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Quantitative Easing in the Euro Area: Its Record and Future Prospects

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IMFS

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Recent Issues

1/2015, The ECB's Outright Monetary Transactions in the Court, eds. Helmut Siekmann and Volker Wieland, January 2015

The Outright Monetary Transaction (OMT) program of the ECB and the court case at the German Federal Constitutional Court are analyzed by Christoph Degenhart (Constitutional Court of the Free State of Saxony and Leipzig University), Antonio Luca Riso (ECB), Harald Uhlig (University of Chicago) as well as Helmut Siekmann and Volker Wieland. The study was published on the occasion of the European Court of Justice's Advocate General summing up the OMT case.

2/2013, Central Banking: Where are we headed?, eds. Helmut Siekmann and Volker Wieland, March 2014

This study contains articles based on speeches at the symposium held in February 2013 in honor of Stefan Gerlach's contributions to the IMFS by Michael Burda (Humboldt University), Benoît Coeuré (ECB), Stefan Gerlach (Bank of Ireland), Patrick Honohan (Bank of Ireland), Sabine Lautenschläger (Deutsche Bundesbank), Athanasios Orphanides (MIT) and Helmut Siekmann as well as Volker Wieland.

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Guenter W. Beck and Volker Wieland Introduction

Over the past years, the European Central Bank (ECB) has adopted a new course. Its expansionary monetary policy has reached an unprecedented scale. With quantitative easing (QE), the ECB has almost quadrupled its balance sheet. The aim of this study is to shed some light on this phenomenon.

As a starting point, Peter Praet illustrates the expansionary monetary policy from the ECB's point of view, giving account on the use of QE in response to disinflationary pressures. He outlines the impact on financial conditions as well as output and inflation, reaching the conclusion that "a strong and sustainable recovery from the crisis requires a comprehensive response that involves all economic policies".

Subsequently, Julian Callow shares his view on QE from a markets perspective. In this context, he analyzes whether the "implicit intention of QE" has been reached, that is "to depress real yields and raise inflation expectations".

In their joint contribution, David Folkerts-Landau and Stefan Schneider identify the risks that emerge in connection with QE. In their view, the increasing concentration of risk on the Eurosystem balance sheet is alarming. However, according to the authors, the detrimental impact is even worse. They see the ECB stuck "between an unfavourable equilibrium of low growth, high unemployment and low reform momentum on the one hand, and growing risks to core country balance sheets on the other".

Looking back at the collapse of Lehman Brothers in September 2008 and, thus, a collapse in rates of growth of net banking credit and total net new bond issues, Alex Cukierman draws some lessons for the debt crisis in the euro area.

In our joint contribution to this study, we focus on the end of QE, making a proposal how to normalize monetary policy in the euro area. In this regard, we look at the key chal-

lenges of the exit and describe the need to develop an exit strategy in an environment characterized by financial and fiscal dominance fears. In our opinion, as one element of a strategy, there are many possibilities for the ECB to improve its forward guidance and, by this means, make progress towards the main objective: Achieving a smooth process of normalization.

Peter Praet

The ECB's monetary policy response to disinflationary pressures¹

Since June 2014, the ECB has adopted a series of monetary policy measures to ward off the risk of a too prolonged period of low inflation. There is a strong rationale for why we have acted to lift inflation back towards our objective, which I laid out in a speech in Rome last year.²

What I would like to discuss in this article is how our measures work in achieving this.

The ECB's crisis response

It is useful to briefly recall what led us to our current monetary policy stance and the particular measures that the ECB has adopted to articulate it. Since autumn 2008, the ECB has been confronted with various episodes of downside risks to price stability.

In the months following the Lehman demise, those risks arose principally from the threat that the liquidity crunch in the interbank market would lead to a disorderly deleveraging of the banking sector, which would have had serious consequences for real activity and price stability. The ECB provided liquidity elastically to the banking sector and with increasingly long durations, which restored confidence in the financial system. Our balance sheet expanded to unprecedented levels, but the monetary policy support that this was expected to provide was temporary and non-discretionary. As banks started actively contracting their exposures to a worsening economy, they reimbursed the loans from the ECB.

A next set of risks to price stability surrounded the sovereign debt crisis. Unwarranted fears about the future of the euro area led to a dramatic widening of sovereign

spreads, interrupting monetary transmission and posing severe risks for inflation dynamics. The ECB acted to preserve price stability through its Outright Monetary Transactions programme. This proved to be a powerful circuit breaker, successfully truncating the worst tail of the distribution of possible macroeconomic outcomes. But the confidence crisis nonetheless left a harmful heritage on transmission.

Banks in a vast portion of the euro area lost their willingness and capacity to keep credit flowing to the real economy. Credit conditions tightened, feeding back into weak domestic demand and threatening the economy with persistent disinflationary forces.

By summer 2014, the ECB was confronting a further set of risks to price stability linked to a too prolonged period of low inflation. The economic recovery had lost momentum, removing a key driver of the reflation scenario that we had anticipated. As Mario Draghi underlined in his speech in Jackson Hole in August of that year³, this situation required a comprehensive policy response by euro area authorities on structural reforms and policies to support aggregate demand, of which stronger monetary policy accommodation was one element.

By this point our ability to provide that additional accommodation through standard measures was constrained as policy interest rates approached zero. Like other central banks⁴, we had learned that the likelihood of hitting zero interest rates had been severely under-estimated in our previous analysis.⁵ We therefore achieved the expansion of our stance through three new, non-standard instruments: a series of targeted long-term refinancing operations (TLTROs); a negative deposit facility rate (DFR); and an asset purchase

¹This article is an updated version of my speech at the ECB and Its Watchers Conference XVII on 7 April 2016.

²See Praet, P. (2016), "The ECB's fight against low inflation: reasons and consequences", speech by at LUISS School of European Political Economy, Rome, 4 April 2016.

³Draghi, M. (2014), "Unemployment in the euro area", annual central bank symposium in Jackson Hole, 22 August 2014.

⁴Chung, H., J.-P. Laforte, D. Reifschneider and J. Williams (2011), "Have We Underestimated the Likelihood and Severity of Zero Lower Bound Events?", Federal Reserve Bank of San Francisco Working Paper Series, January 2011.

⁵Coenen, G. (2003), "Zero lower bound: is it a problem in the euro area?", ECB Working Paper No. 269, September 2003.

programme (APP) including private and public securities.

As new shocks have rattled the economy since 2014, our policy package has been rescaled by the Governing Council, notably at its meetings in January 2015, December 2015, March 2016, and most recently December 2016. At the December 2016 meeting, the ECB further extended the horizon of the APP, which is now intended to continue at a reduced pace until the end of December 2017. We also indicated that we stand ready to increase our asset purchase programme in terms of size and/or duration if the outlook becomes less favourable, or if financial conditions become inconsistent with further progress towards a sustained adjustment in the path of inflation.

Augmenting these instruments is our forward guidance. This began in July 2013 when we provided indications on the likely path of policy rates looking forward, although at that time the measure was intended more to insulate our money market conditions from the volatility imported from the US “taper tantrum” than to act as an active instrument of accommodation. In the event, the policy helped decoupling the risk-free curve from outside influences and made it more appropriate to the underlying conditions we were facing. Econometric analysis supports the conclusion that our forward guidance has helped stabilise money market conditions – that is, making the term structure of forward rates less responsive to macroeconomic surprises.⁶

We later complemented this interest rate guidance with a new form of forward guidance intended to link our asset purchases to our objective. Today – after those four rounds of recalibrations – we say that the APP is intended to run until the end of December 2017, or beyond, if necessary, and in any case until the Governing Council sees a sustained adjustment in the path of inflation consistent with its inflation aim. We also clarified the interaction between our rate

and asset purchase guidance, namely that we expect the key ECB interest rates to remain at present or lower levels well past the horizon of our net asset purchases.

Transmission channels of the ECB's non-standard monetary policy measures

Our decision to respond to emerging shocks by rescaling our existing measures – rather than adopting new ones – has hinged on our confidence that those measures are effective in lifting inflation back towards our objective. This is based on two assumptions about the monetary transmission process: first, that our policy package has led to improved financial and borrowing conditions; and second, that improved financial and borrowing conditions have led and will lead to higher real activity, reduced economic slack and upward pressure on inflation.

How justified are we in making these assumptions? In principle, the mechanisms through which our policy measures should boost the economy are clear. They are designed to work as a package, easing financial conditions through a combination of mutually reinforcing channels. This contributes to a lower cost of debt finance, a lower cost of equity and a weaker exchange rate, all of which contribute to raising consumption and investment.

First, via the portfolio rebalancing channel, the measures lower yields on a wide array of financial assets, resulting in a broad-based easing of financial conditions. The primary instrument in this regard is the APP, which compresses the term premia incorporated in risk-free interest rates and thereby encourages investors to move up in the maturity and risk ladder and to shift to other, non-targeted asset classes. The negative DFR in turn discourages selling agents from hoarding the additional liquidity, speeding up the process of asset reallocation and reinforcing the downside pressure on

⁶ECB analysis looking at time-varying sensitivity of forward rates to surprises, using daily rolling regressions, finds that since the introduction of forward guidance forward rates with maturity up to three years have been less sensitive to macroeconomic surprises. This has been important to keep markets focused on levels – i.e. the degree of slack in the economy – and not on rates of change – i.e. the latest conjunctural indicator.

the long end of the term structure of interest rates.

Second, via the direct pass-through channel, our package eases borrowing conditions in the real economy by easing banks' refinancing conditions and supporting non-financial corporates directly. This channel is perhaps most prominent in the case of the TLTROs, which through built-in incentive mechanisms ensures that the funding cost benefit is passed on to borrowers. It also applies to our purchases of ABS and covered bonds, which encourage banks to increase their supply of loans as underlying assets backing those instruments, and more recently our decision to start a corporate bond purchase programme. In addition, substitution effects induced by the TLTROs can result in a reduction in the supply of bank bonds, which translates into lower yield on bank bonds for the financial sector as a whole.

In parallel, portfolio rebalancing supports this direct pass-through channel, as lower term spreads on public securities encourage a shift in the composition of banks' portfolios toward other types of exposures with a higher risk-adjusted return, especially loans. The resulting increase in credit supply lowers its cost.

Third, via the signalling channel, the policy package puts downward pressure on market expectations for future short-term interest rates, which aids portfolio rebalancing and direct pass-through effects by further flattening the risk-free curve. In the case of the DFR, the ECB's forward guidance on interest rates tilts downwards the probability distribution of the expected path of future rates. The signalling channel also helps stabilise inflation expectations, thereby preventing an unwarranted tightening in real long-term rates with negative effects on investment and consumption.

Impact on financial conditions

How do we know that these positive effects of our policy package are indeed occurring and that they are sufficiently powerful to achieve the desired outcomes? In terms of financial conditions, the evidence so far suggests that the impact of our policy has been substantial. Since June 2014, we have seen a broad-based easing in money market conditions, long-term government bond yields, corporate and bank bond yields, bank lending rates to firms and households, and the growth of money and credit.

Using a number of econometric techniques, we find that without our policy measures, financial conditions would be considerably tighter today. Events studies conducted by ECB staff give evidence about the central role of our policy package in the broader easing of financial conditions since June 2014.⁷ A sizeable impact is estimated for long-term sovereign bonds – with the ECB's measures contributing to the largest part of the decline in yields observed since June 2014. Excluding the December 2016 decisions, ECB staff analysis suggests that the credit easing measures⁸ contribute to about 20 percent of the total estimated impact on euro area yields, while other measures, most notably the APP, account for the remaining 80 percent. The spillovers to the yields of other asset classes are significant, too, in the case of euro area financial and non-financial corporate bonds. In addition, we estimate that without our measures stock prices would be notably lower. Moreover, ECB analysis finds that our policy package has had a substantial direct effect on bank lending rates, as well as an indirect effect on lending conditions through their marked impact on long-term government bond yields.⁹ This effect has been further reinforced by the beneficial impact of lower long-

⁷For more on the methodology behind these estimations see ECB (2015), "The transmission of the ECB's recent non-standard monetary policy measures", Box 2, Economic Bulletin, Issue 7/2015.

⁸Credit easing measures mostly refer to the TLTROs.

⁹Altavilla C., G. Carboni, R. Motto (2015), "Asset purchase programmes and financial markets: lessons from the euro area", ECB Working Paper No. 1864.

term yields on the macroeconomic outlook and hence on the macroeconomic risk embedded in lending rates. Counterfactual simulations by our staff attribute around 60 basis points of the overall decline in bank lending rates to the indirect impact of the TLTROs and APP.¹⁰

The effectiveness of the ECB's measures is further confirmed using individual bank-based analysis, for instance by gauging how they have affected the behaviour of TLTRO borrowers relative to non-borrowers. It is found that TLTRO borrowers have reduced their recourse to wholesale funding more than other banks, allowing them to further lower their funding costs. The associated decline in the supply of bank bonds has in turn contributed to lowering the yields and, in combination with spillover effects from the APP, the cost of financing for banks across euro area countries has significantly declined, benefiting banks regardless of their recourse to ECB's lending operations. The role of our measures as a driver of these developments is confirmed by banks' responses to the Bank Lending Survey (BLS).

This funding improvement can in turn be seen in bank lending conditions: analysis of the bidding of banks in TLTROs shows that there has been a close relationship between participation in these operations and lending behaviour, especially in vulnerable countries. We find that banks located in vulnerable countries that have participated in TLTROs have lowered their lending rates by more than non-participants. This has resulted both from the lower financing costs elicited by the TLTRO, which has created scope for banks to reduce lending rates, and the increased lender competition for good credit it has spurred. These patterns are again confirmed by the responses to the BLS.¹¹

Micro evidence confirms that the negative DFR has empowered the APP, too.¹² ECB staff research finds that bank balance sheet reactions to holdings of excess liquidity have changed as a result of the negative interest rate policy: for example, banks in less vulnerable euro area countries were found to have granted more loans to the real economy than would have been the case without negative rates. In addition, banks with large holdings of excess liquidity, in particular in less-vulnerable Member States, were found to have rebalanced significantly more towards non-domestic euro area government bonds than absent the negative DFR. This behaviour is likely to have contributed to a reduction in fragmentation and a more uniform transmission of monetary policy.

In sum, relative to the counterfactual scenario, our policy package has had a tangible improvement in financial and borrowing conditions.

Impact on output and inflation

This improvement is a sign that our measures have cleared important hurdles on their way to supporting the macroeconomy. What we have not seen yet, however, is a significant recovery in the path of underlying inflation. This has led some observers to question whether the second leg of the transmission – from financial conditions to real activity and inflation – is still intact.

Of course, the fact that this easing has occurred concurrently with the economy receiving new shocks poses a fundamental identification problem. Or put another way, we have to be careful to avoid assessing monetary policy by "looking out the window".¹³ This describes the process

¹⁰These estimates are based on a counterfactual simulation of lending rates using a panel BVAR of euro area banks and the long-run effect of lower government bond yields on NFC lending rates using a panel-error correction model, also estimated at bank level.

¹¹ECB (2015), "The transmission of the ECB's recent non-standard monetary policy measures", *Economic Bulletin*, Issue 7/2015.

¹²Demiralp, S., J. Eisenschmidt and T. Vlassopoulos, (2016), "The impact of negative interest rates on bank balance sheets: Evidence from the euro area", ECB mimeo.

¹³Blinder, A. (1998), *Central Banking in Theory and Practice*, Cambridge: MIT Press.

of eyeing where certain key variables are today compared with the beginning of the policy, and then concluding that the policy has succeeded or failed. But this is not how rigorous economic analysis is conducted. Given that the economy is never static, one always needs to assess a counterfactual scenario: what would have transpired without the policy action.

In that context counterfactual analysis has also helped us to measure the impact of our measures along another dimension: their macroeconomic propagation.

Our impact assessment on GDP and inflation spans a large and diverse suite of models, reflecting alternative modelling traditions, and capturing different transmission channels, in particular in relation to the impact of asset purchases. Some models mainly draw on empirical time-series methodologies, while others draw on (semi-)structural macro models, with an important role for financial frictions, and on macro-finance term structure models.

Intuitively, the various model assessments build on the idea that the relevant variable in modelling the impact of the APP is the expected future path of central bank asset holdings (i.e. the evolution of the “stock” of assets) under the programme. In some models, the full path of the central bank portfolio enters the decision problem of economic agents upon announcement of the programme. This is consistent with empirical evidence from event studies which supports the view that financial markets respond on impact to the announcement of asset purchases, and even prior to the announcement when expectations of a programme build up.

At the same time, for robustness considerations some models have entertained the alternative assumption that asset purchase programmes affect the behaviour of economic agents only gradually. Such effects are compatible with a situation in which financial markets learn over time the implications of the central bank's asset purchases, or in which such purchases trigger changes in local liquidity conditions.

A related distinction across those model assessments is how this expected future path of asset purchases is mapped onto the macroeconomy. Many of these models include directly the quantity of central bank asset purchases, and embed mechanisms that allow the transmission of purchases to the economy and inflation. The remainder of the models indirectly back out the effect of asset purchases on the economy on the basis of a two-step approach.

The results from this comprehensive exercise suggest that, relative to the counterfactual scenario, our measures (excluding the December 2016 decisions) have provided significant support to output and inflation. In the absence of our policy package inflation would have been negative in 2015; and over 2016-2018, on average, it would have been about half a percentage point lower than we forecast currently. The impact of the policy measures on euro area GDP is also sizeable (again excluding the December 2016 decisions). According to the staff assessment, our policy is contributing to raise euro area GDP by more than 1.5% in the period 2015-2018.

In sum, while this staff assessment must be qualified, the results of our counterfactual simulations show that the expected return of inflation to levels closer to our objective relies to a significant extent on continued monetary accommodation. The very slow progress of inflation towards the Governing Council aim of below, but close to, 2% cannot be explained by policy ineffectiveness, but rather by new negative shocks which have hit the economy throughout this period. The scaling-up of our policy measures has hence been the appropriate response in the face of intensifying headwinds; indeed, had it not been for these measures, the economic environment would likely be considerably more troubling today.

Conclusion

The monetary policy package the ECB has adopted since June 2014 has been effective. It has led to a substantial easing of financial conditions, and this has in turn led to

an improvement in both output and inflation relative to counterfactual scenarios. Arguments that our policy has not worked because inflation has remained subdued are misguided, since they do not take into account the series of shocks we have faced between mid-2014 and today.

That being said, we have consistently maintained since summer 2014 that a strong and sustainable recovery from the crisis requires a comprehensive response that involves all economic policies. A return to higher structural growth and employment cannot depend on monetary policy.

Julian Callow

QE and the ECB – a markets perspective¹

Summary

In this essay I offer some views on Quantitative Easing as practiced by the European Central Bank from the perspective of an economist working in the financial markets, focusing in particular on forward rates. I conclude that the ECB's Expanded Asset Purchase Programme (APP) has played an important role in depressing real yields and raising inflation expectations (consistent with studies published by the ECB²). Looking at outcomes, growth in euro area nominal GDP has picked up from close to zero during the second half of 2012 to around 2.5% in both 2015 and 2016, while the unemployment rate has been on a steady decrease since 12.1% in the third quarter of 2013 to 9.7% in the fourth quarter of 2016.

Introduction

There has been a strong focus in the literature on the effect of QE by the Federal Reserve, given the four key episodes³. One survey (by Gagnon, 2016) identified twelve studies of these episodes, of which four estimated that an amount of bond purchases worth 10% of US GDP would depress US 10-year bond yields by 40 to 47 basis points (bp), while a further four estimated an impact in a range of 78 to 91bp (Gagnon, 2016). A separate survey of the literature (by Andrade et al. (2016)) concluded that the first large-scale asset purchase program (LSAP1), which amounted to 11% of GDP,

had a median estimated negative impact on 10-year bond yields of 43bp (with a range of 32 to 175bp), LSAP2 (4% of GDP) had a median impact of 45bp (range of 33 to 138bp) while the Maturity Extension Program (3% of GDP) had a median impact of 60bp (range of 23 to 175bp).

There have also been several studies of the first round of the Bank of England's QE (14% of UK GDP), which lasted from March 2009 to January 2010, and which is estimated to have lowered the 10-year gilt yield of around 100bp, but with a negligible impact on the second and third rounds (see Joyce et al. (2011), and Chadha & Waters (2014)).

Academic studies of the impact of QE on the euro area are less numerous, owing to its later start^{4,5}. A survey by Andrade et al. (2016) concluded that the first phase of its Expanded APP (amounting to 11% of GDP, from March 2015 to September 2016) had a median impact of 43bp on the average euro area 10-year yield, so similar to the Federal Reserve's LSAP2. In this ECB study, the authors argue that the initial round of the Expanded APP was comparable to a reduction of 110bp in the official interest rate, and would boost euro area inflation by 40bp and GDP by 1.1% with a peak effect felt in around two years.

In the literature there has been significant debate about whether QE works only through signalling (the "New Keynesian" model) or, additionally, through portfolio rebalancing, also

¹ The views expressed here are in a personal capacity, and not the views of Element Capital as a firm, and are submitted here for educational/informational purposes only. Although I may have shared similar views (or different views) with members of Element Capital's portfolio team and other staff in my capacity as an Economist at Element Capital, these views may not necessarily be consistent with trading activity or portfolio positions for any investment funds managed by Element Capital. As such, none of these views should be attributed to Element Capital; nor should they be taken to constitute investment advice of any form. I am grateful to Ricardo Caballero, Jagjit Chadha and colleagues at Element Capital for their comments.

² See Altavilla, C., Carboni, G. and Motto, R. (2015); and Andrade, P., Breckenfelder, J., De Fiore, F., Karadi, P., Tristani, O. (2016).

³ LSAP1 (November 2008 to March 2010), LSAP2 (November 2010 to June 2011), the Maturity Extension Program (September 2011 to December 2012) and LSAP3 (September 2012 to October 2014 with the tapering starting December 2013). See Rosengren (2015).

