I. Financial dependence and growth since the crisis ([1])

One of the fundamental roles of the financial sector is the efficient allocation of savings and investment through the relocation of external funds towards firms with investment opportunities, but with less available internal funding possibilities. This focus section examines whether the financial and sovereign crisis have had a deeper impact on growth in the euro area's industries that are more dependent on external finance and, thereby, on financial sector development and banks' credit supply.

Regression results show that more developed financial markets have, to some extent, helped cushion the impact of the crisis on the industries that are more dependent on external funds in the euro area. The balance sheet structure of monetary financial institutions (MFIs) also seems to have played an important role. These effects have been differentiated across industries (tradable vs. non-tradable/services sectors) and asymmetric across countries (core vs. periphery euro area economies).

Although manufacturing is generally less dependent on external funds than services, the crisis effects on growth stemming from the interactions between external financial dependence and financial sector development or MFI balance sheets are essentially present in the manufacturing sector. Market service industries attracted most of the surge in credit in the euro area economies during the boom years but the impact of financial development or MFI balance sheet structure on growth in these industries does not seem to have changed since the crisis.

The persistence of some of the estimated effects over the 2010-11 period also suggests that the changes in the supply of finance brought by the crisis have a lasting nature. Firms' access to finance appears to have been durably altered by the crisis and not to have been just temporarily impaired during the sharp recession of 2008-09. In particular, there are some indications that manufacturing industries that have moved funding sources away from bank loans towards bonds and equities have benefited from faster growth in 2010-11, while the MFIs balance sheet structure and leverage seem to have continued to have a strong negative impact on industrial growth long after the 2008-09 recession, in particular in the core euro area economies.

I.1. Introduction

The global financial crisis has deeply affected the growth and finance nexus via several channels, including wide-scale private deleveraging, tighter credit constraints for some economic agents, e.g. small and medium size enterprises (SMEs) and, more generally, possible changes in lending practices due to more cautious risk attitudes.

To gain a better understanding of possible changes in the growth and finance nexus in the euro area, this focus section examines whether the financial and sovereign crises have had a deeper impact on growth in the industrial sectors that are more dependent on external finance, leading to potential changes in the relationship between growth and external financial dependence.

Since the seminal work by Rajan and Zingales (1998), a range of studies have explored the growth-finance nexus by relating growth in industrial sectors to measures of external financial dependence and of financial market development. ([2]) In particular, the methodology has been applied to assess the impact of financial and banking crises or to estimate the size of a possible credit crunch in the 2008-09 global recession. ([3]) The present section follows a similar econometric approach to analyse possible changes in the relationship between growth and finance both during the 2008-09 global recession and its immediate aftermath (2010-11). ([4]) This allows to check whether the 2008-09 credit crunch documented in some studies ([5]) has been followed by a more lasting alteration of the supply of finance in the euro area. The work presented here departs

([1]) Section prepared by Narcissa Balta and Plamen Nikolov.

([2]) Rajan, G. and L. Zingales (1998), "Financial dependence and growth", *The American Economic Review*, Vol. 88(3); pp. 559-586.

([3]) See for instance:
Bijlsma M., A. Dubrovik and B. Straathof (2013), "How large was the credit crunch in the OECD?", *CPB Discussion Paper*, No. 232.
Dell' Ariccia G., E. Detragiache and R. Rajan (2004), "The real effect of banking crises", *Journal of Financial Intermediation*, Vol. 17(1), pp. 89-112, January
Kannan P. (2012), "Credit conditions and recoveries from financial crises", *Journal of International Money and Finance*, Vol. 31, pp. 930-947.

([4]) Data for 2012 are not available yet.

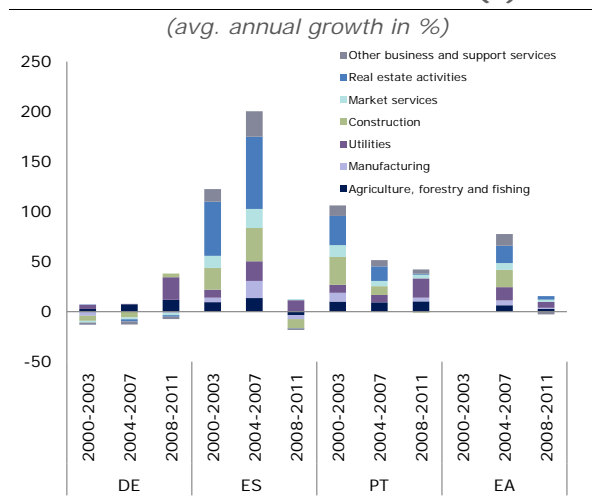([5]) See for instance Bijlsma et al. (2013), op. cit.

from previous studies in that it is based on new country specific indicators of external financial dependence and it is not restricted to manufacturing industry but also covers services. Due to data limitations, the analysis is carried out only for a small set of euro area Member States but offers some interesting insights regarding possible differences between Member States in the core and the periphery.

The remainder of this focus is divided in five sections. Section I.2 reviews developments in credit allocation and growth at sectoral level. Section I.3 presents the external financial dependence of sectors in selected euro area countries. [6] Section I.4 shows a range of indicators of financial market development across the countries. Section I.5 discusses the main results from the econometric analysis. Section I.6 concludes.

