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# IMF Working Paper

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Unemployment Surges in the EU:  
The Role of Risk Premium Shocks

by Bas B. Bakker, Marta Korczak, and Krzysztof Krogulski

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I N T E R N A T I O N A L M O N E T A R Y F U N D

## IMF Working Paper

European and Western Hemisphere Departments

### Unemployment Surges in the EU: The Role of Risk Premium Shocks

Prepared by Bas B. Bakker, Marta Korczak, and Krzysztof Krogulski<sup>1</sup>

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#### Abstract

In the last decade, over half of the EU countries in the euro area or with currencies pegged to the euro were hit by large risk premium shocks. Previous papers have focused on the impact of these shocks on demand. This paper, by contrast, focuses on the impact on supply. We show that risk premium shocks reduce the output level that maximizes profit. They also lead to unemployment surges, as firms are forced to cut costs when financing becomes expensive or is no longer available. As a result, all countries with risk premium shocks saw unemployment surge, even as euro area core countries managed to contain unemployment as firms hoarded labor during the downturn. Most striking, wage bills in euro area crisis countries and the Baltics declined even faster than GDP, whereas in core euro area countries wage shares actually increased.

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# 1 Introduction

The prevailing view in the literature is that interest rates in advanced countries are *pro-cyclical*: they fall during recessions and increase during booms (Stock and Watson, 1999). The typical interpretation is that recessions are the result of *demand* shocks. As economic activity declines, interest rates fall.

By contrast, interest rates in emerging markets are *counter-cyclical*: they tend to be high during recessions, low during booms, and *lead* the cycle (Neumeyer and Perri, 2005).

The explanation is that recessions in emerging economies are associated with risk premium shocks (Calvo et al., 2006).<sup>1</sup> Risk premium shocks result from the collision of *underlying vulnerabilities* and specific trigger events. An underlying vulnerability is thus a necessary, but not a sufficient, condition for a crisis. A vulnerability could be a large current account deficit, a credit or asset price bubble, or a balance sheet mismatch (excessive borrowing in foreign currency, at too-short maturities, or with inadequate capitalization). A crisis trigger, however, could be almost any event—political turmoil, terms of trade shocks, contagion from other countries.

Risk premium shocks reduce the output level that maximizes profit. The intuition is that if firms need to pre-finance working capital, a rise in financing costs will raise the marginal cost of output to above marginal revenue. The profit-maximizing reaction is to cut back production and employment. They are thus akin to *supply* shocks—although they of course also affect demand. Monetary policy in emerging markets tends to further exacerbate risk premium shocks because policy makers need to raise interest rates in bad times to defend the domestic currency against depreciation (Vegh and Vuletin, 2012).<sup>2</sup>

In the past decade, over half of EU countries that were either in the euro area or had exchange rates fixed to the euro were hit by large risk premium shocks. We measure risk premia by the difference between local and German long-term interest rates.<sup>3</sup> These risk premium shocks occurred when investors started to worry that the large pre-crisis imbalances that had been built up were no longer sustainable. Countries where pre-crisis imbalances were high suffered the largest risk premium shocks. The Baltic countries experienced a risk premium shock in 2008/09; while the euro area periphery countries saw a surge in 2010 and beyond, during the euro area sovereign debt crisis (Figure 1.1).

In the past decade, there have also been marked differences in unemployment rate movements in EU countries that were either in the euro area or had exchange rates fixed to the euro. In some countries, unemployment rates surged, while in others they remained modest (Figure 1.2). Eleven countries had an "unemployment surge" defined as an increase in unemployment of at least five percentage points.<sup>4</sup> The Baltic countries, Croatia, Greece, Spain, Portugal, Ireland, and Cyprus all stand out as countries that experienced very sharp unemployment increases; while in northern European countries unemployment increases were more modest. In Germany, unemployment did not increase at all.

The paper shows that these unemployment surges were the result of risk premium shocks. There was no country *with* a large risk premium shock that did not have an unemployment surge;

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<sup>1</sup>Interest rates in emerging market countries can be decomposed into an international rate and a country risk component (Neumeyer and Perri (2005), Arellano (2008)). The risk component dominates and is the most variable of the two. When risk premia surge, interest rates surge; and when risk premia fall, interest rates fall.

<sup>2</sup>Risk premia can rise as a result of both domestic factors (for example, increased concerns about the sustainability of the public finances) as well as changes in global risk aversion. When global risk aversion rises, risk premia tend to rise most in countries with weak fundamentals (high current account deficits, high fiscal deficits, etc.). Risk premia can also rise as a result of spill-overs of developments in other emerging market countries. For example, during the Asian crisis, risk premia for Latin-American countries jumped as well.

<sup>3</sup>To ensure that these differences do not reflect differences in monetary policy, we look at euro area countries and countries with hard pegs only. 11 out of the 21 remaining countries have suffered large risk premium shocks in the past decade. We identify years with large risk premium shocks as years in which risk premia get high. We identify high risk premia by comparing the average local long-term interest rate during a given year with that in Germany. If the difference is at least 400 basis points, we identify that year as a year with a high risk premium. We based the threshold on a CART decision tree analysis.

<sup>4</sup>We define an unemployment surge as  $\Delta u_t > 0$  for  $t$  in  $(t_0, t_1)$  for which  $u_{t_1} - u_{t_0} > 5$ .

and there was no country *without* a large risk premium shock that had an unemployment surge.

We discuss the risk premium shocks in greater detail for two episodes: the Baltics in 2008/09 and the euro area periphery during the euro area sovereign debt crisis. The experience suggests that having a common monetary policy alone is not sufficient to prevent country-specific private sector financing costs shocks. Monetary policy in the euro area crisis countries was not different from that in the euro area core. Yet despite a common monetary policy, private sector financing costs in the crisis countries were very different from those in the euro area core. In the latter, market interest rates were very low, but in the crisis countries, market interest rates were very high. It was only after the announcement of the OMT programme and Mario Draghi's assertion to do "whatever it takes" in July 2012 that interest rates in the euro area periphery decreased and the crisis ended.

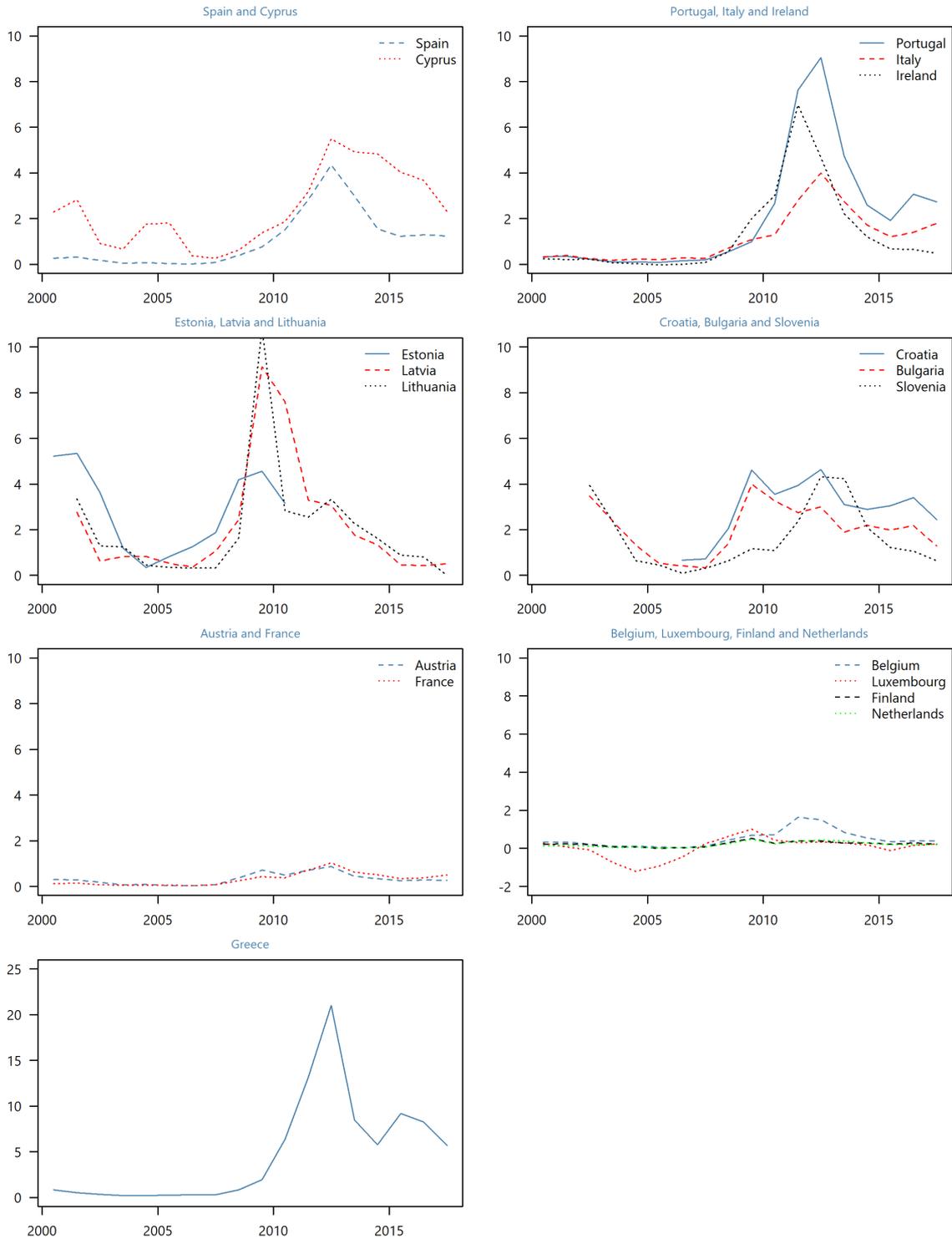
This is not the first paper that highlights the role of risk premium shocks in the euro area crisis. However, other papers have mainly focused on the impact of risk premium shocks on *demand*, including through its effect on fiscal policy. De Grauwe (2013) argued that the rise in spreads led to "panic-driven austerity", which then led to an economic downturn. Countries with the largest increase in spreads saw the most fiscal austerity and the sharpest downturn.<sup>5</sup>

This paper, by contrast, focuses on the impact risk premium shocks had on *supply*, and their role in *unemployment surges*. Risk premium shocks reduce the output level that maximizes profit. They also lead to unemployment surges, as firms are forced to cut costs when finance becomes expensive or is no longer available. As a result, all countries with risk premium shocks saw unemployment surge, even as euro area core countries managed to contain unemployment. Most striking, wage bills in euro area crisis countries and the Baltics declined even faster than GDP, whereas in core euro area countries wage shares actually increased, as firms hoarded labor during the downturn.