⁴ The Asset Purchase Programme (APP) began with around €12bn of net monthly purchases of ABS and covered bonds during October 2014 to February 2015, and then from March 2015 was expanded to include public debt, at a combined monthly pace of €60bn, to last until September 2016. It was expanded to a net monthly purchase rate of €80bn in April 2016 with a time horizon until at least March 2017, as well as to include corporate bonds. In December 2016 the ECB announced that the monthly net purchase rate would be lowered to €60bn, and that purchases were expected to continue until at least December 2017. See Praet, P. (2016) for a table of ECB measures since June 2014.

⁵ See also Krishnamurthy, Nagel and Vissing-Jorgensen (2014), and De Pooter, DeSimone, Martin and Pruitt (2015) for studies on the impact of the Securities Markets Programme.

referred to by the ECB as “asset valuation” effect. From the perspective of financial markets, this is no trivial matter especially if, as has been suggested recently, the ECB might reconsider its forward guidance (where it has frequently stated that it expects an extended period between the completion of its APP and increases in its policy interest rates).

Most academic studies conclude that the portfolio balance channel is significant for driving down bond yields in the presence of QE, particularly via extracting duration (see Huther et al. (2016), and Chadha, Turner and Zampolli (2013) for a discussion about the impact of duration extraction on the US forward market and term premium⁶; Blattner & Joyce (2016), and Altavilla, Carboni and Motto (2015) for a discussion on the euro area duration extraction and term structure⁷).

In the following analysis I focus in particular on the five-year interest rate, five years ahead (5Y5Y forward rate) split into the inflation ‘breakeven’ component and real yield. In doing so, I am seeking (a) to avoid the influence of the short-term interest rates, including expectations thereof on a medium term horizon, so as to lessen the potential for long-term rates to be influenced by signalling, and (b) to identify the separate contributions of shifts in the forward rate from changes in real rates and in inflation expectations – after all, the implicit intention of QE is to depress real yields and raise inflation expectations⁸.

There appear to be comparatively few academic studies which have taken this approach. A possible explanation is that much of the assessment of the impact of QE has centred on the first round by the Fed and to some extent by the Bank of England. This coincided with extreme dislocation in financial markets, with the signals coming from breakevens and real yields distorted by comparatively less market liquidity in inflation linked securities⁹. However, since QE by the ECB started much later, the episode of extreme market dislocation during the fourth quarter of 2008 until the second quarter of 2009 had passed, with the consequence that more reliable signals can be presumed from the inflation linked swap curves.

How the ECB came to QE: A brief narrative

Chart 1 provides the history since 2005 of the euro area 5Y5Y forward inflation and real interest rate, using data from the swap and government bond markets¹⁰. It also includes EONIA (the euro overnight interest rate), the ECB’s Composite Indicator of Systemic Stress, and a chronology of key ECB announcements concerning both its lending to the banking system and its securities purchases. We can make several observations from this.

First, during September 2008 until July 2012 the bulk of the ECB’s policy innovations focused upon a dramatic easing in

⁶ Chadha, Turner and Zampolli (2013) concluded that the impact of US QE had been to lower debt held outside of the Federal Reserve by 7% of GDP, which had an impact of 12 to 15bp on the 5Y forward 10Y rate, as well as lowering the average maturity of privately held debt by seven months, which contributed a further 81 to 100bp, resulting in a total impact of 93 to 115bp.

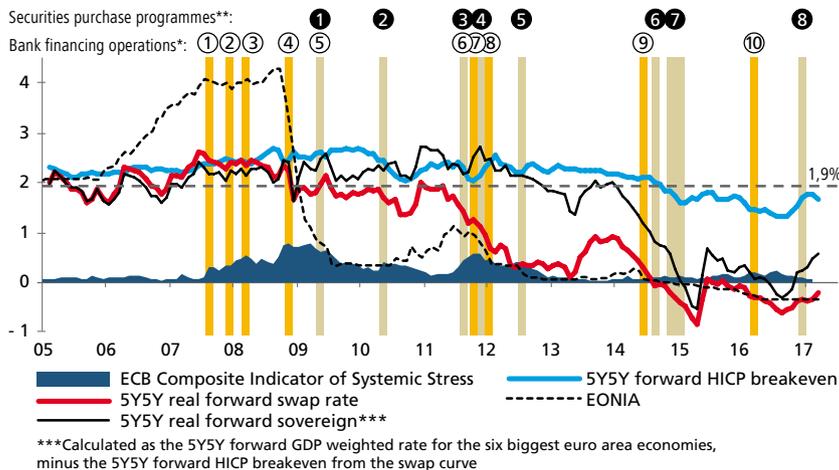
⁷ Blattner & Joyce (2016) focus on duration extraction and conclude that the original Expanded APP announcement may have lowered euro area bond yields by as much as 30bp, while Altavilla, Carboni and Motto (2015) argue that 10-year sovereign bond yields fell by 30 to 50bp as a result of APP.

⁸ In contrast to a focus on nominal bond yields in assessing the impact of QE is inherently complicated for if the policy is working then inflation expectations will rise while at the same time real yields will fall, resulting in an ambiguous outcome in terms of nominal interest rates.

⁹ See D’Amico, Kim and Wei (2014).

¹⁰ In this analysis I use two series for real forward rates, derived from the swap market and from the sovereign bond market. Obtaining a series for the latter is challenging, and I have constructed one that is based on nominal 5Y5Y forward sovereign rates for the six largest euro area countries, weighted by GDP, minus the euro area forward inflation breakeven derived from the swap market. As illustrated on Chart 1, both the swap and sovereign real forward rates were similar during 2006-2008, but thereafter showed a significant divergence, which was particularly wide during 2012 to early 2013. The swap rates data have the advantage of being market prices (rather than aggregations) and can be regarded as important for the transmission of monetary policy by the banking sector. However, the data for sovereign rates are also included since they highlight the greater degree of financial stress within the euro area since 2009, especially during the episode of concern about fragmentation during 2011 – 2013, and may also therefore reflect constraints on the transmission of the ECB’s monetary policy.

Concerning the first graphic & accompanying annotations & tables:



*Bank liquidity providing operations			**Securities purchase programmes		
Chart 1 reference	Date	Operation	Chart 1 reference	Date	Operation
①	Aug 07	New liquidity injections			
②	Dec 07	Unlimited borrowing in main refinancing operations (MRO)			
③	Mar 08	6m LTROs			
④	Nov 08	3m & 6m fixed rate full allotment (FRFA) longer-term refinancing operations (LTROs)			
⑤	May 09	12m FRFA LTROs	①	May 09	CBPP1 (Covered Bond Purchase Programme) launched
			②	May 10	SMP (Securities Market Programme) launched (ended March 2011)
⑥	Aug 11	FRFA extended and a further 6m LTRO	③	Aug 11	SMP re-launched (ending Aug. 2012)
⑦	Oct 11	12m LTRO	④	Nov 11	CBPP2 launched (ending October 2012)
⑧	Dec 11	3Y very long-term refinancing operations (VLTROs) launched and collateral list expanded	⑤	Jul 12	Draghi's 'do whatever it takes' speech, followed by launch of OMT in August
⑨	Jun 14	Targeted longer-term refinancing operations (TLTROs) launched	⑥	Aug 14	Draghi's Jackson Hole speech followed by launch of ABSPP & CBPP3 in Sept.
			⑦	Nov 14	Indications of expanded QE during Nov. and Dec.; Expanded APP launched at 60bn net monthly purchase with 18-month horizon and including public sector debt purchases (PSPP)
⑩	Mar 16	TLTRO terms eased to permit negative borrowing rates	⑧	Mar 16	APP expanded to 80bn per month and to March 2017; Corporate Sector Purchase Programme (CSPP) launched

Chart 1: Euro 5Y5Y forward inflation and real interest rates (%), EONIA, the ECB's Composite Indicator of Systemic Stress and significant innovations in ECB lending and purchase operations. Sources: Bloomberg, ECB website and database

'conventional' policy instruments, i.e. lowering policy rates and expanding the size and duration of lending to banks. These efforts were motivated by the perspective that the banking sector was the dominant means of transmitting monetary policy in the euro area economy. Nonetheless, evidence was accumulating of increasing financial fragmentation and of a negative feedback loop between banks and sovereigns within the non-core countries, which intensified as Greece, Ireland and Portugal entered into official programmes and with the 2012 Greek debt restructuring. These tensions intensified with the increases in ECB official interest rates in April and July 2011 (as illustrated by EONIA on Chart 1) and were reflected by the renewed rise in the ECB's Composite Indicator of Systemic Stress during the second half of 2011.

Second, there were two important episodes where the ECB responded to a significant rise in financial stress. Both were accompanied by the presence of abundant liquidity alongside substantial reductions in EONIA (which went negative in the fourth quarter of 2014¹¹). In the first episode, the ECB focused on several new initiatives to address growing fragmentation across euro area markets, including the relaunch of the Securities Markets Programme (SMP) in April 2011, expanded bank lending operations (including 3-year very long-term refinancing operations, "VLTROs", in December 2011), President Draghi's declaration that the ECB stood ready to "do whatever it takes" in July 2012, and the announcement of the Outright Monetary Transactions (OMT) programme in August 2012. Such forceful policy

¹¹ A negative EONIA rate emerged after the ECB had lowered the Deposit Facility Rate (DFR) to -0.1% in June 2014; the ECB subsequently lowered the DFR a further three times, each by an increment of 10 basis points, in September 2014, December 2015 and March 2016.

innovations were important in driving down the real forward swap rate during 2011 to 2012, although the real forward sovereign rate remained significantly more elevated at above 2% until the fourth quarter of 2012. Moreover, as evidence that the first wave of measures was still not sufficient to deliver above-trend growth (at a time of major financial stress and substantial correction in private and public sector borrowing), the euro area unemployment rate rose steadily from 9.9% in the first half of 2011 to a high of 12.1% in the second quarter of 2013.

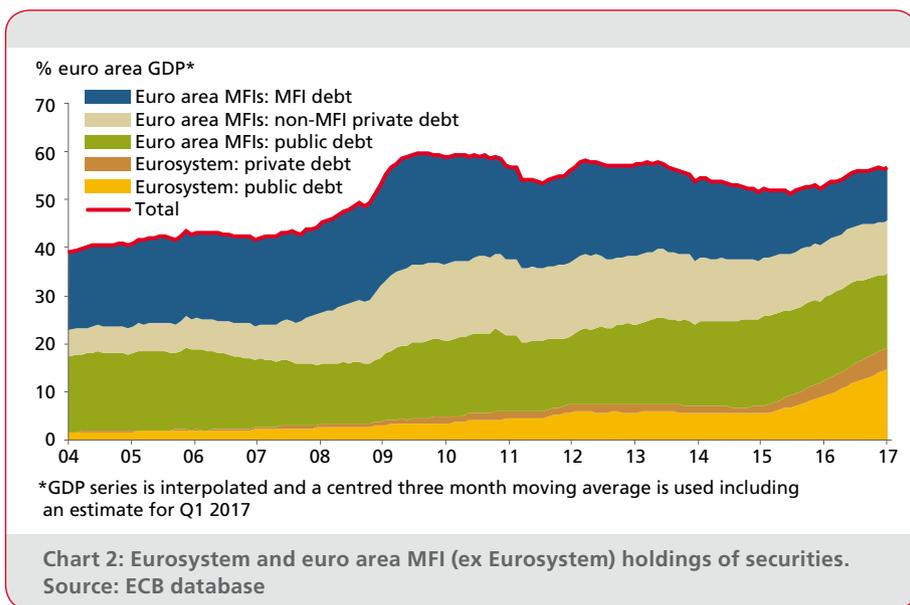
During the second episode, real forward rates declined during the second half of 2014 as financial market participants increasingly anticipated that there was no option left for the ECB other than to undertake broad-based QE. This conclusion was underscored by certain pivotal events, including President Draghi’s speech in Jackson Hole in August 2014, the launch of the ABS Purchase Programme (ABSPP) and third round of the Covered Bond Purchase Programme (CBPP) in September 2014, and comments by the President in late November and at the time of the December 2014 press conference. It is noteworthy that, in anticipation of additional policy easing, the real forward sovereign rate shown in Chart 1 experienced a major decline from around 2.0% only after December 2013 to move down close to -0.5% in March 2015. Therefore, when the announcement of the Expanded APP, amounting to €60bn monthly net purchases over an envisaged eighteen-month time horizon, was finally made in January 2015 including a substantial component for public sector debt purchases (Public Sector Purchase Programme, PSPP), this news had been significantly anticipated by financial markets, and the real forward rate (on both measures) had moved into negative territory.

Chart 1 also illustrates the importance of inflation expectations for the ECB’s policy. The closely watched 5Y5Y forward breakeven swap remained relatively stable and above 2%

until August 2014. Its movement through this key threshold was an important influence which ultimately persuaded the ECB’s Governing Council to undertake a major acceleration of asset purchases in January 2015 with its PSPP. We can observe that the 5Y5Y inflation forward rate has yet to move back to above 2% (at the time of writing it was 1.70%).

The above narrative suggests that the ECB was too slow to embrace aggressive QE and as a consequence real interest rates remained too high for too long, causing unemployment to move upward until the second quarter of 2013, and so putting significant downward pressure on domestically generated inflation, which was reflected in a significant – but delayed – reduction in inflation expectations.

The ECB’s hesitancy concerning the aggressive purchase of government debt partly was based on legal considerations, as well as on concern about moral hazard as it sought to incentivise governments to embark upon structural reforms. Additionally, in the early years the ECB considered that there was sufficient policy stimulus through its aggressive lending operations to banks: Since banks could then purchase government bonds, its extensive liquidity provision could be regarded as an indirect form of QE. However, as noted



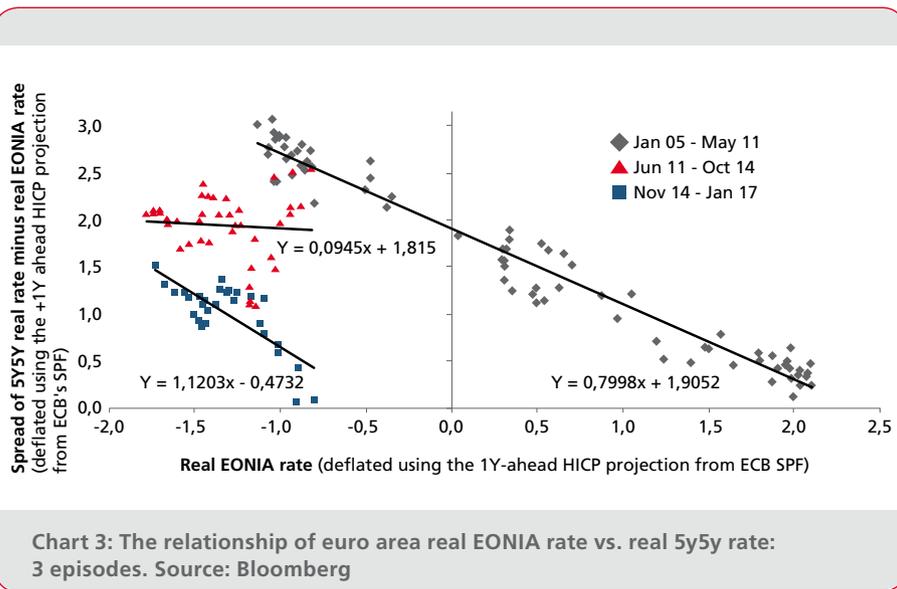


Chart 3: The relationship of euro area real EONIA rate vs. real 5y5y rate: 3 episodes. Source: Bloomberg

above, large parts of the euro area banking sector were undergoing funding stress (especially with the emergence in some jurisdictions of a destabilising feedback loop between banks and sovereign debt) which in turn acted as a constraint on banks' appetite and scope to purchase government debt. Additionally, banks tend to purchase shorter-term debt, which constrained duration extraction by this process, and the magnitude of bank purchases of sovereign debt were not especially large (Chart 2).

The altered relationship of forward real rates to real short rates as a result of QE

It is instructive to consider how the relationship of the 5Y5Y real forward rate to the real overnight interest rate has been altered as a consequence of the ECB's Expanded APP¹². In Chart 3, the relationship of the 5Y5Y real forward swap rate is compared with that of the real EONIA rate (I am deflating EONIA with the one-year-ahead HICP (inflation) projection from the ECB's quarterly Survey of Professional Forecasters). The chart illustrates that there has been a significant shift

leftward in this relationship coinciding with the anticipation and then launch of the Expanded APP in January 2015. In other words, QE has been associated with a significantly lower level of real 5Y5Y forward interest rates, for a given real EONIA rate, than had been in place during 2005 until the second quarter of 2011. This provides some evidence that the real forward rate has been depressed significantly as a direct consequence of the Expanded APP, rather than as a consequence only of signalling effects. This therefore illustrates the importance for central banks to consider undertaking QE when nominal rates are at the effective lower bound and where the inflation outlook is considered to require a further easing in financing conditions.

The very low long-term interest rates fostered by ECB policies have enabled some governments to lengthen the duration of their liabilities (for example, Spain from 5.7 years in 2012 to 6.5 years in 2016 and France from 6.7 years in 2013 to 7.1 years last year (source: IMF Fiscal Monitor), which therefore reduces risk premia¹³.

The significance of ECB measures, including QE, for bank lending

The importance of lowering long-term forward real interest rates is important for enabling the euro area economy to undertake greater fixed rate borrowing at lower interest rates, an important influence on business investment. Chart 4 shows the composition of new loans extended by euro area banks to non-financial corporations, broken down according to tenor (this series includes refinancing as well as new loans). While the overall monthly flows are still modest, nonetheless since May 2015 the flows with a fixed term greater than five

¹² Other factors may also have played a role, notably improvements in countries' fiscal positions, the entry into official programmes by several, and in the health of the euro area banking sector.

¹³ Not all have done so: the average term to maturity of Italian government debt last year is estimated by the IMF to have been 6.5 years, compared to 6.3 years in 2014 and 6.6 years in 2012, while that for German federal debt has fallen to 6.1 years from 6.5 years in 2012.

years have moved back into positive territory, and account for a large proportion of the overall monthly flow.

The overall impact of ECB policies, together with improvement in the health of the euro area banking sector, has resulted in a substantial reduction in overall bank lending costs. These are summarised by the ECB's cost-of-borrowing indicator, which is shown as an aggregate for the core and non-core countries in the euro area in Chart 5. In particular, the nominal cost of borrowing rose steeply in the 'non-core' countries during 2011 and 2012, from 3.8% in January 2011 to a high of 4.9% in May 2012 – Chart 5(a). This rate did not fall sharply until the summer 2014 when targeted longer-term refinancing operations (TLTROs) and a negative interest rate were introduced, and has subsequently fallen especially steeply since the Expanded APP was announced in January 2015, taking the 'non-core' interest rate down to 2.24% in January 2017.

Additionally, when measured in real terms (arguably a better series to use for considering the economic impact of interest rates), the cost of borrowing series showed a particularly large reduction during 2015, decreasing from 4.0% in October 2014 to an estimated 1.41% in January 2017¹⁴ (Chart 5(b)). Note, however, that this real lending rate may still be too high for the non-core economies, given the amount of economic slack and deflationary pressure which exists in them, which is an indication that the combination of the ECB's Expanded APP low or negative po-

licy interest rates will most likely be required for a significant period of time to come.

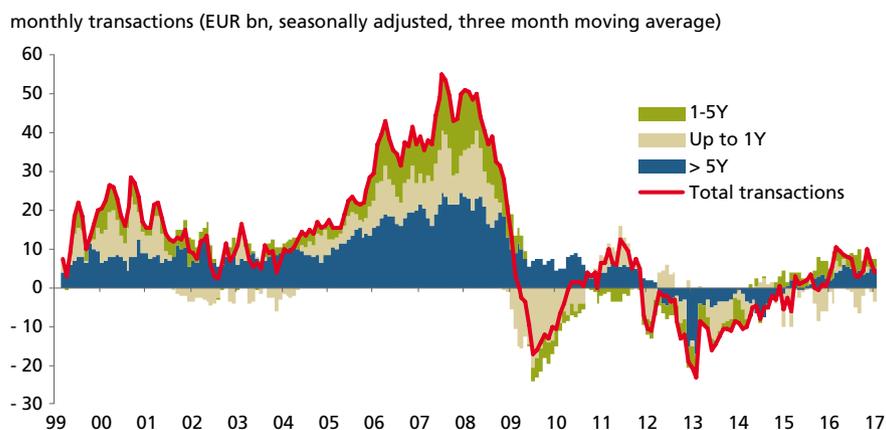


Chart 4: MFI loans to non-financial corporations: monthly transactions by maturity of loan. Source: ECB database

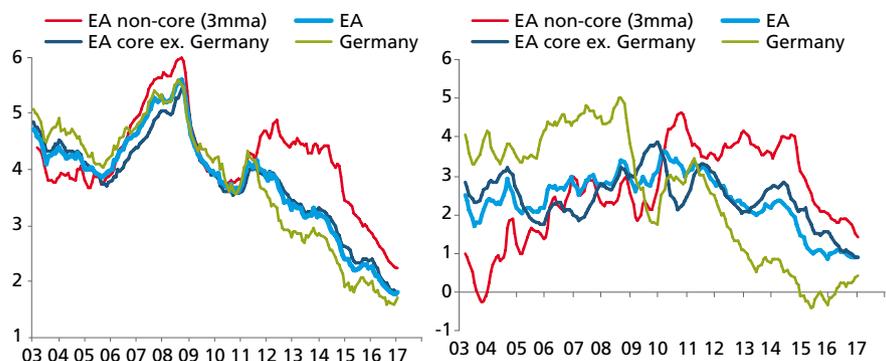


Chart 5: Summary cost of borrowing indicator for non-financial companies and households. (a) Nominal terms (b) Real terms (deflated with GDP deflator). The 'core' countries are here defined as Austria, Belgium, Finland, France and the Netherlands. The 'non-core' are defined as Greece, Ireland, Italy, Portugal and Spain. The data are aggregated using nominal GDP weights. Source: ECB database

¹⁴The GDP deflator at base prices is used for the inflation adjustment, including estimates for the fourth quarter of 2016 and the first quarter of 2017.

