 ▲ 28	Arkansas Local Police & Fire Retirement System	US	NA	PF	2.08	17%	1983
551 ▲ 12	San Jose City Federated City Employees Retirement System	US	NA	PF	2.08	4%	1941
552 ▲ 9	Louisiana School Employees' Retirement System	US	NA	PF	2.07	2%	1937
553 ▲ 22	Prince George's County Retirement System	US	NA	PF	2.06	11%	1993
554 ▲ 8	Centrale Bank van Curaçao en Sint Maarten	Curaçao	LA	CB	2.05	2%	1828
555 ▲ 4	Detroit General Retirement System	US	NA	PF	2.04	-1%	1938
556 ▲ 11	Southwark Council Pension Fund	UK	EU	PF	2.03	6%	1974
557 ▲ 11	Pensionskasse der Stadt Winterthur	Switzerland	EU	PF	2.01	5%	2014
558 ▲ 12	Jacksonville Police & Fire Pension Fund	US	NA	PF	2.00	6%	1937
559 ▲ 10	Chicago Transit Authority Employees Retirement Plan	US	NA	PF	2.00	5%	1949
560 ▲ 21	Anne Arundel County Retirement & Pension System	US	NA	PF	1.98	13%	1996
561 ▲ 19	London Borough of Tower Hamlets Pension Fund	UK	EU	PF	1.98	12%	1974
562 ▲ 14	London Borough of Hackney Pension Fund	UK	EU	PF	1.97	9%	1966
563 ▲ 9	Caisse Nationale d'Assurance Pension	Luxembourg	EU	PF	1.96	5%	1951
564 ▼ -25	Employees' Old Age Benefits Institution	Pakistan	AP	PF	1.94	-14%	1987
565 ▲ 22	National Social Security Fund	Kenya	AF	PF	1.94	15%	1965
566 ▲ 13	Baltimore City Employees' Retirement System	US	NA	PF	1.92	9%	1926
567 ▲ 10	Vermont State Employees' Retirement System	US	NA	PF	1.88	5%	1944
568 ▲ 6	Miami City Fire & Police Retirement Trust	US	NA	PF	1.87	0%	1985
569 ▲ 13	Lambeth Pension Fund	UK	EU	PF	1.84	6%	1974
570 ▲ 18	Haringey Council Pension Fund	UK	EU	PF	1.81	7%	1965
571 ▲ 25	Tacoma Employees' Retirement System	US	NA	PF	1.81	11%	1941
572 ▲ 17	Northumberland Pension Fund	UK	EU	PF	1.79	7%	1974
573 ▼ -9	Social Security and National Insurance Trust	Ghana	AF	PF	1.79	-10%	1972
574 ▲ 21	London Borough of Islington Pension Fund	UK	EU	PF	1.79	10%	1974
575 ▲ 19	City of Westminster Superannuation Fund	UK	EU	PF	1.78	9%	1972
576 ▲ 10	Government of Guam Retirement Fund	US	NA	PF	1.77	5%	1951
577 ▲ 16	Caisse de Prévoyance des Fonctionnaires de Police et de la Prison	Switzerland	EU	PF	1.75	7%	1930
578 ▲ 6	Eastern Caribbean Central Bank	E. Caribbean System	LA	CB	1.75	2%	1983
579 ▲ 13	London Borough of Lewisham Pension Fund	UK	EU	PF	1.74	6%	1974
580 ▲ 37	Nigeria Sovereign Investment Authority	Nigeria	AF	SF	1.74	26%	2011
581 ▲ 16	Banque Centrale de Madagascar	Madagascar	AF	CB	1.74	9%	1973
582 ▲ 27	Superannuation Fund	Guernsey	EU	PF	1.74	17%	1948
583 ▼ -10	Tallahassee Pension Plan	US	NA	PF	1.73	-7%	2004
584 ▲ 1	CPS Energy Employees' Pension Trust	US	NA	PF	1.71	0%	1986
585 ▲ 16	Pensionskasse St. Galler Gemeinden	Switzerland	EU	PF	1.71	10%	2012
586 ▲ 13	Louisiana Firefighters' Retirement System	US	NA	PF	1.71	7%	2008
587 ▲ 13	Royal Borough of Greenwich Pension Fund	UK	EU	PF	1.70	8%	1974
588 ▲ 10	Orlando Employee Retirement Funds	US	NA	PF	1.70	6%	1998
589 ▲ 31	Tulare County Employees' Retirement Association	US	NA	PF	1.69	23%	1945
590 ▲ 16	Metropolitan Water Reclamation District Retirement Fund	US	NA	PF	1.67	10%	1931
591 ▲ 12	Massachusetts Bay Transportation Authority Retirement Fund	US	NA	PF	1.67	8%	1948
592 ▼ -78	Banque Centrale du Luxembourg	Luxembourg	EU	CB	1.65	-36%	1998
593 ▼ -3	Japan Pension Service	Japan	AP	PF	1.62	-3%	2010
594 ▲ 16	London Borough of Ealing Pension Fund	UK	EU	PF	1.61	9%	1974

