THE EVOLUTION OF FUNDING CHOICES OF EURO-AREA NON-FINANCIAL GROUPS

Daniele Pianeselli[*] and Andrea Zaghini[§]

Abstract

We analyse the evolution of the leverage ratio and its main components (bank loans, bonds and equity) of euro-area non-financial business groups. We rely on group's consolidated accounts over the period 2006-2016 from the novel ERICA dataset. By looking at consolidated accounts we avoid the possible distortions due to internal resource reallocation, which are particularly relevant in times of financial stress. We find that while the leverage has not changed significantly in 2016 with respect to 2006, its main determinants have varied a lot. The case of Italy, the country for which the leverage increased the most is telling. The change in leverage is due to a large change in equity and bank loans of a similar magnitude but opposite direction (over 9 percentage points each) and a positive contribution of 3.5 percentage points by bonds, the growth of which is concentrated in the years of the Sovereign debt crisis. In addition, a panel regression analysis shows that even controlling for the main groups' characteristics, the Italian leverage is structurally higher than that of the other countries.

Key words: Non-financial groups, funding choices, financial crisis.
JEL Classification: G32; C23.

Contents

[*] Bank of Italy, DG Economics, Statistics and Research – daniele.pianeselli@bancaditalia.it

[§] Bank of Italy, DG Economics, Statistics and Research – andrea.zaghini@bancaditalia.it.

1. Introduction[1]

The two waves of the crisis started in the summer 2007 have stressed financial market conditions and hampered the market access of non-financial corporations. In particular, during the euro-area Sovereign debt crisis (2010-2012) several economies experienced a significant credit crunch: firms were struggling in search of capital from alternative sources of funding. Indeed, given the reduced availability of credit from traditional providers, firms looked for other external sources such as corporate bonds and equity issuance and, whenever possible, internal sources such as business group internal capital re-allocation. Thus, the possibility of internal capital redistribution clearly puts groups in advantage with respect to standalone firms.

The aim of the paper is to shed light on the evolution of firms' funding choices over the expanded period of crisis. In particular, we focus on euro-area business groups and analyze the evolution of the leverage ratio and its main components (bank loans, bonds and equity) by using group's consolidated accounts from the relatively novel ERICA dataset (rev. 2016). An interesting advantage of focusing on group data is that through consolidated accounts we avoid the possible distortions due to significant internal resource reallocation. It is well known that especially in time of financial stress several techniques are used to provide funds to firms within the same group as a substitute for the external funding normally supplied by banks. This phenomenon might particularly relevant when a single firm part of the group is the vehicle through which the whole group taps the market.

A business group is usually defined in the economic literature as a set of related but independent firms, with their own legal entities, distinct management and shareholders which, formally or informally, shares a common link and acts coordinately (Khanna and Rivkin, 2001). Business groups are organized in hierarchical entities where cooperation is guaranteed by the control power of the common parent company, while members preserve their formal property rights and a certain degree of organizational autonomy (Altomonte and Rungi, 2013). International accounting standards requires that every business group presents

[1] The authors would like to thank Francesco Corsello, Antonio De Socio, Giuseppe Grande, Giovanni Guazzarotti and Riccardo Renzi for helpful discussions and useful suggestions. The views expressed in the paper do not necessarily reflect those of the Bank of Italy.

assets, liabilities, equity, income, expenses and cash flows of the parent and its subsidiaries in a consolidated financial statement using uniform accounting policies (IFRS 10). This accounting principle strictly delimits the perimeter of consolidation of the group by assessing whether the parent controls one or more investees. Hence, a parent company controls the other members of the group if and only if it exerts over them power and rights (through voting rights or contractual arrangements).

Among the many performance-enhancing benefits from affiliation, capital reallocation within groups works as an efficient internal capital market which can mitigate the presence of tighter financial constraints both in developed and developing countries (Khanna and Palepu, 1997; Carney et al., 2011). However, the extent of these benefits diminishes with firm and group size (Hamelin, 2013).