I.2. A look at credit and growth data at the sectoral level

Graph I.1: **Credit growth by industry, selected euro area countries (1)**

(avg. annual growth in %)

(1) Sectors' definition NACE Rev. 2. Utilities: electricity, gas, water and mining (sectors D, E, and B). Market services: distribution, transport, accommodation and information and communication (sectors G, H, I and J). Other business and support services: sectors M to S.
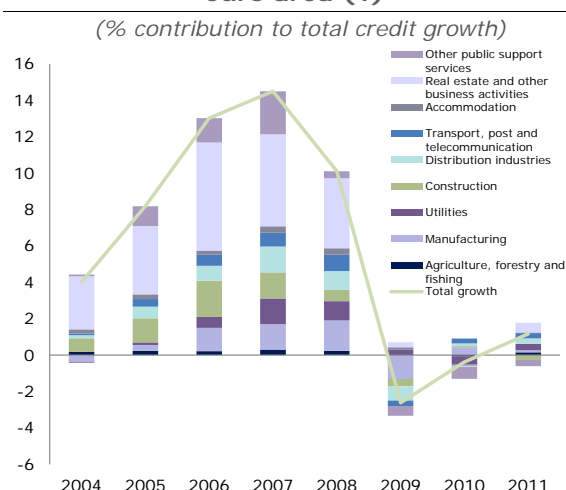*Source:* National central banks and ECB.

The first decade of the euro has been marked by an extraordinary integration of financial markets through the elimination of intra-area currency risk and a global financial boom. Credit to non-financial industrial sectors in the euro area grew at

an annual average rate of 11 % in the years preceding the global financial crisis. Moreover, in the periphery (e.g. ES) some services industries registered annual average rates of even up to 70 % (see Graph I.1).

The credit boom of the mid-2000s can be observed at the euro area level in almost all sectors. [7] Sectors where it was particularly pronounced were the non-tradable/services sectors, with construction, real estate activities, other business and support services taking the top positions, followed closely by distribution industries and utilities. Manufacturing also registered significant positive credit growth rates, but its share in total credit decreased continuously in the boom years of 2004-07 (see Graph I.2).

Graph I.2: **Credit allocation by industry, euro area (1)**

(% contribution to total credit growth)

(1) Sectors definition in NACE Rev. 2. Utilities: electricity, gas, water and mining (sectors D, E and B). Real estate and other business activities (sectors L, M and N). Other public support services (sectors P to S, incl. health and education).
Source: National central banks and ECB.

One of the fundamental roles of the financial sector is to facilitate the reallocation of savings towards firms with a shortage of funds and better investment potential. By reducing the transaction costs of savings and investment, the financial sector lowers the cost of capital in the economy in general.

Moreover, to the extent that financial markets are able to overcome problems of moral hazard and adverse selection, financial development should
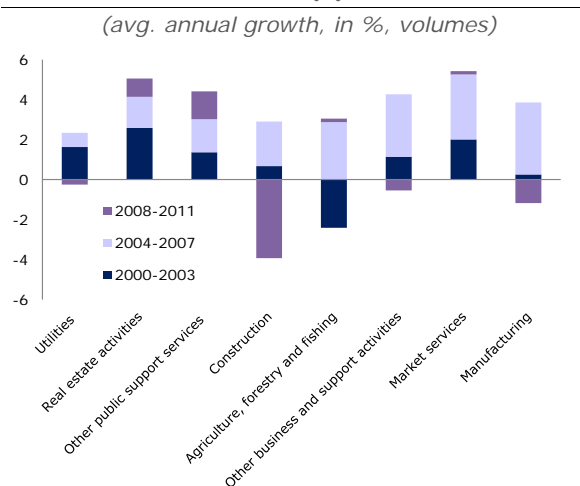
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also reduce the wedge between the costs of external finance through credit and/or equity and internal funds, such as profits. Starting with the work of Rajan and Zingales (1998), a number of empirical studies have shown that because of a lower wedge between external finance and internal funds, sectors that are relatively more in need of external finance tend to grow disproportionately faster in countries with more developed financial markets.

Looking at gross value added growth across sectors at the euro area level, the highest growth over the per-crisis boom years can be observed in the manufacturing sector, while construction, real estate activities and utilities are at the lower range of growth over 2004-07 (see Graph I.3, sectors ordered by average growth in 2004-07). Moreover, during the crisis years, 2008-11, with the exception of the construction sector, the more indebted services sectors seem to have gone through a rather modest fall in activity relative to the manufacturing sector. This may reflect several traditional macroeconomic factors, including the fact that the non-tradable sectors, by definition, were not directly exposed the collapse in world trade and in many cases face a more inelastic demand. However, this could also be an indication of a different relationship between market funding and growth in these sectors.

Graph I.3: **Gross value added growth, euro area (1)**

(avg. annual growth, in %, volumes)

(1) Sectors definition NACE Rev. 2. Utilities: electricity, gas, water and mining (sectors D, E and B). Market services (sectors G, H, I, and J). Other business and support activities (sectors M and N). Other public services (sectors P to S, including health and education).
Source: Eurostat.

The persistence of the credit allocation pattern across sectors over the boom years in the euro area suggests that the decrease in the cost of capital in the first decade of the euro benefitted primarily the non-tradable/services sectors, while the same sectors also seem to have been more protected during the crisis. The question arises whether there have been significant differences across euro area economies, and whether the degree of dependence on external finance has played any role.

The next two sections look into the nature of the dependence of sectors on external finance and developments in a number of external financing sources across selected euro area Member States.

I.3. Quantifying external financial dependence

Estimating the sector-specific external financial dependence is a key step in assessing the impact of finance on growth. Actual data on external funding reflect the equilibrium between demand and supply of credit realized on financial markets at a given moment in time. This means that measures of financial dependence are likely to be affected by a range of factors. For instance, business cycle fluctuations may play a role. A technology shock in one sector will boost its investment spending and will temporarily push measured external dependency up. Measures of external dependency can also be affected by credit rationing. Credit rationing plays a role in financial intermediation because of information asymmetry between borrowers and lenders. The asymmetry increases the costs of capital and smaller firms in particular often fall short of securing the amount of outside capital that their sector-specific technology requires.

