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Ludger Schuknecht*

The Supply of Safe Assets and Fiscal Policy

Beyond fleeting references, there is surprisingly little analysis about the interrelationship between fiscal policy and safe assets. This study analyses this interrelationship and argues that, at a certain point, more public debt will not “buy” more safety: countries face a kind of “safe assets Laffer curve”, with a maximum amount of safe assets at some level of indebtedness. The position and stability of this curve depend on a number of national and international factors, including international risk appetite and the quantitative easing policies implemented by central banks. The study also finds evidence of declining safe assets, as reflected in government debt ratings.

There is a lively debate about the role and provision of so-called safe assets. Safe assets are needed as a benchmark against which one can measure the riskiness of other assets (a kind of reference unit of account), as liquidity service for companies and banks, and as an investment device (storage of value).

While some economists argue that there is a scarcity of safe assets, others doubt this claim.¹ The implicit assumption of most studies, however, is that government debt is always safe. Hence, more expansionary fiscal policies and higher deficits raise public debt and thus the supply of safe assets.² Public debt sustainability does not play much of a role for “safety”, especially in the policy debate; if governments have difficulties, it is because there are liquidity problems, not solvency problems. The euro crisis in 2011-12 was “fuelled by the absence of a union-wide safe asset” and not primarily by solvency concerns about the sovereigns in distress.³

* The views expressed are the author’s and not necessarily those of his employer. I am grateful to Jan Krahnert, Daniel Gros, Thorsten Arnsward and Helmut Herres for comments and discussions.

- 1 For a survey, see R. Portes: The Safe Asset Meme, Keynote lecture at Fudan, Shanghai, 26 May 2013.
- 2 G.B. Gorton, G. Ordoñez: The Supply and Demand for Safe Assets, NBER Working Paper No. 18732, 2013. From a policy perspective, C. Grosse Steffen: The Safe Asset Controversy: Policy Implications after the Crisis, DIW Roundup 3, 2014; and S. Tober: The ECB’s Monetary Policy: Stability Without “Safe Assets”?, IMK Report No. 112e, 2016.
- 3 M.K. Brunnermeier, S. Langfield, M. Pagano, R. Reis, S. Van Nieuwerburgh, D. Vayanos: ESBies: Safety in the Tranches, draft of a paper prepared for the 64th Panel Meeting of Economic Policy, 14-15 October 2016.

There is surprisingly little analysis about the fact that public finances need to be sustainable for there to be any safe assets.⁴ At the same time, and independent of the safe asset debate, it is frequently argued that current public debt levels, especially when considering contingent liabilities from high private debt and population ageing, may already be too high to be sustainable in some countries. The current low interest rate environment may create an illusion of safety that could disappear when the inflation-interest environment becomes less favourable. Therefore, public finances need to be placed on a sustainable path with declining deficits and public debt to enhance the safety of government debt.

This paper takes a closer look at the interrelationship between fiscal policy and safe assets. It argues that, at a certain point, more public debt will not “buy” more safety; countries face a kind of “safe assets Laffer curve”, with a maximum amount of safe assets at some level of indebtedness. The position and stability of this curve depend on a number of national and international factors, including international risk appetite and, a more recent factor, the quantitative easing (QE) policies implemented by central banks.

The study also finds evidence of declining safe assets, as reflected in government debt ratings. The data confirms that a) higher public debt *ceteris paribus* means lower ratings, b) AA/A instead of AAA seems to be the new normal for “safe” industrial country debt, c) a number of emerging economies have moved up the rating ladder and may

4 For rather general references to this constraint, see R. Caballero, E. Farhi: A Model of the Safe Asset Mechanism (SAM): Safety Traps and Economic Policy, NBER Working Paper No. 18737, 2013; M. Obstfeld: The International Monetary System, Living with Asymmetry, in: R.C. Feenstra, A.M. Taylor (eds): Globalisation in an Age of Crisis: Multilateral Economic Cooperation in the Twenty-First Century, Chicago and London 2013, University of Chicago Press; International Monetary Fund: Global Financial Stability Report, Old Risks, New Challenges, April 2013.

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provide the “safe assets” of the future, d) even industrial countries can slide, at times rapidly, out of safe territory, which was conceivable only for emerging economies in the past, and e) central banks’ QE policies further reduce the supply of safe assets available in markets.