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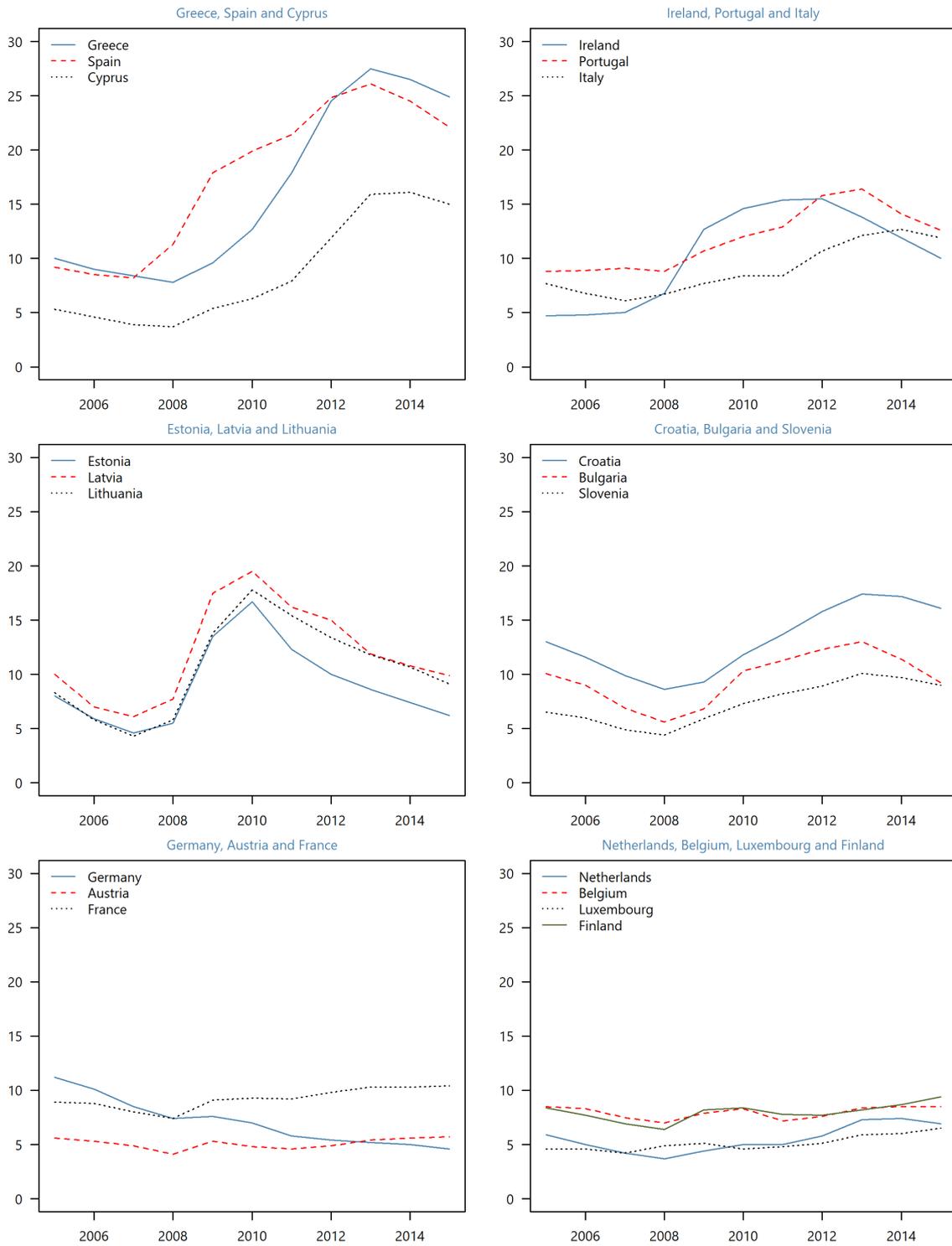
<sup>5</sup>Baldwin and Giavazzi (2015) highlighted how rising risk premia drove up private borrowing costs, which led to a fall in economic activity.

**Figure 1.1. Risk Premia 1/**  
(Percentage Points)



1/ Difference between local and German long-term government bond yields

**Figure 1.2. Unemployment Rate**  
(Percent)



## 2 Risk Premia and Output: a Stylized Model

Risk premium shocks reduce the output level that maximizes profit. The intuition is that if firms need to pre-finance working capital, a rise in financing costs will raise the marginal cost of output to above marginal revenue. The profit-maximizing reaction is to cut back production and employment.

Ball (2018) gave a good example of how this works in practice. In a discussion of the aftermath of the default of Lehman Brothers, he noted:<sup>6</sup>

”This event shook confidence in money market funds, which savers had come to regard as riskless. Over several days, the funds’ customers withdrew about \$350 billion, or about 10 percent of the funds’ assets, setting off a chain reaction that disrupted the economy. As the funds lost cash, they reduced their purchases of commercial paper, which corporations needed to issue to obtain working capital. Fearing that they could not raise the money they needed to operate, many corporations reduced production and laid off workers.”

Risk premium shocks lead firms to reduce output and employment, *even if demand is not an issue*. In other words, they are akin to *supply* shocks. Of course, risk premium shocks also have an impact on demand. If employment drops, consumption is likely to follow.

### A Stylized Model

Consider the following model. Firms’ production function has one input, labor:

$$Y = L^\alpha \quad (1)$$

The gross operating surplus is:

$$OS = Y - wL \quad (2)$$

Following Neymeyer and Perri (2005) and Kabaca (2014) we assume that firms need to pre-finance working capital, in this case the wage bill. Profits are therefore equal to:

$$\Pi = Y - wL - r wL = Y - (1 + r)wL \quad (3)$$

First order conditions for profit maximizing are:

$$L^{1-\alpha} = \frac{\alpha}{w(1+r)} \quad (4)$$

It follows that employment and output are given by:

$$L = \left( \frac{\alpha}{w(1+r)} \right)^{\frac{1}{1-\alpha}} \quad (5)$$

$$Y = \left( \frac{\alpha}{w(1+r)} \right)^{\frac{\alpha}{1-\alpha}} \quad (6)$$

We can deduce the wage share from equation (4) and (1):

$$\frac{wL}{Y} = \frac{\alpha}{1+r} \quad (7)$$

Labor productivity is therefore equal to:

$$\frac{Y}{L} = \frac{(1+r)w}{\alpha} \quad (8)$$

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<sup>6</sup>See page 44.

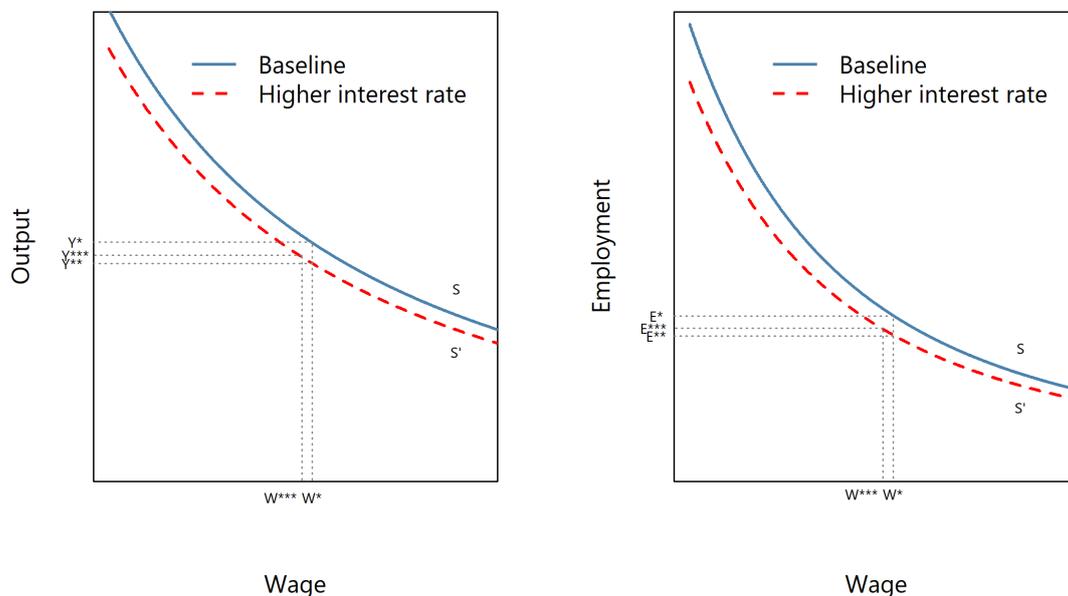
An increase in interest rates will reduce output, employment, the wage share, and increase labor productivity. Figure 2.1 illustrates the mechanism. If interest rates rise, the profit-maximizing level of output declines. Initially, production equals  $Y^*$ . If interest rates rise, the supply curve  $S$  shifts left to  $S'$ . For a given wage level the output falls.<sup>7</sup>

If wages fall after an interest rate shock, the impact on employment and output will be mitigated. If wages fall from  $W^*$  to  $W^{***}$ , in the new equilibrium output and employment will be at higher level ( $Y^{***}$  and  $E^{***}$ ) than in the absence of wage adjustment.

The intuition is simple. An interest rate shock increases the marginal cost of labor. The more wages adjust, the less need there is for firms to increase the marginal productivity of labor by shedding workers.<sup>8</sup>

The model suggests that a rise in interest rates leads to higher unemployment. This is borne out by the data. In the crisis countries, despite low official rates, surging risk premia led to a spike in real long term interest rates (Figure 2.2, left hand charts) which led to a sharp rise in unemployment (Figure 2.2, right hand charts)

