Invesco

Invesco Global Sovereign Asset Management Study 2015

This study is not intended for members of the public or retail investors.
Full audience information is available inside the front cover.

Important information
This document is intended only for Qualified Investors in Switzerland and for Professional Clients in other Continental European countries, Dubai, Jersey, Guernsey, Isle of Man and the UK, for Institutional Investors in the United States and Australia for Institutional Investors and/or Accredited Investors in Singapore, for Professional Investors only in Hong Kong, for Professional Investors, pension funds and distributing companies in Japan; for Persons who are not members of the public (as defined in the Securities Act) in New Zealand, for accredited investors as defined under National Instrument 45-106 in Canada and for one-on-one use with Institutional Investors in Bermuda, Chile, Panama and Peru.

This document is for information purposes only and is not an offering. It is not intended for and should not be distributed to, or relied upon by, members of the public. Circulation, disclosure, or dissemination of all or any part of this material to any unauthorised persons is prohibited.

Welcome
As chair of Invesco's Global Sovereign Group, I am delighted to share with you our third report on the sovereign asset management industry. This year we have expanded our study to include interviews with 59 sovereign wealth funds, government pension funds and central banks worldwide.

The environment for sovereign investors continues to be volatile. Geopolitical risk continues, and oil prices are volatile after having fallen sharply, bringing to an end a four-year period of stability. Our sovereign investor framework, which groups sovereigns into four objective-based categories, remains in our view the most relevant means to explain sovereign investor issues and behaviours.

Our first theme looks at how the fall in the oil price is expected to affect funding and capital flow across sovereigns. We note how these expectations vary by region but also that there is positive sentiment around managing this long-term.

In last year's report we looked at how strategic asset allocation was driving increased allocations to emerging markets and alternatives. This year we've analysed the relationship between asset class and region and highlight strong demand for infrastructure, particularly within emerging markets. We explore the drivers for this behaviour and highlight how infrastructure, investing is acting as a catalyst for sovereign collaboration.

Sovereigns have previously cited investment strategy as a key challenge. We note some key changes in this year's report, with sovereigns increasingly focusing on execution. We explore the relationship between internal and external management and active versus indexing strategies.

We look in detail at currency management and define three investment strategies and their rationales.

We conclude the report by focusing on central banks. We identify currency diversification driven by a desire to increase risk asset exposure and examine how this is increasing demand for external asset management.

We believe that the key themes in this report deliver unique, evidence-based findings and hope these provide insights into a fascinating and important group of investors.

Summary of key themes

1
The impact of the oil price on sovereign investors
The fall in the oil price is expected to reduce funding and increase withdrawal risk but sovereigns are better placed to manage these challenges than in the past.

2
Growth and implications of infrastructure investing
In emerging markets, infrastructure helps sovereigns manage investment risk. Demand for infrastructure is increasing and changing the nature of sovereign collaboration.

3
The evolution of sovereign asset management strategies
Internal versus external management and active versus indexing decisions are becoming more important and established sovereigns are citing a shift to external active management.

4
Currency management is a challenge for sovereign investors
There are different levels of awareness and strategies for currency management; sovereigns expect the importance of currency management to increase over time.

5
Central banks and their investment portfolios
Central banks are seeking currency diversification, risk asset exposure and support from external asset managers.

Nick Tolchard
Chair of Invesco's Global Sovereign Group
nick.tolchard@invesco.com
+44 1491 417010

igsams.invesco.com
Visit the study webpage to view more content on this year's themes

1

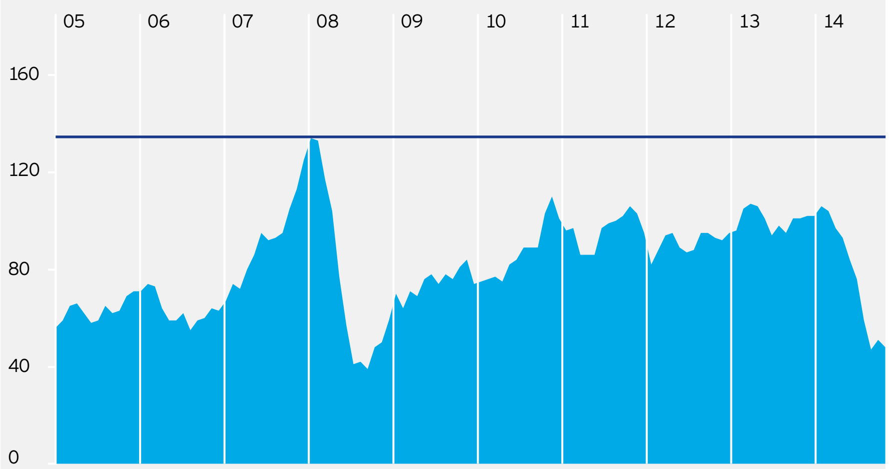
The impact of the oil price on sovereign investors

The fall in the oil price is expected to reduce funding and increase withdrawal risk but sovereigns are better placed to manage these challenges than in the past.

Over the past few years we have reflected on the investment objectives and behaviours of sovereign investors
During this period investors have been operating within a uniquely low return environment supported by ongoing quantitative easing. We have also seen the impact of continued uncertainty in the eurozone coupled with political instability in the Middle East. While we have tracked the impact of these political and economic events, all of them started, in some form, prior to us publishing our first Global Sovereign Asset Management Study.

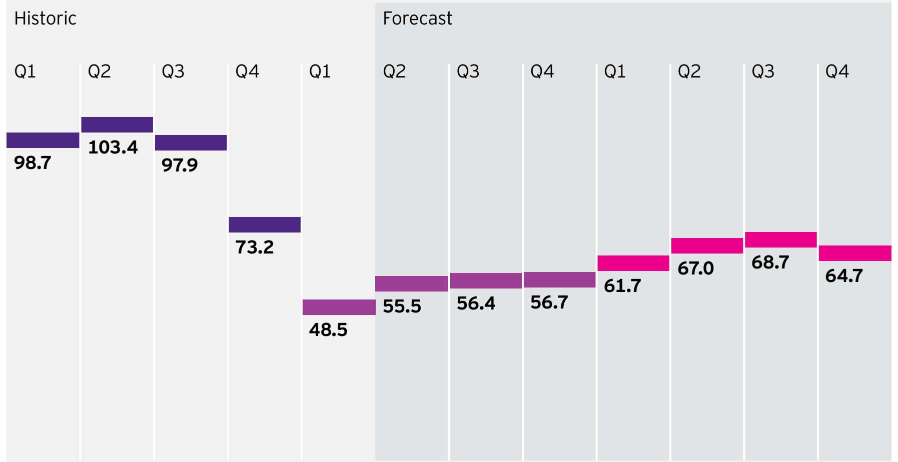
2015 is the first year in which we can monitor a major economic change from inception. Since Q3 2011 (before our first sovereign study in 2013), the oil price has moved within a relatively small range around the US$100 per barrel mark as shown in figure 1. However in Q3 2014 (after our second study in H1 2014) the change in supply, driven first by shale producers in North America and then by the response from Gulf Cooperation Council (GCC) oil producers, pushed the oil price down, until it finally fell below US$50 per barrel in January 2015. Many industry commentators forecast several years of lower prices. Figure 2 plots the quarterly decline since 2014 as well as an oil price projection through to the end of 2016 from the US Energy Information Administration on 7th April 2015.

Fig 1. Historic annual price of West Texas Intermediate (WTI) crude oil ($)



Average monthly price in US dollars of one barrel of West Texas Intermediate (WTI) crude oil.
[1] High water mark defined as highest monthly price during the given year, reached during June 2008.
Source: US Energy Information Administration – Short Term Energy Outlook, 7th April 2015.

Fig 2. Historic and forecast quarterly price of WTI crude oil



Average quarterly price in US dollars of one barrel of West Texas Intermediate (WTI) crude oil.
Source: US Energy Information Administration – Short Term Energy Outlook, 12th May 2015.

Such a significant shift in the oil price has major implications for economies, stock markets and especially current account surpluses, which drive funding for many sovereign investors. In theory funding challenges are potentially relevant to all sovereign segments (as defined by the Invesco sovereign investor profiles in figure 3). In practice we note that funding issues will impact investment sovereigns the most. This is supported by the higher importance placed on commodities (typically oil) for funding, seen in figure 4, and by the fact that more than 70% of investment sovereigns expect funding to reduce in the future (see figure 5).

Based on our discussions with sovereigns, the oil price-related challenges for sovereigns are typically characterised by the following key questions:

– Will sovereigns continue to receive new funding from their governments?
– Will governments withdraw funds from sovereigns?
– Will the change in oil price impact sovereign objectives or investment strategy?

We will cover each of these questions in turn within this theme.

> "In theory funding challenges are potentially relevant to all sovereign segments."

Fig 3. Invesco's sovereign investor profiles

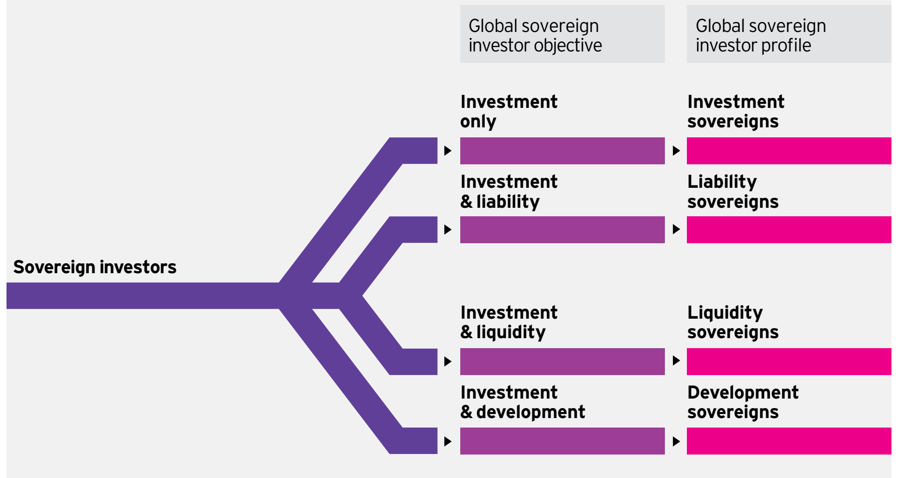
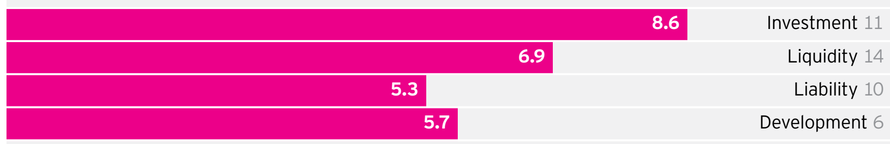
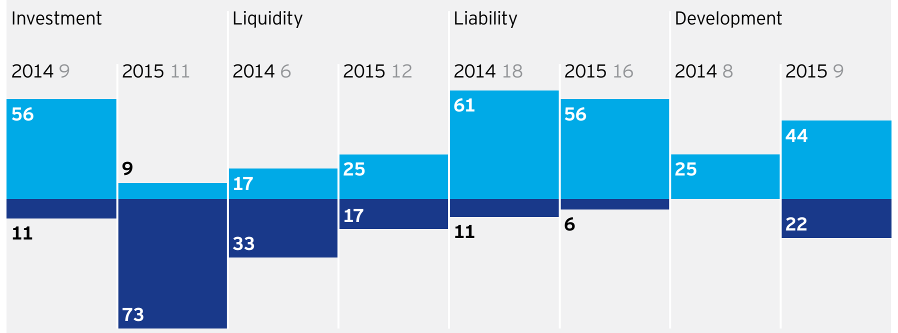


Fig 4. The importance of commodity prices in influencing funding by sovereign investor profile



Importance rated on a score from 1 to 10 where 10 = most important. Sample size shown in grey.

Fig 5. Expected future change in new funding by sovereign investor profile (%)



Sample size shown in grey.

"Many North American sovereigns are forecasting years of no or reduced funding and are busy working through the implications for their long-term investment strategies."

Funding challenges for sovereigns in North America, not just emerging markets

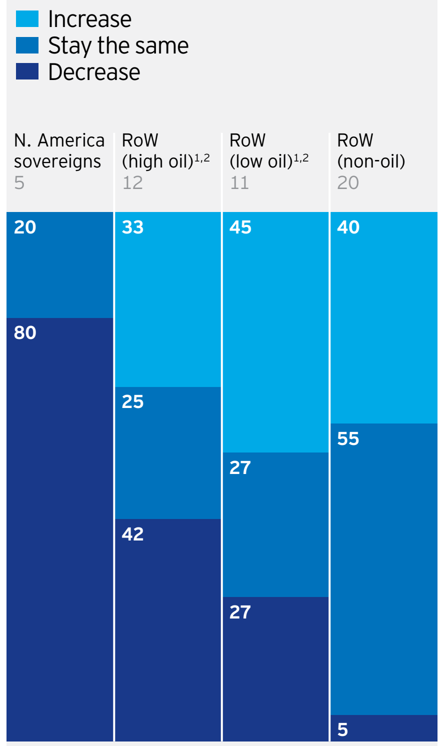
Oil prices and oil-funded sovereign wealth funds are associated with emerging markets, notably the Middle East. However our study indicated that, from a funding perspective, sovereigns in North America were most acutely impacted. Sovereigns in the US and Canada have been established as a result of state surpluses in commodity-rich regions. In these regions the timing of the fall in the oil price has been particularly challenging for state governments. Respondents explained that reduced revenues from oil producers have driven down state taxation income at the same time as the baby boomer generation has reached retirement. More retirees means further reduced tax revenues combined with increased state welfare costs.

Many North American sovereigns are forecasting years of no or reduced funding and are busy working through the implications for their long-term investment strategies. Figure 6 validates this finding, showing that 80% (4 out of 5) of North American sovereign investors are expecting funding to reduce compared to only 42% (5 out of 12) for oil-funded sovereigns in the rest of the world. However, the 42% remains meaningful and demonstrates the link between sovereign funding and oil across the world. In figure 6 one can also observe that sovereigns that are not dependent on oil continue to be positive on new funding, consistent with overall results in previous years.