The additional option of capital redistribution within the perimeter of the group unequivocally puts groups in advantage with respect to standalone firms, especially in time of crisis when external capital markets are distressed. Santioni et al. (2017) show that the probability to survive of Italian firms during the recent period of crisis was higher for firms affiliated in a business group as a result of the sharp increase of internal capital transfers. During the crisis, controlling companies, which have an easier access to external financing, channeled funds from relatively cash-rich to relatively cash-poor firms, substituting external market mechanism (Santioni and Supino, 2018).

To preview our results, we find that while the leverage ratio has not changed significantly in 2016 with respect to 2006 in the 7 countries under analysis (Austria, Belgium, France, Germany, Italy, Portugal and Spain), its main determinants have varied a lot over time. The case of Italy, the country for which the leverage increased the most (3.2 percentage points) is telling. The change in leverage is due to a large change in equity and bank loans of a similar magnitude but opposite direction (over 9 percentage points each) and a positive contribution of bonds, the growth of which was concentrated in the years of the Sovereign debt crisis.

In addition, through a panel technique with interactive fixed effects we analyze the main determinants of the leverage. Since the model well support the finding of the literature, we introduce an interaction term between time and country fixed effect to analyse the leverage of Italian groups. We find that an idiosyncratic extra leverage of over 6 percentage

points is still present in the most recent post-crisis period, notwithstanding a downward trend started in 2014.

The paper is organized as follows. In Section 2 we first introduce the Erica dataset, then we describe our set of variables and sample composition. In Section 3 we illustrate the evolution of leverage over the selected time span (2006-2016). In Section 4 we introduce our empirical model and show the regressions' results. In Section 5 we draw some conclusions.

2. The dataset

2.1 ERICA

This paper relies on micro-data collected from ERICA, which is a database managed by the ERICA Working Group (WG) of the ECCBSO (European Committee of Central Balance Sheet Data Offices).[2] It includes fully harmonized information on the consolidated annual accounts of around 1,000 non-financial listed groups of eight participating European countries from 2005 to 2016.[3] According to the EU law, since January 1, 2005, publicly traded companies "shall prepare their consolidated accounts in conformity with the international accounting standard if, at their balance sheet date, their securities are admitted to trading on a regulated market" (EU Regulation 1606/2002 §4). Therefore, all the accounting information available in ERICA, sharing a similar accounting framework, can be considered as fully comparable. However, full cross-country comparability may be hindered by different choices in IFRS valuation options and influenced by domestic tax laws. To avoid these further sources of discrepancy and guarantee data accuracy, ERICA includes an additional standardization procedure and a set of quality controls.[4]

The representativeness of ERICA database is high. According to the latest ERICA Annual Report (ECCBSO, 2018), the coverage in terms of ERICA groups to total population of listed European non-financial groups ranges from around 40% in Germany and Greece, to

[2] The ERICA Working Group primarily focuses on assessing the International Financial Reporting Standards (IFRS) implementation on non-financial corporation balance sheets. This group is composed by representatives from 8 national central banks, ECB, Cerved Group spa - Centrale dei Bilanci and IASB-XBRL.

[3] Austria, Belgium, France, Italy, Germany, Greece, Portugal and Spain.

[4] Controls are mainly about matching and logical coherency in order to manually verify the information collected on the financial statements of the reporting groups. A detailed list of quality controls is available at https://www.eccbso.org/wba/pubblica/publications.asp#ERICA WG.

more than 90% for the other countries. Similarly, the overall goodness is confirmed when looking at the share of sales turnover. The turnover sales of ERICA groups represent the 83% of the total revenues in Greece and they account for more the 90% in the rest of the countries. Moreover, the same document highlights how the different sectoral breakdown of listed European groups is closely mirrored by the ERICA composition. By looking at four main sectors, ECCBSO (2018) observes that industrial groups are the most important in terms of revenues in the four Northern countries (Austria, Belgium, France and Germany), while they are less relevant in the other countries (ranging from 8% in Spain to 26% in Italy). The construction sector is instead prominent in Spain and Austria, while the energy sector accounts for a large share in Greece, Italy and Portugal. Lastly, the services sector is important in almost all countries, particularly in Spain, Portugal, Greece and France. Overall, the sectoral shares well represent the population confirming how the ERICA dataset is balanced and representative.