Rank and change on 2018	Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
595 ▼ -63	Sistema de Retiro de los Empleados de Puerto Rico	US	NA	PF	1.57	-33%	1964
596 ▼ -39	Bank of Zambia	Zambia	AF	CB	1.57	-25%	1964
597 ▲ 21	El Paso Firemen & Policemen Pension Fund	US	NA	PF	1.55	12%	1920
598 ▲ 6	Public Service Pensions Fund	Swaziland	AF	PF	1.55	0%	1993
599 ▲ 3	Memphis Light Gas & Water Division Pension Plan	US	NA	PF	1.55	0%	1948
600 ▲ 7	Vorsorgeeinrichtung der SUVA	Switzerland	EU	PF	1.53	1%	1918
601 ▲ 4	Pensionskasse Stadt Luzern	Switzerland	EU	PF	1.52	-1%	2012
602 ▲ 6	The National Board of the Commonwealth of the Bahamas	Bahamas	LA	PF	1.52	0%	1972
603 ▲ 19	Pensionskasse Stadt St. Gallen	Switzerland	EU	PF	1.51	11%	1922
604 ▲ 7	Croydon Pension Scheme	UK	EU	PF	1.49	5%	1974
605 ▲ 14	Arkansas State Highway Employees' Retirement System	US	NA	PF	1.47	7%	1949
606 ▲ 10	London Borough of Enfield Pension Fund	UK	EU	PF	1.47	6%	1974
607 ▲ 16	Barnet Pension Fund	UK	EU	PF	1.46	8%	1974
608 ▲ 19	Southeastern Pennsylvania Transportation Authority	US	NA	PF	1.45	10%	2007
609 ▲ 15	Royal Borough of Kensington and Chelsea Pension Fund	UK	EU	PF	1.44	7%	1998
610 ▲ 5	Fresno City Retirement Systems	US	NA	PF	1.44	3%	1939
611 ▲ 18	Prévoyance Santé Valais	Switzerland	EU	PF	1.44	11%	1984
612 ▶ 0	Louisiana Education Quality Trust Fund	US	NA	SF	1.42	0%	1986
613 ▲ 1	Fonds de Stabilisation Des Recettes Budgétaires	DR Congo	AF	SF	1.41	0%	1999
614 ▲ 11	Omaha School Employees' Retirement System	US	NA	PF	1.40	4%	2010
615 ▲ 6	Fondo de Ahorro de Panamá	Panama	LA	SF	1.40	2%	2012
616 ▲ 21	Fulton County Employees' Pension Fund	US	NA	PF	1.39	14%	1991
617 ▲ 17	San Luis Obispo County Pension Trust	US	NA	PF	1.37	9%	1958
618 ▲ 18	Hillingdon Pension Fund	UK	EU	PF	1.35	10%	1974
619 ▲ 9	London Borough of Hammersmith and Fulham Pension Fund	UK	EU	PF	1.35	4%	1974
620 ▲ 20	Fundusz Gwarantowanych Świadczeń Pracowniczych	Poland	EU	PF	1.35	11%	1994
621 ▲ 5	Puerto Rico Electric Power Authority Employees	US	NA	PF	1.32	0%	1945
622 ▲ 13	City of London Corporation Pension Fund	UK	EU	PF	1.31	5%	1974
623 ▲ 21	Caisse de pensions de la République et du Canton du Jura	Switzerland	EU	PF	1.30	9%	1979
624 ▼ -53	Georgia Municipal Association	US	NA	PF	1.30	-30%	1933
625 ▲ 13	Bromley Pension Fund	UK	EU	PF	1.30	6%	1974
626 ▲ 19	Barking and Dagenham Pension Fund	UK	EU	PF	1.29	9%	1974
627 ▼ -14	Central Bank of the Bahamas	Bahamas	LA	CB	1.28	-9%	1974
628 ▲ 3	Atlanta General Employees' Pension Fund	US	NA	PF	1.28	0%	1962
629 ▲ 1	National Bank of Tajikistan	Tajikistan	AP	CB	1.28	-1%	1991
630 ▲ 2	Wichita Employees' Retirement System	US	NA	PF	1.28	0%	1956
631 ▲ 8	Hounslow Pension Fund	UK	EU	PF	1.28	5%	1974
632 ▲ 18	Centralna Banka Crne Gore	Montenegro	EU	CB	1.26	17%	2001
633 ▲ 13	Chicago Laborers' Annuity & Benefit Fund	US	NA	PF	1.24	8%	1982
634 ▲ 34	Central Bank of the Republic of Guinea	Guinea	AF	CB	1.22	30%	1960
635 ▲ 7	Fondo para la Revolución Industrial Productiva	Bolivia	LA	SF	1.20	0%	2013
636 ▲ 12	Shelby County Retirement System	US	NA	PF	1.15	6%	1978
637 ▲ 12	Dumfries and Galloway Council Pension Fund	UK	EU	PF	1.14	6%	1994
638 ▲ 14	Banco de Previsión Social	Uruguay	LA	PF	1.12	5%	1970
639 ▲ 18	Bank Ċentrali ta' Malta	Malta	EU	CB	1.12	10%	1968
640 ▲ 16	London Borough of Bexley Pension Fund	UK	EU	PF	1.11	9%	1974