The risk of withdrawals is increasing liquidity objectives and allocations

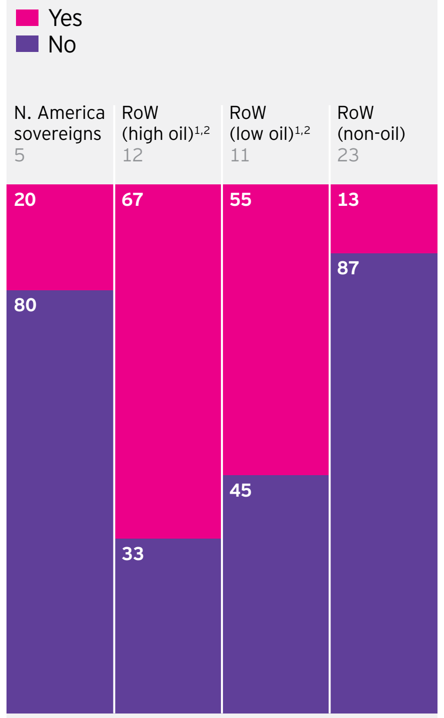
In contrast to funding issues, North American sovereigns were confident their assets are protected from the government. This was not the case in other parts of the world. The oil price has highlighted the importance of governance and legal structures surrounding sovereign investors. Figure 7 shows that 67% of sovereigns in countries outside North America (labelled 'RoW', for rest of world)with a high dependency on oil (defined as oil rents accounting for 25% of GDP) expected withdrawals if the oil price remains below US$40 per barrel for two years. During Q4 2014 (the design period of this study) this scenario looked implausible. However, at the time of fieldwork (13 January to 23 March) the scenario was very real.

Fig 6. New funding dynamics by sovereign oil dependency



[1] RoW = Rest of world, defined as sovereigns from countries other than the US and Canada.
[2] Low oil exposure is defined as oil rents/GDP less than 25%, high oil exposure is oil rents/GDP greater than 25% Oil rents data source: The World Bank, World Development Indicators.
Sample size shown in grey.

Fig 7. Views of sovereigns on potential funding withdrawals due to sustained low oil prices



[1] RoW = Rest of world, defined as sovereigns from countries other than the US and Canada.
[2] Low oil exposure is defined as oil rents/GDP less than 25%, high oil exposure is oil rents/GDP greater than 25% Oil rents data source: The World Bank, World Development Indicators.
Sample size shown in grey.

Confidence in the short term

The impact of withdrawal and funding risks on sovereign objectives and investment strategy was polarised. Some sovereigns have extremely conservative objectives and portfolios so there was no need to reduce risk appetite or shift portfolios into lower risk assets. Other sovereigns have shifted their priorities, noted in an increase of the average liquidity objective importance (excluding central banks) from 6.7 to 7.3 out of 10.

Overall, sovereigns were confident in their ability to manage the impact of withdrawals. Respondents explained that they were in a much better position this year than they were prior to the global financial crisis (GFC) in 2008. We noted the following improvements following the GFC:

- Greater recognition of liquidity objectives from Board level down to investment teams and an improved governance process to sign off withdrawals.
- More sophisticated risk management models to understand the implications of withdrawals for investment strategy and asset allocation.
- Improved management information and reporting on liquidity metrics and an understanding of how best to liquidate assets.

These observations suggest fewer, more incremental changes to investment strategy and asset allocation in the short term. We will assess this hypothesis in future studies by monitoring the extent to which withdrawals from sovereigns drive risk assets into fixed income and cash.

However, for certain sovereigns the price drop has raised some concerns over long-term strategic direction. Respondents explained that the change appears to have validated more conservative sovereign investment and governance strategies. As a result the probability of sovereigns making progressive changes to investment strategy (such as new benchmarks, strategic asset allocations or organisational structures) has reduced. In conclusion, we suspect the oil price movement will have fewer short-term impacts but more long-term strategic implications than the asset management industry expects.

2

Growth and implications of infrastructure investing

In emerging markets infrastructure helps sovereigns manage investment risk. Demand for infrastructure is increasing and changing the nature of sovereign collaboration.

We identified strong demand for alternative and emerging market investments last year
We explained that many sovereigns had made recent policy decisions to increase strategic asset allocations to alternatives to optimise risk-adjusted returns and diversification benefits. Furthermore emerging market target allocations increased, in recognition of attractive economic growth profiles. These changes will take time to implement due to supply shortages and execution challenges in these asset classes and regions. Our results this year validate the strong growth prospects for alternatives: figure 8 shows that each alternative asset class is expected to grow strongly on a net respondent view basis.

This theme goes further by analysing the relationship between asset classes and regions. Figure 9 maps out two headline correlations of respondent portfolios. First is the relationship between emerging markets and infrastructure: 9% of total sovereign portfolios were allocated to emerging markets compared to 17% for emerging market infrastructure. Second is the relationship between developed markets and real estate: 56% of total sovereign portfolios are allocated to developed markets compared to 73% for developed market real estate.

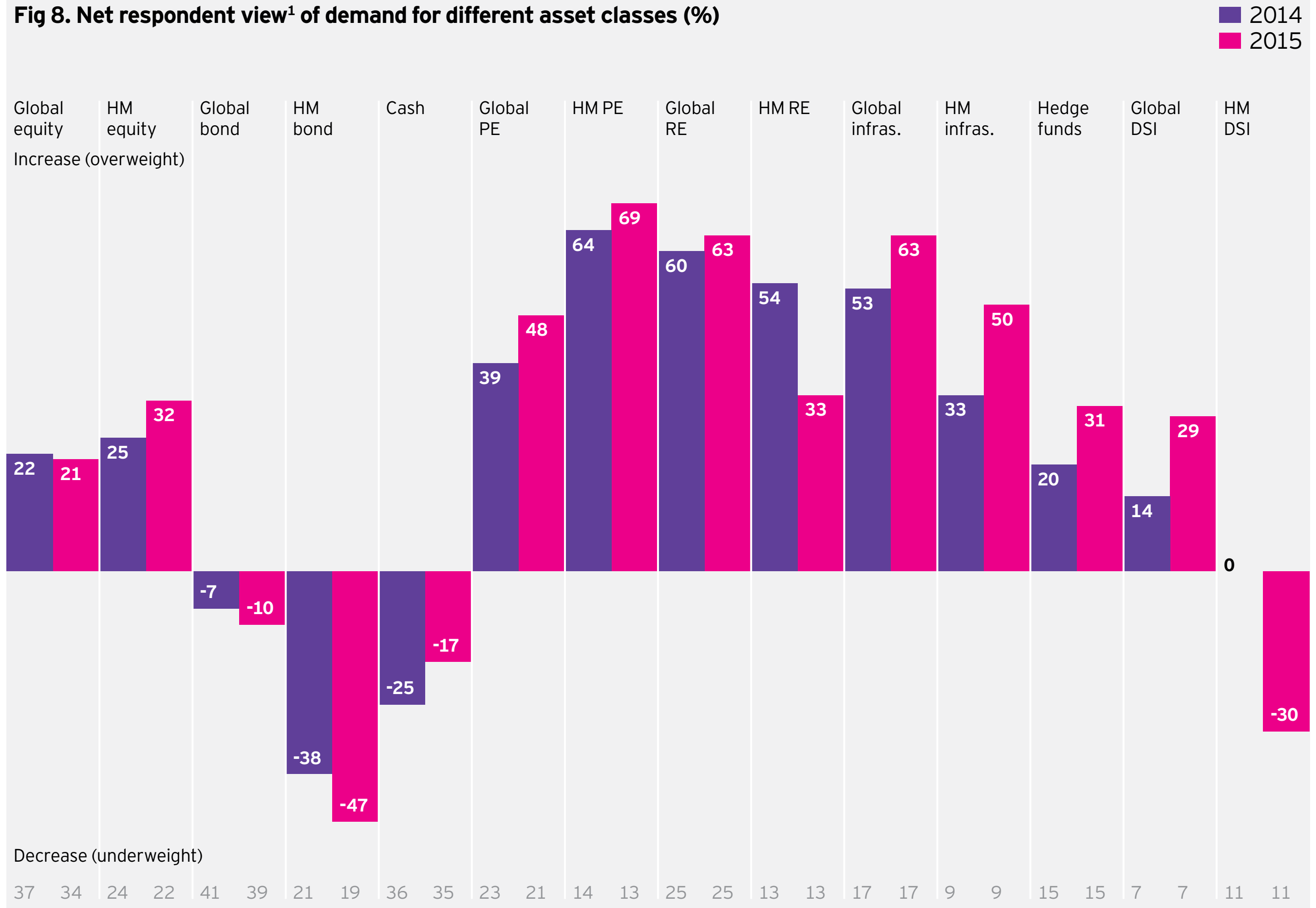
17%

17% of total sovereign infrastructure investments are allocated to emerging markets.

73%

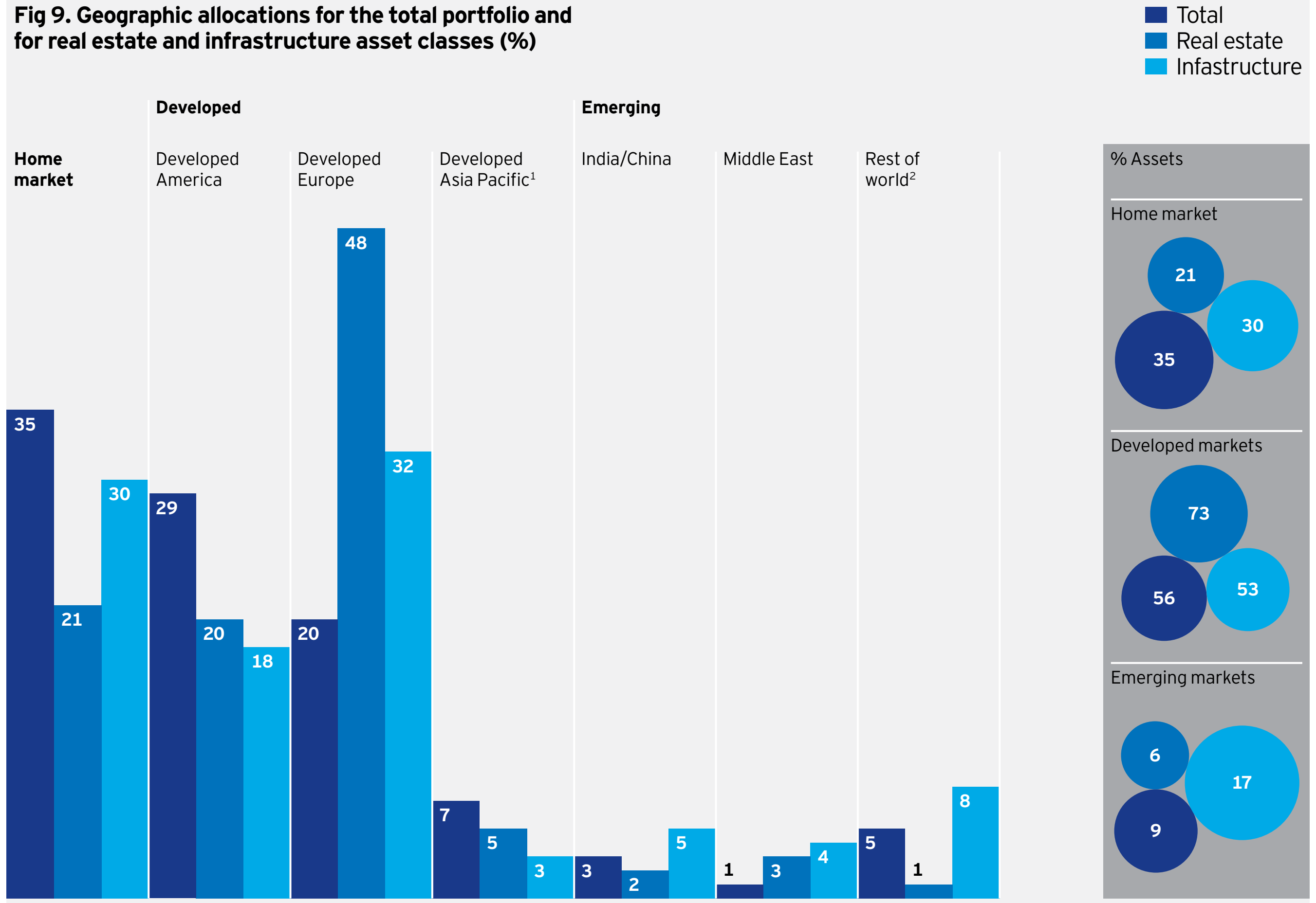
73% of total sovereign real estate investments are allocated to developed markets.

Fig 8. Net respondent view[1] of demand for different asset classes (%)



[1] Net respondent view, defined as difference between positive and negative responses. HM (home market); PE (private equity); RE (real estate); infras (infrastructure). Sample size shown in grey.