The study first discusses some conceptual issues around safe assets. It then assesses empirically whether the financial and fiscal crisis and the post-crisis period have led to more or fewer safe assets before concluding with some policy considerations.

What are safe assets?

Safe assets are those assets which have a high degree of liquidity and a low default probability.⁵ High liquidity is needed so that investors can be sure that they will be able to sell an asset at any time – especially when the environment is rough. In the European fiscal crisis, a number of government debt markets virtually shut down as “liquidity” evaporated. A low probability of default is needed so that investors do not demand much of a default premium. It is basically solvency and liquidity that can then be translated into measures of “safeness”. The liquidity service of a sufficient amount of safe assets increases output and growth.⁶ Safe assets also have an important signalling role in markets to ensure that the pricing of risk (and riskier assets) functions properly. Finally, investors demand safe assets as a safe store of value (e.g. to smooth consumption in old age). A sufficient supply of safe assets may then increase demand, as overall precautionary saving can be lower.

Market-based measures of safeness include the rating of an asset by credit rating agencies. A rating typically looks at the probability of default of an asset within five years. Liquidity also plays a role. Ratings reduce the information and monitoring costs of safety.⁷ Another market-based measure is the “benchmark” status of an asset. Only government debt has benchmark status and only that of some countries, i.e. Japanese government bonds in the yen market, US Treasuries in the US dollar market, German Bunds in the euro market, UK Gilts in the pound market. Some countries’

5 A distinction should be made between “nominal safety”, i.e. no risk of haircut or restructuring, and “real safety”, where the inflation risk is limited. In this study, I refer primarily to the former, even though the IMF also rightly mentions limited inflation risk, low exchange rate risks and limited idiosyncratic risks as essential for safety. These factors also enhance the stability of real asset prices and returns. See International Monetary Fund: Global Financial Stability Report. The Quest for Lasting Stability, April 2012.

6 R. Caballero, E. Farhi, P.-O. Gourinchas: Safe Asset Scarcity and Aggregate Demand, in: American Economic Review, Vol. 106, No. 5, 2016, pp. 513-551.

7 G. Franke, J. Krahn: Instabile Finanzmärkte, in: Perspektiven der Wirtschaftspolitik, Vol. 10, No. 4, 2009, pp. 335-366.

debt may thus not qualify not because there is a higher solvency risk but simply because the market is small.

Other market-based measures include the cost of credit default swaps or the spread of government debt over benchmarks. Markets for credit default swaps are, however, rather thin, and their accuracy as a measure of default risk has been doubted. The same is true for spreads over benchmarks, with the additional caveat that benchmarks are assumed to be perfectly safe. Volume and volatility indicators could proxy liquidity, but such indicators are hard to come by and compare.

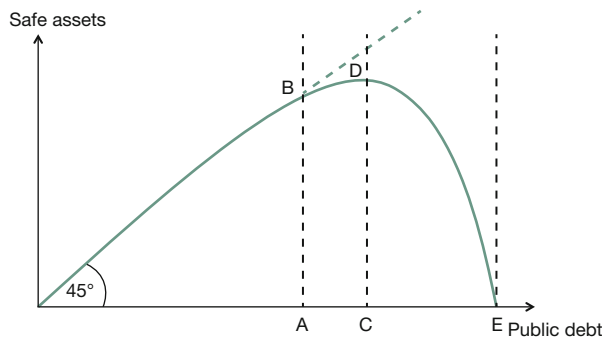
Regulation-based measures of safety essentially rely on ratings or on past volatility which, in turn, affects asset returns, their risk weight and bank stress tests. Finally, there are technical measures of safeness for government debt of various degrees of sophistication. These include absolute measures such as fiscal deficits, public debt, and public debt plus contingent debt in the private and social security sectors, as well as probabilistic measures such as default probabilities based on assumptions and judgements about growth, interest rates, inflation, the institutional environment, etc. None of these measures is perfect; otherwise, defining and measuring safeness and the supply of safe assets would be trivial.