Rank and change on 2018	Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
641 ▲ 26	Bundespensionskasse	Austria	EU	PF	1.11	18%	2000
642 ▲ 13	Brent Pension Fund	UK	EU	PF	1.11	7%	1974
643 ▲ 16	London Borough of Harrow Pension Fund	UK	EU	PF	1.08	8%	1974
644 ▲ 14	Royal Borough of Kingston upon Thames Pension Fund	UK	EU	PF	1.08	7%	1974
645 ▲ 21	Waltham Forest Pension Fund	UK	EU	PF	1.08	14%	1974
646 ▲ 16	Pensionskasse Uri	Switzerland	EU	PF	1.07	10%	1938
647 ▲ 4	Pensionskasse Appenzell Ausserrhoden	Switzerland	EU	PF	1.06	-1%	2000
648 ▲ 6	South African Local Authorities Pension Fund	South Africa	AF	PF	1.05	0%	1985
649 ▲ 70	Central Bank of Barbados	Barbados	LA	CB	1.05	122%	1972
650 ▲ 3	PPF Pensions Fund	Tanzania	AF	PF	1.04	-2%	2002
651 ▲ 39	Public Service Pensions Fund	Tanzania	AF	PF	1.04	41%	1999
652 ▲ 13	London Borough of Redbridge Pension Fund	UK	EU	PF	1.03	8%	1974
653 ▼ -12	Royal Monetary Authority of Bhutan	Bhutan	AP	CB	1.03	-15%	1982
654 ▲ 6	Fonds Gabonais d'Investissements Stratégiques	Gabon	AF	SF	1.00	0%	2011
655 ▲ 5	Fonds Souverain d'Investissements Strategiques	Senegal	AF	SF	1.00	0%	2012
656 ▲ 13	Centrale Bank van Aruba	Aruba	LA	CB	0.99	6%	1986
657 ▲ 22	Palestine Investment Fund	Palestine	ME	SF	0.99	16%	2003
658 ▲ 5	Banka Slovenije	Slovenia	EU	CB	0.98	2%	1991
659 ▲ 18	Western Australian Future Fund	Australia	AP	SF	0.96	12%	2006
660 ▲ 33	Social Insurance Fund	Ireland	EU	PF	0.96	37%	2005
661 ▲ 13	Pensionskasse der Stadt Biel	Switzerland	EU	PF	0.96	9%	1923
662 ▲ 9	Central Bank of Cyprus	Cyprus	EU	CB	0.96	5%	1963
663 ▼ -16	Reserve Bank of Fiji	Fiji	AP	CB	0.95	-15%	1984
664 ▼ -31	Bank of the Lao PDR	Lao PDR	AP	CB	0.95	-25%	1968
665 ▲ 11	Havering Pension Fund	UK	EU	PF	0.94	9%	1974
666 ▲ 12	Banque Centrale de Mauritanie	Mauritania	AF	CB	0.93	8%	1973
667 ▲ 3	Puerto Rico System of Annuities and Pensions for Teachers	US	NA	PF	0.92	0%	2004
668 ▲ 5	Wayne County Employees' Retirement System	US	NA	PF	0.92	4%	1944
669 ▲ 11	Scottish Borders Council Pension Fund	UK	EU	PF	0.91	8%	1996
670 ▲ 2	National Bank of Rwanda	Rwanda	AF	CB	0.91	2%	1964
671 ▼ -7	Government Employees' Retirement System of the Virgin Islands	US	NA	PF	0.90	-6%	1959
672 ▲ 9	London Borough of Merton Pension Fund	UK	EU	PF	0.88	5%	1974
673 ▲ 9	Banka Qendrore e Republikës së Kosovës	Kosovo	EU	CB	0.88	8%	2006
674 ▲ 23	Ghana Petroleum Funds	Ghana	AF	SF	0.87	29%	2011
675 ▲ 9	Pensionskasse des Kantons Nidwalden	Switzerland	EU	PF	0.86	10%	1946
676 ▲ 22	National Social Security and Welfare Corporation	Liberia	AF	PF	0.85	27%	1975
677 ▲ 10	Pensionskasse des Kantons Glarus	Switzerland	EU	PF	0.85	12%	2011
678 ▲ 18	Cayman Islands Public Service Pensions Board	UK	EU	PF	0.84	24%	1999
679 ▲ 9	National Insurance Fund Jamaica	Jamaica	LA	PF	0.83	13%	1965
680 ▲ 5	Powys Pension Fund	UK	EU	PF	0.83	7%	1974
681 ▲ 21	London Borough of Sutton Pension Fund	UK	EU	PF	0.81	28%	1974
682 ▲ 1	Fondo para la Estabilización Macroeconómica	Venezuela	LA	SF	0.80	0%	1998
683 ▲ 21	Maldives Monetary Authority	Maldives	AP	CB	0.77	29%	1981
684 ▲ 7	Isle of Wight Council Pension Fund	UK	EU	PF	0.76	4%	1974
685 ▲ 1	Reserve Bank of Malawi	Malawi	AF	CB	0.76	-1%	1964
686 ▲ 9	Personalversicherungskasse Obwalden	Switzerland	EU	PF	0.76	10%	2011