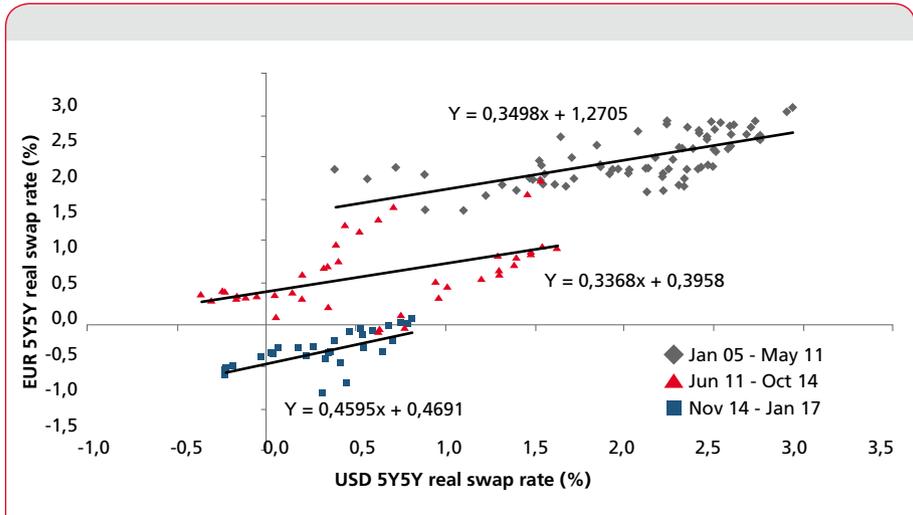


Chart 6: Comparing the relation of EUR and USD real forward rates.
 Source: Bloomberg

underscoring the importance of the ECB's Expanded APP at a time of normalisation in US monetary policy (and potential expansion in the US fiscal stance).

Additionally, the Expanded APP is likely to be an important influence – together with other factors, including the policy rate differential and communication – in helping to ensure that the euro remains relatively low on a real effective exchange rate basis, which in turn is supportive for economic activity and therefore for the ECB to have some hope over time of getting back to meeting its inflation objective.

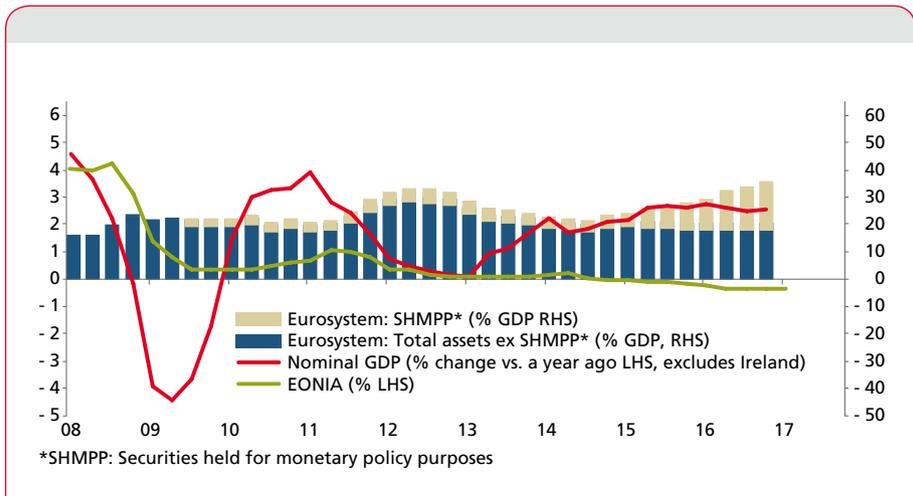


Chart 7: Comparing growth in euro area nominal GDP & EONIA (LHS) with the Eurosystem balance sheet (RHS). Sources: ECB database, Eurostat

The wider macroeconomic implications of QE

Lower long-term interest rates should support the expansion of demand via several channels, including encouraging households to consume (both by income and asset price channels), encouraging corporates to invest, and helping exporters via a lower exchange rate than otherwise.

It is also important to assess whether QE in Europe has been effective in delivering faster economic growth. Since central bank actions are nominal actions, in my view it is sensible to evaluate them with respect to nominal economic variables because the parsing of

The ECB's Expanded APP is also important in the context of a divergent monetary policy cycle between Europe and the United States. Chart 6 shows the relationship of the euro 5Y5Y real forward swap rate against that of the US. Again, an important shift in the relationship is discernible from November 2014, indicating that the euro area has been experiencing lower 5Y5Y real forward swap rates in relation to those of the US since November 2014, thereby

nominal GDP growth into prices and economic activity will vary depending upon the economic cycle, type of inflationary impulse, slope of the Phillips curve, etc.

Chart 7 indicates that nominal GDP growth has been on an uptrend since the first quarter of 2013, potentially helped by the expansion in the Eurosystem's balance sheet from the second quarter of 2011 to the second quarter of 2012,

as well as the announcement of the OMT programme. Since the third quarter of 2014, euro area nominal GDP growth¹⁵ has picked up from an annual growth rate of 0.4% in 2012 to 2.0% in 2014, 2.5% in 2015 and 2.6% last year. This therefore provides some supportive evidence for the assertion that the ECB's aggregate mix of policies, including the Expanded APP, have been playing an important role in supporting a steady pace of nominal GDP growth. That said, for the ECB to be meeting its near-2% inflation target in a steady state with potential GDP growth of around (or slightly above) 1% will require nominal GDP growth to be around 3%, i.e., nearly half a percentage point quicker than at present.

Additionally, the impact of aggregate ECB policies may be seen in the striking downtrend of the unemployment rate. This rose from 9.9% in the first half of 2011 to a high of 12.1% in the second quarter of 2013. Since then it has been steadily falling by around 0.2 percentage points per quarter, to 9.6% in January 2017. While welcome, a focus on wider definitions of underemployment still illustrates that there is substantial labour market slack¹⁶.

Conclusions

In conclusion, my focus on forward swap rates indicates that the ECB's Expanded APP has played an important role in depressing real yields and raising inflation expectations. The consequences of this are apparent in terms of duration extension by the private sector and by some governments. Growth in euro area nominal GDP has picked up from close to zero during the second half of 2012 to around 2.5% in both 2015 and 2016. While an encouraging development, nonetheless the ongoing existing level of economic slack, particularly in the labour market, combined with inflation expectations significantly below 2%, implies that the ECB will most likely have to retain a highly accommodative

Real GDP - annual growth %					
	Euro area	US	UK	Sweden	Japan
2010-14	0.4	2.0	1.9	1.7	0.9
2014	1.2	2.4	3.1	2.7	0.2
2015	1.5	2.6	2.2	3.8	1.2
2016	1.7	1.6	1.9	3.1	1.0
Nominal GDP - annual growth %					
	Euro area	US	UK	Sweden	Japan
2010-14	1.6	3.8	3.8	2.9	0.6
2014	2.1	4.2	4.8	4.5	2.0
2015	2.5	3.7	2.8	6.0	3.3
2016	2.6	2.9	3.6	4.5	1.3
Nominal GDP per capita - annual growth %					
	Euro area	US	UK	Sweden	Japan
2010-14	1.3	3.1	3.0	2.1	0.7
2014	1.9	3.5	4.0	3.4	2.2
2015	2.2	3.0	2.0	4.9	3.4
2016	2.2	2.2	2.9	3.1	1.3
Population - annual growth %					
	Euro area	US	UK	Sweden	Japan
2010-14	0.2	0.7	0.7	0.9	-0.1
2014	0.2	0.7	0.8	1.1	-0.2
2015	0.3	0.7	0.8	1.1	-0.1
2016	0.4	0.7	0.7	1.5	0.0
Labour productivity (real GDP per employed person)					
	Euro area	US	UK	Sweden	Japan
2010-14	0.4	0.5	0.7	0.4	0.4
2014	0.6	0.6	0.7	1.2	-0.6
2015	0.3	0.5	0.5	2.3	0.2
2016	0.2	-0.2	0.6	1.7	-0.3

Table 1: Historic comparisons. Sources: National Accounts (OECD Economic Outlook (December 2016) for productivity. Euro area 2015 data exclude Ireland due to a structural break in national accounts

¹⁵ I am excluding Ireland from these calculations owing to a structural break in the Irish national accounts in the first quarter of 2015 which distorts the euro area profile.

¹⁶ If underemployed part-time workers and persons describing themselves as available but not seeking work are included, this broader measure of labour market slack was at 17.6% (estimated) in the fourth quarter of 2016.

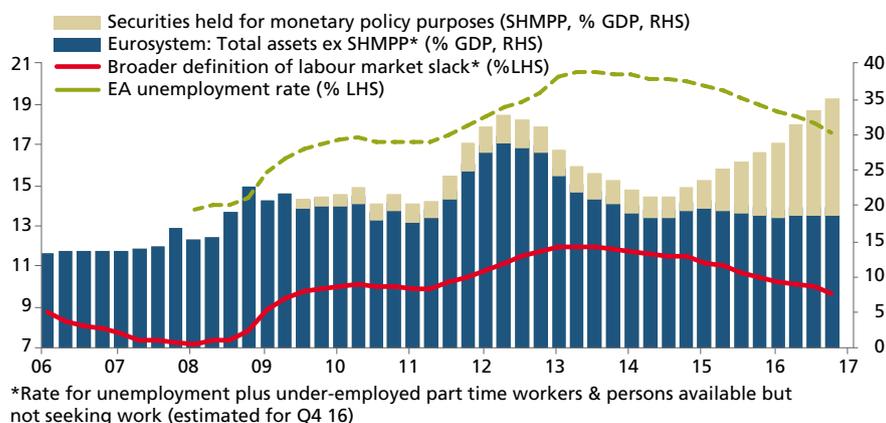


Chart 8: Comparing the Eurosystem balance sheet with unemployment.
 Sources: ECB database, Eurostat

monetary stance in order to facilitate further closure of the output gap and to achieve a subsequent rise in underlying inflation back to its target.

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David Folkerts-Landau and Stefan Schneider

Backdoor socialisation, expropriated savers and asset bubbles – the dark side of QE

While European central bankers commend themselves for the scale and originality of monetary policy since 2012, this self-praise appears increasingly unwarranted. The reality is that since Mr Draghi's "whatever it takes" speech in 2012, the Eurozone has delivered barely any growth, the worst labour market performance among industrial countries, unsustainable debt levels and inflation far below the central bank's own target. Only recently headline inflation has come closer to the European Central Bank's (ECB) target, but core inflation remains stuck below one per cent. While the positive case for ECB intervention is weak at best, it seems that the negative repercussions are becoming overwhelming. This paper outlines the five darker sides to current monetary policy.

The first is a paradox of ECB intervention: that monetary policy stifled the very reform momentum it sought to create. Up until July 2012, high interest rates and refinancing threats forced governments to be serious about reforms. Indeed, pre-2012, more than half the growth initiatives recommended by the OECD were being implemented across the Eurozone. But in 2015 just twenty per cent were. ECB intervention has curtailed the prospect of significant reforms in labour markets, legal systems, welfare systems, and tax systems across the continent.

Second, bond prices have lost their market-derived signalling function. Since investors began to anticipate sovereign purchases by the central bank in late 2014, intra-Eurozone government bond spreads have been locked together. In turn, misrepresentative sovereign yields distort the whole fixed income universe that is priced off government debt.

Perhaps the darkest side of ECB monetary policy is the increasing concentration of risk on the Eurosystem balance sheet – expected to be around 2.2 trillion euros by the end of December 2017. In the event of a debt restructuring of a Eurozone member, the liabilities of the national central bank are likely to be borne by the taxpayers of the other Eurozone member states, even if losses are spread over a long period. Essentially, however, the debt will have been socialised.

Fourth, ECB intervention has not been a net positive for Eurozone savers. While high and stable revaluation gains have buttressed total returns over recent years, this is clearly a one-time gain. Now, rising energy prices, the shortage of high coupons and ultimately mean-reversion are likely to take their toll. This is also a serious problem for institutional asset managers with large bond holdings.

Finally, the misallocation of capital caused by ECB policy is preventing creative destruction and causing asset bubbles. Increased lending has gone mostly to low quality existing borrowers while obviating troubled banks from the need to write down loans. Without creative destruction in ailing industries, investors in high-saving countries have simply bid-up the price of healthy assets.

The ECB believes its policies are justified

European central bankers have proclaimed for seven years that they have "countered the threat of a new great depression" as Mario Draghi himself put it to the Bundestag on September 28, 2016. While the ECB should be commended for acting quickly, during the financial emergencies of recent years, this self-confidence seems increasingly unwarranted.

The truth is that since Mr Draghi's "whatever it takes" speech in 2012, the Eurozone has delivered barely any growth, the worst labour market performance among industrial countries, double digit unemployment rates, more than twenty per cent youth unemployment and unsustainable debt levels. Inflation rates had been far below the central bank's own target. More recently headline inflation has risen to 2.0%, but this is largely due to the basis effect of rising energy prices. The ECB has already indicated that it will "look through" this temporary rise. Unfortunately, it did not adopt a similar attitude when headline inflation was falling to zero per cent back in the first half of 2016, then driven by the collapse in energy prices. Core inflation however remains stuck below one per cent, despite the recent spike in the headline rate.

By some measures, indeed, the situation is worse than during the Great Depression. The French unemployment rate is still at par with the ten per cent average from 1930 to 1938. In most countries of the periphery it is clearly north of ten per cent. And without a buoyant German economy, the numbers would be much worse. Given the aggressiveness and unconventionality of monetary policy since 2012, it seems fair to ask whether the ECB’s approach bears some of the blame for Europe’s woes. After all, the scope of central bank intervention since 2012 has been unprecedented. In July of that year, the ECB guaranteed to bail out countries in need via Outright Monetary Transactions (OMT), a policy of stepping into public debt markets as buyer of last resort. OMT has not been used, but three years later the ECB launched the Public Sector Purchase Programme (PSPP), which since then has reached a volume of 1.42 trillion euros. Additional purchases by the PSPP’s smaller siblings, the Covered Bond Purchase Programme (CBPP) and Asset-Backed Security Purchase Programme (ABSPP), lift the total to 1.7 trillion euros, or 15 per cent of Eurozone output. Even if the ECB stopped QE by year-end, without any tapering extension, it will still own more than a fifth of the Eurozone’s public debt by December 2017.

President Draghi told the Bundestag that the ECB’s measures “are working: they are contributing to keeping the recovery on track.” But this is merely one side of the story – arguably the negative repercussions of these policies are now greater than the benefits. This paper concentrates on the five biggest repercussions. First, while ECB asset purchases did indeed reduce the risk premia for investing in periphery assets, ultimately that success has eroded the prospects of reforms.

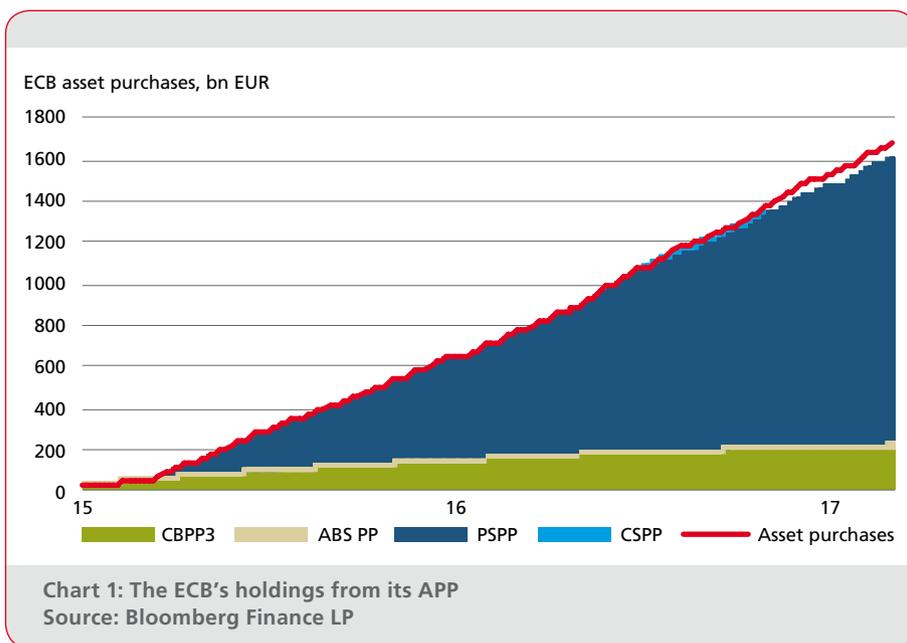


Chart 1: The ECB’s holdings from its APP
Source: Bloomberg Finance LP

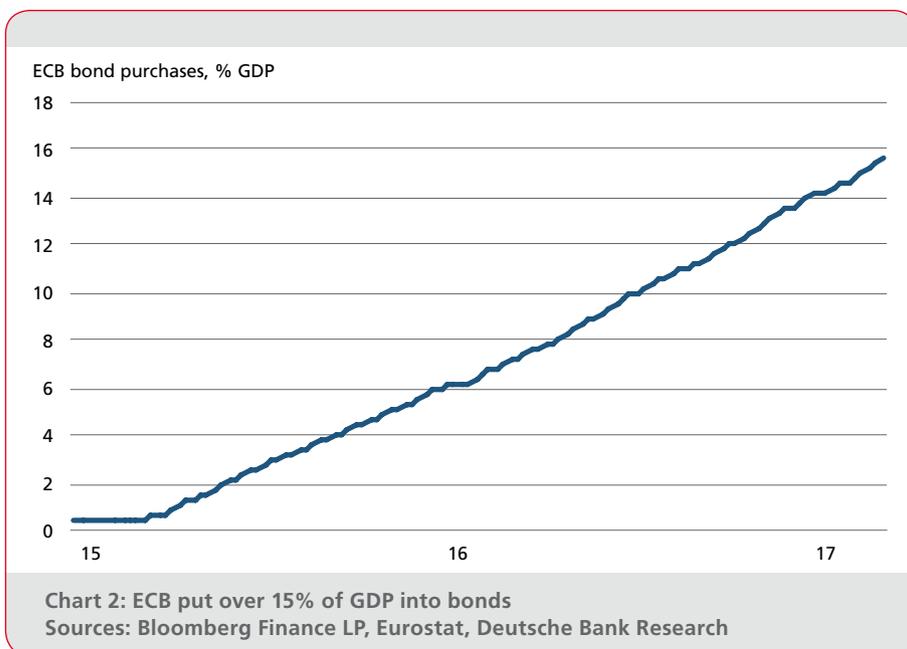
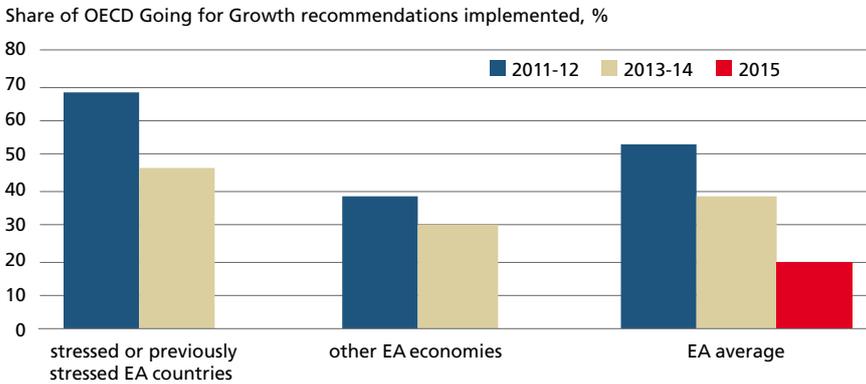


Chart 2: ECB put over 15% of GDP into bonds
Sources: Bloomberg Finance LP, Eurostat, Deutsche Bank Research

Second, bond prices have lost their signalling function. Third, by heaping credit risk onto the Eurosystem, the ECB has increased the risk to core country balance sheets and their taxpayers. Fourth, savers are struggling. Fifth, there is no creative destruction and asset bubbles continue to expand.



The data for 2015 refer to fully implemented measures and are not available for individual countries. The stressed and previously stressed countries are Ireland, Greece, Spain, Italy, Portugal and Slovenia. "Other EA economies" comprises the euro area economies not captured in the former group. Cyprus, Latvia, Lithuania and Malta are not captured in the OECD report

Chart 3: Reform progress has slowed
Sources: ECB, OECD

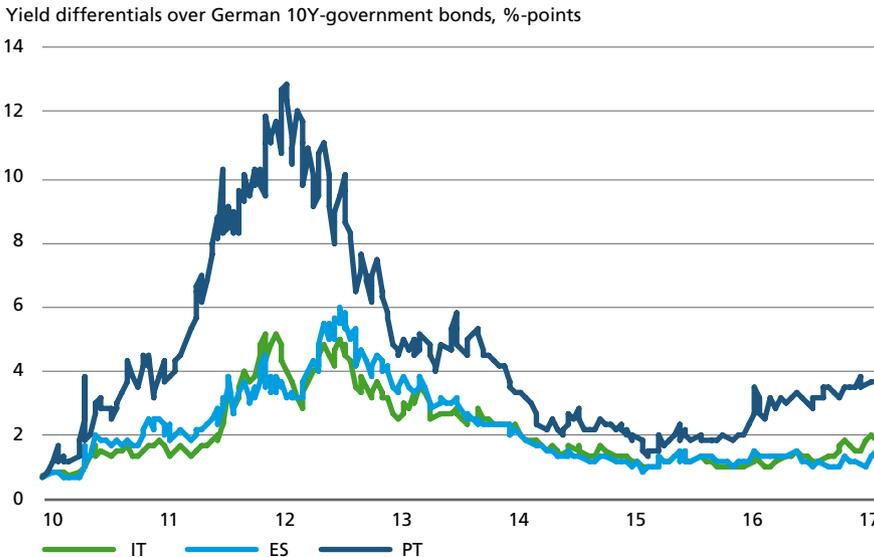


Chart 4: Yield differentials
Source: Bloomberg Finance LP

We address each of these repercussions in more detail below.