The safe assets (Laffer) curve

It is a mathematical law that a curve that starts at zero and at some point ends at zero must have a maximum (or a minimum) in between. If this logic is applied to safe assets in the form of government debt, an increase in public debt increases – for a while – the supply of safe assets. At some point along this path, however, confidence will start to wane, and a further increase in public debt will not increase the amount of assets without compromising their quality or degree of safety. If one were to measure safety by the amount of assets weighted by their degree of safety, at some point, a maximum will be reached. This Laffer curve pattern is actually rather trivial: until point B in Figure 1, it is the 45 degree line, as all additional public debt is seen as ultra-safe. Until point D, the curve continues to rise, as additional debt is still of a high enough quality that total weighted safe assets increase. At some point E, the whole debt stock is unsafe.

Fiscal policy implies a movement along the curve: an increase in deficit and debt via expansionary policies implies a move to the right. At first, it has the double benefit of stimulating demand and raising the available amount of safe assets. This is certainly true until point B, as the country is in the safe zone. Beyond point D, the loss in quality outweighs the gain in quantity, and all debt is unsafe beyond E. In rating terms, a country would be AAA until B and below BBB in E.

Figure 1
The safe asset curve



Source: Author's illustration.

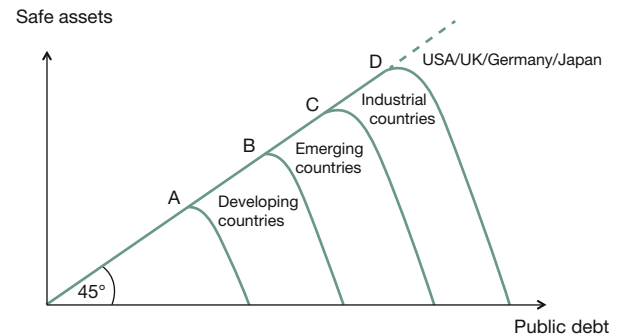
A number of factors complicate this simple picture in reality. The maturity structure of debt matters for the perceived safety. Issuing more short-term debt may allow the issuance of more total debt, but it makes long-term debt junior. Variable interest debt, GDP floaters or debt with a preferred creditor status (like the IMF) are additional complications.

Determinants of the position of the curve

What shifts the curve? What is the implication of uncertainty and shocks? What are the short- versus long-run dynamics, also in light of political economy considerations? As regards the first question, the position of the curve is determined by a number of endogenous and exogenous factors. Strong fiscal governance that gives investors confidence, so that even large deficits and debt levels do not necessarily indicate an unsustainable debt path, will result in the 45-degree line remaining relevant for longer than in countries with weak fiscal governance and little such confidence. The same holds for monetary policies: independent central banks that maintain stable, low inflation levels have more credibility, and thus real and nominal interest rates are lower. Again, the 45-degree part of the Laffer curve is likely to be longer, as the country can safely finance more public debt. Favourable long-term growth prospects due to sound economic structures have the same effect, as the economy can more easily grow out of large public debt levels. Policy reforms that improve any of these factors are also likely to improve the perceived safety of government debt.

External factors include the size of the market. More liquidity has a favourable effect, *ceteris paribus*. Market size in conjunction with favourable fiscal and monetary governance is likely to make public debt even safer. The underlying currency can become a reserve currency, and the asset can become a benchmark in international mar-

Figure 2
The safe asset curve by country groups



Source: Author's illustration.

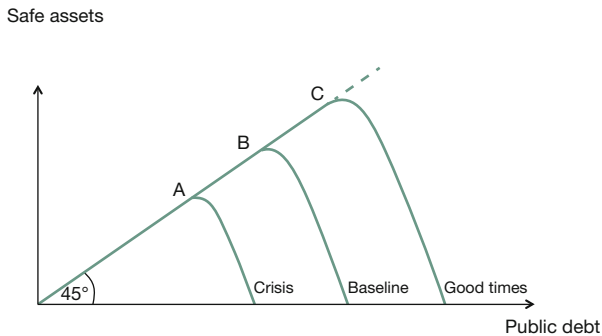
kets. This again extends the safe part of the curve and shifts outward the zones of less safe or unsafe government debt. As a result, some countries with very high debt like the UK or the US have much better ratings than a country like Mexico, even though the latter's debt ratio is much lower.

Figure 2 illustrates a typology of curves across country groups: developing countries (illiquid markets, weak policy governance) have the shortest 45-degree segment, indicating a low potential for generating safe government assets. In some of them, no government debt would be considered safe. Emerging economies, especially those that are large and have more credibility, can reap the double benefit of debt financing and safe asset generation significantly longer. "Normal" industrial countries may find that they can issue even more safe assets (public debt). However, confidence about the difference between emerging economies and industrialised countries was severely shaken in the European fiscal crisis. The countries with the highest potential for generating safe assets through the issuance of public debt are, as mentioned, the reserve currency/benchmark debt countries, i.e. the US, Japan, the UK and Germany.

