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European Headwind: ECB Policy and Fed Normalization

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Abstract

The monetary policy of the ECB and the Fed over the past few years are compared and contrasted. The two central banks have similar price stability objectives and faced similar conditions early in the crisis, including the zero bound on short-term interest rates. Since mid-2012, their policies have diverged dramatically. The Fed has pursued consistently expansionary policy through a large expansion of its balance sheet, contributing to significantly better outcomes with respect to both inflation and growth. By contrast, the ECB has tightened policy by reducing its balance sheet by one third. Judging from the weakness in money and credit growth, this policy has been inconsistent with the ECB's two-pillar strategy. The outcome has been economic stagnation and a harmful disinflation that is inconsistent with the ECB's mandate. The paper explores alternative explanations for this policy, including the role of politics in managing the euro area crisis. It proposes a policy of balance sheet expansion that would promote better fulfillment of the ECB's mandate and outlines the implications of developments in the euro area for Fed normalization.

Keywords: ECB, Federal Reserve, central bank mandate, price stability, zero bound, monetary pillar, balance sheet, quantitative easing, euro area crisis.

JEL Classification: E52, E58, E61.

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The euro area crisis five years on

It has been five years since the epicenter of the global financial crisis that erupted in late 2008 moved from the United States across the Atlantic.¹ Since then, while the U.S. economy has enjoyed recovery with steady growth, the euro area economy has languished, going through a double dip slump and is currently at risk of falling back to an unprecedented triple dip recession (see Figures 1 and 2). The mismanagement of the euro area crisis has converted a relatively small and potentially easily manageable fiscal problem that originated in Greece (a state representing merely 2% of euro area GDP) into a systemic crisis for the euro area as a whole. On average, real GDP has moved sideways, but the mismanagement of the crisis has led to substantial declines in some member states.² The resulting economic dislocation has threatened the very existence of the euro area, generating recurrent questions about the long term viability of its construction.

Headwind from Europe has been one of the key factors behind the extraordinary accommodation pursued by the Fed over the past five years. In light of the continuing risks that the euro area crisis poses to the global economy, European headwind will likely remain a key factor in shaping the normalization of Fed policy. Policy actions in the old continent over the past few years have contributed to the benign outlook for inflation in the United States. Had policies contributing to growth and stability been pursued in the euro area, the global economy would have experienced faster growth and the accumulated policy easing in the United States would have proven overly inflationary. At present, risks continue to hamper the prospects of the European economy. In the October 2014 *World Economic Outlook*, the IMF concluded that the euro area faced a 40% chance of returning to recession over the next year and a 30% chance of deflation. Another downturn in Europe would be a major drag for the global economy. In light of the interconnectedness of the global economy, the pace of Fed normalization is intimately related to developments in the old continent. ECB policy decisions, and their impact on the euro area economy, are key drivers for assessing Fed policy.

A supremely independent central bank

In theory, the ECB is the most independent central bank in the world. Its institutional role and mandate are governed by the European Union Treaty which requires the unanimous agreement

¹ The beginning of the euro area crisis can be identified with the revelation of an outsized fiscal deficit in Greece, following elections and the formation of a new government in October 2009.

² The aggregate performance of the euro area that is shown in Figures 1 and 2 masks tremendous differences across member states. As an example, Figure 3 compares economic performance in Germany (which represents just under a third of euro area GDP) to that of the euro area excluding Germany. Some smaller member states, including Greece, have experienced economic catastrophes comparable to the Great Depression.

of the member states of the European Union for changes. Compared to the Fed, the ECB is more independent and less accountable. Key to the independence of the ECB is the appointment process of the members of the ECB Governing Council which comprises of the 6-member Executive Board, based in Frankfurt, and the governors of the national central banks of the eurosystem. Members of the Executive Board, including the President and Vice President of the ECB, are appointed for 8-year non-renewable terms, ensuring maximum independence following appointment and relatively infrequent political battles relating to appointments.

An important advantage for the ECB relative to the Fed is the clarity of its mandate. In contrast to the mandate of the Federal Reserve, the ECB's mandate is consistent with the SOMC's core belief that price stability should be the primary objective of the central bank, recognizing that this is the best contribution that monetary policy can make to overall macroeconomic performance over time. To be sure, respecting the primacy of price stability is not meant to ignore the wider role of the ECB in the economy. Subject to the achievement and maintenance of price stability, the ECB is mandated to support the general economic policies and contribute to the achievement of the objectives of the European Union which, according to Article 3 of the Treaty, include "the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment."

The ECB is also well protected by the European Union Treaty against fiscal dominance. The Treaty includes a strict prohibition of monetary financing. The ECB cannot take instructions from governments, cannot extend loans to governments and can engage in the purchase of sovereign debt only in the context of monetary policy, and as long as such purchases are not made in the primary market.

Like any other central bank, however, the ECB does not operate in a political vacuum and the existential nature of the euro area crisis has been challenging to the institution. The political complexity and lack of cooperation among euro area governments during the crisis has created an environment that placed the ECB in an impossible position on numerous occasions. At times, the institution has been called to take decisions at the limit of its legal authority and political legitimacy. At times the ECB has faced criticism for actions or inaction for which useful precedent has not been established and the proper interpretation of the assignment of responsibility and authority is less than clear.

Political complexity

The crisis has exposed the deeply flawed political construction of the euro area which has led to woefully inefficient crisis management in the past five years. In the absence of a federal

structure, member-state politics have dominated decision making over sound economic reasoning. The inability of the governments of the member states to coordinate a policy response that could serve the interests of the people of the euro area as a whole has been the key reason for the abysmal performance of the euro area economy, and the unbalanced distribution of crisis-related costs among different member states (Orphanides, 2014).

The European Central Bank has been caught in the crosshairs of this dysfunctional political environment. Under such circumstances, maintaining a steady course independent of politics can become impossible, even with the most well-intentioned efforts. During the crisis, European governments have called on the ECB to undertake additional responsibilities that have complicated decision making and moved the central bank closer to politically sensitive areas. Starting with the case of Greece, the ECB has been involved in the highly political process of so called “troika” programs. Since late 2010, the ECB has served as the anchor of the European Systemic Risk Board, which was established to coordinate macro-prudential stabilization policy in the European Union. More critically, starting this month, the ECB is assuming new bank supervision responsibilities as part of the Single Supervisory Mechanism (SSM) that has been established in Europe.