The ERICA 2016 database used in the paper offers detailed information about general characteristics of consolidated entities, income statement by function and by nature, other comprehensive income, assets and liabilities in the statement of financial position, cash flows and other variables selected from the explanatory notes. The groups' consolidated accounts are usually reported at the yearly frequency. The dataset includes also some interim financial statements. However, non-yearly accounting periods have been excluded from the analysis.

The exploitation of the ERICA database varies from risk assessment analysis for eligibility in monetary policy operations (ECCBSO, 2014) to specific descriptive analysis focused on few financial ratios or years (Carlino et al., 2017). Notwithstanding its high degree of harmonisation and comparability, to the best of our knowledge, this relatively new database has not been fully exploited. In trying to fill this gap in the literature, we have chosen to exploit the harmonised information available in ERICA to study the evolution of the funding sources of European non-financial groups by focusing on their balance sheet positions. The availability of a long time-span allows for the introduction of four sub-periods: the tranquil period before the boost of the crisis, the great recession, the euro-area sovereign debt crisis and the most recent post-crisis period.

Overall, despite the relevance of business groups in the euro area, and Italy in particular[5], the analysis of consolidated groups has been largely neglected in the economic literature, which centred the attention on individual firms. Our paper contributes to the existing literature by analysing the liabilities side of euro-area groups' balance sheets, during a period of heightened financial distress. Crucially, the use of consolidated accounts has pros and cons. As already mentioned, a clear advantage of focusing on consolidated group data is that we avoid the possible distortion that arises when a single firm part of the group is the vehicle through which the whole group funds itself on the market. In fact, cash pooling techniques are generally used to move funds from cash-rich to cash-poor firms or towards more profitable investment opportunities, in particular during recessionary periods (Hovakimian, 2011). Hence, consolidated financial statements are essential for the fair valuation of the group as a whole, net of internal resource reallocation. Conversely, working with consolidated data posits specific problems related to changes in the perimeter of consolidation and the real meaning of "nationality" in multinational groups. Business groups may exhibit changes in growth rates due to organic (internal) growth or through corporate acquisition or disposal operations. Moreover, the nationality of all the international subsidiaries is set equal to the controlling entity, regardless of their country of operation.[6] While the former concern (at least as regards the double counting) is addressed in ERICA by the manual detection of acquisitions within the database items, the latter remains as a specific characteristic of the consolidated analysis.

2.2 Our variables

We slightly modified our sample with respect to the original ERICA database. First, we eliminated singleton observations and interim financial statements. Then, a set of additional balance sheet checks and logical tests were implemented to improve the data quality. We enlarged the original industry classification from 4 to 11 sectors, relying on the values of

[5] Santioni et al. (2017) reports how, in 2014, Italian business groups employed 5.6 million workers, which accounts for about one-third of total employment in the industrial and service sectors. They also produce the 55% of the total value added of the sectors.

[6] A possible further drawback stemming from this issue might arise in case of idiosyncratic shocks hitting selected economies only. For instance, the Sovereign debt crisis which mainly hit the Southern countries may have hit less intensely an Italian group with more foreigner subsidiaries than a similar Italian group with a higher domestic focus.

NACE rev.2 – the statistical classification of economic activities in the European Community (Eurostat, 2008). Table A.1 in the Annex reports the 11 aggregated sectors, with the corresponding sections and divisions of NACE rev.2 classification. All consolidated groups in the original ERICA database are classified into three size classes, based on sales turnover: small groups have an yearly turnover of less than EUR 250 million; medium groups have a turnover between EUR 250 million and EUR 1,500 million; large groups have a turnover of more than EUR 1,500 million. Size is considered here as time-invariant at group level.