Difficulties in disentangling demand and supply determinants of external dependency, combined with data scarcity, have led Rajan and Zingales (1998), as well as subsequent studies, to use a sector-specific measure of external financial dependence that is common to all countries. This measure is the sectoral gap between investment and operating cash flow, based on large-company US data. If, as assumed by the authors, the supply of capital for large firms in the US is very elastic, the gap will mostly represent the extent to which firms in a given sector are in need of outside funding due to reasons beyond credit supply. The authors assume further that this measure of dependency should also be a good proxy for the

underlying demand for external funds as driven by technological and structural factors (not related to financial development) in all other countries.

In practice, the assumption of common underlying external funding needs across countries has never been tested due to lack of data. There are, however, reasons to suspect that these needs could vary across countries in some sectors. In particular, growth in the non-tradable/services sectors tends to be driven by country-specific factors rather than EU (or worldwide) trade-related factors. This may translate into different underlying funding needs. There are also factors which affect corporate savings (e.g. taxation and the level of competition), which vary to some degree across the euro area. Finally, even in manufacturing sectors, demand for external funding in a sector may vary across countries if the sub-sector composition of this sector varies across countries.

Therefore a sector and country-specific measure of external dependence in the pre-boom-EMU years, 2000-04, is used for this focus section. The period choice is dictated by several considerations. The measure should be taken as an average over a period long enough to mitigate short-term fluctuations in activity. As the econometric analysis presented in Section I.5 focuses on the crisis and its aftermath, a pre-crisis period is required to mitigate endogeneity issues. Pre-crisis boom years (2005-07) may be associated with some cyclical distortions in funding needs and should therefore preferably be excluded. Finally, pre-2000 data cannot be considered due to limitations in data availability.

The dependence to external finance is measured by the degree to which cash flow generated by operational activities is sufficient to cover investment. Data on operating profits and investment come from BACH, a database managed by the European Committee of Central Balance-Sheet Data Offices (ECCBSO). (8)

The measure of external dependence varies significantly across sectors. This is illustrated in Table I.1 and motivates the use of a country and sector-specific external dependence indicator in the empirical analysis in Section I.5.

Table I.1: **Dependence on external finance, selected industries (1)**
(avg., 2000-2004)

	DE	FR	IT	ES	BE	PT
Externally dependent sectors						
Computers and electronics	2	2	5		17	24
Motor vehicles	6	4	1	6	16	21
Water supply	11	11	6	3	2	4
Accommodation and food services	10	7	15	10	7	8
Transportation	9	6	2	4	4	6
Agriculture	8	8	3	5	5	5
Other services	3	9	4	16	9	1
Externally independent sectors						
Pharmaceuticals	20	30	27	26	21	27
Wholesale and retail trade	25	28	23	25	30	28
Textiles and wearing apparel	26	29	24	23	24	12
Furniture and other manufact.	21	23	19	22	23	19
Sectors where dependency varies across countries						
Arts and entertainment	1	16	8	12	22	3
Real estate activities	15	3	28	2	1	9
Health services	4	21	25	15	19	2
Construction	14	26	18	13	13	16
Electricity and gas	27	5	11	8	26	14
Information and communication	24	19	13	18	15	25

(1) Ranking from 1 to 30, a top position means a more externally dependent sector.
Source: BACH.

The average external dependence at the beginning of the 2000s is consistently high in certain sectors and low in others in all countries. (9) The non-tradable/services sectors, with the exception of distribution industries and information and communication, come out more dependent on external funding than the manufacturing sectors. Among the manufacturing sectors, only computers and electronics industry seems to be as dependent on external funds as most non-tradable/services sectors. Non-tradable/services sectors appear to have more external funding needs than the manufacturing sectors in all countries, likely to reflect a technological need for more infrastructure investment than the manufacturing sector, but also less profitability.
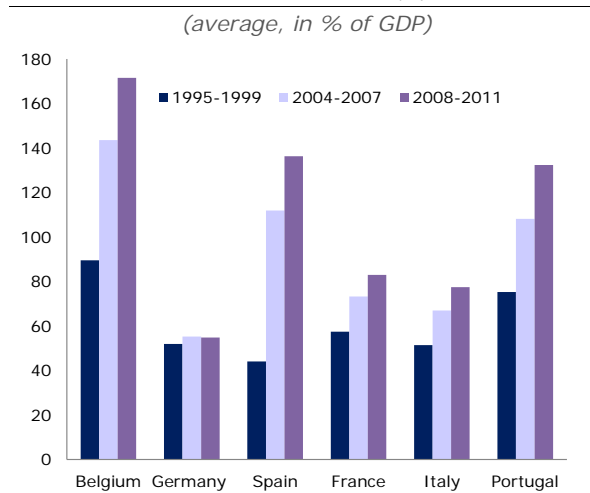
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(8) The European Committee of Central Balance-Sheet Data Offices (ECCBSO) is an informal body whose members come from National Central Banks or Statistical Offices in EU Member States.

(9) Similarly to the US data, aggregated from a sample of large publicly traded manufacturing firms, presented in Rajan and Zingales (1998), manufacturing sectors such as textiles and wearing apparel are relatively externally independent, while others such as motor vehicles are relatively externally dependent in the euro area countries included. This is not surprising as the technological characteristics of manufacturing sectors and their capital intensity should not differ substantially between the euro area Member States and US. Yet, some variation of the relative position of sectors between the euro area data for the early 2000s and the US data in Rajan and Zingales (1998) (data computed for the 1980s) can be expected. A notable example is the pharmaceutical sector, which was very externally dependent in the US in the 1980s and much less dependent in the euro area countries in the early 2000s. This fact explains why an average external dependence over a recent period is used in the empirical analysis presented in this focus section.

Beyond these similarities, important country differences stand out. A range of services with a relatively low degree of competitiveness, such as arts and entertainment, health services, electricity and gas distribution, show a marked divergence in external dependence in the six countries. These are joined by construction and real estate which also follow more country-specific developments. Cross country differences are also noticeable in some manufacturing sectors, including computer and electronics and motor vehicles.