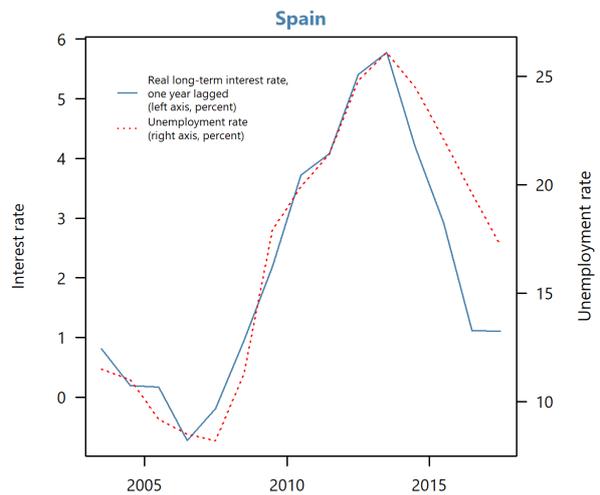
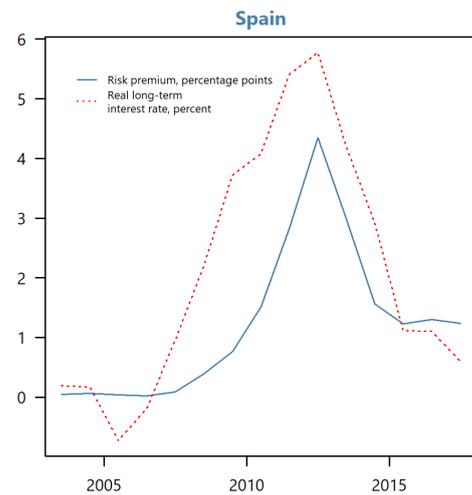
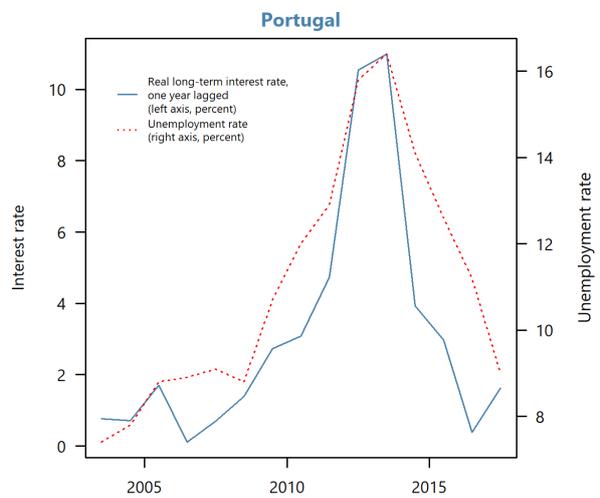
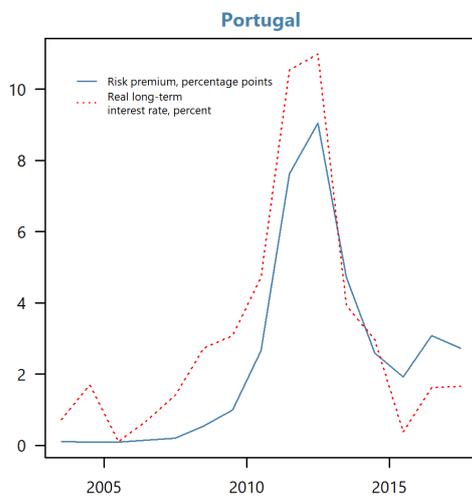
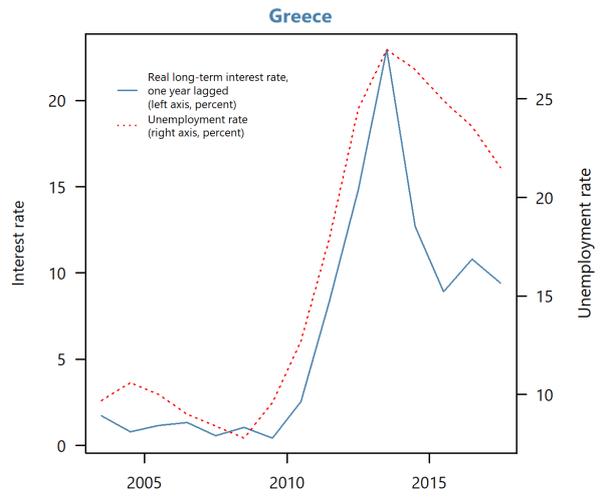
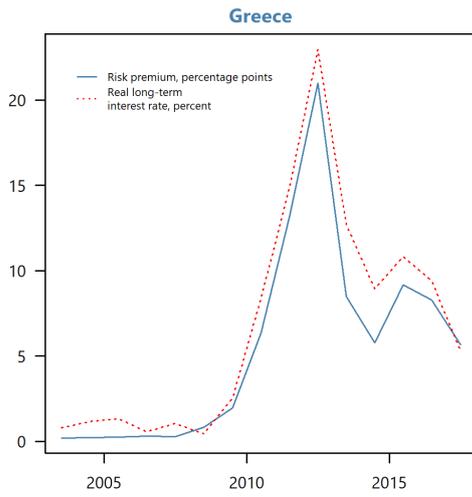
**Figure 2.1. Interest Rates, Output and Employment**



<sup>7</sup>Using  $\alpha$  of 0.6, an increase in  $r$  from 0.04 to 0.10 results in a decline of GDP by 8.1 percent and a decline of employment by 13.1 percent.

<sup>8</sup>This suggests that labor market institutions also matter. Bakker and Zeng (2013) show that in countries with dual labor markets, wages adjusted less in response to rising unemployment. Bakker (2015) discusses the role of real wage growth in employment losses during the great recession.

Figure 2.2. Risk Premium, Real Long-term Interest Rates and Unemployment 1/



1/ Risk premium defined as difference between local and German long-term government bond yields. Real interest rate deflated by GDP deflator.

### 3 The Role of Risk Premium Shocks in the post-2008 Unemployment Surges

#### 3.1 All Countries with Risk Premium Shocks had Unemployment Surges; and all Countries with Unemployment Surges had Risk Shocks

Risk premium shocks played an important role in the post-2008 unemployment surges. There was no country with an unemployment surge that did not have a large risk premium shock; and there was no country with a large risk premium shock that did not have an unemployment surge (Table 3.1).

This was so for two reasons. One reason was that risk premium surges were associated with deep recessions (Figure 3.1). Indeed, the larger the risk premium shock, the larger the decline in GDP (Figure 3.2). Another reason was that risk premium surges triggered labor shedding. In the crisis countries, the employment declines were associated with a sharp decline in wage shares (Figure 3.3). This was very different from the euro area core: there wage shares *increased* during the euro area sovereign debt crisis (Figure 3.4).

**Table 3.1. Risk premium shocks and Unemployment Surges**

	Risk premium peak 1/	Unemployment change 2/	GDP decline 3/
<b>Low risk premium peaks 4/</b>			
Germany	0.0	0.2	-5.6
Denmark	0.4	3.8	-5.4
Netherlands	0.5	3.7	-3.8
Finland	0.5	3.0	-8.3
Austria	0.9	1.9	-3.8
Luxembourg	1.0	2.3	-5.6
France	1.0	3.0	-2.9
Belgium	1.6	1.5	-2.3
Malta	2.6	0.9	-2.5
Slovakia	3.1	4.9	-5.4
<b>High risk premium peaks 5/</b>			
Italy	4.0	6.6	-8.7
Bulgaria	4.0	7.4	-3.6
Slovenia	4.3	5.7	-9.6
Spain	4.4	14.8	-8.9
Estonia	4.6	12.1	-19.3
Croatia	4.6	8.8	-11.6
Cyprus	5.5	12.2	-10.2
Ireland	7.0	10.5	-8.4
Portugal	9.1	7.6	-7.9
Latvia	9.1	13.4	-20.7
Lithuania	10.8	12.0	-14.8
Greece	21.0	19.1	-26.5

1/ Maximum post-2007 difference between local and German long-term government bond yields.

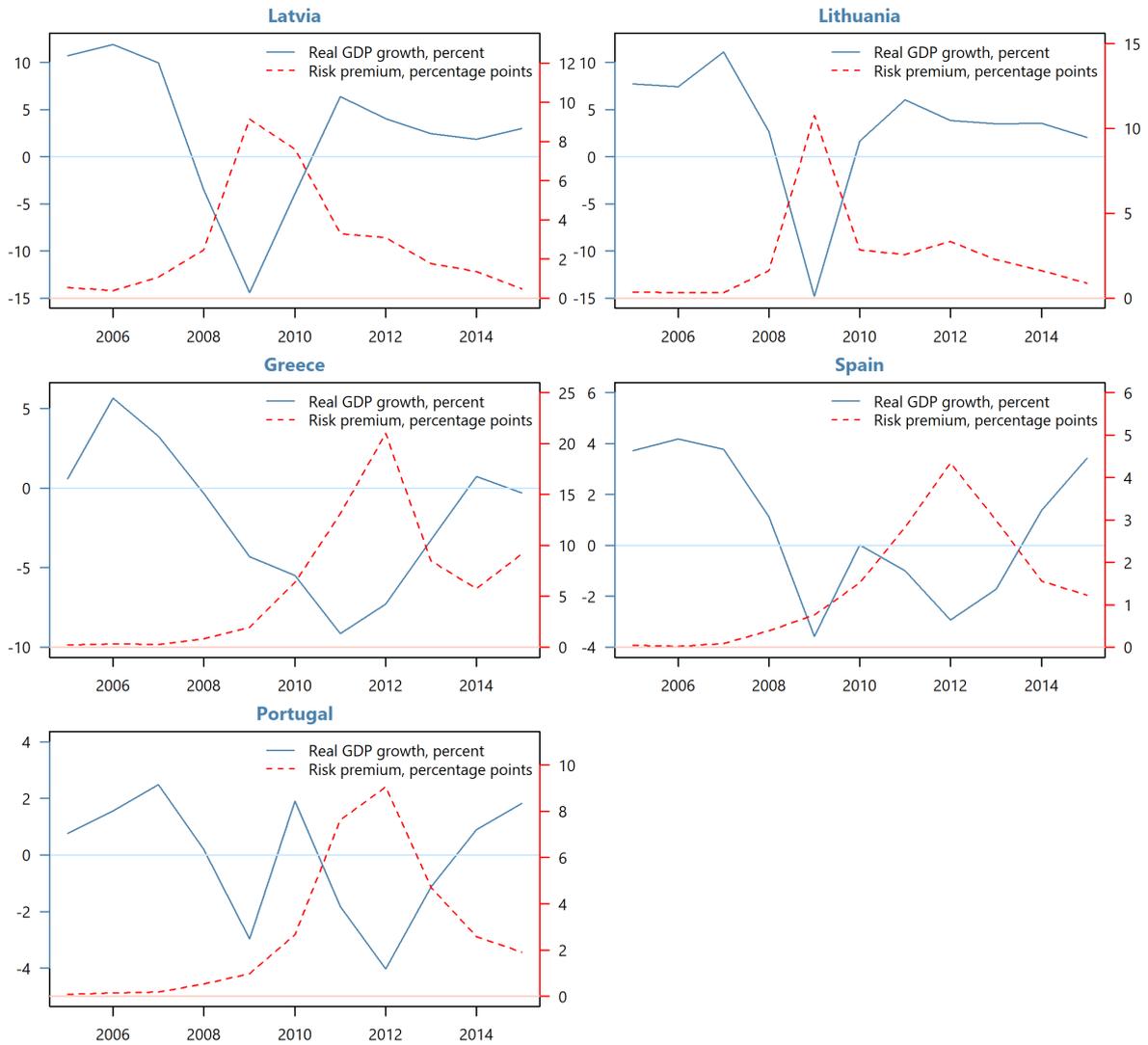
2/ Difference between post-2008 peak and 2008; percentage points. For DNK, LUX, ITA, EST, CYP, IRL, LVA and GRC - 2007 is the benchmark year (same for GDP decline).

3/ Difference between post-2008 trough and 2008; in percent.

