

# The Monetary Policy Origins of the Eurozone Crisis

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## **Abstract**

The Eurozone crisis represents one of the greatest economic tragedies of the past century. It has caused immense human suffering, which continues to this day. The standard view attributes the economic crisis to an earlier buildup of public and private debt that was augmented by the imposition of austerity during the crisis. Although evidence exists of a relationship between (a) the debt buildup and austerity measures and (b) economic growth during the crisis, that same evidence, on closer examination, points to Eurozone countries' common monetary policy as the real culprit behind the area's sharp decline in economic activity. In particular, it seems that the European Central Bank's tightening of monetary policy in 2008 and again in 2010–2011 not only caused two recessions but also sparked the sovereign debt crisis—and gave teeth to the austerity programs. Such findings point to the need for a new monetary policy regime in the Eurozone. The case is made for the new regime to be a targeted growth path for total money spending.

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## The Monetary Policy Origins of the Eurozone Crisis

David Beckworth

Since 2008, one of the greatest economic tragedies of the past century has been unfolding in the Eurozone. As seen in figure 1 (page 31), the region has endured two sharp recessions and a consistently underperforming economy during this period. The Eurozone's unemployment rate topped 12 percent at its peak, and deflation buffeted the region twice. Reported levels of alcohol abuse, psychological stress, and suicides soared over this period.<sup>1</sup> Many observers view this crisis as a full-blown depression, and some even believe it matches the severity of Europe's Great Depression of the 1930s.<sup>2</sup>

Though the pain caused by the Eurozone's economic crisis has been acute, it has not been evenly distributed. The second and third columns of figure 1 show that the core region of the Eurozone saw its economy decline 2 percent below its precrisis trend by the end of 2014, compared to a 25 percent decline for the periphery.<sup>3</sup> Similarly, the core region experienced a peak unemployment rate of approximately 8 percent, compared to almost 18 percent for the periphery. Such disparate economic effects meant that the periphery countries suffered far more fallout from the crisis than did their counterparts in the Eurozone's core region. In particular,

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<sup>1</sup> Holly Ellyatt, "Depression, Suicides Rise as Euro Debt Crisis Intensifies," *CNBC*, September 4, 2012, <http://www.cnn.com/id/48883704>.

<sup>2</sup> Ryan Avent, "The Eurozone Crisis: Call It a Depression," *Economist*, May 2, 2012, <http://www.economist.com/blogs/freexchange/2012/05/euro-zone-crisis-0>; John Aziz, "Europe Is in an Epic Depression and It Is Getting Worse," *Week*, August 15, 2014, <http://theweek.com/articles/444505/europe-epic-depression--getting-worse>; Nicholas Crafts, "The Eurozone: If Only It Were the 1930s," *VoxEU.org*, December 13, 2013, <http://www.voxeu.org/article/eurozone-if-only-it-were-1930s>; Matt O'Brien, "Worse than the 1930s: Europe's Recession Is Really a Depression," *Washington Post*, August 20, 2014, <http://www.washingtonpost.com/blogs/wonkblog/wp/2014/08/20/worse-than-the-1930s-europes-recession-is-really-a-depression/>.

<sup>3</sup> The core countries are Austria, Belgium, Finland, France, Germany, and the Netherlands. The periphery countries are Greece, Ireland, Italy, Portugal, and Spain. This taxonomy follows Fernanda Nechio, "Monetary Policy: When One Size Does Not Fit All," FRBSF Economic Letter 2011-18, Federal Reserve Bank of San Francisco, June 13, 2011.

periphery countries faced rising public debt burdens from bailing out the private sector and from having less national income to service their debts. In turn, the mounting debt burden raised the specter of sovereign default and sparked an outflow of capital from the periphery.

These divergent outcomes fueled rising tensions among Eurozone members. Core countries insisted that any debt restructuring or bailout package for the periphery countries be conditional on those countries adopting austerity measures to rein in government budgets.<sup>4</sup> Unsurprisingly, periphery countries were not thrilled about raising taxes and cutting government spending in the midst of a deep recession. Tensions also rose among member countries over the extent to which monetary policy should address the crisis. Though the European Central Bank (ECB) did take some action during the crisis, the periphery countries wanted the ECB to more aggressively ease monetary policy. The core countries, especially Germany, were against such actions, and because of their objections, the ECB only began a quantitative easing (QE) program on March 9, 2015.

Growing tensions sparked fear that the currency union might break apart. Some members wondered whether the periphery countries might be better served by having their own currency and monetary policy rather than by being subject to the ECB's one-size-fits-all policies.<sup>5</sup> Before the creation of the euro, numerous critics had warned that the Eurozone was far from being an optimal currency area and that introduction of the currency would likely end in disaster.<sup>6</sup> These warnings appeared to be coming to fruition during the crisis and, as one

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<sup>4</sup> Periphery countries were also required to implement structural reforms to labor markets and public pensions.

<sup>5</sup> See, for example, Ambrose-Evans Pritchard, "Germany and Greece Flirt with Mutually Assured Destruction," *Telegraph*, September 11, 2011, <http://www.telegraph.co.uk/finance/financialcrisis/8755881/Germany-and-Greece-flirt-with-mutual-assured-destruction.html>; Ramesh Ponnuru, "Strong Countries, Not Greece, Should Ditch Euro," *Bloomberg Business*, September 19, 2011, <http://www.bloomberg.com/news/articles/2011-09-20/strong-nations-not-greece-should-exit-euro-commentary-by-ramesh-ponnuru>.

<sup>6</sup> For an extensive review of the Eurozone critics, see Lars Jonung and Eoin Drea, "It Can't Happen, It's a Bad Idea, It Won't Last: US Economists on the EMU and the Euro, 1989–2002," *Econ Journal Watch* 7, no. 1 (2010): 4–52.

observer put it, placed the Eurozone in a “full-fledged existential crisis.”<sup>7</sup> Concerns over the crisis became such an issue that even the head of the ECB, Mario Draghi, felt compelled to address them in 2011.<sup>8</sup>

All these challenges point to the severity of the Eurozone crisis over the past eight years. They also raise an important question: Why did the crisis suddenly erupt in 2008 and then intensify in 2011? To answer this question, this paper begins by reviewing the standard view of the crisis and then considers an alternative perspective—that of monetary policy origins. Next, the paper takes an in-depth look at the evidence behind these two differing views of the crisis.

### **The Standard View**

The standard answer to the earlier question centers around three key developments. First, financial panic in the United States spread to the Eurozone and triggered the initial recession.<sup>9</sup> Second, the periphery countries of Greece, Italy, and Portugal either accumulated too much public debt or failed to reduce public debt during the years leading up to the crisis. Also during that time, the periphery countries of Ireland, Spain, and Portugal accumulated too much private debt, which later became public debt because of government bailouts. These two developments led to the emergence of the sovereign debt crisis, which caused the second recession.<sup>10</sup> The third development was the imposition of fiscal austerity on the periphery countries without offsetting

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<sup>7</sup> Jay C. Shambaugh, “The Euro’s Three Crises,” *Brookings Papers on Economic Activity* (Spring 2012): 157–211, 158.

<sup>8</sup> See, for example, Ralph Atkins and Lionel Barber, “Draghi Warns on Eurozone Break-Up,” *Financial Times*, December 18, 2011.

<sup>9</sup> A good example of this view is Frederick Mishkin, “Over the Cliff: From the Subprime to the Global Financial Crisis,” *Journal of Economic Perspectives* 25, no. 1 (2011): 49–70.

<sup>10</sup> For a good summary of this view, see Phillip R. Lane, “The European Sovereign Debt Crisis,” *Journal of Economic Perspectives* 26, no. 3 (2012): 49–68.

expansionary fiscal policy in the core countries.<sup>11</sup> This asymmetric approach meant that fiscal policy overall contracted in the Eurozone, further depressing total money spending in the currency union during the second recession.<sup>12</sup>

Though widely held, this understanding has some serious timing problems, which are visible in figure 2 (page 32). This figure shows that economic activity, as measured by industrial production, peaked in January 2008 in both the core and the periphery regions of the Eurozone.<sup>13</sup> The economic weakening that followed preceded by approximately seven months both the financial panic and the first signs of sovereign debt distress, as seen in panels B and C. The timing suggests, then, that the slowdown in economic activity gave rise to financial panic and the sovereign debt crisis, rather than the other way around.

Industrial production peaked again in February 2011 for both the core and the periphery regions, ushering in a second recession. Although periphery sovereign spreads had been elevated in 2010, they had begun to stabilize by later that same year. Core sovereign spreads at the time were also flat.<sup>14</sup> A new surge in spreads, however, began in mid-2011. Bank stress also started increasing in mid-2011 as concerns about the solvency of banks in periphery countries sparked an exodus of depositors.<sup>15</sup> As it had in 2008, economic contraction in early 2011 preceded the new round of sovereign debt and bank stress that began in mid-2011. This timing suggests,

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<sup>11</sup> Austerity measures were imposed as a way to deal with the growing sovereign debt crisis. Critics such as Paul Krugman argued that they made matters worse. As noted later in the paper, austerity measures were implemented primarily through higher taxes.

<sup>12</sup> One example of this view is Paul De Grawe, "The Eurozone's Double-Dip Recession Is Entirely Self Made," *London School of Economics European Politics and Policy Blog*, November 28, 2012, <http://blogs.lse.ac.uk/europpblog/2012/11/28/eurozone-double-dip-recession/>.

<sup>13</sup> Industrial production rather than GDP is used here as a measure of economic activity because data on the former are available on a monthly basis and are therefore a more precise indicator of turning points in economic activity.

<sup>14</sup> For the core region, the spread is calculated as the difference between the average weighted yield on all the core countries less Germany minus the German yield.

<sup>15</sup> This flow of capital out of periphery country banks and into core country banks further intensified regional differences in the Eurozone. See Robert Hetzel, "Should Greece Remain in the Eurozone?" (Working Paper 15-04R, Richmond Federal Reserve, 2015).

again, that the former caused the latter. But what caused the initial economic slowdowns of 2008 and 2011? The standard view of the Eurozone crisis has no answer.

Another problem with the standard view of the Eurozone crisis is that it implies that the periphery region, where the excessive debt buildup occurred, should have been hit first and hardest by the crisis. However, the first panel in figure 2 shows that both the core and the periphery contracted at approximately the same time and pace during the first recession. The standard view cannot explain this pattern. During the second recession, the periphery experienced a sharper economic contraction than did the core, but the timing was again the same for both regions.<sup>16</sup>

The standard view of the Eurozone economic crisis is incomplete. It cannot explain what caused economic activity to slow down before financial panic and the sovereign debt crisis ensued. It also cannot explain why the recessions in the periphery and core countries shared the same timing and, at least initially, the same pace of contraction.<sup>17</sup>

### **The Monetary Policy Origins View**

There is an alternative view that *can* explain these developments: the ECB's tightening of monetary policy first in 2008 and again in 2010–2011. It is a simple but thorough explanation for the origins and severity of the Eurozone crisis.

As noted earlier, the economy began contracting in early 2008. The growth of total money spending, a broad indicator of monetary conditions, had started declining even earlier.<sup>18</sup>

With monetary conditions tightening and the economy slowing down, most central banks would

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<sup>16</sup> According to the industrial production index, the recession in the periphery did last a few months longer than in the core.

<sup>17</sup> The austerity portion of the standard view is also problematic. As discussed later in the paper, the effect of austerity is conditional on the stance of the monetary policy.

<sup>18</sup> As discussed later, total money spending is measured by nominal GDP. Its growth rate began declining in the second quarter of 2007.

have cut interest rates. The ECB, however, did nothing and kept its target interest rate pegged at 4 percent. Thus began the first tightening cycle of the ECB in early 2008. In the following months, the ECB intensified this tightening cycle by signaling that it would raise its policy rate to ward off rising inflation.<sup>19</sup> Finally, in July 2008, the ECB raised its target interest rate to 4.25 percent and kept it there for three months. This tightening cycle was arguably the shock that triggered the Eurozone crisis.

The second monetary policy tightening cycle began in late 2010, when the ECB again signaled that it would raise its policy rate to stem burgeoning inflation. The anticipation of the raised rate began stemming the growth in total money spending in early 2011, and the ECB indeed raised its policy rate from 1.00 percent to 1.25 percent in April and again to 1.50 percent in July, where it stayed for four months. This second tightening cycle occurred even though the Eurozone was still recovering from its first recession, and it is arguably the shock that intensified the economic crisis in 2011.

The simplicity and thoroughness of this view makes its near absence from popular discussion rather surprising. Beyond economist Robert Hetzel, a handful of bloggers, and a small number of journalists, few individuals have discussed this particular understanding of the Eurozone crisis.<sup>20</sup> Many observers are aware of the ECB's policy actions, but few seem to connect the timing of those actions to the two recessions in the Eurozone. Consequently, the standard view continues to dominate debates regarding the origins of the crisis.<sup>21</sup>

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<sup>19</sup> As discussed later, this implicit tightening, and that which occurred in 2010, can be seen in the slope of the yield curve.

<sup>20</sup> Robert Hetzel, "A Monetarist Critique of ECB Monetary Policy in the Great Recession" (Working Paper 3-07R, Federal Reserve Bank of Richmond, 2013). Bloggers promoting this view include Scott Sumner at *TheMoneyIllusion*, Lars Christensen at the *Market Monetarist*, Nick Rowe at *Worthwhile Canadian Initiative*, and Juan Castaneda of *The Old Lady of Threadneedle Street*. Journalists include Ambrose Evans-Pritchard of the *Daily Telegraph* and Matt O'Brien of the *Washington Post*.

<sup>21</sup> For more on this point, see Scott Sumner, "Why Are Economists in Denial about the Eurozone?," *TheMoneyIllusion*, October 14, 2014, <http://www.themoneyillusion.com/?p=27795>.



This paper attempts to broaden the conversation on the Eurozone crisis by closely examining the view of monetary policy origin. It does so by providing a wide range of evidence. The next section reconsiders the evidence for the standard view, which is—at best—an incomplete understanding of the crisis. Building on the implications of that section, the paper then delves into the evidence for the monetary policy origin view of the Eurozone crisis and demonstrates why this view provides a better explanation for the crisis. On the basis of those findings, the paper then proposes a new monetary policy regime for the ECB.

### **Another Look at the Standard View of the Crisis**

As outlined earlier, the standard view of the Eurozone crisis considers financial panic to have caused the first recession and the sovereign debt crisis to have caused the second, which in turn was intensified by the tightening of fiscal policy. Serious timing problems abound with this view, as already noted. However, such timing problems do not necessarily suggest that the developments implicit in this view of the Eurozone crisis neither affected nor amplified the existing recessions. Some may argue, for example, that the burgeoning level of public debt and the intense levels of austerity turned what otherwise would have been an ordinary recession into a depression that plagued the Eurozone.

