



## ECONOMIC POLICY NOTE 17/2/2016

# Credit booms and the “productivity puzzle”

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- Low productivity growth has confused both policymakers and economists. In this paper, we argue that the credit cycle can help explain the so-called “productivity puzzle”.
- In phases with loose credit conditions, investment of lower quality is financed. This slows aggregate productivity growth. The opposite happens when credit conditions tighten.
- We show evidence for a sample of euro area countries that resources were misallocated during the recent credit boom. Activity shifted from the more productive manufacturing sector towards less productive construction and real estate sectors.

### The credit cycle and the real sector

George Osborn, the British Chancellor of the Exchequer has called raising productivity “the challenge of our lifetime”.<sup>1</sup> But why has productivity growth slowed so much? Monetary policy and the credit cycle may offer an answer.

Central banks intervene in money markets and manipulate the conditions for credit creation by the banks. This leads to credit boom-bust cycles which trigger real business cycles, as described by Wicksell, von Mises and von Hayek.<sup>2</sup>

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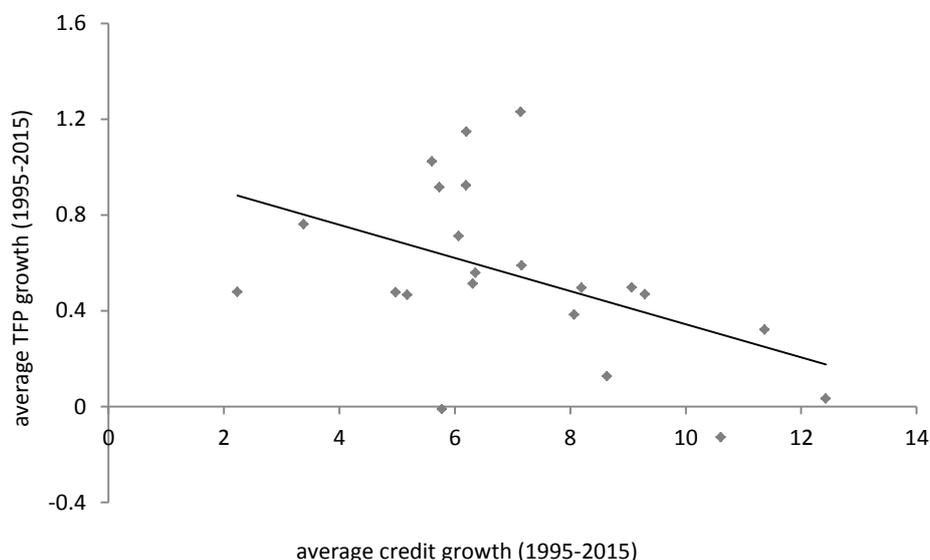
<sup>1</sup> Claimed in July 2015, when launching his productivity plan alongside the British Budget. See “Fixing the foundations: Creating a more prosperous nation”, Presented to Parliament by the Chancellor of the Exchequer, HM Treasury, Department for Business, Innovation and Skills, 10 July 2015. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/443897/Productivity\\_Plan\\_print.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/443897/Productivity_Plan_print.pdf).

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<sup>2</sup> For details regarding theoretical predictions and descriptive evidence confirming the occurrence of credit boom-bust cycles, see Agnieszka Gehring and Thomas Mayer: Understanding low interest rates. Flossbach von Storch Research Institute, Economic Policy Note 23/10/2015.



Figure 1 Growth of credit to the private sector and of total factor productivity (TFP)



Note: The sample includes Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Italy, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

Source: Bank for International Settlements for credit data and DG Ecfm AMECO database for TFP data

In phases with loose credit conditions, investment of lower quality is financed. This slows aggregate productivity growth. The opposite happens when credit conditions tighten. The relationship between the growth of credit and productivity is shown in Figure 1 for a sample of 22 countries in the period 1995-2015. Growth rates of credit to the private sector are plotted against growth rates of total factor productivity. Figure 1 shows that in countries where credit growth was strong, total factor productivity growth lagged behind. A simple cross-sectional regression based on this sample suggests that a one percentage point increase in credit growth contributed to a 0.65 percentage point decline in TFP growth.<sup>3</sup>

<sup>3</sup> The estimated coefficient is significant at 5% level. Cross sectional estimation was performed controlling for the influence of government consumption and of trade openness.

Why do credit booms provoke a slowdown of productivity growth? Phases of credit expansion are characterized by loose monetary policy with the aim to stimulate growth. Under these conditions, risky projects that would not have qualified for funding credit are now financed.

Moreover, loose credit conditions induce malinvestment, as less productive projects become viable. In addition, the quality standards for credit decline and firms with lower quality projects are financed (Gorton and Ordoñez, 2015).<sup>4</sup>

Cecchetti and Kharroubi (2015) blame “financial deepening” for these negative productivity effects. They develop a model which predicts that the expansion of the financial sector favors investment projects with high collateral for credit but low productivity (e.g. real estate).