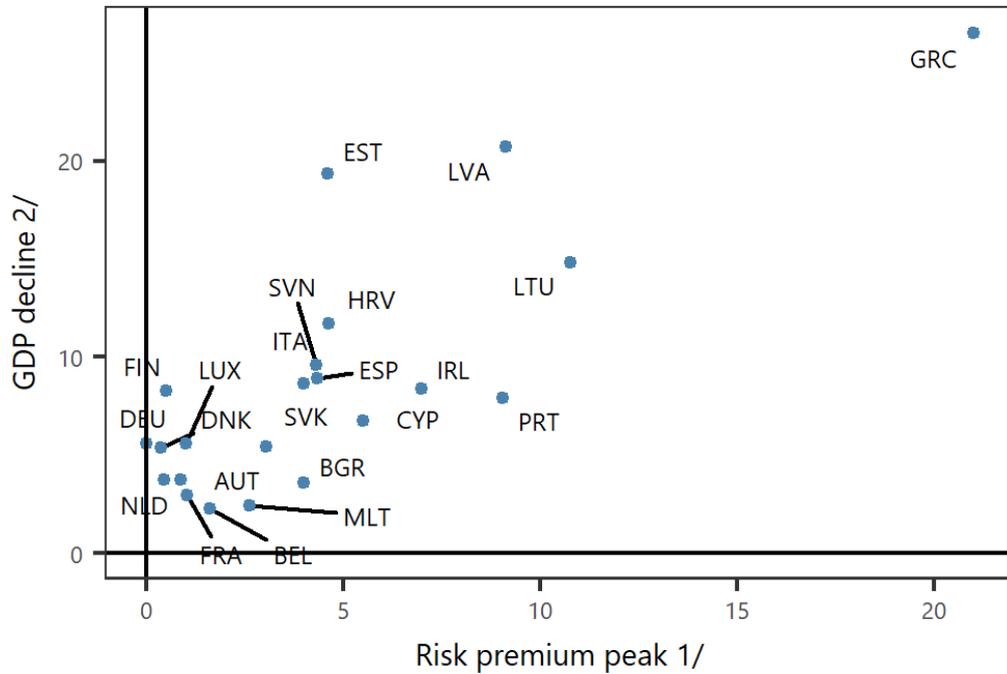
4/ Risk premium peaks at less than 350 basis points.

5/ Risk premium peaks at more than 350 basis points.

**Figure 3.1. Risk Premium and Real GDP Growth**  
 (Risk premium defined as long-term interest rate spread with Germany)

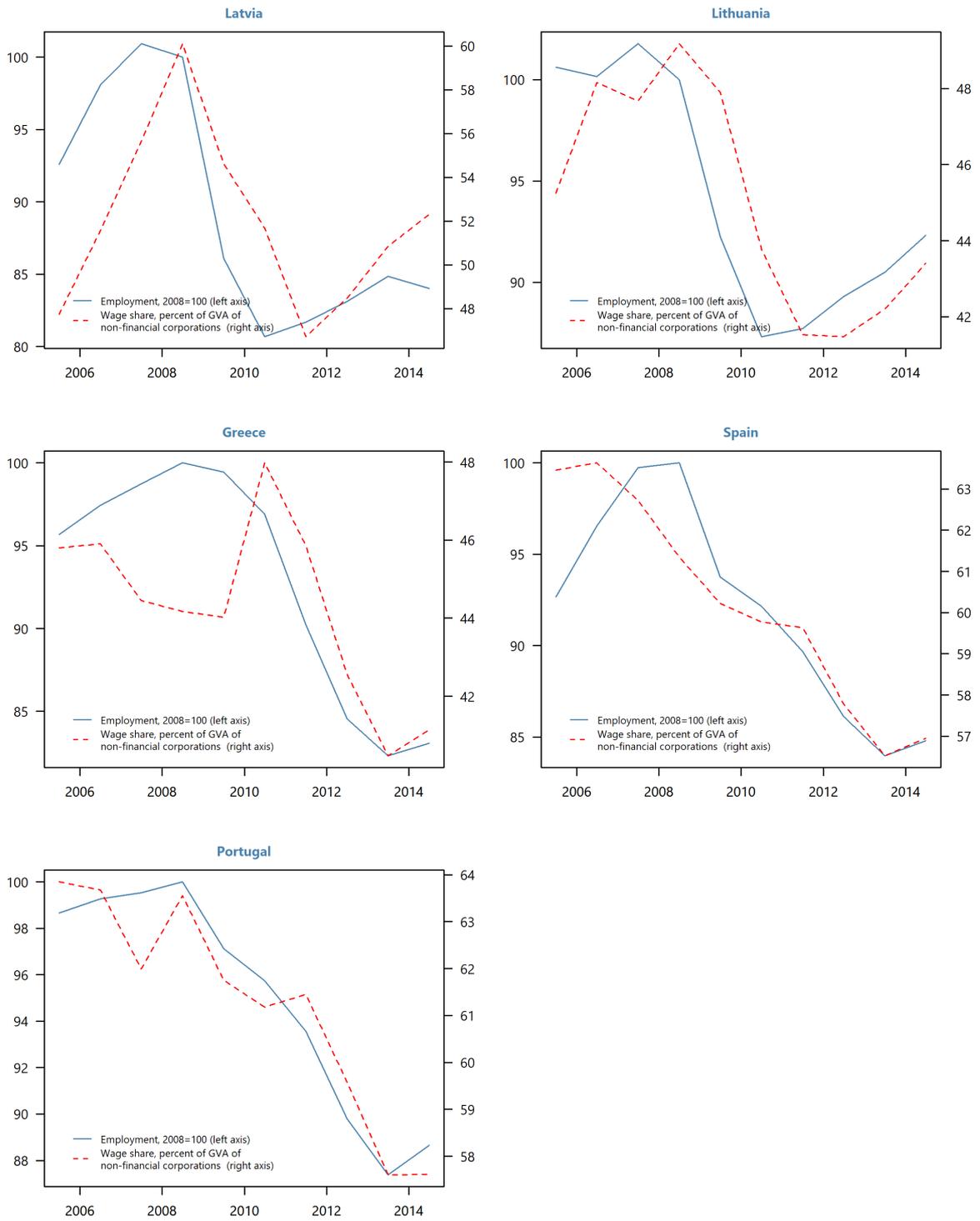


**Figure 3.2. Risk Premium Peak and GDP Decline**

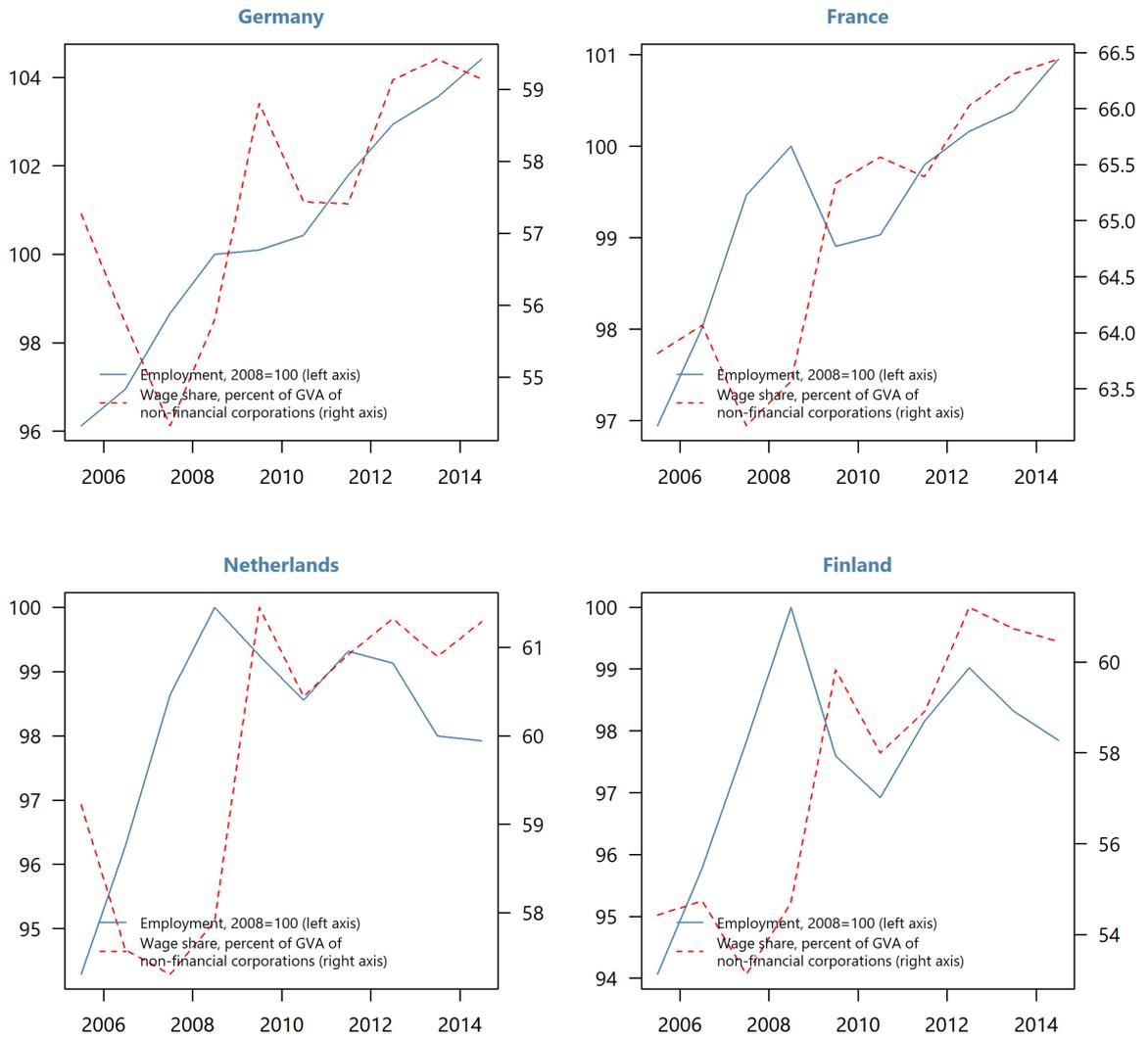


1/ Maximum post-2007 difference between local and German long-term government bond yields, in percentage points.  
 2/ Post 2008 through in GDP minus GDP in 2008, in percent. For DNK, LUX, ITA, EST, CYP, IRL, LVA, GRC the benchmark year is 2007.