While progress in unifying bank supervision in Europe could be seen as welcome, the framework put in place this year is also evidence of the continuing political dysfunction that has plagued the old continent and continuing economic risks. It has long been recognized that a proper unification of the banking industry is necessary to reduce the fragility of the euro area economy. A proper banking union requires common bank supervision as well as a common deposit guarantee and bank resolution framework. These are essential to maintain a level playing field across member states in an otherwise fragmented environment. They are needed to break the link between banks operating in a member state and the sovereign of that state, especially since euro area governments decided to introduce credit risk in sovereign markets in October 2010.³ These features can be compared to the role that is served jointly by the Federal Reserve and the FDIC in the United States in enforcing common rules and providing a level playing field to banks and a uniform safety net to depositors across states. While comparable proposals that could have resulted in a proper unification of the banking sector in the euro area had been made, and in principle agreed upon at the June 2012 meeting of the European Council, political opposition and lobbying in some member states dominated subsequent deliberations and led to backsliding away from the formation of a complete banking union in the euro area. Earlier this year, European governments finalized their decision to drop plans for a complete banking union, at least for the next several years. In effect, the ECB has been asked to undertake a supervisory role similar to that of the Fed in the United States but the creation of an entity parallel to the FDIC that could have provided a level playing field in banking across member states has been

³ See Orphanides (2014) for a brief description of the adverse consequences of that decision for sovereign markets and banking in the euro area.

rejected. Deposit guarantees and bank resolution functions in the common currency area remain fragmented across national lines, ensuring the continuation of fragility in the euro area banking sector.⁴

In anticipation of the assumption of regulatory responsibilities, the ECB has engaged in a comprehensive capital assessment of major banks in the euro area over the past year. The results were announced in late October. However, as governments had failed to put in place a common mechanism for strengthening capital buffers in banks found to be challenged, the credibility of the exercise has been brought into question. Concerns remain that the ECB was not in the position to identify any problems that risked igniting a crisis without solutions at hand. Without a credible common fiscal backstop, the ECB is not in a position to allay such concerns.

The lack of clarity and absence of credible common rules about the likely treatment of banks found in need of additional capital has inflicted further damage to the euro area economy. Over the past two years, while plans were being put in place to unify bank supervision without a common backstop, the uncertainty regarding what would be demanded of banks increased risk aversion of bank managements and induced a retrenchment in credit supply---a credit crunch. This policy-induced credit crunch has been one of the factors contributing to the weakness of the euro area economy.

An additional layer of complexity that could potentially influence ECB policy is the series of legal challenges brought against ECB monetary policy decisions involving the purchase of euro area sovereign debt. Stakeholders in Germany, which currently enjoys an advantageous position in sovereign markets and benefits from the impairment of sovereign markets in the rest of the euro area, have been systematically challenging ECB decisions to purchase sovereign debt. At present, such lawsuits remain pending and in the meantime the presence of these lawsuits might unduly restrain the ECB from engaging in otherwise appropriate monetary policy actions. To the extent these challenges succeed in discouraging the ECB from engaging in appropriate monetary policy decisions, the ECB effectively becomes captive of the same politics responsible for the overall mismanagement of the crisis, despite its independence.

The ECB's two-pillar strategy

In pursuing its mandate, the ECB adopted a numerical definition of price stability and a two-pillar strategy to guide its monetary policy to attain it. Since May 2003, the ECB has interpreted its primary objective as maintaining inflation rates close to but below 2% per year over the medium term. This clarified earlier language that had suggested lower inflation levels, explicitly acknowledging the “need for a *safety margin* to guard against *risks of deflation*” (Issing, 2003,

⁴ Hellwig (2014) reviews the current state of affairs, relative to proposals that had been advanced in 2012 but were subsequently rejected by euro area governments.

emphasis in the original). Recognition that the operational definition of price stability should be well above zero measured inflation and closer to 2%, in order to account for the zero lower bound on nominal interest rates and provide added room for conventional policy easing, has been a common principle across numerous central banks, including the Fed and the ECB.

The ECB's two-pillar strategy, as developed under the direction of Otmar Issing who served on the Executive Board of the ECB from its founding in 1998 until 2006, provided a role for economic analysis in formulating an assessment of the inflation outlook as well as a prominent role for money and credit as a cross check (Issing, 2005). The ECB's two-pillar strategy distilled the fundamental lessons of monetarist economics and combined it with business cycle analysis such as models that draw on the Keynesian tradition that have generally downplayed the role of money and credit. In this sense, the two-pillar strategy, could deliver more robust policy advice.

Overall, judging from the performance of inflation since 1999, the Fed and the ECB have performed about equally well since the ECB took over monetary policy decision making for the euro area. As seen in Figure 4, inflation in the United States (as measured by the PCE index) and inflation in the euro area (as measured by the HICP) have tracked fairly closely one another and have averaged around 2 percent, in line with the respective numerical definitions of price stability adopted by the two institutions.⁵ This performance speaks well for the overall credibility of the two central banks over this period, which likely contributed to expectations remaining anchored at levels not very different from the numerical definitions of price stability of the two institutions.

However, the comparison becomes much less favorable for the ECB if only the recent past is examined and once other considerations are brought to bear, such as the performance of the economy highlighted in Figures 1 and 2. Since, according to its mandate, and without prejudice to price stability, the ECB is obligated to contribute to the achievement of the objectives of the European Union (including balanced economic growth) questions can be raised as to whether the ECB has been adequately fulfilling its statutory mandate.

The dismal performance of the euro area coincides with the euro area crisis so it can be suggested that at least part of the responsibility for the outcome (and perhaps the largest part) can be attributed to the mismanagement of the crisis by euro area governments. Pertinent to the ECB, however, would be the question as to whether it has pursued the best possible independent policy action, within its mandate, and accounting for the dysfunction of the governments. And if the ECB has not pursued the best policy to fulfill its mandate, a question of interest is why not?

⁵ The Fed only adopted a clear numerical definition of price stability in 2012. However, as the record of policy deliberations makes clear, FOMC participants had effectively adopted implicit numerical definitions equivalent to 2% or between 1% and 2% inflation rates (as measured by the PCE index), throughout the period shown in the figure.

With regard to conventional policy action, as measured by the level of policy-related short-term interest rates, the Fed and the ECB have been effectively close to the zero lower bound for over five years. As can be seen in Figure 5, the ECB was somewhat delayed in its response to the crisis in late 2008 and allowed rates to increase somewhat in 2011. Over the last three years, short-term interest rates have been essentially similar and close to zero in the two economies.

Confusion and policy miscalibration at the zero lower bound?

When the economy is near the zero lower bound on nominal interest rates, short-term interest rates are no longer useful for assessing monetary policy. Instead, other indicators of the stance of monetary policy become more important guides of the degree of policy accommodation. Additional accommodation, when needed, can be engineered through balance sheet policies---altering the size and composition of the central bank's balance sheet---and consistent communication of the central bank's current and desired future policy actions.

