

Growth and the Interaction between Monetary Policy and Structural Reforms: A Tribute to Mario Draghi

Philippe Aghion

Emmanuel Farhi

Enisse Kharroubi

Introduction

- **Why is Europe less resilient than the US?**
 - Suboptimal policy sequencing in Europe following the 2008 crisis?
 - Lack of reactivity in macroeconomic policy in Europe?
 - Failure to implement structural reforms?
- In 2014, Mario Draghi pointed to the complementarity between **proactive monetary policy** and **structural reforms on labor and product markets**.
- This paper focuses on **product market competition**. We argue that a proactive monetary policy is more growth-enhancing in a more competitive environment.

Sketching our analytical framework

- **Our framework:**

- An economy where firms can make growth-enhancing investments but subject to liquidity shocks
- To survive liquidity shocks, firms need to reinvest in their project at the interim period
- Anticipating this, firms sacrifice part of their investment in order to secure reinvestment by hoarding liquidity

- **Main result:**

- Countercyclical interest rates (low in recessions and high in expansions) reduce the amount of liquidity firms need to hoard to weather liquidity shocks.

- **Predictions:**

- The more likely the liquidity shock, the more growth-enhancing are countercyclical interest rates
- Countercyclical interest rates are more growth-enhancing when competition is high
 - With low competition, large rents allow firms to stay on the market and reinvest, irrespective of how funding conditions change over the cycle

Empirical strategy and results

- **Methodology:**

- **Difference-in-difference** approach comparing pre versus post-OMT industry growth in a sample of Euro Area countries.
- We relate the change in growth to the **unexpected change in 10-year government bond yields pre/post-OMT.**

- **Results:**

- Unexpected drop in government bond yields has a **positive effect** on growth in sectors with higher pre-existing **indebtedness...** but only in countries with **low product market regulation (i.e with high product market competition).**
- Pre-existing levels of **indebtedness** act as a drag on growth...and more so in countries with **low product market regulation.**

Why look at before vs. after OMT announcement?

- We are interested in the effect of monetary policy on growth.
- This raises an endogeneity issue:
 - Growth may affect the ability to cut interest rates in bad times
- We address this objection by looking at:
 - OMT as the ECB response to the European sovereign debt crisis.
 - the unexpected change in government bond yields before and after OMT.

Some historical context

- Over 2011-2012, some major Euro area countries faced severe spikes in government bond yields, raising prospects of sovereign default.
- The Outright Monetary Transaction program (OMT) was a **commitment** by the European Central Bank to buy government debt (acting as a monetary backstop) **under some strict conditionality**.
- OMT was targeted at relatively **short maturity** bonds. Yet, its announcement was followed by massive changes in **long term** government bond yields, beyond and above what had been expected.

Empirical methodology - I

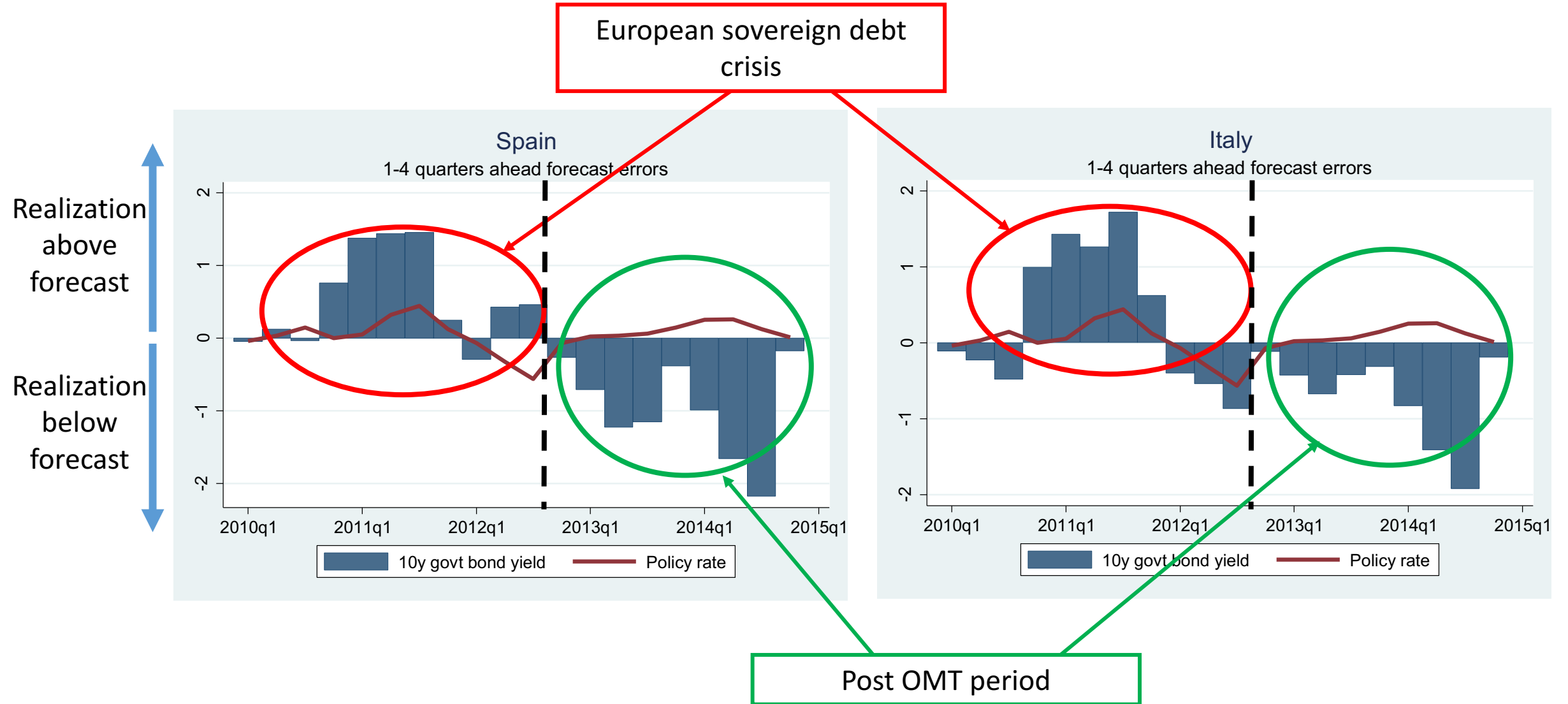
- We measure the unexpected component in bond yields by the forecast error defined as

$$FE(v, y, q) = v(y; q) - E[v(y; q) | I_{y-1}]$$

where $v(y; q)$ is the realized bond yield in quarter q of year y and $E[v(y; q) | I_{y-1}]$ is the forecasted bond yield at the end of year $y-1$.

- The forecast error horizon ranges from 1 to 4 quarters.
- We use OECD economic outlook data and compute ΔFE as the change in average forecast error between the periods 2011-2012 and 2013-2014.