Figure 3.3. Euro Area Periphery and Baltics: Employment and Wage Share

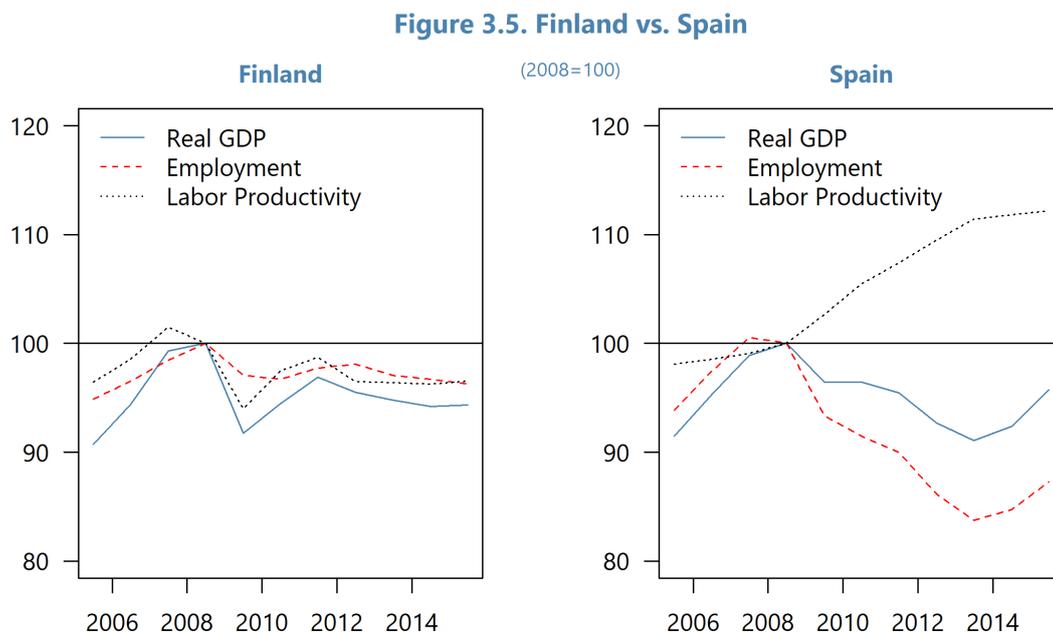


**Figure 3.4. Euro area Core: Employment and Wage Share**



### 3.2 Risk Premium Shocks Help Explain why Countries with Similar GDP Declines had Very Different Unemployment Rate Movements

The experience of Spain and Finland is a nice example of how similar developments in GDP lead to very different changes in employment (Figure 3.5). In Finland, firms were hoarding labor, and a decline in GDP was offset by a decline in labor productivity.<sup>9</sup> In Spain, firms were shedding labor, and a decline in GDP was *exacerbated* by an increase in labor productivity.



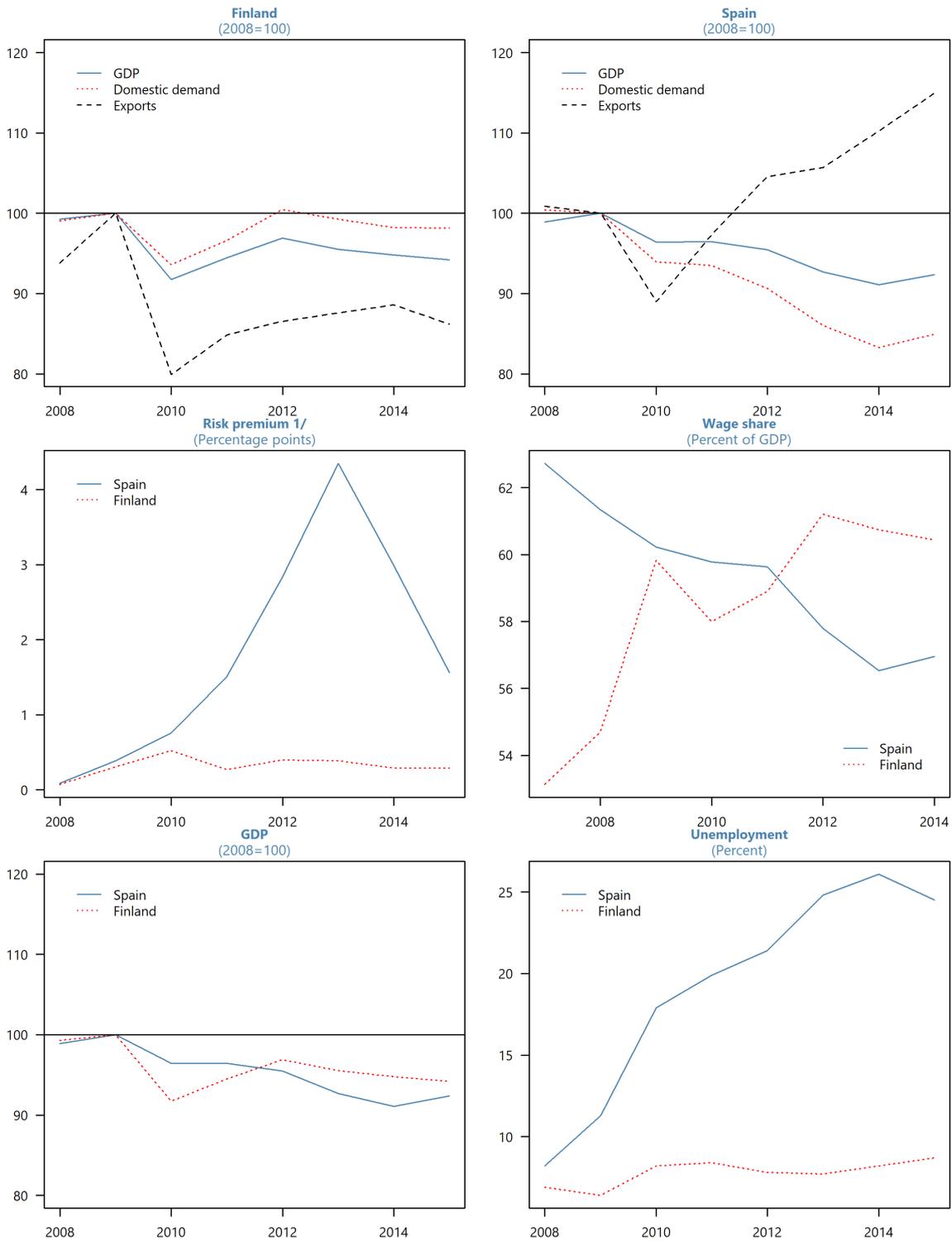
Risk premium shocks played an important role in these differences (Figure 3.6). Finland suffered from an export shock<sup>10</sup> but risk premia remained low. As a result firms continued to spend, and firms did not shed labor. By contrast, in Spain, the risk premium surge led to labor shedding, and a sharp drop in firms' spending.<sup>11</sup>

<sup>9</sup>During the crisis of 2009, some Finnish firms adopted short-time work arrangements, which also helped to avoid layoffs.

<sup>10</sup>The export shock was the result of low growth in its exports markets (almost half of the country's exports are raw materials and production supplies used in manufacturing and a further third are investment goods), further exacerbated by the demise of Nokia.

<sup>11</sup>Labor shedding in Spain was further exacerbated by the increase in real wages. Real wages increased by 11 percent between 2007 and 2011 (see Bakker (2015)).

Figure 3.6. Spain vs Finland



1/ Difference between local and German long-term government bonds.

## 4 The Baltics 2008/2009 Crisis

### 4.1 The Crisis

The Baltic states experienced a very sharp increase in unemployment between 2007 and 2010. Unemployment in Latvia (which was hardest hit by the crisis) increased from 6 percent in 2007 to 19.5 percent in 2010. Estonia and Lithuania also saw very sharp increases.

In the pre-crisis years, large capital inflows had fueled and financed a domestic demand boom.<sup>12</sup> Much of the capital inflows came from foreign (mostly Swedish banks) which had subsidiaries in the Baltics.<sup>13</sup> The result was rapid GDP growth (in Latvia GDP growth in 2005-2007 averaged almost 11 percent), but also rising imbalances. By 2007, wage growth in Latvia had risen to 35 percent, and inflation to 15 percent. External imbalances became also very high, by 2007, current account deficits amounted to 20% in Latvia and to 15% of GDP in Lithuania and Estonia.

The capital flows stopped after the default of Lehman Brothers.<sup>14</sup> Risk premia and government bond yields surged as investors became concerned about the viability of the currency boards.<sup>15</sup>

With new financing no longer available, the private sector needed to close its saving-investment imbalance very rapidly. Companies reduced investment and cut costs—including by shedding labor. Between 2007 and 2010, the wage bill in Latvia declined by 23 percent—even more than the decline in GDP (Figure 4.1). The result was a drop in the wage share, and a sharp rise in the profit rate. The drop of the wage bill was not just due to a fall in employment; it was also driven by an adjustment of wages as unemployment rose. Between 2008 and 2010, private sector wages declined by 10 percent in Lithuania in nominal terms—and even more in real terms.

To prevent the emergence of large fiscal deficits, fiscal policy needed to be tightened. In 2009 alone, Latvia took 11.2 percent of GDP in fiscal measures (Purfield and Rosenberg, 2010).<sup>16</sup> With both private and public demand declining, the result was a sharp decline in GDP.

By 2010, profitability of the non-financial corporate sector had improved considerably, and cost cutting came to an end. As unit labor costs in manufacturing had fallen, and relative export prices had not, profitability in the export sector improved markedly.<sup>17</sup> An export boom ensued. The recovery was further helped by a sharp decline in risk premia, as worries about the sustainability of the currency boards had abated. As anxiety fell, and housing prices started to recover, household saving rates fell, further boosting demand. And with fiscal adjustment now largely over, the recovery was not dampened by fiscal drag.

### 4.2 What was Behind the Risk Premium Shocks?

As we discussed in the introduction, crises result from the collision of underlying vulnerabilities and specific trigger events. In the Baltics, the underlying vulnerabilities were large flow and stock imbalances that had built up in the run-up to the crisis, including high current account deficits, high external debt, and overheating economies.

There were two crisis triggers. The first one was the decision by Swedish banks in late 2007 to rein in credit growth. The more important one was the surge in global risk aversion after the default of Lehman Brothers. Sovereign credit default swap (CDS) spreads jumped several hundred basis points in a matter of days in the Baltics. Debt markets in Emerging Europe came under

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<sup>12</sup>For a discussion of the boom-bust in the Baltics, see Purfield and Rosenberg (2010), Bakker and Gulde (2010), Bakker and Kligen (2012). For a discussion of the boom-bust in Latvia, see Aslund and Dombrovskis (2011) and Blanchard, Griffiths, and Gruss (2013).

<sup>13</sup>On average, according to BIS statistics, foreign banks' claims on all sectors in the Baltic countries increased by 53% of GDP in 2000-2007.

<sup>14</sup>Capital inflows in Estonia and Latvia had started to slow in late 2007, as Swedish banks became concerned about their exposure to these countries. Foreign bank flows to Latvia declined from 2.4 billion USD in 2007Q3 to 1.1 billion USD in 2008Q3.

<sup>15</sup>All measures of risk premia (the difference between long-term government bond yields and government bond yields in Germany, CDS spreads, etc.) increased in tandem.