In the case of the ECB, and in light of the two-pillar strategy the institution had in place before the crisis, an alternative guide of the stance of monetary policy could be the behavior of money and credit. Figure 6 plots the year-over-year growth in M3 and credit to households and non-financial corporations. As can be seen, according to the monetary pillar, the ECB has pursued consistently exceptionally tight monetary policy over the past few years. Could this be because the monetary pillar lacked information content? Figure 7 suggests the contrary. Before the crisis, real credit growth tracked real GDP growth in the euro area rather closely. And since the beginning of the crisis, fluctuations in real credit growth continue to track fluctuations in real GDP growth, albeit also suggesting the presence of a persistent structural weakness in banking associated with a severe deleveraging during the past five years.

The persistent and significant monetary policy tightness reflected in money and credit growth in the euro suggests that the ECB may have all but abandoned its monetary pillar. If it had not, the ECB would have pursued considerably easier monetary policy during this period, counteracting at least part of the dramatic fall in the growth of money and credit. If the ECB has abandoned the two-pillar strategy it had developed over a decade ago, as is strongly suggested by the data, this would represent a very unfortunate development. The ECB's monetary pillar was meant to provide the very cross check that could have guided the ECB against the mistake of pursuing overly tight monetary policy, with its associated adverse effects on economic growth and welfare. Faster money and credit growth over the past few years could have contributed to higher employment and greater economic growth and stability without compromising price stability. In this manner, faster money and credit growth would have led to better fulfillment of the ECB's mandate as specified in the Treaty.

As worrisome as the conclusions suggested by examining the ECB's monetary pillar may seem, a fundamentally similar conclusion is suggested by examination of recent trends in inflation. Figure 8 focuses on inflation developments over the past five years. The figure reproduces HICP inflation from Figure 4 and adds a measure of core inflation (that excludes the volatile energy and unprocessed food components) as well as data for the 5-year forward 5-year inflation swap, a market-based measure of longer-term inflation expectations. As can be seen, over the past 2-3 years, the ECB has guided the euro area to a disinflation, bringing headline inflation down to merely 0.3-0.4% which is significantly below the ECB's definition of price stability. Core inflation has been similarly trending downwards, also in the opposite direction from what would be needed to fulfil the ECB's price stability mandate. Over the past six months, core inflation has consistently registered readings under 1%, the first time in the history of the euro with such persistently low core inflation readings. Consistent with the information suggested by the monetary pillar, these data suggest that the ECB has been persistently pursuing overly tight monetary policy. The inflation swap data further suggest that longer-term inflation expectations are becoming unanchored.

Figure 9 shows one implication of the ECB's deflationary bias compared to the Fed. The figure shows a proxy for the ex post real short term interest rate, constructed as the difference of the nominal interest rate shown in Figure 5 and the trailing inflation shown in Figure 4. As can be seen, over the past 2-3 years, the Federal Reserve has delivered systematically large negative real interest rates of minus one percentage point or more. In contrast, the real interest for the euro area shows a policy tightening over the past 2 years, and is now barely negative, reflecting the decline of inflation to a mere few tenths of a percent.

What are the causes of the ECB's deflationary bias? One possibility is a miscalibration of policy at the zero lower bound, perhaps resulting from the misleading notion that policy is already "as easy as can be" once short-term nominal interest rates are close to zero. Such confusion, often associated with the notion of the so called "liquidity trap," has been noted in earlier historical episodes, for example at the Fed during the Great Depression and at the Bank of Japan in the late 1990s and 2000s (Orphanides, 2004).

Lessons from the Great Depression and the Japanese lost decade

As early as 1930, a few months after the market crash of 1929, Keynes had identified how "the mentality and ideas" of the policymakers themselves could stand in the way of the necessary policies and thus hinder economic recovery following a crash. What more can be done to expand monetary policy at the zero lower bound, one might ask? One answer is what we now call quantitative easing, which Keynes had already identified as the proper policy response back in 1930: "The Bank of England and the Federal Reserve Board . . . should pursue bank-rate policy and open-market operations 'a outrance' . . . [t]hat is to say, they should combine to

maintain a very low level of the short-term rate of interest, and buy long-dated securities . . . until the short-term market is saturated.” (Keynes, 1930, p. 386). Keynes recognized that by pursuing an expansion of their balance sheets through the purchase of government bonds, central banks can reflate the economy with no limit. His concern was not the effectiveness of this policy but the potential unwillingness of policymakers to pursue it: “I repeat that the greatest evil of the moment and the greatest danger to economic progress in the near future are to be found in the unwillingness of the Central Banks of the world to allow the market-rate of interest to fall fast enough” (Keynes, 1930, p. 207). Unfortunately, Keynes’ fear materialized. In the early 1930s, policymakers failed to pursue quantitative easing. The outcome is what we now know as the Great Depression.

History repeated itself across the Pacific during the 1990s. The Bank of Japan was faced with the zero lower bound and stopped easing policy, focusing inappropriately on short-term rates. Economists such as Milton Friedman (1997) and Allan Meltzer (1998) warned that the Bank of Japan should engage in quantitative easing to avert continued stagnation. Friedman reminded policymakers: “There is no limit to the extent to which the Bank of Japan can increase the money supply if it wishes to do so. Higher monetary growth will have the same effect as always. After a year or so, the economy will expand more rapidly; output will grow; and after another delay, inflation will increase moderately.” Unfortunately, Bank of Japan policymakers delayed the adoption of quantitative easing policies by many years. The result is what we now know as the Japanese “lost decade.”

The Fed and the ECB at the zero lower bound

The Japanese experience in the 1990s and early 2000s served as a useful wakeup call that central banks needed to better prepare for the possibility of hitting the zero lower bound and formulate contingency plans in case such a scenario materialized elsewhere. The issue was studied extensively before the crisis, both at the Fed and the ECB. In the case of the ECB, the staff completed pertinent analysis under the direction of Otmar Issing. Among others, this analysis was instrumental in the clarification of the ECB’s definition of price stability in May 2003.

The simplest way to calibrate the proper stance of monetary accommodation at the zero lower bound is by adjusting the size of the balance sheet of the central bank through the accumulation of government debt. Once the zero lower bound looms near, policy needs to shift from interest rates to monetary quantities. Adjusting the size of the balance sheet could replace the traditional movements in the policy rate as a guide to policy. Other options for providing policy accommodation are also available. Clouse et al (2003) present a review of policy options in a study that was prepared for the FOMC on this issue.