1. Monetary policy has stifled needed reforms

After a combined monetary and fiscal policy easing effort during the 2009 crisis, an unspoken deal was struck between the central bank and Eurozone governments. Monetary policy would remain extremely loose to allow fiscal policy to consolidate. Public finances – which had deteriorated substantially due to the recession, counter-cyclical spending decisions and support for the financial sector – needed to be brought under control and difficult productivity-enhancing reforms undertaken.

But politicians need compelling reasons to risk their job on reforms – the losers are too visible while the winners are not immediately apparent. Up until July 2012, this natural reticence was countered by the urgency of exorbitantly high interest rates and risk premia, as well as the threat of not being able to refinance sovereign debts. Failure meant a rescue programme provided by the Troika, conditional on reforms and unpopular spending cuts.

But any incentive to reform disappeared with the guarantee to bail out countries in need via OMT. At the time, the justification was that different sovereign yield spreads signalled a breakdown in the transmission of monetary policy rather than reflecting different country-specific risks. Nevertheless, the OMT announcement was a lifeline for the periphery. The average risk premia above German yields fell almost five percentage points for Spain, Italy, Ireland, Portugal and Greece, with immediate benefits.

For example, Italy's interest payments dropped by one third, despite an increase in debt-to-output.

But this OMT lifeline, like the chance afforded by the drop in interest rates immediately after joining the Eurozone in 2000, was essentially squandered. Prior to 2012 high interest rates and refinancing threats forced governments to become serious about reforms. In those years more than half of the growth initiatives recommended by the OECD were being implemented across the Eurozone. In 2015, by contrast, just twenty per cent of these reforms were.

Since 2012, policies such as OMT and PSPP have prevented the Eurozone facing hard realities. Peripheral countries do not generate enough growth to reduce high levels of indebtedness and unemployment. And there is no prospect of significant reforms in labour markets, legal systems, welfare systems, and tax systems. With no growth and 2.5 per cent fiscal deficits, Italy's three-figure sovereign debt level is unsustainable.

It is not just that the ECB apparently misread European politics. It also had unrealistically optimistic expectations about the recovery path of the global economy. A combination of strong global demand and a much weaker euro would certainly have increased the chances of budget consolidation and productivity-enhancing reforms. But, in fact, global growth rates have hovered around three per cent, substantially below pre-crisis levels of close to five per cent, while the euro remained much stronger than widely expected. Recent weakness against the US dollar is more likely a response to the political changes in the United States rather than the result of ECB policy. Both (mis)judgements, on the incentives of political actors as well as the global growth trajectory – which was not only made by the ECB – substantially doomed the unspoken deal between the ECB and governments from the start.

2. Bond prices have lost their signalling function

Another casualty of ECB policy is financial analysis. Since the last few months of 2014, when markets began to anticipate sovereign purchases by the central bank – subsequently announced in January 2015 – intra-Eurozone government bond

spreads have been more or less locked together. For example, Italian and Spanish bond spreads versus bunds have hovered in a 130 basis points range, notwithstanding the political risks in both countries until autumn last year. More recently Italian government bonds (BTPs) moved above this corridor given a further heightening of political risks. By contrast, Portuguese bond spreads have increased almost 120 to 310 basis points during the past twelve months, due to heightened concerns that the only remaining agency rating Portuguese debt as investment grade might change its assessment – which ultimately has not happened – thereby making them no longer eligible for quantitative easing.

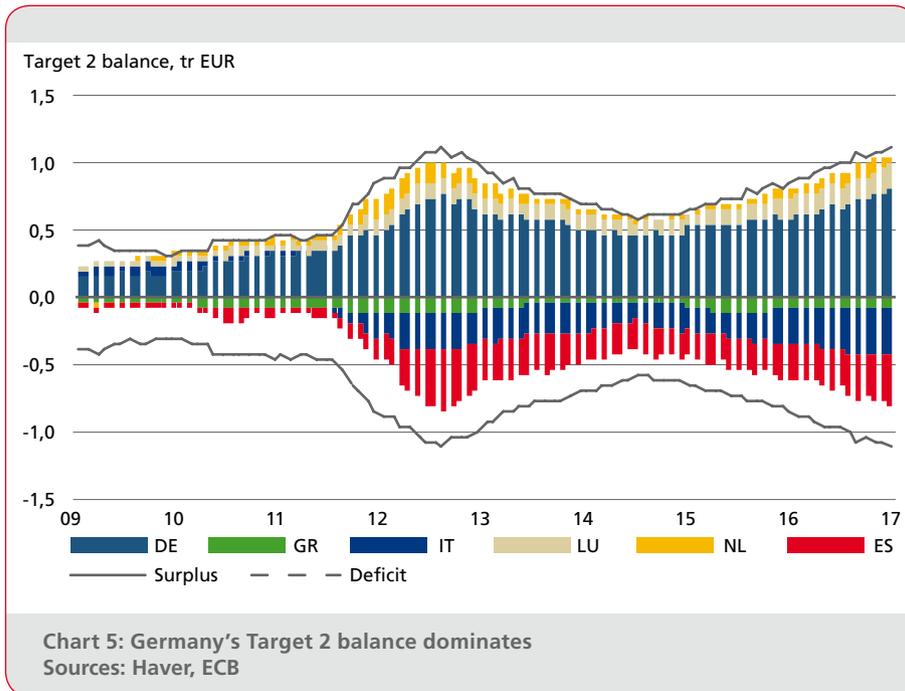
Such detachment of domestic bond yields from changing political and fiscal risks can be attributed to ECB asset purchases. Depressed or misrepresentative sovereign bond yields not only shield politicians from market oversight, they also distort the whole fixed income universe that is priced off government debt. The dislocations they cause in the meantime are considerable, but they will probably become much more detrimental once these distortions ultimately unwind.

3. Mounting strain on the Eurosystem balance sheet

Potentially the biggest negative repercussion of ECB monetary policy is the fate of the substantial claims by the central bank on member countries held through the Eurosystem balance sheet. Based on the potential losses a core country is theoretically on the hook for given the costs associated with the two main rescue funds (European Financial Stability Facility, EFS, and European Stability Mechanism, ESM), quantitative easing and Target2, it is inconceivable that any member country would be allowed to fail, save a small one with limited contagion effects.

This has long been a shadow over the whole quantitative easing effort. To dissipate concerns that losses would be socialised within the Eurosystem in the event of a default, the ECB arranged that of the 90¹ per cent of the PSPP purchases

¹ The share was increased from 88 per cent to 90 per cent in January 2017.



that go into Eurozone sovereign bonds, four fifths would be bought by the relevant national central banks, based on a capital key. In effect, the Bundesbank buys German bonds while the Banca d'Italia purchases BTPs, with no risk-sharing between the two. The remaining ten per cent is earmarked for bonds issued by international organisations and multilateral development banks.

But this is a fragile safeguard. In the event of a debt restructuring of a Eurozone member, it hardly seems feasible that its national central bank would be left to its own devices, especially since it could not expect any support from its own government. This leaves the risk that the final backstops are taxpayers of other Eurozone member states. They would then have to pay, if only through forgoing potential profit transfers from their national central bank over a long period. Fundamentally, however, the debt will have already been socialised.

What would member states be liable for? It is necessary to count both the ECB's balance sheet as a whole as well as the

Target2 balances between Eurozone countries. On the former, assuming the programme ends by December 2017, the Eurosystem's holdings of government bonds would reach about 1.85 trillion euros. Among these holdings are German bonds worth 475 billion euros, French bonds worth 385 billion euros, Italian bonds worth 325 billion euros and Spanish bonds worth about 235 billion euros. A possible extension into 2018 allowing a gradual taper could easily lift the grand total above 2 trillion euros.

A default scenario is unlikely to happen while quantitative easing is ongoing, especially since the ECB has stated that asset purchases would not stop before the inflation outlook has normalised. In any case, in a proper default and exit from the euro, the liabilities encountered via an involuntary socialisation of quantitative

easing losses might prove a minor part of the overall financial damage a remaining Eurozone country might suffer. This is because during the built-up of such extreme stress Target 2 imbalances would surge.

Yet, Target2 imbalances are already elevated and will continue to rise. These imbalances, which are a proxy for the accumulated current account deficits or surpluses of Eurozone member countries to each other, first became an issue during the periphery funding crisis in the first half of 2012. Then, capital flight from periphery countries to core economies increased imbalances substantially. These subsequently narrowed in 2013 and 2014 after President Draghi's "whatever it takes" speech. However, they have subsequently moved back and are by now even exceeding the levels experienced during the heights of the bank funding crisis in 2012.

As researchers from the Dutch National Bank (DNB) suggest in a recent article,² this is partly due to quantitative easing.

² Dutch National Bank (2016). Target2 imbalances reflect QE and persistent fragmentation within the euro area. 06/16/2016.

Investors who sell assets under quantitative easing to their national central bank in vulnerable countries have tended to put the proceeds into bank deposits in countries with the highest perceived creditworthiness. The recent surge in Target2 imbalances is slightly different compared with 2012 in that it is supply-driven (quantitative easing) rather than demand-driven (capital flight). But the underlying logic is the same.

It is not difficult to imagine in times of extreme crises that both drivers push Target2 imbalances to unprecedented levels. In January 2017, Germany was running a surplus of 796 billion euros, while the largest deficits were recorded by Spain (350 billion euros) and Italy (365 billion euros). Given a default, any losses would be allocated in accordance to the ECB’s capital key, meaning Germany takes slightly more than a quarter. However, the actual share would increase as any country in trouble would obviously not participate in the loss allocation.

For now, the ECB can treat the DNB’s findings with regard to quantitative easing and Target2 as academic. However, it requires little imagination to see Target2 levels at new highs if a large country suffers a crisis. Of course, bailouts in the hundreds of billions of euros by core country taxpayers were not intended by domestic or European policymakers when designing the European monetary system. Even in recent times they do not acknowledge the possibility of such bailouts happening. When the German constitutional court ruled on participation in the Greek rescue package, for example, one of the guiding principles was that whatever happens, liabilities should not reach levels that curtailed the parliament’s budgetary authority. Given the implicit liabilities generated within the Eurosystem, one can ask whether we are not already beyond that point.

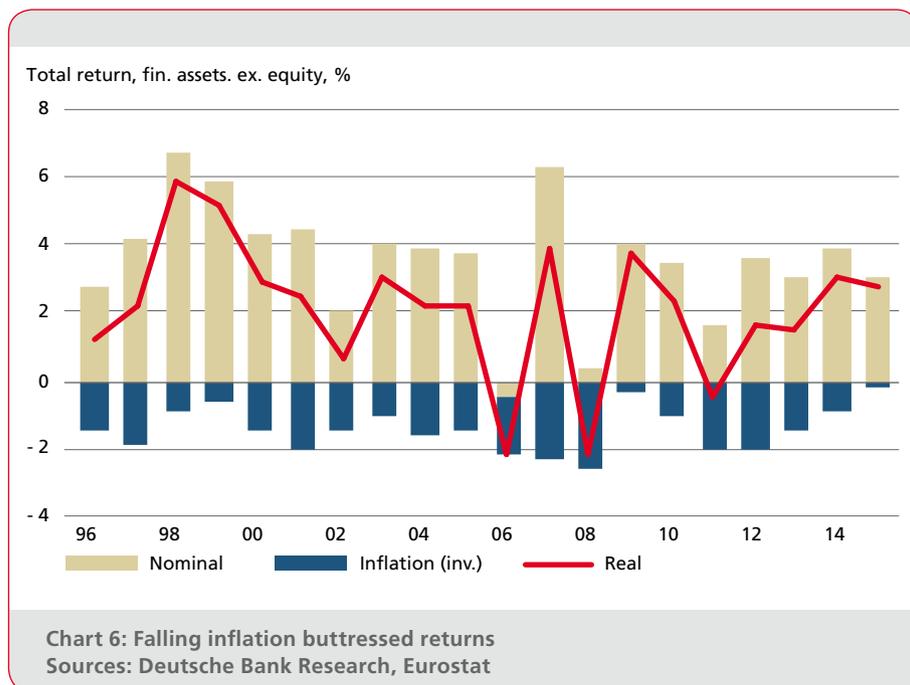
Moreover, it is not just about actual costs but about the democratic mandate that underpins the Eurosystem. As early as 2011, Bundesbank President Jens Weidmann strongly suggested

that the ECB did not have the democratic mandate to accumulate such risks on the German central bank’s balance sheet. If bailouts on such a vast scale do materialise, the public anger towards bailing out banks after the financial crisis could be mild in comparison.

4. Difficult times for savers

The effect on savers’ ability to plan and execute long-term planning is another negative externality of the prolonged low and negative interest rate environment. For German households thus far, the ECB and Bundesbank are correct in pointing out that the impact on savers has so far been limited, but it is not clear for how long this can continue.

Consider that nominal total returns for German households have averaged 3.4 per cent over the past four years, similar to the average throughout the 2000s and similar to the rest of the Eurozone. In fact, real returns even trended upwards due to declining inflation since 2012. Even nominal returns on interest-bearing investments did not slip below two per cent until 2015 because a large proportion of longer-dated and mostly



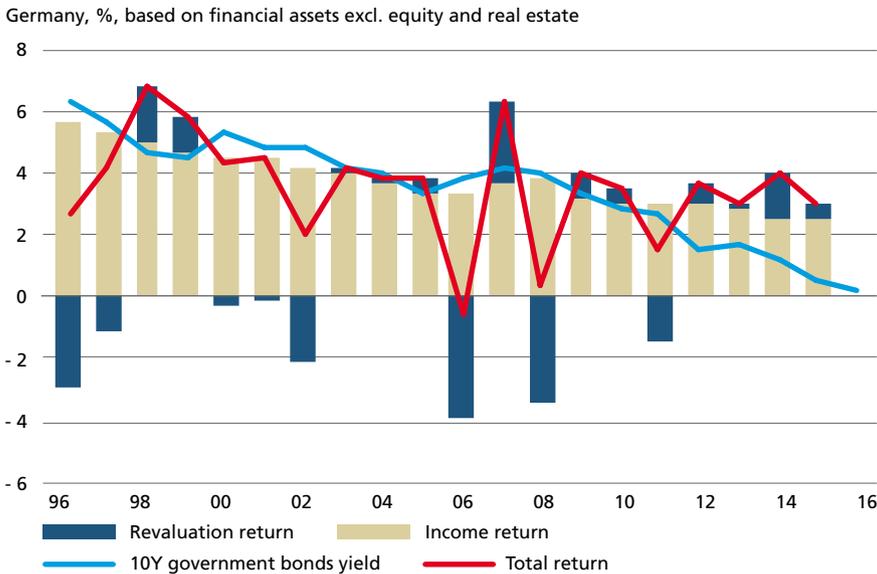


Chart 7: Government bond yields only one piece of the puzzle
Sources: Deutsche Bank Research, Bloomberg Finance LP, Eurostat

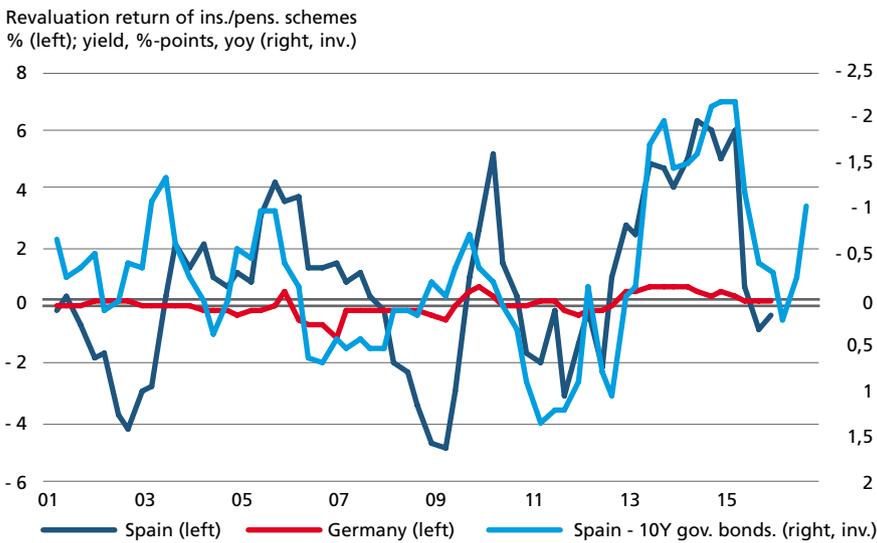


Chart 8: ECB policy and Spanish revaluation gains
Sources: Eurostat, Deutsche Bank Research, Bloomberg Finance LP

higher-coupon investments dampened the effect of evaporating market returns. High and stable revaluation gains have also buttressed total returns over recent years. In this sense, the evidence suggests that savers have not yet suffered the full brunt of ECB monetary policy.

However, many of these effects are unrepeatably and likely to be exhausted. First, rising energy prices are pushing headline inflation up this year, weighing on real returns. In February 2017, this factor caused headline inflation to surge to 2.0 per cent. Then the buffering effects of long-term interest-bearing investments with high coupons are likely to recede as households own fewer such assets. Finally, the scope for further significant revaluation gains is likely to be limited given already-high valuations and the fact that revaluation returns are ultimately mean-reverting over the long term. The risk is a scenario in which real total returns for German household savings turn negative, while the benefits to the real economy of the interest rate extremes are not obvious.

5. No creative destruction, many asset bubbles

While ever-lower rates were meant to encourage real economic activity, investment opportunities remain scarce due to the lack of structural reforms and creative destruction in inefficient industries. OMT and the collapse in bond spreads benefited the worst-quality borrowers disproportionately. In their paper “Whatever it takes: The Real Effects of Unconventional Monetary Policy”³, Acharya et al. show that peripheral banks with large holdings of national sovereign debt enjoyed a “recapitalisation through the backdoor” from revalua-

³ V. Acharya, T. Eisert, C. Eufinger, C. Hirsch (2016). *Whatever it takes: The Real Effects of Unconventional Monetary Policy*. May 2016.

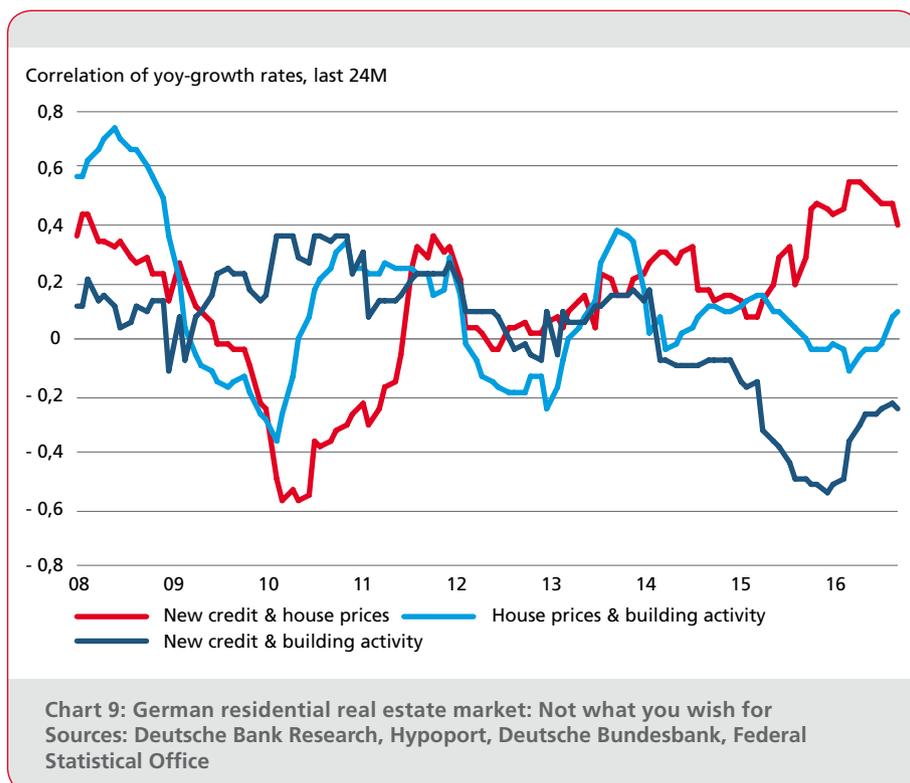
tion gains. These banks increased lending, but mostly to low quality existing borrowers. Such firms benefitted from rates often below what high-quality public borrowers had to pay, and used cheap funding to repay debts, instead of financing employment or investment. The authors show OMT supported “zombie companies” via evergreening, which prevented banks from the need to write down the existing loans.

Moreover, the paper also shows that the misallocation of capital is hampering employment and growth in the Eurozone. In industries with a high share of such zombie firms, quality companies have to pay higher interest rates and invest significantly less than good companies in sectors with a small share of zombie companies. This supports the view of the OMT announcement as impairing creative destruction and depressing product prices. Since PSPP extended the yield compression generated by OMT this argument also applies to the current monetary policy configuration.

Without the creative destruction of ailing industries, investors have simply bid up the price of healthy assets. These now function as the exhaust valve, especially in countries with substantial net savings. The flipside of tumbling yields across Europe is therefore inflated asset prices and a general hunt for yield. For example, developments in the German residential housing market are worrying, with increasing overvaluation in several segments of the market due to low mortgage rates. Mario Draghi himself has acknowledged the risk of prolonged highly accommodative policy for financial stability.