<sup>4</sup> Gary Gorton and Guillermo Ordoñez: Good booms, bad booms. Yale University and University of Pennsylvania, mimeo, 2015.



Moreover, they show that financial sector expansion attracts skilled labor away from more productive sectors.<sup>5</sup>

This shift towards less productive investment projects is accompanied by a reallocation of activities between sectors. In particular, Borio et al. (2016) show that a large part (almost two-third) of the negative impact on productivity growth can be ascribed to the shift of workers to sectors with lower productivity growth.<sup>6</sup>

The present paper analyses sector-level data for six euro area countries with the aim of disentangling the direction of inter-sectoral reallocation of economic activities during the last credit boom.

### **Credit booms, production reallocation and productivity slowdown**

Recent findings by Borio et al. (2016) offer evidence suggesting that the credit cycle negatively affects labor productivity growth in a sample of 21 industrialized countries over the period 1979-2013. Specifically, they find that two thirds of the negative productivity impact was due to the shift of activity from high to low productivity sectors. In the present paper, we check whether and in which direction such reallocation has occurred during the period preceding the Great Recession.

To this end, simple scatter plots of sector level value added growth and labor productivity growth are used. Our hypothesis suggests that value added in sectors with low productivity growth grew strongly at the expense of the high

productivity manufacturing sector (and vice versa). Hence, we expect the slope of a regression line through the observations to be negative.

It should be noted that this kind of analysis does not allow conclusions on the causal relationship between the variables. There is, however, an important advantage of this method over a standard regression analysis. By looking at single country sector-level data, it is possible to identify the actual length of the credit booms. Indeed, despite common monetary policy, each country in the euro area has experienced a different pattern of the credit expansion. For instance, the credit boom in Spain lasted between 1999 and 2007. In Italy it lasted two years longer until 2009. Against this, credit booms in Finland, Austria, Greece and Ireland were shorter and occurred between 2003 and 2008. Finally, in Germany and Netherlands there was no clear sign of a credit boom in the period 1999-2015. Hence, we do not include these countries in our analysis.<sup>7</sup> Also, due to data limitations, it was not possible to perform the analysis for Greece, Portugal and Ireland.<sup>8</sup>

Based on each country's specific length of the credit boom, we calculated the average growth rates of value added and productivity for each of 24 sectors (listed in the Appendix). In the scatter plots of the two series, we excluded outlier observations, which could have unduly influenced our conclusions.<sup>9</sup> Figure 2 shows the scatter plots for six euro area countries. It is obvious that production shifted from more to less productive sectors during the credit booms.

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<sup>5</sup> Stephen Cecchetti and Enisse Kharroubi: Why does financial sector growth crowd out real economic growth? Bank for International Settlements, Working Paper 490, February 2015.

<sup>6</sup> Claudio Borio, Enisse Kharroubi, Christina Upper and Fabrizio Zampolli: Labour reallocation and productivity dynamics: financial causes, real consequences. Bank for International Settlements, Working Paper 534, January 2016.