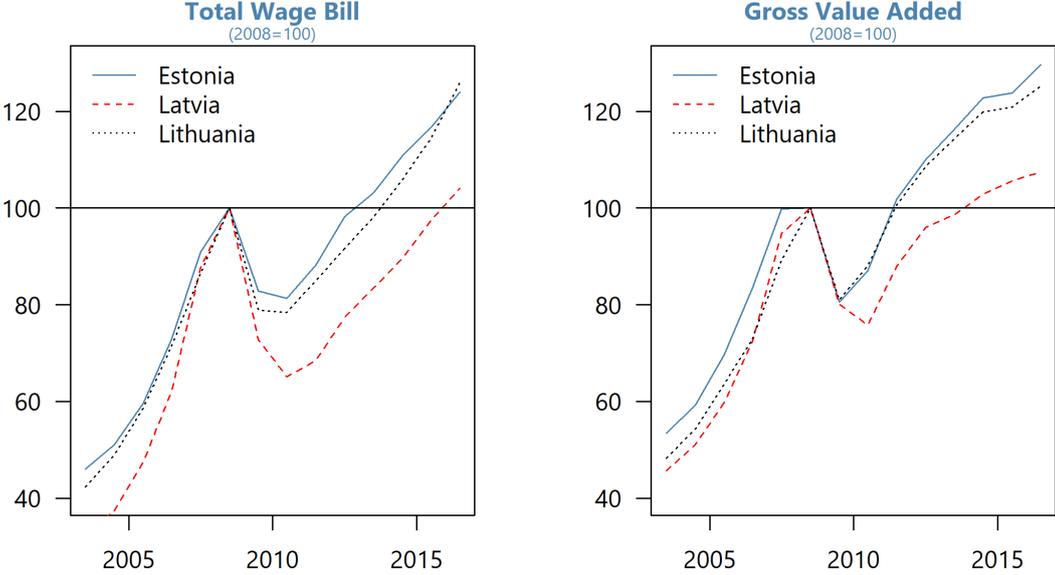
<sup>16</sup>The corresponding figures for Estonia and Lithuania were 7.1 and 7.0 percent of GDP.

<sup>17</sup>For a discussion of the Boom-Bust-Recovery in the Baltics, see Bakker and Korczak (2017).

severe strain. As Western European parent banks came under funding pressures, capital flows from Western European parents into the region dropped sharply.

The result of the sudden stop in capital flows was not just a deep recession. It also led to worries about the sustainability of the currency boards. These worries then translated into high risk premia.

**Figure 4.1. Cost Cutting by Non-financial Corporations**



## 5 The Euro Area Sovereign Debt Crisis

### 5.1 The Crisis

The crisis in the euro area periphery countries was more protracted than in the Baltics. However, the unemployment increase was comparable, and the GDP decline in Greece even exceeded that in the Baltics.

Before the global economic and financial crisis of 2008/09, the euro area periphery countries had received large capital inflows, particularly from eurozone banks, and exposures of banks to these countries had increased rapidly. Large capital flows had contributed to high GDP growth, but also to strong credit growth, a rapid increase in asset prices, and high current account deficits. After Lehman, banks started to reduce their exposure to the *private* sector. As capital flows dropped, credit booms ended, and asset prices started to fall, contributing to the decline of GDP.<sup>18</sup>

Fiscal deficits deteriorated sharply during the 2008-09 crisis. In the Spring 2008 WEO, fiscal headline deficits in 2009 were still projected to be small, with most below 2 percent of GDP (Figure 5.1). Two years later, this picture had changed dramatically. According to the Spring 2010 WEO, 2009 headline deficits exceeded 10 percent of GDP in Greece, Ireland, and Spain. Two years earlier, Spain was still projected to have a *surplus* in 2009.

The deterioration was only partly cyclical. Projections of *structural* deficits were also revised up sharply. In the case of Greece and Spain by more than 10 percentage points (Figure 5.1). Structural deficits were revised up for two reasons:

- First, estimates of the pre-crisis structural fiscal balances were revised down, as previous estimates of potential output now looked too optimistic. The 2007 structural deficit estimate for Ireland was revised from  $\frac{1}{4}$  percent of potential GDP in the Spring 2008 WEO to 8 percent in the Spring 2010 WEO. Pre-crisis structural balances were revised down most strongly in the crisis countries, as in these countries growth had been fueled by unsustainable capital-flows-fueled credit booms.
- Second, countries reacted to the deteriorating economic situation with counter-cyclical fiscal policy. There was a large deterioration of the structural deficit in the crisis countries. The deterioration was most pronounced in Greece and Spain. Spain took 7 percent of GDP in stimulus measures during 2008-09.<sup>19</sup>

The result was a sharp deterioration of projected debt dynamics (Figure 5.1). In the Spring 2008 WEO, it was projected that most countries' debt ratio would fall between 2007 and 2013. In the Spring 2010 WEO it had become clear that many countries would see a sharp increase. In the Spring 2008 WEO, the debt ratio in Greece was projected to *decline* by 20 percentage points between 2007 and 2013; in the Spring 2010 WEO, it was projected to *increase* by 50 percentage points. An increase in the projected debt change of 70 percentage points in two years!

Risk premia started to rise in the fall of 2010, after it was revealed that the Greek 2009 fiscal deficit would not be 6 percent of GDP but 12½ percent (Figure 5.2 and 5.3). Higher deficits contributed to a further worsening of debt dynamics. In the January 2010 WEO, it was projected that the Greek debt ratio would increase to 165 percent of GDP in 2014—70 percentage points higher than had been projected a year earlier. As interest rates rose, GDP started to decline, which led to shortfalls in tax revenues, and further fiscal pressures. A vicious cycle ensued.

The Spring 2010 WEO warned that "in the near term, a risk is that, if unchecked, market concerns about sovereign liquidity and solvency in Greece could turn into a full-blown and contagious sovereign debt crisis". This was indeed what happened. Long-term government bond yields in euro area periphery countries peaked at 36 percent in Greece (February 2012), 16 percent in Portugal

<sup>18</sup> However, financing pressures on private firms remained modest. Cost cutting were limited in 2009, and the wage shares in the euro area periphery countries rose in 2009.

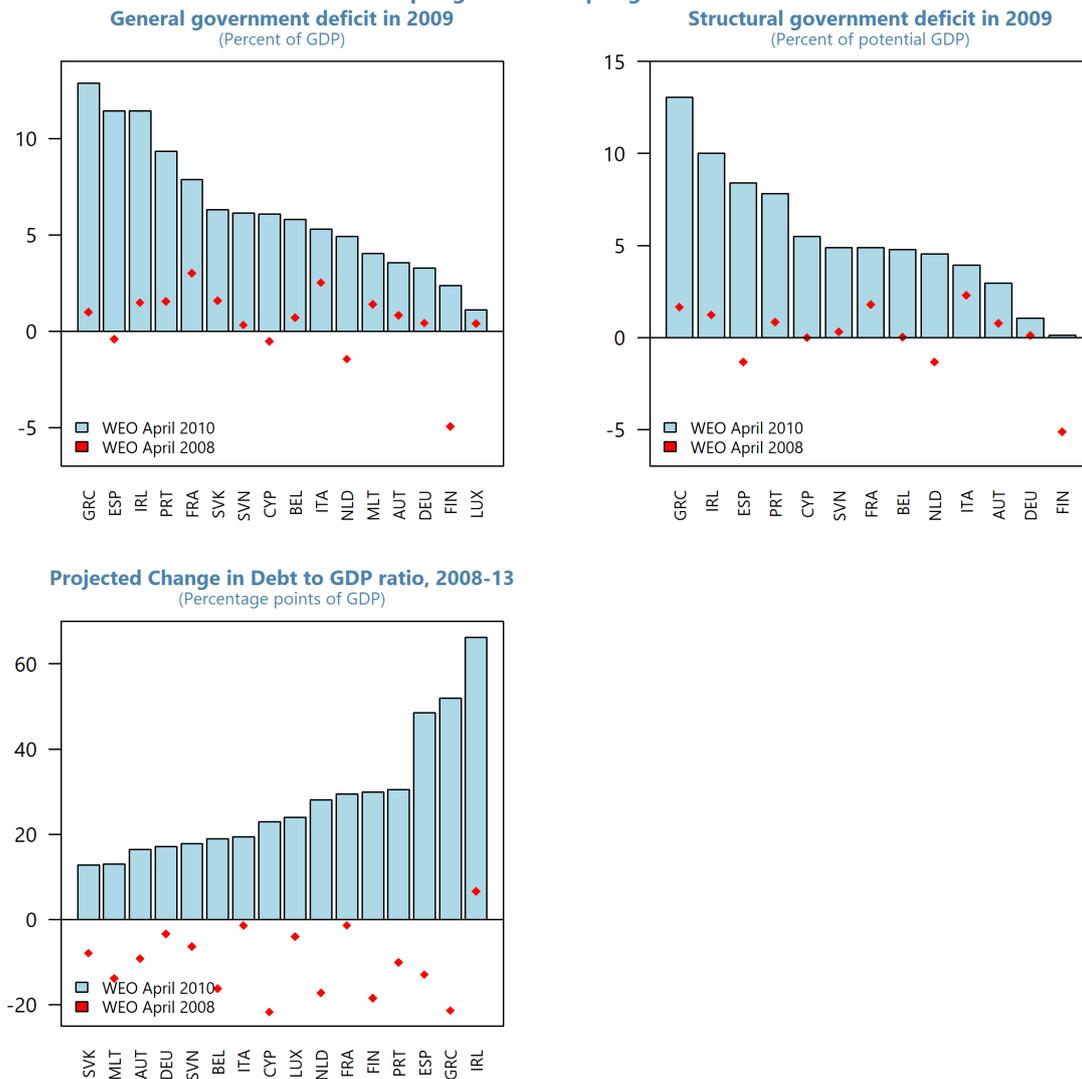
<sup>19</sup> See IMF Country Report No. 10/254, page 7. Euro area countries took on average 1½ percent of GDP in stimulus measures during 2008-09.

(February 2012), 12 percent in Ireland (June 2011), 7½ percent in Italy (November 2011), and 6½ percent in Spain (November 2011).

The rise in sovereign risk premia spilled over into rising risk premia for the private sector. High financing costs led to severe cost cutting by firms. Wage bills dropped by more than GDP, wage shares fell, and unemployment rose sharply (Figure 5.4).

The euro area crisis only ended when ECB action brought down risk premia. The announcement of the OMT programme and ECB president Draghi’s promise to do “whatever it takes” led to a sharp compression of risk premia. Once risk premia declined, the recovery started.

**Figure 5.1. Deterioration of 2009 Public Finances between Spring 2008 and Spring 2010 WEO**



**Figure 5.2. Ten-year Government Bond Yields**  
(Percent)



On Sunday October 18, the 2009 deficit was revised up to 12.7 percent of GDP. The line shows Monday.