Fig 9. Geographic allocations for the total portfolio and for real estate and infrastructure asset classes (%)

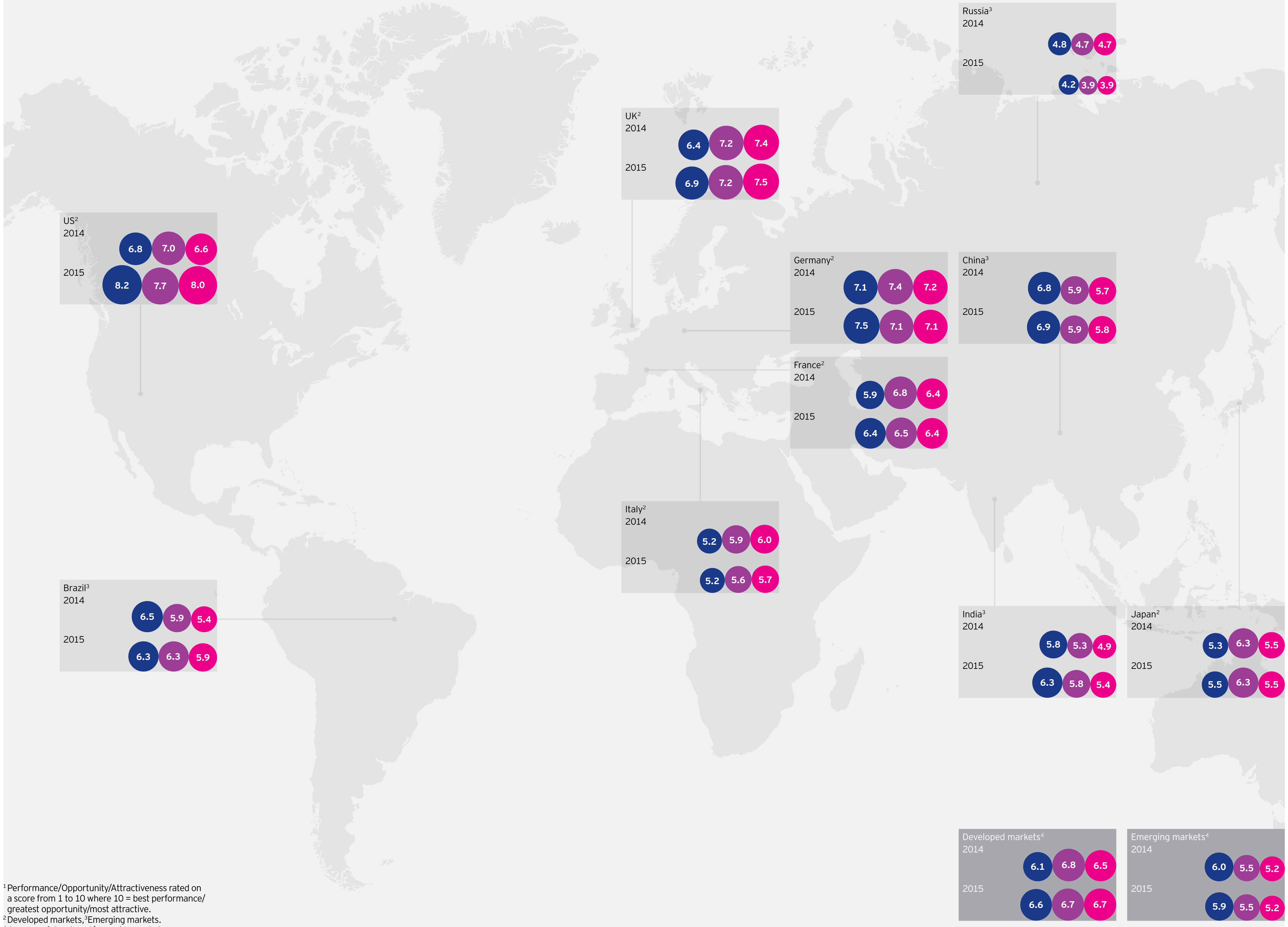


[1] Developed Asia Pacific consists of Developed Asia, Australia and New Zealand. [2] Rest of world consists of Latin America, Africa, Central and Eastern Europe and Emerging Asia (excluding India and China). Sample: 46.

Risks of investment in emerging markets
Despite a strategic commitment to emerging markets, sovereigns highlight the investment risks, such as political instability, corruption, regulation change and a lack of legal protection, as limiting factors. These risks are of particular concern to sovereigns because they cannot be quantified and many emerging market investments are prohibited by risk management guidelines irrespective of potential returns. These findings help to explain why the average scores decline when respondents rate emerging markets on sovereign investor attractiveness rather than economic performance (see figure 10). As an example, we note the difference for China between economic performance rated 6.9 out of 10 and the attractiveness to a sovereign investor rated 5.8 out of 10. There are also comparable declines for India, Brazil and Russia.

As an example, we note the difference for China between economic performance rated 6.9 out of 10 and the attractiveness to a sovereign investor rated 5.8 out of 10.

Fig 10. Perceived attractiveness of the top 10 economies based on economic performance, private sector investment opportunities and investment opportunities for sovereign investors



[1] Performance/Opportunity/Attractiveness rated on a score from 1 to 10 where 10 = best performance/greatest opportunity/most attractive.
[2] Developed markets, [3] Emerging markets.
[4] Average of developed/emerging markets scores.
Sample: 27 (2015).

In emerging markets, infrastructure helps sovereigns manage investment risk
The attraction of infrastructure to sovereigns is well documented. Sovereigns feel they have the competitive advantage over most other investors due to their long-term investment horizon, their ability to absorb large deal sizes via flexible financing structures and their ability to leverage their network to source deals.

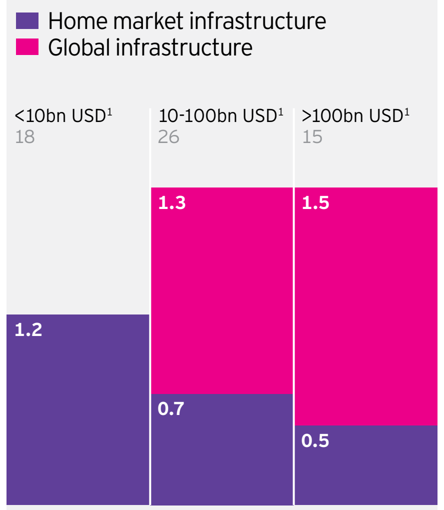
However there are two further factors that make infrastructure investments particularly attractive in emerging markets. First, within emerging markets infrastructure is seen as low risk compared to other asset classes: infrastructure reduces risks linked to politics and regulation as investments often have local governmental support. Furthermore many respondents explained that co-investment with other international organisations such as governments, development banks and sovereign investors (all regular infrastructure investors) adds credibility and helps to reduce perceived investment risk.

Second, the supply demand dynamics are more attractive than for developed market infrastructure. We note McKinsey[1] forecast a global infrastructure need of US$57 trillion between 2013 and 2030. The report estimated the value of Brazil's infrastructure assets at 53% of GDP compared to an average of 70% for selected global economies. It also outlined Latin America's spending on infrastructure at 2.3% of GDP, which is lower than that of the US, the EU and Japan. These statistics are supported by our discussions with sovereigns. Respondents cited a pipeline of large infrastructure projects in emerging markets and strong interest in sovereign investment from emerging market governments.

Despite strong underlying demand for emerging market infrastructure investment, some challenges remain for sovereigns. Data quality to manage and monitor investments was a concern, notably in the most politically unstable or corrupt regions. Deal size and frequency was a collective challenge for the larger sovereigns needing to deploy significant assets. Cost was a concern across a range of sovereigns, particularly when you pay an external party to source the deal but even the costs of an internal team were significant when translated into basis points. Despite low levels of competition relative to developed market infrastructure, competition was a challenge for the smaller sovereigns, who were often only able to compete in their home market. This observation is supported by figure 11, which shows that sovereigns with less than US$10bn in assets have only invested in local infrastructure projects.

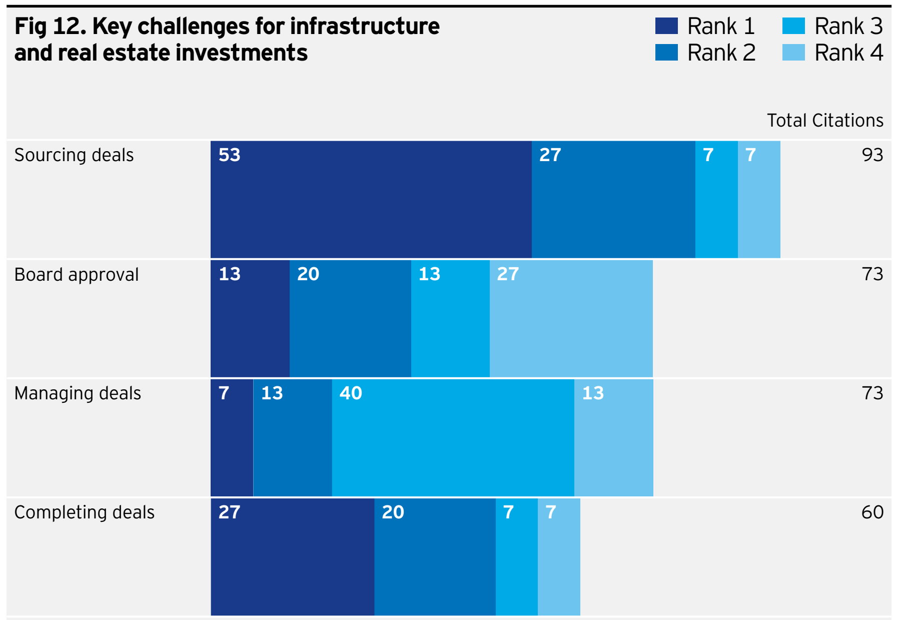
[1] 'Infrastructure productivity: how to save $1 trillion a year', McKinsey Global Institute, January 2013

Fig 11. Home market and global infrastructure investment by size (based on AUM) (%)



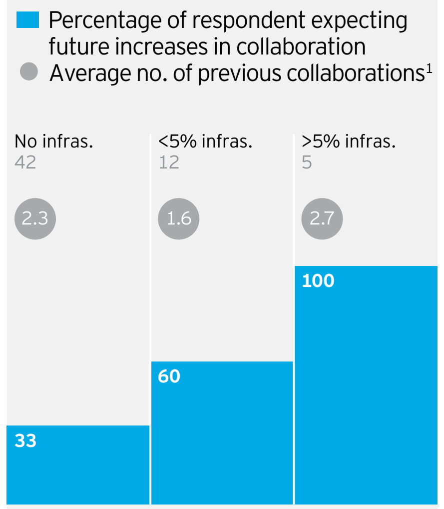
[1] Size of assets. Sample size shown in grey.

Fig 12. Key challenges for infrastructure and real estate investments



Rank 1 = most challenging. Rank 4 = least challenging. Sample: 15.

Fig 13. Expected increase in sovereign collaboration by infrastructure allocation



[1] Previous collaborations across entire portfolio. infras (infrastructure). Sample size shown in grey.

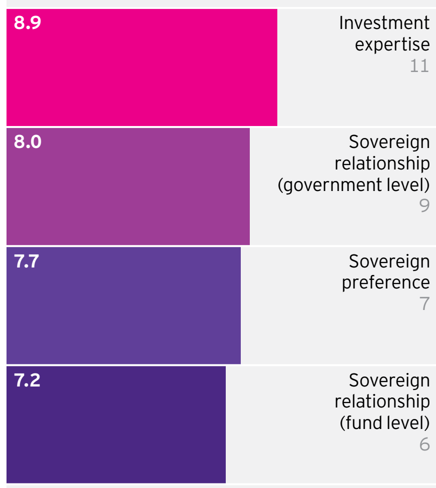
Demand for infrastructure has acted as a catalyst for sovereign collaboration
Infrastructure and real estate (especially in commercial and retail sectors) are high-value, low-frequency investments. As a result, it is no surprise that the biggest challenge for sovereigns is sourcing deals (53% of sovereigns cited this as the number one factor - see figure 12). Respondents explained that sourcing deals is hardest in infrastructure and that it was driving accelerated growth in collaboration between sovereign investors. Sovereigns cited three primary benefits to collaboration:

1. Board approval: the presence of certain peers within an infrastructure deal effectively guaranteed Board approval.
2. Commercials: a syndicate of sovereigns can improve pricing based on scale benefits and credibility from multiple investors.
3. Referrals: a belief that an introduction by one sovereign to another may be reciprocated in the future, especially given the view that local sovereign investors have the inside track on any infrastructure projects in their home-market.

The growth in sovereign collaboration linked to infrastructure is supported by findings in figure 13. Every sovereign with an allocation of greater than 5% to infrastructure expected to increase collaborations in the future. Furthermore, these sovereigns had already collaborated (across all collaboration models) with an average 2.7 other sovereigns, higher than that of sovereigns with lower infrastructure allocations. We also note that intra-sovereign collaborations form only one component of a sovereign investor's partnership strategy for real estate and infrastructure, with partnerships also extending to the private sector.

Evolving sovereign collaboration models
The nature of sovereign collaboration is also changing. In the past sovereign collaboration was driven by government relationships and regional proximity. This year sovereigns explained that investment expertise was the primary driver for collaboration, rated at 8.9 out of 10 in importance in figure 14. Investment-focused collaboration is evolving quickly and certain sovereigns are developing infrastructure propositions specifically to target other sovereigns (as well as private sector investors). Many respondents felt this trend was intuitive: established sovereigns are best placed to help emerging sovereigns enter new alternative asset classes. In summary, traditional relationship models are changing and the investment industry is becoming more integrated and more complex.

Fig 14. Key drivers of sovereign collaboration



Importance rated on a score from 1 to 10 where 10 = most important. Sample size shown in grey.

"Respondents explained that sourcing deals is hardest in infrastructure and that it was driving accelerated growth in collaboration between sovereign investors."

3

The evolution of sovereign asset management strategies
Internal versus external management and active versus indexing decisions are becoming more important and established sovereigns are citing a shift to external active management.

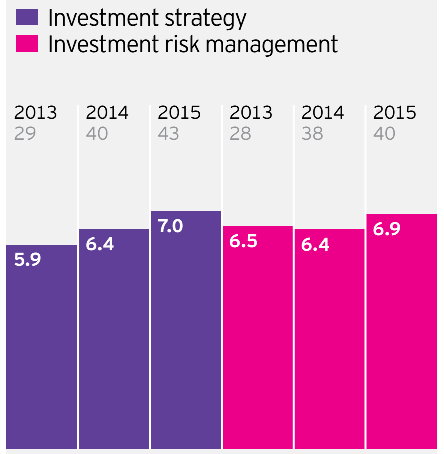
Sovereigns have historically cited investment strategy as a key challenge
Investment strategy includes designing and prioritising benchmarks as well as agreeing strategic and tactical asset allocations. It was evident during discussions this year that sovereigns have invested significant resources into this space. Sovereigns are more confident with the rationale for their strategy and can articulate why it differs from peers and from the latest academic research on investment strategy and portfolio construction. Growing confidence in investment strategy is evidenced in figure 15 where sovereign perception of capability performance has risen from 5.9 in 2013 to 7.0 out of 10 in 2015. Furthermore, the perceptions of investment risk management performance (another key challenge for sovereigns) have also increased this year.