I.4. Developments in external financing sources

The empirical analysis presented in Section I.5 relies on several country-specific variables of financial development and of monetary financial institutions (MFIs) balance sheets. To reflect, the importance of various financial intermediation channels, the former include bank loans, quoted shares of non-financial corporations and bonds of non-financial corporations – all as a ratio to GDP. MFI balance sheet variables include the ratio of total assets to loans, which captures the degree to which financial institutions have been able to diversify away from the traditional business model of granting loans. They also include a measure of leverage. The remainder of this section takes a rapid look at each of these variables.

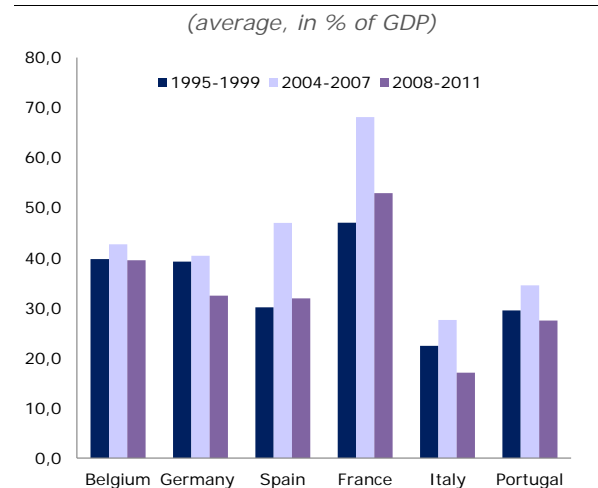Graph I.4: **Credit markets, selected euro area economies (1)**

(average, in % of GDP)

(1) Loans liabilities of the non-financial corporate sector as % of GDP.
Source: Eurostat, Financial accounts.

During the first decade of the EMU, financial markets in the euro area have gone through a deep process of integration that together with the global

financial boom has led to a significant growth in the weight of the financial sectors in most euro area economies, but in particular in peripheral countries (e.g. ES, PT). Moreover, there seems to have been a disproportionate growth of loan markets vis-à-vis equity or bond markets, in particular in the peripheral countries (e.g. ES and PT) (see Graph I.4, Graph I.5 and Graph I.6).
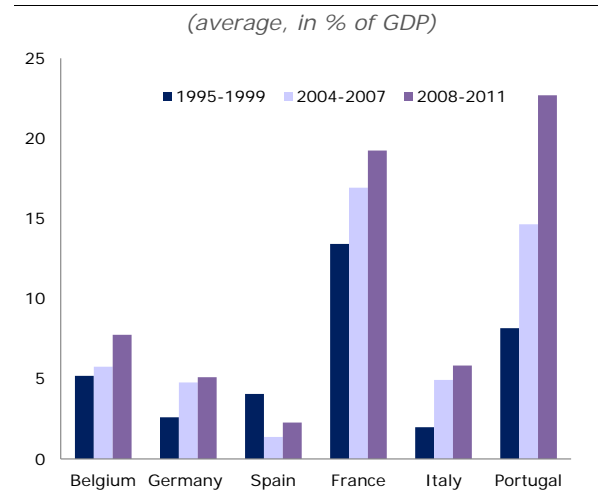
Graph I.5: **Equity markets, selected euro area economies (1)**

(average, in % of GDP)

(1) Shares other than securities, liabilities of the non-financial corporate sector as % of GDP.
Source: Eurostat, Financial accounts.

Graph I.6: **Corporate debt markets, selected euro area economies (1)**

(average, in % of GDP)

(1) Securities other than shares, liabilities of the non-financial corporate sector as % of GDP.
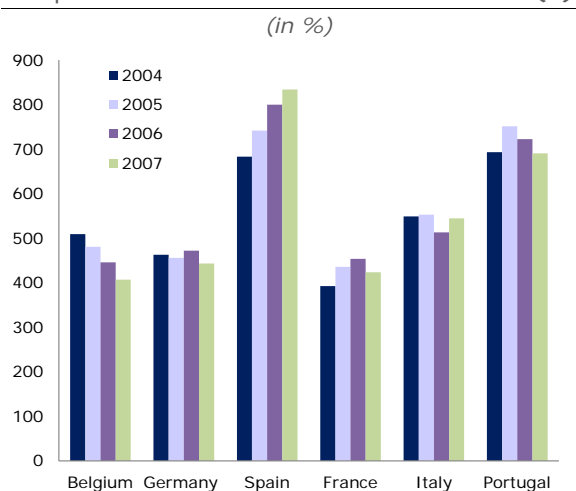**Source:** Eurostat, Financial accounts.

Cross-country differences in corporations' external funding are particularly large for bonds. The corporate sector receives considerably higher outside financing through bonds and other debt

instruments in France and Portugal than in the four other countries analysed in this section. Sectoral data for 2004-07 in BACH suggests that the high level of bond financing in Portugal in this period is concentrated in sectors such as utilities, wood and paper products and information and communication. In these sectors outstanding corporate debt securities compared to and even exceeded bank loans.

The balance sheet structure of financial institutions at the beginning of the crisis, as illustrated by the ratio of total assets to loans, shows to which extent financial sector balance sheets were dominated by non-traditional bank business, such as money market and corporate debt (Graph I.7). A higher ratio indicates a financial sector that has diversified more its asset portfolio towards non-core bank assets. [10]

Graph I.7: **MFI balance sheet structure (1)**

(in %)

(1) Total financial assets as % of loans, monetary financial institutions.
Source: ECB, MFIs balance sheet database.