An important question, then, is how important these developments were in intensifying the Eurozone crisis. Another is to what extent the effects of these developments were conditional on the stance of ECB monetary policy? These questions are examined next in relation to public debt, private debt, and austerity.

## ***Public Debt***

To understand the role the public debt burden played in the Eurozone crisis, consider public debt trends before and after the first recession started in the first quarter of 2008. Figure 3 (page 33) shows the public debt-to-GDP trends for the 11 largest economies in the Eurozone and the Eurozone as a whole. While the figure reveals that public debt burdens in Greece and Portugal grew and that Italy failed to lower its elevated level of public debt before the crisis, it also shows that, in almost every case, the debt burdens soared *after* the recession started.

Spain, for example, saw its debt-to-GDP ratio go from 62.2 percent in the first quarter of 1999 to 34.5 percent in the first quarter of 2008. Spain, in other words, was actually running budget surpluses and paying down its debt before 2008. Once the recession started, though, its debt burden started growing and reached 98.5 percent by the fourth quarter of 2014.

This common pattern of run-up in public debt after 2008 suggests that the soaring public debt burden was more a consequence than a cause of the Eurozone crisis. National income fell in many countries, making it harder for these countries to service their public debts. In some countries, such as Ireland and Spain, bailouts of private debt raised the level of public debt, while in other countries, the use of automatic stabilizers during the recessions raised the public debt.<sup>22</sup> In all cases, however, it was the weakened economy that catalyzed the events that caused public debt burdens to soar.

Figure 4 (page 34) shows the trend of the ratio of public debt to GDP for the Eurozone as a whole and plots these data against deviations of total money spending from its precrisis trend. The two series are highly correlated and suggest that the worsening monetary conditions created

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<sup>22</sup> Put differently, tax revenues fall and unemployment insurance rises during recessions. This effect automatically causes deficits—and therefore public debt—to grow.

by the ECB were key to the surge in public debt. This finding is consistent with the monetary policy origins view of the crisis.

The point here, though, is to assess the standard view of the role of public debt in the Eurozone economic crisis. Figure 5 (page 35) does so by considering whether the accumulation of public debt before 2008 and afterward is related to the sovereign debt crisis. The figure plots the public debt-to-GDP ratio for 2007 and 2011 against real GDP growth during the approximate time period of the sovereign debt crisis. The figure plots this relationship for 29 European countries, of which 13 are members of the Eurozone.<sup>23</sup> The debt-to-GDP ratio for 2007 captures the effect of public debt acquired before the first recession, while the ratio for 2011 captures the added public debt from the bailout of the private sector as well as the decline in nominal income. If the standard view is correct, then, there should be a negative relationship between the public debt-to-GDP ratio and economic growth.

Panel A in figure 5 shows that precrisis public debt burden—public debt acquired before 2008—is negatively related to economic growth during the crisis. However, precrisis public debt explains only about one-third of the variation in real GDP growth. Although one-third is by no means trivial, two-thirds of the variation in real GDP growth must be explained by another phenomenon. Thus, pre-crisis debt burden explains only one-third of the slowdown in economic activity.

Panel C of figure 5 shows that, among European countries, only Eurozone countries maintain the relationship between public debt and economic growth. That is, only in Eurozone countries does the public debt burden before 2008 appear to matter to economic growth during

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<sup>23</sup> The scatterplots used for analysis in this section of the paper treat Denmark as a Eurozone country because its currency is pegged to the euro and therefore has its monetary policy set by the ECB.

the crisis. Why is this? What is unique about the Eurozone that is not true of other countries? The most obvious answer is shared currency and monetary policy.

Panels B and D of figure 5 repeat this exercise, but they use the public debt-to-GDP ratio for 2011. By 2011, as noted previously, the public debt burden had grown, because many countries had to bail out their private sectors. Nonetheless, a similar pattern emerges here and appears even stronger than in 2008. That is, though the public debt burden had become more closely tied to economic growth for Eurozone countries, it had stayed about the same for non-Eurozone countries. Again, this raises the question as to whether the public debt burden or the ECB's tightening of monetary policy caused the slowdown in real GDP. The monetary policy origin view of the crisis points to the latter.

### ***Private Debt***

The standard view of the Eurozone economic crisis also holds that the accumulation of private debt was important to the emergence of the sovereign debt crisis. Some Eurozone countries, such as Ireland and Spain, experienced rapid private credit growth as part of the housing boom in the years leading up to the crisis. Once the crisis hit, these countries often had to bail out the private sector, which, in conjunction with automatic stabilizers kicking in during the recession, further increased the public debt burden.

Figure 6 (page 36) reports the trends in private credit-to-GDP for the 11 largest Eurozone countries. All periphery countries saw increases between 2003 and 2008, as did the core countries of Belgium and Finland. Ireland and Spain saw the largest increases, with run-ups of 165 percent and 80 percent, respectively.

The standard view maintains that this precrisis run-up of private debt, together with the precrisis levels of public debt, was the seed that sprouted the sovereign debt crisis. Some observers, such as Daniel Gros, director of the Centre for European Policy Studies, go further and say that the cause of the crisis was not only the total amount of public debt accumulated from both the public and private sectors, but also how much of that debt was borrowed from abroad—in other words, how much a particular country was indebted to foreigners.<sup>24</sup> Interestingly, much of the private credit accumulation in the periphery was borrowed from core countries, especially from France and Germany.<sup>25</sup> So when periphery governments were bailing out their private sectors, they were implicitly saving creditors from the core countries. Hence, some analysts have come to view the Eurozone crisis as a struggle between creditors and debtors.

The issue here is whether the accumulation of private debt during the boom years was an important contributor to crisis. Figure 7 (page 37) examines this relationship for 36 countries, of which 13 are in the Eurozone, for both recession periods; it does so by plotting the change in private credit-to-GDP between 2003 and 2008 against real GDP growth. Panel A shows a negative relationship between the growth of private debt during the boom years and economic growth during the first recession.<sup>26</sup> That is, the greater the private debt accumulated during the boom years was, the sharper the downturn during the 2008–2009 recession became. Like the public debt–economic growth scatterplot, though, this relationship is not particularly strong, with an  $R^2$  value of 27.23 percent.

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<sup>24</sup> Daniel Gros, “External versus Domestic Debt in the Euro Crisis,” VoxEU.org, May 24, 2011, <http://www.voxeu.org/article/external-versus-domestic-debt-euro-crisis>.

<sup>25</sup> See “Eurozone Debt Web: Who Owes What to Whom?,” *BBC News*, November 18, 2011, <http://www.bbc.com/news/business-15748696>.

<sup>26</sup> The 36 countries are those in the Bank for International Settlements database. They include some non-European countries.

Panel C of figure 7 divides the sample into Eurozone and non-Eurozone countries. Whereas the relationship strengthens for Eurozone countries (to an  $R^2$  value of 41.74 percent), it weakens for non-Eurozone countries (whose  $R^2$  value falls to 18.86 percent). This finding raises the question, again, as to whether the growth in private debt or something else unique to Eurozone countries drives this stronger relationship. The monetary policy origin view of the crisis identifies that “something else” as the ECB’s tightening of monetary policy, which affected only Eurozone countries.

The panels B and D of figure 7 shows no relationship between the buildup of private debt before 2008 and the second recession, which is consistent with the understanding that the public sector bailed out the private sector’s debt after 2008. Thus, one would expect, if anything, that public debt would be more closely related to the second recession than would private debt. But even then, as noted earlier, the relationship between public debt and economic growth is strongest for those countries subject to the ECB’s monetary policy.

Another way to assess the importance of both private and public debt to the economic crisis, with an eye toward Gros’s emphasis on external debt, is to look at the relationship between precrisis current account balances and postcrisis economic growth.<sup>27</sup> The current account balance measures a country’s dependence on foreign funding. If the accumulation of foreign obligations, and not the overall accumulation of private and public debt, was the most important determinant of the crisis, then there should be a strong positive relationship between the current account balance and economic growth.

Figure 8 (page 38) assesses this point by plotting the average size of the current account balance between 2003 and 2008 as a percentage of GDP against real GDP growth during the

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<sup>27</sup> Gros, “External versus Domestic Debt,” 2011.

crisis. The figure shows data for 29 European countries, of which 13 are Eurozone countries. Panel A shows no relationship at all between current account balance and subsequent real growth, which suggests that the point about external debt is moot.

Panel B of figure 8 divides European countries into Eurozone and non-Eurozone countries. Now there is a strong relationship between current account balance and subsequent real growth, with an  $R^2$  value of 54 percent, but this is true only for Eurozone countries. Thus only in the Eurozone does the precrisis accumulation of foreign obligation appear to have mattered. As before, this finding raises the question about what was driving the relationship between current account balances and growth. Did (a) the current account balances or (b) the one thing all Eurozone countries have in common—ECB monetary policy—drive the relationship? The monetary policy origin view of the Eurozone economic crisis points to the latter.

### ***Austerity***

The final component of the standard view is the claim that the tightening of fiscal policy—austerity—in the Eurozone further intensified the crisis.<sup>28</sup> In particular, austerity was imposed on the periphery countries as part of their bailout and debt-restructuring programs, but without a compensatory offset in expansionary fiscal policy from the core countries. Thus, fiscal policy tightened overall and further reduced total money spending for the Eurozone.<sup>29</sup> Echoing this point, economist Paul Krugman created a scatterplot like the one in panel A of figure 9 (page 39).<sup>30</sup> With

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<sup>28</sup> Austerity in the Eurozone was implemented primarily through higher taxes. Some countries, such as Greece, also imposed sharp cuts to government spending. See Alberto Alesina et al., “Europe’s Fiscal Crisis Revealed: An In-Depth Analysis of Spending, Austerity, and Growth,” Special Report 147, Heritage Foundation, Washington, DC, June 6, 2014. This same report makes the case that austerity was more severe because it was heavily weighted toward tax hikes.

<sup>29</sup> De Grawe, “Eurozone’s Double-Dip Recession, 2012.

<sup>30</sup> Paul Krugman, “The Record of Austerity,” *The Conscience of a Liberal* (blog), *New York Times*, January 6, 2015, <http://krugman.blogs.nytimes.com/2015/01/06/the-record-of-austerity/>.

an  $R^2$  value of 63.97 percent, the plot shows a strong positive relationship between government spending and economic growth for 32 European countries, of which 16 are Eurozone members. Another example is a graph created by the International Monetary Fund (IMF) in 2012, which plotted real GDP forecast errors against a more general fiscal consolidation measure.<sup>31</sup> Like Krugman, the IMF found a strong fit between government spending and economic growth, with an  $R^2$  of 50.06 percent. Both of these example scatterplots are interpreted by proponents of the standard view as evidence for the claim that austerity measures intensified the Eurozone crisis.

Panel B of figure 9, however, raises questions about the meaning of these relationships. As before, the graph separates Eurozone from non-Eurozone countries and fits each group with a regression line. Here, the relationship between government spending and economic growth in Eurozone countries strengthens to an  $R^2$  value of 80.70 percent, whereas in non-Eurozone countries it falls to 17.76 percent. Dividing the countries included in the IMF scatterplot mentioned earlier yields similar results: the  $R^2$  value for Eurozone countries rises to 78.20 percent and for non-Eurozone countries falls to 23.43 percent.

Figure 10 (page 40) is provided as a robustness check. It plots the overall budget balance (corrected for the effects of the business cycle) as a percentage of potential GDP against real GDP growth. This so-called structural budget balance is a more precise measure of explicit changes in fiscal policy and captures all levels of government.<sup>32</sup> As in figure 9, the scatterplots in panels A and B of figure 10 show that a strong relationship between austerity and economic growth exists—but only for the Eurozone countries.<sup>33</sup>

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<sup>31</sup> IMF, “Are We Underestimating Short-Term Fiscal Multipliers?,” box 1.1, *World Economic Outlook* (Washington, DC: International Monetary Fund, 2014), 41–43.

<sup>32</sup> This measure comes from the IMF’s *Fiscal Monitor* report.

<sup>33</sup> Even if the outlier observation (Greece) is dropped from panel B’s scatterplot in figure 9, there is still a strong relationship between austerity and economic growth, with an  $R^2$  of 53 percent.



Once again, these scatterplots raise the question as to whether austerity or ECB monetary policy was behind this relationship. The effect of fiscal policy is generally considered to depend on the stance of monetary policy, at least outside the zero lower bound (ZLB) of interest rates. For most of the period covered in the scatterplots, the ECB's target interest rate was meaningfully higher than the ZLB. Only in November 2013 did the ECB lower its policy rate to 0.25 percent. This observation points to the stance of ECB monetary policy as the driving force behind the sovereign debt crisis. Moreover, as noted earlier, the ECB tightened monetary policy well before the sovereign debt crisis and before austerity measures were put in place.

This section has shown that the rise in public debt appears to have been a consequence rather than a cause of the Eurozone's two recessions. Only in Eurozone countries were precrisis public debt burdens, precrisis private debt growth, precrisis current account balances, and postcrisis austerity meaningfully related to economic growth during the crisis. That is, only those countries governed by ECB monetary policy were affected. These findings indicate that ECB monetary policy ultimately caused the sovereign debt crisis and gave teeth to the austerity measures imposed on periphery countries. This understanding is further examined in the next section.

### **The ECB's Role in the Eurozone Crisis**

The introduction to this paper noted that changes in the stance of ECB monetary policy preceded the 2008 and 2011 Eurozone recessions. The second section of the paper discussed how debt and austerity were issues only for those countries that were subject to ECB monetary policy. Both of these observations point to a monetary policy origin view of the Eurozone crisis. This section further examines this view of the crisis in three steps. First, it looks at three standard indicators of monetary policy to assess the ECB's actions during this time. Second, it compares the ECB's

actions against the Taylor Rule for the Eurozone as a whole and for individual countries. Third, it tests for causality between the stance of monetary policy and the performance of the economy using a vector autoregression. Collectively, the evidence presented in this section strongly suggests that the policy errors of the ECB—compounded by the problems inherent in applying a “one-size-fits-all” monetary policy to a suboptimal currency area—caused the Eurozone crisis.