In the case of the Fed, the massive expansion of its balance sheet since the beginning of the crisis suggests that in the current episode, the Fed implemented monetary policy along the lines of the policy response suggested by Keynes, Friedman and Meltzer for earlier episodes. The policy response also included additional elements, such as forward guidance, consistent with the preparatory analysis done before the crisis for the FOMC.

Sadly, in the case of the ECB, the data point to a different conclusion. Figure 10 compares the size of the balance sheet of the ECB to that of the Fed over the past several years. In the summer of 2012, the two balance sheets were comparable, with the Fed's balance sheet at about 3 trillion dollars and the ECB's balance sheet at about 3 trillion euro. Since then, the Fed embarked on the quantitative easing policy that has just been concluded at the FOMC's latest meeting, raising its balance sheet to about 4.5 trillion dollars, an increase of one half. By contrast, over the same time period, the ECB has engineered a massive tightening of policy by reducing its balance sheet to about 2 trillion euro, a reduction of one third.

The tightening of monetary policy that the ECB has engineered through the contraction of its balance sheet has been partly offset by other policy decisions, for example a small reduction in policy rates. Indeed, in response to negative economic developments, in September 2014 the ECB has undertaken the unprecedented step of bringing the deposit facility rate to minus 0.2%. And the ECB has repeatedly communicated that it wishes to provide the appropriate policy stimulus to fulfill its mandate. But the very focus on short term interest rates, coupled with the unwillingness to engage in quantitative easing, suggests deep problems with the policy strategy pursued by the ECB in the recent past.

To be sure, there are other ways the ECB could ease monetary policy beyond quantitative easing. Garnier (2014) discusses how the ECB could intervene in the interest rate swap market. Indeed, employing derivatives is one of the numerous tools listed in the aforementioned survey prepared for the FOMC (Clouse et al, 2003). It is also certainly true that at the zero lower bound, communication becomes a more powerful policy tool. But the effectiveness of each strategy rests on how credible and convincing the central bank can be that it will deliver on what it promises to achieve. A central bank claiming that it will do "whatever it takes" while not delivering with actions eventually loses its credibility. Quantitative easing---the expansion of the central bank's balance sheet through the purchase of government debt---or even the undertaking of open positions in derivatives contracts, allow the central bank to demonstrate with its actions that it means what it says. By "putting its money where its mouth is," the central bank vastly improves the odds of success in providing policy accommodation.

Headwind in the outlook?

A number of questions remain:

Why has the ECB pursued such overly tight monetary policy since the summer of 2012? It is important to examine this question in its proper context. The ECB has been dealt a terrible hand. It is an independent central bank for the euro area but has had to worry about the very existence of the euro area as a result of the mismanagement of the crisis by euro area governments. Perhaps the politics involved in managing the crisis unduly influenced monetary policy decisions. Whatever the explanation, it is difficult to escape the conclusion that the ECB has not been operating in a manner that promotes the fulfilment of its mandate. To fulfill its mandate, the ECB should have been pursuing considerably more expansionary monetary policy. This would have contributed to growth and greater stability in the euro area as a whole, while also delivering rates of inflation closer to the ECB's definition of price stability.

What should the ECB do? The most straightforward and time-tested course of action is for the ECB to announce and start the implementation of a quantitative easing program with no further delay. Purchases of euro area sovereign debt should be apportioned according to the ECB's capital key, to account for the relative sizes of the member states whose sovereign debt would be purchased in the secondary market. How large the purchases should be to restore growth and stability in the euro area, and in full respect of the ECB's primary mandate, cannot be determined in advance. Judging from the experience of the Federal Reserve, the ECB could announce an initial plan of purchases aiming to double its balance sheet in coming quarters, with a target of reaching at least 4 trillion euro. This expansion would be proportionally smaller than the expansion of the Fed's balance sheet relative to the size of the balance sheets of the two central banks in the summer of 2012. Nonetheless, a plan to expand the ECB's balance sheet to 4 trillion euro could serve as a starting point and could be subsequently adjusted, depending on the success of the policy. One could further hope that the ECB will return to its pre-crisis roots and refocus on its two-pillar strategy ensuring that money and credit growth in the euro area economy is commensurate with sustainable growth and price stability, in accordance with the ECB's mandate.

What are the consequences of further timidity and inaction? Europe is not out of the woods and a severe deterioration of the crisis cannot be ruled out, both because of the ECB's inappropriately tight monetary policy and because of continued political fragility and dysfunction. Turning to this side of the Atlantic, the Fed needs to remain vigilant to headwind from Europe. At the same time, it should be recognized that if the ECB reverses course and adopts the warranted monetary policy for the euro area, global growth prospects would improve notably and the Fed would need to be ready to unwind the accumulated policy accommodation on this side of the Atlantic at a much faster clip than is currently anticipated.

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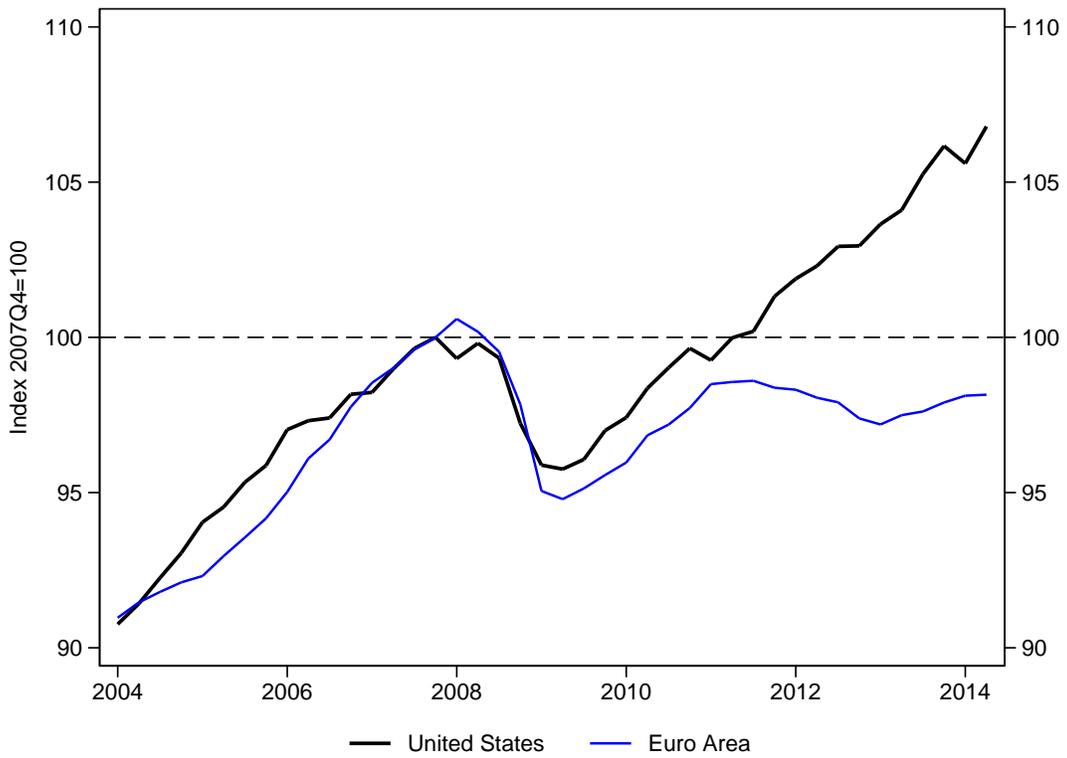