Just before the crisis, financial institutions in the euro area periphery, notably in Spain and Portugal, had relatively a high weight of non-core business, compared to the core euro area economies (DE, BE and FR). Despite the rapid increase in traditional lending after 2004, the MFIs in these countries, notably in Spain, have also seen a steady increase in the share of their non-core business. By contrast, in the core euro area economies (in particular in Belgium and Germany) the ratio of total assets to loans either decreased or remained
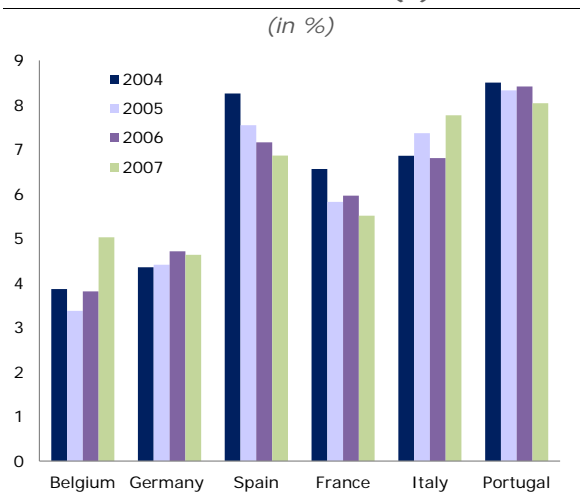
relatively stable, indicating that the financial sector in these countries remained relatively more oriented towards traditional bank lending.

However, financial institutions appear to have been more leveraged in the core euro area economies than in the periphery at the beginning of the crisis, as measured by the ratio of capital and reserves to total assets/liabilities (Graph I.8). A lower ratio of capital to total liabilities indicates a higher leverage.

Such differences in the balance sheet structure and exposure of the financial institutions between the core and the periphery are likely to have led to an asymmetric impact of the crisis on financially dependent industries in these economies.

Graph I.8: **Capital and reserves to total assets/liabilities (1)**

(in %)

(1) Capital and reserves as % of total assets/liabilities, monetary financial institutions.
Source: ECB, MFIs balance sheet database.

I.5. Financial dependence on external funds and growth since the crisis

Have the industries that are more dependent on external finance been hit harder during the current crisis in the euro area? In a well-functioning complete financial market, there should be no cost wedge between internal and external financing for a firm, and industrial growth should not be affected by the source of funding. However, such a wedge occurs when there is a differential in financial development or a change in finance supply. Therefore, the econometric analysis presented below aims at measuring the differentiated impact of the crisis on growth in industries that are more dependent on external finance and how this impact depends on country differences in the development

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[10] The ratio does not reveal the relative distribution of non-core business among banks and other financial intermediaries in a given country.

of the main market funding channels or country differences in MFIs balance sheets.

The main empirical results presented in this section are derived from a panel regression analysis based on industry and financial data for 6 euro area countries. The regressions relate growth at the industry level to industries' external financial dependence and a number of control variables (see Box I.1for more details). To better understand the possible channels through which the crisis may have affected growth in industries that are more dependent on external finance, the regressions include interactions terms combining external dependence and various measures of financial development and/or financial institutions balance sheet structure. These include measures of the size of equity, bond and credit markets as well as measures of MFIs balance sheet structure and leverage. Contrary to the external dependency variable which is available by country and by industry, a majority of the financial development and MFIs indicators are available at the country level. ([11]) Interacting the external dependence ratio with these financial development measures allows exploiting both the industry and country dimension of the dataset.

The financial development variables are averaged for the period 2000-04. The choice of this interval is dictated by several factors. The period is sufficiently distant from the main period of interest in this analysis (the global financial crisis and its aftermath) to reduce substantially possible endogeneity issues. Covering the early years of the euro, it also includes a period after the occurrence of possible structural breaks with the introduction of the single currency while avoiding possible distortions brought by the overheating seen in some Member States at the peak of the cycle. The measures of MFIs balance sheet structure or leverage are taken for the year 2007 to capture vulnerabilities in the financial sector existent at the onset of the crisis.

The regressions include country-time effects to control for macroeconomic fluctuations at the country level as well as country-sector fixed effects. Moreover, in order to account for shocks which could affect specific industries across all countries (e.g. related to internal market integration or to changes in common euro area risk premia), an industry-time effect common across all countries is also added.

While the regressions are run for the period 1995-2011, the analysis focuses on possible changes in the growth-finance relationship since the global financial crisis. This is done by testing changes in the overall estimated relationship with dummies for the period 2008-11. As this period covers several cyclical phases, the last two years (2010-11) are also looked at separately in order to disentangle the possible recessionary effects of a credit crunch episode caused by the global financial crisis from more persistent effects also observed during the ensuing (and short-lived) recovery. As the available data end in 2011, it is unfortunately not possible to analyse the full effects of the sovereign crisis.

Following Rajan and Zingales (1998), a number of studies have analysed the growth finance nexus using industry data on growth and external financial dependence. The methodology used here follows largely the approach proposed by Bijlsma at al. (2013), and previously by Dell'Ariccia at al. (2008). The results presented in this section are, however, based on a different data set. As already highlighted, the financial dependency indicator is constructed from data collected in each country and therefore differs across countries and includes, besides the manufacturing industries, all market services and few non-market services sectors such as education, health, and some other support services. In contrast, Bijlma et al. (2013) use the traditional Rajan and Zingales approach which consists in applying the same financial dependency indicator across all countries to the manufacturing industries.

The results show that growth has been hit more severely by the global financial crisis in sectors more dependent on external finance. More developed financial markets have, to some extent, helped cushiong this impact. Well-developed credit markets seem to have helped in the early stage of the crisis (2008-09) but this effect turns negative during the ensuing limited recovery (2010-11). Well-developed bond markets appear to have been a positive factor for growth in externally dependent sector and more significantly so over the 2010-11 period, probably reflecting intensified pressures to diversify credit sources and move

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([11]) The two exceptions are the bond and the credit indicators which are available at the industry and country levels.