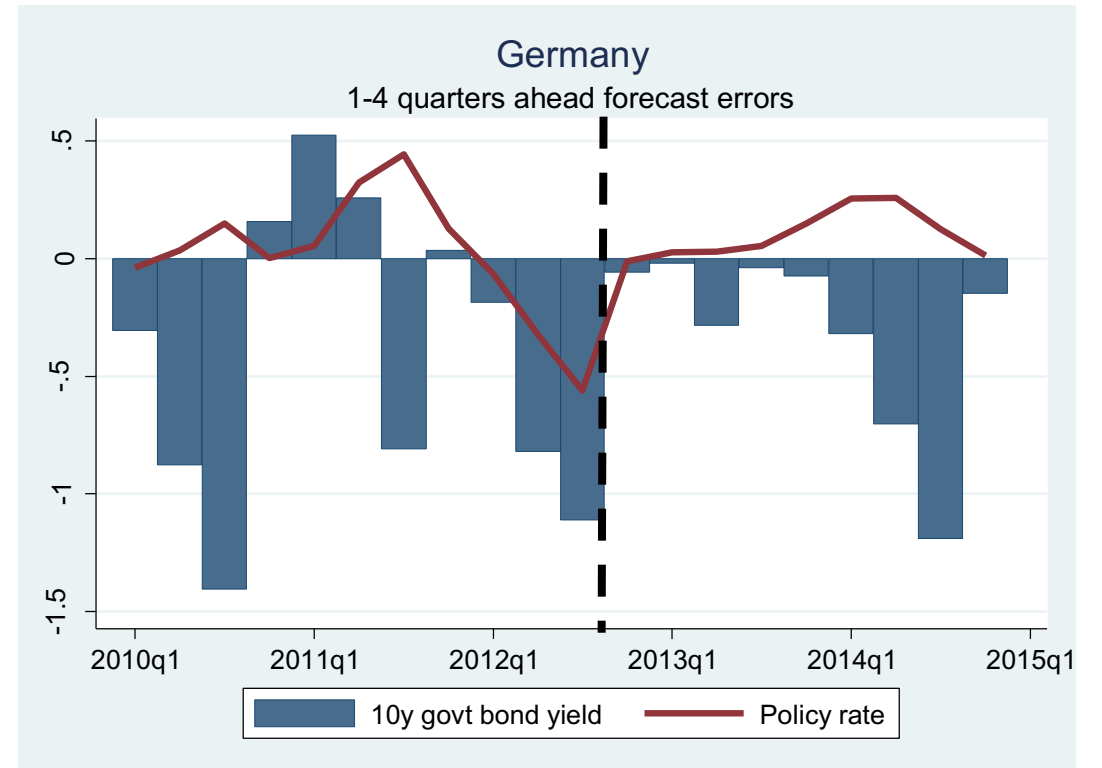
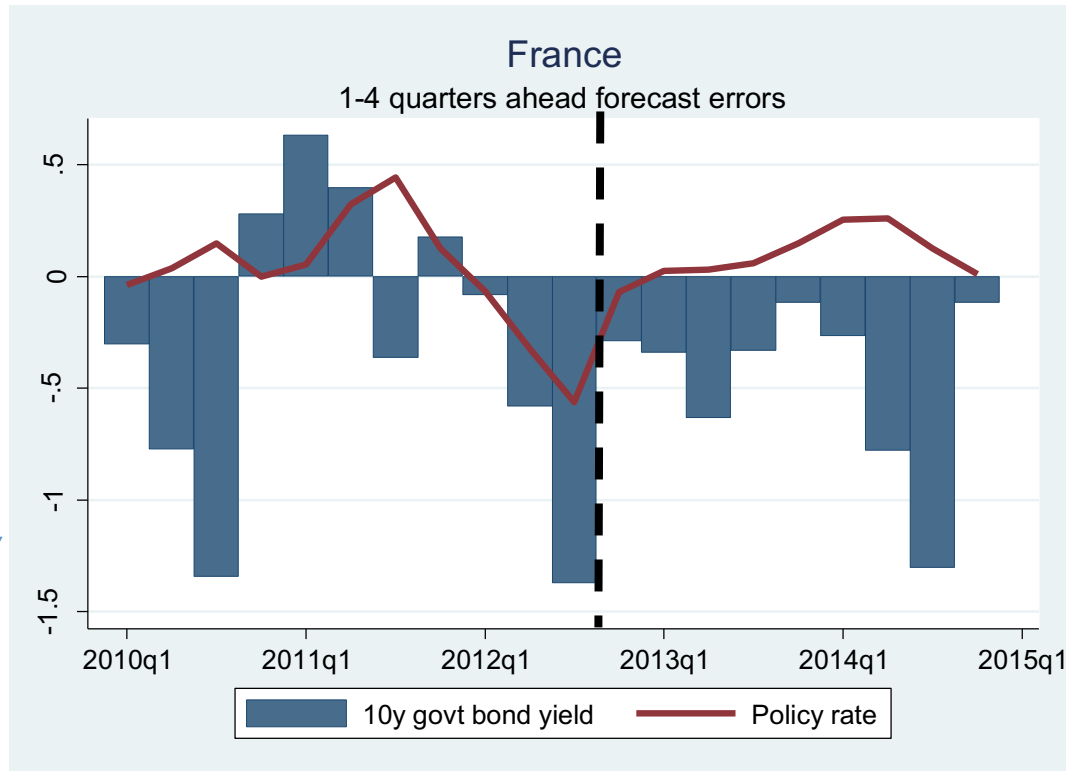
Interest rate forecast errors in Spain and Italy (in 100 bps)



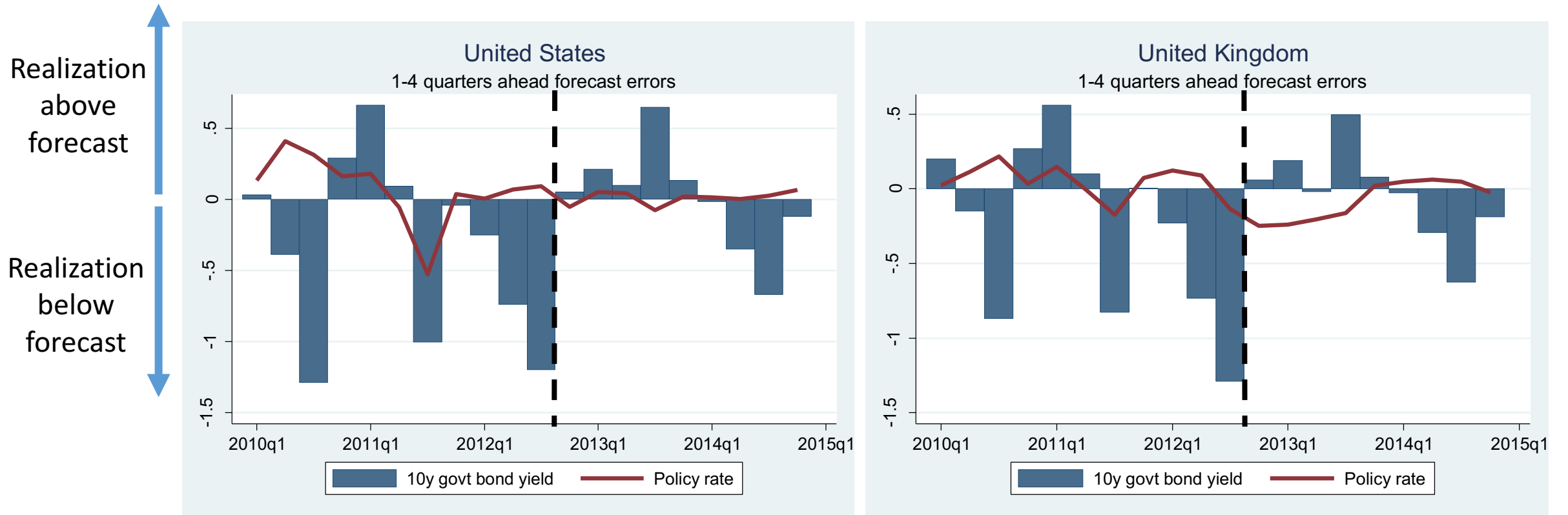
Interest rate forecast errors in France and Germany (in 100 bps)