Increasing focus on asset management strategies
As investment strategy improves, sovereigns explained that they were focusing on execution and we noted more discussions on underlying asset management strategy (both internal versus external and active versus indexing) this year. There is a capability gap (defined as the difference between perceived capability importance and capability performance) in internal asset management, which has remained this year. Furthermore, there is an even greater capability gap in people and talent, which is cited as the key enabler to internal asset management performance (see figure 16). Sovereigns are less concerned by external manager selection despite some comments on paying active fees for funds which are only part invested in active strategies. In this theme we will explore the historic drivers of internalisation, preferences for active and indexing strategies and the likely evolution of sovereign asset management strategies.

Historic drivers in internal asset management
Sovereigns cited a decade-long shift to developing in-house asset management capability. Our discussions highlighted the following five drivers of internal management across active and indexing strategies:

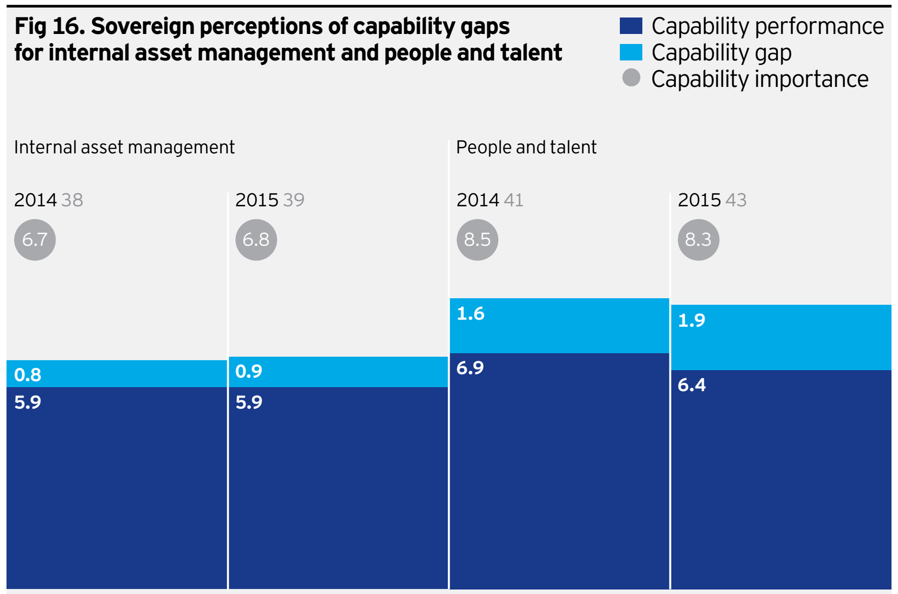
1. Cost: typically Board-level objectives and mandates to reduce overall costs and benchmark favourably against comparable organisations.
2. Reputation: sovereigns want to be seen as leading institutional investors with deep expertise in asset management.
3. Risk: internal management can be viewed (particularly at Board level) as having greater control and reducing risk.
4. Competition: an internal asset management function creates competition (and an alternative benchmark) for external active managers.
5. Bespoke indexing: a belief that sovereigns can develop a more bespoke indexing strategy in-house than via external indexing providers.

Fig 15. Sovereign perceptions of the capability performance of their investment strategy and risk management



Performance rated on a score from 1 to 10 where 10 = best performance. Sample size shown in grey.

Fig 16. Sovereign perceptions of capability gaps for internal asset management and people and talent



Importance/Performance rated on a score from 1 to 10 where 10 = most important/best performance. Sample size shown in grey.

22%

Figure 17 shows that citations relating to underlying asset managers increased from 10% last year to 22% this year.

Challenges with existing internal asset management strategies
It was clear from discussions this year that sovereigns are not comfortable increasing internal asset management across all strategies and asset classes. Our discussions pointed to four challenges related to internal asset management:

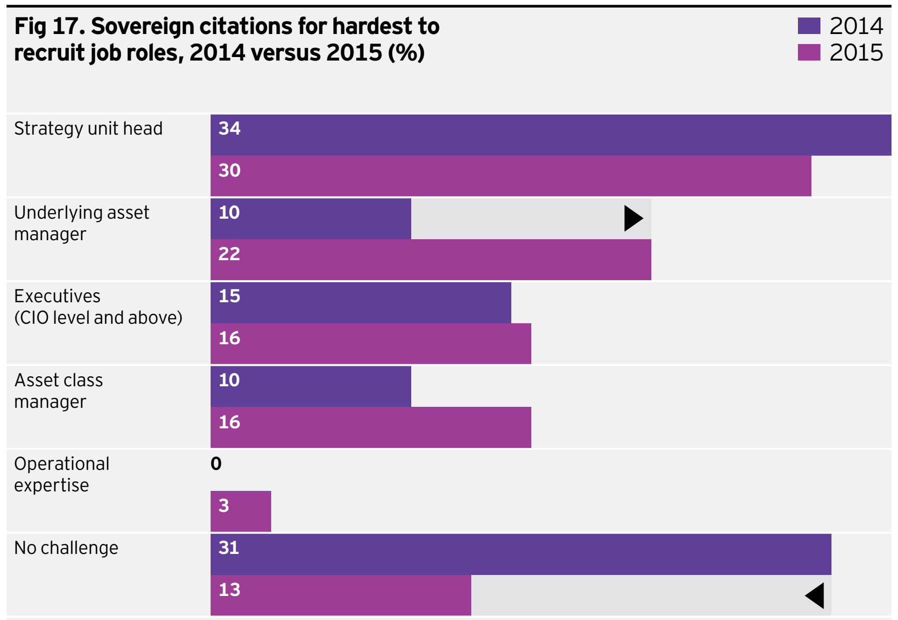
1. Internal management struggling to deliver alpha: established sovereigns now have a track record of internal performance and few cited internal teams in the top quartile. A number of participants questioned the business case for internal active management with performance now consistently below the benchmark.
2. Deal availability for alternatives: many sovereigns who have executed an internalisation strategy for fixed income and public equities are expected to do the same for alternatives. As we have seen in the previous theme, the supply demand dynamics in real estate and infrastructure are challenging and only the largest, most capable sovereigns are likely to succeed with an internal team.
3. Scope to improve internal indexing strategies: many sovereigns felt there was an opportunity to save costs and at the same time create a more bespoke indexing strategy. The best examples are Western liability sovereigns, which prefer to take long-term passive positions in global equities in-house or invest in reference portfolios.
4. Ability to sell active expertise to third parties: a small segment of sovereigns have a very different challenge. Rather than questioning internal performance these sovereigns want to attract third party assets, which is seen as the ultimate proof of internal asset management capability.

There are two primary factors responsible for these challenges. First, there are the top-down organisational constraints such as slow sign-off processes for investing or investment restrictions. Either sovereigns place too much emphasis on internal management without considering the practicalities or sovereigns are too conservative in their approach to accessing alpha.

Second, there are capability gaps. These link primarily to people and talent but also extend to support services. This year we observed significantly more sovereigns citing issues in recruiting underlying asset managers. Figure 17 shows that citations relating to asset managers increased from 10% last year to 22% this year and many of these citations linked to fewer respondents citing no challenge. Some respondents explained that it was now easier to source a Chief Investment Officer (CIO) than an underlying fund manager.

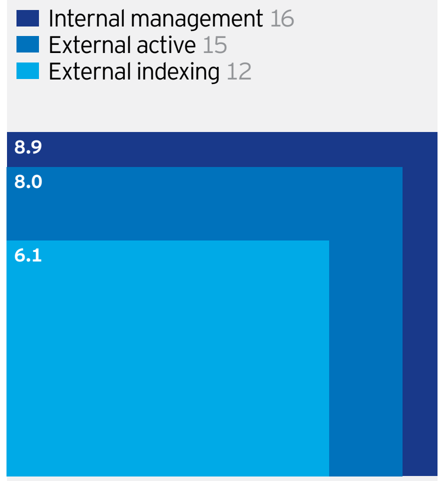
For certain sovereigns, capability gaps stretched beyond people and talent into operational issues such as research and access to management. For example, smaller sovereigns with a desire to build internal global equity expertise explained that they needed a presence in London or New York, given head office locations, equity research and dealing (time zone) requirements.

Fig 17. Sovereign citations for hardest to recruit job roles, 2014 versus 2015 (%)



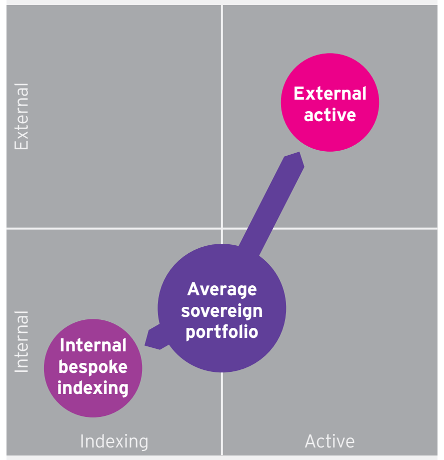
Greatest challenge is taken to be highest ranked response. Sample: 37.

Fig 18. Importance of internal, external active management and indexing strategies to sovereigns



Importance rated on a score from 1 to 10 where 10 = most important. Sample size shown in grey.

Fig 20. Schematic describing a typical portfolio and the key asset management trends for an established sovereign



For illustrative purposes only.

Future demand for active external management amongst established sovereigns

The importance placed on internal management remains high amongst sovereigns. Figure 18 shows that sovereigns on average rate the importance of internal management at 8.9 out of 10, higher than external active management and external indexing strategies. The results also recognise the importance of external active management compared to external indexing. External active management was on average rated at 8.0 out of 10 compared to 6.1 out of 10 for external indexing. Overall sovereigns were confident in their ability to outperform the relevant index on a risk-adjusted basis whether investing internally or externally.

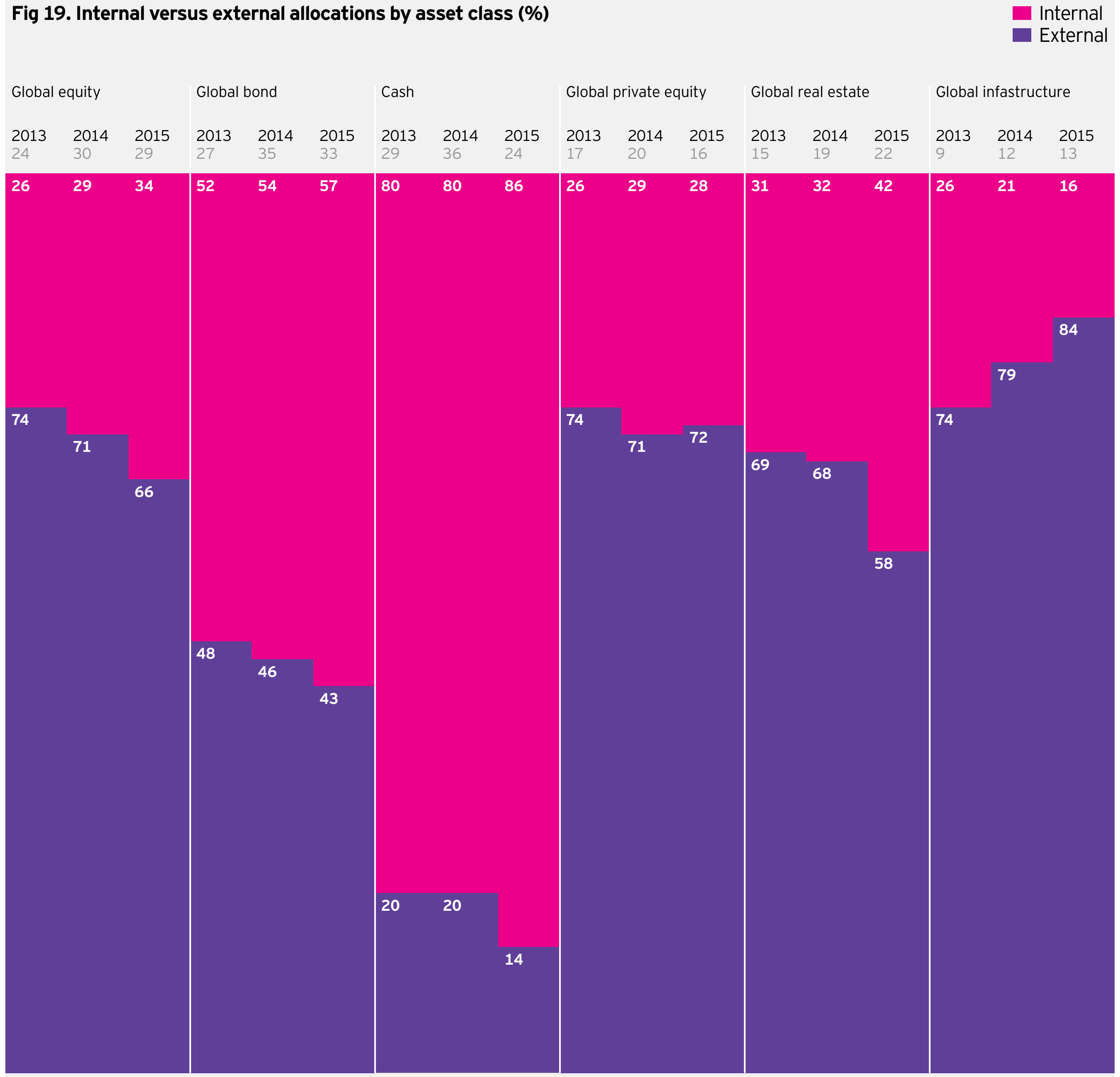
Defining three sovereign categories helps to understand future demand for asset management:

- Emerging: small sovereigns with strong interest in building in-house capabilities and an initial preference for indexing strategies.
- Building: medium-sized sovereigns moving into alternatives and (as a result) executing more external active strategies. This can be evidenced by much lower internal allocations to alternatives, notably for infrastructure and private equity, compared to conventional asset classes - see figure 19.
- Established: large sovereigns who expect more indexing in-house and more external active management. A summary schematic setting out a typical sovereign portfolio and the trend towards internal bespoke indexing and external active management is set out in figure 20.