Figure 1: Real GDP in the US and the euro area. Index: Fourth quarter 2007 = 100.

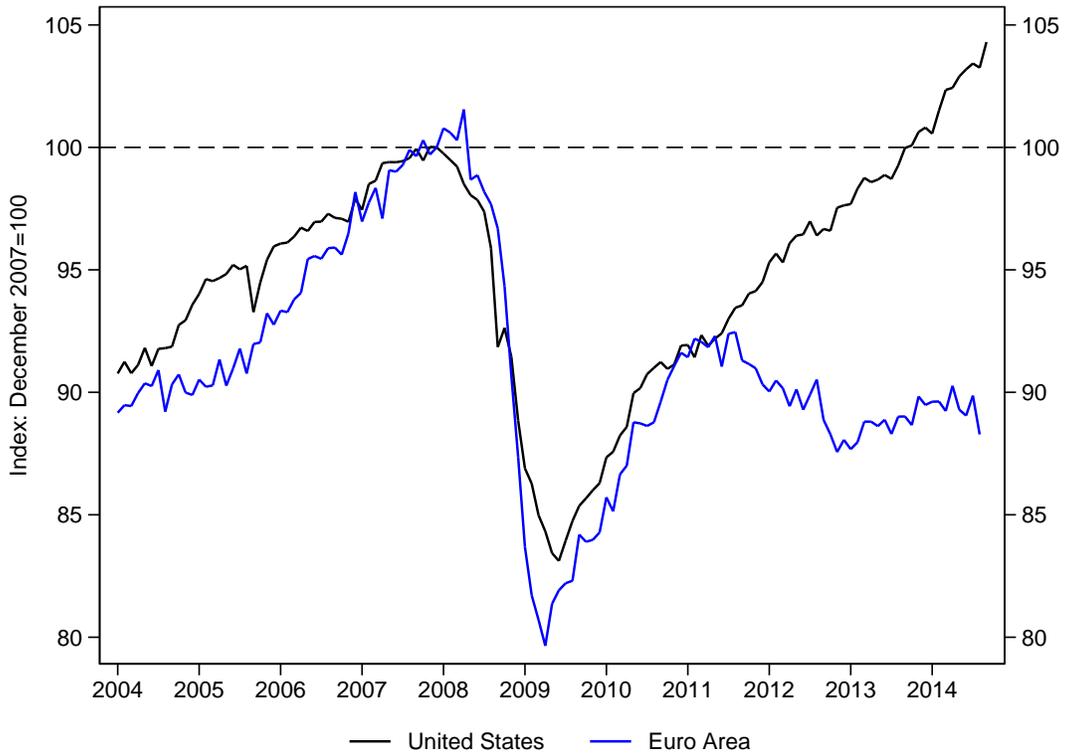


Figure 2: Industrial production in the United States and the euro area. Index: December 2007 = 100.

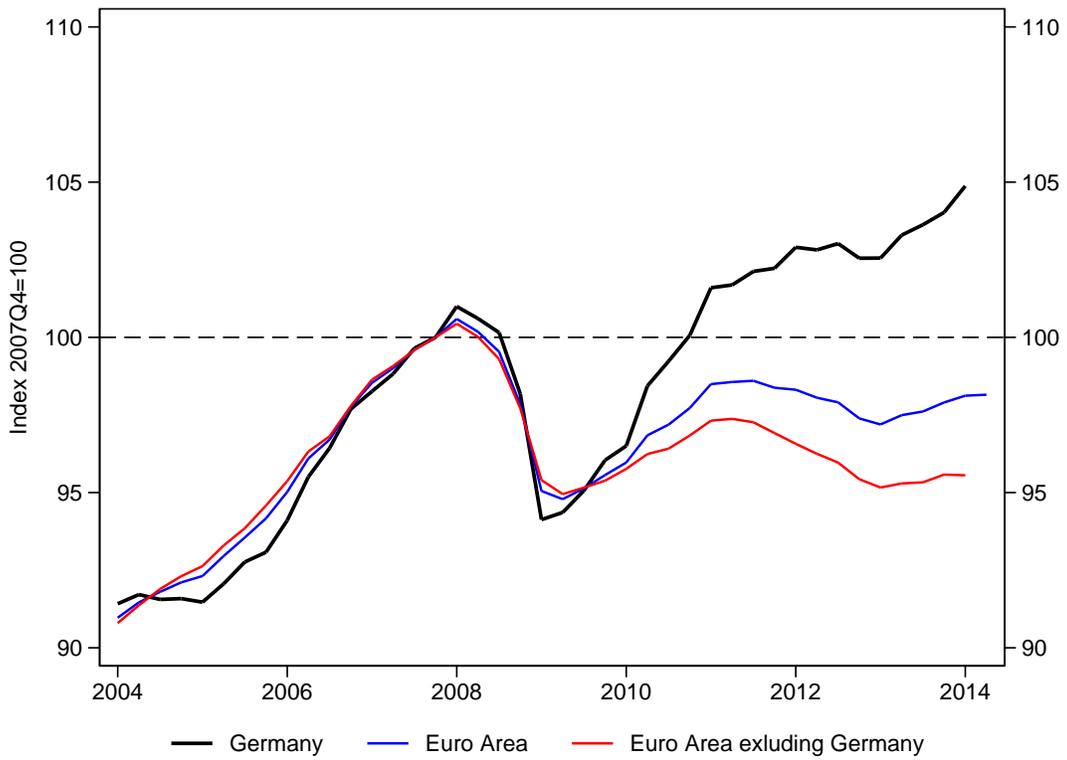


Figure 3: Real GDP in the euro area including and excluding Germany.