Box I.1: External financial dependence and growth during the crisis

To study whether industries that are more dependent on external funds have experienced more severe output loss during the crisis, following the methodology developed by Rajan and Zingales (1998), growth in value added in industry j at time t in country k ($y_{j,k,t}$) is regressed on industry-country, country-time, and industry-time fixed effects and an interaction term given by the product of the financial dependence measure for industry j in country k ($ExtDep_{j,k}$), the crisis dummy for year t ($CRISIS_t$), and a measure of financial development in country k ($FINDEV_k$). As in Rajan and Zingales (1998), the lagged share of industry j in country k ($SIZE_{j,k,t-1}$) is included to account for "convergence" effects, i.e. larger sectors tend to experience slower growth. Moreover, to account for possible common euro area industry j characteristics, such as different risk premia across sectors during the crisis, industry-time fixed effects are included in the regression. The benchmark regression is:

$$y_{j,k,t} = \sum_{jk} \alpha_{j,k} d_{j,k} + \sum_{kt} \beta_{k,t} d_{k,t} + \sum_{jt} \chi_{j,t} d_{j,t} + \delta_1 ExtDep_{j,k} + \delta_2 ExtDep_{j,k} \bullet CRISIS_t \bullet FINDEV_k + ...$$

$$... + \gamma SIZE_{j,k,t-1} + \varepsilon_{j,k,t}$$

A negative and significant δ_1 indicates that the crisis has had a relative worse impact on industries that are more financially dependent on external funds in the absence of financial development, while a negative and significant δ_2 indicates that the crisis has had a relatively worse impact on industries that are more dependent on external finance even in countries with a more ex-ante developed financial market. The fixed effects should control for most shocks affecting industry performance, global shocks to the industry, aggregate country-specific shocks, correcting for omitted variable bias. The external dependence variable alone also captures to a certain extent shocks varying simultaneously across countries, industrial sectors and time. It is not a perfect industry-country-time fixed effect as its variability in time is limited to the 2000-04 average, some shocks that vary simultaneously across countries, industrial sectors and time might not be accounted.

Data. Several crisis dummies have been considered alternatively in the benchmark regression to account for different developments during the crisis: dummy for 2008/09-11, dummy for 2010-11, and dummy only for 2011. Our sample, ending in 2011, does not fully take into account the impact of the sovereign debt crisis of 2011-12. The analysis includes 6 euro area Member States during the period 1995-2011 (DE, FR, BE, IT, ES, and PT) and 29 sectors (13 manufacturing sectors disaggregated at 2-digit NACE Rev. 2 level, and 26 sectors, including market services and other public support sectors disaggregated at 1-digit, NACE Rev. 2 level).

The measures of financial development are: 1/ quoted shares liabilities of the non-financial corporate sector to GDP ($qshares\_gdp_k$); 2/ the ratio of capital and reserves of monetary and financial institutions (MFIs) to loan assets ($MFI\_bs\ structure_k$), as a measure of financial sector balance sheet structure; and 3/ two measures that vary also by industry j: bonds issued by industry j in country k ($bonds_{j,k}$) and bank credit of industry j in country k ($bank\_credit_{j,k}$), as a share of the industry j balance sheet. An additional variable measuring exposure of MFIs through leverage has also been included: 4/ the ratio of capital and reserves to total assets/liabilities ($MFI\_leverage_k$) Data for the variables (1) are from EUROSTAT, financial accounts balance sheet database, for the variable (2) and (4) from ECB, MFIs balance sheets, while the data for both industry-country specific variables (3) are from BACH database. The ex-ante financial development is defined as the average of the respective variables over the beginning of the boom years, 2000-04. The MFIs balance sheet structure and leverage measures are taken for the year just before the start of the crisis, 2007.

Growth in real gross value added has been defined as the natural logarithm of real gross value added at time t minus t-1, while the size of the sectors has been computed as the natural logarithm of real gross value added in industry j in country k minus real total gross value added of country k at time T. Data are from EUROSTAT for the period 1995-2011, chain-linked volumes, reference year 2005.

A dummy for the peripheral euro area economies (i.e. ES, PT and IT), *Periphery*, is also considered in the regressions, the estimated coefficient should be interpreted as a differential relative to the estimate for the rest of the countries in the sample (i.e. DE, FR and BE), which is shown first in the results tables below.

Box (continued)

Results

Benchmark specifications: market sectors

The results for the whole sample show that over the crisis period, 2009-11, the sectors that are more dependent on external funds have actually been better off in the core countries where either credit or bonds markets were ex-ante more developed. By contrast, in the periphery, the sectors more dependent on external funds have been worse off since the acute phase of the global financial crisis, the benefits stemming from higher financial development being almost insignificant (*Column (1), (2) and (3)*). When looking at the second stage of the crisis in 2010-11, the effects are coming mainly from MFIs balance sheet structure and leverage and the corporate bonds market.

When it comes to MFIs balance sheet structure and leverage, the impact has also been asymmetric between core and periphery. While MFIs balance sheet structure has had a significant negative impact on the financially dependent industries in the core, this effect turns to be much less negative or even close to zero in the periphery, reflecting a less unfavourable effect stemming from the MFIs diversified asset structure in the periphery (*Column (4)*). Lower MFIs leverage, as measured by the ratio of capital to total assets/liabilities, has helped industrial growth in the core, while in the periphery this impact has been less important in magnitude during the crisis, partly reflecting a better starting position with higher capital ratios of MFIs in the periphery than in the core in 2007 (*Column (5)*). It is important to note that MFIs' balance sheet structure seems to have had a much bigger impact on industrial growth than MFIs leverage.

