

## Safety, In Numbers

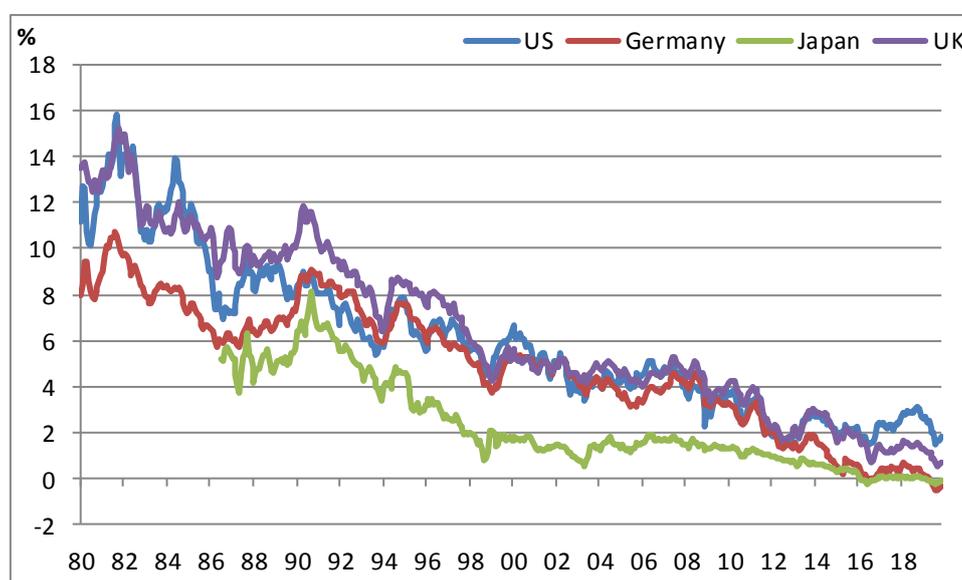
### *Quantifying the Global Safe Asset Shortage and Assessing its Implications for Financial Markets*

Chris Crowe<sup>1</sup>

#### 1. Introduction

Since 1981 US ten-year Treasury bond yields have fallen from 15% to under 2%, and yields in other advanced economies have seen a similar relentless downwards trajectory (Figure 1, below). While a modest bond market sell-off since the summer has seen the stock of negative-yielding debt shrink to \$11 trillion (trn) in December 2019, in August more than \$17trn worth of debt – equivalent to around 20% of world GDP – was trading at negative yields.<sup>2</sup>

**Figure 1: Major economies have seen a persistent fall government bond yields (10 year maturity)**



Source: Haver Analytics

Part of the return on bonds demanded by investors is a compensation for the erosion of their real value by inflation, and so for much of that period of tumbling yields declining inflation expectations were likely a principal driver. In recent years, however, yields have continued to fall even while the decline in inflation has levelled off. Real (inflation-adjusted) yields on US indexed ten-year bonds have fluctuated in the 0-1% range since 2014, having been between 2% and 3% up until 2007 (Figure 2). Yields on UK inflation-indexed bonds, for which there is a longer time series, show an almost monotonic decline from around 4% in the early 1990s to around -2% currently.

Economists and market commentators have come up with a number of rationales to explain this drop in real yields. One potential explanation is that real economic growth has declined. Since simple economic models suggest that the rate of return in the economy should be related to its growth