Realization above forecast

Realization below forecast



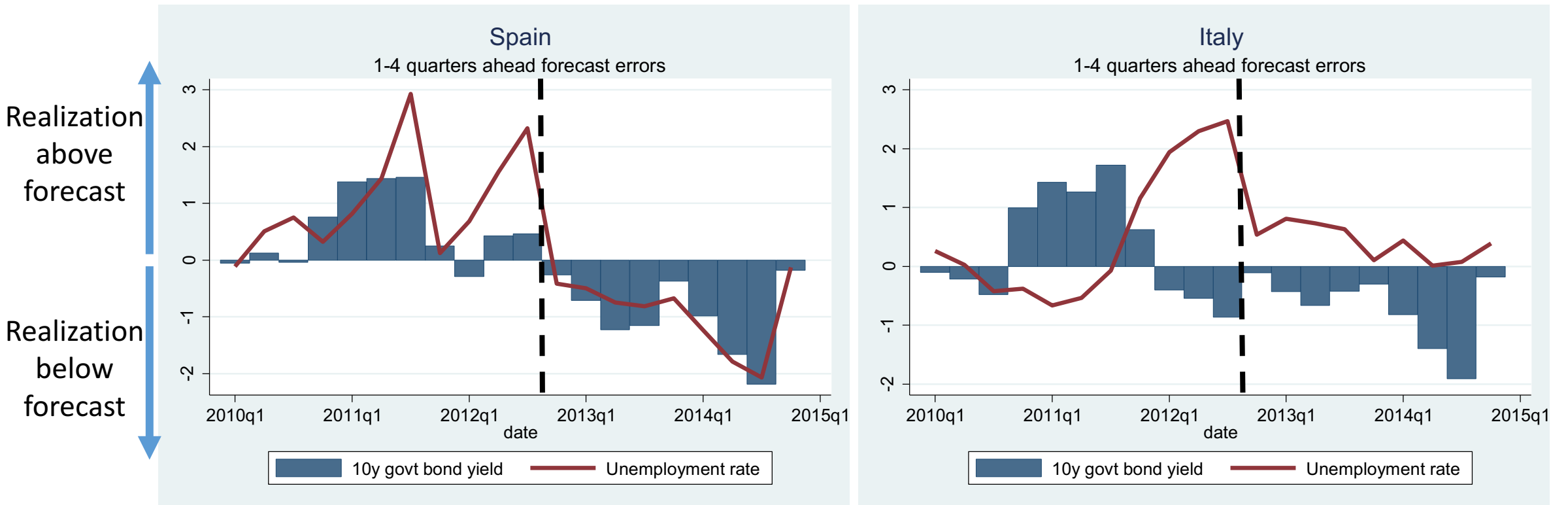
Interest rate forecast errors in the US and the UK (in 100 bps)



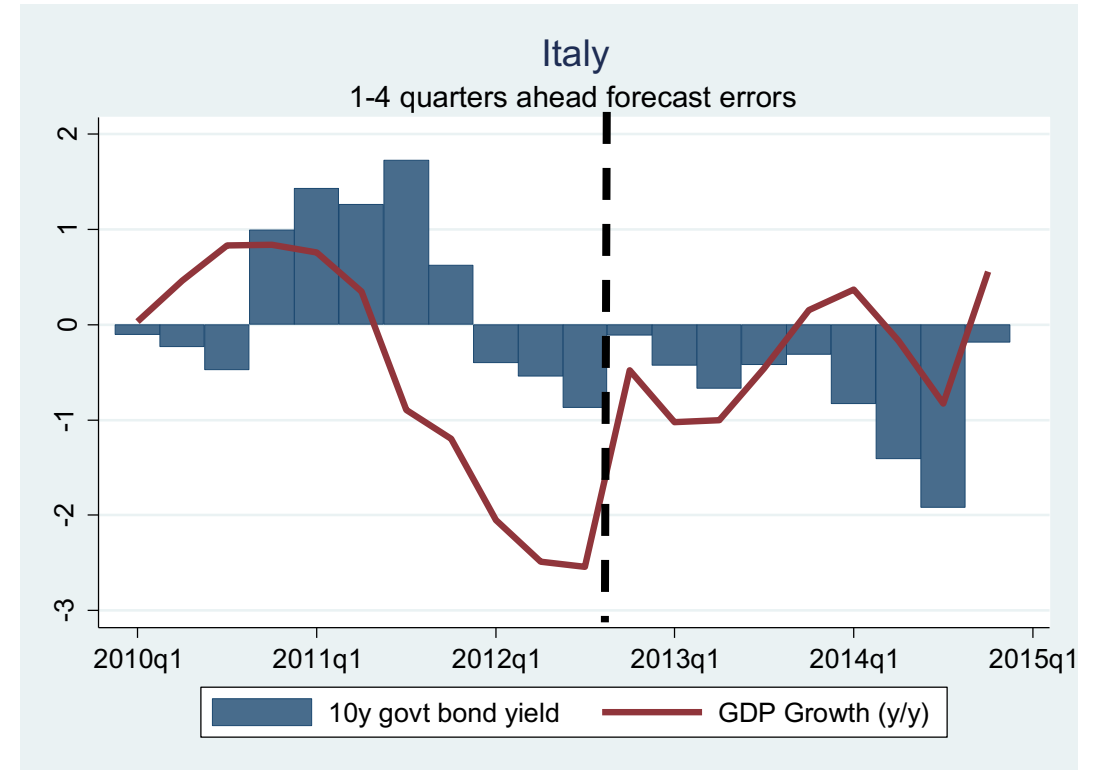
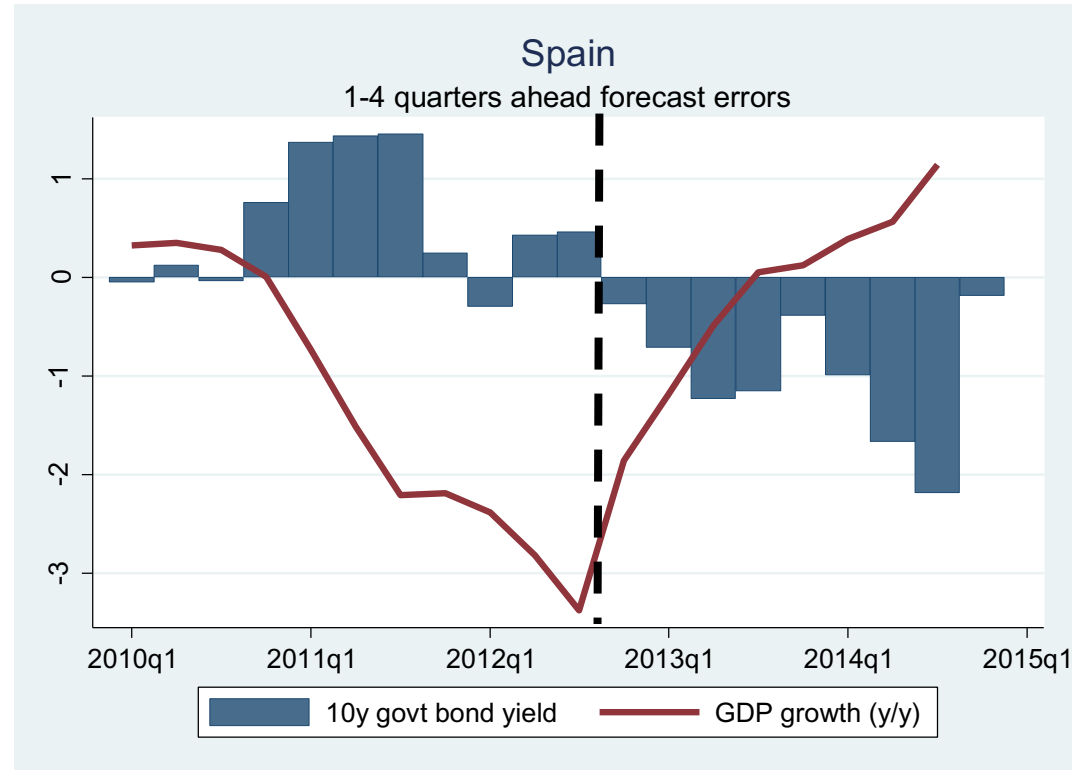
Some take-aways

- Following OMT, major unexpected changes on long-term government bond yields in Euro Area countries
 - particularly in Southern Europe
- Still, large variability in the surprise component:
 - Countries with public debt perceived as unsustainable benefited a major reduction in yields (OMT as a monetary backstop)
 - Countries perceived as safe havens during the European sovereign debt crisis actually had some minor unexpected increases in yields.
- Let us now turn to real variables