Market sectors

Variable	1		2		3		4		5	
Crisis dummy (C)	2009-11	2010-11	2009-11	2010-11	2009-11	2010-11	2009-11	2011	2009-11	2011
Interaction: ExtDep x C x QSHARES (k)	0,0193	0,0212								
Periphery x ExtDep x C x QSHARES (k)	-0,0263	0,044								
Interaction: ExtDep x C x BONDS (j, k)			0.0099*	0.022***						
Periphery x ExtDep x C x BONDS (j, k)			-0.0115**	-0.0229***						
Interaction: ExtDep x C x BANK CREDIT (j, k)					0.0238**	-0.021*				
Periphery x ExtDep x C x BANK CREDIT (j, k)					-0.0135	0,0167				
Interaction: ExtDep x C x MFI bs structure (k)							-0.3838**	-0.9853***		
Periphery x ExtDep x C x MFI bs structure (k)							0.3756**	0.9845***		
Interaction: ExtDep x C x MFI leverage (k)									0.1649*	0.3839**
Periphery x ExtDep x C x MFI leverage (k)									-0.1565	-0.3922**
Size of industry j in country k (t-1)	-0.1408***	-0.1401***	-0.1607***	-0.1582***	-0.1216***	-0.1339***	-0.1367***	-0.1355***	-0.1389***	-0.1375***
industry-country, f.e.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
industry-time, f.e.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
country-time, f.e	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: ***, ** and * denote respectively statistical significance at 1, 5 and 10%.

Benchmark specifications: manufacturing

The interaction between financial dependence and financial market development and MFIs balance sheet structure/leverage has affected the most the manufacturing sector. The estimated impact coefficients grow in magnitude relative to the estimates with the entire sample. Among all interaction variables, the greatest impact on growth has come from the interaction of industrial financial dependence with MFIs balance sheet structure/leverage (*Column (4) and (5)*), the effect being again asymmetric in the core vis-à-vis the periphery.

Manufacturing

Variable	1		2		3		4		5	
Crisis dummy (C)	2009-11	2010-11	2009-11	2010-11	2009-11	2010-11	2009-11	2011	2009-11	2011
Interaction: ExtDep x C x QSHARES (k)	0,0819	0,1159*								
Periphery x ExtDep x C x QSHARES (k)	-0,0982	-0,0353								
Interaction: ExtDep x C x BONDS (j, k)			0,0025	0,0246**						
Periphery x ExtDep x C x BONDS (j, k)			-0,0042	-0,0217						
Interaction: ExtDep x C x BANK CREDIT (j, k)					0.0449***	-0.0354*				
Periphery x ExtDep x C x BANK CREDIT (j, k)					-0.0327	0,0263				
Interaction: ExtDep x C x MFI bs structure (k)							-0.8207*	-2.7721***		
Periphery x ExtDep x C x MFI bs structure (k)							0.8116*	2.7753***		
Interaction: ExtDep x C x MFI leverage (k)									0.4271**	1.1108***
Periphery x ExtDep x C x MFI leverage (k)									-0.3974*	-1.0396***
Size of industry j in country k (t-1)	-0.1473***	-0.1458***	-0.1472***	-0.1436***	-0.1111***	-0.1396***	-0.1338***	-0.13***	-0.1411***	-0.14079**
industry-country, f.e.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
industry-time, f.e.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
country-time, f.e	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: ***, ** and * denote respectively statistical significance at 1, 5 and 10%.

Benchmark specifications: services sectors

Market services appear to have been the least affected during the crisis by the interaction of these industries' financial dependence with financial markets development and/or MFIs balance sheet structure/leverage. Growth within these sectors seems to have been mainly driven by country-specific characteristics.

Services sectors

Variable	1		2		3		4	
Crisis dummy (C)	2009-11	2010-11	2009-11	2010-11	2009-11	2010-11	2009-11	2011
Interaction: ExtDep x C x QSHARES (k)	-0,0141	-0,0154						
Periphery x ExtDep x C x QSHARES (k)	0,0329	0,0399						
Interaction: ExtDep x C x BONDS (j, k)			0,0041	-0.0067				
Periphery x ExtDep x C x BONDS (j, k)			-0,0014	0,0073				
Interaction: ExtDep x C x BANK CREDIT (j, k)					-0.0209*	-0.0039		
Periphery x ExtDep x C x BANK CREDIT (j, k)					0.0449**	-0,0331		
Interaction: ExtDep x C x MFI bs structure (k)							0,1387	0,0112
Periphery x ExtDep x C x MFI bs structure (k)							-0.1106	0,0554
Size of industry j in country k (t-1)	-0.1113***	-0.1074***	-0.14***	-0.1266***	-0.1256***	-0.1122***	-0.1113***	-0.1068***
industry-country, f.e.	yes	yes	yes	yes	yes	yes	yes	yes
industry-time, f.e.	yes	yes	yes	yes	yes	yes	yes	yes
country-time, f.e	yes	yes	yes	yes	yes	yes	yes	yes

Note: ***, ** and * denote respectively statistical significance at 1, 5 and 10%.

Benchmark specifications: non-productive market services

Growth in the non-productive sectors that are dependent on external funds such as utilities and other public support industries has been affected during the crisis through the interaction with bank credit development and equity and bonds markets (*Column (1), (2) and (3)*). The MFIs balance sheet structure/leverage does not seem to come out as a significant factor affecting growth in the financially dependent industries of this sector. However, these results should be interpreted with caution due to sample size limitations.

Non-productive services sectors

Variable	1		2		3		4	
Crisis dummy (C)	2009-11	2010-11	2009-11	2010-11	2009-11	2010-11	2009-11	2011
Interaction: ExtDep x C x QSHARES (k)	-0.2339**	-0.2046*						
Periphery x ExtDep x C x QSHARES (k)	0.2806**	0.3731**						
Interaction: ExtDep x C x BONDS (j, k)			-0.017*	-0.0223**				
Periphery x ExtDep x C x BONDS (j, k)			0,013	0.0219**				
Interaction: ExtDep x C x BANK CREDIT (j, k)					0.0494**	0.007		
Periphery x ExtDep x C x BANK CREDIT (j, k)					-0.0553	-0.0379		
Interaction: ExtDep x C x MFI bs structure (k)							0,3846	0,1784
Periphery x ExtDep x C x MFI bs structure (k)							-0.333	-0.1692
Size of industry j in country k (t-1)	-0.226***	-0.2093***	-0.2365***	-0.2067***	-0.2256***	-0.2092***	-0.2202***	-0.2086***
industry-country, f.e.	yes	yes	yes	yes	yes	yes	yes	yes
industry-time, f.e.	yes	yes	yes	yes	yes	yes	yes	yes
country-time, f.e	yes	yes	yes	yes	yes	yes	yes	yes

Note: ***, ** and * denote respectively statistical significance at 1, 5 and 10%.

away from bank credit. Finally, for the entire sample, the development of equity market does not seem to have played a particular role during the crisis period. This obviously does not mean that equity markets do not matter for growth but rather that their effect on growth has not changed during the crisis.