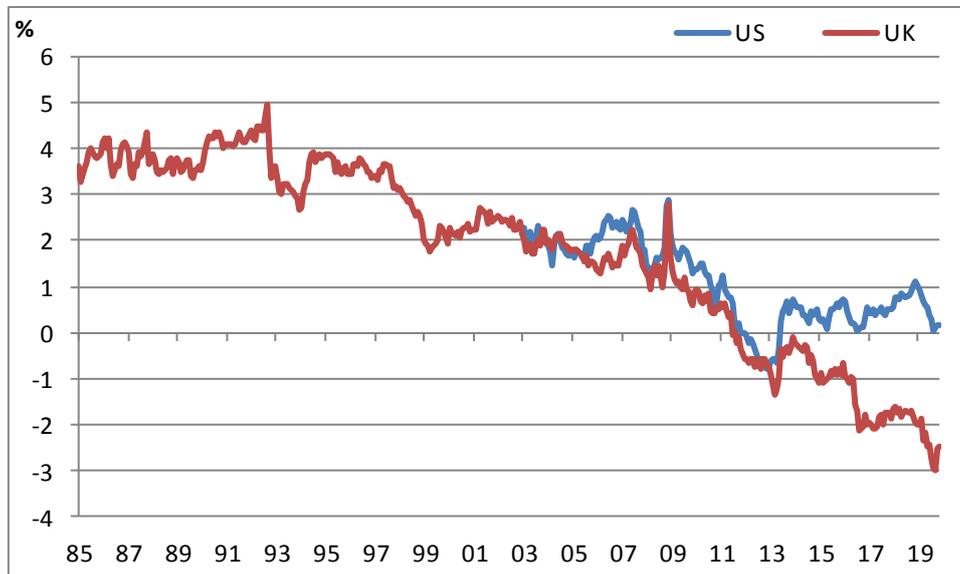
<sup>1</sup> All views expressed are my own and do not represent the opinions of any entity with which I am affiliated.

<sup>2</sup> "Bond Market Wobble Shrinks Global Pile of Negative Yields," *Financial Times* 23 December 2019.

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rate, it follows that yields will need to fall if the economy has transitioned to permanently lower growth. But the empirical evidence linking yields to economic growth is limited, at best.

**Figure 2: Real yields (government inflation-linked bonds, 10 year maturity) have also declined**



*Source: Haver Analytics*

Other explanations focus on financial market specific factors, such as an ageing population and associated expansion of the pensions industry that creates a growing demand for financial assets. Some commentators, especially in financial markets, blame central bank policy, noting that short rates have been held at unprecedented low levels – negative in some cases – for prolonged periods, while central bank asset purchases have further compressed yields. Central banks would counter that expansionary policy has simply been a response to the economic conditions that have depressed yields.

One set of explanations has emphasised the special role of sovereign bonds and other fixed income assets issued by creditworthy borrowers in an economic environment characterised by pervasive uncertainty. These so-called “safe assets” are seen as commanding a special premium. The decline in yields can therefore be attributed to a growing shortage of such assets and associated increase in their price.

This essay attempts to shed more light on this issue by carefully quantifying the supply of safe assets in their various guises and tracking its evolution over time. Attention is also paid to sources of safe asset demand by the official sector, including via mandated demand created by regulatory rules, which limit these assets’ net availability to meet autonomous private sector demand.

The calculations in this paper suggest that the universe of safe assets is currently around \$67trn or 78% of global GDP. This includes \$42trn of advanced economy sovereign paper. Official demand for safe assets comes from three principal sources: official reserves, largely held by emerging market economies; central bank asset purchases, largely by central banks in advanced economies; and mandated holdings of liquid assets by advanced economy financial institutions. Overall, official demand for safe assets from these three sources reduces net safe asset supply by \$30trn. Net safe

asset supply has therefore fallen from 70% of global GDP in 2009 to only 44% now. Much of the downwards trajectory in bond yields can be accounted for by the global safe asset shortage, even controlling for factors such as low policy interest rates.

Section 2 below provides a brief survey of the existing literature on declining real yields and the safe asset shortage. Section 3 describes the universe of safe assets and quantifies official demand and hence their net supply. Section 4 relates the derived estimate of net safe asset supply to the performance of bond yields over recent years. Section 5 concludes with some policy suggestions for ameliorating the global safe asset shortage and hence helping us to exit from the current low yield environment.

## **2. Safe assets: the view from the literature**

Investors have always sought assets with a variety of risk profiles. Just as the financial system has always provided ‘risk assets’ that provide a return *on* capital, it has also required a set of ‘safe assets’ guaranteeing a return *of* capital. For centuries gold has provided that latter role. In the post-war era, as the US dollar’s link to gold was weakened and then abandoned, the US emerged as a ‘banker to the world’ (Poole, 2004; Gourinchas and Rey, 2007). As Beckworth and Crowe (2017) illustrate, a key part of that role has been the provision of safe assets. For instance, their analysis of the US net international investment position shows that, taken as a whole, the US has a net long position in risk assets and a net short position in safer, more liquid, assets.