### ***Standard Indicators of ECB Monetary Policy***

Earlier it was argued that the ECB was tightening monetary policy in early 2008. Figure 11 (page 41) provides evidence to support this claim. Panel A plots the ECB’s policy interest rate (the main refinancing operation rate) alongside industrial production, which acts as a measure of economic activity.<sup>34</sup> Panel A shows that even as the economy began to contract in early 2008, the ECB kept its policy rate steady at 4 percent. Robert Hetzel argues that this failure to act was contrary to the ECB’s earlier track record of “leaning against the wind”—that is, the traditional response of the ECB to lower rates in the event of economic contraction.<sup>35</sup> In the early days of the Eurozone crisis, however, the ECB chose not to lower rates, a decision that essentially amounted to a passive form of monetary policy tightening.<sup>36</sup>

Panel B of figure 11 confirms the passive tightening cycle of early 2008 using another indicator of monetary policy: the spread between the safe interest rate on a 12-month and a 1-month interbank loan. According to the expectations theory of interest rates, this spread indicates where the market sees short-term interest rates in the Eurozone heading across the next year. As

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<sup>34</sup> Here industrial production is used as a measure of economic activity rather than GDP because the former is available on a monthly basis and therefore allows for a more precise timing of events.

<sup>35</sup> Hetzel, “Monetarist Critique of ECB Monetary Policy.”

<sup>36</sup> The ECB’s reason for not “leaning against the wind” was concern about rising inflation. The concern was misplaced, though, because the surge in inflation was caused by a temporary rise in commodity prices. This point is discussed in greater detail in the final section of the paper.

can be seen in the graph, the spread starts to rise in early 2008, indicating that the market was expecting rates to rise. The only reason the market expected this outcome was because the ECB had signaled that it would raise rates.

Panel C of figure 11 shows that the expectation of ECB tightening coincided with a slowdown in the growth of total money spending. *Total money spending* is the amount of money (for example, euros) in circulation times how often that money is spent. It provides a broad measure of monetary conditions and therefore acts as another indicator of monetary policy. Thus, panel C shows that, by creating the expectation of future monetary policy tightening, the ECB caused total money spending growth to decline in the Eurozone in early 2008.<sup>37</sup>

Finally, in July 2008, the ECB made expectations of a rate hike a reality; the bank raised its target interest rate to 4.25 percent and kept it there for three months. At that point, what had been an economic contraction began free falling into a deep recession. The tightening cycle was thus arguably the shock that triggered the beginning of the Eurozone crisis.

The ECB eventually cut its target interest rate and introduced innovations, which included (a) extending the maturity of its refinancing options, expanding its list of acceptable collateral, and engaging in a securities market program in which it bought some periphery country sovereign bonds to control their yields.<sup>38</sup> These programs, however, were limited, and the securities market program was sterilized.<sup>39</sup> So the recovery was both weak and, as shown in panel A of figure 2, uneven across the Eurozone.

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<sup>37</sup> Note that the market also expected the ECB to cut its policy rate beginning around mid-2007. This expectation coincided with a moderate slowdown in total spending growth. That the ECB did not cut its policy rate as expected, but kept it at 4 percent, can arguably be seen as the real beginning of the tightening cycle.

<sup>38</sup> The securities market program was used intermittently until 2012, when it was replaced by the outright monetary transactions program.

<sup>39</sup> That is every euro of sovereign debt the program bought up was offset by a euro's worth of short-term assets on its balance sheet.

The weak recovery was cut short in 2011, when another recession began. As in the case of the recession of 2008, a tightening of monetary policy also preceded the 2011 recession. In the latter case, the expected path of the ECB policy rate started rising sharply in late 2010. This expectation stalled the growth of total money spending and pushed the economy back into recession. In 2011, the ECB worsened the blow by raising its policy rate from 1.00 percent to 1.25 percent in April and to 1.50 percent in July, where it stayed for four months. It should not come as a surprise to anyone that an economy not fully recovered from a deep recession could easily fall into another one if monetary policy were to tighten. This is indeed what appears to have happened to the Eurozone in 2011.

### ***Taylor Rule Analysis of ECB Monetary Policy***

A more systematic way to evaluate monetary policy during the Eurozone crisis is to compare the ECB's target interest rate to the one prescribed by the Taylor Rule. The Taylor Rule tells a central bank how to best set its target interest rate according to changes in the economy. Consequently, the rule is often used as a benchmark against which the actual interest rate path set by a central bank is evaluated. If, for example, the Taylor Rule prescribed an increase in the ECB's policy interest rate and the ECB did nothing to act on that prescription, the resulting gap would indicate a loose monetary policy. Conversely, if the Taylor Rule prescribed a decrease in the ECB's policy interest rate and the ECB did nothing, the gap would indicate a tight monetary policy. The stance of monetary policy, then, can be gauged by looking at the difference between the actual interest rate path and that prescribed by the Taylor Rule. In this section, the paper uses the Taylor Rule to systematically assess the ECB's actions leading up to and during the Eurozone crisis.

Under the original Taylor Rule, the central bank adjusts the target interest rate to deviations of inflation from its desired level and to deviations of real GDP from its potential level. Although economists disagree about how much emphasis to place on each deviation, the basic Taylor Rule framework continues to be used by many economists—and policymakers—as a benchmark.<sup>40</sup> Building on Evan Koenig’s observation that a Taylor Rule is just a special case of a nominal GDP (NGDP) targeting rule, this paper follows George Selgin, David Beckworth, and Berrak Bahadir, as well as Beckworth and Joshua Henderson, in applying a Taylor Rule that responds to deviations of total money spending from a targeted growth path.<sup>41</sup> Using NGDP to measure total money spending, this Taylor Rule takes the following form:

$$i_t = i_t^* + \phi_1 NGDP_t^{Gap} + \phi_2 \left( \sum_{i=1}^{12} NGDP_{t-i}^{Gap} / 12 \right), \quad (1)$$

where  $i_t$  is the target interest rate,  $i_t^*$  is the market-clearing or equilibrium nominal interest rate, and  $NGDP_t^{Gap}$  is the percentage difference between the actual and the targeted growth rate of NGDP. The  $\phi_1 NGDP_t^{Gap}$  term causes the central bank to respond to current money spending deviations from its targeted growth rate. The  $\phi_2 \left( \sum_{i=1}^{12} NGDP_{t-i}^{Gap} / 12 \right)$  term causes the central bank to respond to the average of past target NGDP growth-rate misses across the business cycle, which is assumed here to last approximately three years (12 quarters). The idea behind the

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<sup>40</sup> Formally, the Taylor Rule can be stated as follows:

$$i_t = i_t^* + \phi_\pi \tilde{\pi}_t + \phi_y \tilde{y}_t,$$

where  $i_t$  is the prescribed Taylor Rule interest rate,  $i_t^*$  is an equilibrium nominal interest rate that is usually set equal to 2 + the inflation rate,  $\tilde{\pi}_t$  is the deviation of inflation from its target, and  $\tilde{y}_t$  is the percentage of deviation of the economy from its sustainable growth path (or the output gap). There is some debate over how big the response coefficients  $\phi_\pi$  and  $\phi_y$  should be as well as over how the correct measure for  $\tilde{\pi}_t$  should be chosen. For a recent discussion of these issues, see Janet Yellen, “The Economic Outlook and Monetary Policy” (speech, Money Marketeers of New York University, April 11, 2012).

<sup>41</sup> See Evan Koenig, “All in the Family: The Close Connection between Nominal GDP Targeting and the Taylor Rule” (Staff Paper 17, Dallas Federal Reserve, 2012); George Selgin, David Beckworth, and Berrak Bahadir, “The Productivity Gap: Monetary Policy, the Subprime Boom, and the Post-2001 Productivity Surge,” *Journal of Policy Modeling* 37, no. 2 (2015): 189–207; David Beckworth and Joshua Hendrickson, “Nominal GDP Targeting and the Taylor Rule on an Even Playing Field” (working paper, the University of Mississippi, 2015).

second term is to make up for past misses during the course of the business cycle so that a steady growth path for total money spending is maintained.<sup>42</sup> This approach makes it possible to stabilize monetary conditions without knowing the output gap or the proper inflation rate to use, questions that plagued the standard Taylor Rule.<sup>43</sup>

To operationalize equation (1), this analysis sets  $\phi_1$  to 1,  $\phi_2$  to 0.5,  $i_t^*$  to 1 plus the ECB's consensus inflation forecast for the next year, and the NGDP target to 3.5 percent.<sup>44</sup> The target value is set at 3.5 percent because the ECB has a 2.0 percent inflation target and has seen its potential real GDP grow, on average, by roughly 1.5 percent a year between 1999 and 2014.<sup>45</sup> This approach implies that a reasonable growth path for total money spending in the Eurozone should be approximately 3.5 percent a year.

The interest rate path from this Taylor Rule, along with the ECB's policy rate path, is plotted in panel A of figure 12 (page 42). This graph shows that, although the ECB's monetary policy for the Eurozone was relatively effective through 2003, it was looser through 2007. This easing, though, pales in comparison with the tightening cycle that began in 2008 and continued through 2009. This cycle begins with the ECB raising its policy rate just as the Taylor Rule rate begins falling. The ECB continues to trail the descending Taylor Rule rate through mid-2009. This failure by the ECB to keep up with the Taylor Rule occurs not only because the Taylor Rule rate breaches the ZLB—a point the ECB cannot reach with its target interest rate—but also because the ECB (a) refused to lower its policy rate below 1 percent and (b) failed to engage in a

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<sup>42</sup> In other words, this Taylor Rule approximately follows an NGDP-level target. Responding to the average of past misses gets around the thorny problem of constantly reestimating the trend growth path of NGDP.

<sup>43</sup> For more on this point, see Beckworth and Hendrickson, "Nominal GDP Targeting."

<sup>44</sup> Setting  $i_t^*$  equal to 1 plus the inflation forecast implies a real natural interest rate of 1 percent. This method follows Fernanda Nechio, "Monetary Policy."

<sup>45</sup> Potential real GDP growth was calculated using the IMF's output gap estimate for the Eurozone.

work-around policy to the ZLB, such as quantitative easing.<sup>46</sup> The second tightening cycle is also evident in panel A of figure 12. The Taylor Rule rate starts falling again in 2011, just as the ECB begins tightening monetary policy. This tightening cycle is not as deep as the previous one, but it lingers longer and indicates that monetary policy is still tight in the Eurozone.

Panel B of figure 12 applies the Taylor Rule to the core and the periphery regions of the Eurozone. It shows that, for core countries, ECB monetary policy has been largely neutral (outside of the 2008–2009 tightening cycle), whereas for periphery countries policy has been consistently nonneutral. More precisely, monetary policy for the periphery was too loose during the boom years and was too tight during the crisis years. Put differently, monetary policy has been consistently pro-cyclical or “leaning with the wind” for the periphery. It should not be surprising, then, that the periphery grew more rapidly prior to the crisis and suffered more economic pain afterward. It should also not come as a surprise that the core economies have resisted calls for more aggressive easing by the ECB, primarily because monetary policy, outside of 2008–2009, has been largely neutral for the core. In short, this graph speaks to the challenges of applying a one-size-fits-all monetary policy to different regional economies.

The distortionary effects of the ECB’s one-size-fits-all monetary policy can be seen in more detail in figure 13 (page 43). Here, the Taylor Rule is applied to the 11 largest economies in the Eurozone and the Eurozone as a whole and is also compared to the ECB policy rate. The graphs in this figure reveal a persistent pattern, with the ECB setting its target interest rate in a manner more consistent with the core economies than with the periphery countries, which appear to be on a monetary policy roller coaster. On the upside of the roller-coaster ride, the

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<sup>46</sup> As noted earlier, the ECB did undertake bond purchases under the securities market program and outright monetary transactions program, but these efforts were limited in size and often sterilized.

periphery economies of Greece, Ireland, Portugal, and Spain were exposed to very accommodative monetary policy. These countries were experiencing rapid growth in total money spending relative to the cost of funding that spending during the Eurozone boom years. Ireland, for example, averaged 14.0 percent NGDP growth between 1999 and 2002 but faced an average ECB policy rate of 3.5 percent. This large spread between the nominal growth of the periphery and its low financing costs screamed leverage. It is not surprising, then, that these economies saw a buildup of debt, soaring asset prices, and large current account deficits. On the downside of the ECB roller-coaster ride, all periphery countries experienced persistently tight monetary policy.

The importance of these Taylor Rule gaps—the deviation between the ECB policy rate and the Taylor Rule rate—can be seen in figure 14 (page 44). This figure plots real GDP growth across the recession periods against the average Taylor Rule deviation during those periods for the 11 largest Eurozone economies. For both recessions, a strong relationship exists between the stance of monetary policy and the depth of the recession.<sup>47</sup> Specifically, the deeper the recession grew, the tighter the stance of monetary policy was for the multiyear period shown in the graphs. Maintaining a tight monetary policy over many years is a drag on the economy, which again points to the monetary policy origin view of the Eurozone economic crisis.

### ***Vector Autoregression Analysis of ECB Monetary Policy***

The previous section provided strong evidence that the ECB's tightening cycles, combined with the challenges of applying a one-size-fits-all monetary policy to different economies, were what sparked—and later intensified—the Eurozone crisis. Some observers, however, may question

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<sup>47</sup> If Greece is dropped from graph in panel B, which shows the 2011–2013 recession, the  $R^2$  still remains high at 80 percent.



whether causality went from the Taylor Rule gap to changes in economic growth. It is possible that the sovereign debt crisis and austerity measures weakened the Eurozone economy and thus caused the Taylor Rule deviations to grow.

As noted earlier, however, these Taylor Rule deviations lasted for *many years* and therefore had to have been a drag on the economy. So regardless of what initially caused the deviations, monetary policy was *persistently tight*, a fact that implies causality running from tight ECB policy to the contraction in economic growth. Moreover, the timing of the ECB's actions outlined earlier renders this causal path very likely.<sup>48</sup> This causal path can be verified by estimating a panel vector autoregression (VAR) for 11 Eurozone economies for the period between the first quarter of 1999 and the fourth quarter of 2014. This model allows one to estimate the effect of a shock to one variable while controlling for changes in other variables. Here, the panel VAR was estimated using the Taylor Rule gap, real GDP, long-term interest rate spreads, and core inflation as variables.<sup>49</sup>

The panel VAR's estimated effects of a shock to the Taylor Rule gap during this time are reported in figure 15 (page 45). These responses reveal what generally happened to the four variables because of an independent and unpredicted change to the Taylor Rule gap. These responses, therefore, show the typical causal effect of a change in the stance of ECB monetary

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<sup>48</sup> This observation does not suggest, however, that there was no feedback between the weakened economy and the stance of monetary policy. Rather, the stance of monetary policy tightened further once the economy started free-falling simply because the ECB did nothing.