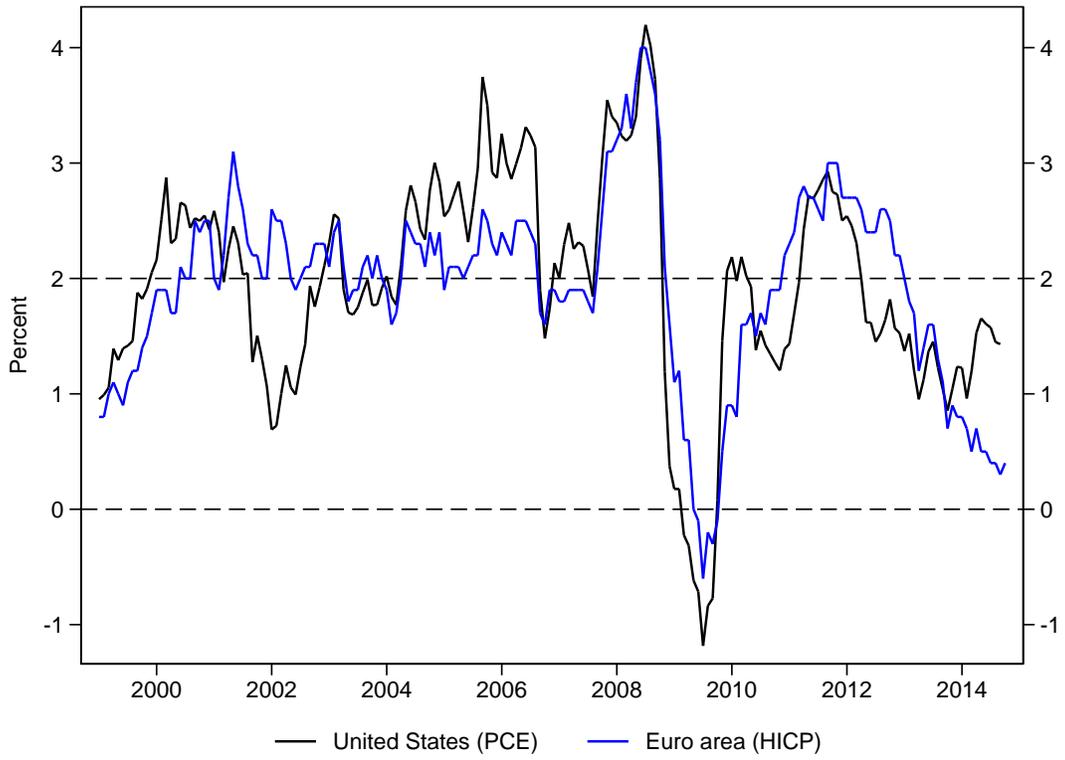


Figure 4: Inflation in the United States and the euro area.

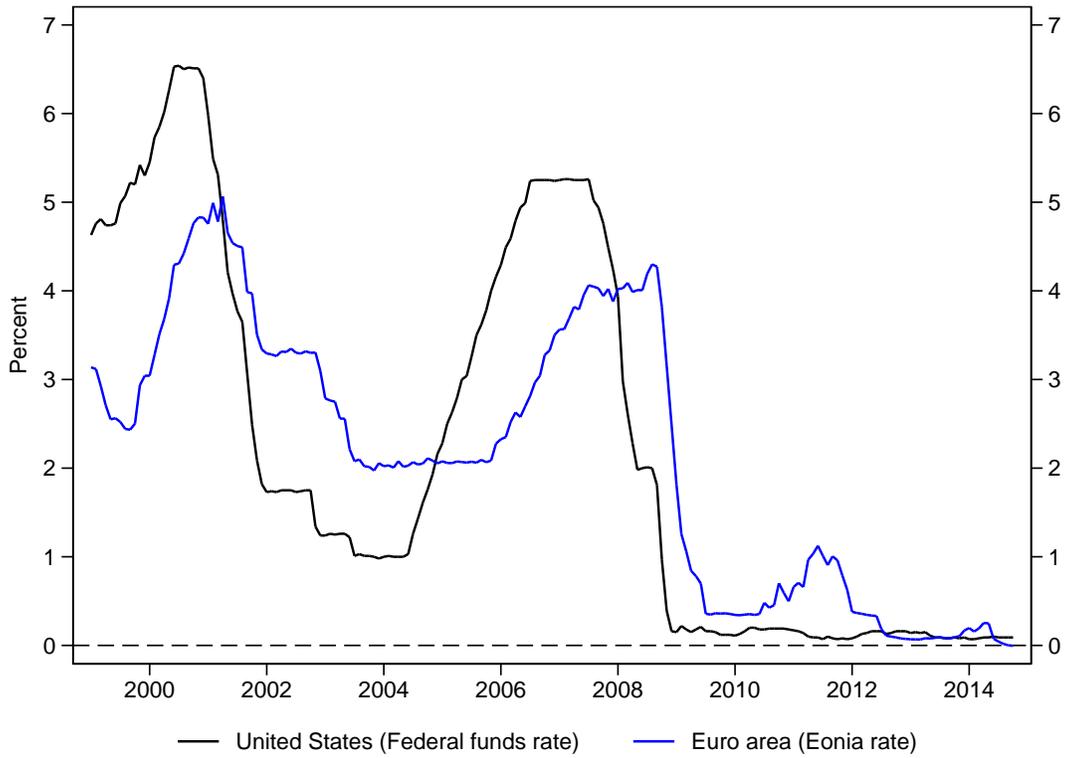


Figure 5: Overnight interest rates in the United States and the euro area.