**Figure 5.3. Greece: Fiscal Sustainability Concerns**

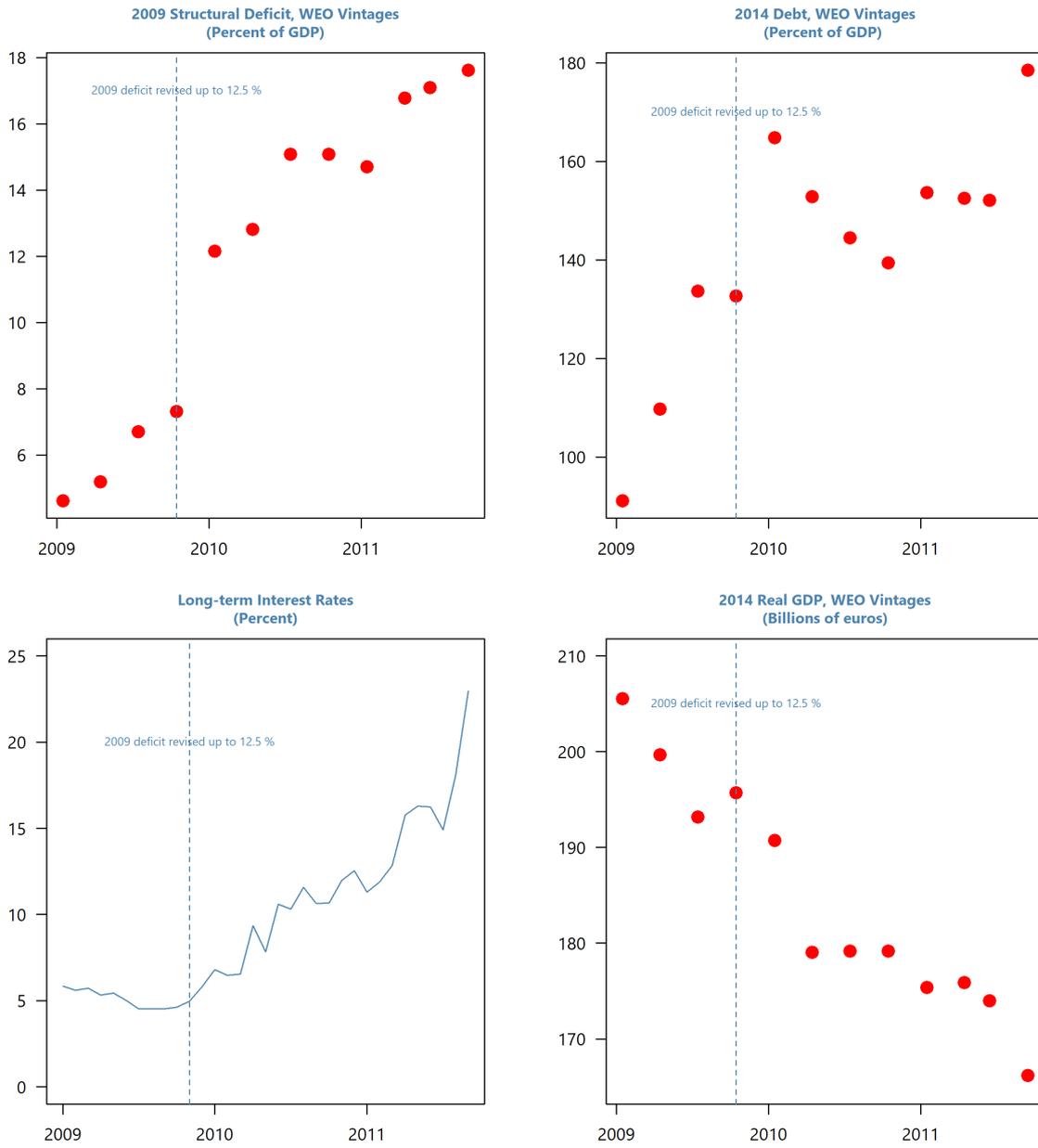
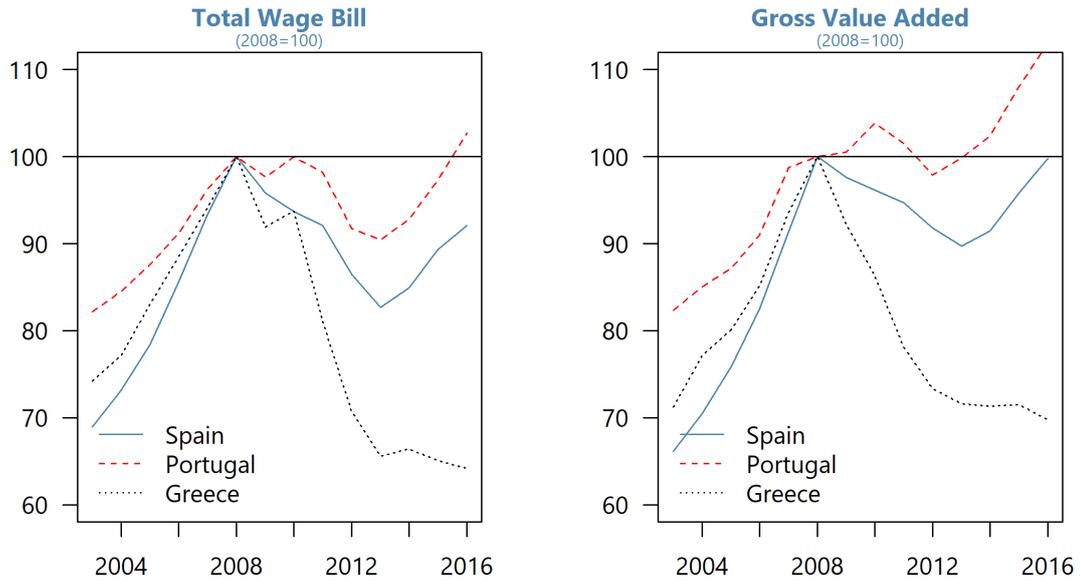


Figure 5.4. Cost Cutting by Non-financial Corporations



## 5.2 Fiscal Sustainability Concerns and Financing

When private sector output declined in 2009, countries increased public spending. As the decline in private demand led to a fall in tax revenue, the result was that a large gap between expenditure and revenue opened. The hope was that the fiscal stimulus would lead to recovery of private demand, which would boost tax revenues and reduce the deficit.

However, large deficits could only continue as long as financing was available. With markets no longer willing to finance large deficits, large scale consolidation was unavoidable. Even a complete debt write-off would not have eliminated that need: in 2009, both Greece and Spain had a *primary* deficit of around 10 percent of GDP. The surge in risk premia following default might have increased primary deficits even further, as the resulting decline in GDP would have further reduced revenue.

Fiscal consolidation no doubt exacerbated the downturn. Public expenditure in Greece was reduced by 25 percent. And disappointing growth may have pushed up risk premia further. In a deep recession, it becomes more difficult to put the public finances on a sustainable footing. With a debt ratio of 100 percent of GDP, and six percent nominal growth, a deficit of 6 percent of GDP will stabilize the debt ratio, but if nominal growth is zero, you need a balanced budget. Indeed, forecasts of 2014 GDP declined in line with the rise in interest rates (Figure 5.5), consistent with the view that causality may have gone both ways. In 2009, before the euro area crisis, higher GDP forecasts were associated with *higher* interest rates.

However, that does not mean that less fiscal consolidation would have mitigated the downturn—at least not in an environment where financing was not available. Such a strategy would likely have led to default and even higher risk premia.<sup>20</sup>

Nevertheless, disappointing growth made debt reduction more difficult. By the Fall of 2011, the projected 2014 debt ratio for Greece was higher than it was in the Spring of 2010 (Figure 5.3), despite a sharp reduction in the structural deficit. This episode illustrates that high deficits may be more dangerous than previously thought. If markets start to worry about high deficits, it may be very difficult to reduce them, as rising interest rates reduce GDP and thus tax revenues.<sup>21</sup>

It should be noted that when the euro area crisis started, the downward revision in growth in Greece had not been particularly pronounced. Between January 2009 and October 2009, just before the euro area crisis started, projections for 2014 real GDP were revised down by 5¼ percent of GDP—similar to that in the Netherlands and well below that in Ireland, Finland, Malta, and Cyprus (Figure 5.6). What sets Greece apart was the upward revision in the 2014 debt ratio (70 percentage points in one year). This suggests that the crisis was triggered by debt sustainability concerns, and not by growth concerns.

What would have made the fiscal adjustment much less painful is if interest rates had been much lower, as that would have made the recession much less deep. Greece had to reduce its fiscal deficit during a time when interest rates peaked at 36 percent. If interest rates had been 2 percent at the time, the recession would no doubt have been much less deep. Risk premia were brought down eventually by the European Central Bank. But this happened only after most of the adjustment in Greece had already been done.

The availability of central bank financing may help explain why high deficits in euro area periphery countries led to a crisis, but high deficits in the United States and the United Kingdom did not. The crucial difference may have been that the euro area periphery countries did not have their own central bank. As capital fled the country and interest rates rose, there was no central bank to step in and contain interest rates. This was very different in the United Kingdom and the

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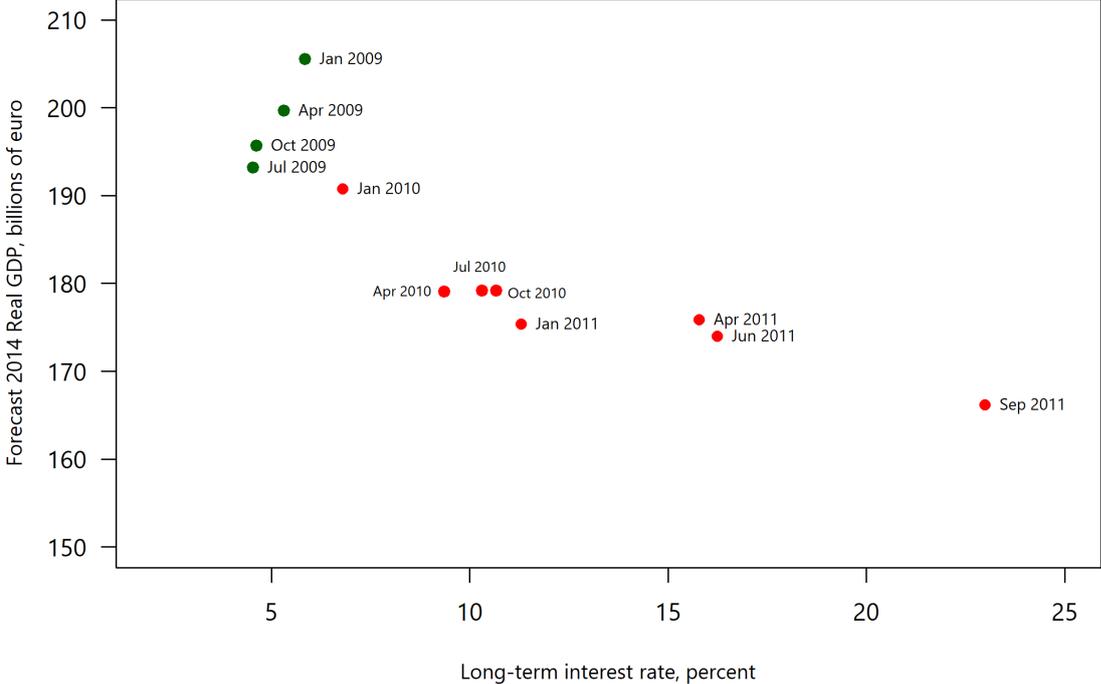
<sup>20</sup>A similar argument was made in a letter from former IMF Research Department Director Rogoff (See <https://www.imf.org/en/News/Articles/2015/09/28/04/54/vc070202>). Rogoff argued that when governments are having trouble finding buyers for their debt, the solution is not to raise deficits and issue more debt. When investors are no longer willing to finance a government, increasing the supply will not make it suddenly "sell like hot cakes". "[at the IMF] we find that when an almost bankrupt government fails to credibly constrain the time profile of its fiscal deficits, things generally get worse instead of better."