Rank and change on 2018		Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
687	▲ 43	Eesti Pank	Estonia	EU	CB	0.76	119%	1919
688	▲ 4	Revenue Equalisation Reserve Fund	Kiribati	AP	SF	0.75	5%	1956
689	▲ 10	Central Bank of Lesotho	Lesotho	AF	CB	0.73	11%	1980
690	▲ 10	National Insurance Corporation of St. Lucia	E. Caribbean System	LA	PF	0.71	9%	1970
691	▲ 19	Jersey Teachers Superannuation Fund	UK	EU	PF	0.71	29%	2010
692	▼ -3	Instituto Nicaragüense de Seguridad Social	Nicaragua	LA	PF	0.70	-5%	1956
693	▲ 12	National Savings Fund	Mauritius	AF	PF	0.68	14%	1995
694	▲ 18	Banco Central de Timor-Leste	Timor-Leste	AP	CB	0.67	24%	2011
695	▼ -1	Banque Centrale du Congo	DR Congo	AF	CB	0.67	-4%	1997
696	▲ 5	National Social Security Fund	Tanzania	AF	PF	0.63	-2%	1997
697	▼ -163	Excess Crude Account	Nigeria	AF	SF	0.63	-73%	2004
698	▲ 10	Central Bank of Solomon Islands	Solomon Islands	AP	CB	0.62	10%	1985
699	▲ 4	Banco de Cabo Verde	Cape Verde	AF	CB	0.61	-2%	1975
700	▲ 23	Centrale Bank van Suriname	Suriname	LA	CB	0.58	37%	1957
701	▲ 10	Central Bank of Seychelles	Seychelles	AF	CB	0.55	1%	1978
702	▼ -315	Fondo de Estabilización de los Ingresos Petroleros	Mexico	LA	SF	0.54	-91%	2000
703	▲ 19	Palestine Monetary Authority	Palestine	ME	CB	0.54	20%	1994
704	▲ 2	Bank of Guyana	Guyana	LA	CB	0.53	-10%	1965
705	▲ 9	Saint Christopher and Nevis Social Security Board	E. Caribbean System	LA	PF	0.52	0%	1977
706	▲ 7	Bank of Sierra Leone	Sierra Leone	AF	CB	0.51	-5%	1964
707	▲ 14	Grant Schools Provident Fund	Hong Kong	AP	PF	0.49	4%	2000
708	▲ 10	Central Bank of Liberia	Liberia	AF	CB	0.48	1%	1999
709	▲ 11	Punjab Pension Fund	Pakistan	AP	PF	0.46	-2%	2008
710	▼ -1	Central Bank of Djibouti	Djibouti	AF	CB	0.45	-18%	1977
711	▼ -4	Central Bank of Swaziland	Swaziland	AF	CB	0.44	-24%	1974
712	▲ 13	Reserve Bank of Vanuatu	Vanuatu	AP	CB	0.42	6%	1981
713	▲ 2	Central Bank of Syria	Syria	ME	CB	0.41	-19%	1953
714	▲ 12	Saskatchewan Pension Plan	Canada	NA	PF	0.41	10%	1986
715	▲ 14	Algemeen Pensioenfonds Sint Maarten	Netherlands	EU	PF	0.38	11%	2010
716	▲ 15	Luzerner Gemeindepersonalkasse	Switzerland	EU	PF	0.36	10%	1965
717	▲ 11	Banca Centrale della Repubblica di San Marino	San Marino	EU	CB	0.34	-6%	2005
718	▲ 14	National Insurance Scheme Grenada	E. Caribbean System	LA	PF	0.34	5%	1983
719	▲ 18	South Yorkshire Passenger Transport Pension Fund	UK	EU	PF	0.32	13%	1974
720	▲ 18	Hampshire County Retirement System	US	NA	PF	0.32	16%	1911
721	▲ 15	Kantonale Versicherungskasse Appenzell Innerrhoden	Switzerland	EU	PF	0.32	10%	1930
722	▲ 17	Pensionskasse des Personals der Einwohnergemeinde Köniz	Switzerland	EU	PF	0.30	9%	1942
723	▲ 11	Fiscal Stability Fund	Mongolia	AP	SF	0.30	0%	2011
724	▲ 9	Central Bank of Belize	Belize	LA	CB	0.29	-6%	1982
725	▲ 2	Banko di Seguro Sosial	Curaçao	LA	PF	0.29	-19%	1960
726	▲ 55	Misr Fund	Egypt	AF	SF	0.28	N/A	2019
727	▲ 16	Seamen's Provident Fund Organisation	India	AP	PF	0.25	6%	1964
728	▲ 16	Korea Workers' Compensation & Welfare Service	South Korea	AP	PF	0.24	3%	1976
729	▲ 12	Pensionskasse der Gemeinde Küsnacht	Switzerland	EU	PF	0.24	-3%	2010
730	▲ 10	Social Security Board Belize	Belize	LA	PF	0.24	-8%	1981
731	▲ 14	Central Bank of Eritrea	Eritrea	AF	CB	0.24	8%	1914
732	▲ 10	Antigua-Barbuda Social Security Fund	E. Caribbean System	LA	PF	0.24	0%	1973