Unemployment forecast errors in Spain and Italy

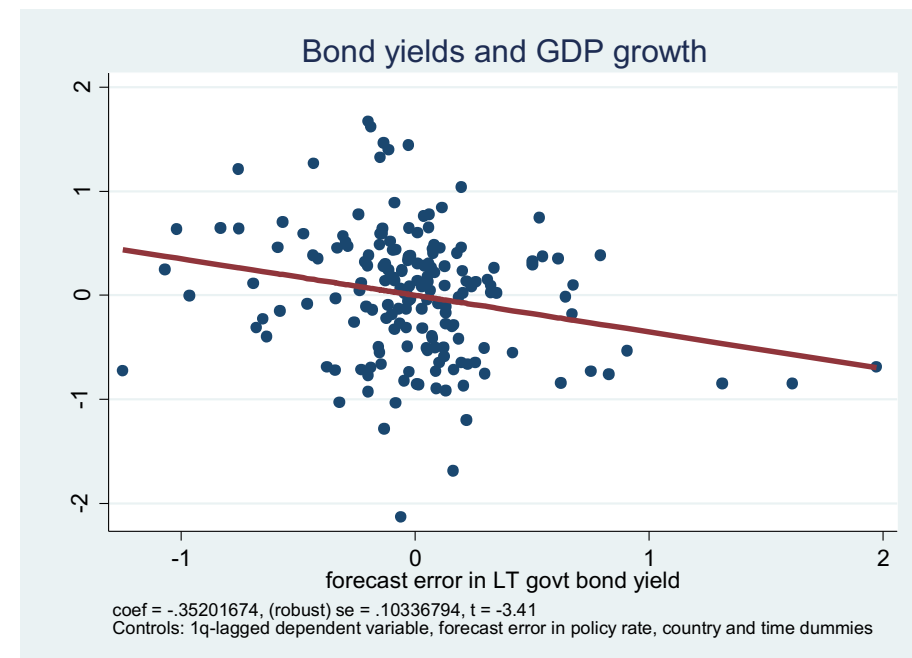
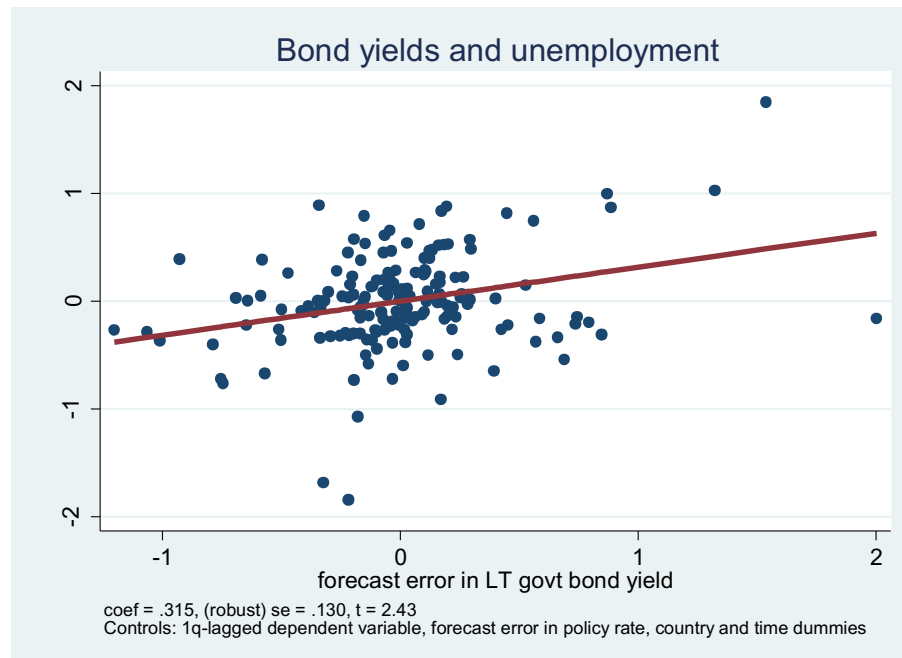


GDP growth forecast errors in Spain and Italy



Some cross-country panel evidence

- Lower LT government bond yields come with lower unemployment, and higher growth.

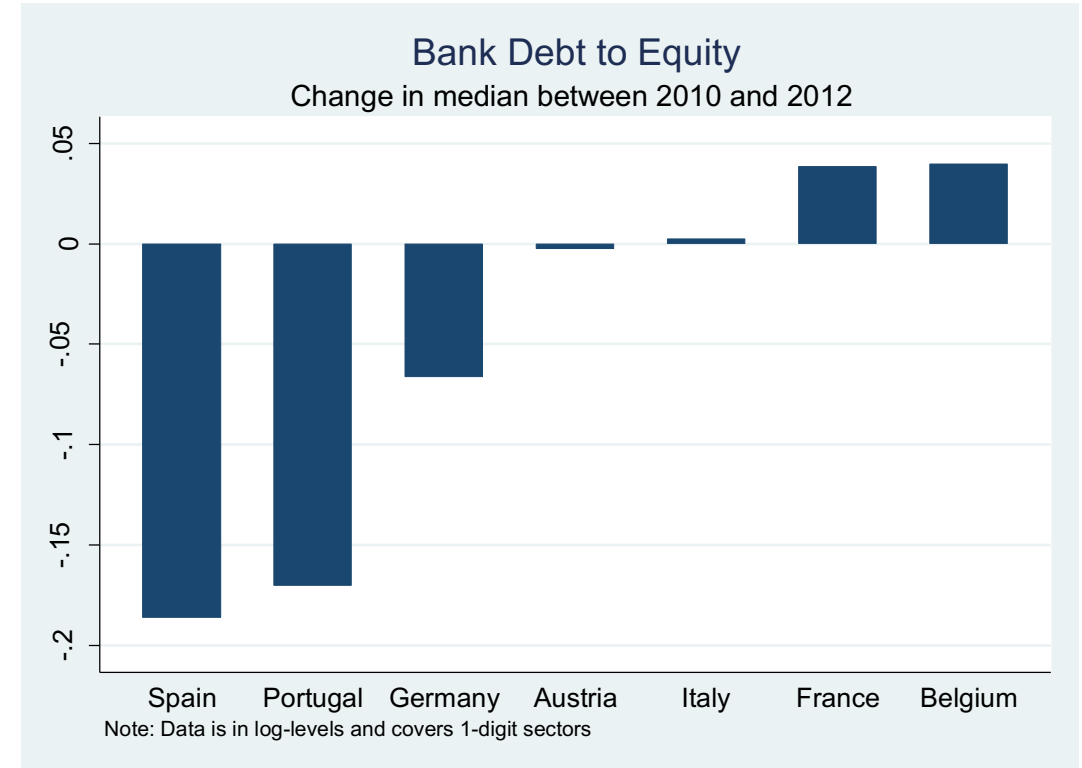
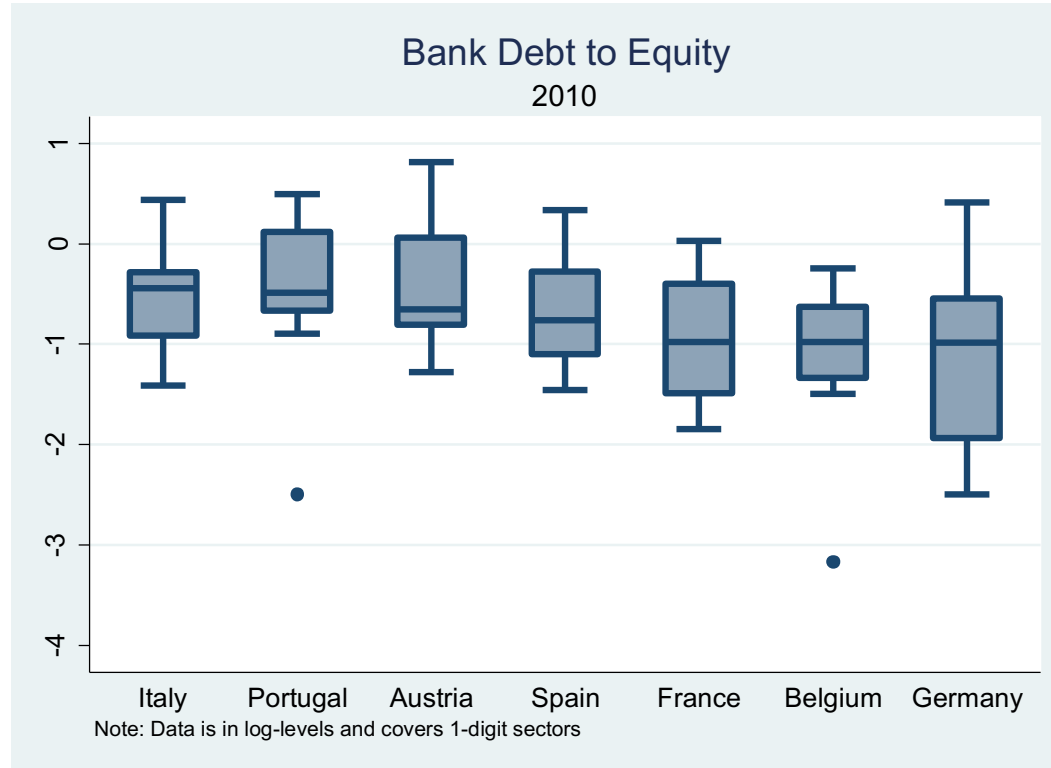