The trend to external active management for established sovereigns is of particular interest. It represents a change from the historic evolution towards internal asset management within the most experienced group of sovereign investors. In fact these decisions could influence future asset management decisions taken by emerging and building sovereigns. However, in this instance there might be a difference between what sovereigns say they will do and what they actually do. Respondents explained that there are strong strategic drivers for internalisation and it is always easier to build new internal capability than to unwind internal structures and issue more external mandates.

"Overall sovereigns were confident in their ability to outperform the relevant index on a risk adjusted basis whether investing internally or externally."

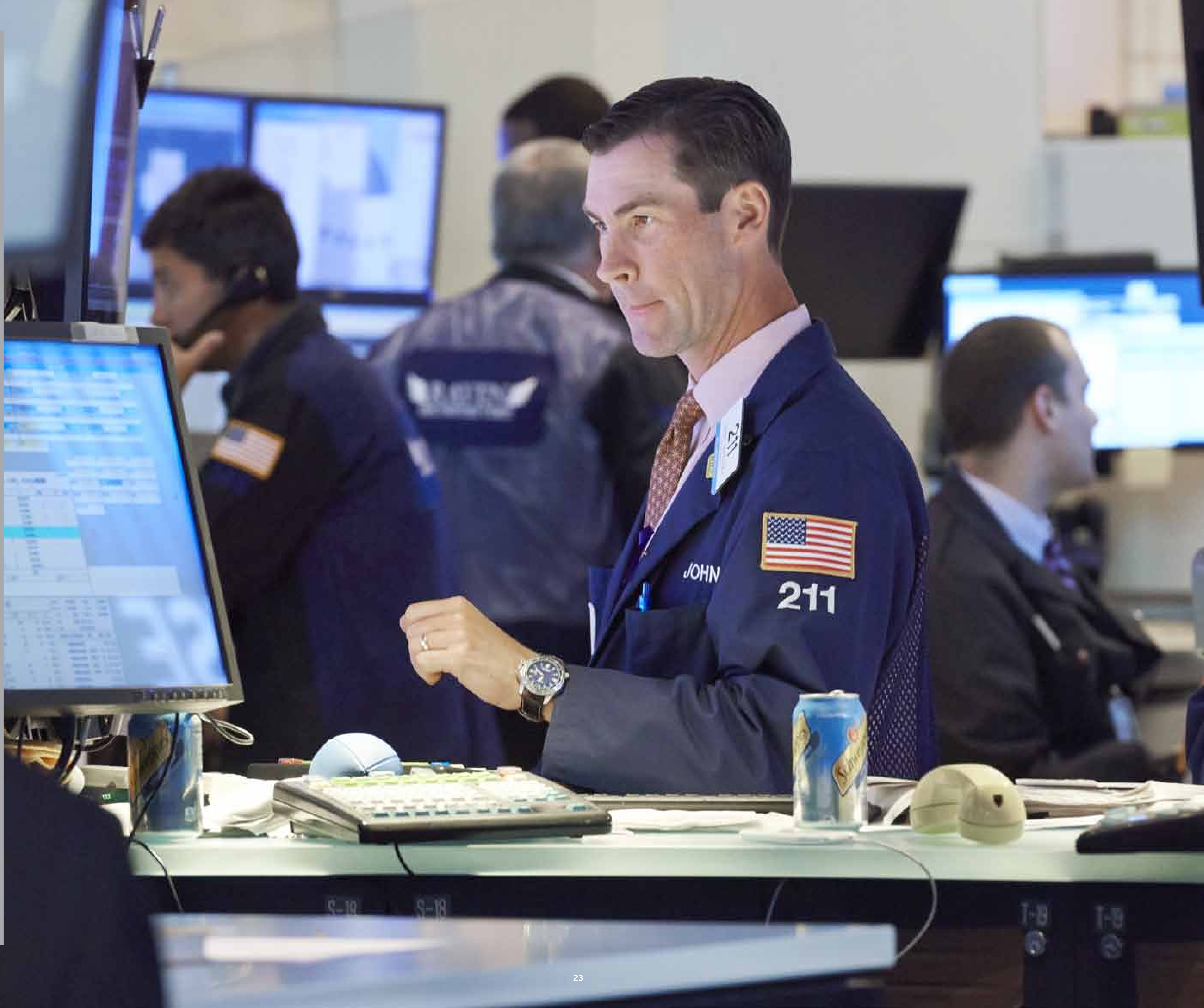
Fig 19. Internal versus external allocations by asset class (%)



Sample size shown in grey.

4

Currency management is a challenge for sovereign investors
There are different levels of awareness and strategies for currency management; sovereigns expect the importance of currency management to increase over time.

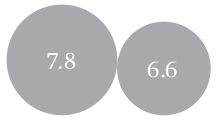


Small movements in currency can have a significant impact on returns and absolute losses can be large given the size of sovereign portfolios

This year we were keen to understand the degree to which sovereign investors understand and manage this risk. Sovereign feedback indicated that the topic was a significant challenge and we noted that the level of understanding on currency management and risks was varied. Some of the more confident respondents explained that sovereigns did not fully appreciate currency risk and this could be the reason why currency management challenges have not been identified in our previous studies.

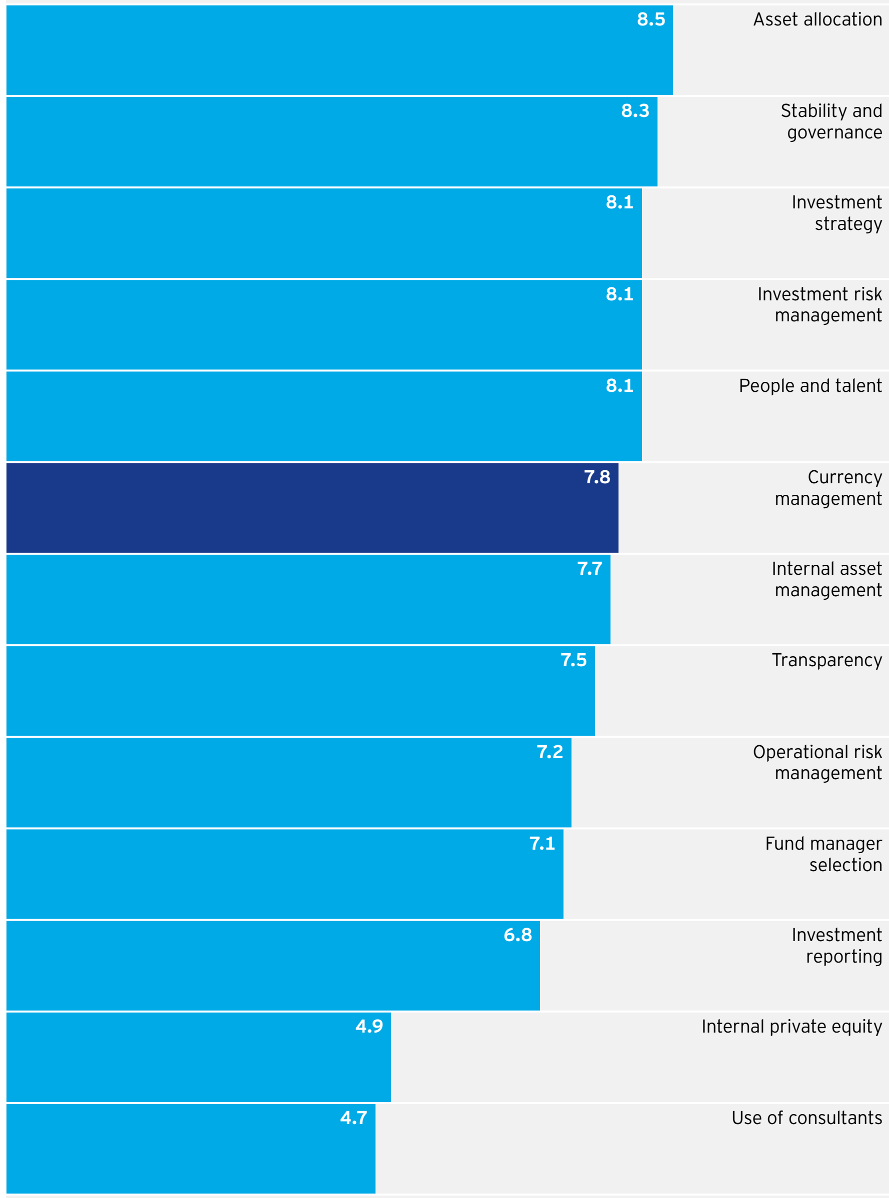
On average sovereigns rated currency management at 6.6 out of 10 in terms of importance. However amongst sovereigns with hedging and active currency management strategies, the importance rose to 7.8 out of 10. This places currency management above investment reporting, fund manager selection and operational risk management in terms of importance, as shown in figure 21.

There was limited consensus on how to define currency risk and currency management. At a high level, and for the purposes of this study, we have defined currency management as the strategies sovereign investors use to manage currency risk. We define currency risk as the risk exchange rates will change over time when sovereign investors buy foreign assets. This risk is hard to quantify and only part of this risk can be predicted by expected changes in interest rate differentials.



7.8 Importance of currency management to those with currency strategies, compared to 6.6 for the entire sample.

Fig 21. The importance of currency management relative to other capabilities for sovereigns with hedging or active currency management strategies



Responses only from respondents with hedged or active currency strategies. Sample: 17.

Currency management strategies

For certain sovereign investors, currency risk was not relevant: for example, sovereigns that invest nearly all of their assets in their domestic currency or equivalent and as a result do not have meaningful currency exposures. A number of development sovereigns fall into this category. However we would note that as development sovereigns increase their international portfolios (a trend we identified last year), currency will become a priority. Many of these funds were interested in understanding how the larger development funds with big international portfolios were able to manage currency.

Looking at those sovereigns with currency exposures, we identified the following three strategies.

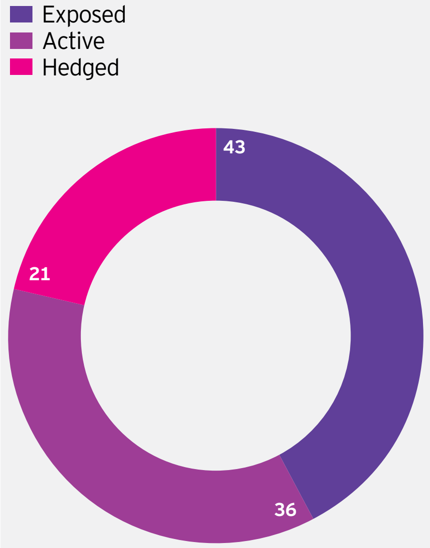
1. Exposed: sovereigns that have significant currency exposures derived from their investment portfolio but do not hedge or consciously monitor and adjust specific currency exposures. A range of liquidity, liability and investment sovereigns fall into this category: most are smaller organisations but some large established sovereigns exhibit these traits. 43% of the sovereigns in our study with significant currency exposure fell into this category.
2. Hedged: sovereigns that attempt to hedge some or all of their investment portfolio depending on cost, value and effectiveness considerations. A large number of sovereign pension funds fell into this category with a strong focus on hedging international fixed income exposures. 21% of the sovereigns in our study with significant currency exposure fell into this category.
3. Active: sovereigns that take more deliberate (or conscious) currency exposures and describe themselves as actively managing currency risk. In most cases this involved a separate currency asset class or risk exposure and this segment included some of the largest pension and investment sovereigns. 36% of the sovereigns in our study with significant currency exposure fell into this category.

Figure 22 shows the number of respondents in each strategy while figure 23 shows respondent ratings on the importance of currency management and on their existing currency management capability for each strategy. The lack of importance attributed to the exposed strategy is consistent with question marks over respondent awareness and understanding. There is a major increase in perceptions of importance and performance for hedged strategies, with average scores of 9.0 and 8.5 out of 10 respectively. We hypothesise that this confidence is attributed to a positive perception of hedging as an effective way to removing currency risk.

The most interesting result was the drop in both importance and performance from hedged to active strategies. Sovereigns with active strategies were typically the most sophisticated audience with the most complex investment portfolios. We hypothesise that lower scores for importance can be explained by greater confidence in their currency management strategy.

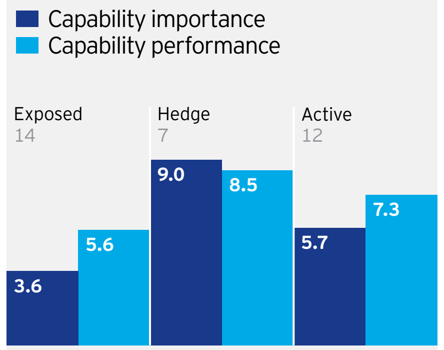
However, one of the investment objectives of sovereigns in this group was to generate alpha from currency management strategies. We suspect that lower scores for performance linked to execution challenges in delivering alpha in the currency market. Respondents explained that alpha was hard to achieve because currency markets were more liquid and efficient than other markets they invest in.

Fig 22. Classification of sovereign investors with currency exposure into currency management strategies (%)



Segmentation based on responses to currency management strategy usage, currency management strategy importance and geographic asset allocation questions. Sample: 33.

Fig 23. Average sovereign perceptions of currency management importance and performance by currency strategy



Importance/Performance rated on a score from 1 to 10 where 10 = most important/best performance. Sample size shown in grey.

Drivers of sovereign attitudes towards currency management

Based on our discussions, we have identified the factors which influence the approach taken by sovereigns to currency management. The factors vary significantly: some are structural such as size while others are more technical such as asset allocation or views on future currency performance.