Safe assets in different circumstances

The position of the safe asset (Laffer) curve is not only country-specific but depends very much on the state of the economy as related to internal and external conditions and shocks. In times of low inflation and low interest rates, little risk aversion, political stability, and strong growth, the ability of governments to borrow and thus create safe assets often appears limitless. By contrast, in times of global or national stress, when views on growth prospects, risk aversion, fiscal prospects and political stability turn more negative, the perception of safety will decline. Moreover, the European boom and subsequent

Figure 3
The safe asset curve by state of the economy



Source: Author's illustration.

fiscal crisis have shown that favourable and unfavourable factors tend to occur in a highly correlated manner. While the curve of less safe countries will shift to the left in times of stress, the safe haven flows will move the curve of reserve countries to the right.

In sum, it is probably more appropriate to say that countries face a “fan” of safe asset curves. An example of such a set of plausible curves is illustrated in Figure 3. The baseline curve is in the middle. In the worst case, when everything goes wrong, the relevant curve is the “crisis” curve. In the best case, countries are presented with the curve “good times”, where public debt can in principle be expanded significantly further without any doubt about the safety of underlying assets. For reserve currencies, the curves for good times and crisis scenarios may both move to the right compared to the baseline. The primary risk for these countries, then, is that they might lose their reserve currency status (e.g. the UK in the 1960s and 1970s).

The financial cum fiscal crisis taught us that a country can move rapidly from a seemingly very safe position to a near-crisis position as the curve shifts left. And obviously, countries have options to react: fiscal consolidation implies a move along as well as a potential shift in the curve if expectations are affected. Other reforms to strengthen policy governance and growth also shift the curve favourably. External financial support via IMF/ESM programmes is likely to improve the perceived safety of assets in two ways: by reducing a government’s financing needs and by improving the prospect of fiscal sustainability through reforms.

There are also more “temporary” measures: countries can avert concerns by shortening the maturity structure of debt issuance. They can resort to moral suasion by, for example, “asking” banks to buy government debt. Or they can ask the central bank to step in, making government assets safer.

Structural changes in the demand for safe government debt

The three scenarios depicted in Figure 3 could also be seen as reflecting structural changes in the demand for safe assets (and hence also government budget constraints). Ageing societies with funded pension systems may have greater demand for safe government debt in the build-up phase of pension funds. Tightening regulatory requirements for private assets on bank balance sheets may cause a shift into government assets, as they are not subject to capital requirements or exposure limits. Independent central banks receive the benefit of the doubt when declaring government asset purchases part of monetary policy; dependent central banks would be under much more suspicion of monetary financing. These three factors may have contributed to markets now financing much higher debt levels at low interest rates than was the case years ago.

At the same time, the risk of non-linear market reactions and sudden stops may have increased as well. This implies a steeper downward segment of the curve and a greater risk of shifts in the curve. Regulatory and central bank privileges may be dependent on minimum ratings. International interdependence (financial and confidence channel), herd behaviour in asset classes (such as vulnerable countries) and less market making may also increase volatility.

Political economy

What is the likely course policy makers are going to take? In the ideal world of forward-looking, perfectly informed governments, public debt would probably not rise beyond point A in Figure 3. The government would not want to risk a fiscal crisis scenario with financing difficulties that would require ad hoc and pro-cyclical fiscal consolidation measures. From a political economy perspective, this is not necessarily so. Governments with limited time horizons will discount the probability of crisis, especially at the longer horizon. They will maximise the scope for indebtedness, or at least they may not seek to reduce public debt as much as needed. Public debt is likely to stay or rise above B and even close to C in good times.

From a political economy perspective, two further scenarios are worth discussing. First, the potential for financial support will soften the government’s budget constraint and raise expected deficits. This implies a shift in and a move along the curve. Second, a very volatile financial environment (frequent shifts in the curve) and conditionality tied to financial aid tightens budget constraints and reduces moral hazard because crisis-related external financing would be politically costly. The resulting reforms, in turn, would reduce debt and shift the curve to the right.