Sample: AT, BE, DE, ES, FI, FR, GB, IT, NL, SE, US; 2011q1-2014q4

Empirical methodology - II

- We are interested in how growth evolved before/after OMT (using the unexpected drop in LT bond yields as a proxy).
- We focus on two balance sheet indicators which reflect financial constraints:
 - indebtedness: **bank debt to equity** and **financial debt to equity**
 - liquid liabilities: **current bank debt to equity** and **current financial debt to equity**
- We test whether the real effects of lower bond yields depend on product market competition using as an inverse proxy the average of :
 - **barriers to trade and investment, barriers to entrepreneurship** and **state control**.

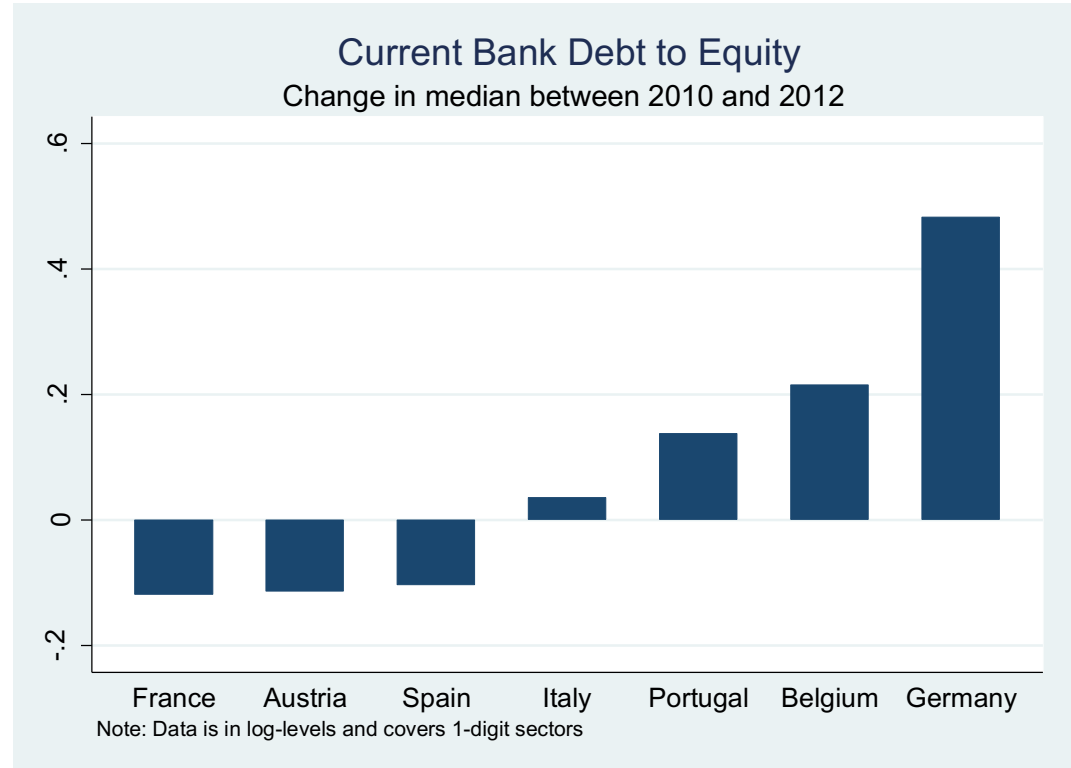
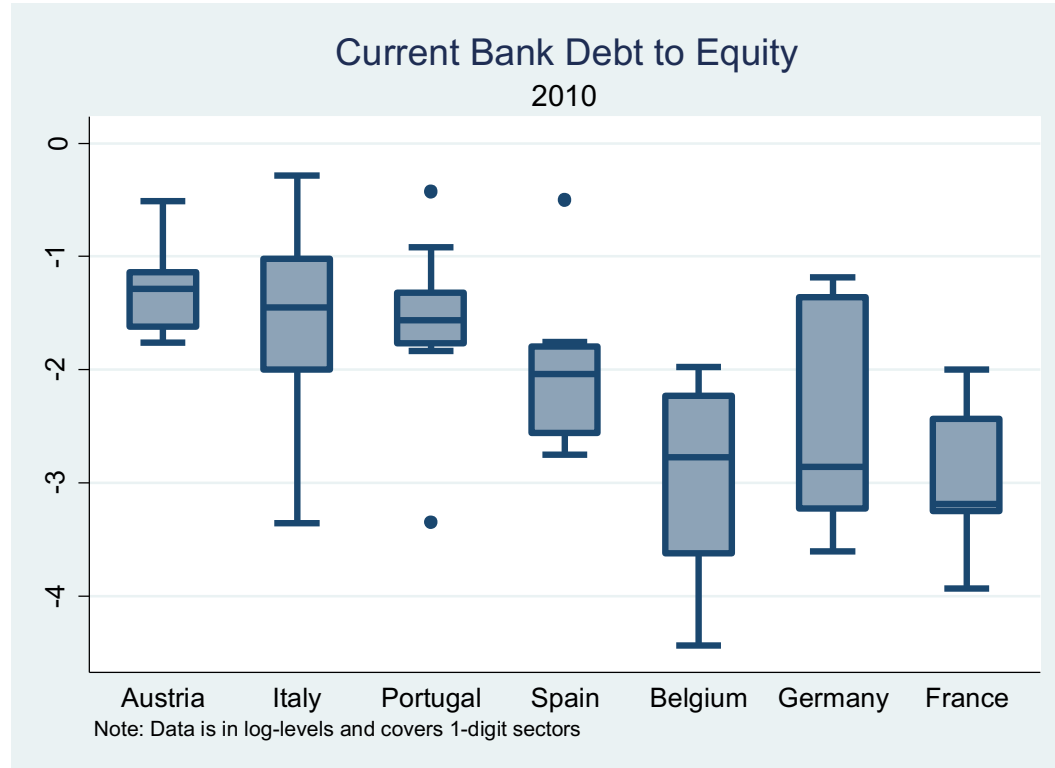
Corporate Balance Sheets



Source: BACH database.

Italy, Portugal and Austria's corporate sectors display highest median indebtedness, while some deleveraging took place over 2010-12 in Spain and Portugal.