As already mentioned, the whole 2006-2016 time span was divided into four periods: an initial tranquil period before the crisis eruption (2006-2007); the global financial crisis and the great recession period (2008-2009); the second phase of the double-dip recession connected to the euro-area sovereign debt crisis (2010-2012) and the post-crisis period (2013-2016) characterized by the economic recovery.

Micro-level financial ratios and indicators for each year are constructed as follows. The regression dependent variable is the *Leverage ratio*, constructed as the percentage of group's total debt (bank loans and issued bonds) to its sum with total equity.[7] This metric measures the proportion of capital which comes in the form of debt. *Composition* indicates the percentage of bonds to the total amount of debt. It may reflect the increased funding opportunity of the whole group. *Profitability* is proxied by the return of assets at group level. It is constructed as the percentage ratio of net income generated to total assets and evaluates the company profitability and efficiency in using its assets to generate earnings. *Turnover growth* is the yearly growth rate of operating revenues. This variable measures the rate of expansion (or contraction) of the business. *Assets size* is the natural logarithm of the group total assets and it represents a time-varying indicator of group size. *Tangibility* is constructed as the ratio of company tangible assets (including fixed and current assets) to the value of total assets. This indicator measures the proportion of assets that has a physical form and can be used as collateral. *Interest coverage* is an indicator of financial distress and it is constructed as the ratio of the amount of interests paid on its debts during the calendar year

[7] Here and throughout the paper, bank loans include also financial leases, which remained rather constant during the period of the analysis.

to the group's total assets. *Liquidity* is the ratio of liquid current assets (cash, accounts receivable and short-term investments) to current liabilities. Also known as "*Acid test ratio*", it evaluates the ability to pay short-term obligations, ignoring illiquid assets such as inventory. *Cash flow* is a relative indicator, constructed as the percentage ratio of internal cash-flow to its operating revenues, which evaluates the ability to turn sales into cash.

2.3 Summary statistics

Table 2.1 reports the number of groups included in our dataset for each country over the period 2005-2016. The table clearly shows that coverage generally increases over-time, in particular for Belgium, Greece, Germany and Spain. Carlino et al. (2017) report how the central banks of these countries did not have a national database when the ERICA database was created. Consequently, only a limited number of highly representative and large groups were manually included in those years.

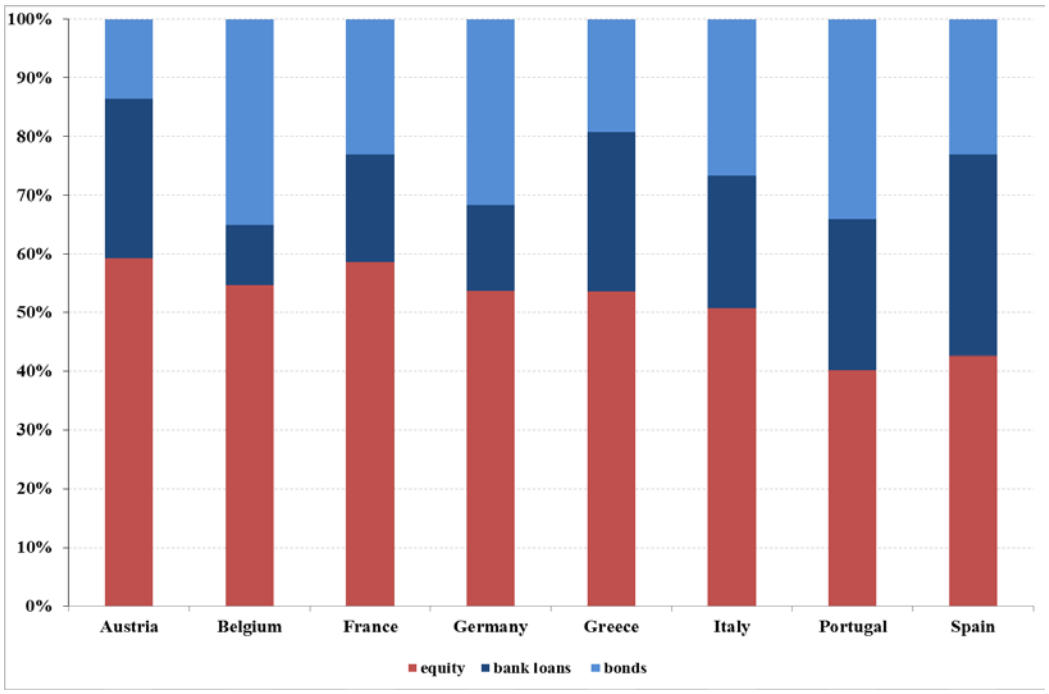
Table 2.1: Sample composition by country and year