<sup>49</sup> The panel VAR was estimated using country fixed effects and a Cholesky decomposition with the variables in the same order. Note that this order allows shocks to the Taylor Rule gap to immediately affect the other variables. Because the Taylor Rule has real GDP and inflation embedded in it, these variables are also able to affect the Taylor Rule gap. This property is desirable because one wants to see the effect of a monetary policy shock on the economy, regardless of whether the shock is active (an explicit changing of interest rates not warranted by changes in the economy) or passive (a failure to change interest rates when warranted by changes in the economy). Also note that the effects of monetary policy shocks on the other variables (real GDP and core inflation) were transformed into log form so that all the responses can be interpreted as percentage changes. Five lags were used to eliminate serial correlation.

policy. The solid black line shows the percentage point change in each of these variables, and the dashed lines provide a 95 percent confidence interval.

The responses reveal a story consistent with the one described earlier. A typical tightening of monetary policy—a positive shock to the Taylor Rule gap—caused real GDP and core inflation to decline for approximately two years before they returned to normal levels. The shock also caused long-term interest rate spreads to rise for roughly two years before they returned to zero. The causal channel is clear here: tight monetary policy during the sample period led to weaker economic growth, lower inflation, and an increase in the risk premium.

Although these results establish a statistically significant causal effect for monetary policy, they do not make clear how important overall monetary policy shocks were to the Eurozone business cycle. To evaluate the importance of such shocks, the forecast error variance decompositions from the panel VAR are reported in figure 16 (page 46). The variance decompositions show how much of the forecast error can be attributed to the monetary policy shock. The solid black line shows the average estimate, and the dashed lines provide a 95 percent confidence interval.

Panel A of figure 16 shows that the monetary policy shocks explain most of the forecast error in the Taylor Rule gap during this period. The point estimate never falls below 75 percent, which means the shocks to the Taylor gap were persistent. Monetary policy mistakes by the ECB did not quickly fade and were a nagging burden on economic activity.

Panel B shows how much of the forecast error of real GDP can be explained by these monetary policy shocks. On average, roughly 55 percent of the forecast error of real GDP can be explained by the shocks. Note how the confidence bands show that, at times, monetary policy shocks explained as much as 72 percent of real GDP's forecast error. Thus monetary policy was

quite important—in a negative way—to the path of real GDP. These findings, then, provide further evidence of the causal path posited by the monetary policy origins view of the Eurozone economic crisis.

### **Policy Implications for the Eurozone**

This paper has argued that the ECB's tightening of monetary policy in 2008 and again in 2010–2011 caused the Eurozone economic crisis. This view, though, raises the question about why the ECB tightened its policy during these times. Hetzel shows that, in both cases, the ECB was mistakenly worried about the rise in headline inflation, which both times had been caused by a temporary surge in commodity prices.<sup>50</sup> This can be seen in panels G, H, and I of figure 1, which show that core inflation remained stable even as headline inflation temporarily grew in 2008 and again in 2010–2011.

The ECB's big mistake was in responding to these changes in inflation as if they were symptoms of a demand shock when, in fact, they were symptoms of a supply shock. The ECB's confusion over inflation is a common problem for inflation-targeting banks. The Federal Reserve (the Fed), for example, treated the declining inflation of 2002–2004 as a symptom of weak demand rather than as a symptom of the rapid productivity growth that occurred during this period. The Fed consequently kept interest rates low despite the housing boom taking off. Similarly, as the US economy was imploding in September 2008, Fed officials decided not to lower interest rates over concern about rising headline inflation. The burgeoning inflation, however, was the result of a temporary surge in commodity prices rather than excessive demand

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<sup>50</sup> Hetzel, "Monetarist Critique of ECB Monetary Policy."

growth. Thus distinguishing demand-driven changes in inflation from those driven by supply shocks remains a key challenge for inflation-targeting central banks.<sup>51</sup>

One way to get around this problem is to target the cause rather than the symptom. If central banks should respond only to demand-driven changes in inflation, why not cut to the chase and target demand directly? A straightforward way to do this is to target the growth path of total money spending. By focusing solely on demand growth, the ECB would not be tempted to respond to supply shocks as it did in 2008 and in 2010–2011. For example, if a positive supply shock—say, a new technology or increased oil supply—lowered prices of a commodity, the ECB would do nothing beyond maintaining stable money spending. The composition of the spending would change—more goods and services would be purchased at lower prices—but the total amount of spending would not. Nor would total money spending change because of a negative supply shock—such as a natural disaster or an oil shortage—though the composition of the spending would change.<sup>52</sup> In other words, the ECB would let relative prices and markets sort out real shocks on their own while it maintained monetary stability.

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<sup>51</sup> Supply shocks come from changes to the productive capacity of an economy. For example, reduction of an important input for production such as oil or labor would be a negative supply shock. An increase in these inputs or the introduction of a new technology that increases productivity would be a positive supply shock. These shocks create problems for monetary policy because they push real GDP and price levels in opposite directions. If a war caused the supply of oil to decrease, production costs would rise and would result in a temporary surge in inflation. An inflation-targeting central bank might be tempted to respond by tightening monetary policy, but doing so would further constrict an already weakened economy. This is effectively what the ECB did in 2008 and in 2010–11. Monetary policymakers, therefore, should avoid responding to changes in inflation created by supply shocks.

Demand shocks, conversely, are not caused by changes to the productive capacity of an economy but rather by changes in monetary conditions. A sudden increase in desired money holdings by households that caused spending to fall would be an example of a negative demand shock. A permanent “helicopter drop” of money by the government to households would be an example of a positive demand shock. These shocks push real GDP and price levels in the same direction and therefore make them easier to handle. For example, if there were a sudden surge in consumer spending that led to an unsustainable boom in economic activity and an above-target rate of inflation, a central bank could respond to both by tightening monetary policy. There would be no tradeoffs. Monetary policy, therefore, can and should respond to changes in inflation created by demand shocks.

<sup>52</sup> In this case, fewer goods and services would be available, and prices would be higher.

A *targeted growth path* or *level target* for total money spending would commit the ECB to make up for past misses both above and below the target so that the targeted growth path would be maintained. This approach would create expectations of stable spending growth that would become self-fulfilling. That is, households and firms would have less incentive to rapidly spend or hoard money if they believed that the ECB would automatically make up for past misses in the growth path of total money spending. This expectation would thus decrease the likelihood of total money spending deviating from its targeted growth path in the first place.

This concept is illustrated in figure 17 (page 47), panel A, which shows a scenario in which the ECB is targeting 3.5 percent growth in total money spending as measured by NGDP. Now imagine that some adverse economic development causes money spending to drop in year Y1. The ECB would make up for the miss the next year, Y2, by growing total money spending faster than 3.5 percent—the steeper slope—until it caught up to its targeted path. A similar response would follow a spending boom that pushed money spending above the targeted path of 3.5 percent, as seen in panel B of figure 17.

Adopting this target would also allow the ECB to facilitate a more balanced recovery across the Eurozone. To understand this claim, imagine that the ECB made its quantitative easing program conditional on the Eurozone returning to its precrisis NGDP trend path. This approach would lead to a temporary burst of catch-up growth in total money spending. As a result, prices of goods and services would temporarily increase, and they would do so first in the region with the least excess capacity—the core countries. Prices of goods and services in the periphery countries would then become relatively cheaper. Consequently, even though the exchange rate

between the regions would not change, there would be a relative change in price levels between countries, which would make the periphery region more competitive.<sup>53</sup>

Note that a total money spending target for the ECB would not solve all the deep structural problems that currently plague the Eurozone.<sup>54</sup> However, it would provide a monetary policy that does not push the currency union into another recession. It would also facilitate a more balanced recovery across member countries. The Eurozone sorely needs such a monetary policy regime.

## **Conclusion**

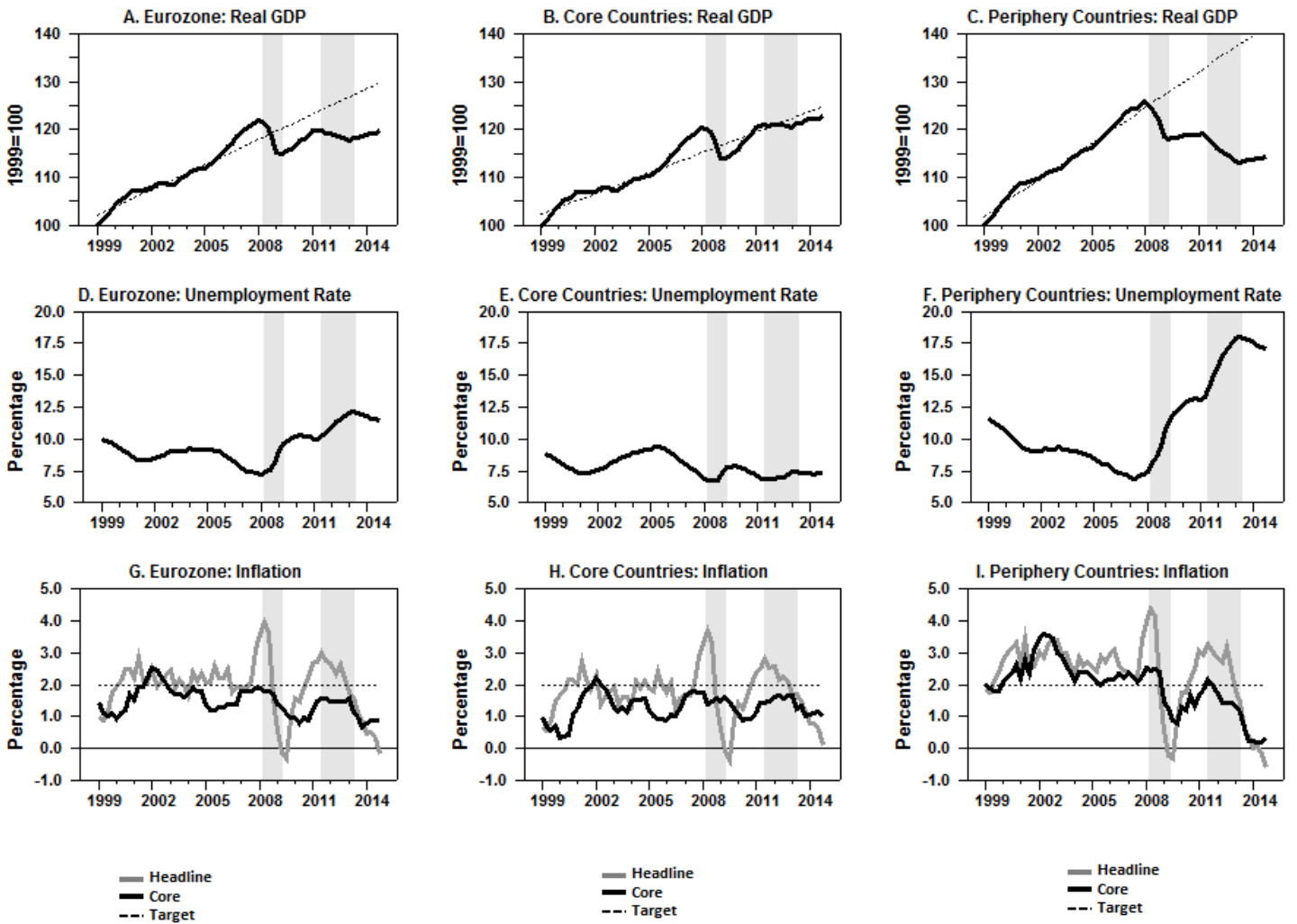
The Eurozone crisis represents one of the greatest economic tragedies of the past century. It has caused immense human suffering, which continues to this day. The standard view attributes the crisis to an earlier buildup of public and private debt that was augmented by the imposition of austerity during the crisis. Although evidence exists of a relationship between (a) the debt buildup and austerity measures and (b) economic growth during the crisis, that same evidence, on closer examination, points to Eurozone countries' common monetary policy as the real culprit behind the area's sharp decline in economic activity. In particular, it seems that the ECB's tightening of monetary policy in 2008 and again in 2010–2011 not only caused two recessions but also sparked the sovereign debt crisis—and gave teeth to the austerity programs. Such findings point to the need for a new monetary policy regime in the Eurozone. This paper has made the case for the new regime to be a targeted growth path for total money spending.

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<sup>53</sup> Put differently, an NGDP growth path target would help bring about a much-needed depreciation of the periphery's real exchange rate relative to the core.

<sup>54</sup> As mentioned earlier, many critics recognized, before it even happened, that the creation of the Eurozone was inherently problematic because the region failed to meet optimal currency area criteria. The crisis, then, may have been inevitable, and the ECB may have been bound to make mistakes. The solution proposed here does not solve these deeper structural problems.