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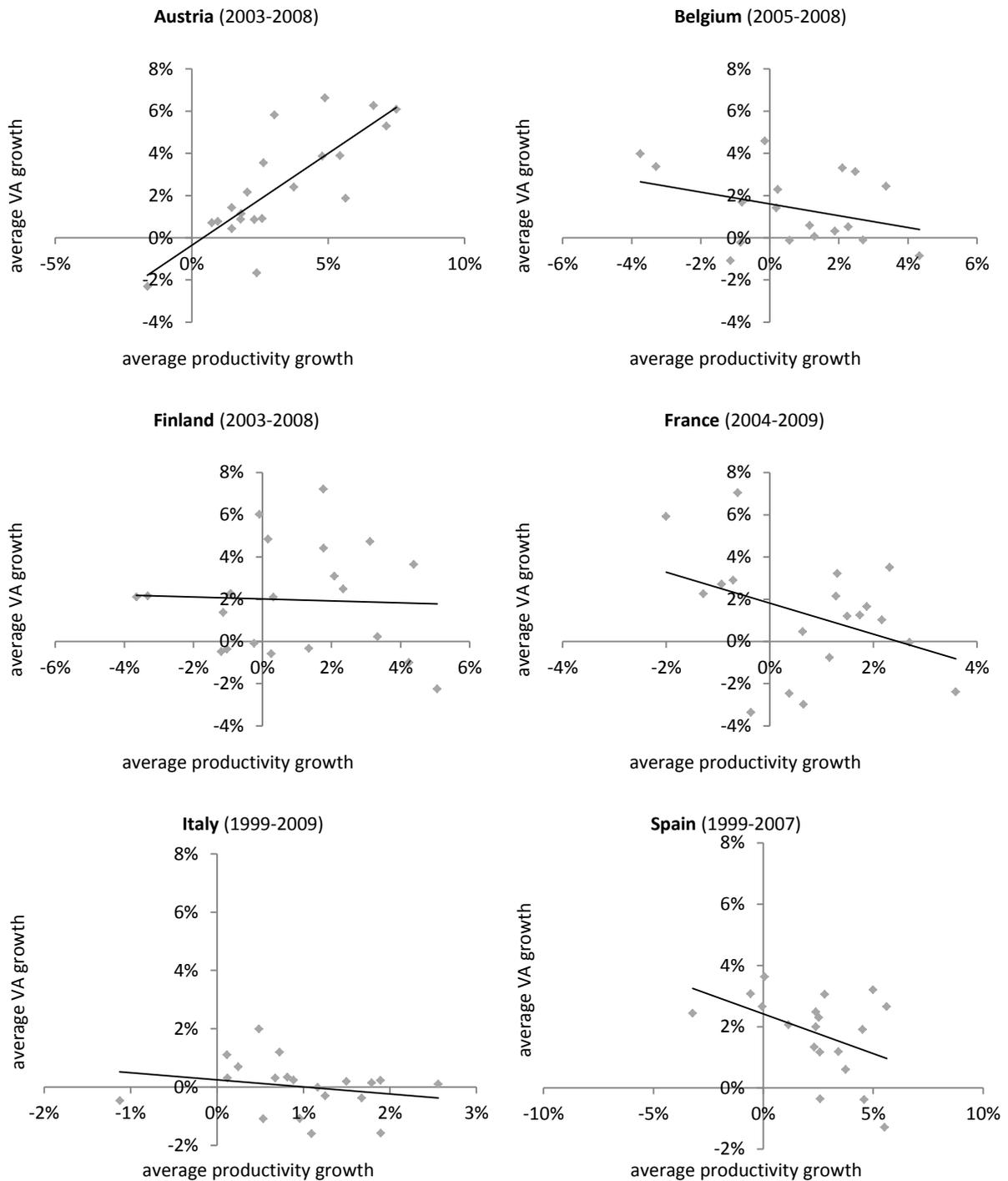
<sup>7</sup> We define the credit cycle as the period of time of accelerated credit allocation.

<sup>8</sup> The 2012 EU KLEMS database was used for this part of analysis. These are sector-level data available for eight euro area countries up to 2010.

<sup>9</sup> However, these outliers are often extreme examples of economic misallocation, which we will consider in the analysis below.



Figure 2 Average sectoral real value added and labor productivity growth over the recent credit boom