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
Austria	49	58	62	62	57	49	47	44	44	42	43	42	50
Belgium	-	24	17	16	29	29	70	76	76	81	81	79	53
France	396	467	469	451	441	433	417	367	353	355	377	293	402
Germany	130	211	253	266	280	301	328	319	305	286	253	191	260
Greece	-	-	-	-	27	54	57	57	49	50	50	47	49
Italy	147	170	176	181	186	190	186	175	174	186	188	172	178
Portugal	-	26	30	40	42	41	40	39	39	39	39	39	38
Spain	-	29	30	30	30	30	110	114	111	101	104	105	72
Total	722	985	1,037	1,046	1,092	1,127	1,255	1,191	1,151	1,140	1,135	968	1,071

Sources: ERICA and own computations

In 2005, the number of groups contained within the ERICA database is the smallest, with four countries completely missing (Greek groups have been included only from 2009). The same is true for 2016, probably due to some lags on reporting by German, French and Italian groups. Overall, we employ an unbalanced panel of around 1,000 observations per year which, as shown in the previous paragraph, are greatly representative of the underlying population of non-financial listed firms.

Figure 2.1: Funding choice by country (2005-2016)



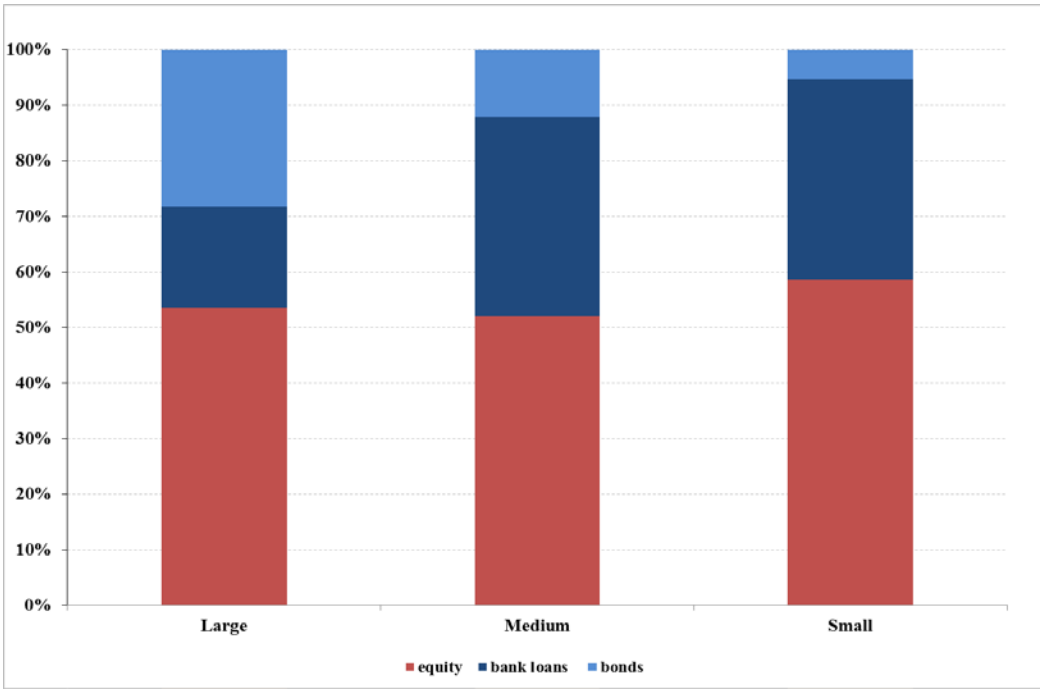
Sources: ERICA and own computations