<sup>21</sup>To the extent that the impact of fiscal consolidation itself was higher-than-expected, this only exacerbated the problem.

United States, where central banks purchased government bonds in a deliberate attempt to bring down interest rates.

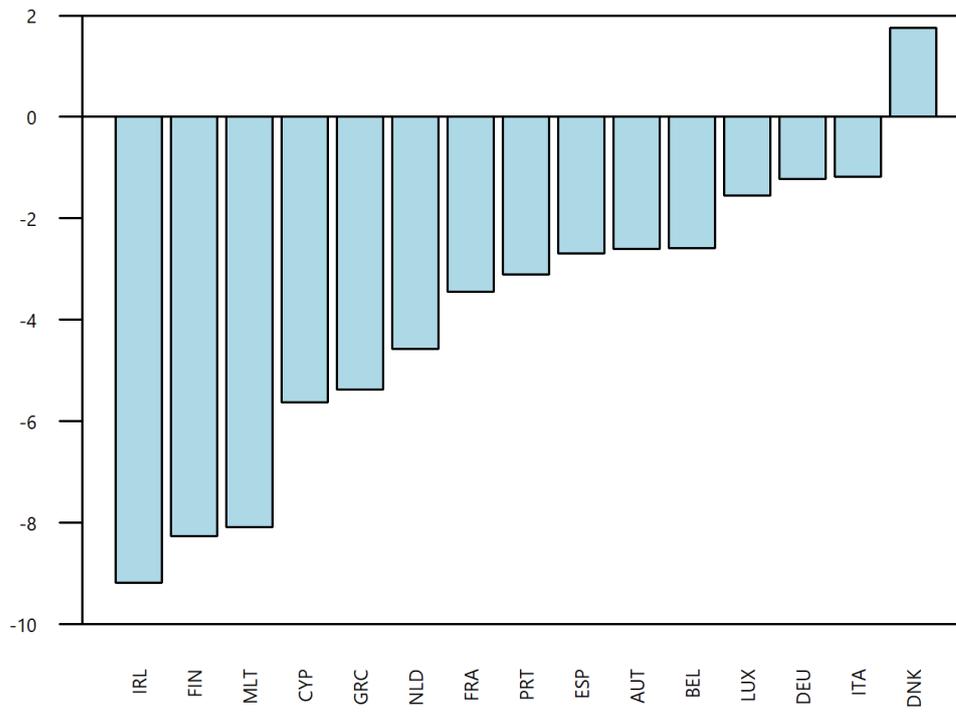
In short, the euro area crisis arose when markets became concerned about the sustainability of the public finances. In an environment where central bank financing was not available, drying up of private financing led to a sharp increase in risk premia. The rise in risk premia killed private sector output, which in turn reduced tax revenues, which then necessitated further fiscal consolidation.

**Figure 5.5. Greece: Long-term Interest Rate and Forecast for 2014 Real GDP**



**Figure 5.6. Downward Revisions of 2014 Real GDP,  
October 2009-January 2009**

(In percent)



## 6 Conclusion

It has long been recognized that risk premium shocks can lead to deep recessions and labor shedding in *emerging market countries*. High risk premia raise financing costs, which force firms to cut back on production and employment. As GDP declines and wage shares drop, employment falls sharply.

The role of risk premium shocks in advanced country recessions has received less attention. Recessions in advanced countries are typically seen as resulting from *demand* shocks.

This paper has argued that risk premium shocks played an important role in the global economic and financial crisis of 2008/09 and the euro area sovereign debt crisis in EU countries. The Baltic countries in 2008/09, and the euro area periphery countries during 2010-13 were hit by large risk premium shocks. The risk premium shocks forced firms to cut back on output and employment. The result was not just a decline in *demand*, but also a drop in *supply*. With GDP declining and wage bills declining even faster, the result was a sharp increase in unemployment rates—by 10-20 percentage points in the Baltics and euro area periphery countries. Overall, countries that were hit by risk premium shocks suffered deep recessions and sharp increases in unemployment.

Risk premium shocks were the result of the interaction of high underlying vulnerabilities with a shift in investors' sentiment. Previously, investors had not worried much about countries with high current account deficits or high fiscal deficits. When they started to worry that the massive imbalances that had built up during the pre-crisis years were no longer sustainable, risk premia shot up, most sharply in the countries with the largest imbalances. Thus, countries where pre-crisis imbalances had been the highest, saw the sharpest increase in risk premia (Figure 6.1).

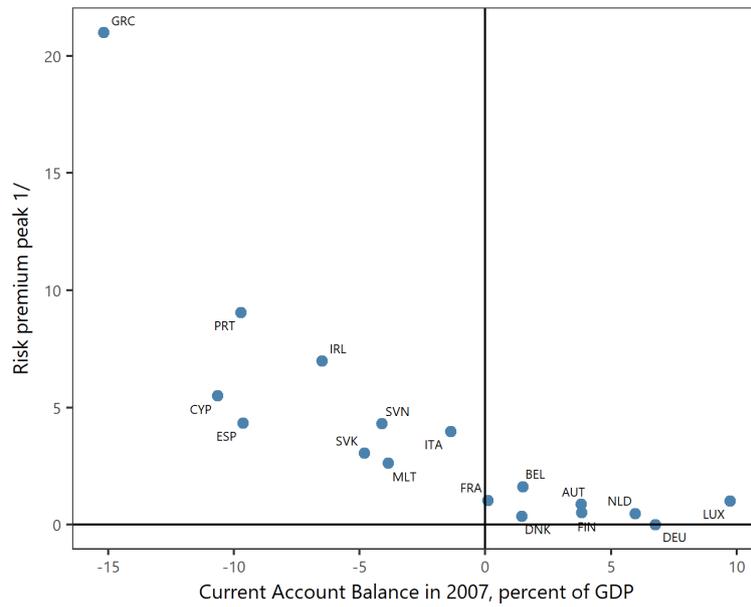
The tremendous damage risk premium shocks can do, suggests it may be best to *avoid* these risk shocks in the first place by avoiding the build-up of macroeconomic vulnerabilities. Large current account deficits or large fiscal deficits for countries that do not have their own central banks may be more dangerous than previously thought.<sup>22</sup> This is even more so if fiscal multipliers in downturns are large, because that makes it very hard to reduce these deficits when financing dries up.

When risk shocks do occur, risk premia should be brought down as quickly as possible. As long as risk premia remain large, a recovery will remain elusive: firms will remain under pressure to cut production and employment. To bring down risk premia quickly, adjustment may need to be upfront—as was successfully done in the Baltics. However, adjustment *alone* may not be sufficient to bring down risk premia; central bank intervention may help as well. The euro area crisis ended only when the ECB stepped in and brought down risk premia in the periphery.

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<sup>22</sup>In a number of countries that had their own central banks, central bank asset purchases helped reduce risk premia.

**Figure 6.1. Current account balance in 2007 and Risk premium peak**



1/ Maximum post-2007 difference between local and German long-term government bond yields, in percentage points.

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## Data Sources

Figure	Variable	Source	Code 1/	Description
1.1, 2.2, 3.1, 3.2, 3.6, 6.1; Table 3.1	Long-term government bond yields	AMECO	1.1.0.0.ILN	The longest maturity of government bonds in a given country; in nominal terms. The maturity differs between countries.
1.2, 2.2, 3.6; Table 3.1	Unemployment rate	AMECO	1.0.0.0.ZUTN	Unemployment rate: total; Member States: definition Eurostat
2.2	Real long-term government bond yield	AMECO	1.1.0.0.ILRV	The longest maturity of government bonds in a given country; deflated by GDP deflator. The maturity differs between countries.
3.3, 3.6	Employment	AMECO	1.0.0.0.NETN	Employment, total economy (national accounts)
3.3, 3.6	Wages	Haver	L_ND1@EUNA	Compensation of employees in non-financial corporations, in EUR
3.3, 3.6	Gross value added	Haver	O_NB1G@EUNA	Gross value added of non-financial corporations at basic prices; in EUR
3.1, 3.2; 3.5 Table 3.1	Real gross domestic product	AMECO	1.1.0.0.OVGD	Gross domestic product at 2010 reference levels; in national currency
3.5	Employment	AMECO	1.0.0.0.NECN	National civilian employment
3.5	Labor productivity	AMECO	1.1.0.0.RVGDE	GDP per person employed at 2010 reference levels; in national currency
3.6	Real gross domestic product	Haver	A_GDPT@EUNA	Gross domestic product in 2010 chained values; in EUR
3.6	Domestic demand	Haver	A_DDT@EUNA	Total consumption plus gross capital formation in 2010 chained values, in EUR
3.6	Exports	Haver	A_EXPT@EUNA	Exports of Goods and Services in 2010 chained values, in EUR
4.1, 5.4	Total wage bill	Eurostat	Database: nasa_10_nf_tr, sector: S11, unit: CP_MEUR, direct: PAID, na item: D1	Compensation of employees paid by the non-financial sector in current prices, in EUR

4.1, 5.4	Gross value added	Eurostat	Database: nasa_10_nf_tr, sector: S11, unit: CP_MEUR, direct: PAID, na item: B1G	Gross value added of non-financial corporations in current prices, in EUR
5.1	General government balance	WEO April 2008	ggb.a	General government balance in national currency
5.1	Gross domestic product	WEO April 2008	ngdp.a	Gross domestic product, current prices, in national currency
5.1	General government balance	WEO April 2010	ggxcnl_gdp.a	General government net lending/borrowing, percent of Fiscal year gross domestic product, in USD
5.1	General government structural balance	WEO April 2008 and WEO April 2010	ggsb.a	General government structural budget balance in national currency
5.1	Potential gross domestic product	WEO April 2008 and WEO April 2010	npgdp_n.a	Potential gross domestic product in nominal national currency
5.1	General government gross debt	WEO April 2008	ggd.a	General government gross debt, GFS 1986, in national currency
5.1	General government gross debt	WEO April 2010	ggxwdg_gdp.a	General government gross debt, percent of fiscal year gross domestic product, in USD
5.2	Ten-year government bond yields	stooq.pl		Daily
5.3	Structural deficit in 2009	WEO January, April, July and October in the years: 2009-11	ggsb.a	General government structural budget balance in national currency
5.3	Gross domestic product in 2009	WEO January, April, July and October in the years: 2009-11	ngdp	Gross domestic product, current prices, in national currency
5.3	General government gross debt in 2014	WEO January, April, July and October in the years: 2009-11	ggxwdg_gdp	General government gross debt, percent of fiscal year gross domestic product, in USD
5.3, 5.5	Long-term interest rates	Bloomberg		10-year government bond yields

5.3, 5.5, 5.6	Real gross domestic product in 2014	WEO January, April, July and October in the years: 2009-12; (for Fig. 5.6 only WEO Jan-2009 and WEO Oct-2009)	ngdp_r	Gross domestic product at 2000 reference levels, in national currency
6.1	Current account balance	WEO April 2018	bca_gdp_bp6.a	Balance of payments, current account, total, net(BPM6), percent of GDP in USD

1/ For data from Haver ”\_” in the middle of the code stands for the IMF country code.