The way forward

The euro’s design – a combination of unified monetary policy and national fiscal policy where rules can be ignored without sanction – is flawed. But with Mr Draghi’s



promise of “whatever it takes” the implied moral hazard was pushed into a much larger dimension. There are two broad options now. The Eurozone could move towards fiscal union and the sharing of liabilities. Alternately, policy-makers could install a system more geared towards individual fiscal responsibility, via reintroducing market-based pricing of sovereign risks. The former is not being proposed by any national politician in the Eurozone because it is unpopular. The second could be the ideal solution, though it is difficult to imagine politicians seeking re-election in the periphery to back a move to raise risk premia on their own assets. Moreover, it is likely to also be rejected by the ECB since it would – at least in the ECB’s own logic – undermine the effects of its monetary policy. And so the ECB is stuck, as it has been since 2012, between an unfavourable equilibrium of low growth, high unemployment and low reform momentum on the one hand, and growing risks to core country balance sheets on the other. It remains to be seen how it will escape from this dilemma of its own making.

Alex Cukierman

Bailout uncertainty, US banks' behavior and bond issues after Lehman's collapse: Empirical evidence and some lessons for the euro area public debt crisis¹

The collapse of Lehman Brothers in September 2008, along with the decision not to bail it out, is probably the most traumatic financial event of the twenty-first century. In the aftermath of the financial panic that ensued, there was a virtual collapse in rates of growth of net banking credit and of total net new bond issues in spite of subsequent huge injections of liquidity by the Federal Reserve.²

1. US banking credit and reserves before and after Lehman's collapse

Figure 1 illustrates this dramatic change in the behavior of US banking credit prior to and after the downfall of Lehman Brothers. Between January 1947 and August 2008 total US banking credit expanded at an average yearly compound rate of 7.15%. Since Lehman's collapse until June 2011,

this rate dropped to a mere 0.65% – about one tenth of its previous normal long-term rate of growth.³ An even more dramatic break – before and after September 2008 – can be observed in the behavior of total US bank reserves. Their annual long-term normal rate of increase between January 1999 and August 2008 is about half a percent. After the Lehman event and up to April 2011, this annual rate accelerated to 100%. Figure 2 shows the accumulation of US banks' reserves after September 2008. At the end of August 2008, total banking reserves stood at about \$46 billion. A year later they were eighteen times larger! They did decline moderately during the second half of 2010 and then increased again by about sixty percent until the end of April 2012. Obviously, this gigantic increase in reserves is largely a mirror image of the quantitative easing operations of the Fed which started shortly after the collapse of Lehman Brothers.

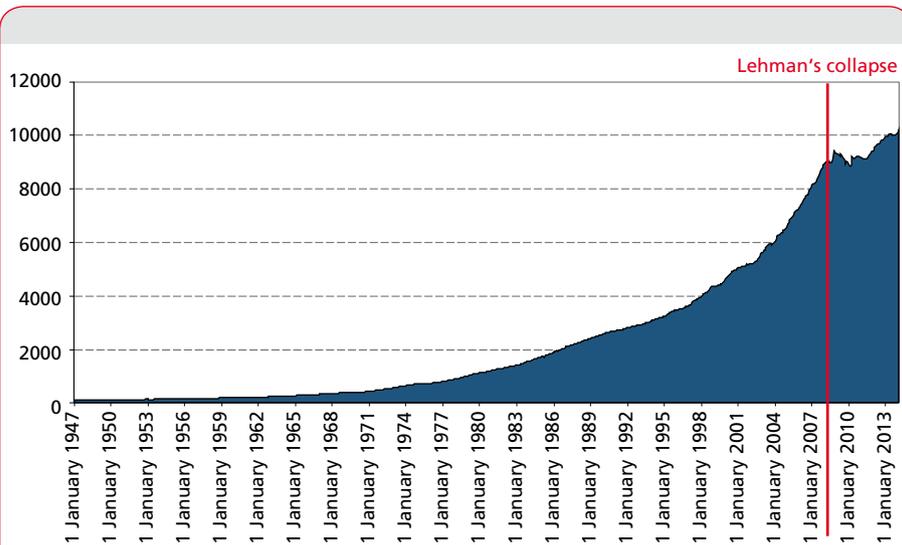


Figure 1: Total US commercial banks' credit (Billions of \$):
January 1947-February 2014
Source: Bloomberg - Ticker: ALCBBKCR Index

In spite of this huge – policy-induced – increase in reserves, the rate of growth of banking credit remained anemic. Another way to appreciate the magnitude of the change in the behavior of US banking credit prior to and after the Lehman event is to compare the ratio between their total reserves and their total credit before and after this event. For a sustained period of time and up to August 31, 2008, this ratio did not deviate much from half a percent. As illustrated in Figure 3, it shot up dramatically immediately following Lehman's demise reaching 12.62% on November 30, 2009 (a twenty-four-fold increase in the ratio). Thus, in spite of a huge policy-induced increase in reserves, post-Lehman banking credit growth was minimal and even negative over 2009.

¹ Interdisciplinary Center, Tel Aviv University and CEPR. Gabi Gordon provided efficient research assistance.

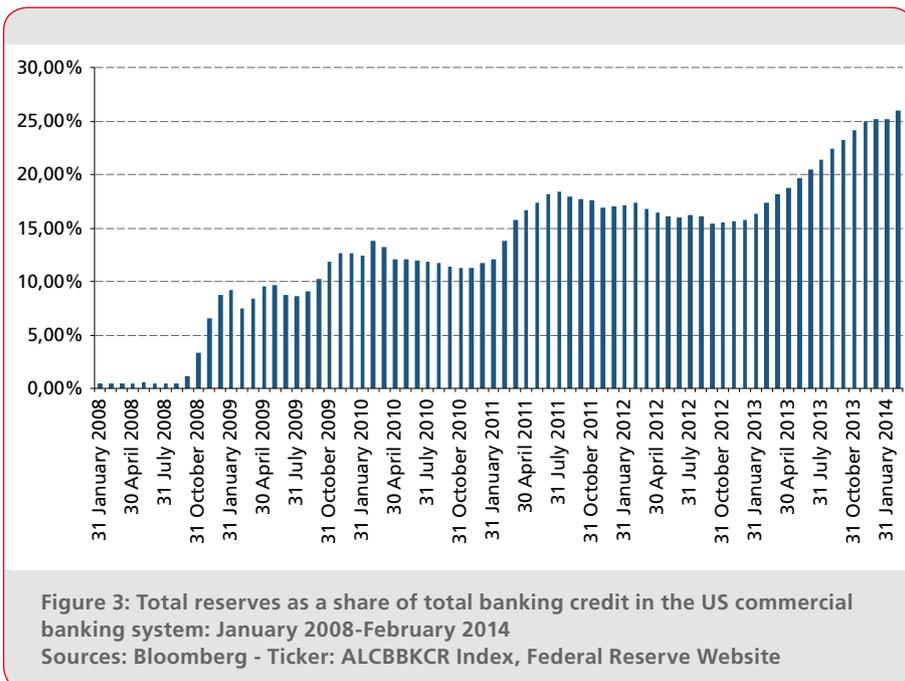
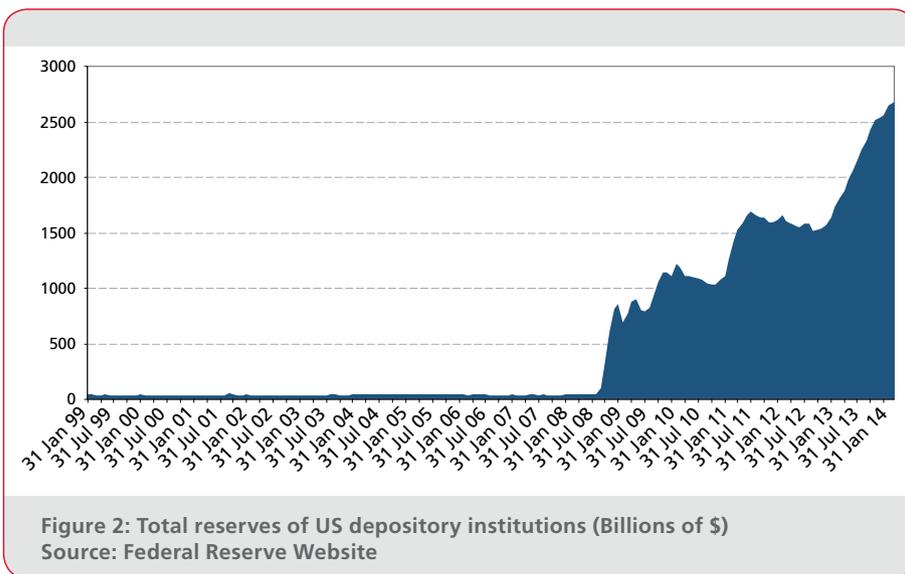
² Chapter 12 in Bernanke (2015) contains a detailed and informative discussion of the considerations that led to the decision not to bailout Lehman Brothers.

³ It shrank by over 3.5% during 2009, temporarily picking up to 5.22% between July 2011 and December 2012, and then slowing back down to 0.76% between January and August of 2013. Over the entire period between September 2008 and February 2014 the rate of growth was 2.01%.

2. Total net new credit flows and net bond issuance before and after Lehman's collapse⁴

A substantial part of credit flows in the US occurs through bond issues in the capital market.⁵ The banking credit evidence presented above is complemented in what follows by data on net new issues of bonds along with net new credit flows via the banking system. Figure 4 shows the yearly volumes of total, net of redemptions, new bond issues excluding treasury bills and net new banking credit flows. The yearly data in the figure highlights the huge decline that occurred in the grand total (through both the capital market as well as through the banking system) net new credit flows between 2007 and 2008. Most of this decline is due to the collapse in net new issues of bonds that went down from over \$2.5 trillion in 2007 to a small positive number in 2008. Net new banking credit also experienced a serious decrease of "only" 47%. In addition, in 2009 both net new bond issues as well as net new banking credit were in negative territory.

The decrease in net new bond issues was not distributed evenly across different categories of bonds. There was a dramatic and sustained decrease in net new issues of mortgage-related and asset-backed bonds. From a peak of over one trillion and a half in 2006, net new issues of those bonds became negative in 2009, remained in negative territory in every



⁴This section partially draws on section 3 of Cukierman (2016).

⁵The stock of US private bonds is about three times larger than the stock of banking credit. Further detail appears in section 5 of Cukierman (2014).

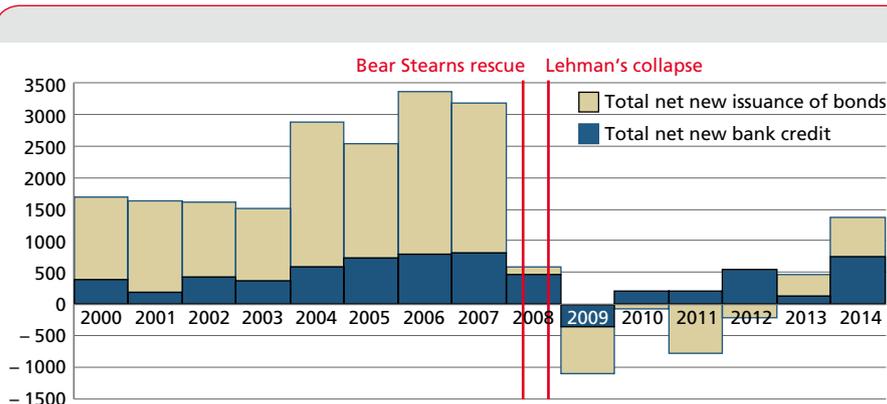


Figure 4: Total net new bank credit + Total net new issuance of bonds in the US (Billions of \$)

Sources: Bloomberg ALCBBKCR Index, Securities Industry and Financial Markets Association (SIFMA)

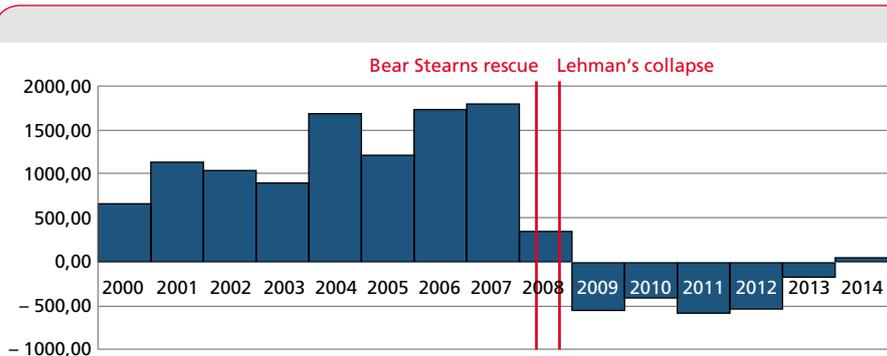


Figure 5: Total net new issuance of mortgage-related, asset-backed bonds, plus federal agency securities and municipal bonds
Source: Securities and Financial Markets Association (SIFMA)

single year until 2013, and rose modestly above zero only in 2014. Net new issues of federal agencies securities and municipal bonds also plunged into negative territory for a good number of years following Lehman's collapse. Figure 5 shows that the sum total of net new issues of those four categories decreased from over a trillion and a half in 2006 and 2007 to less than half a trillion in 2008. This sum was persistently negative in every year between 2009 and 2013

and essentially zero in 2014.⁶ This is a reflection of the complete loss of confidence in the pricing of mortgage-backed securities.

By contrast, the time path of net new issues of corporate bonds is quite different. Although those issues decreased from about \$400 billion in 2007 to less than \$200 billion in 2008, they actually increased to roughly \$500 and \$600 billion over 2009 and 2010, respectively (Figure 6). However, since the increase in net new issues of corporate bonds was substantially smaller than the collapse of mortgage-related and asset-backed bonds, total net new nonfederal bond issues were still in negative territory as can be seen from Figure 4.

The dramatic decrease in mortgage-related and asset-backed bonds is due to the realization by investors in the wake of the crisis that their ability to measure and manage the risks associated with these types of instruments is substantially lower than what they had believed prior to the outbreak of the crisis. The increase in corporate bonds during 2009 and 2010 partially reflects a substitution between these defunct mortgage instruments and corporate bonds due to the perceived increase in the relative riskiness of mortgage-related bonds and asset-backed securities. It also implies that the demand for credit by large corporations with good access to the capital market remained substantial in spite of the recession induced by the subprime crisis. The quantitative easing operation of the Fed reinforced this trend through liquidity injections and through forward guidance aimed at keeping long-term rates low.

The flight to safety that engulfed the world in the wake of

⁶ Although they differ in terms of absolute magnitudes, the time paths of each of the components of this sum are qualitatively similar to the behavior of the total. In terms of magnitudes, the total sum is dominated by movements in mortgage-related and asset-backed bonds.

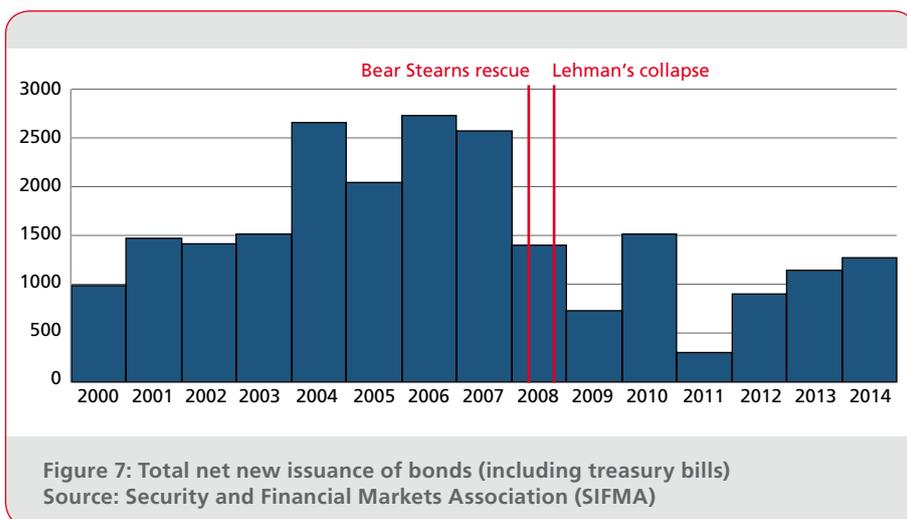
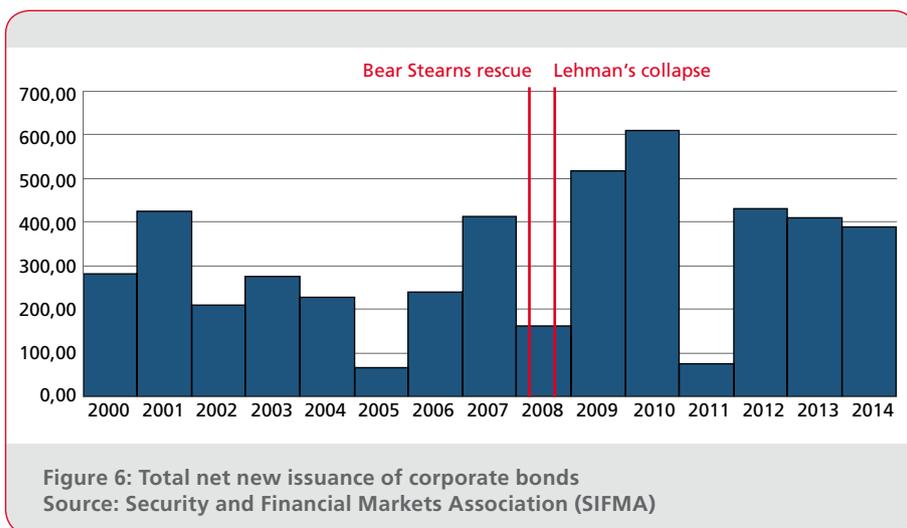
the subprime crisis substantially raised the demand for treasury securities. From less than \$200 billion in 2007, net new issues of treasury securities rose to roughly \$1.3, \$1.5 and \$1.6 trillion in 2008, 2009 and 2010, respectively. As a consequence, total new issues of bonds including those of the federal government remained consistently in positive territory after Lehman's downfall. However, in comparison to the pre-Lehman period, and as suggested by Figure 7, the increase in treasury securities did not fully offset the impact of the virtual disappearance of net new issues of mortgage-related and asset-backed bonds between 2008 and 2013.⁷

3. Increase in probabilistic awareness to low bailout probabilities as an explanation for arrest of credit flows through banks and the capital market following Lehman's collapse⁸

In what follows I briefly sketch the argument that the virtual arrest in total credit creation during the first two years following Lehman's collapse is consistent with the view that the Lehman event temporarily raised bailout uncertainty and permanently raised the awareness of financial market participants to the existence of low bailout probabilities

which were given zero mass prior to Lehman's demise. The starting point of the analysis is that prior to the crisis banks and other financial markets participants, like pension funds, believed that in case of financial difficulties there is a positive and non-negligible probability of bailout. However, they were not certain in the Knightian sense about the likelihood of such bailouts.

Following Cukierman and Izhakian (2015) (CI), bailout uncertainty is modeled by using the multiple prior framework proposed by Gilboa and Schmeidler (1989). In this framework subjective bailout **risk** is captured by postulating that there exists a single probability, P , that in case of insolvency on the part of a bank government or the central bank will pay the bank's debt to creditors. Subjective uncertainty about bailouts



⁷ Using this type of data Caballero et al. (2016) argue that world supply of safe assets shrank in the aftermath of the crisis, putting further downward pressure on long-term safe real rates.

⁸ This section partially draws on section 4 of Cukierman (2016).

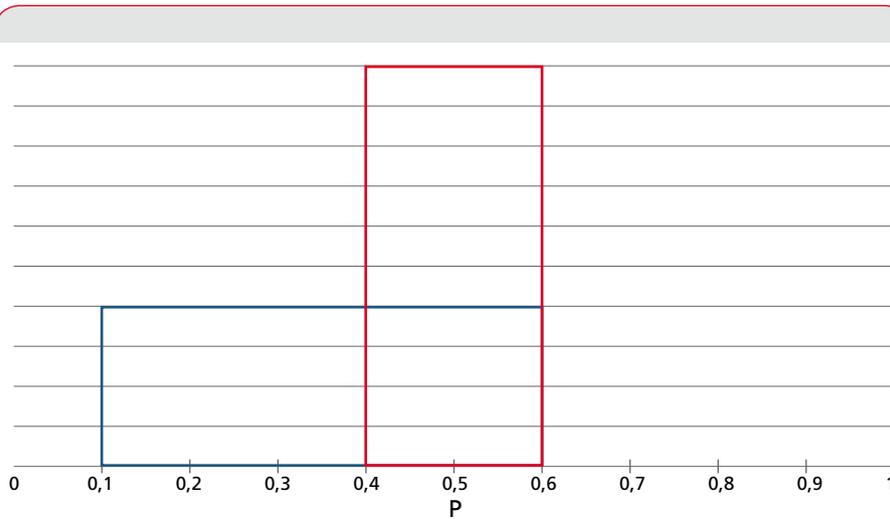


Figure 8: Example of a downward expansion of the set of multiple prior bailout probabilities

is introduced by assuming that banks and other financial market participants are not certain about the probability, P , of a bailout and entertain the view that there is a whole range of *a priori* bailout probabilities with positive mass.⁹

An increase in bailout uncertainty is then modeled as an expansion of the set of binomial multiple priors distributions. To illustrate, suppose that prior to Lehman's downfall markets believed that the possible range of P is between 0.4 and 0.6 so that all other bailout probabilities were considered to be irrelevant. A post-Lehman increase in bailout uncertainty is then modeled as an expansion of the set of P 's with positive mass to, say, the range between 0.1 and 0.6. This is illustrated in Figure 8.¹⁰ More generally I will refer to sets of bailout probabilities with non-zero mass as sets to which individuals are probabilistically aware to.¹¹ Using this terminology we can refer to an expansion in the set of multiple

priors in the direction of lower probabilities as an increase in probabilistic awareness to low bailout probabilities.