Figure 2.1 gives an overview of the average financial position of each country during the period 2005-2016. Based on data, funding preferences of non-financial groups appear to be different among countries. While Belgium, Germany and France mostly rely on a combination of equity and bonds to cover their financing needs, the remaining countries have a lower internal financing and a clear preference for borrowing from financial institutions. Austria represents a particular exception with a prevalence of equity and bank loans. In general, financial market funding via bonds is the main source for debts for business groups, with the exception of Austria, Greece and Spain.

At the same time, Figure 2.2 shows how financing through bonds is positively correlated with size: mainly large groups use bonds, while small groups have a higher percentage of equity and bank loans.

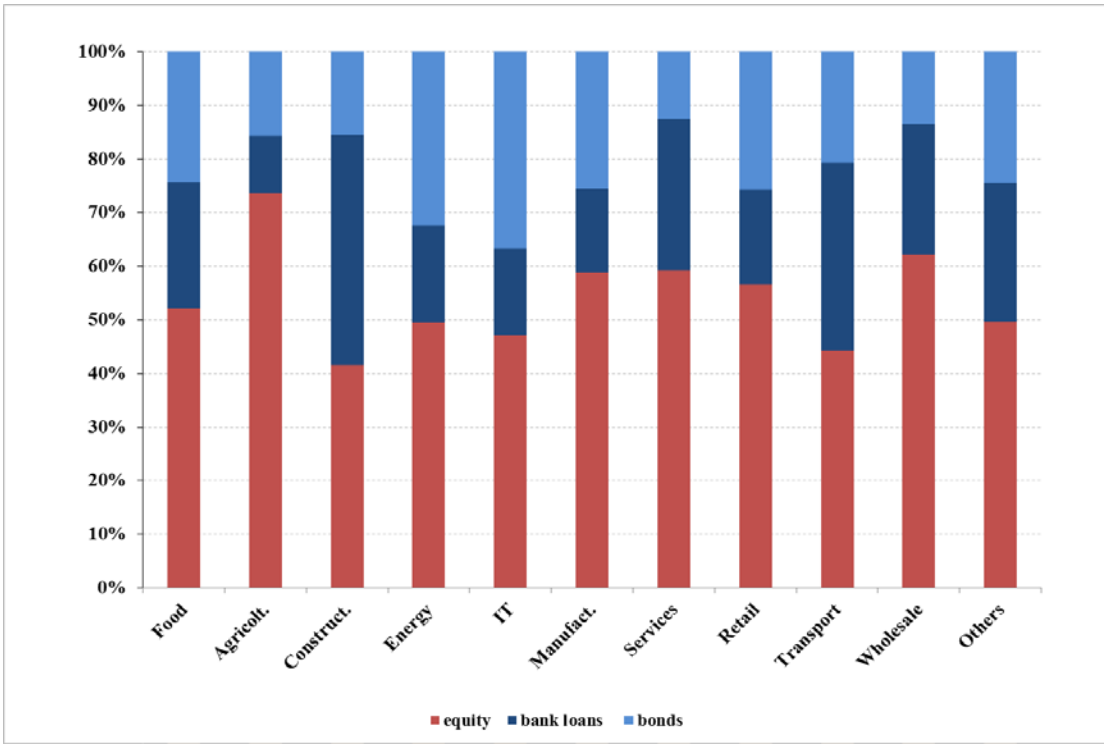
Lastly, Figure 2.3 illustrates how sectors have clear patterns in funding choices. For instance, construction business groups, as expected, have on average a lower equity and a higher share of indebtedness from financial institutions. On the contrary, energy and information technology groups have a higher internal financing and they resort to external funding more through the financial markets.