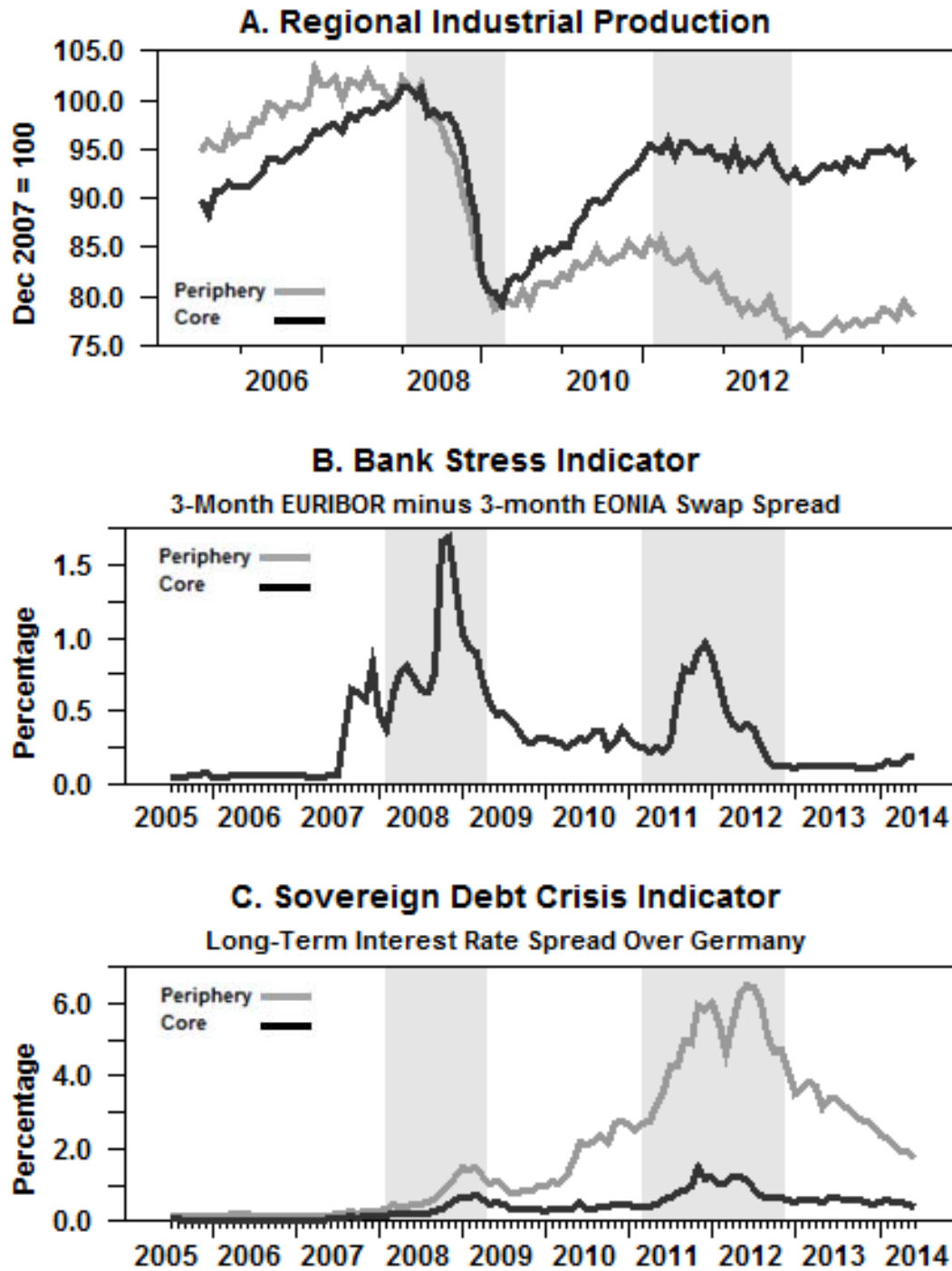
**Figure 1. The Eurozone Crisis**



Note: Gray bars = GDP recession. Core countries = Austria, Belgium, Finland, France, Germany, and the Netherlands; periphery countries = Greece, Ireland, Italy, Portugal, and Spain.

Sources: Eurostat; author's calculations.

Figure 2. Problems with the Standard View

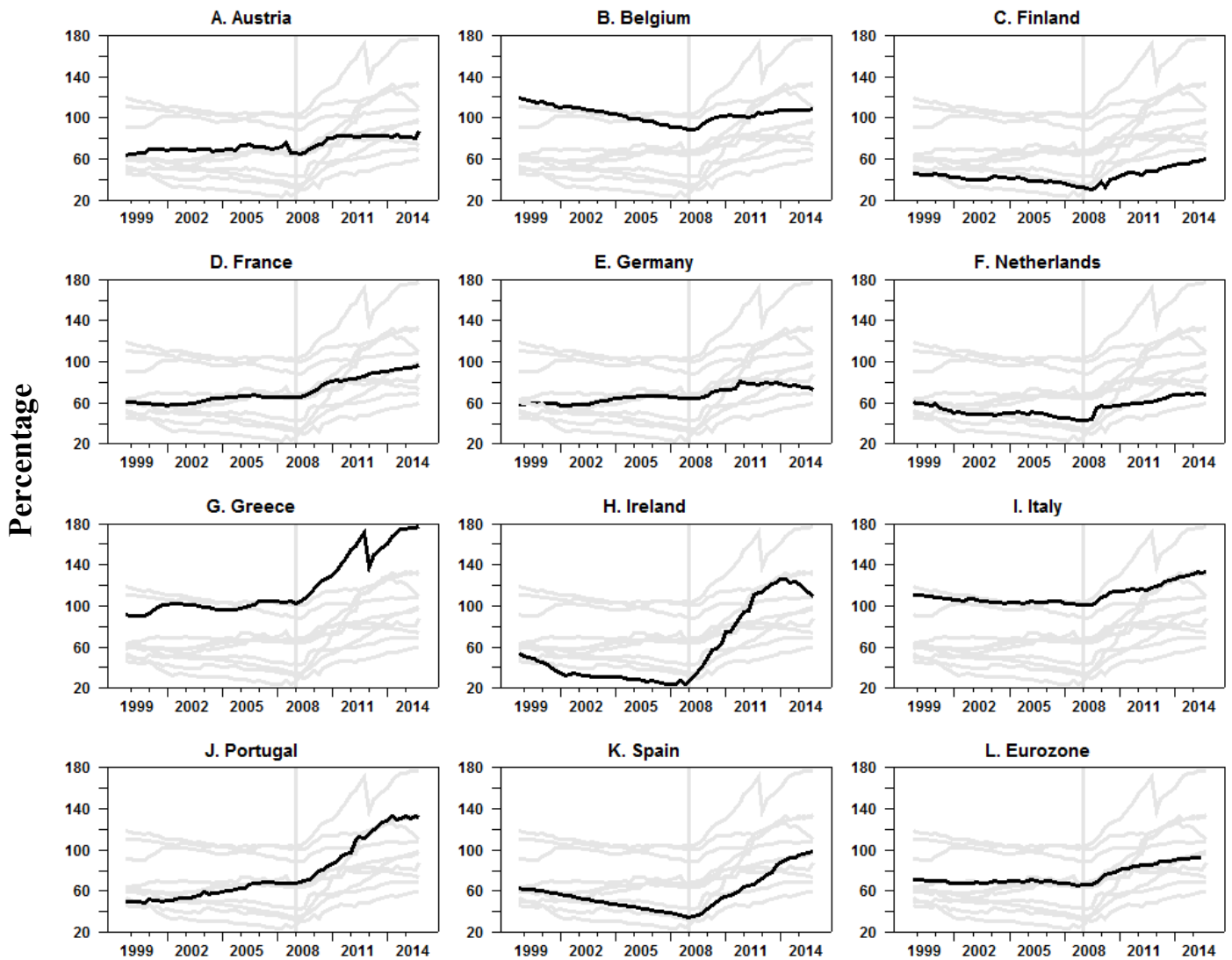


Note: Gray bars = industrial production recession. The European interbank offer rate (EURIBOR) is an unsecured short-term lending rate for banks, whereas the euro overnight index average (EONIA) swap rate is a secured lending rate. Put differently, this spread measures the difference between risky and safe short-term lending rates.

Sources: Eurostat; ECB; author's calculations.



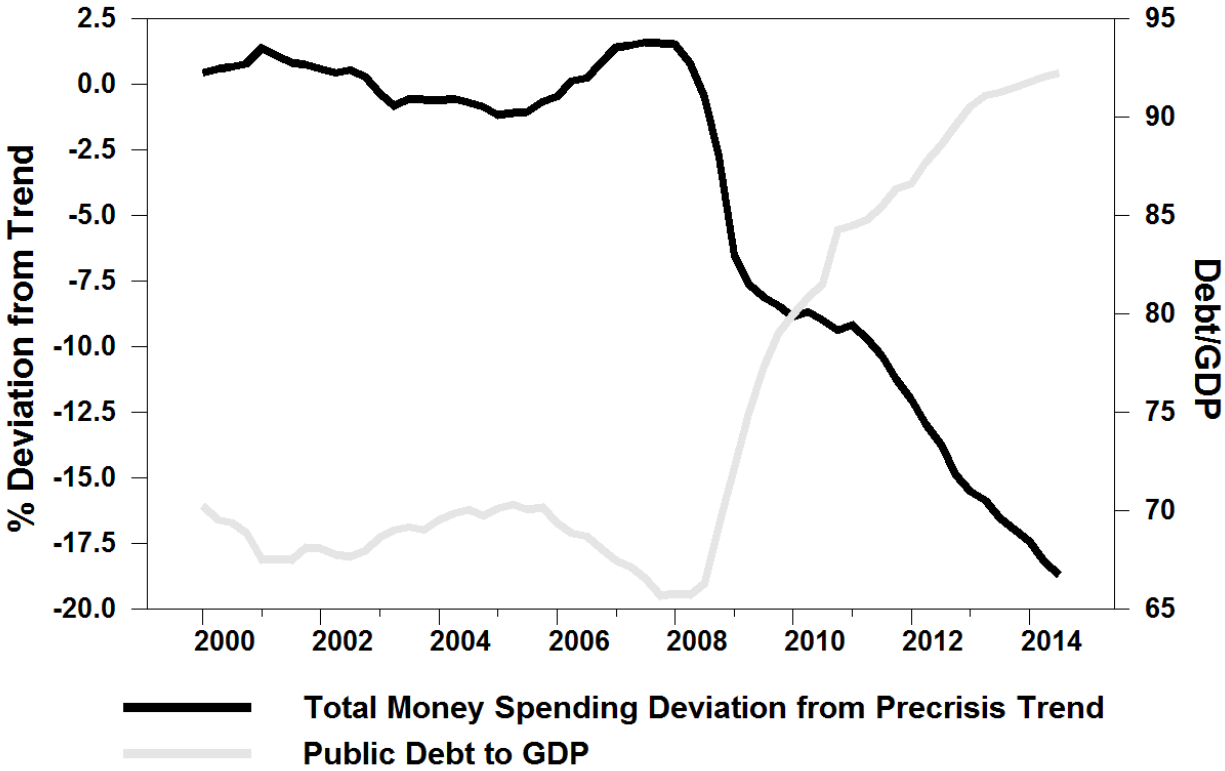
**Figure 3. Ratio of Public Debt to GDP in the Eurozone**



Note: Grey lines are all the other countries.

Sources: Eurostat; author's calculations.

**Figure 4. Monetary Conditions in the Eurozone and Public Debt Growth**

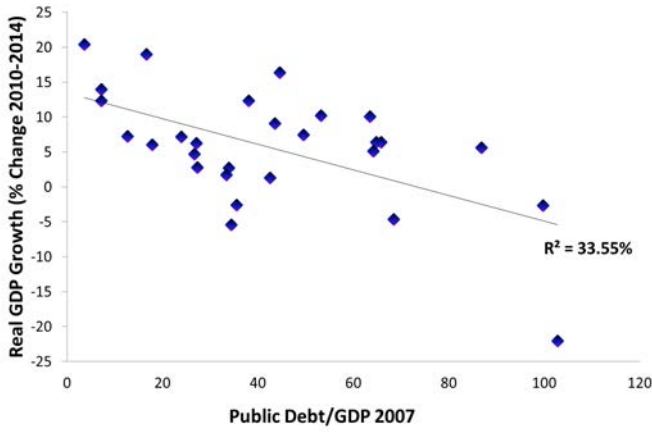


Note: Total money spending is measured using nominal GDP.

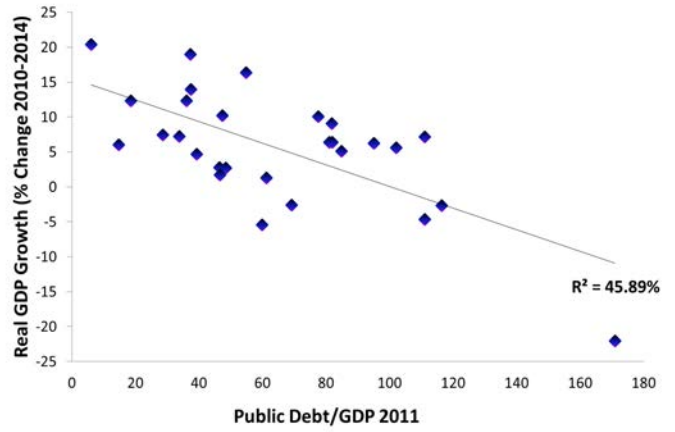
Sources: Eurostat; author’s calculations.

**Figure 5. Public Debt and Economic Growth in 29 European Countries**

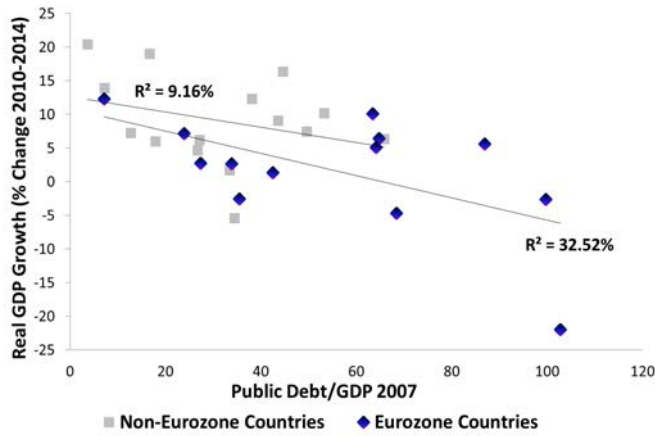
**A. Effects of Pre-2008 Public Debt, European Countries**



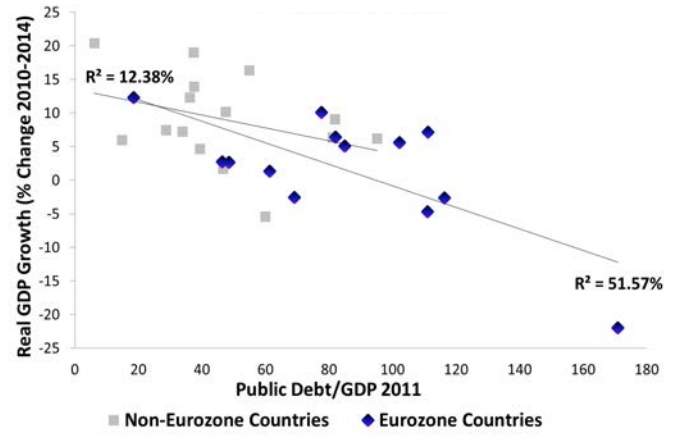
**B. Effects of Post-2008 Public Debt, European Countries**