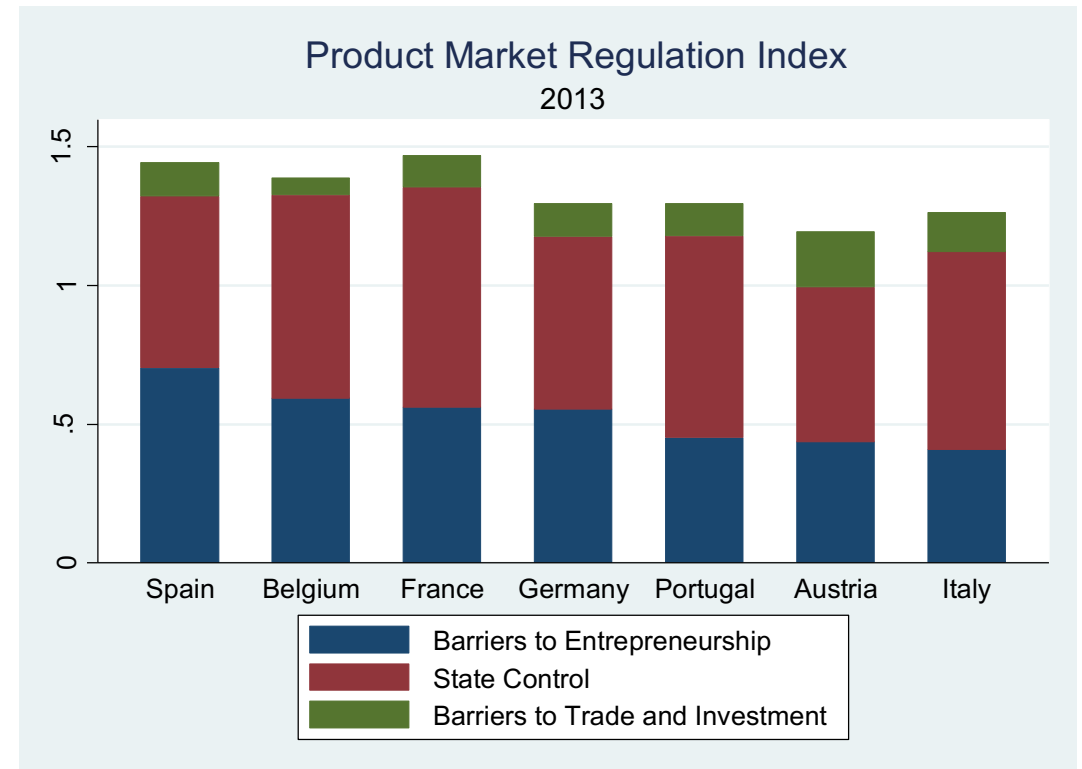
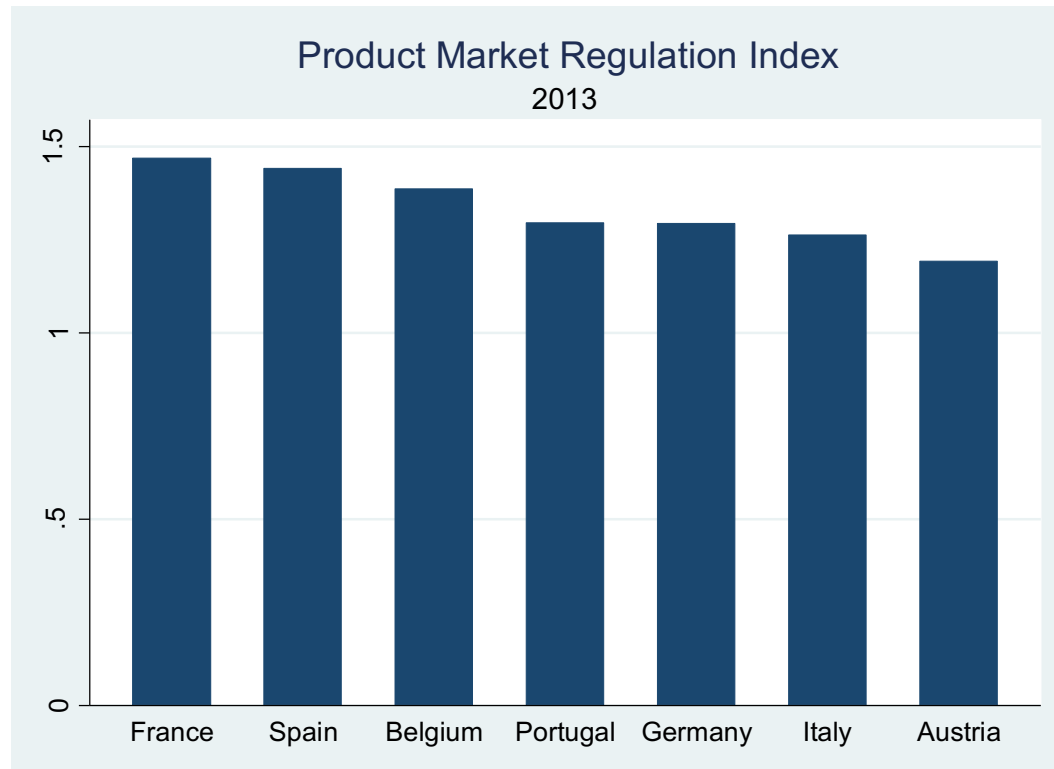
Corporate Balance Sheets



Source: BACH database

Italy, Portugal and Austria's corporate sectors hold largest current debt relative to equity, while France, Austria and Spain reduced current debt over 2010-12.

Product market regulation



Source: OECD product market regulation database

France, Spain and Belgium have highest index of the product market regulation but barriers to entrepreneurship highest in Spain.

Empirical methodology – III

- Denoting D_{sc} indebtedness in sector s in country c , we estimate the effect of the unexpected drop in long-term government bond yields ΔFE_c on growth G_{sc} :

$$G_{sc,12-14} = \beta_g \cdot G_{sc,10-12} + \beta_{d0} \cdot D_{sc} + \beta_{c0} \cdot D_{sc} \times \Delta FE_c + \varepsilon_{sc}$$

We expect $\beta_{d0} < 0$ and $\beta_{c0} > 0$

- We then test whether these effects differ across countries according to the degree of product market regulation:

$$G_{sc,12-14} = \beta_g \cdot G_{sc,10-12} + \beta_{d0} \cdot D_{sc} + \beta_{c0} \cdot D_{sc} \times \Delta FE_c \\ + \beta_{d1} D_{sc} \times PMR_c + \beta_{c1} \cdot D_{sc} \times \Delta FE_c \times PMR_c + \varepsilon_{sc}$$

We expect $\beta_{d1} > 0$ and $\beta_{c1} < 0$

Note: All estimations are saturated with country and sector fixed effects. Standard errors will be clustered at the sector level.