Mendoza et al. (2009) develop a model with multiple countries that differ in terms of asset market completeness, to show that capital flows ‘up-hill’ as economies become more financially integrated via globalisation. That is, the country with better developed financial markets runs up net financial liabilities as it provides a cushion of safe assets to the less developed economy. Caballero et al. (2008) make similar arguments, while Forbes (2010) provides empirical evidence that investors in countries with relatively undeveloped domestic financial markets are more likely to hold US assets.

Bernanke (2005 and 2007) argues that persistent downwards pressure on US long-term rates reflected a ‘global savings glut’ in the form of international reserves accumulation by emerging market economies. Bernanke et al. (2011) argue that these flows into US assets were driven in large part by a desire for safety. Those flows came especially from emerging market economies that lacked the institutional depth to create an adequate supply of safe assets themselves (Golec and Perotti, 2017).

## **3. Estimating the supply of, and official demand for, safe assets**

The set of safe assets can be delineated in a number of ways. This paper defines the safe asset universe in a similar way to the IMF (2012), capturing OECD sovereign government and government-linked securities, high-rated corporate bonds and securitised instruments. The coverage in this paper differs from that of the IMF in a couple of ways. First, it excludes gold, on the basis that its value can be highly volatile, which limits its potential role as a safe asset. Second, it excludes the lowest-rated investment grade non-sovereign paper (BBB) on the basis that these bonds carry a still-material default risk and an even more substantial risk of downgrade (which removes them from the investible universe for many institutional investors) and therefore their claim to the status of safe assets is questionable.

US Treasury securities form the largest single pool of safe assets. According to BIS data, outstanding US government debt securities amounted to around \$19trn at the end of Q2 2019. That total has approximately doubled in the last decade. Looking across the universe of government debt securities issued by major advanced economies, the total is around \$42trn, with Japanese government debt (around \$9trn) the second largest component. That total has increased from around \$28trn a decade ago.

Securitised assets (excluding Covered Bonds) form the next largest bloc of assets, totalling around \$12trn in Q2 2019. Residential Mortgage-Backed Securities (RMBS) issued by US Agencies form the largest single component, summing to around \$7trn. Including non-agency Commercial Mortgage-Backed Securities (CMBS), Agency Collateralised Mortgage Obligations (CMO) and non-agency Asset-Backed Securities (ABS) and Collateralised Debt Obligations (CDO), total US-issued securities amount to over \$10trn.<sup>3</sup> EU-issued securities account for most of the remainder. Note that, in contrast to government securities, the volume of outstanding securitised assets is still below the level of a decade ago (although it is growing again now). This likely reflects a decline in the appetite for securitisation in the immediate aftermath of the global financial crisis, which some observers saw as precipitated at least in part by securitisation in the US mortgage market (Segoviano et al., 2013). The crisis exposed that many securitised assets with the highest credit ratings were in fact at high risk of default: the global appetite for safe assets had conjured up assets that were in fact not safe at all.

Both AAA-A-rated government-related securities and corporate bonds had outstanding volumes a little below \$5 trn in Q2 2019.<sup>4</sup> Government-related securities have seen minimal growth recently, while corporate bond issuance has picked up. Meanwhile, outstanding Covered Bonds are estimated at a little under \$3trn in Q2 2019.<sup>5</sup> The outstanding volume has been broadly static in recent years having shrunk somewhat in the aftermath of the Euro area sovereign debt crisis.

The estimated total supply of safe assets in Q2 2019 is therefore around \$67trn (Figure 3), of which almost two thirds are government securities, with almost 30% made up by US government securities alone. Having been broadly flat between 2011 and 2017, reflecting in large part the impact of fiscal austerity and a diminished appetite for securitisation in the wake of the global financial crisis, gross safe asset supply is once again on an upwards trend. However, as a percentage of global GDP gross safe asset supply is around 78%, down from 89% at the end of 2009. This decline in the supply of safe assets relative to the size of the global economy is even more pronounced once one controls for the increase in demand from the official sector, to which we turn now.