Rank and change on 2018	Institution	Country	Region	Type	Assets $bn	Assets % change	Year est.
733 ▲ 17	National Reserve Bank of Tonga	Tonga	AP	CB	0.23	14%	1972
734 ▲ 12	Seychelles Pension Fund	Seychelles	AF	PF	0.22	8%	1971
735 ▲ 16	Universities Provident Fund	Sri Lanka	AP	PF	0.21	5%	1978
736 ▲ 12	Turks and Caicos Islands National Insurance Board	UK	EU	PF	0.21	0%	1991
737 ▲ 10	Central Bank of Comoros	Comoros	AF	CB	0.20	-4%	1981
738 ▲ 11	Bank of Sudan	Sudan	AF	CB	0.20	-1%	1960
739 ▲ 15	Cayman Islands Monetary Authority	Cayman Islands	LA	CB	0.19	16%	1997
740 ▲ 13	Central Bank of Gambia	Gambia	AF	CB	0.19	13%	1971
741 ▲ 15	Colpensiones	Colombia	LA	PF	0.18	14%	2005
742 ▲ 19	Faletupe Tutotonu o Samoa	Samoa	AP	CB	0.17	29%	1984
743 ▲ 10	Fonds de Réserves pour Générations Futures	Equatorial Guinea	AF	SF	0.17	0%	2002
744 ▼ -20	Reserve Bank of Zimbabwe	Zimbabwe	AF	CB	0.09	-70%	1956
745 ▲ 7	Central Bank of Burundi	Burundi	AF	CB	0.07	-30%	1964
746 ▲ 13	Agaciro Development Fund	Rwanda	AF	SF	0.06	4%	2012
747 ▲ 12	Fonds National des Revenus des Hydrocarbures	Mauritania	AF	SF	0.06	0%	2006
748 ▲ 8	Banco Nacional de São Tomé e Príncipe	Sao Tome and Principe	AF	CB	0.04	-26%	1975
749 ▲ 12	Bank of South Sudan	South Sudan	AF	CB	0.03	0%	2011
750 ▲ 12	National Stabilisation Fund	Taiwan	AP	SF	0.00	23%	1973