Empirical results

- sectoral indebtedness measure: *bank debt to equity ratio* in 2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable	Value Added Growth				Labour Productivity Growth				Capital Productivity Growth			
Lagged dependent variable	0.256** (0.104)	0.250** (0.104)	0.251** (0.102)	0.252** (0.102)	0.149 (0.109)	0.142 (0.110)	0.146 (0.115)	0.148 (0.115)	0.361** (0.162)	0.347** (0.159)	0.299** (0.145)	0.297* (0.146)
Interaction (Sectoral Indebtedness and unexpected drop in yield)	0.00986* (0.00513)	0.00973** (0.00461)	0.307*** (0.0949)	0.350*** (0.124)	0.0101* (0.00540)	0.0100** (0.00482)	0.283** (0.112)	0.329** (0.148)	-0.0248 (0.0294)	-0.0130 (0.0286)	0.868*** (0.201)	0.965*** (0.313)
Interaction (Sectoral indebtedness and unexpected drop in yield and PMR)			-0.229*** (0.0714)	-0.262*** (0.0949)			-0.211** (0.0855)	-0.246** (0.114)			-0.626*** (0.152)	-0.696*** (0.233)
Sectoral indebtedness	-0.0139 (0.0113)	0.171* (0.0888)	-0.00764 (0.0104)	-0.0612 (0.0915)	-0.0132 (0.0125)	0.153 (0.0932)	-0.00738 (0.0118)	-0.0649 (0.0901)	-0.0140 (0.0230)	0.207* (0.122)	-0.0184 (0.0231)	-0.0897 (0.161)
Interaction (Sectoral indebtedness and PMR)		-0.138* (0.0709)		0.0407 (0.0708)		-0.124 (0.0744)		0.0438 (0.0703)		-0.166* (0.0858)		0.0531 (0.114)
Observations	220	220	220	220	220	220	220	220	144	144	144	144
R-squared	0.464	0.480	0.502	0.503	0.415	0.429	0.450	0.450	0.397	0.409	0.439	0.440

Empirical results

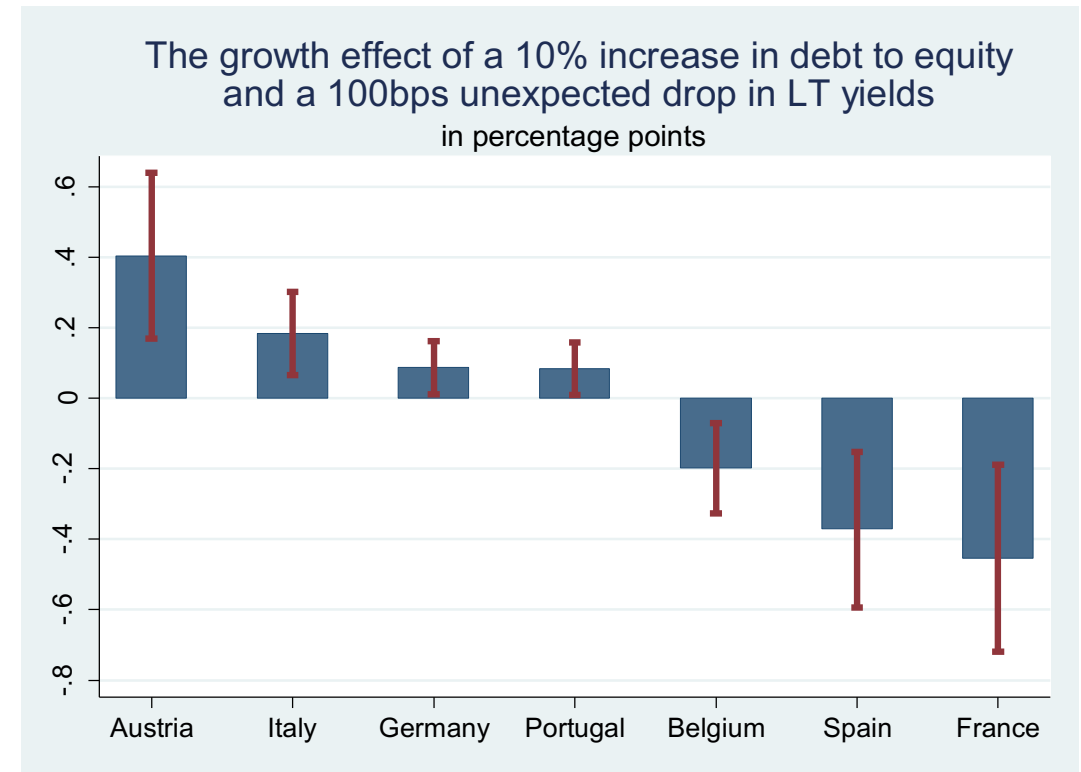
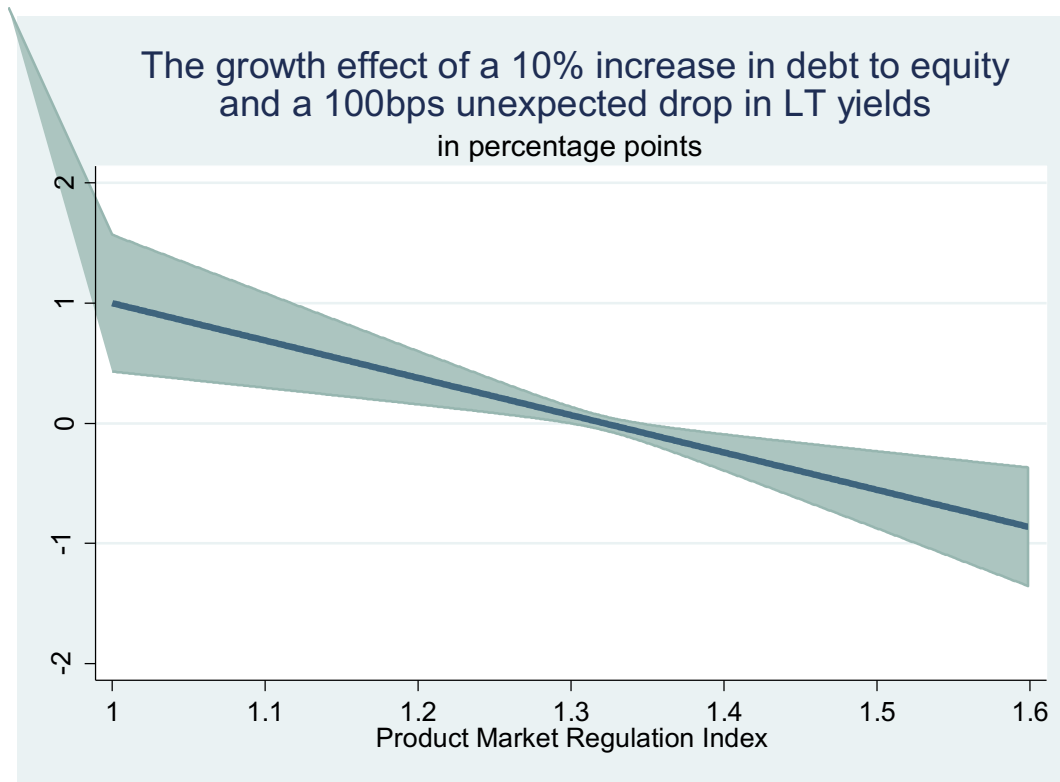
- Sectoral indebtedness measure: *bank debt and bonds to equity* in 2010.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable	Value Added Growth				Labour Productivity Growth				Capital Productivity Growth			
Lagged dependent variable	0.249** (0.0946)	0.245** (0.0937)	0.245** (0.0925)	0.246** (0.0924)	0.181 (0.118)	0.174 (0.117)	0.175 (0.120)	0.177 (0.121)	0.360** (0.158)	0.346** (0.156)	0.315** (0.144)	0.316** (0.147)
Interaction (Sectoral indebtedness and unexpected drop in yield)	0.000966 (0.00573)	0.00267 (0.00656)	0.284** (0.108)	0.338** (0.143)	0.00154 (0.00494)	0.00311 (0.00527)	0.255** (0.124)	0.311* (0.172)	-0.0341 (0.0332)	-0.0185 (0.0326)	0.879*** (0.266)	0.834** (0.405)
Interaction (Sectoral indebtedness and unexpected drop in yield and PMR)			-0.217** (0.0804)	-0.258** (0.109)			-0.194** (0.0941)	-0.237* (0.132)			-0.635*** (0.191)	-0.604** (0.293)
Sectoral indebtedness	-0.00937 (0.0112)	0.155* (0.0875)	-0.00341 (0.0102)	-0.0689 (0.0924)	-0.00964 (0.0128)	0.133 (0.0901)	-0.00429 (0.0120)	-0.0735 (0.102)	-0.00490 (0.0261)	0.266** (0.116)	-0.0157 (0.0254)	0.0122 (0.181)
Interaction (Sectoral indebtedness and PMR)		-0.125* (0.0717)		0.0505 (0.0725)		-0.108 (0.0741)		0.0533 (0.0805)		-0.206** (0.0860)		-0.0208 (0.131)
Observations	220	220	220	220	220	220	220	220	144	144	144	144
R-squared	0.447	0.460	0.478	0.479	0.397	0.407	0.424	0.425	0.400	0.417	0.433	0.433

Main take-aways

- Heavily indebted sectors benefited disproportionately from the unexpected drop in LT government bond yields following OMT....
 - ...but only in countries with low index for product market regulation.
 - Product market regulation acts to divert the benefits of lower interest rates away from indebted sectors.
- Corporate indebtedness acts as a drag on subsequent growth...
 - ...but only in countries with low index for product market regulation. Product market regulation acts to dampen the negative effect of corporate indebtedness.
- These results holds using bank debt or bank debt and bonds as a measure of corporate indebtedness.