Based on a set of axioms similar to those postulated by Von Neuman-Morgenstern to derive the expected utility theorem, Gilboa and Schmeidler (1989) show that, when faced with multiple priors, individuals should choose the best action against the worst possible distribution (the Maxmin criterion). Continuing the preceding illustration this means, within the CI framework, that prior to the Lehman event creditors maximized expected utility as if bailout probability was 0.4, and after it as if it was 0.1. CI explore the implications of such a change within a three sectors general equilibrium model of the financial system and

show that it leads to a general contraction of banking credit, a general increase in borrowing rates and, in extreme cases, to a total credit arrest.

The three sectors include ultimate borrowers (firms and households), financial intermediaries (banks) and ultimate lenders like pension and mutual funds. Lenders lend to financial intermediaries and the latter utilize those funds along with own capital to lend to borrowers. An increase in awareness to low bailout probabilities, by reducing the expected value of lenders returns from buying banks' obligations and raising the associated risk, reduces the supply of funds to financial intermediaries and increases lenders' demand for safe assets. This reduces, in turn, the amount of resources available to banks and the volume of credit extended to borrowers. This mechanism operates through an increase in lenders and banks' reluctance to lend.

⁹Hansen and Sargent (2008) use the idea of multiple priors to explore the consequences of parameter uncertainty for the behavior of the economy.

¹⁰The probability masses have been drawn as uniform for simplicity. Any two probability masses over P such that the minimal value of the post-Lehman support is lower than its counterpart in the pre-Lehman period can be used to convey the general idea of the figure.

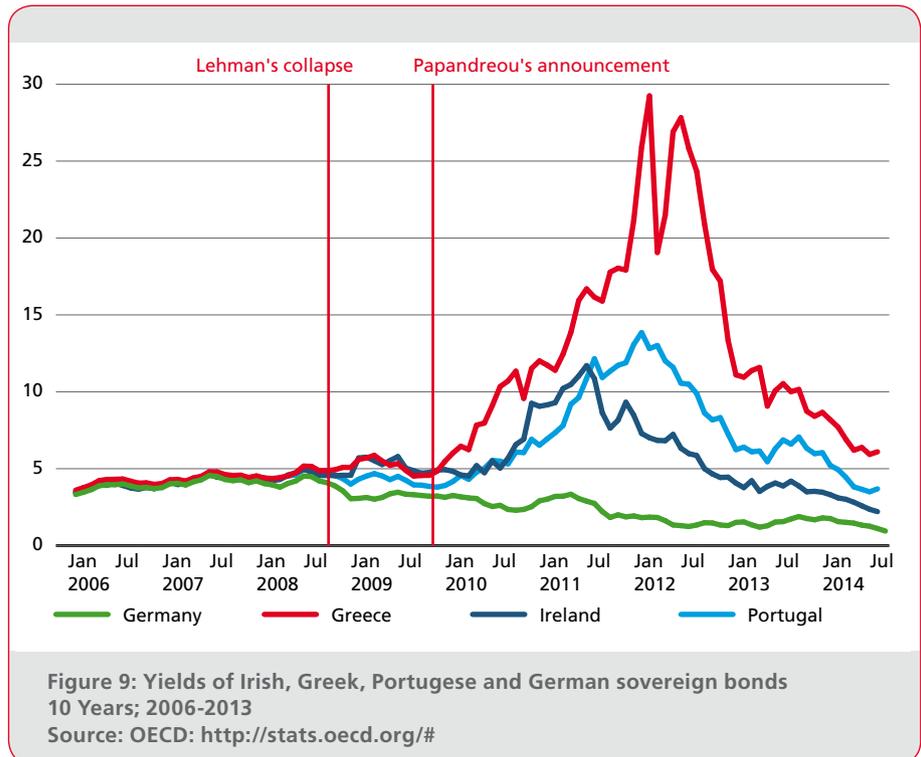
¹¹The adjective "probabilistic" is needed in order to distinguish it from the term "awareness" in modern decision theory. The latter refers to states of natures that individuals know might realize as opposed to states they are completely unaware of like Taleb's (2007) black swans prior to their discovery in Australia.

It may be argued that part of the decrease in credit was due to a decrease in demand for credit due to the recession triggered by the crisis rather than by shrinkage of supply. But the fact that during the first two post-Lehman years the issuance of corporate bonds actually picked up is consistent with the view that the main reason for the collapse of banking credit resided on the side of supply.

At least for the first two years following the Lehman event the increase in bailout uncertainty appears to provide a reasonable explanation for the dramatic decrease in banking credit. The persistence of credit arrest beyond those two years is due to gradual enactment of tougher banking regulations along with the longer-term memories that a traumatic, widely observed, event such as Lehman's collapse left in the minds of financial market participants. Once triggered by a dramatic, widely observed event, probabilistic awareness to low bailout probabilities persists much beyond the realization of that event.

The following episode from a completely different area illustrates the generality of this view. According to the Non-Life Insurance Rating Organization of Japan (NLIRO), stricken Fukushima prefecture, bearing the brunt of the huge earthquake and tsunami that devastated the region at the beginning of 2011, saw rates of new earthquake insurance coverage increase almost threefold in the aftermath of the earthquake (Majirox news, August 24, 2011). This evidence is consistent with the view that, following the trauma caused by the tsunami, the awareness to higher probabilities of earthquakes and tsunamis increased. The analogy to the Lehman's event should be self-explanatory.

Similarly, Cukierman (2014) argues that the major traumatic event of the European crisis, that is comparable to Lehman's collapse in the US, was the realization that default probabilities on sovereign bonds of different governments may differ



substantially. But this realization dawned on euro area financial markets somewhat more gradually than the increase in probabilistic awareness of low bailout probabilities in the US.

This is illustrated in Figure 9 (taken from Cukierman, 2014) that shows the behavior of Irish, Greek, Portuguese and German sovereign bonds between 2006 and 2013. Between 2006 and the Lehman event, the sovereign yields on those bonds are practically indistinguishable, supporting the view that financial markets viewed those bonds as equally risky. Following Lehman's demise, some moderate spreads emerge. But those spreads widen substantially only after Papandreou's November 2009 announcement about the true size of the Greek deficit as well as subsequent adverse pieces of information about Irish and Portuguese sovereign debt. The upshot is that, following public events like Papandreou's announcement, euro area financial market participants became aware of default probability distributions on sovereign bonds to which they previously had assigned a negligible or even zero mass.

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*Guenter W. Beck and Volker Wieland**

How to normalize monetary policy in the euro area

I. Introduction

The European Central Bank has used quantitative easing as early as 2009 when it announced the first covered bond purchase program in the middle of the recession. Then, the main policy rate, the rate on its main refinancing operations (MRO rate), was still at one percent. In subsequent years, the ECB made use of longer-term refinancing operations (LTRO) extending first three and, later, four years in order to stimulate bank lending and increase the central bank balance sheet. Targeted long-term refinancing operations (TLTRO) have included a fixed four-year interest rate as low as -40 basis points. By January 2014, the ECB resorted to a large-scale bond purchase program comprising a variety of assets but mostly sovereign bonds.¹ As a result of quantitative easing (QE), its balance sheet has increased enormously. It is expected to reach almost four times the pre-crisis level by the end of 2017 (compared with July 2007).

While the euro area economy has improved and inflation has risen, the ECB has not yet presented an exit strategy, that is, a plan that provides guidance on factors determining timing and process of policy normalization. Communicating such a strategy would help build public trust in the ECB and its ability to steer this process effectively.² Key challenges concern the appropriate reduction in the balance sheet and market participants' fears that monetary policy-making is dominated by financial and fiscal concerns. Communicating an exit strategy in a timely manner would significantly improve the prospects for a smooth normalization process. The aim of this study is to review the challenges for normalization and discuss key elements of an exit strategy.

First, we consider the dimensions and scope of the normalization process. This includes questions concerning which

measures should be phased out and which should continue to be used in the future. In this context, a key question is the appropriate size of the central bank's balance sheet. Next, we examine the link between improving macroeconomic and financial conditions and the timing of the exit from quantitative measures and negative interest rates. It is by no means ensured that the overall economic environment will be benign for normalization. Rather, the exit strategy should explicitly account for challenges arising from concerns for financial, fiscal or economic stability. Market participants may need to be convinced that member states will attend to their areas of responsibility in ensuring the stability of the financial system, the sustainability of public finances and progress with structural reform rather than relying on a continuation of extremely accommodative monetary policy and low long-term interest rates. Thus, in spelling out the details of an exit strategy we also discuss in what way the ECB could adjust its communication as regards such challenges. The paper concludes with a brief summary.

II. Dimensions and scope of normalization

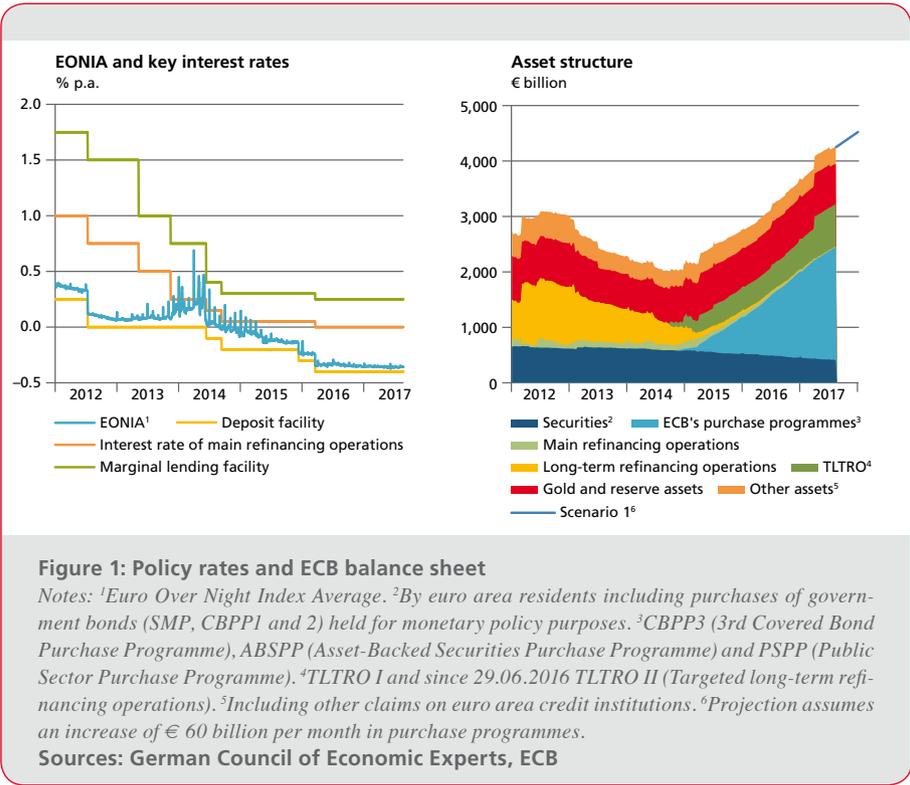
A. Negative interest rates and quantitative easing

Once the MRO rate and the ECB deposit rate had been lowered to 5 basis points and -20 basis points, respectively, in the course of 2014, the ECB introduced purchase programs for covered bonds and asset-backed securities. On January 22, 2015, the ECB then initiated a large-scale purchase program for public assets (PSPP) with the stated aim of raising consumer price inflation towards its objective of below, but close to 2 percent. Following a large reduction in oil prices, headline HICP inflation had registered slightly below zero at the end of 2014. The combination of purchase programs (EAPP: expanded asset purchase program) was envisaged to last until

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¹This is the "expanded asset purchase program" (EAPP). It comprises the purchase of covered bonds (CBPP3), asset-backed securities (ABSPP), public sector bonds (PSPP) and corporate sector bonds (CSPP). The CBPP3 and ABSPP had already started in October and November 2014, respectively.

²See, e.g., the contribution by Donald Kohn and the general discussion on this topic in Blinder et al. (2013, chapters 4 and 5) or chapter 1 of IMF (2013a) concerning the importance of central bank communication in this regard.



half times by the end of 2017 compared with 2014. In comparison to the pre-crisis level in 2007, it will have almost quadrupled.

Any plan to exit from these measures, which the ECB itself has classified as unconventional, must address the following two questions at the outset: (i) Should the central bank return to using a short-term interest rate as its primary instrument, or should it employ unconventional measures regularly in the future? (ii) Should the central bank's balance sheet be returned to its pre-crisis level (relative to nominal GDP, for example) or should it remain at a much higher level, and if so, which one? A further important question that we leave for another study is whether or not existing monetary policy strategies, including inflation objectives, need to be modified.³

B. Current and future use of policy instruments

September 2016 and comprise the purchase of assets worth €1140 bn. It has been extended twice. In June 2016 a program for corporate bonds was added (CSPP). Currently, the EAPP is envisaged to run until the end of 2017 and encompass the acquisition of bonds worth €2280 bn.

Figure 1 shows the development of the key policy rates and the ECB balance sheet. The MRO rate has been lowered to zero percent and the rate at which banks can redeposit reserves at the ECB to - 40 basis points. The EONIA rate, which measures interbank rates, has also moved into negative territory and closely follows the ECB deposit rate.

As a consequence of the EAPP and fixed-rate TLTROs, the ECB's total assets will have increased more than two and a

Before the global financial crisis, the central banks of the main industrial economies, with the exception of the Bank of Japan (BoJ), relied on a short-term nominal interest rate as the main policy instrument. The BoJ had been using its balance sheet since March 2001 as its primary instrument in a low-inflation environment with near-zero interest rates.

Changes in the central bank rate are transmitted to medium- and longer-term nominal rates which take into account current and expected future short rates. As a result of price rigidities, these changes are also transmitted to real interest rates, which in turn influence aggregate demand, for example via investment, consumption and savings motives and wealth effects. Interest rates also affect the exchange rate and thereby imports and exports. Furthermore, financial

³For example, monetary policy strategies could include financial stability considerations more explicitly (see BIS, 2016 (chapter 4)) or inflation targets could be increased to leave more room for interest rate cuts in recessions (see, e.g., Blanchard et al. 2010). GCEE (2016) conclude that the ECB's current strategy offers enough flexibility to deal with current challenges.

frictions imply that changes in asset prices influence the borrowing capacity of firms and the lending capacity of banks. Additionally, there is a risk-taking channel resulting from the behavior of investors and banks.

The use of short-term interest rates as the main policy tool of central banks is well understood and has been fairly effective in the past when interest rates were positive. Thus, in an economy exhibiting positive rates of economic growth and inflation, that is, in more normal times, central banks can rely again on this instrument. Importantly, open market operations conducted to change short-term nominal interest rates in money markets imply endogenous changes in the central bank balance sheet. Hence, balance sheet and interest rate are not independent instruments. Furthermore, real-balance and portfolio balance effects that remain operative with constant or zero interest rates are quantitatively small relative to the effects of balance sheet changes due to open market operations accompanied by changes in central bank rates. Therefore, in a more normal environment these (independent) macroeconomic effects of quantitative measures will be swamped by the standard effects via interest rate transmission (see e.g. Orphanides and Wieland 2000, Coenen and Wieland 2004, Wieland 2010, GCEE 2016).

Whenever the room for lowering the short-term policy rate may be exhausted, for example in the event of a recession or deflation, longer-term refinancing operations provide a natural option for extending further policy accommodation. Furthermore, the arsenal of quantitative measures including private and public asset purchases should remain available. Empirical research of the experience following the global financial crisis has helped reduce uncertainty about their effects, at least relative to the situation prior to the financial crisis.⁴

In making use of quantitative easing in such crisis situations it is important to consider cost-benefit tradeoffs. For example, quantitative measures are associated with risks for inflation

and financial stability (see, e.g. BIS 2016, chapter 4) that may increase the longer they are employed. Furthermore, in a currency union of otherwise largely sovereign member states, moral hazard may well induce negative side effects of central bank purchases of member states' debt. Member states might reduce efforts to maintain sound public finances and remove structural barriers to competition and growth.

C. The appropriate size of the balance sheet

The balance sheet of the ECB has risen from about €1200 bn prior to the financial crisis in July 2007 to €4200 bn by August 2017. By the end of this year, the size of the balance sheet will reach about €4500 bn. The €3300 bn increase is roughly equal to 30 percent of euro area GDP. Central bank balance sheets have also expanded substantially in other major industrial economies such as the United States, the United Kingdom, and Japan. Currently, it is the ECB and the Bank of Japan that are contributing most to the expansion of world central bank liquidity.

An important question is whether and, if so, when, how and to which level the central balance sheet should be decreased in the context of a monetary policy normalization. The Board of Governors of the Federal Reserve System (U.S. Fed) published "Policy Normalization Principles and Plans" in September 2014. It announced that it would decrease its balance sheet in the long run to "hold no more securities than necessary to implement monetary policy efficiently and effectively" (Board of Governors, 2014). Conceptually, this would seem to be a level similar to the pre-crisis period, adjusted for the increase in the demand for central bank liquidity and cash resulting from the economic growth since then. By contrast, Carney (2013) has indicated that the Bank of England might hold a systematically different level of assets in the future.

To answer whether the "new normal" size of the ECB's balance sheet should be systematically different from its "old normal", it is useful to consider the role of the balance sheet

⁴See, for example, Bernanke et al. (2004), Gagnon et al. (2011) or Borio and Zabai (2016) and for recent overviews GCEE (2015, 2016).

in times when the short-term interest rate is the main policy instrument. Under these circumstances, the central bank provides the amount of reserves to the banks that they demand at that rate and aims to make sure that the rate at which these reserves are exchanged between banks corresponds to the central bank's desired rate. As a consequence, the size of the central bank's balance sheet (absent any other, non-monetary policy related transactions) is determined endogenously by the liquidity needs of the banking system. By contrast, when a central bank conducts quantitative easing, it increases the volume of its assets deliberately and thus actively employs its balance sheet for monetary policy purposes.

Direct asset purchases have some consequences that are delicate from a political economy perspective (Borio and Zabai, 2016). First, holding assets directly increases financial risks for the central bank's balance sheet. Holdings of medium- to long-term bonds imply considerable interest rate risks. Moreover, there is credit risk unless purchases are limited to those government bonds that are very safe. Secondly, large-scale purchase of government bonds establishes a direct link between monetary and fiscal policy. It changes the financing conditions of governments directly. Even if conducted on

secondary markets, they may induce sufficient certainty for investors on the primary market to assure them of a purely intermediary role. This is of particular concern in the euro area, because the Eurosystem is purchasing member states' debt and is prohibited from monetary financing by the Maastricht Treaty. Ultimately, blurring the line between monetary and fiscal policies threatens the independence of the central bank. Both considerations suggest that the normalization process should include a sizeable reduction in the ECB balance sheet down to levels determined by the liquidity needs of banks. New regulatory measures may well imply somewhat greater demand for central bank liquidity relative to GDP than before the crisis (see also Wyplosz 2014).

III. Timing of normalization

A. Inflation in the euro area

The Treaty on the Functioning of the European Union (TFEU, Art. 127 (1)) assigns the ECB the pursuit of price stability as its main task. A stable price level would imply zero inflation however measured. The ECB has provided a quantitative definition for the HICP (Harmonized Index of Consumer Prices)

as part of its strategy. From 1998 to 2003, it aimed for an increase below 2 percent over the medium term, that is, an objective of 0 to 2 percent HICP inflation. Following its 2003 mid-term review, the ECB clarified its objective as below, but close to 2 percent HICP inflation over the medium term (ECB 2003). The close to 2 percent safety margin was meant to account for measurement bias and provide room for interest rate cuts relative to an effective lower bound on nominal rates. The objective does not need to be met at each point in time. The medium term horizon is commonly understood as a period of more than one year but less than five years.