International reserves total almost \$12trn currently.<sup>6</sup> The bulk of these reserves are held in the form of liquid fixed income securities, or safe assets. Emerging market economies hold around \$7trn, of which China accounts for around \$3trn. Reserves holdings increased rapidly until around 2014 but have declined slightly since then, driven in large part by an almost \$1trn drop in China's reserves.

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<sup>3</sup> All data on securitised assets other than Agency RMBS is taken from various SIFMA publications; data on outstanding Agency RMBS are available via Haver Analytics.

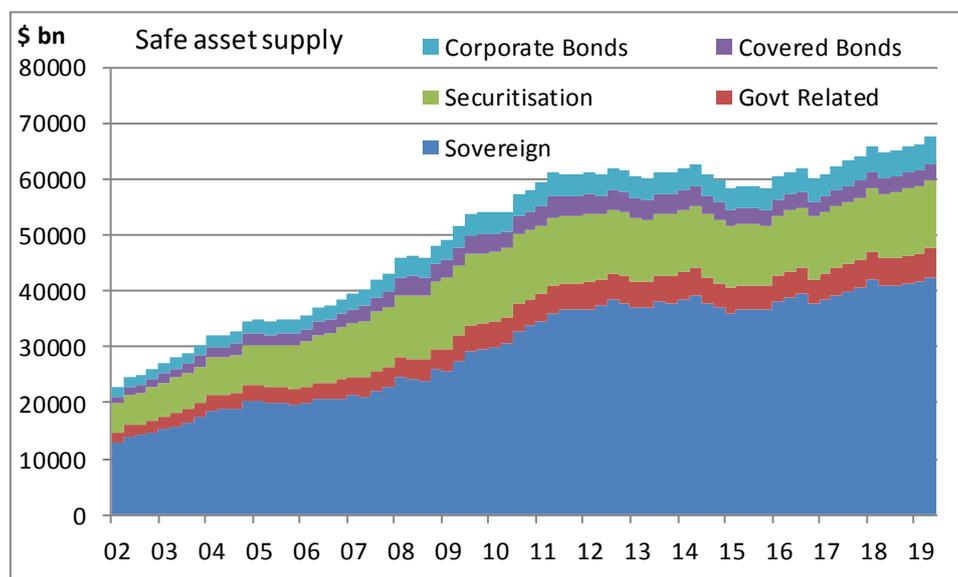
<sup>4</sup> Barclays data, accessed via *Barclays Live*.

<sup>5</sup> Annual data from the European Covered Bond Council.

<sup>6</sup> IMF International Financial Statistics: Total Reserves Minus Gold (totals for Advanced Economies plus Emerging and Developing Economies).

One source of safe asset demand that has seen a marked increase in recent years is advanced economy central bank asset purchases for monetary policy purposes, or so-called “Quantitative Easing” (QE). The combined holdings of securities by the Federal Reserve, ECB, Bank of Japan and Bank of England have increased from around \$1trn at the end of 2008 to over \$11trn by Q2 2019.