Quantifying the joint effect of indebtedness and lower yields



Unexpected drop in LT yields benefited *more* to highly indebted sectors in Austria, Italy and Germany but *less* to highly indebted sectors in Spain and France.

Investigating the transmission channel

- Falling yields should lead to easier funding conditions. Do we observe this? What is the role of product market regulation?
- Denoting IP_{sc} a measure of interest payments of sector s in country c , we estimate the empirical specification:

$$IP_{sc,12-14} = IP_{sc,10-12} + (D_{s,c} + \Delta FE_c \times D_{s,c}) \times PMR_c + \varepsilon_{s,c}$$

- We consider two alternatives: either *average* or *change* in interest payment to equity over the period

Empirical results

- sectoral indebtedness measure: *bank debt to equity ratio* in 2010

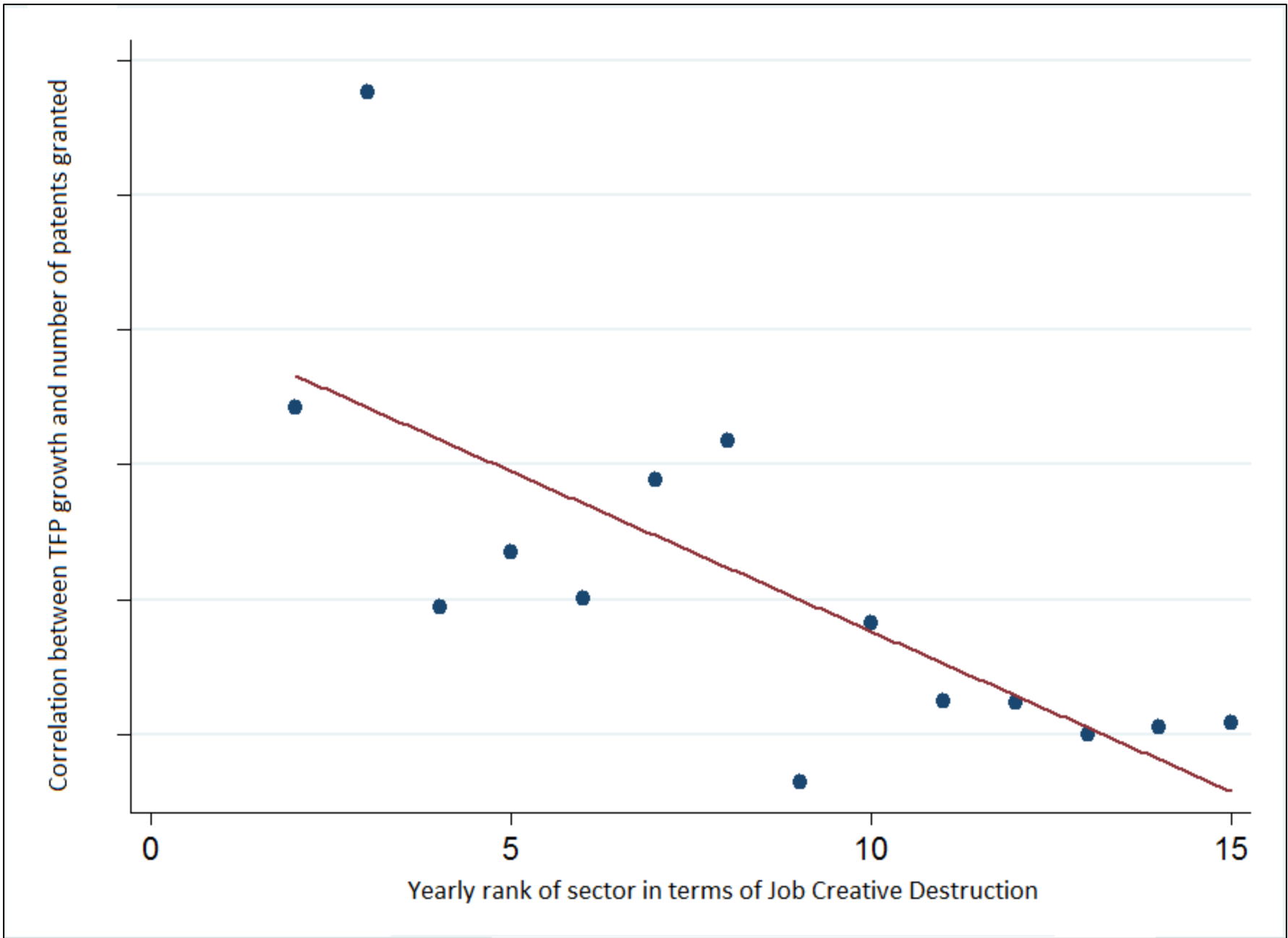
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	Interest payments to equity				Change in Interest payments to total equity			
Lagged dependent variable	1.011*** (0.0642)	0.999*** (0.0750)	0.964*** (0.0894)	0.968*** (0.0875)	0.0609 (0.148)	0.0485 (0.159)	0.0299 (0.155)	0.0359 (0.156)
Interaction (Sectoral indebtedness and unexpected drop in yield)	-0.130** (0.0529)	-0.127** (0.0503)	-1.362* (0.690)	-2.254** (0.900)	-0.155* (0.0778)	-0.150* (0.0763)	-2.219** (0.945)	-3.435* (1.781)
Interaction (Sectoral indebtedness and unexpected drop in yield with PMR)			0.957* (0.515)	1.642** (0.679)			1.597** (0.696)	2.531* (1.352)
Sectoral indebtedness	-0.0748 (0.0614)	-0.480 (0.657)	-0.104* (0.0545)	1.148 (0.710)	-0.179 (0.155)	-1.076 (1.039)	-0.245* (0.131)	1.467 (1.886)
Interaction (Sectoral indebtedness with PMR)		0.302 (0.517)		-0.948* (0.545)		0.664 (0.836)		-1.296 (1.455)
Observations	214	214	214	214	215	215	215	215
R-squared	0.773	0.774	0.784	0.788	0.460	0.463	0.483	0.489

Conclusions

- Main results:
 - We looked at the effect of unexpected drops in long-term government bonds following the announcement of OMT.
 - We found that heavily indebted sectors benefited disproportionately from the unexpected drop in long-term government bond yields following OMT...
 - ...but only in countries with low index for product market regulation.
- Next steps:
 - Investigating the role of labour market reforms
 - Using bank-firm matched data

Missing Growth from Creative Destruction

with A. Bergeaud, T. Boppart, P. Klenow, and H. Li



MEASURED VS. TRUE GROWTH

% points per year

	Measured	“True”
1983–2013	1.87	2.43
1983–1995	1.80	2.40
1996–2005	2.68	3.09
2006–2013	0.98	1.67

% points per year

	Missing	Measured	“True”
2003–2013	0.58	0.71	1.29
2006–2013	0.57	0.42	0.99

% points per year

		Missing	Measured	" True"
2006-2013	France	0.57	0.42	0.99
	US	0.69	0.90	1.59