Quantitative easing

Quantitative easing is interesting to analyse in this context.⁸ The purchase of safe government paper by central banks withdraws the respective liquidity services and investable paper from the economy. Moreover, it distorts the signalling role of the interest rate both on the price of safety and the price of risk, especially when central banks buy very large amounts of assets. This should also lead to distortions in investment decisions (a desired stimulus of demand plus an undesired allocation to less productive investment). Graphically, this implies that the safe asset curve that governments face is shifted to the right during the entry phase and back to the left during exit. Here, of course, timing matters. QE during a crisis may compensate for loss of market confidence as leftward and rightward shifts in the curve balance out. Exit in times of exuberance may appropriately normalise the financing situation governments face.

It is also interesting to analyse QE in terms of the particular risks in the Economic and Monetary Union (EMU). While national central banks can normally inflate away their governments' debt (and thereby avoid nominal default), individual EMU countries do not have this option. Hence, highly indebted EMU countries are more susceptible to shifting perceptions of safety while overall inflation in the euro area remains low. Here, QE can be a side effect of monetary policies that counter the financial cycle and thereby enhance safety. Taking bonds (and risk) onto the central bank balance sheet in times of crisis increases the safety of individual government bonds. When the financial environment has normalised, the central bank can shorten its balance sheet again.

This, however, brings up the moral hazard risks associated with QE. While countercyclical QE would be desirable, central banks may exit too late (as investors and governments prefer cheap financing). Moreover, governments may fill some of the QE-related additional safe asset demand via fiscal spending and higher deficits and find themselves in an uncomfortable position of having excessive debt when the central bank attempts to exit. Thus, QE may increase the very fiscal dominance risks that central banks must avoid.

Another fact to consider is the implications of QE for the safeness of existing debt outside central banks' balance sheets relative to those on central bank books. What does

⁸ On monetary policy at the zero lower bound and the logic of QE, see e.g. G. Eggertsson, M. Woodford: The Zero Bound on Interest Rates and Optimal Monetary Policy, in: Brookings Papers on Economic Activity, No. 1, 2003, pp. 139-211.

QE do? It replaces the financing costs of long-term borrowing with those for short-term borrowing; the rollover risk does not change. In other words, a change to long-term variable financing instead of fixed rate financing. However, unless central banks are explicitly exempt from preferred creditor status (PCS), the risk for the remaining paper in the market rises.

The situation in the EU may be even more complex: the Eurosystem may gain a significant veto power against restructuring if its foreign debt holdings become very large. Even without formal PCS or without using its veto, it may need priority access to somebody's public money to be recapitalised (de facto PCS) after a debt restructuring in the euro area.⁹ All this requires further reflection on the risk of unintended and unexpected consequences.

In conclusion, the accuracy of the claim that expansionary fiscal policies raise the pool of safe assets and aggregate demand depends very much on the state of both the domestic and global economy. Political economy considerations suggest that governments are likely to let public debt rise beyond the point where government debt would still be safe in a crisis. QE may exacerbate short-term shortages of safe assets through adverse supply effects and long-term shortages through adverse sustainability effects.

An empirical assessment of the supply of safe assets

Even from a descriptive analysis, there is some evidence of the indebtedness pattern that political economy would predict, with countries' government debt ratios tending to move beyond the maximum point of safe assets.

Government debt ratios

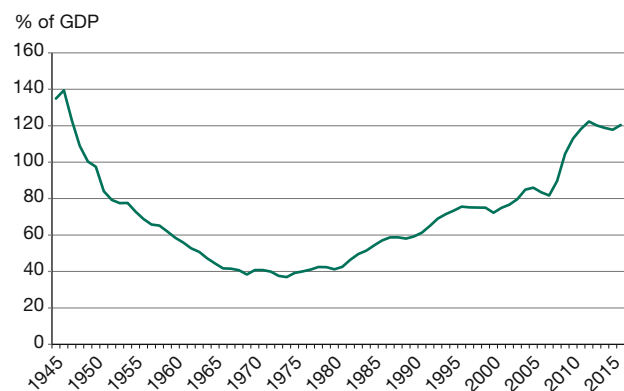
Government indebtedness has been rising for the past four decades on average and in most industrialised countries. Government debt in the G7 countries, for example, is now about 120% of GDP on average, nearly as high as it was in the aftermath of World War II (see Figure 4). Japan has the highest ratio of gross debt for general government – it has been well above 200% of GDP since 2009. Italy and the US follow, with ratios higher than 100% of GDP. France and the UK are not far from 100%, while Germany's ratio is around 70%.