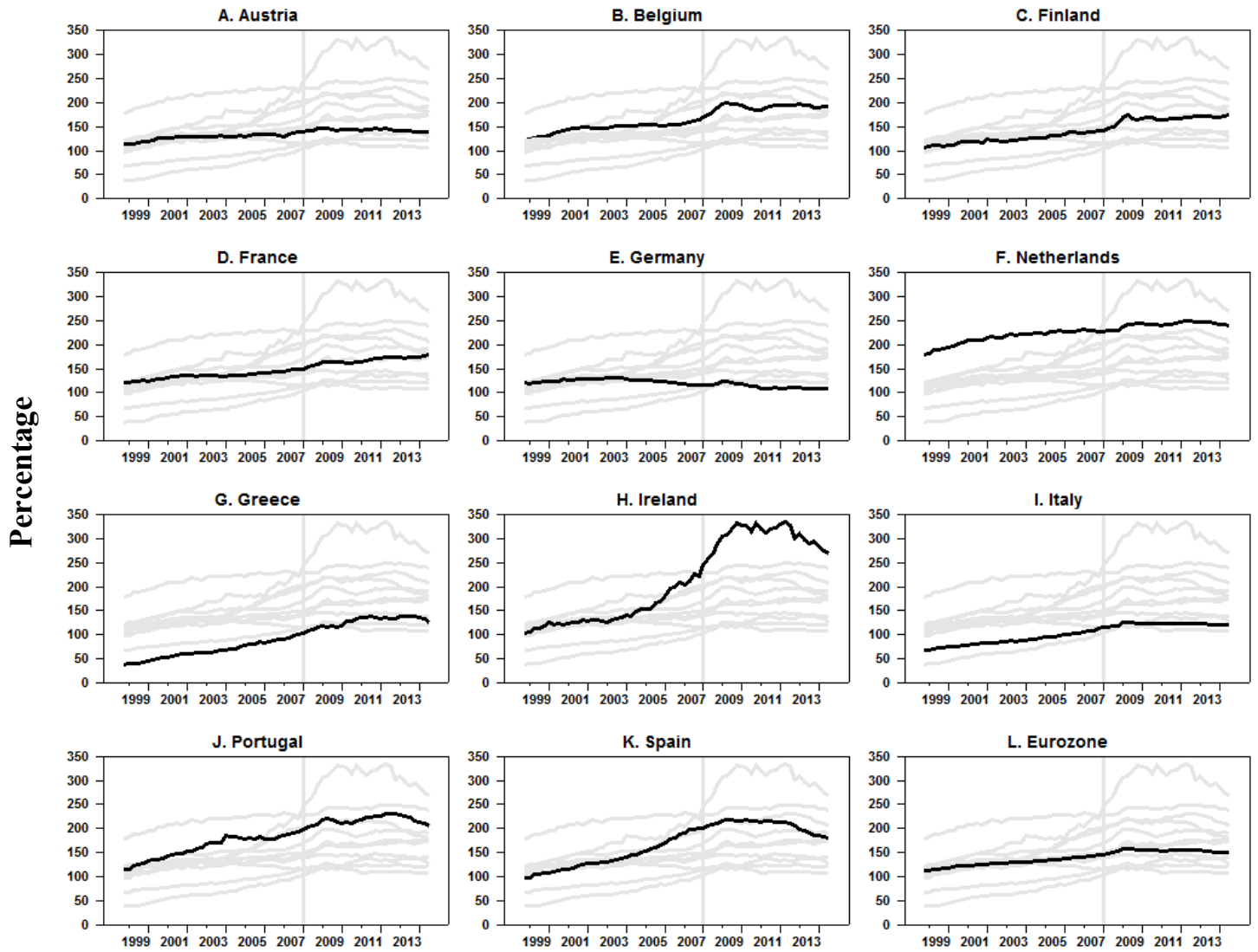
**C. Effects of Pre-2008 Public Debt, Eurozone and Non-Eurozone Countries**



**D. Effects of Post-2008 Public Debt, Eurozone and Non-Eurozone Countries**

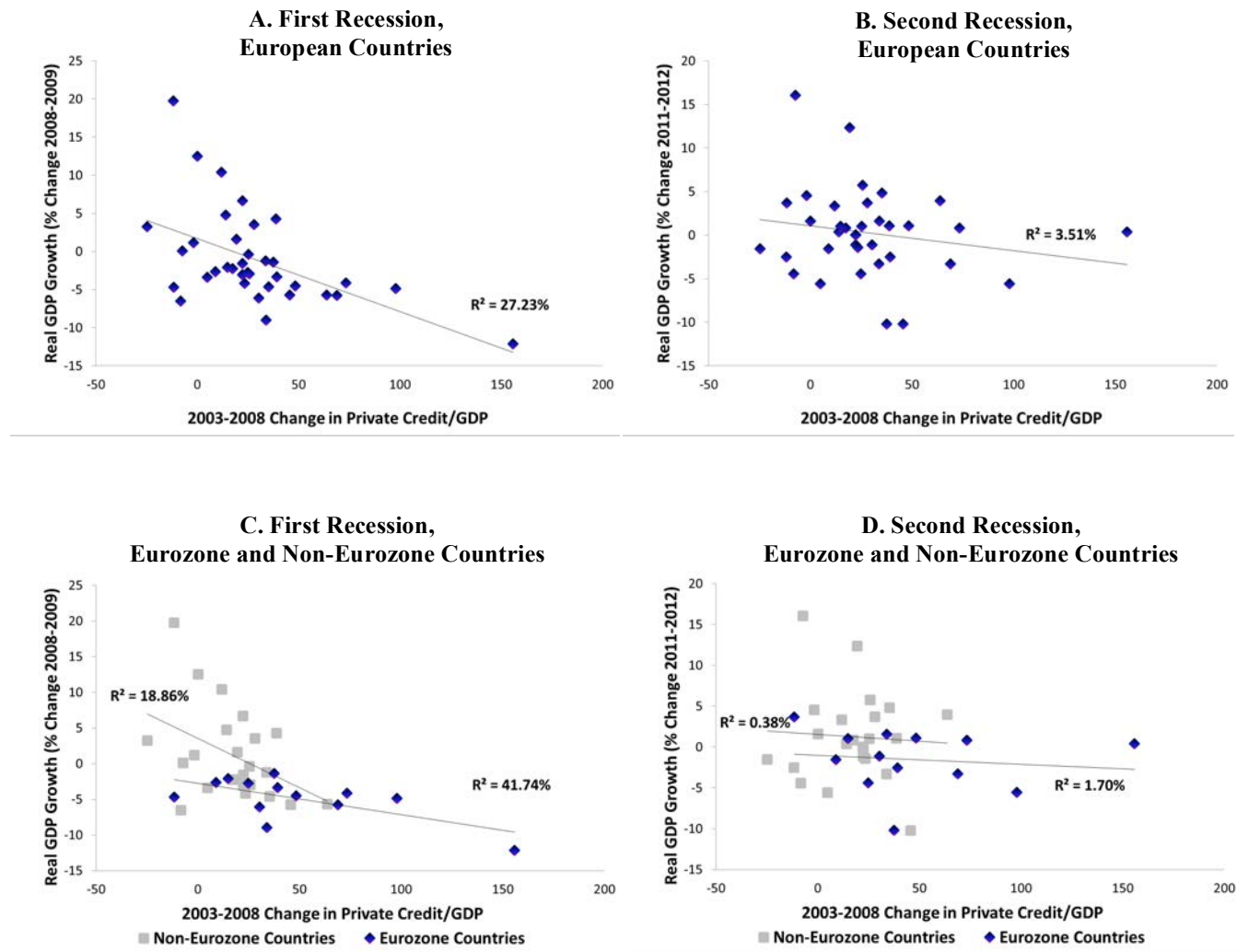


**Figure 6. Ratio of Private Credit to GDP in the Eurozone**



Sources: Bank for International Settlements (BIS) Credit Database; Eurostat; author's calculations.

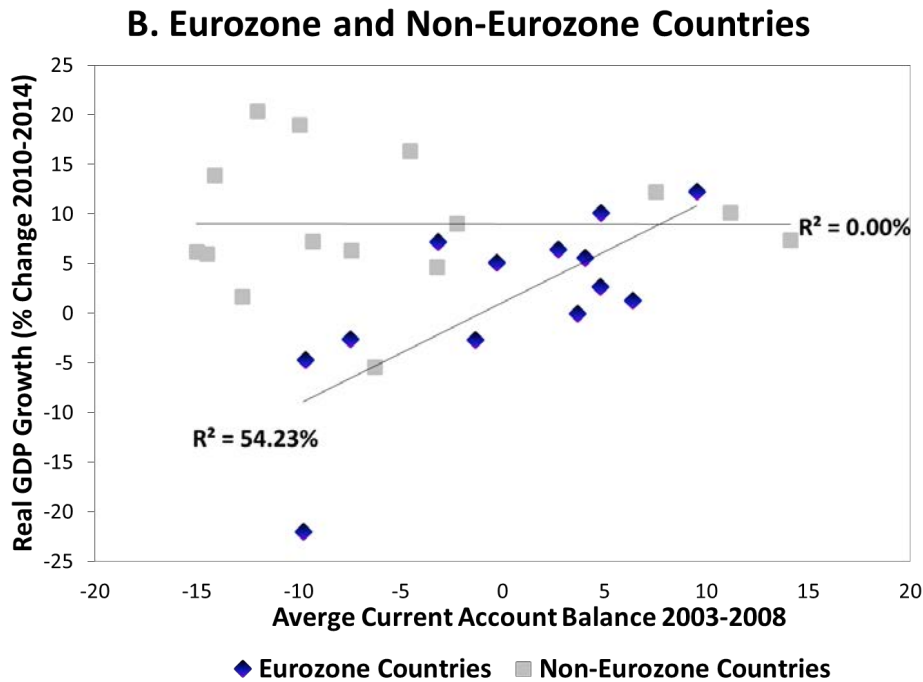
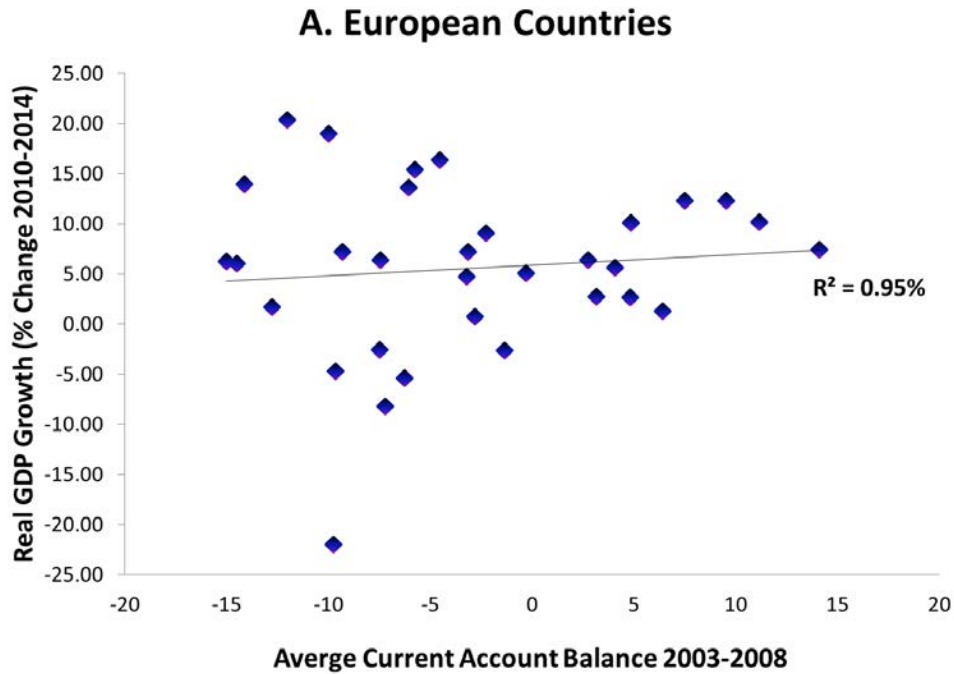
**Figure 7. Effects of Private Debt on Economic Growth in 36 European Countries**



Note: The change in private debt stock is measured using credit to the nonfinancial private sector. Data were only available for Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Portugal, and Spain. Denmark is counted as a Eurozone country because its currency is pegged to the Euro.

Sources: Bank for International Settlements (BIS) Credit Database; IMF *World Economic Outlook*; author's calculations.

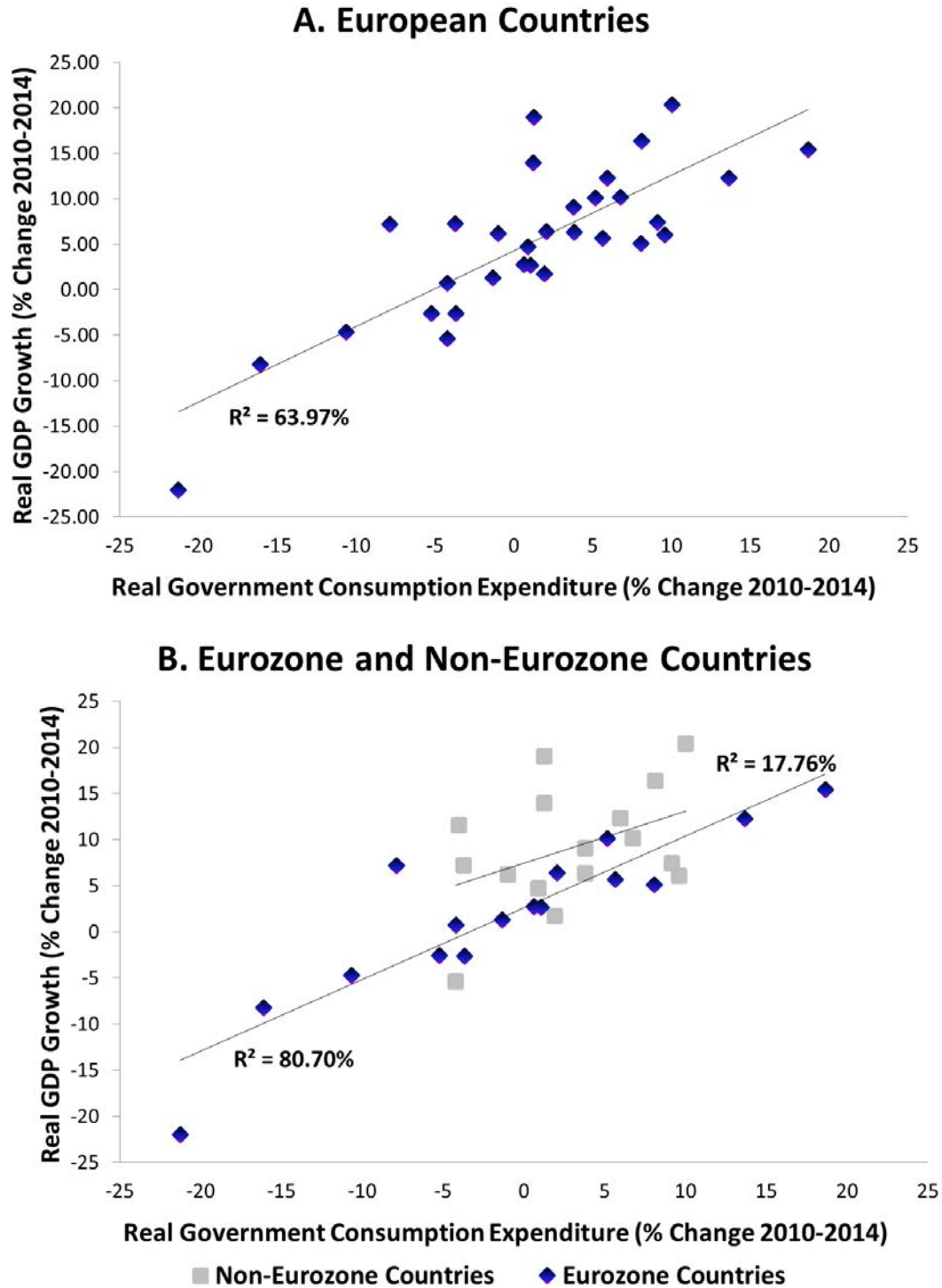
**Figure 8. Current Accounts and Economic Growth in 29 European Countries**



Note: The Eurozone countries of Cyprus, Malta, Slovakia, and Slovenia are not used in these scatterplots because they joined around the outbreak of the crisis. Their pre-crisis current account balances, therefore, occurred largely outside their Eurozone membership. The Eurozone countries of Latvia and Lithuania are defined here as non-Eurozone countries because they only joined in 2014 and 2015, respectively. Denmark is counted as a Eurozone country because its currency is pegged to the Euro.