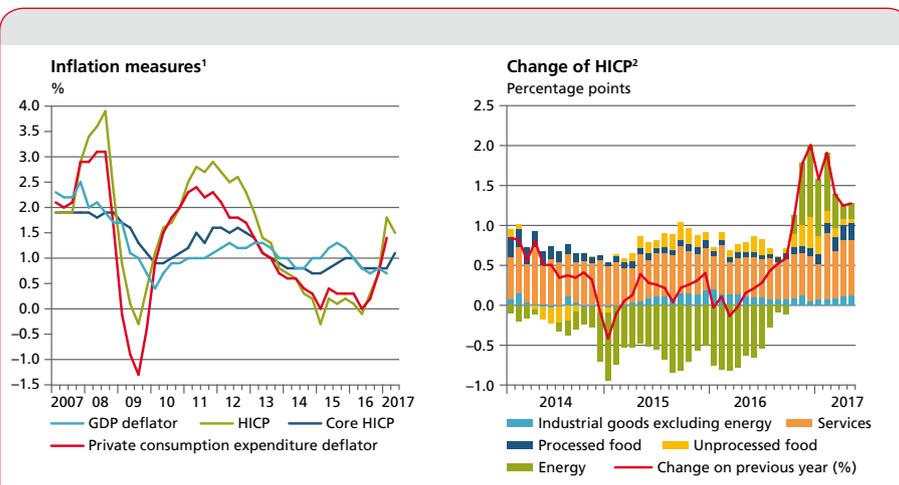


Figure 2: Inflation measures and decomposition of the HICP inflation rate
 Notes: ¹Change of the respective index on previous year. ²Overall index (HICP) and the contributions of subindices, seasonally adjusted.
 Sources: German Council of Economic Experts, own calculations, ECB, Eurostat

Figure 2 reports on the development of several measures of inflation: the overall HICP, core

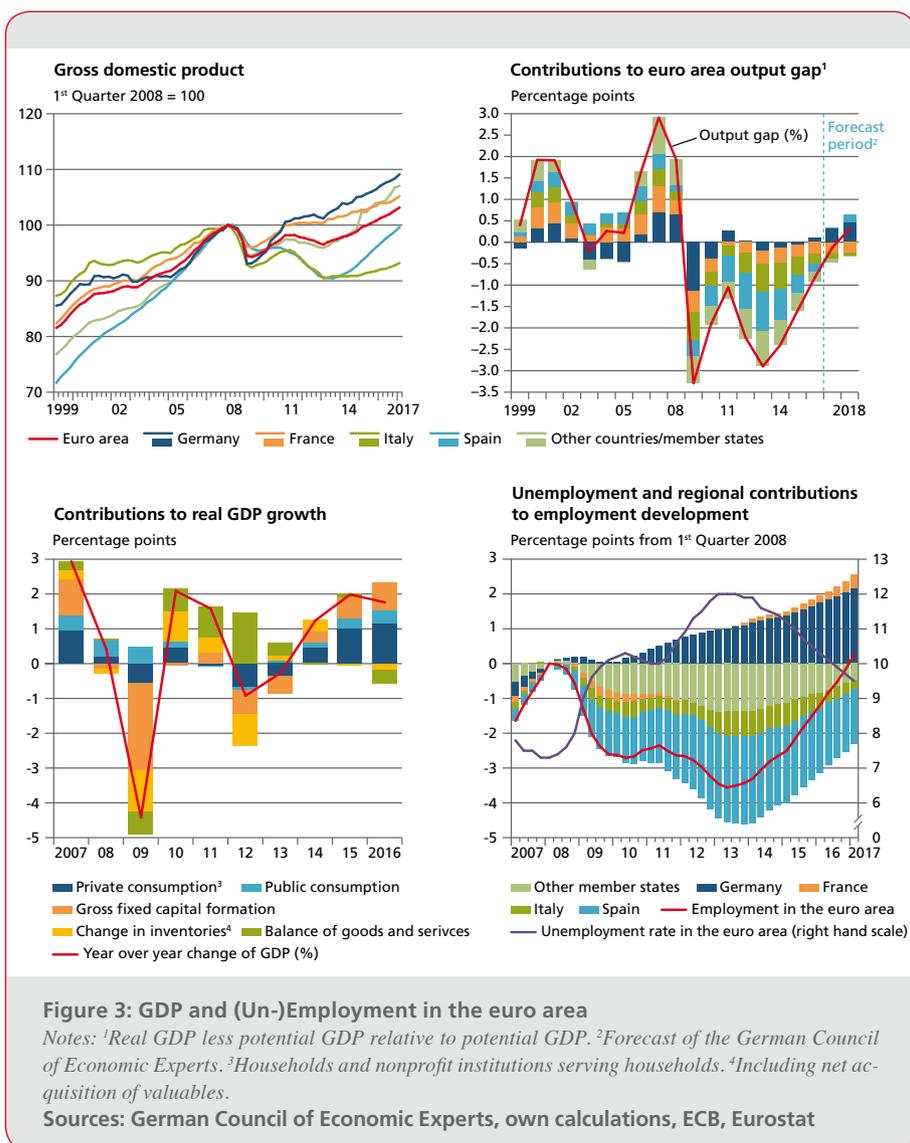
HICP (excl. food and energy), the PCE (private-consumption-expenditure) deflator and the GDP (gross domestic product) deflator. The overall HICP and the PCE declined towards small negative numbers in 2014, varied between 0 and 0.5 percent in 2015 and 2016, quickly rose to 2 percent at the start of 2017 and declined somewhat in the last few months. The 2013-14 decline in the HICP was largely driven by a decline in energy price inflation that was mostly due to an enormous drop in the oil price. Once the oil price stabilized, its dampening effect disappeared. The resulting path of annual energy price inflation raised overall HICP inflation quickly but temporarily to 2 percent.

By contrast, core HICP and GDP deflator inflation, which are much less affected by movements in energy prices, had not experienced similar declines in 2013 and 2014. Core inflation has been quite stable, somewhat above one percent between 2010 and 2013, and a little below 1 percent between 2014 and 2016. Recently, it has been rising above 1 percent again. The GDP deflator, which measures inflation for all goods and services produced in the euro area, has also been fairly stable for the past ten years. During some years, it was a little above and during others a little below 1 percent.

The June 2017 ECB staff forecast anticipates core HICP (overall HICP) to reach 1.4 percent (1.3 percent) in 2018 and 1.7 (1.6) percent in 2019. The ECB Survey of Professional Forecasters has core HICP (overall HICP) at 1.3 (1.4) percent in 2018 and 1.5 (1.6) percent in 2019. Arguably, this could be summarized as consumer price inflation being below, but close to 2 percent over the medium term – or at least not far from that point. A recent empirical estimate puts the ECB's point target at 1.72 percent on the basis of an interest rate reaction function that fits ECB interest rate decisions quite well (see Bletzinger and Wieland 2017).

B. Economic recovery in the euro area

The euro area has experienced a steady economic recovery which started already in the course of 2013 (see Figure 3). GDP growth has been around 2 percent since 2015, which is well above the European Commission's estimate of potential growth of around 1 percent. Euro area GDP surpassed the pre-crisis level in 2015 and stood almost 4 percent higher by the second quarter 2017. According to estimates of the GCEE, the gap between actual and potential output is being closed



in the course of 2017 (GCEE 2016). Actual GDP growth is expected to continue outstripping potential growth such that the output gap will increase and add inflationary pressure.

The decomposition of euro area GDP growth indicates that it is mostly driven by household consumption and private sector investment. Along with the improvement in economic output, there has been a sizeable decrease in aggregate unemployment. It has declined from a record level around 12 percent in 2013 to 9.1 percent in June 2017.

Despite the significant improvement in euro area aggregates, several factors remain that raise concerns about the robustness of the economic recovery. First, there are substantial differences across euro area member states. While GDP in Germany in 2017 exceeds the pre-crisis level by about 10 percent, Italian GDP remains about 8 percent below the level before the crisis. By contrast, Spanish GDP has increased by more than 10 percent and returned to pre-crisis level in just about three years.

The European Commission estimates quite differential potential growth rates. For example, its estimate for Germany is near 2 percent, for France near 1 percent and about zero percent for Italy. The unemployment rate in Germany has declined well below the pre-crisis level, while in France it is still somewhat above that rate. In Italy and Spain, however, it remains substantially higher than before the crisis, though Spain at least shows a significant rate of improvement.

Secondly, the heterogeneous development of member states faced with the same monetary policy suggests that structural, supply-side factors are causing low potential growth and high structural unemployment. Indeed, a variety of indicators suggest the existence of structural deficiencies to different degrees. To give an example, ease of doing business indicators vary substantially across the euro area with Germany and Ireland fairly high, Spain in the middle, and Italy and Greece towards the bottom of the scale (see Draghi 2016). Thus, there exist enormous obstacles for opening new businesses in many euro area countries.

Thirdly, banking sectors remain weak while the sustainability of public finances is questionable in several member states of the euro area. These member states remain vulnerable to instability as discussed later on.

These concerns need to be addressed in the context of an exit strategy from quantitative easing. However, they cannot be resolved by monetary policy. Rather, they require action by the governments of member states. Unfortunately, however, the pace of reform has slowed in recent years as indicated by the share of implemented “Going for Growth” recommendations by the OECD in the member states (see OECD 2016). The reform fatigue has arisen at the same time accommodative monetary policy continued to support aggregate demand in euro area countries. While some argue that this environment supports governments’ reform efforts, others suspect that moral hazard leads governments to postpone unpopular reforms (see GCEE 2016, for example).

C. Symmetric policy versus “lower for longer”

Central bank interest rate policy is typically described quite well by interest rate reaction functions that capture the policy response to inflation deviations from target and economic activity relative to potential. Such reaction functions imply that policy accommodation is removed step by step as inflation increases and economic activity improves. Accordingly, the extent of quantitative easing should be adjusted along with price developments and the recovery in the euro area.

There is a line of research that suggests that deflation risk introduces an important asymmetry because of increased uncertainty about policy effectiveness at the lower bound on interest rates. Accordingly, a “lower for longer” approach to policy accommodation is recommended (Reifschneider and Williams 2000, Orphanides and Wieland 2000, Auerbach and Obstfeld 2005, Evans et al. 2015). Additionally, it is argued that an exit from quantitative easing requires the absence of financial stability concerns (Kohn 2013, IMF 2013b).

By contrast, others point to increasing risk of financial in-

stability the longer the central bank sticks to quantitative easing (BIS 2016). Balancing these concerns may well lead to recommending a symmetric approach to policy accommodation in a low inflation environment (see GCEE 2015 for a discussion). In any case, in designing the normalization, careful attention needs to be given to maintaining a robust financial sector and sustainable public finances.

At this point, the ECB is still expanding its balance sheet further and thereby increasing monetary policy accommodation. Yet, inflation and GDP growth have been improving since 2014. This suggests that ECB policy is better described as a “lower for longer” approach at the effective lower bound than as a symmetric reaction to inflation and economic activity.

This conclusion is supported by comparisons with two simple interest rate rules in Figure 4. The interest rate band from the first-difference or change rule of Orphanides and Wieland (2013) fits past ECB decisions quite well, yet it did not call for massive easing from 2014 onwards. This rule is based on SPF forecasts of inflation and output growth. Recent estimates of such a reaction function by Bletzinger and Wieland (2017) also suggest that the ECB pursues a “lower for longer” approach. By comparison, the instantaneous forward rates from the yield curve have declined significantly. They provide a possible indication of the near-term interest rate impact of the ongoing government debt purchases.

Interest rate prescriptions from a version of the famous Taylor (1993) rule using euro area output gap and core HICP inflation have been rising for some time. Currently they stand at approximately 2 percent. By comparison, estimates of shadow interest rates that are meant to summarize the impact of ECB asset purchases on the yield curve in a short-term nominal rate are between -2 and -4 percent according to Kortela

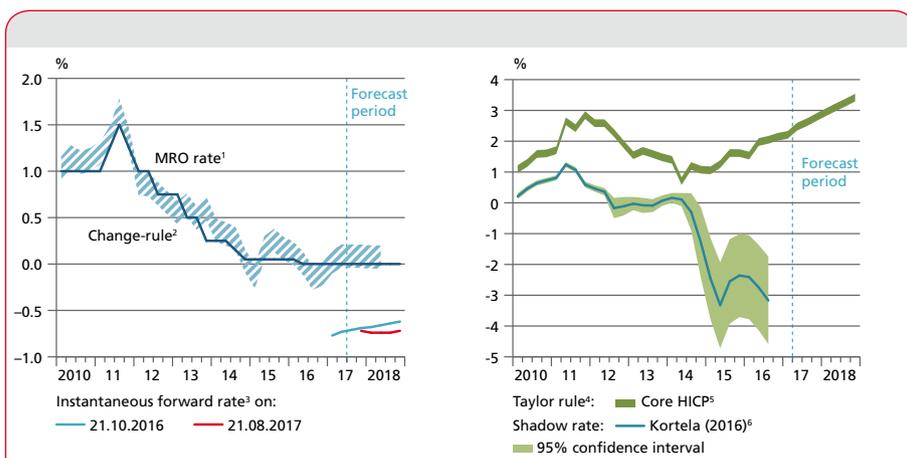


Figure 4. Interest rate rules indicating a “Lower for Longer” approach

Notes: ¹Interest rate on main refinancing operations. ²Equation: $i_t = i_{t-1} + 0.5(\pi^f - \pi^*) + 0.5(\Delta q^f - \Delta q^*)$. i_t denotes the estimated ECB's MRO rate, it depends on the MRO rate of the previous period, i_{t-1} , on the deviation of the inflation forecast, π^f , from the central bank's inflation target, π^* , and on the deviation of the growth forecast, Δq^f , from the estimated growth potential, Δq^* . The estimates of growth potential are based on realtime data from the European Commission. The forecasts are based on data of the Survey of Professional Forecasters: for inflation it is the forecast for three quarters ahead, for growth it is the forecast for two quarters ahead. ³Instantaneous forward rates based on euro area AAA-rated government bonds with maturity of 3 months and longer. ⁴Equation: $i = 2 + \pi + 0.5(\pi - \pi^*) + 0.5(y)$. i denotes the estimated money market interest rate; it depends on the long-term real equilibrium interest rate (estimated to be 2 %), on the current inflation rate, π , in deviation from the central bank's target, π^* , and on the output gap, y . ⁵Based on ECB's real-time database and AMECO. ⁶Updated estimates for Kortela (2016). Sources: German Council of Economic Experts, calculations based on data from the European Commission and the ECB

(2016). Thus, the ECB is keeping policy much more accommodative than suggested by the Taylor rule. Even if one were to use recent estimates of medium-term equilibrium real rates of near zero percent (see Holston, Laubach and Williams 2017, Beyer and Wieland 2017) instead of Taylor's long-run equilibrium real rate of 2 percent the resulting prescription remains much higher than the shadow rates. Importantly, if one uses medium-run equilibrium rate estimates in the Taylor rule together with the consistent medium-run output gap, the interest rate prescriptions turn out a good bit higher and closer to 2 percent than to zero percent (see Michaelis and Wieland 2017).

One could argue that there has already been a tightening via the exchange rate. Indeed, the nominal trade-weighted exchange rate has risen about 5½ percent between the

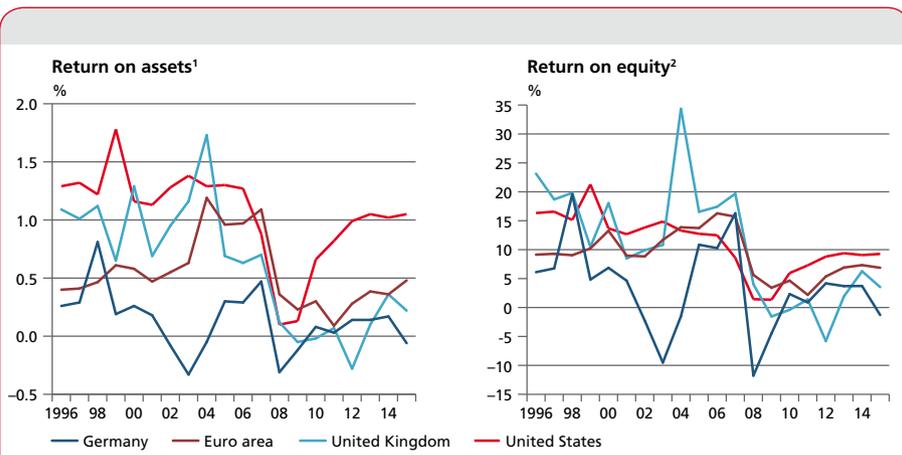


Figure 5: Profitability of euro area banks

Notes: ¹Ratio of after-tax net income to total assets. ²Ratio of after-tax net income to book capital.

Sources: German Council of Economic Experts, World Bank

beginning of January and the end of August 2017. Yet, this may simply be an adjustment to the recovery of the euro area and the anticipation of an exit from quantitative easing. Still, the trade-weighted exchange rate remains about 4¾ percent below the latest peak in spring 2014.

Of course, there is continued debate about whether the ECB should stop asset purchases this year or whether it should continue its quantitative easing for quite a bit longer. However, it should be possible to agree across a large spectrum that macroeconomic developments call for formulating and communicating an exit strategy now, that is, ahead of a first policy tightening. In this context, it is important to consider the potential impact on the financial system and government finances.

D. Resilience and stability of the financial system

The ECB has identified four major sources of risks to financial stability in the euro area. These stem from global risk repricing, adverse feedback loops between weak bank profitability and low nominal growth, re-emerging sovereign and private-sector debt sustainability concerns and prospective stress in the recently strongly expanded investment fund sector (see Table 1 of ECB, 2016). It also strongly emphasizes

the important role of nominal growth (or its absence) in muting (amplifying) these risks. The IMF also emphasizes that the prolonged low-growth, low-interest rate period imposes considerable challenges for the medium-run solvency of insurance companies and pension funds (IMF, 2016b). While the ongoing economic recovery in the euro area counteracts these risks to some extent, the divergence in national growth rates indicates that significant relief depends on governments implementing market- and growth-oriented structural reforms. Moreover, the IMF (2016b, 2017) points to weaknesses in the euro area banking sector which a cyclical recovery alone would not overcome.

As shown in Figure 5 the profitability of European banks has declined substantially following the global financial crisis and has not recovered since then. Banks' profits directly influence their ability to raise capital as a buffer against negative shocks. Moreover, higher profitability improves banks' ability to extend loans and thereby supports the economic recovery.

One reason for low profitability is high operational cost due to extensive branch networks. Another one is the high proportion of non-performing loans particularly in crisis countries (ECB 2015, 2017, IMF 2016a, 2017, GCEE 2016). Among the large euro area economies Italy stands out with a high share (see Figure 6). Profits are depressed due to provision costs and the ability of banks to extend loans declines. Last but by no means least, monetary policy itself contributes to low bank profitability to the extent that the low interest rate environment is caused by ECB asset purchases, TLTROs and negative deposit rates.

Simulation exercises by the IMF indicate that a cyclical recovery would only partly mitigate the profitability of euro area banks (see IMF 2016, 2017) leaving assets worth around \$8.5 trillion in weak shape. Policymakers need to address non-performing loans, low operational efficiency, weak business mo-

dels and overcapacities. This should be done within the rules of banking union including bail-in of bank creditors rather than relying on exceptions for more tax payer funded bailouts. Yet, the low interest rate environment contributes to the phenomenon of “evergreening”, that is, revolving non-performing loans to avoid credit default and thus preventing a necessary clean-up in the banking sector.

The share of long-term low interest rate loans is increasing. The longer the low interest rate environment persists, the greater the build-up of interest rate risk within the banking system. Germany is a good example. Low interest rates induce search-for-yield and higher risk taking by banks (see Borio and Zhu 2012, Rajan 2005, Adrian and Shin 2010 and Jimenez et al. 2014). The longer the ECB waits with an exit from quantitative easing and negative deposit rates, the more difficult and potentially damaging to financial stability such an exit may become.

E. Sustainability of public finances

Currently, euro area governments are able to refinance their debt at extremely low interest rates. Yet, long-term interest rates may rise substantially once the ECB stops government debt purchases. Indeed, even the anticipation of a future end of purchases may already trigger such an increase. Not all member states appear to be prepared for such a development.

The sustainability of a given debt level depends on current and future primary deficits, interest rates as well as current and expected future GDP growth. Should growth rates exceed interest rates, a given debt level may be sustainable even with a lasting primary deficit. Otherwise, the sustainability of current debt requires future surpluses. For example, with a constant deficit ratio, interest rate and growth rate, the primary surplus and/or real growth rate need to be larger the higher the current debt level. An increase in the real interest rate then requires a greater future surplus or growth rate.

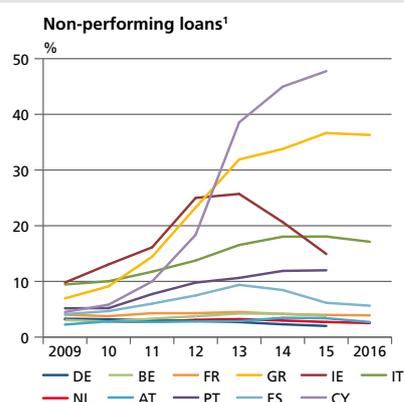


Figure 6: . Non-performing loans

Notes: ¹AT-Austria, BE-Belgium, CY-Cyprus, DE-Germany, ES-Spain, FR-France, GR-Greece, IE-Ireland, IT-Italy, NL-Netherlands, PT-Portugal.

Sources: German Council of Economic Experts, World Bank

Debt-to-GDP ratios of most euro area member states remain far above the 60 percent maximum once enshrined in the Maastricht Treaty except for countries such as the Netherlands or Germany. In France and Spain the ratio is only a little below 100 percent of GDP, while in Greece, Portugal and Italy it lies far above it. The above considerations imply that fiscal sustainability requires higher primary surpluses for given higher initial debt levels. Except for Italy, high debt levels remain associated with current deficits rather than surpluses. Unfortunately, growth rates are quite low for most high debt countries. Among large economies, Italy is of particular concern because it has barely exited stagnation, but also France is far from being a major growth engine. More detailed analysis by the European Commission also suggests that there exist considerable risks for fiscal sustainability in a number of euro area countries (European Commission 2016).

Euro area members undertook considerable efforts in order to stabilize government finances between 2011 and 2014, as can be seen from Figure 7. Since then, however, they have loosened the fiscal stance. They did not take advantage of the reduction in interest rates since 2014 to apply interest savings towards fiscal consolidation. Governments have largely missed the opportunity provided by massive monetary

policy easing for improving fiscal sustainability with an eye towards the future exit from this unusually accommodative monetary policy.

Governments that are not preparing for higher funding costs in the future may be counting on monetary policy to continue facilitating government finances. If instead the ECB tightens policy and winds down sovereign debt purchases, prices of the bonds of those countries may decline quickly due to higher risk premia demanded by investors. Highly indebted member states would be subject to enormous fiscal stress. Of course, the European Stability Mechanism (ESM) offers a way out if any government is in danger of losing market access. Yet, ESM loans would come with conditions concerning fiscal consolidation and structural reform. Massive fiscal stress might even fuel calls for leaving the euro area in countries where anti-EU parties might have a chance of winning elections.

it considers it necessary, market participants may doubt its commitment. Clearly, it is important to address such concerns in designing an exit strategy.