We have ordered the factors below based on the number of times each factor was cited in our interviews:

1 Asset allocation: participants were most likely to hedge fixed income, followed by equities and alternatives. Respondents explained that the price/value equation was best for fixed income because hedging was easier (relative to alternatives) and more valuable (relative to equities). Fixed income hedging was perceived as more valuable because currency contributes a greater percentage of the risk premium for fixed income than for equities. As a result, we observed greater relative propensity for central banks to hedge their fixed income exposures than for investment sovereigns to hedge their equity and alternative exposures, even though the absolute exposures amongst investment sovereigns were much higher.

2 Views on future performance: a strong view of future currency movement drove specific sovereigns towards a particular approach. For example, sovereigns in Latin America with a positive outlook on the US$ versus local exchange rates were willing to leave their US$ fixed income unhedged. In contrast, certain sovereigns in the GCC expected domestic currencies to appreciate versus non-US$ currencies as certain GCC markets open up to foreign investors. These sovereigns saw hedging as a key component of their international investment strategy because international currencies were expected to fall relative to their domestic currency.

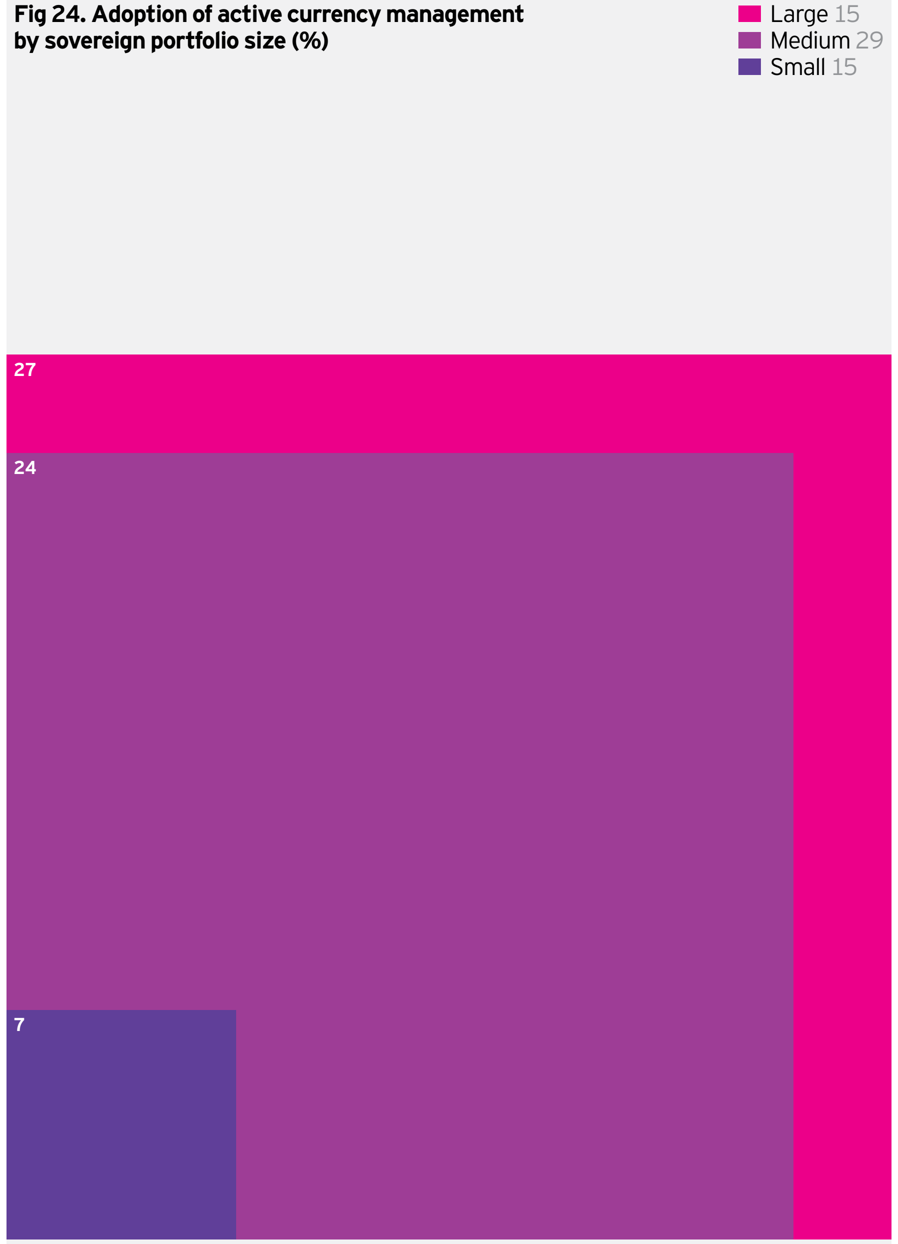
3 Size and structure: small sovereigns with investment teams organised around asset classes were least likely to adopt active currency management strategies. This finding is evidenced in figure 24 where only 7% of small sovereigns (defined as less than US$10bn in assets) actively manage currency compared to 27% for large sovereigns (defined as greater than US$100bn). Small sovereigns lack the resources to hire specific individuals for currency management or to easily integrate currency into their investment strategy.

4 Time horizon: sovereigns with shorter time horizons and higher levels of disclosure within their annual reports were more likely to adopt currency hedging. These sovereigns recognised the volatility in current markets and viewed hedging strategies as essential to minimise currency risk.

5 Base currency: sovereigns who report on their portfolios in US$ appear less likely to hedge. Based on our discussions, most US-based sovereigns viewed currency exposure as a logical part of their exposure to non-US$ equity investments. This observation may link to the size of the currency exposure which is typically 10-20% of the total portfolio for US sovereigns and significantly lower than sovereigns based in other markets.

"Small sovereigns lack the resources to hire specific individuals for currency management or to easily integrate currency into their investment strategy."

Fig 24. Adoption of active currency management by sovereign portfolio size (%)



Based on currency segmentation outlined in figure 22. Small is defined as assets less than US$10bn, Medium is defined as assets between US$10bn and US$100bn, Large is defined as assets greater than US$100bn. Sample size shown in grey.

In summary, currency management is a significant strategic challenge for many sovereigns and sovereign investors adopt different strategies driven by a range of factors. We believe currency risk is an increasing part of investment risk management which continues to be the greatest strategic challenge for sovereigns. Furthermore, its importance is potentially understated amongst sovereigns with exposed strategies who may not fully appreciate all the risks.

Looking forward, most respondents expect currency management to increase in importance driven by two factors. First, some sovereigns are increasing their currency exposures, for example development sovereigns are increasing international allocations. Second, many sovereigns expect ongoing volatility in currency markets. While data supporting the direction of movement between exposed, hedged and active strategies by sovereigns is inconclusive, we expect some migration towards more active strategies in the future. More importantly, we expect sovereigns to invest time and resources into this area over the next 12 months and that they will be better placed to articulate their strategy in next year's study. Given our findings in this report, we will explore current management strategies in more detail in the future.

5

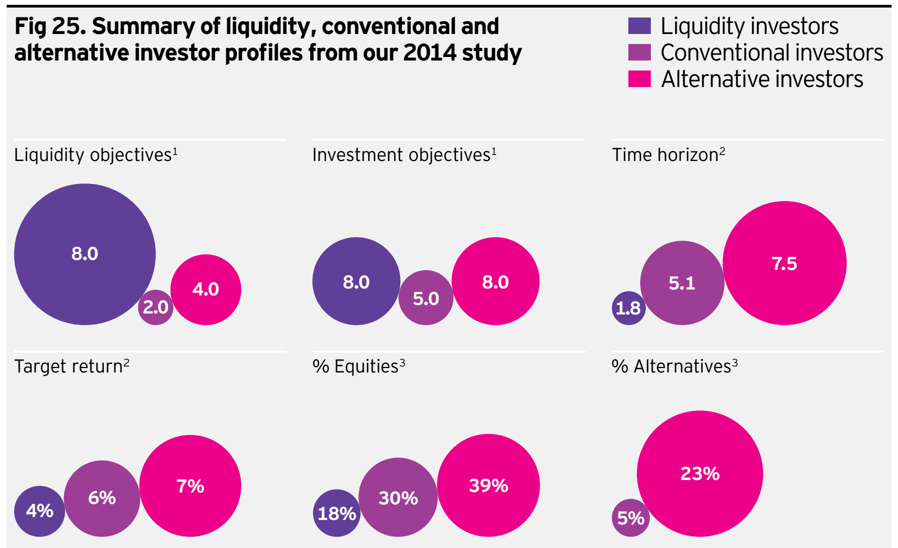
Central banks and their investment portfolios
Central banks are seeking currency diversification, risk asset exposure and support from external asset managers.

Central bank reserves are primarily invested as a safety net to maintain the value of its domestic currency during uncertain times
As a result we classify central banks as liquidity sovereigns because liquidity is more important to them than investment returns. However we focus on central banks with an investment return objective. We interviewed such banks in Europe, Latin America, Africa and Asia, accounting for 14 of the 16 liquidity sovereigns in our study.

It is well known that central bank investment portfolios can be the precursor to the creation of investment sovereigns. We discussed this theme last year, setting out a possible evolutionary path from liquidity to conventional to alternative investor profiles. The key characteristics of each profile from last year's report are set out in figure 25. The migration from liquidity to conventional investor is particularly common where governments are running fiscal surpluses and central banks accumulate reserves greater than realistically required to maintain the currency. This migration can take place either from within the central bank organisational structure or via the creation of a new sovereign entity to focus on investment objectives.

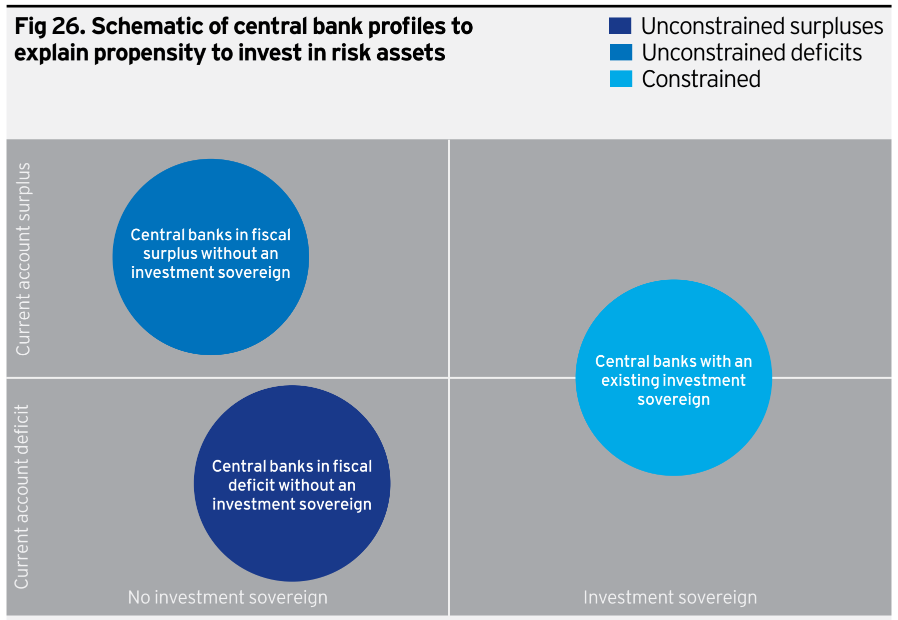
> "It is well known that central bank investment portfolios can be the precursor to the creation of investment sovereigns."

Fig 25. Summary of liquidity, conventional and alternative investor profiles from our 2014 study



[1] Importance rated on a score from 1 to 10 where 10 = most important. [2] Average calculated as weighted mid-point between time horizon categories. [3] Average allocations across segments, results not weighted by assets under management. Equities include global equity, home market equity; alternatives include hedge funds, global and home market private equity, real estate, commodities and infrastructure.
Source: Invesco Global Sovereign Asset Management Study 2014.

Fig 26. Schematic of central bank profiles to explain propensity to invest in risk assets



For illustrative purposes only.

Central bank propensity to invest in risk assets
Central bank reserves have grown rapidly over the past decade (from under US$ 2 trillion in 2005 to nearly US$ 4 trillion by 2013[1]). More central banks are confident they can meet their primary liquidity objective and an increasing number are considering investment objectives. This leads to growing demand for risk asset exposure and interest in outsourcing this portion of the portfolio to asset managers. In this theme, we define risk asset exposure as sub investment grade fixed income, equities or alternatives other than gold, recognising that central banks with an existing investment sovereign are less likely to seek risk asset exposure.

When considering the propensity of a central bank to invest in risk assets, we define three profiles depending on their macro-economic status and whether the government has already created a separate sovereign investment entity:

- Unconstrained surpluses: Central banks in fiscal surplus without an investment sovereign to manage the country's risk asset investments.
- Unconstrained deficits: Central banks in fiscal deficit without an investment sovereign to manage the country's risk asset investments.
- Constrained: Central banks with an existing investment sovereign responsible for managing some or all of the country's risk asset investments.

Figure 26 sets out a schematic of these three profiles. We interviewed central banks in all three of these categories. In theory, unconstrained surpluses are most interested in risk assets because their reserves are increasing and there is not an existing investment sovereign to manage the investment portfolio. However, in practice it is more complex and there is demand for risk asset exposure amongst unconstrained surpluses and deficits which we will explore later in this section.

Strong demand for yield, RMB and US$
Between 2005 and 2009 there has been reduction from 67% to 62%[1] in central bank allocations to US$ relative to other currencies. Since 2009, allocations to US$ started to stabilise following the global financial crisis and a flight to safety. Last year, we observed a range of views on future currency allocation and this year we focused discussions on this topic to identify the key themes.

We found that existing central banks were strongly weighted to US$ and euros. Figure 27 shows that central banks allocated on average 44% of their portfolios to the US$, 33% in euros and 13% in domestic currency. These numbers represent a higher weighting to euros due to the inclusion of certain central banks in Europe but outside the eurozone with high allocations to the euro. Looking at future currency allocations, we observed strong demand for second-tier currencies (defined as any non-domestic currency other than US$, yen, pound sterling or euro) with 84% of respondents expecting second-tier currencies to increase on a net respondent view basis. Demand for second -tier currencies can be explained by short-term tactical themes such as demand for high-yielding sovereign debt and more strategic themes such as demand for RMB exposure.