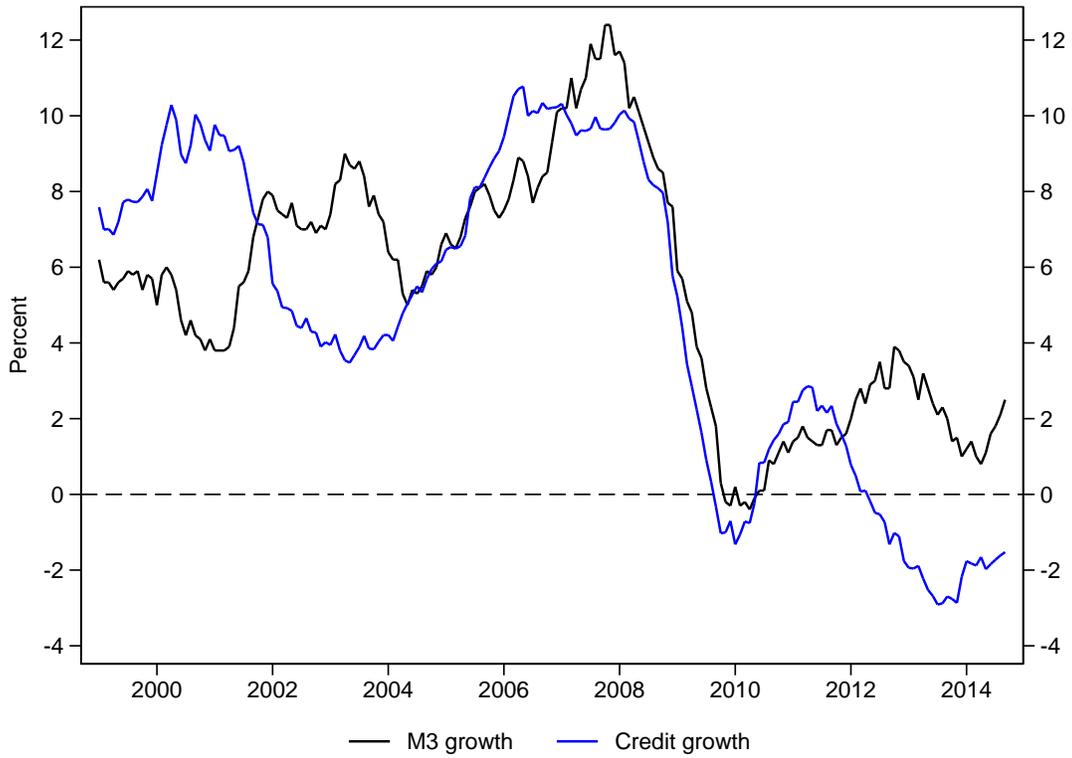


Figure 6: Money and credit growth in the euro area. Credit growth reflects the annual growth of loans extended to non-financial corporations and households.

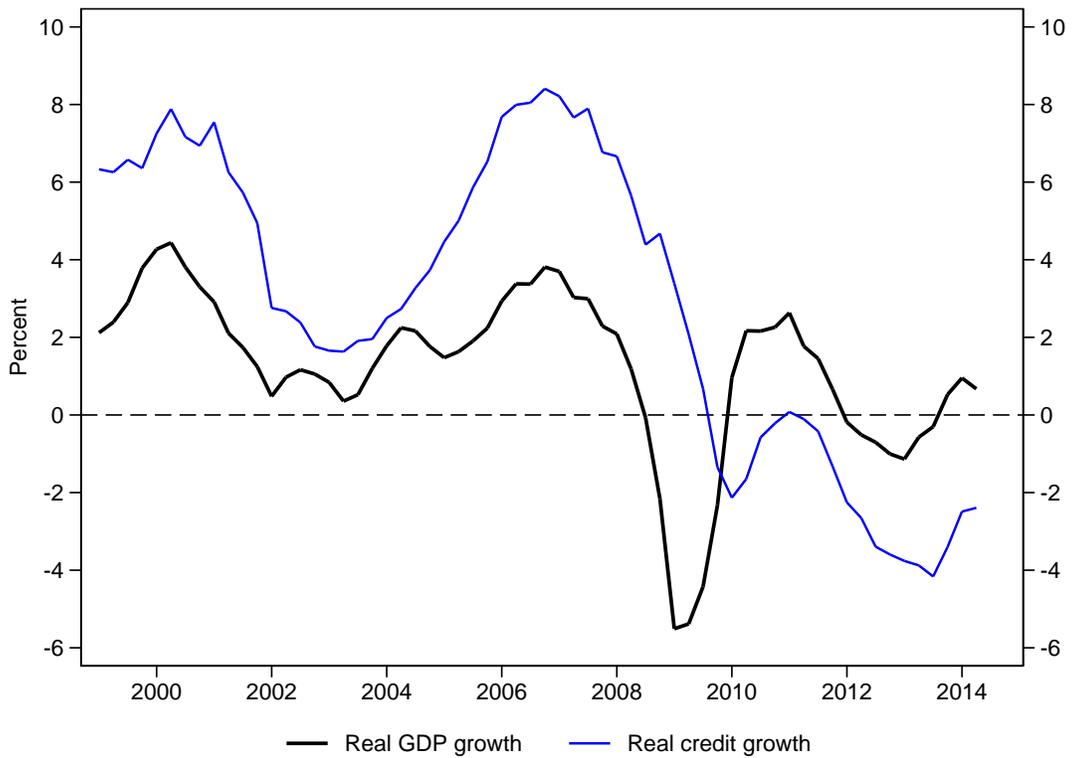


Figure 7: Real GDP and credit growth in the euro area. Real credit growth reflects the annual growth of loans extended to non-financial corporations and households, deflated by HICP inflation.

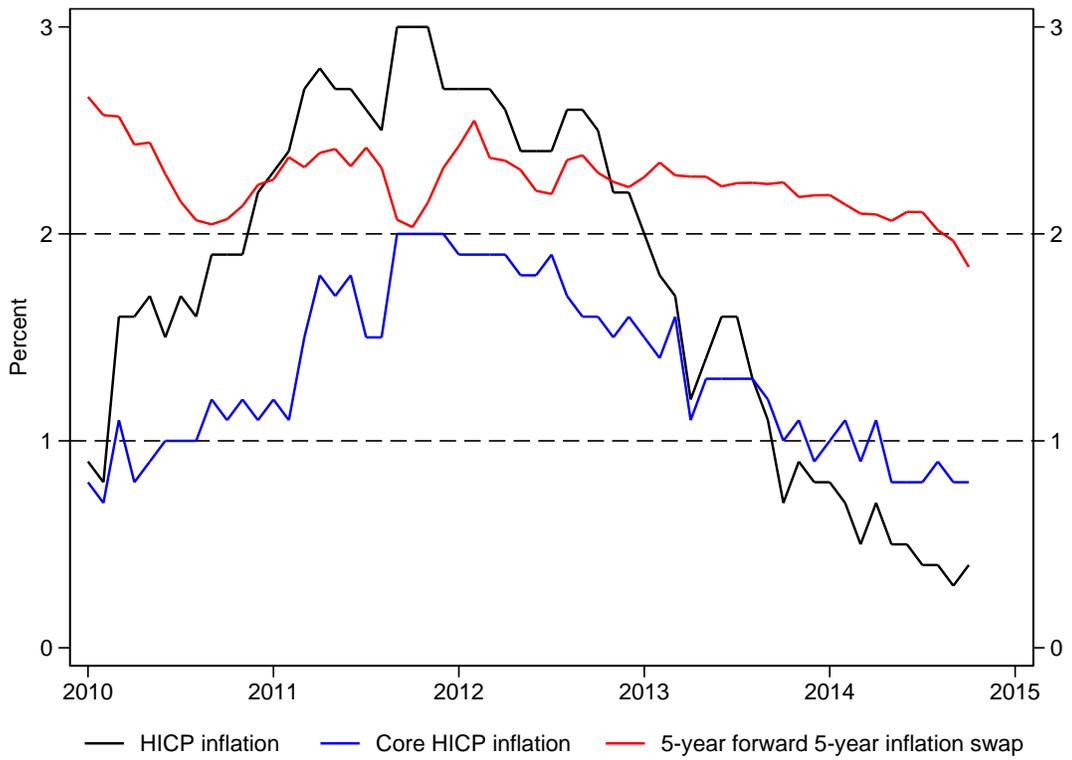


Figure 8: Inflation and inflation expectation measures for the euro area.