IV. Developing an exit strategy

A. The need for a strategy

Average euro area macroeconomic performance has improved substantially and core inflation has been moving up beyond one percent per year, while the ECB is still increasing monetary policy accommodation. The ECB should prepare and communicate a strategy for ending the increase in its balance sheet and adjusting policy to the improved environment. However, problems remain that are outside the ECB's range of influence. There is substantial heterogeneity among euro area members. Governments need to proceed with implementing growth-oriented structural reforms, improving the robustness of the financial system and getting government finances ready for an increase in longer-term interest rates. Thus, the ECB needs to develop an exit strategy that remains credible in light of such vulnerabilities.

Ideally, the normalization of interest rates and volatility would be orderly and unfold as follows: short-term interest rate expectations rise along a smooth, gentle path, consistent with current market expectations; the term premium compression unwinds gradually; the portfolio adjustment response occurs smoothly, and credit valuations reprice modestly;

pockets of balance sheet leverage are unwound at a gradual pace, with limited knock-on effects; market liquidity is sufficient to accommodate these adjustments; and all of these developments occur in the context of an economy gathering strength" (IMF, 2013a, p. 6).

Such a benign outcome implies favorable expectations formation by market participants. This requires effective com-

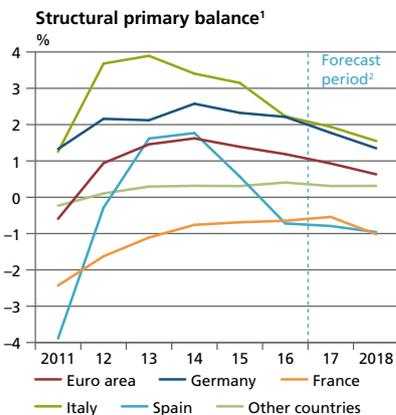


Figure 7: Primary Budget balances of selected euro area countries
 Notes: ¹In relation to potential output. ²Forecast of the European Commission.
 Sources: German Council of Economic Experts, European Commission

Another danger might be that the ECB keeps postponing an exit in order to avoid fiscal stress for member states. This raises the specter of fiscal dominance, a situation in which monetary policy is subordinated to ensuring fiscal sustainability thereby, losing control of the price level. Given the legal framework of the European Monetary Union, the ECB is probably the most independent central bank of the world. Yet, even if the ECB is fully committed to tightening policy when

munications, predictable decision-making and a high degree of credibility of policy-makers. Given the diversity of governments and European institutions involved in macroeconomic policy making, this is a major challenge for most. The ECB is perhaps best positioned as an independent institution with a clear mandate and the ability to make plans and proceed with implementation at its own choosing. Having moved far from previous predictable patterns of policy-making, during crisis and post-crisis management, it urgently needs to give markets more guidance in the form of a strategy.

A timely communication of a normalization strategy is essential for a benign process of expectations formation by market participants. This concerns not only financial markets, but also goods, services and factor markets. Such a normalization strategy would explain the links between the path for policy instruments and macroeconomic developments including forecasts. Importantly, it would also explain how the central bank and other policy makers can credibly guard against particular risks and manage potential disruptions in the financial and other spheres. Finally, it would indicate key features of the longer-run policy environment that is anticipated to persist after normalization.

Some disruptions may be unavoidable. If investors in long-term bonds attempt to unwind large positions swiftly, because they fear major losses, sharp price drops and higher volatility will be the result. The likelihood of such events may even be higher in an environment of lower market liquidity due to increased regulation (see IMF 2013a). An example of turbulence was the so-called “taper tantrum”, that is, the sharp increase in U.S. government bond yields following remarks by FOMC Chairman Bernanke on May 22, 2013, stating that the Fed would likely start reducing asset purchases later that year. Ultimately, the Fed’s tapering process that started around seven months later in January 2014 went fairly smoothly. Of course, U.S. policy rates are still far from what would have been a normal level relative to inflation and economic activity in times prior to the financial crisis. Thus, it is too early for a final judgment.

To support the normalization process, the Fed published a one-page statement regarding policy normalization laying out some basic principles in September 2014. While this was not a detailed strategy, it did provide useful information on key criteria of normalization, sequencing of policy measures and features of the policy environment after normalization.

B. Symmetry

Monetary policy needs to respond to macroeconomic developments, hence a smooth normalization process requires that market participants understand the links between the path of policy instruments and key macroeconomic variables. As noted in section III.C, there is an established view that central banks should act asymmetrically in fighting deflation and guarding against deflation risk. This implies that quantitative easing and near zero policy rates should be kept in place such that interest rates remain lower for longer than in past recession and low inflation episodes during which policy rates did not reach the effective lower bound. Research supporting this approach goes back well before the financial crisis. The asymmetry view is also behind the argument for the safety margin in the inflation objective used to justify the “close to” in the ECB strategy (see ECB 2003, Coenen and Wieland 2003). Thus, the “lower for longer” prescription needs to be taken into account in designing a normalization strategy.

However, the experience of the financial crisis has shown that a low interest rate environment carries its own risks. Taylor (2007), for example, suggests that unusually low policy rates contributed to the excessive build-up of housing prices prior to the crisis. Furthermore, quantitative easing works primarily through increasing asset prices via portfolio balance effects and depressing risk premia. Thus, the longer quantitative easing persists, the greater the likelihood that it induces unsustainable increases in asset prices. Moreover, low interest rates and flat yield curves reduce bank profitability (Borio et al. 2015). This makes it difficult to raise capital and keeps the banking system fragile. Continued search for yield behavior induced by low interest rates on safe assets may lead to an accumulation of risks in the balance sheets of investors.

Perhaps most importantly, interest rate risks on bank balance sheets rise the longer the flat yield curve persists. This is of particular concern in the euro area, where the banking system plays a larger role than in the United States but has built up less capital since the crisis.

Macroprudential policy is typically considered the first line of defense against excessive developments in financial markets. Yet, there is only limited experience with deploying these instruments, in particular, in situations where monetary policy is oriented in a different direction. Furthermore, euro area countries, such as Spain, that made use of macroprudential measures prior to the financial crisis, were not able to stave off excessive increases in asset prices.

Finally, there might be another counteracting asymmetry at work when withdrawing quantitative easing. While instituting and increasing asset purchases may have quite significant effects when financial markets are segmented and dysfunctional, reducing and ending asset purchases once market functioning has improved is likely to have less macroeconomic impact.

With regard to balancing deflation and financial stability concerns, we note that core HICP or GDP deflator have remained in positive territory for many years suggesting no pronounced deflation risk. Unfortunately, there are no quantitative model-based analyses balancing the implications of deflation risks and financial stability concerns. Even so, given the available evidence we think it advisable to lean towards a more symmetric reaction to macroeconomic developments during the normalization phase.

C. Sequencing

In terms of the sequencing of the normalization steps, the question is whether to start with abolishing negative interest rates or with reducing and ending the asset purchases under the EAPP. Savings banks, in particular, have been outspoken in terms of urging the ECB to abolish the negative deposit rate because of its impact on bank profitability. This reaction

is quite understandable given their reluctance to pass on negative interest rates to the large majority of depositors and limited options for lending.

Nevertheless, we would recommend to start with reducing asset purchases. This is also the sequencing the ECB has already indicated to be in line with its existing forward guidance, namely “its expectation that key ECB interest rates will remain at present (or lower) levels for an extended period of time, and well past the horizon of our net asset purchases” (see, for example, Draghi 2017a, b). Note, in the June 8 meeting the ECB decided to drop the words “or lower” from this statement.

Ending asset purchases will free up medium- and longer-run interest rates. Supply and demand in those markets will better reflect market participants’ views regarding future growth and inflation. Thus, medium- and long-term rates will move closer to levels consistent with the recovery observed so far and the outlook for the future. The end of direct central bank intervention in these markets together with improved consistency of market prices and market participants’ economic outlook is generally supportive of a smooth normalization with appropriate expectations formation.

Furthermore, higher medium- to long-term rates will improve bank income from new loans at higher rates relative to deposit rates which will remain close to the short-run policy rate. Thus, ending asset purchases prior to raising policy rates will also support bank profitability. More importantly, it will limit and eventually reduce interest rate risk in the banking system which is crucial to achieving a smooth normalization.

Additionally, the reduction in asset purchases allows for a greater degree of gradualism. Thus, it also allows an earlier start. Abolishing the negative deposit rate would have an immediate impact across the yield curve. Thus, the possibility that it is followed by turbulence and market overreactions might be somewhat greater.

With regard to the type of purchases, the corporate bonds

purchase program could be stopped right away. It is very small in size relative to the ongoing massive purchases of government debt. Furthermore, it exposes the ECB to criticism that it is favoring large companies relative to small- and medium-size enterprises. As to the PSPP, it is advisable to slow down and stop purchases soon enough such that the ECB need not loosen the self-imposed limits regarding weights on member states, issuer and issue shares as well as yields.

D. Forward guidance and rules

The ECB has provided forward guidance on the future path of policy interest rates conditional on its outlook since July 2013. Generally, transparency about the policy path expected by the central bank is helpful information for market participants' expectations formation. By providing information on expected future policy decisions, policy makers remove some of the uncertainty faced by market participants, namely uncertainty about the policy-makers' anticipation of its own policy decisions. Doing so can help stabilize financial and macroeconomic developments and play a useful role during the process of policy normalization and beyond that. It is sensible to provide guidance conditional on the outlook rather than installing unconditional guideposts or commitments that then need to be fulfilled even if economic developments unfold differently from the outlook.

The exact numerical expectation of the policy path and the length of time, for which the Governing Council anticipates policy rates to stay at current levels, remain uncertain to market participants. However, already in 2013, President Draghi stressed that "there is no precise deadline for this extended period of time. As a matter of fact, you can ... extract a reaction function and, from there, estimate what would be a reasonable extended period of time".

Other central banks provide much more detailed information on anticipated policy paths. For example, the U.S. Fed regularly publishes a survey of policy rate expectations of FOMC members. This so-called dot chart receives much attention by Fed watchers. It also indicates the range of disagreement

among FOMC members which may either be due to different forecasts of macroeconomic developments or to different views on the appropriate reaction function for the central bank. Good examples of reaction functions are simple interest rate rules such as the difference rule or Taylor's level rule reviewed in section III.C.

The central banks of Norway and Sweden even go a good bit further. They regularly publish not only inflation and output growth forecasts with associated uncertainty bands but also their policy rate forecast with the respective uncertainty band. Thus, they spell out clearly when they expect the next rate increase to occur. Of course, if the economy develops differently from the forecast, the central bank's anticipated policy path will also change. Clearly, having such insight on the central bank's perceptions and plans helps market participants to better prepare for the future. The central banks of Norway and Sweden have published such information for some years without triggering any significant disruptions.

With regard to an effective normalization strategy for the ECB, a first step would be to reveal more information about its current expectation regarding how long it anticipates policy rates to stay at current levels and to further increase policy accommodation by means of asset purchases. Such a clarification of its forward guidance could be very effective in stabilizing market participants' expectations and reducing the risk of turbulence. If it is too difficult to form agreement on such a path among ECB Governing Council members, another sensible approach would be to provide information on Council members' own forecasts similar to the survey of FOMC members'. This information could simply be added to the regular ECB accounts of the monetary policy meeting that have been published since February 2015. These accounts have already provided some useful information regarding the range of views discussed at the Council meetings. A third option would be to build the ECB staff forecast around the staff's best possible forecast of the policy path rather than around market expectations and publish it along with the staffs output and inflation forecasts.

Another sensible aspect of a normalization strategy would be to quantify the link between the policy path and key macro-economic variables. Thus, the ECB could reveal information on a reaction function or functions that are useful to describe the endogenous policy response of the ECB to real and monetary variables. If it is too difficult to decide on appropriate reaction functions for this purpose in the ECB's Governing Council, it would still be useful to reveal what reaction functions would ensure consistency between the ECB's staff forecast for inflation, output and interest rates.

Policy reaction functions or rules are not meant to be followed in a slavish manner. There may be important reasons for deviating from past responses to inflation and other key macro variables, either because there are special factors and data to be taken into account, or because the structure of the economy appears to have changed, or because policy-makers' preferences have changed due to changes in the decision-making council. The central bank could then simply explain its reasons for deviating from the rule or reaction function.

Interestingly, with the new Republican majority in both Houses of the U.S. Congress, the Fed Oversight Reform and Modernization (FORM) Act that was passed by the House of Representatives in November 2015 is receiving renewed attention. Section 2 requires that the Fed: "describe the strategy or rule of the Federal Open Market Committee for the systematic quantitative adjustment" of its policy instruments; and compare its strategy or rule with a reference rule. Some Fed representatives, including FOMC Chair Yellen and Vice Chair Fischer, have been critical of this initiative fearing that it would restrict too much their ability to act in a discretionary manner (see for example, Fischer 2017). Even so, FOMC Chair Yellen has repeatedly made use of simple rules such as the Taylor rule to structure her discussion of the appropriate policy stance (see Yellen 2015, 2017).

Most recently, the Federal Reserve Bulletin has included a section on policy rules (see FRB 2017). It states key principles of good monetary policy that are incorporated in simple rules. Furthermore, it provides information on the implica-

tions of different policy rules for the policy path. These include a first-difference rule and versions of Taylor's rule. One of these rules even incorporates the "lower for longer" prescription by extending the time at the effective lower bound to make up for preceding interest rate prescriptions below the lower bound. Another way to account for periods when the rule prescribes policy rates in negative territory is quantitative easing. Differences in measures of inflation, the equilibrium interest rate and appropriate policy responses are standard issues in monetary policy-making. The rules are useful in order to translate these differences into policy instrument space in a systematic way.

At this point, there is necessarily wide-ranging speculation about how the ECB might eventually move towards a more normal policy environment. An exposition of policy paths under different rules consistent with the ECB staff forecasts would have the potential to help market participants focus on likely scenarios and improve the predictability of ECB policy. It would not commit the ECB to these rules nor to the implied policy path but indicate the consequences of different assumptions for the policy path.

E. Financial dominance fears

The vulnerabilities of the financial sector in the euro area raise concerns that a monetary tightening could induce financial turmoil. The low profitability of euro area banks makes it difficult to keep adequate capital buffers and weakens their resilience to adverse shocks. An increase in interest rates, and thus loan servicing costs, could increase the proportion of impaired loans and require additional loss provisions and lower profits further. The "evergreening" of loans induces additional fragility. Capital losses resulting from bond yield could induce additional needs for write-offs. Investor fears regarding bank profitability could trigger sharp adjustments in bank stock valuations and cause financial turmoil.

Thus, the ECB faces an incentive to postpone monetary tightening if it endangers the stability of banks that have been under its supervision and previously declared in good health.

This question of moral hazard is known under the term financial dominance. Of course, the ECB may be fully committed to pursue policy normalization as required by macroeconomic developments. Potentially, however, doubts might prevail among market participants. For this reason, enhancing credibility by establishing a track record is key. Additionally, it may be helpful to address financial stability concerns and possible fears of a financial dominance of monetary policy in the communications strategy.

The ECB's role in banking supervision provides it with privileged information and influence. It can encourage banks towards raising capital and initiate bank restructuring or resolution. It would have been preferable to separate the responsibility for banking supervision from monetary policy and place it in a different institution to avoid moral hazard in the conduct of monetary policy. However, this would have required changing EU treaties.

At this point, the ECB's best chance is to encourage banks to raise sufficient capital such that there is no doubt that they can weather a normalization of interest rates. In particular, careful attention needs to be given to interest rate risks building up on banks' balance sheets. Furthermore, the ECB is well advised to establish a track record for initiating timely and effective bank restructuring or resolution when this is needed. In this regard, it is key for building credibility to follow the new bail-in rules of the banking union. The case of Banco Popular in Spain was a good example, while the search for loopholes and exceptions in the case of Italian banks Veneto Banca, Banca Popolare di Vicenza and Banca Monte dei Paschi was not.

F. Fiscal dominance fears

In a monetary union of otherwise largely sovereign member states it is crucial that member governments understand that they cannot rely on the ECB to postpone a tightening that is called for by area-wide macroeconomic conditions. Common monetary policy cannot be directed towards individual countries. Thus, it cannot deal with the heterogeneity of

economic recovery. Additionally, monetary policy is incapable of dealing with structural differences leading to differential potential growth rates. Governments are responsible for structural reforms that can improve efficiency and competitiveness, thereby raising potential growth. Although the ECB regularly admonishes governments to use the period of accommodative monetary policy for initiating and implementing structural reforms, OECD data on reform responsiveness indicate a slowdown in 2015 relative to earlier years (OECD 2016). Yet, the ECB cannot postpone a normalization of its policy to allow governments to postpone structural reform.

It can be expected that risk premia on government bonds from highly-indebted low-growth member states will rise once the ECB slows down and ends purchases of their debt. Debt service costs will rise as governments roll over maturing bonds. There is a danger of unsustainable dynamics and a fiscal crisis.

The ECB is legally bound by the prohibition of monetary financing. The PSPP is not meant to provide support to governments that are in danger of losing market access. The ECB intends to use Outright Monetary Transactions (OMT) as a tool for repairing monetary policy transmission in individual countries and some might consider it as a tool for managing fiscal stress. This program requires that the government concerned asks for an ESM program. However, ESM loans that are guaranteed by member states are actually a much more appropriate tool for helping countries that have lost or are in danger of losing market access.

The effectiveness of ESM loans would be improved if they would not only come with conditionality regarding program countries' policies but also be associated with a debt restructuring mechanism. Proposals for such a mechanism have been presented, for example, in IMF (2002), GCEE (2016) and Deutsche Bundesbank (2016). They would allow for immediate maturity extension or even haircuts if fiscal sustainability could not be secured otherwise. Accordingly, private investors would participate in the costs of rendering the debt sustainable.

Instead, market participants may expect the ECB to postpone a normalization of monetary policy if the resulting increase in interest rates and risk premia threatened fiscal sustainability in some member states. Such an adjustment would effectively subordinate monetary policy to fiscal needs. A regime characterized in this manner is referred to as fiscal dominance. Ultimately, it would imply that the central bank loses control of the price level and cannot fulfill its mandate. A rationale for such fears might be that the fiscal needs of a highly indebted and large euro area economy such as Italy may exceed the funding potential of the ESM. Furthermore, anti-EU parties might push for exiting the common currency rather than accepting an ESM program with conditionality. Fears of fiscal dominance among market participants would certainly hinder expectations formation consistent with a smooth monetary policy normalization.

Of course, the ECB can and should assert that it is bound by its mandate and will not allow a situation of fiscal dominance to emerge. In fact, ECB President Draghi did so publicly in the context of the OMT announcement when he argued that the conditionality of the ESM program required with OMT protects the ECB's independence (Draghi 2012). A similar assertion could be part of the communications strategy regarding the normalization of monetary policy. It should emphasize that ESM loans are the appropriate tool for handling fiscal stress and that governments should not shy away from conditionality if assistance is needed. However, it would be ideal if governments of member states explained unanimously how fiscal stress in the context of monetary policy normalization is supposed to be addressed. This could be done in the context of an initiative to augment the ESM with a sovereign debt restructuring mechanism. The ECB would gain greater leeway in its decision-making from such an extension of the ESM. From this perspective, the ECB should support the creation of such a mechanism. However, large holdings of government debt expose the central bank to losses. Thus, it was wise to keep national sovereign debt and the risks associated with it on the balance sheet of the respective member state's central bank.

V. Conclusions

Following the decline of euro area inflation to small negative numbers in December 2014, the ECB initiated a large-scale asset purchase program in January 2015. The program resulted in a massive expansion of the ECB balance sheet. Already, since 2013 the euro area economy is experiencing a steady recovery reaching growth rates around 2 percent per year. Headline inflation has risen rapidly once the decline in oil prices has stopped, while core inflation is rising slowly. At this point, the ECB still continues increasing monetary policy accommodation by purchasing public and private sector bonds at a rate of €60 bn a month, at least until December 2017.

So far, the ECB appears to have pursued an approach to policy that keeps interest rates lower for longer than would be the case in the absence of the effective lower bound on policy rates. While there is an active debate about whether the ECB should end purchases this year or whether it should still continue into 2018, we believe it should be possible to agree that the ECB should develop a strategy for the normalization of monetary policy. Furthermore, the ECB should communicate this strategy very soon such that it can do so ahead of taking steps towards tightening.

We have laid out key elements of such a strategy. The objective is to achieve a smooth process of normalization that is facilitated by an appropriate process of expectations formation in financial, goods and factor markets. Rather than persisting too long with an asymmetric concern for deflation risk, we suggest that the ECB respond in a fairly symmetric fashion to macroeconomic developments because a long-lasting low-interest-rate environment carries risks for financial stability.

With regard to sequencing, we propose to start with reducing and ending asset purchases first, and then to proceed with raising policy rates in a second stage. This is consistent with the ECB's forward guidance. In our view, it is key that medium- to longer-term interest rates better reflect market conditions and market participants' expectations rather than interventions by the ECB.

In order to facilitate market participants' expectations that are consistent with a smooth process of normalization, the strategy should provide information on the links between the macroeconomic outlook and the anticipated path for policy instruments. So far, the ECB's forward guidance is fairly rudimentary in that it only speaks of an extended period of time during which the current level of policy rates will likely be maintained. Other central banks provide a good bit more information on the link between macroeconomic and policy developments. Examples include the publication of the central bank's anticipated policy path together with forecasts for inflation and economic activity, publication of a survey of policy-makers regarding individual forecasts for the policy path and key macroeconomic variables and publication of policy rule simulations that help translate different assumptions on key variables into differences in likely policy paths. We discuss how the ECB could make use of such techniques in its normalization strategy.

Finally, there is a risk that policy normalization has a negative impact on bank health and the sustainability of some member states finances. The euro area has created institutions that would help managing these risks of monetary policy normalization. We discuss how the ECB can help strengthen the resilience of the banking system and the sustainability of government finances. At the same time, we emphasize that the communications strategy associated with normalization should alleviate potential fears among market participants that monetary policy in the euro area may ever be subject to financial or fiscal dominance.

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