[1] 'IMF COFER Currency Reserves', 31st March 2015. Note that this excludes unallocated reserves.

$

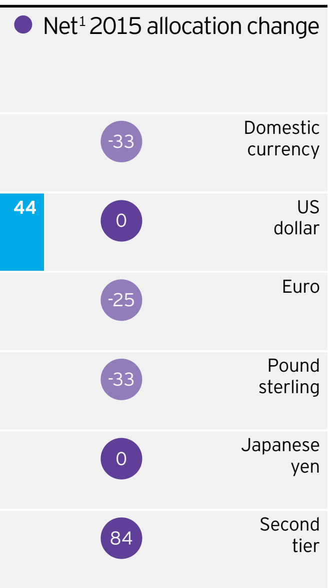
44%

€

33%

Figure 27 shows that central banks allocated 44% of their portfolios to the US$, 33% in euros and 13% in domestic currency.

Fig 27. Average central bank portfolio allocations by currency



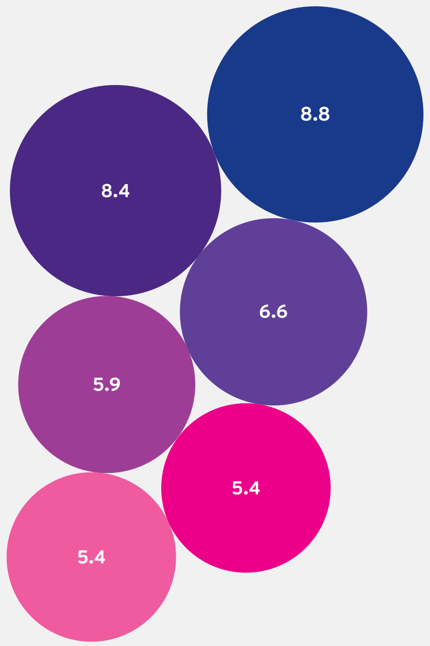
[1] Net respondent view, defined as difference between positive and negative responses. Note that net respondent view is not a forecast growth rate. Second tier = CAD, AUD, NZD, DKK, SEK, NOK, SGD, CNY (RMB). Sample: 10.

Overall, we identified the following three themes:

1. The search for yield: a number of central banks have increased exposure to the Australian and New Zealand dollar in search of higher yielding investment grade bonds. These currencies form part of the second tier category in figure 27. Most of these allocations are tactical investments and consistent with the central bank feedback in figure 28, citing interest rates as the most important factor driving asset allocation decisions. The current attractive interest rates for Australian and New Zealand debt compared to other developed markets are set out in figure 29. Certain central banks explained that demand for high-yield currencies was actually a more strategic move to diversify currency; but even these respondents accepted that interest rate differentials played a role in the decision.
2. Interest in the renminbi: while less than 1% of central bank portfolios were invested in renminbi, 43% of central banks were interested in allocating to or increasing exposure to the currency. This is supported not only by discussions with the central banks but also from sovereigns who are heading down a similar path. Figure 30 shows responses on the level of interest and access to renminbi exposure for central banks and other sovereign investors and validates underlying demand in both segments. We also noted strong demand for domestic quotas in the future but respondents explained that obtaining quotas was outside of their control.
3. Confidence in the US$: despite interest in second-tier currencies, central banks are also positive on the US$. Many respondents expected further strengthening of the dollar and more respondents were on average reducing allocations to the pound, euro and domestic currencies. Confidence in the US$ is underpinned by confidence in the US economy and macro-economic policy. Many respondents cited quantitative easing and contrasted tapering in the US with policy decisions in the eurozone and Japan.

Fig 28. Key factors driving central bank asset allocation

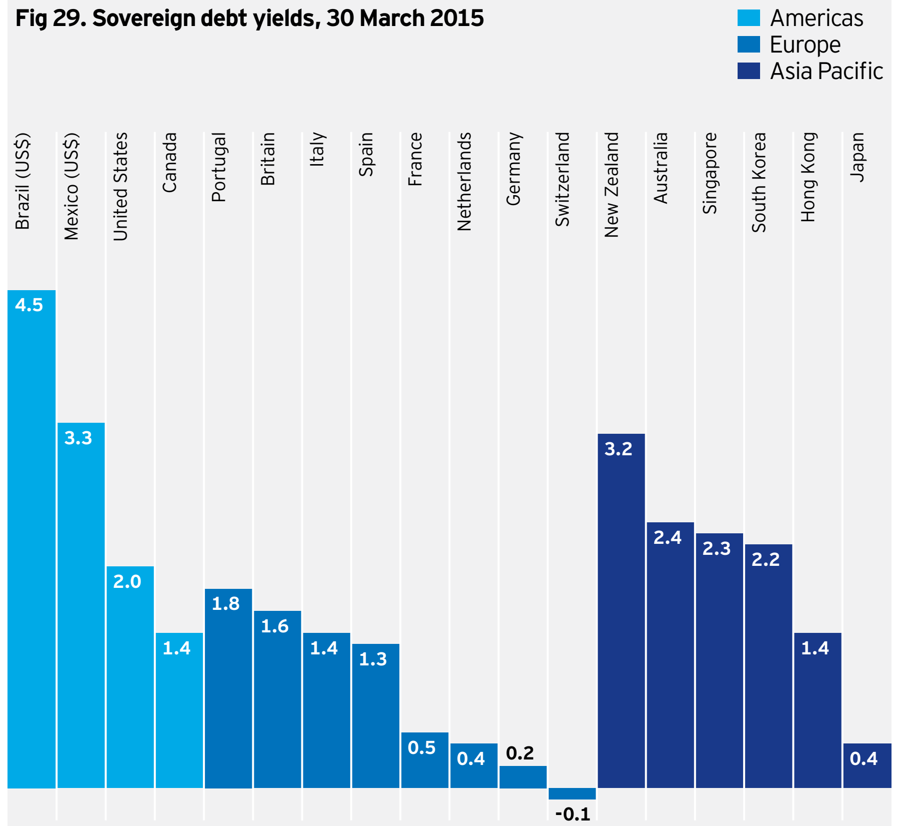
- Interest rates 13
- Economic outlook 14
- Exchange rates 12
- Current ALM[1] position 11
- Current funding rates 7
- Capital flow 11



[1] ALM = Asset liability management. Importance rated on a score from 1 to 10 where 10 = most important. Sample shown in grey.

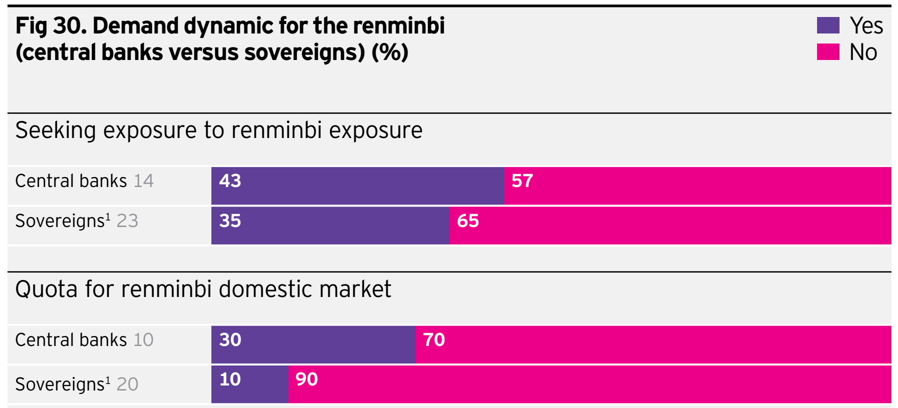
"Central banks have increased exposure to the Australian and New Zealand dollar in search of higher yielding investment grade bonds."

Fig 29. Sovereign debt yields, 30 March 2015

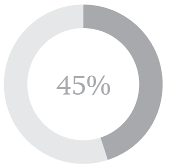


Source: Bloomberg Business, Rates & Bond, 30th March 2015.

Fig 30. Demand dynamic for the renminbi (central banks versus sovereigns) (%)

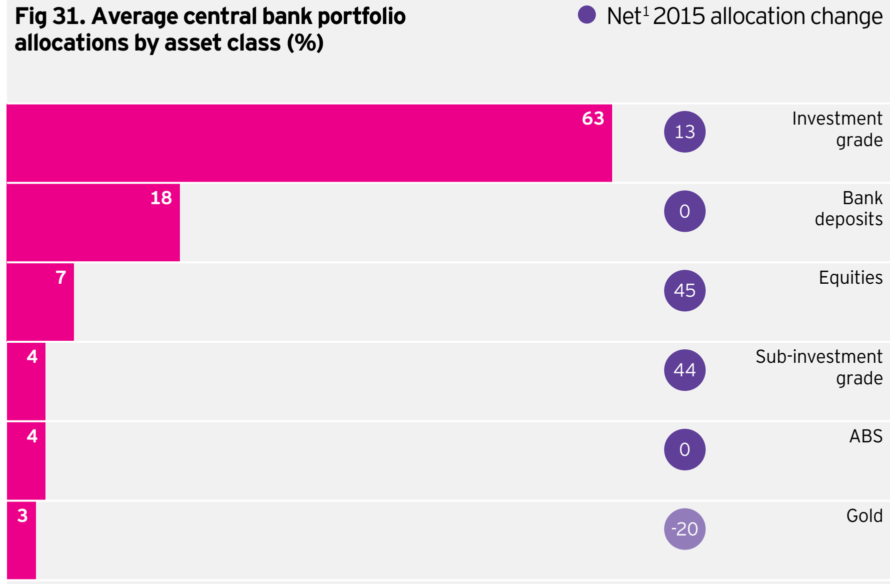


[1] Sovereigns include investment, development and liability sovereigns. Sample size shown in grey.



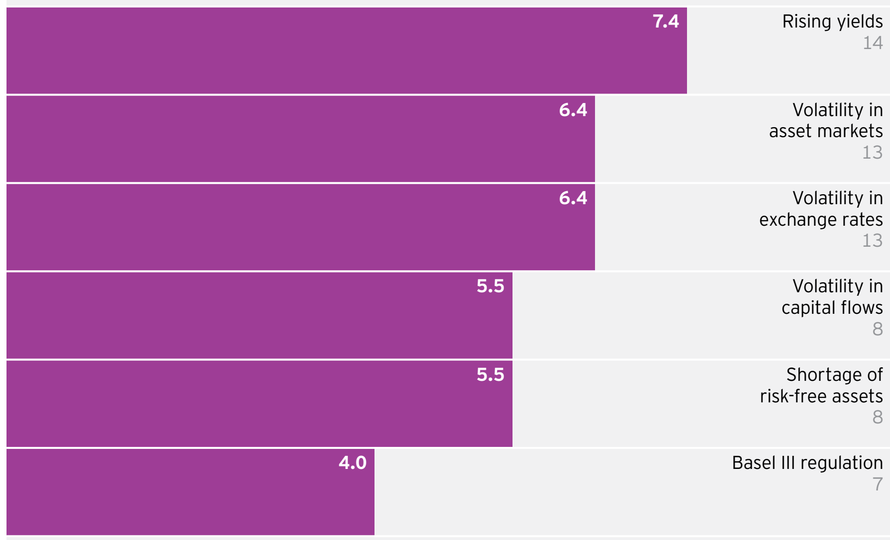
45% of the central bank respondents expected equity allocations to increase.

Fig 31. Average central bank portfolio allocations by asset class (%)



[1] Net respondent view, defined as difference between positive and negative responses. Note that net respondent view is not a forecast growth rate. ABS = Asset backed securities. Sample: 9.

Fig 32. Key challenges facing central banks in 2015 and beyond



Importance rated on a score from 1 to 10 where 10 = most important. Sample size shown in grey.

Currency themes are a sign of increasing risk appetite

The currency trends documented above fit with an overarching theme of greater investment return objectives and increasing risk appetite amongst central banks. Seeking yield, renminbi exposure and even taking a more active stance on developed market currencies align to a group of investors seeking more risk. Alongside these themes we can evidence an increasing interest in sub-investment grade fixed income, equities and even alternatives amongst central banks.

Figure 31 shows that central banks allocated more than 80% of their portfolios to investment grade fixed income or bank deposits. The figure also shows that 45% of respondents expected equity allocations to increase while bank deposits and gold had the lowest growth profile on a net respondent view basis.

Different dynamics for central banks in surplus and deficit

The drivers and challenges for central banks varied depending on their profile. Central banks with unconstrained surpluses were more likely to allocate to risk assets because reserves were large relative to the country's economic and financial profile. However many respondents cited significant challenges associated with a cautious organisational culture as a barrier to increasing risk asset exposure.

In contrast, central banks with unconstrained deficits explained that their organisations were less cautious than their peers. To explain their demand for risk assets, respondents cited the low return environment and potential for higher investment returns from equities. Furthermore, respondents explained that rising yields could severely impact returns from the existing portfolios and a move into risk assets (notably equities) would offer some protection in this scenario. This insight is evidenced in figure 32 which shows that rising yields are the biggest challenge facing central banks across our study, with an average rating of 7.4 out of 10 in terms of importance. Some EU-based respondents cited Basel III and the reducing supply of bank deposits as a driver of equity allocations, but figure 31 supports feedback that this factor is of much lower importance to central banks.

Many of these discussions were academic, especially in comparison to discussions with other sovereign investors. Monte Carlo Markov Chain[1] risk models, which are able to dynamically model macro-economic factors and minimise portfolio return assumptions, were cited by some central banks as a driver for increasing risk asset exposure. Other central banks viewed the modelling as important for validation and ongoing performance measurement of the investment strategy over time.

[1] Source: "Regime-dependent portfolio diversification", Roman Marton in HSBC Reserve Management Trends 2014.

Increasing demand for external management amongst central banks

Most central banks are clear that they have limited in-house asset management expertise for risk assets. More importantly, there was limited desire to build this capability over time. These observations are different to other sovereigns that manage equities and alternatives internally where possible. Figure 33 shows the shift from internal to external management as central banks move from fixed income to equities. This movement from 81% of respondents managing internally for fixed income to 26% for equities is more pronounced than for sovereigns where the percentage of respondents managing internally moves from 47% for fixed income to 37% for equities.