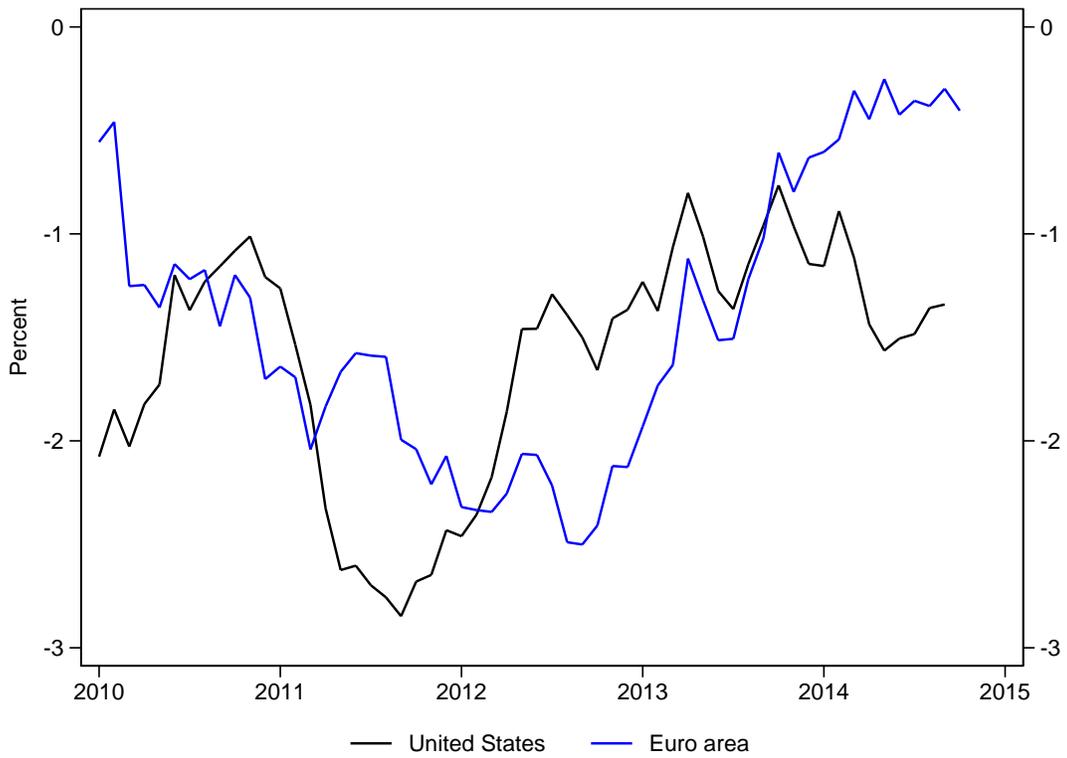


Figure 9: Short-term real interest rates for the United States and the euro area. Proxy constructed as overnight rate minus trailing inflation.

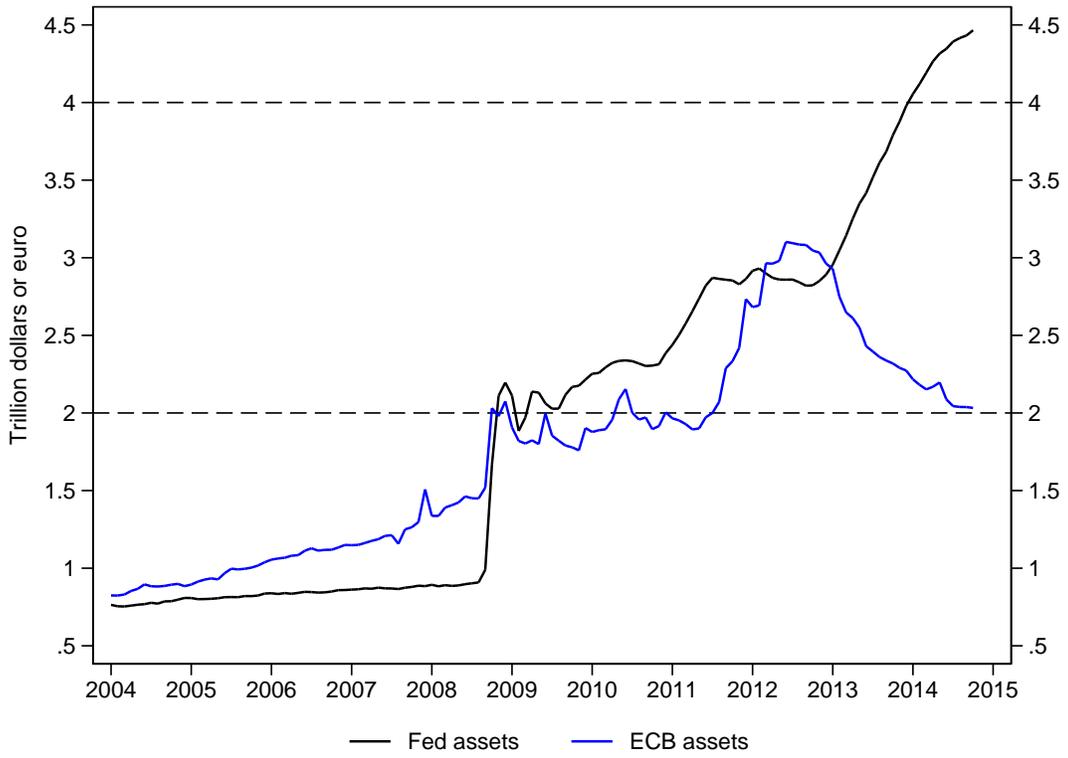


Figure 10: Central bank balance sheets for the United States and the euro area.