Sources: Eurostat; author's calculations.

**Figure 9. Government Spending and Economic Growth in 32 European Countries**

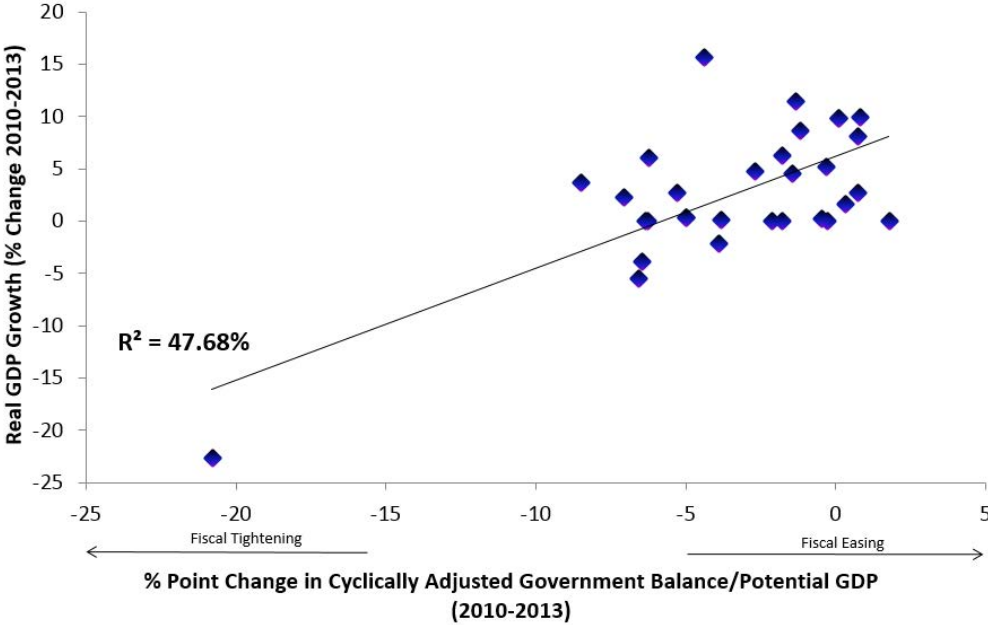


Note: The Eurozone countries of Latvia and Lithuania are defined here as non-Eurozone countries because they only joined in 2014 and 2015, respectively. Denmark is counted as a Eurozone country because its currency is pegged to the Euro.

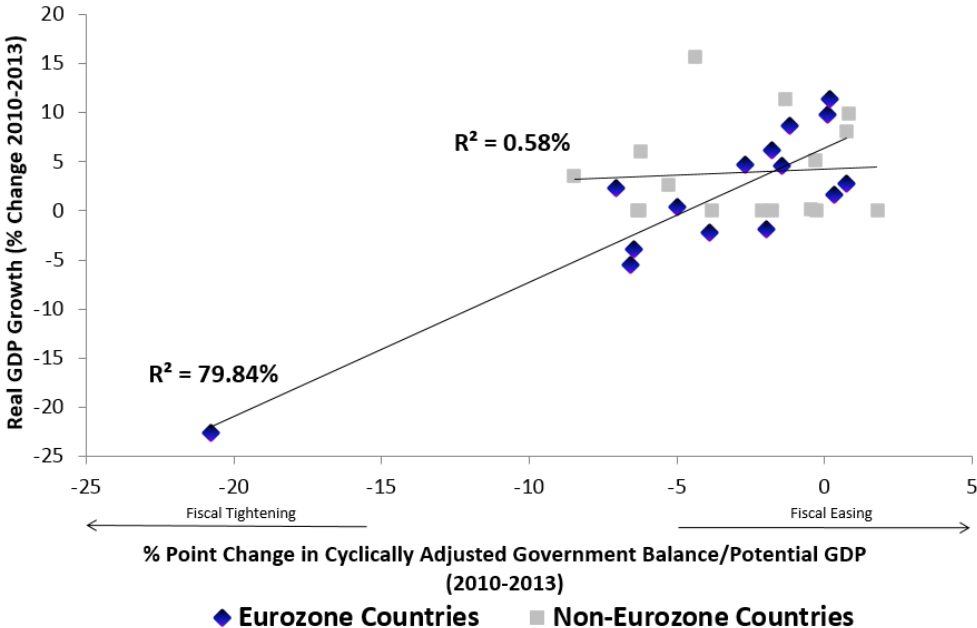
Sources: Eurostat; author’s calculations.

**Figure 10. Structural Changes in Fiscal Policy and Economic Growth in 32 European Economies**

**A. European Countries**



**B. Eurozone and Non-Eurozone Countries**

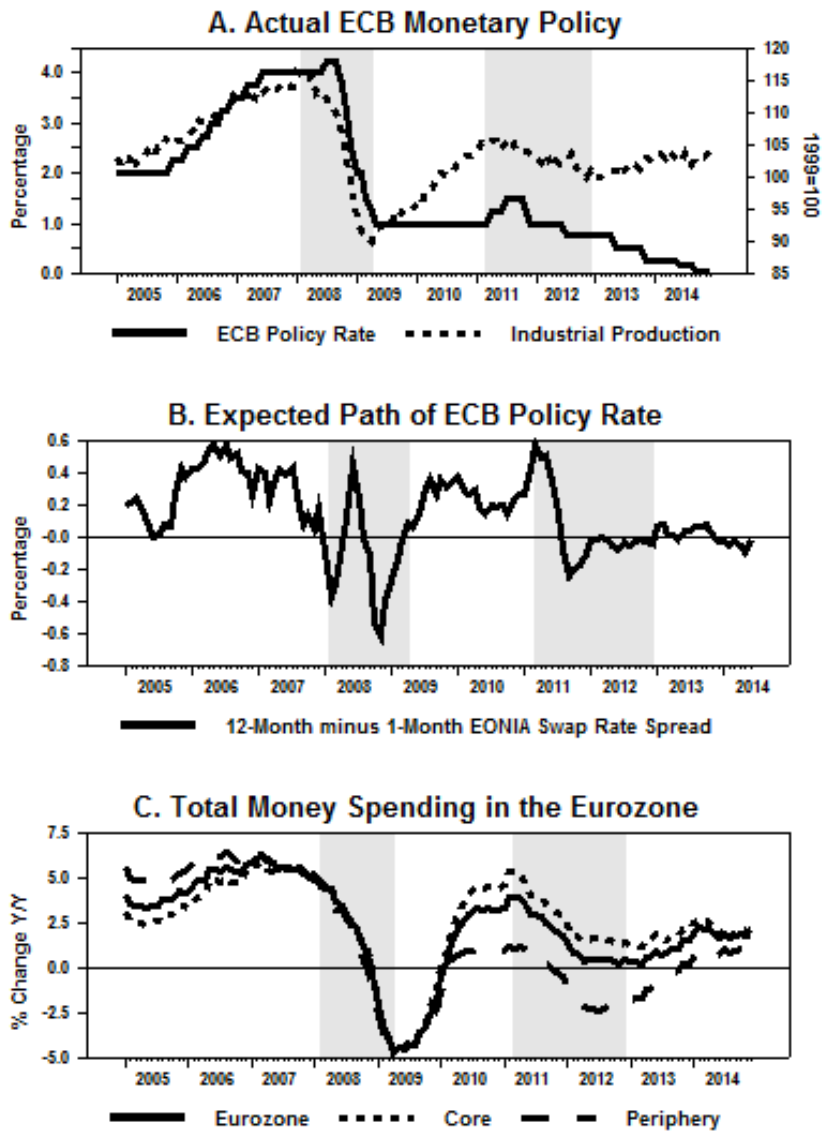


Note: The Eurozone countries of Latvia and Lithuania are defined here as non-Eurozone countries because they only joined in 2014 and 2015, respectively. Cyprus is not included because structural budget balance data were not available for it. Denmark is counted as a Eurozone country because its currency is pegged to the Euro.

Sources: IMF *World Economic Outlook*; author's calculations.



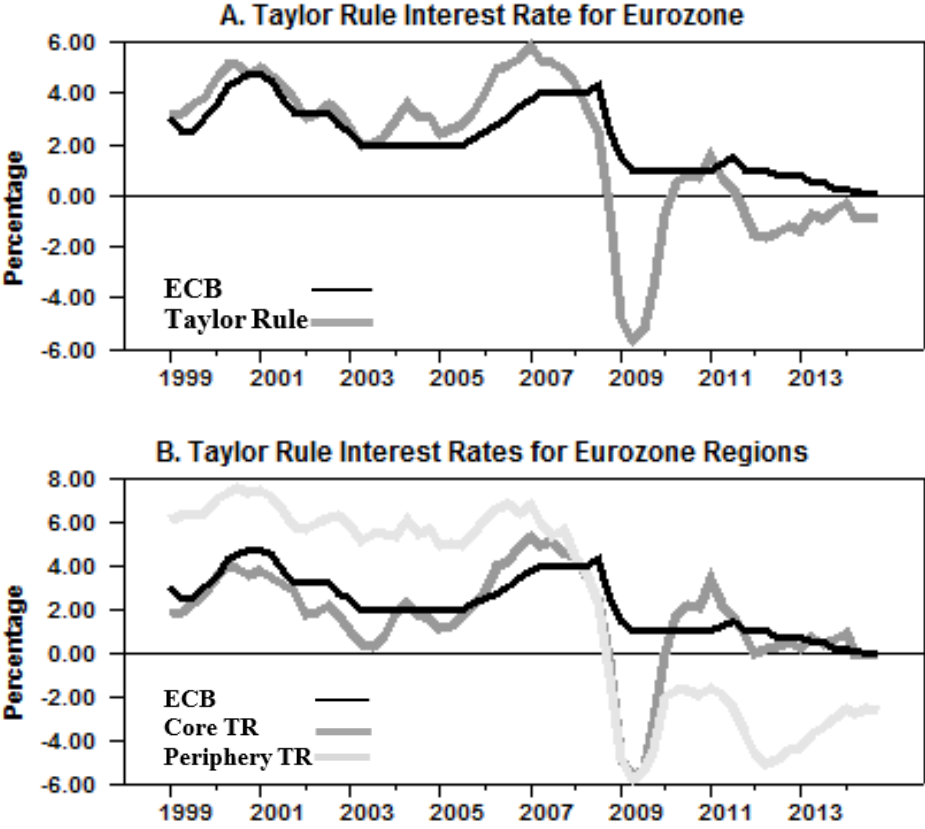
**Figure 11. Monetary Policy in the Eurozone**



Note: Total money spending is measured using nominal GDP.

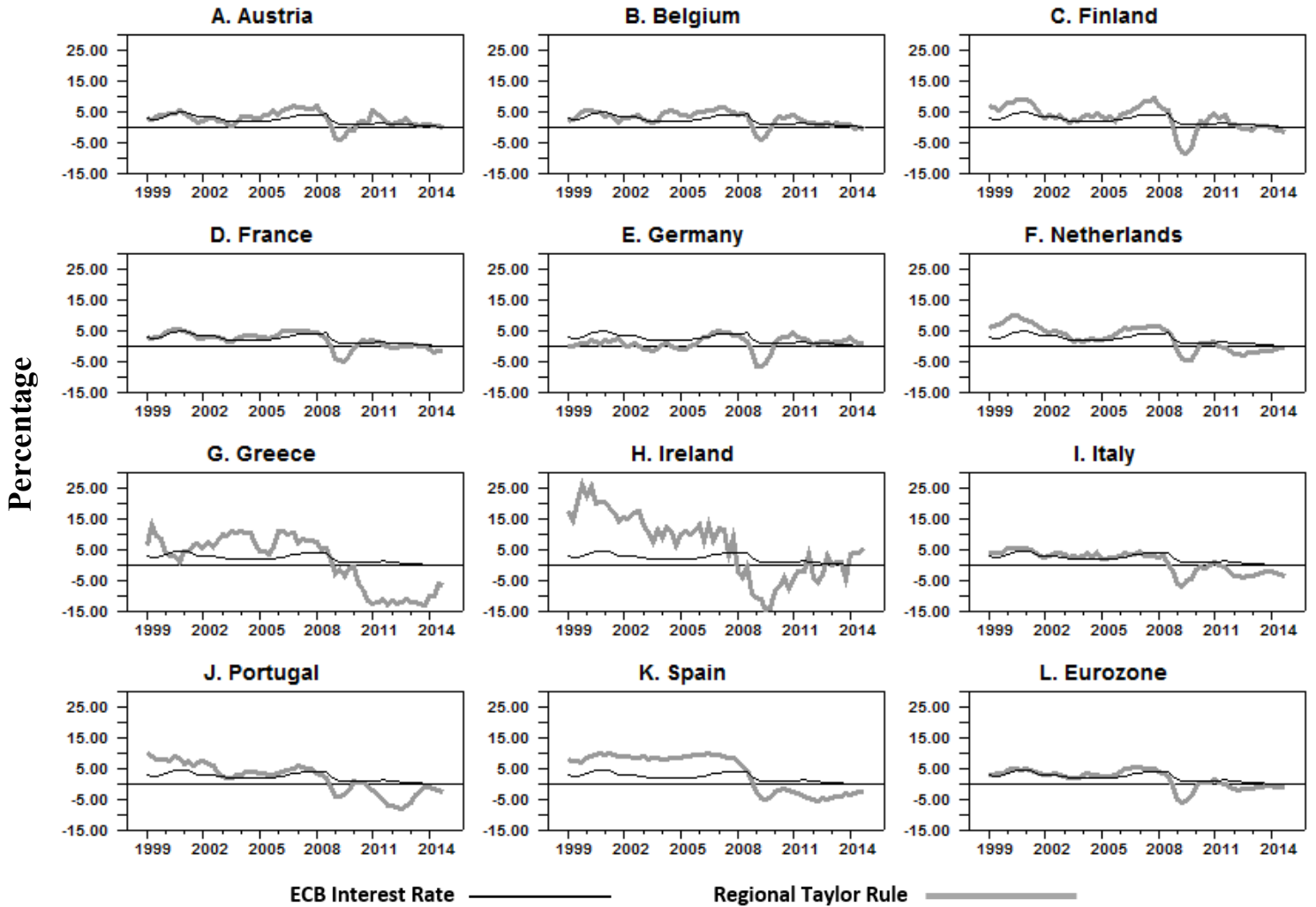
Sources: Eurostat; ECB database; Deutsche Bundesbank; author's calculations.