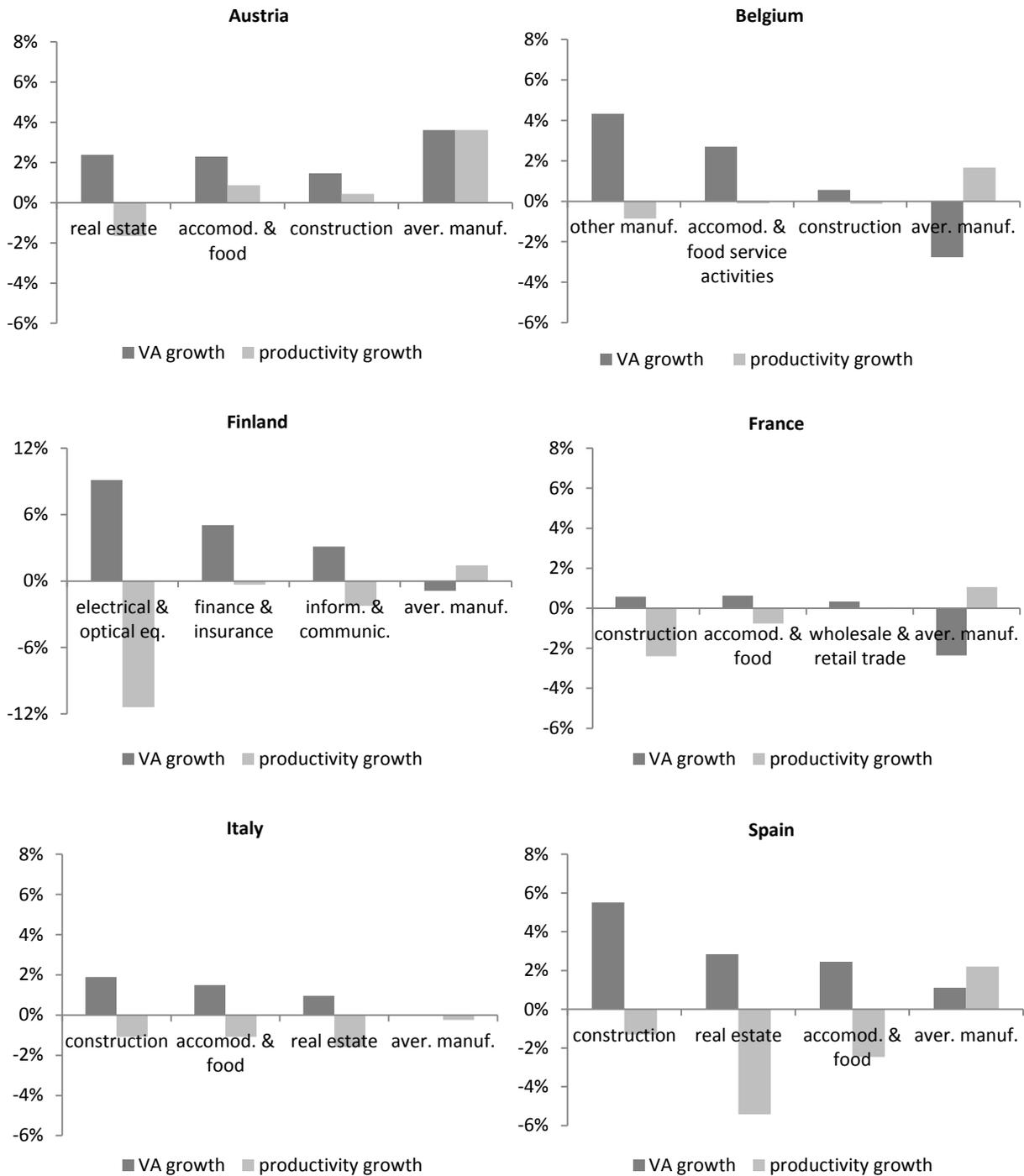


Note: Single points refer to one of 24 sectors as listed in the Appendix. Time periods reported indicated the length of the credit boom. Labor productivity is measured in terms of gross value added per hours worked.

Source: Flossbach von Storch Research Institute; Calculations based on the 2012 EU KLEMS database



**Figure 3 Average real value added and labor productivity growth over the recent credit boom in three worst performing sectors and for average of manufacturing sector**



Source: Flossbach von Storch Research Institute; Calculations based on the 2012 EU KLEMS database



A reallocation occurred in Belgium, France, Spain and Italy. Exceptions are Austria and partly Finland, where the relationship seems to have been positive or inexistent at best (Finland).

Finally, we look at the direction of structural change during the last credit boom. Figure 3 summarizes data on value added growth and productivity growth for the three worst performing and the average of eleven manufacturing sectors in each of the six countries. In all countries, productivity growth was higher and – with the exception of Austria – value added growth was lower in the manufacturing sector than in the worst performing sectors. Moreover, with the exception of Finland, the construction sector expanded strongly during the last credit boom. The value added of this sector rose at an average annual rate of 5.5% in Spain, 1.9% in Italy, 1.5% in Austria, 0.6% in France and in Belgium. Annual productivity growth of this sector averaged at -0.9% for these countries.<sup>10</sup> Real estate activities, which are closely related to construction and exhibit similarly low productivity growth, expanded strongly, with

growth in value added of 2.4% in Austria, 1.0% in Italy and 2.8% in Spain. Other sectors with strongly negative productivity growth, which significantly expanded their activity, included accommodation and food services in Austria, Belgium, France, Italy and Spain, other manufacturing in Belgium, and – as the only manufacturing sector – electrical and optical equipment in Finland.

### **Conclusion**

Credit cycles lead to imbalances in the real economy. Less productive activities expand at the expense of the more productive sectors during credit booms. When booms turn into busts, developments reverse, with episodes of painful adjustments (Borio et al., 2016).

In this paper, we used sector-level data for euro area countries to show that, during the recent credit boom, economic activity was allocated away from the high productivity manufacturing sector towards activities with negative productivity growth. Thus, the long upswing of the credit cycle during the 2000s can help explain the so-called “productivity puzzle”.

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<sup>10</sup> A similar development should have been true for Ireland, which is not covered in this analysis due to the lack of data.



## **Appendix**

Sectors included in the analysis in Figure 2 are: *agriculture forestry and fishing; mining and quarrying; food products, beverages and tobacco; textiles, wearing apparel, leather and related products; wood and paper products; coke and refined petroleum products; chemicals and chemical products; rubber and plastics products, and other non-metallic mineral products; basic metals and fabricated metal products, except machinery and equipment; electrical and optical equipment; machinery and equipment not elsewhere classified; transport equipment; other manufacturing; repair and installation of machinery and equipment; electricity, gas and water supply; construction; wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities; information and communication; financial and insurance activities; real estate activities; professional, scientific, technical, administrative and supportive service activities; community social and personal services; arts, entertainment, recreation and other service activities.*



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