NOTES ON DATA SOURCES AND TOP 750 ENTRIES

Data for assets under management are largely sourced from Global Public Investors' official websites, usually based on annual reports and financial statements. When no such official data are available, OMFIF uses reliable sources from the financial industry and research community.

Most data are taken as of December 2018. In cases where this is not possible, the latest available data are taken. Where figures are not recorded in dollars, an average conversion rate between the reporting currency and dollars of the year in which the report was published is used.

Total assets are used where possible, however in a small minority of cases net assets, fair value or market value are used.

1 Includes reserves managed by China's State Administration of Foreign Exchange
2 Includes assets held by the Japanese Ministry of Finance
3 Manages the Government Pension Fund Global
4 Also owns Central Huijin Investment, which owns government stakes in major Chinese banks. This is estimated to be over $400bn in total assets
5 Includes assets held by the Federal Reserve, Exchange Stabilisation Fund and Treasury
6 GIC manages government reserves
7 Temasek manages commercial assets previously owned by GIC and classifies itself as an investment company
8 Fund created through the 2018 merger of Mubadala Development Company and the Abu Dhabi Investment Council
9 Includes assets held by the HM Treasury
10 The PIC is also responsible for investing the assets of the Government Employees Pension Fund
11 Includes assets of the Labor Pension Fund, Labor Retirement Fund, Labor Insurance Fund, Employment Insurance Fund, Occupation Incidents Protection Fund, Arrear Wage Payment Fund, and the National Pension Insurance Fund
12 Includes all pension funds under the North Carolina State Treasurer
13 Includes Alberta's Heritage Savings Trust Fund
14 Régime de retraite des employés du government et des organismes publics
15 Includes the National Investment Corporation of Kazakhstan and Unified State Pension Fund of Kazakhstan
16 Replaces the National Pensions Reserves Fund
17 Includes Land Grant and Severance Tax Permanent Funds
18 Includes Judges' School, State Patrol, State Cash and County Cash Plans
19 Includes ERS, TSB, MERS, SPRBT, JRBT, RIJRFT, and RI Defined Contribution Plan
20 Includes Employees System, Police System and Uniformed System
21 Previously named Fondo Strategico Italiano