Debt and ratings

When looking at public debt ratings, one can see the close correlation between rising public debt and worsen-

⁹ For a description of the way the Eurosystem's QE programme works, see www.ecb.europa.eu/mopo/implementation/omt/html/pspp.em.html.

Figure 4
Public debt ratio of G7 countries, 1945-2016



Note: Group aggregation weighted with countries' GDP in PPP terms.

Source: IMF.

ing ratings. Until the late 1990s, most industrial countries had AAA ratings. A number of highly indebted European countries and Canada were “only” AA (see Table 1). Ratings for emerging economies were often barely in investment grade territory.

In the new millennium, interesting changes occurred. In the 2010s, industrial country downgrades increased and accelerated, affecting more and more large countries, including even the US. By 2016, Japan was only in single A and Italy and Spain in BBB territory. France, the US and Austria had lost their AAA rating from Standard & Poor's. Meanwhile, a number of emerging economies have moved up the rating scale. Indian, Mexican and Russian debt have received investment-grade ratings. At AA-, both Korea and China were rated higher than Japan in 2016.

When aggregating ratings and issuance, it is interesting to note that AA replaced AAA as the new normal in 2012 when the US was downgraded. With the downgrade of Japan to A in 2015, even AA is not the norm anymore. In 2011, about half of central government debt was rated AAA (nearly \$20 trillion); by 2015, this share had declined to only about 15% (\$5 trillion). The UK and Germany accounted for the lion's share of that. While these figures would look different with Moody's and Fitch data, they are nevertheless an indication that no country's rating is sacred and that if public finances were to get bad enough (or the risk-off sentiment strong enough), the supply of safe assets could dwindle significantly and rapidly.

It is also interesting to look at the quantitative implications of QE on the availability of safe assets in the market. At the end of 2015, only five major central banks (the

Table 1
Government debt ratings

	1993 Q4	1999 Q4	2006 Q4	2011 Q2	2017 Q4
Germany	AAA	AAA	AAA	AAA	AAA
Netherlands	AAA	AAA	AAA	AAA	AAA
Switzerland	AAA	AAA	AAA	AAA	AAA
Austria	AAA	AAA	AAA	AAA	AA+
United States	AAA	AAA	AAA	AAA	AA+
France	AAA	AAA	AAA	AAA	AA
United Kingdom	AAA	AAA	AAA	AAA	AA
Japan	AAA	AAA	AA-	AA-	A+
Canada	AA+	AA+	AAA	AAA	AAA
Belgium	AA+	AA+	AA+	AA+	AA
Australia	AA	AA+	AAA	AAA	AAA
Spain	AA	AA+	AAA	AA	BBB+
Italy	AA	AA	A+	A+	BBB
Ireland	AA-	AA+	AAA	BBB+	A+
Portugal	AA-	AA	AA-	BBB-	BBB-
Korea	A+	BBB	A	A	AA
China	BBB	BBB	A	AA-	A+
Greece	BBB-	A-	A	CCC	B-
Mexico	BB+	BB	BBB	BBB	BBB+
India	BB+	BB	BB+	BBB-	BBB-
Russia		SD	BBB+	BBB	BB+

Source: Standard & Poor's.

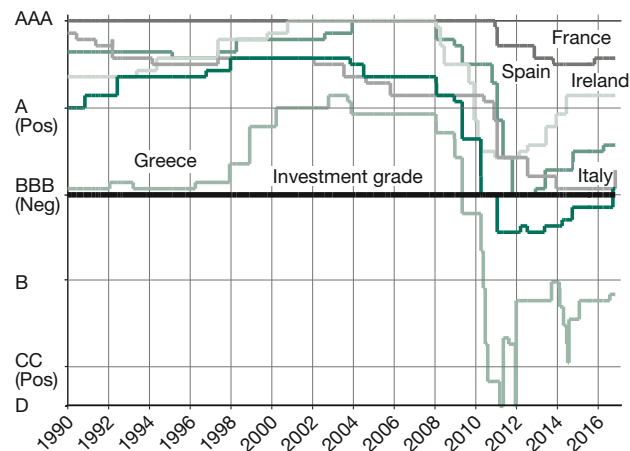
UK, the US, the euro area, China and Sweden) held about 20% of central government debt securities with an investment grade. Given the ongoing QE in Japan and the EU, this share is still growing.