Figure 2.2: Funding choice by size (2005-2016)



Sources: ERICA and own computations

Figure 2.3: Funding choice by sector (2005-2016)



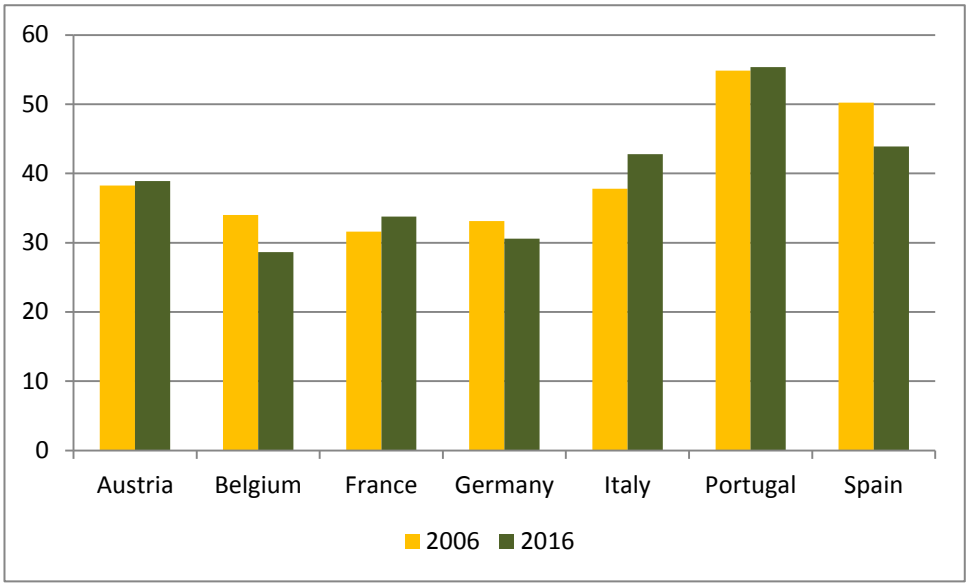
Sources: ERICA and own computations

3. The evolution of leverage over the crisis

The two waves of the crisis have substantially affected the funding choices of euro-area groups. Not only influencing the overall level of leverage but also changing the appeal of the three main determinants (bank loans, bonds and equity) across countries. [8]

According to the level of the leverage in 2006 (Figure 3.1) we have a straightforward geographic clustering: the three Southern countries (Italy, Portugal and Spain) showing a larger leverage than the four Northern countries (Austria, Belgium, France and Germany). In 2016, while the leverage has increased in Austria, Italy and Portugal and declined in the other countries, the overall initial pattern did not record any significant change.