NOTE ON METHODOLOGY

The ranking table includes 750 Global Public Investors.

All figures are in dollars. Throughout the publication 'dollar' refers to the US currency. Figures for the percentage change in assets are calculated using year-on-year figures where possible, generally between December 2017-December 2018.

OMFIF adopts a regional classification: Africa (AF), Asia Pacific (AP), Europe (EU), Latin America Caribbean (LA), Middle East (ME) and North America (NA).

Three broad fund classifications – central banks (CB), public pension funds (PF) and sovereign funds (SF) – integrate different categories of asset managers in an easy-to-assess manner.

OMFIF recognises that not all states are universally recognised as enjoying full political independence or sovereignty. Seven central banks, such as South Korea and Israel, from countries not recognised by at least one UN member, are included. A small number of central banks from countries that are recognised are excluded as no reliable information is available.

Nine independent states do not have a fully-functioning central bank that holds their reserves. North Korea's foreign exchange reserves are held by the Foreign Trade Bank.

Of the 44 inhabited overseas territories, dependencies or other non self-governing territories, six have central banks and monetary authorities, five of which are included in the GPI ranking (Bermuda is not included due to lack of data).

Institutions such as pension funds are deemed public if they fulfil at least one of the following characteristics: they are owned or financed by the state; they serve public employees; or they are constituted as public institutions under public law.

Sovereign funds are institutions owned or controlled by the government and are mandated to manage assets transferred by the government. These assets are derived from balance of payments surpluses, official foreign currency operations, the proceeds of privatisations, fiscal surpluses and receipts resulting from commodity exports. Sovereign wealth funds, a smaller grouping within this category, are contained in the sovereign fund definition.

Sovereign funds generally operate without explicit short-term liabilities and a significant share of their investments are in international assets. They typically fulfil some combination of the following roles: stabilisation fund to insulate the budget and national economy from 'Dutch disease' and volatile commodity prices; savings fund to share wealth across generations; development fund to provide resources for socioeconomic projects; and reserve investment fund to invest excess reserves in assets with higher returns.

Some institutions are grouped to reduce double-counting and eliminate doubts about sectoral overlaps. The most notable examples are: the US, where the term US Monetary Authorities has been used; China, where the holdings of the People's Bank of China include those of the State Administration of Foreign Exchange and other associated institutions; Japan, where the foreign reserves are owned by both the Bank of Japan and the Ministry of Finance; and the UK, where the Treasury's Exchange Equalisation Account owns the Bank of England's reserves.

'US Monetary Authorities' represents a combination of US institutions. The Federal Reserve holds some foreign reserves, while the Exchange Stabilization Fund holds the rest along with US stocks of special drawing rights. The general account of the Treasury holds the US gold reserves and the International Monetary Fund position. The Federal Reserve Bank of New York operates for both the Treasury and the Federal Open Market Committee and holds the Federal Reserve System's foreign exchange.

Central bank reserves include foreign exchange, gold, International Monetary Fund position and special drawing right holdings. Gold valuations are given by the IMF. This does not always match central banks' own valuation of their gold holdings.

IMPORTANT NOTE

Figures for previous years and percentages changes may not correspond directly to those published in earlier editions of *Global Public Investor*. This reflects revisions to and comparisons between 2018 data and past years' figures, as well as changes to the composition of the 750 institutions from year to year because of fluctuations in asset values.

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