**Figure 3: Global Safe Asset Supply once again on an upwards trend**



*Source: Various Sources as detailed in text.*

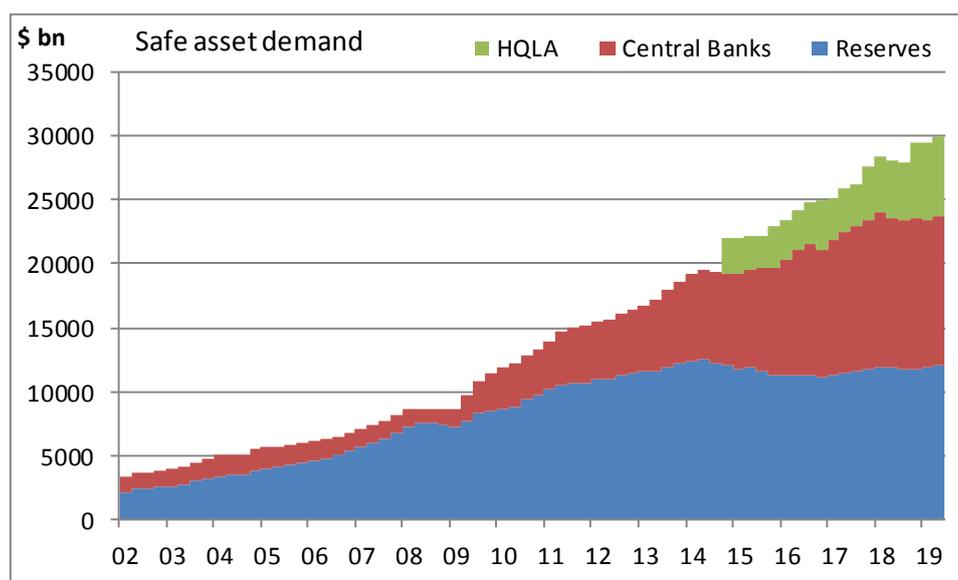
The third source of officially-mandated demand comes from regulatory changes that require banks and other financial institutions to hold a greater proportion of their assets in highly liquid form. From a safe assets perspective the most meaningful of these is the Liquidity Coverage Ratio, under which banks must hold enough so-called High Quality Liquid Assets (HQLA) to be able to cover liability outflows in the event of a serious stress event.

There are two main complications arising in assessing how this rule impacts safe asset demand. The first is that the precise parameters of the regulations depend on the balance sheet make-up of each individual bank, and so the derived demand for HQLA can only be estimated approximately if one does not have access to individual bank balance sheet information. The second is that central bank asset purchases, by increasing the supply of bank reserves, create additional liquid assets that can be used by banks to meet their liquidity requirements, even while the asset purchases themselves drain from the system safe assets that can be used by the financial sector more broadly. The estimated safe asset demand on the part of banks subject to these liquidity rules therefore nets out the safe asset supply created by central banks reserves. A final wrinkle is that these rules have been phased in gradually, with banks only required to hold liquid assets equivalent to 60% of the full requirement at the end of 2014, increasing to the full 100% at the end of 2018.

Using BIS data, our estimate is that total HQLA holdings mandated under the LCR rules amounted to around 13.7% of banks’ assets as of mid-2018. However, separate calculations for large US banks and EU banks suggest that HQLA requirements for major US banks amounted to 22.4% of bank assets, while those for EU banks were 9.5%. Applying the 13.7% global aggregate suggests that the

appropriate figure for banks outside of the EU and US was around 15.3%.<sup>7</sup> These ratios are applied to aggregate data on bank assets for each jurisdiction. The derived official sector demand for safe assets from this source is then calculated over time using the phase-in schedule for the LCR rules. For each jurisdiction, net safe asset demand thanks to HQLA requirements are then calculated by subtracting the supply of central bank reserves for each jurisdiction (subject to a minimum net requirement of zero), as discussed above.

**Figure 4: Official and officially-mandated demand for safe assets**



*Source: Various Sources as detailed in the text.*

Putting these three sources of official sector safe asset demand together, this paper estimates that their combined impact is to make almost \$30trn of safe assets unavailable for general use by the private sector (Figure 4). The combined effect of flat or only moderately increasing safe asset supply and ongoing growth in official sector demand has been to reduce the net supply from around \$46trn in 2011 to less than \$38trn currently. As a percentage of world GDP the net supply peaked at 70% in 2009, but has declined now to around 44% (Figure 5). This persistent and material decline suggests that there is indeed a global safe asset shortage.