Figure 12. Taylor Rule Interest Rates vs. Actual ECB Interest Rates



Sources: Eurostat; ECB database; Deutsche Bundesbank; author’s calculations.

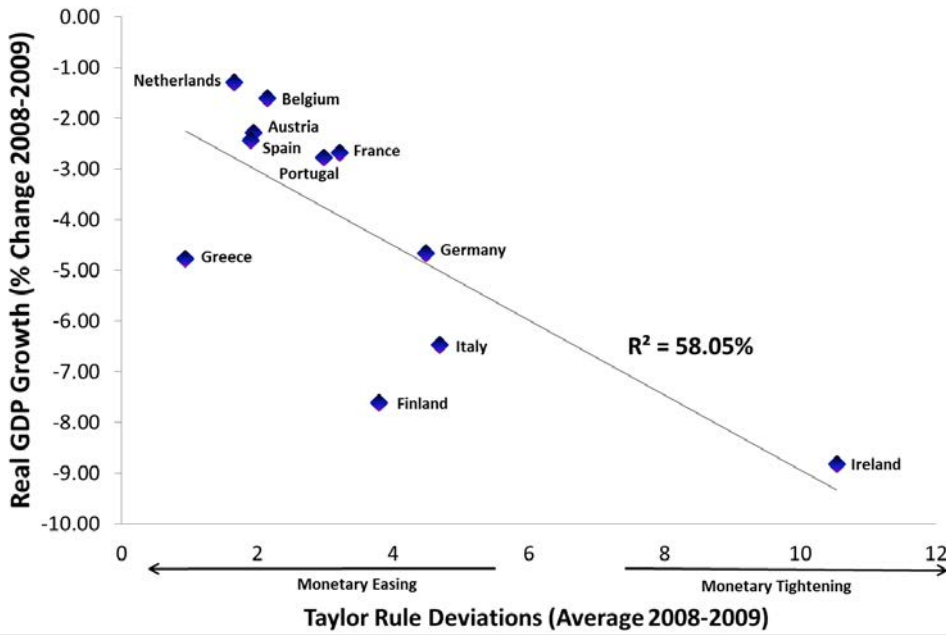
**Figure 13. Regional Taylor Rule Interest Rates**



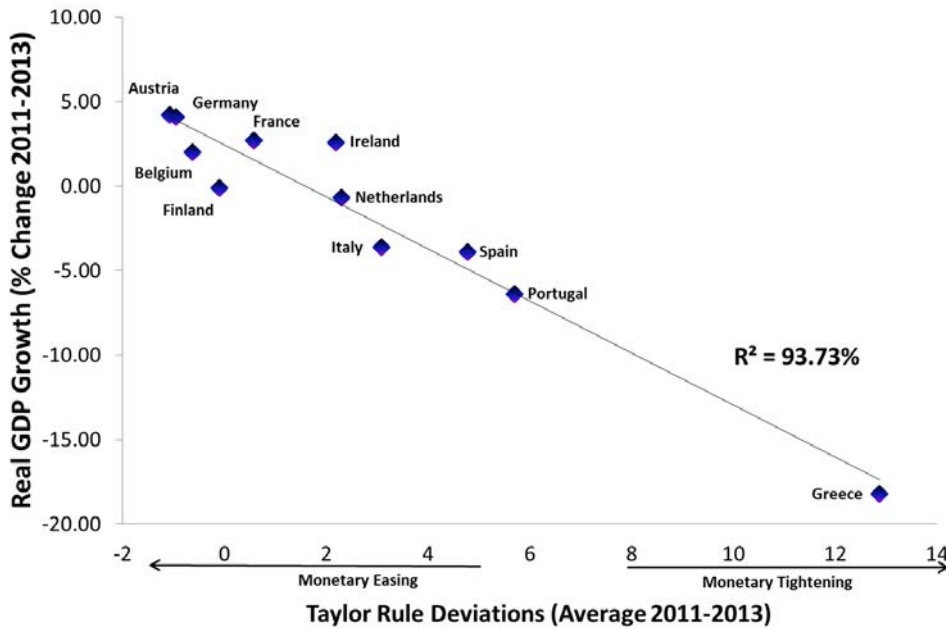
Sources: Eurostat; ECB database; Deutsche Bundesbank; author's calculations.

Figure 14. ECB Monetary Policy and the 2008–2009 and 2011–2013 Recessions

**A. 2008-2009 Recession**

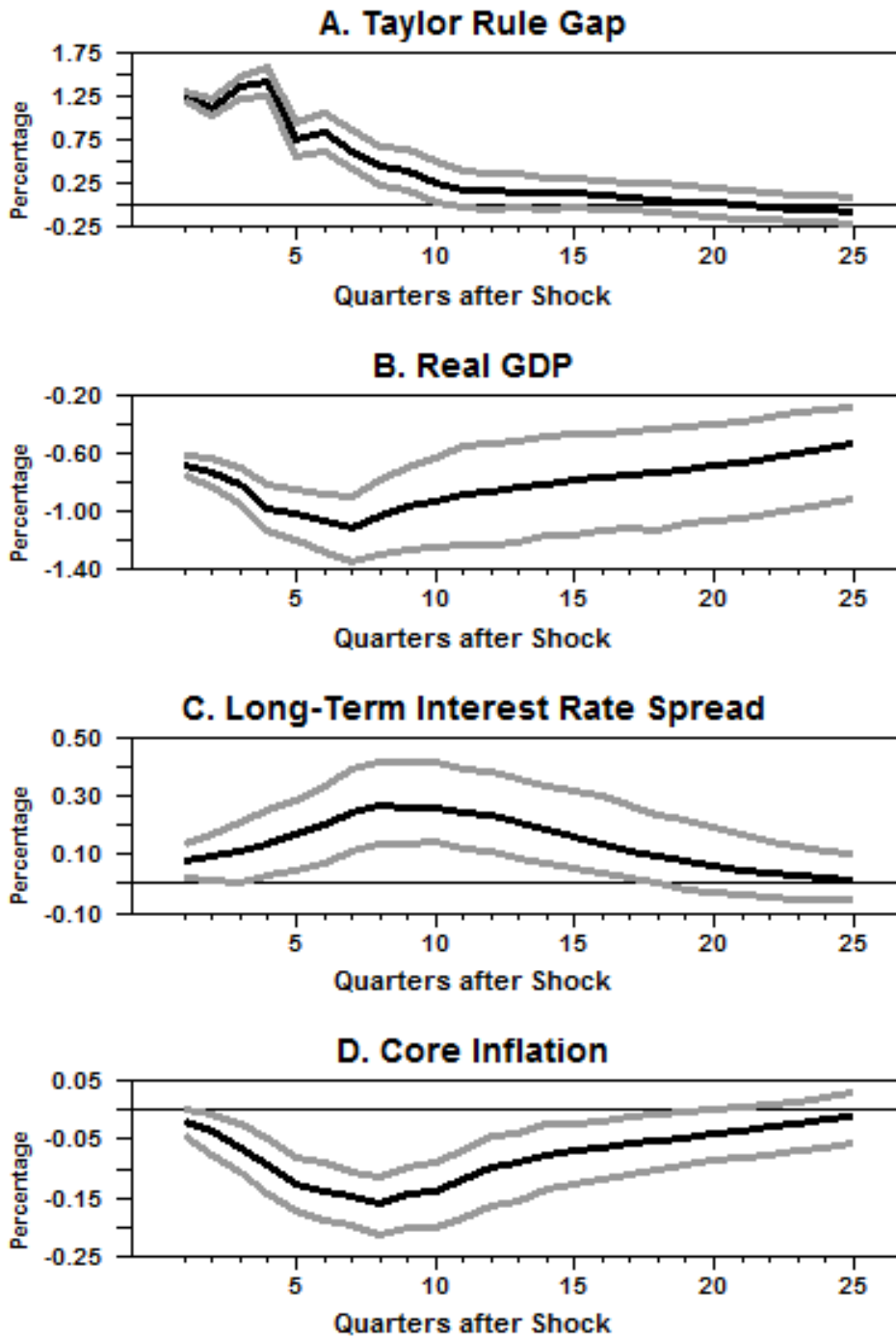


**B. 2011-2013 Recession**



Sources: Eurostat; ECB database; Deutsche Bundesbank; author's calculations.

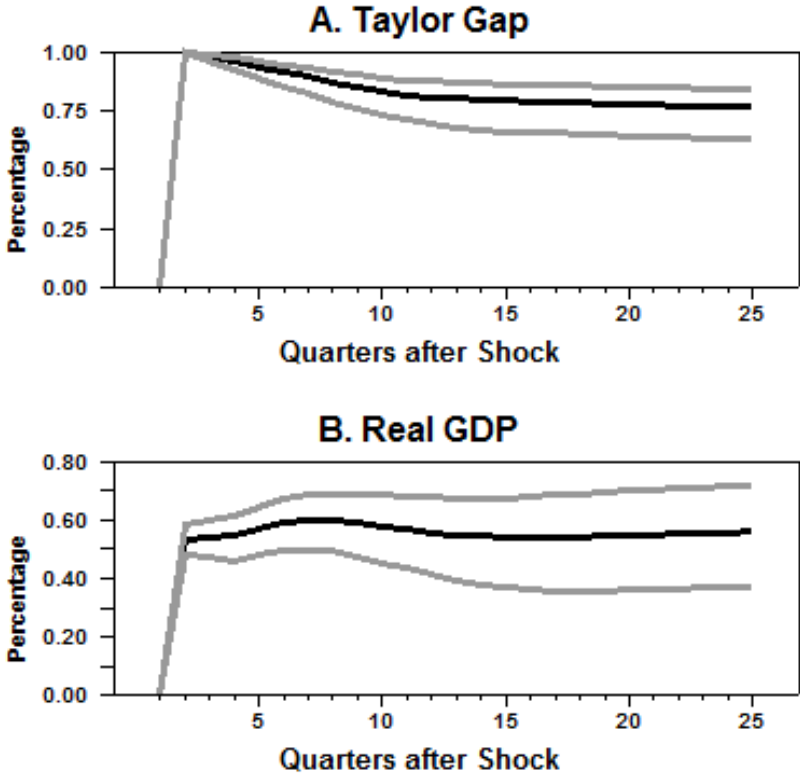
**Figure 15. Typical Response to a Shock of One Standard Deviation to the Taylor Rule Gap (Actual ECB Rate Minus Taylor Rate)**



Note: The black line is the point estimate while the gray lines are 95 percent confidence intervals.

Sources: Eurostat; ECB database; Deutsche Bundesbank; author's calculations.

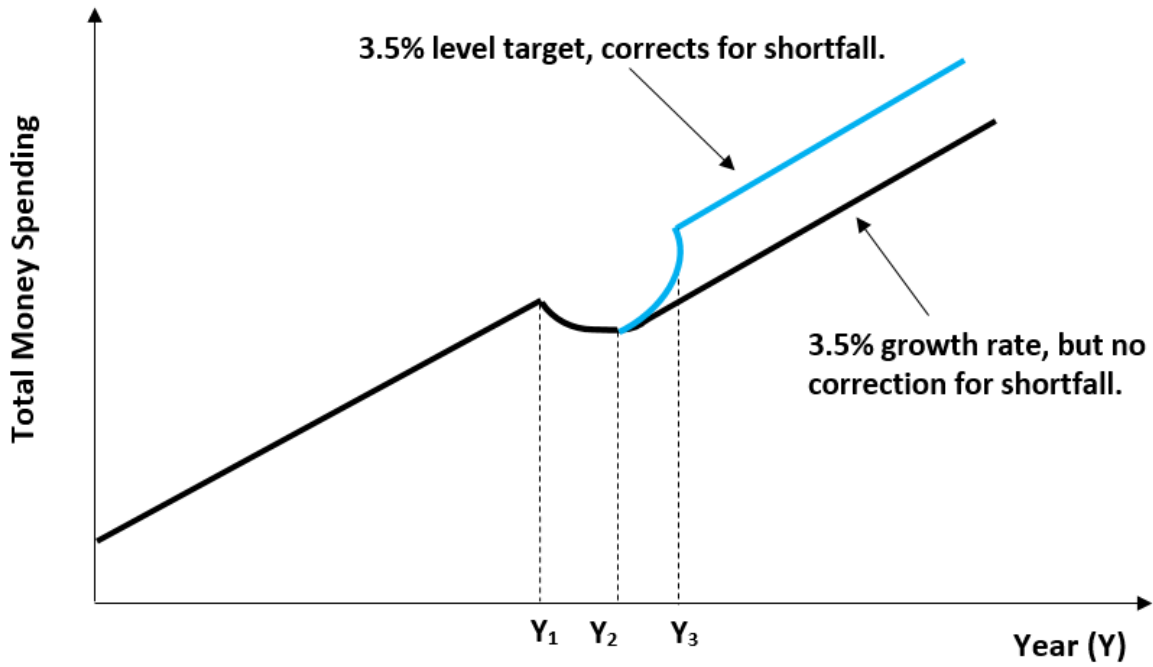
**Figure 16. Forecast Error Variance Decomposition (Percentage of Forecast Error Attributable to Taylor Rule Gap Shock)**



Sources: Eurostat; ECB database; Deutsche Bundesbank; author's calculations.  
Note: The black line is the point estimate while the gray lines are 95 percent confidence intervals.

Figure 17. NGDP Targeting

### A. Spending Contraction



### B. Spending Boom