These findings are intuitive. For sovereigns with a primary objective of investment return, managing internal assets can be seen as core. However, for central banks where investment return is a secondary priority, internal management is non-core. Furthermore, for the yield-chasing central banks whose governments are not in fiscal surplus this move may be temporary so there is no need to create internal infrastructure and fixed costs.

There will be an implementation time lag

There will be a time lag between interest and actual allocations. This is true for all the currency themes in this section and the use of external asset managers. Respondents expressed most confidence in the growth in the renminbi given the structural economic drivers and recent policy moves by the Chinese government. However, current allocations were cited as only 1% and some central banks simply wanted to gain exposure rather than take on a meaningful exposure. Other respondents explained that access to a local renminbi quota was important so the future was not in their hands.

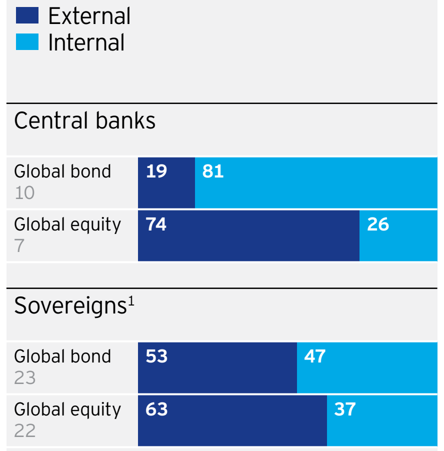
We will monitor renminbi adoption across central banks and other sovereign investors over time. A strategic shift to renminbi exposure would clearly have major implications for global economics and all international investment strategies. Furthermore, sovereign investors are early adopters and well positioned as lead indicators of global demand for renminbi.

The opportunity for the asset management industry to support central banks is significant. However, organisational risk appetite and the governance process are key implementation challenges. Even the more progressive central banks with existing investment portfolios and third party managers explained that the process takes years not months and that implementation remains work in progress.

Respondents explained that the next two to three years are critical. The performance of risk assets and of external asset managers will shape central bank perceptions and dictate future policy decisions. There is a positive scenario where risk assets perform and the current macro environment remains. However there is also a negative scenario where performance drops and central banks refocus on their primary objective.

"For central banks where investment return is a secondary priority, internal management is non-core."

Fig 33. Percentage of respondents citing internal and external management for fixed income and equities, split by central banks versus other sovereigns (%)



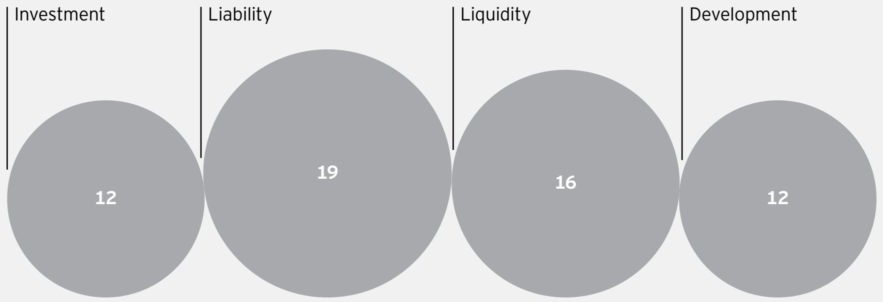
[1] Sovereigns include investment, development and liability sovereigns. Sample size shown in grey.

Sample & methodology
The fieldwork for this study was conducted by NMG's strategy consulting practice. Invesco chose to engage a specialist independent firm to ensure high-quality objective results. Key components of the methodology include:

- A focus on the key decision makers within sovereign investors conducting interviews using experienced consultants and offering market insights rather than financial incentives.
- In-depth (typically 1 hour) face-to-face interviews using a structured questionnaire to ensure quantitative as well as qualitative analytics were collected.
- Analysis capturing investment preferences as well as actual investment allocations with a bias toward actual allocations over stated preferences.
- Results interpreted by NMG's strategy team with relevant consulting experience in the global asset management sector.

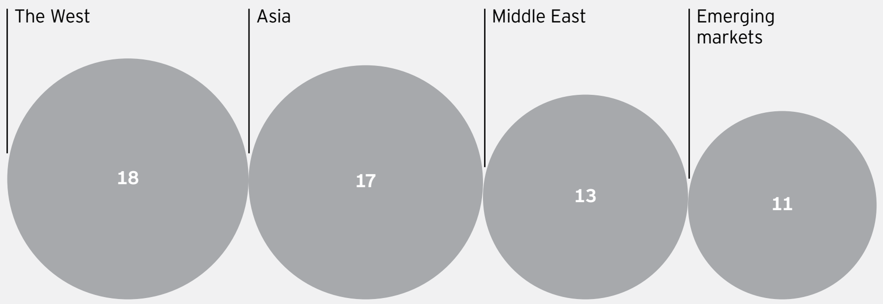
In 2015 we conducted interviews with 59 different sovereign investors compared to 52 in 2014, with a significant increase in our coverage of central banks. The breakdown of the 2015 interview sample split by three core segmentation parameters (sovereign investor profile, region and size of assets under management) is displayed in figures 34 to 36.

Fig 34. Sample by sovereign investor objective



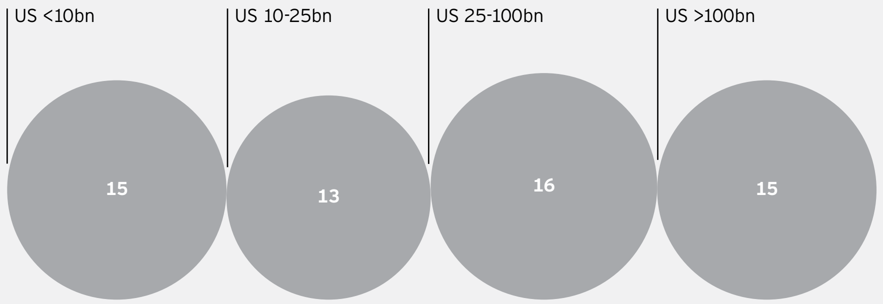
Sample: 59.

Fig 35. Sample by region



Sample: 59.

Fig 36. Sample by size of assets under management



Sample: 59.

Invesco
Invesco is a leading independent global investment management firm, dedicated to helping investors achieve their financial objectives. With offices globally, capabilities in virtually every asset class and investment style, a disciplined approach to investment management and a commitment to the highest standards of performance and client service – we are uniquely positioned to help institutional investors achieve their investment objectives.

Nick Tolchard
Chair of Invesco's Global Sovereign Group
nick.tolchard@invesco.com
+44 1491 417010

NMG Consulting — Shape your thinking
NMG Consulting is a global consulting business operating in the insurance and investment markets. Our specialist focus, global insights programmes and unique network give us the inside track in insurance and investment markets, translating insights into opportunities. We provide strategy consulting, as well as actuarial and research services to financial institutions including banks, insurers, reinsurers and fund managers.

NMG's evidence-based insight programmes carry out interviews with industry-leading experts, top clients and intermediaries as a basis to analyse industry trends, competitive positioning and capability. Established programmes exist in asset and wealth management, life insurance and reinsurance across North America, the UK and Europe, Asia Pacific, South Africa and the Middle East.

Important information
This document is intended only for Qualified Investors in Switzerland and for Professional Clients in other Continental European countries, Dubai, Jersey, Guernsey, Isle of Man and the UK, for Institutional Investors in the United States and Australia for Institutional Investors and/or Accredited Investors in Singapore, for Professional Investors only in Hong Kong, for Professional Investors, pension funds and distributing companies in Japan; for Persons who are not members of the public (as defined in the Securities Act) in New Zealand, for accredited investors as defined under National Instrument 45-106 in Canada and for one-on-one use with Institutional Investors in Bermuda, Chile, Panama and Peru.

This document is for information purposes only and is not an offering. It is not intended for and should not be distributed to, or relied upon by, members of the public. Circulation, disclosure, or dissemination of all or any part of this material to any unauthorised persons is prohibited.

All data provided by Invesco as at 1 June 2015, unless otherwise stated.

The opinions expressed are current as of the date of this publication, are subject to change without notice and may differ from other Invesco investment professionals. The document contains general information only and does not take into account individual objectives, taxation position or financial needs. Nor does this constitute a recommendation of the suitability of any investment strategy for a particular investor. This is not an invitation to subscribe for shares in a fund nor is it to be construed as an offer to buy or sell any financial instruments. While great care has been taken to ensure that the information contained herein is accurate, no responsibility can be accepted for any errors, mistakes or omissions or for any action taken in reliance thereon. You may only reproduce, circulate and use this document (or any part of it) with the consent of Invesco.

Additional information for recipients in:
Australia
This document has been prepared only for those persons to whom Invesco has provided it. It should not be relied upon by anyone else. Information contained in this document may not have been prepared or tailored for an Australian audience and does not constitute an offer of a financial product in Australia.

The information in this document has been prepared without taking into account any investor's investment objectives, financial situation or particular needs. Before acting on the information the investor should consider its appropriateness having regard to their investment objectives, financial situation and needs.

You should note that this information:
- may contain financial information which is not prepared in accordance with Australian law or practices; and
- does not address Australian tax issues.

Hong Kong
This document is provided to Professional Investors in Hong Kong only (as defined in the Hong Kong Securities and Futures Ordinance and the Securities and Futures (Professional Investor) Rules).

New Zealand
This document is issued in New Zealand only to Persons who are not members of the public in New Zealand (as defined in the Securities Act). This document has been prepared only for those persons to whom it has been provided by Invesco. Information contained in this document may not have been prepared or tailored for a New Zealand audience. This document does not constitute and should not be construed as an offer of, invitation or proposal to make an offer for, recommendation to apply for, an opinion or guidance on Interests to members of the public in New Zealand. Any requests for information from persons who are members of the public in New Zealand will not be accepted.

Singapore
This document may not be circulated or distributed, whether directly or indirectly, to persons in Singapore other than (i) to an institutional investor under Section 304 of the Securities and Futures Act (the "SFA"), (ii) to a relevant person pursuant to Section 305(1), or any person pursuant to Section 305(2), and in accordance with the conditions specified in Section 305 of the SFA, or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA. This document is for the sole use of the recipient on an institutional offer basis and/ or accredited investors and cannot be distributed within Singapore by way of a public offer, public advertisement or in any other means of public marketing.

This document is issued in:
Australia by Invesco Australia Limited (ABN 48 001 693 232), Level 26, 333 Collins Street, Melbourne, Victoria, 3000, Australia, which holds an Australian Financial Services License number 239916.

Austria by Invesco Asset Management Österreich GmbH, Rotenturmstraβe 16-18, A-1010 Wien, Austria.

Belgium by Invesco Asset Management S.A. Belgian Branch (France) situé Avenue Louise 235-1050 Bruxelles, Belgium.

Canada by Invesco Canada Ltd., 5140 Yonge Street, Suite 800, Toronto, Ontario, M2N 6X7, Canada.

Denmark, Finland, Greece, Luxembourg, Norway and Portugal by Invesco Asset Management SA, 5th floor, 16-18, rue de Londres, F-75009, Paris, France, authorised and regulated by the Authorité des Marchés Financiers in France.

Dubai by Invesco Asset Management Limited, PO Box 506599, DIFC Precinct Building No.4, Level 3, The Gate Precinct, Dubai, United Arab Emirates. Regulated by the Dubai Financial Services Authority.

France by Invesco Asset Management SA, 5th Floor, 16-18, rue de Londres, F-75009, Paris, France, authorised and regulated by the Authorité des Marchés Financiers in France.

Germany by Invesco Asset Management Deutschland GmbH, An der Welle 5, D-60322 Frankfurt am Main, Germany, which is authorised and regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht in Germany.

Hong Kong by Invesco Hong Kong Limited, 41/F, Citibank Tower, 3 Garden Road, Central, Hong Kong.

the Isle of Man by Invesco Global Asset Management Limited, George's Quay House, 43 Townsend Street, Dublin 2, Ireland. Regulated in Ireland by the Central Bank of Ireland.

Italy by Invesco Asset Management S.A. - Sede secondaria, Piazza del Duomo, 22 - Galleria Pattari, 2, Scala A, 3rd Floor, 20122 Milano, Italy.

Japan by Invesco Asset Management (Japan) Limited, Roppongi Hills Mori Tower 14F, 6-10-1 Roppongi, Minato-ku, Tokyo 106-6114, Japan, which holds a Japan Kanto Local Finance Bureau Investment advisers license number 306.

Jersey and Guernsey by Invesco International Limited, 2nd Floor, Orviss House, 17a Queen Street, St Helier, Jersey, JE2 4WD. Regulated by the Jersey Financial Services Commission.

the Netherlands by Invesco Asset Management S.A., Dutch Branch, J.C.Geesinkweg 999, 1114 AB Amsterdam, Netherlands.

New Zealand by Invesco Australia Limited (ABN 48 001 693 232), Level 26, 333 Collins Street, Melbourne, Victoria, 3000, Australia, which holds an Australian Financial Services License number 239916.

Singapore by Invesco Asset Management Singapore Ltd, 9 Raffles Place, #18-01 Republic Plaza, Singapore 048619.

Spain by Invesco Asset Management S.A, Spanish Branch, Sucursal en España, Calle Recoletos 15-Piso 1, 28001 Madrid, Spain.

Sweden by Invesco Asset Management S.A, Swedish Filial, Regus Stockholm Stureplan 568 Stureplan 4C, 4th Floor, 114 35 Stockholm, Sweden.

Switzerland by Invesco Asset Management (Schweiz) AG, Talacker 34, CH-8001 Zürich, Switzerland.

the UK by Invesco Asset Management Limited, Perpetual Park, Perpetual Park Drive, Henley-on-Thames, Oxfordshire RG9 1HH. Authorised and regulated by the Financial Conduct Authority.

the United States of America by Invesco Advisers, Inc., Two Peachtree Pointe, 1555 Peachtree Street, N.E., Suite 1800, Atlanta, Georgia 30309, U.S.A.