#### **4. The safe asset shortage accounts for much of the decline in global bond yields**

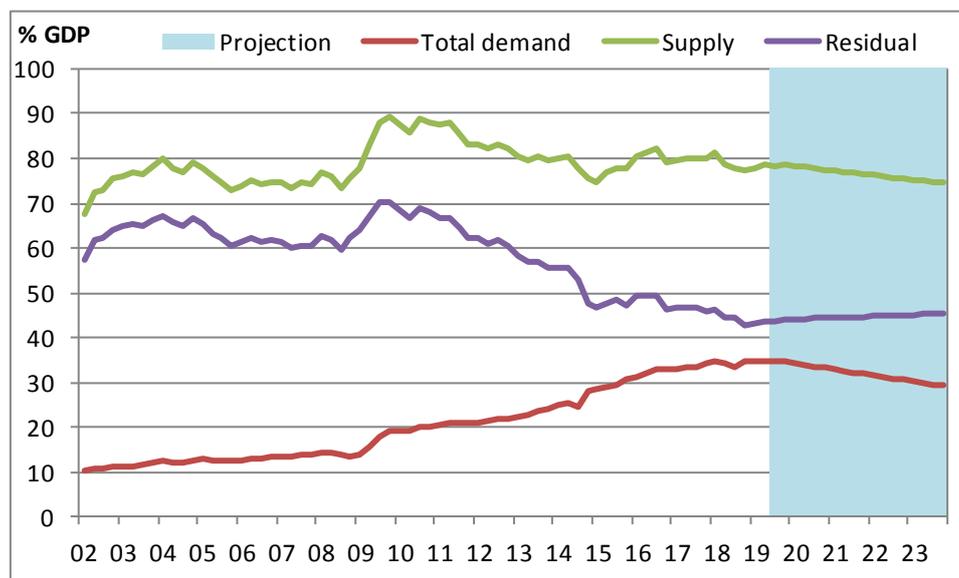
This paper has provided concrete evidence supporting the widely-held perception that the global economy suffers from a shortage of safe assets. Growth relative to global GDP is the obvious benchmark for assessing the adequacy of supply, since, other things being equal, demand for these assets is likely to be at least proportionate to income in the economy (indeed, there are good reasons for thinking that demand for safe assets likely increases more than proportionately with GDP).

Where would we expect a safe asset shortage to manifest itself? The obvious place to look is in the pricing behaviour of US Treasuries, which constitute the largest single pool of safe assets. As discussed above, US Treasury yields are affected by a range of factors, including current and

<sup>7</sup> Calculations draw on data in BIS (2019), EBA (2016), Levine and Sarkar (2019) and Aimone (2018).

expected monetary policy settings and inflation expectations. This paper therefore focuses on estimates of the so-called “term premium” on benchmark 10-year bonds – that is, the portion of the yield that is not attributable to expectations about short-term policy rates. While the term premium does not explicitly correct for inflation expectations, since policy rates themselves respond to inflation the term premium also offers a degree of correction for this factor.

**Figure 5: Net supply of safe assets has fallen materially over the last decade**



Source: Various Sources as detailed in the text.

Figure 6 below shows the evolution of one estimate of the Term Premium versus the estimated measure of net safe asset supply, scaled by global GDP.<sup>8</sup> As is clear from the chart, the evolution of the term premium, and in particular its pronounced downwards trend since around 2011, matches closely the decline in the net supply of safe assets relative to the size of the global economy. This supports the view that a global safe asset shortage has been an important driver of tumbling global yields.

## 5. Conclusions

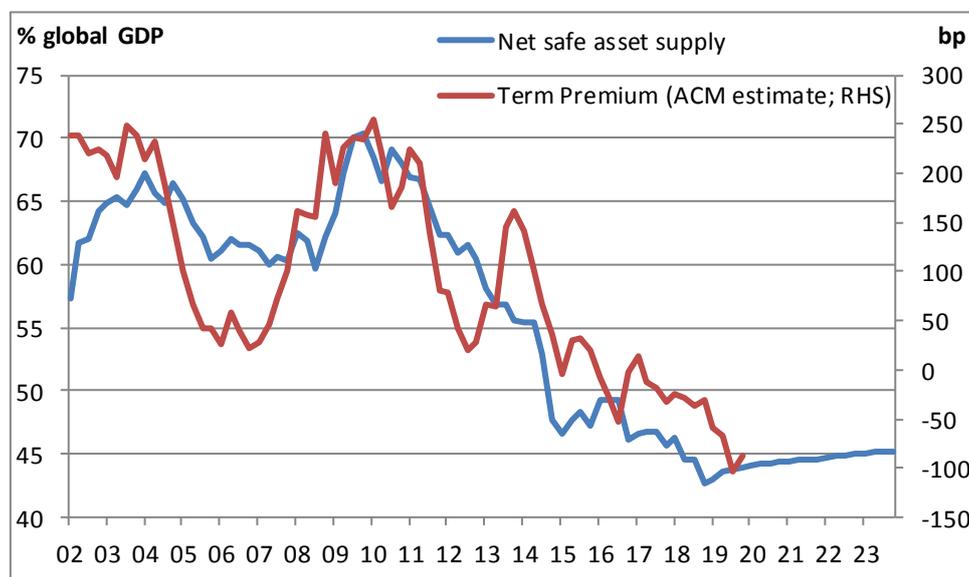
This concluding section discusses some implications of the preceding analysis. First, how is the global safe asset shortage likely to evolve from here? As shown in Figure 6, the good news is that the long decline in the net safe asset supply is likely over.<sup>9</sup> This is largely thanks to an expectation of more aggressive sovereign debt issuance, almost entirely thanks to the US. The bad news is that there is little prospect of a substantial recovery in safe asset supply. This suggests that the current low yields environment will continue, even if we are unlikely to see a further move downwards.