Turning to the effect of MFIs balance sheets, a higher degree of diversification of MFIs balance sheet away from traditional bank lending (ratio of MFIs total assets to loans) seems to have acted as a magnifier of the impact of the crisis on growth in industries more dependent on external funding, probably reflecting MFIs' poor management of non-loan assets. A high leverage appears to have had a similar effect. As further discussed hereafter, these two effects are, however, essentially visible in core euro area economies and not in the periphery.

The results show that industries that are more dependent on external finance have been hit during the crisis differently depending on whether they belonged to the tradable or non-tradable sectors or whether they were located in the periphery or the core of the euro area. The asymmetry between core

and periphery is mainly due to the asymmetric impact of the balance sheet structure and leverage of the MFIs in these countries during the crisis.

I.5.1. Country dimension: core vs. periphery

While the above general picture holds broadly true for core economies, results in the periphery sometimes differ significantly. The cushioning effect of deep bond markets appears to be essentially present in core countries and small or insignificant in the periphery. More importantly, MFIs balance sheet effects appear to be quite different in the periphery. A financial sector with a diversified assets structure appears to have been much less detrimental for growth in externally dependent sectors in the periphery, the impact being much less negative or even close to zero in the periphery relative to the core.

Lower leverage of MFIs balance sheet, as measured by the capital ratio to total liabilities, has benefited industrial growth in the core euro area economies. The favourable impact has, however, been much lower in the periphery although this should be weighed against an overall much lower leverage in the periphery than in the core at the onset of the crisis.

The estimated asymmetric effect of the development of financial markets in the periphery relative to the core is likely to be explained by special features of the crisis, including a bust in asset prices and a correction in financial institutions' balance sheet weaknesses, and should not be interpreted as a long-term impact of financial development on growth.

I.5.2. Sectoral dimension: tradable vs non-tradable

The general picture for all industries holds by and large also true for manufacturing. However, econometric results differ in three ways when the sample is restricted to manufacturing industries. First, equity markets now seem to matter: deep equity markets have helped cushion the impact of the crisis of externally dependent sectors over the later part of the sample (2010-11) both in the core and the periphery. Second, the impact of MFIs balance are qualitatively the same as in the overall sample but much larger, and the above-mentioned differences between the core and the periphery are also much larger. Third, the positive effect of bond

markets on growth in externally dependent sectors is also present in the periphery.

The picture is rather different for market services sectors, which seem to have been driven mostly by country-specific characteristics others than the level of development of financial markets. Service sectors more dependent on external funding have generally not been hit more severely by the crisis than the less financially dependent ones. Furthermore, there is no clear evidence that the level of financial market development or MFIs balance sheets made any significant difference. All interaction terms come out as mostly non-meaningful for market services.

This holds true for both core and the euro area economies, with the exception of the bank credit channel. The development in credit markets seems to have benefited market services sectors in the periphery, while it seems to have had a slightly negative effect in the core.

Growth in those non-market services sectors (such as utilities, education, health, other public support services) that are more dependent on external funds appear to have been affected by the crisis through several channels such as bank credit and equity. While the development of equity markets seems to have made growth in the financially dependent industries of these sectors worse during the crisis, the development in credit markets appears to have had a positive effect. This might reflect the degree of openness to private funding of these sectors, which also benefit from large public spending. More developed credit markets could be beneficial to growth in these industries given that industries in these sectors do not issue equity, while they could still borrow from the credit market given public guarantees.

I.6. Conclusion

The analysis presented in this focus section reveals that the financial crisis has had a negative impact on industrial sectors that are more dependent on external funds in the euro area. However, this impact has been rather asymmetric in the core vs. the periphery euro area economies and differentiated across manufacturing vs. non-manufacturing/services sectors.

There is some evidence that more developed financial markets as measured by the size of bank loans, of bond markets or equity markets have, to

some extent, helped cushion the negative growth effect of the crisis. This effect varies, however, depending on the phase of the crisis. In particular, well developed bank loans seem to have been a supporting factor in the early stages of the crisis but not over the most recent 2010-11 period. The empirical also analysis shows that MFIs balance sheet structure matters. A high degree of diversification of MFIs balance sheet away from traditional bank lending and high leverage seem to have acted as a magnifier of the impact of the crisis on the growth of industries more dependent on external funding.

These results hold for the core countries considered in the analysis. In the periphery of the euro area, some results differ significantly. This is particularly when considering the effect of MFIs balance sheet structure with both the diversification of MFIs balance sheets away from loans and MFIs leverage having much smaller effects in the periphery than in the core.

Despite a higher dependence on external funding, the market services sectors seem to have been more sheltered than the manufacturing sector from the impairment of the market funding channels and the changes in finance supply since the crisis. Market services industries seems to have attracted most of the available credit in the euro area economies during the boom years, however, since the crisis, industrial growths in these sectors has been mostly influenced by country-specific characteristics and not by their higher dependence on external funds and changes in market funding channels.

Overall, the analysis suggests that country-specific and sector-specific considerations play an important role in explaining the changing relationship between external financial dependency and growth since the onset of the crisis. The persistence of some of the estimated effects over the 2010-11 period also suggests that the changes in the relationship have a lasting nature: firms' access to finance appears to have been durably altered by the crisis and not to have just been temporarily impaired during the sharp recession of 2008-09.