The speed at which ratings can deteriorate is also noteworthy, as shown in Figure 5. Greece fell from A- to D within two years. Portugal fell from AA to BB and Spain from AAA to BBB- within three years. Italy's rating declined somewhat more gradually. But rating upgrades in recent years also reflect the successful implementation of reforms – in Spain, Portugal and notably Ireland. This shows that there is nothing final in the loss of a “safe” rating and that reform is the key to future safety.

Conclusions

The analysis above has argued that there are limits to the supply of safe assets via government debt. At some point, an increase in debt results in assets that are less safe. The maximum amount of safe assets, however, is not a fixed point. In crisis situations, it is much smaller (with more

Figure 5
Public debt ratings of selected European countries, 1989-2016



Source: Standard & Poor's.

limited debt issuance potential) than in good times. It is in the nature of most politicians to try to incur more debt, thus softening the government budget constraint. But in so doing, governments tend to incur more debt than is good for the safeness of the underlying assets in a crisis period.

QE may exacerbate this risk, as fiscal space granted by QE may mistakenly be seen as permanent. At the same time, and from a more positive angle, the Eurosystem can counteract the declining safeness of European government debt due to temporary liquidity problems through the purchase of such debt.

The over-emission of seemingly safe assets is conceivable even at the global level which, in turn, raises an externality issue: one country's fiscal crisis could undermine confidence in the safeness of another government's debt. This would be particularly problematic if it was a large industrialised country, as it could lead to the repricing of global public debt markets and revised assessments of their safety.

Where do we stand today? After 40 years of chronic fiscal deficits, industrialised countries are back to debt levels near the post-World War II highs. Some countries are financing government debt ratios above 130% or even 200% of GDP. It is unsurprising that this development has not come without consequences for the safeness of government debt. At the time of writing of this paper, Standard & Poor's rated only about a quarter of the government debt of industrialised countries as AAA. For comparison,

almost all advanced economy government debt had this rating in the early 1990s. However, most public debt still has a rating of A or better. A number of industrialised countries have been on the verge of losing their investment grade – one indicator of minimum safeness.

Are today's high debt ratios perceived as reasonably safe because the scope for government indebtedness has shifted permanently outwards (e.g. due to ageing and regulation-related higher demand for government debt) or because price signals are heavily distorted? We do not know. The experience of the financial cum fiscal crisis in 2012, in which even Spain and Italy were at risk of losing market access, illustrates that sentiment about safeness can shift quickly and dramatically. And the historical experience of many countries has shown that central bank intervention works only up to a certain point.¹⁰

There is no escape from the real question: how can we reverse the debt trend of recent decades, prevent further fiscal crisis *and* achieve a reasonable supply of safe assets and fiscal discipline? Market monitoring alone does not seem to do the job. International financial assistance can buy time for stabilising markets and for bringing down unsafe debt levels. This has been tested quite successfully so far in a number of European economies when combined with conditionality. But the option is probably not suitable for large countries, because financing needs would be immense and conditionality is unlikely to be credible.

Some observers argue that governments should take advantage of low interest rates and abandon balanced budget objectives, taking on more debt for worthy public spending objectives without giving much consideration to adverse political economy incentives. Population ageing and shifting global savings/investment patterns as a long-term risk are also largely not on the radar. The call for more deficit spending from some quarters shows that a main lesson of the crisis may have been learned by the financial sector (enhance resilience, build buffers, deleverage) but not by the public sector. Rating agencies may have learned even more: the lack of rating upgrades following QE suggests that they do not see more safety.

¹⁰ Financial engineering may help in principle, although there are likely to be serious issues of time consistency. New types of bonds may extend the boundary of what markets would see as safe (see e.g. M.K. Brunnermeier et al., op. cit.) or they may improve the incentives for staying within safe limits (see e.g. C. Fuest, F. Heinemann, C. Schröder: Accountability Bonds: Eine neue Art von Staatsanleihen, *Ökonomenstimme*, 9 November 2015). But all depends on the overall framework within which such instruments are introduced.