<sup>8</sup> This paper employs the Adrian, Crump and Moensch measure (Adrian et al., 2013; Bloomberg ticker: *ACMTP10 Index*). Using an alternative measure of the term premium estimated by Kim and Wright (Kim and Wright, 2005; Ticker: *KIMWTP10 Index*) yields similar results.

<sup>9</sup> Projections are quarterly interpolations based on annual forecasts of GDP, government debt and international reserves in the latest IMF World Economic Outlook (WEO). Central bank reserves and asset holdings are based on stated policies and/or recent performance.

Second, if the global safe asset shortage is the main factor driving down yields, then it implies that the slope of the yield curve may no longer be a reliable predictor of an imminent economic downturn. This might then help to rationalise the divergent signals about the state of the business cycle seen in US equity and bond markets.

**Figure 6: A falling net supply of safe assets explains tumbling bond yields in recent years**



*Source: Bloomberg; Various Sources as described in the Text.*

Third, does the safe asset shortage constitute a problem? Low yields are clearly creating challenges, notably for pension funds. More fundamentally, Caballero and Farhi (2017) argue that an economy that lacks a sufficient supply of safe assets can experience a “safety trap,” equivalent to the “liquidity trap” posited by Keynes. For such an economy, supply of and demand for safe assets will be equalised by a drop in economic activity that lowers the demand for safe assets, once yields on safe assets cannot fall far enough to match the supply shortage.<sup>10</sup>

Last, what could be done to boost the net supply of safe assets? The obvious solution would be for other advanced economies to join the US in boosting debt issuance through more expansionary fiscal policies. With demand for safe assets still strong relative to supply, governments are likely to be able to borrow relatively cheaply for some time, suggesting that the penalty in terms of higher debt interest payments will be low.

Previous efforts by the private sector to provide more safe assets ran into problems, as witnessed notably with US securitised assets during the financial crisis, and so the public sector remains a more plausible source of additional safe asset supply. As emerging markets grow and develop deeper financial markets and a stronger institutional framework then they should be in a better position to issue sovereign safe assets of their own, but that may still be some time off.

The public sector could also do more to free up safe asset supply by reducing its own demand. As emerging market economies embrace more flexible exchange rate regimes the need for large

<sup>10</sup> In this case, an inverted yield curve could still predict a recession even though the underlying rationale is the safe asset shortage.

international reserves holdings might decline. Greater recourse to precautionary credit lines from institutions like the IMF might help to reduce the precautionary demand for safe assets from EM sovereigns.

Advanced economy central banks should bear in mind the impact that their QE policies can have on net safe asset supply. This 'safety channel' provides a powerful motivation for asset purchases, since it demonstrates how QE can suppress the term premium and hence loosen financial conditions. And to the extent that the creation of bank reserves helps to offset the reduced availability of other safe assets for banks looking to meet regulatory requirements, the impact of QE on net safe asset supply is in any case limited. Nevertheless, the fact that QE worsens the global safe asset shortage is another factor that major central banks might consider in their cost-benefit analysis of asset purchases.

Similarly, regulatory policies that require banks to load up on safe assets at the expense of other potential holders might also need to be revisited. Efforts to make the financial system safer may be creating problems elsewhere when there is not enough safety to go around.

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