Table 3.1 Leverage by country in 2006 and 2016



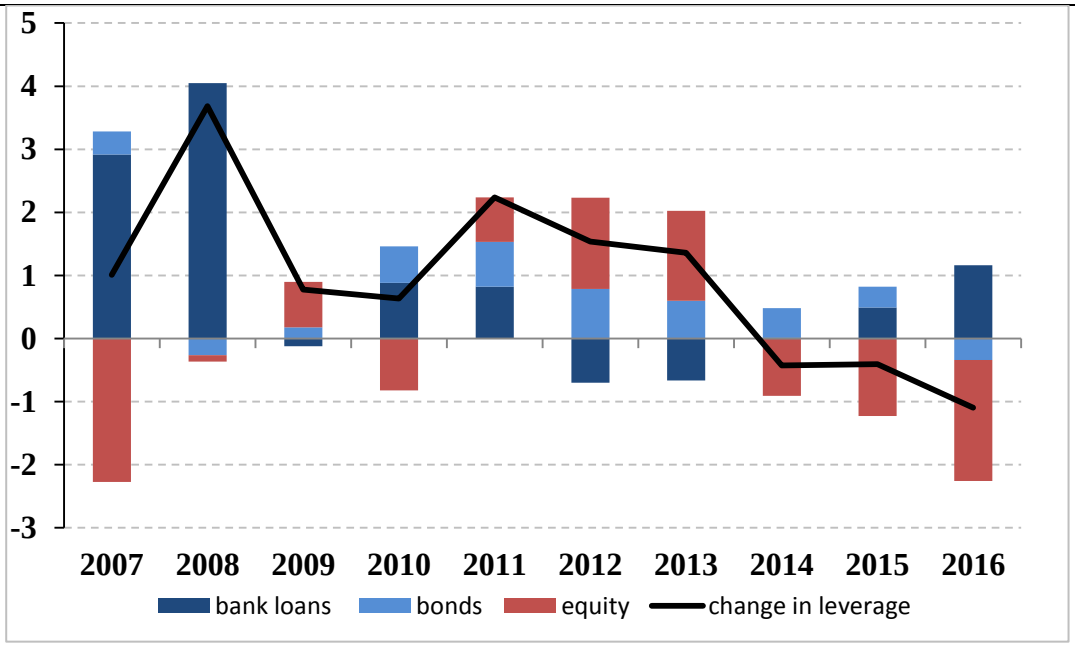
Sources: ERICA and own computations

Nevertheless, bank loans, bonds and equity have contributed differently across countries in shaping the leverage level. Focusing on Italy – the country for which the leverage has increased the most from 2006 to 2016, by more than three percentage points – and looking at the average change of firms' leverage, it turns out that the large expansion has been built up in a different way over time (Figure 3.2). First of all, the leverage increased every year until 2013, then it decreased in the three following years (2014-2016). This suggests that the needed process of deleveraging started only after the euro-area Sovereign

[8] Hereafter, due to data paucity, we will exclude from the analysis Greek data and the 2005 data.

debt crisis and was not sufficient to compensate the deterioration observed since the start of the Global financial crisis.

Table 3.2: Italy: contributions to changes in yearly average leverage



Note: by construction, positive changes in bonds and banks loans contribute positively to leverage growth. Instead, positive changes in equity (represented as negative in the graph) contribute negatively to leverage growth.

Sources: ERICA and own computations

By looking at each item's contribution, we see that during the euro-area Sovereign debt crisis, Italian non-financial groups heavily relied on bonds to fulfill their financing needs, more than offsetting the decline in bank loans. In addition, part of the increase in leverage is related to shrinking equity (i.e. a positive contribution). On the contrary, from 2014, the change in equity was able to revert the overall upward trend in Italian leverage. Indeed, in 2014 and 2015 the increase in equity (i.e. a negative growth contribution) more than offset those of bonds and bank loans; whereas in 2016, in addition to a significant negative contribution from equity, there was also a negative contribution from bond, for the first time since 2009.

Over the whole 2006-2016 period, the increase of 3.24 percentage points in leverage is the result of a large change in equity and bank loans of a similar magnitude but opposite

direction (over 9 percentage points each) and a decisive positive contribution of bonds by 3.5 percentage points.

While the increase in leverage during the sovereign debt crisis and the rising contribution of bonds is a characteristic of Italian firms only, the decline in leverage in the most recent period is common across countries. In particular, also Spain and Portugal show three negative signs in the yearly changes in 2014-2016; two negative signs are recorded for Austria, Belgium and Germany, whereas only one for France (Figure A.2 in Annex).

Given the several sources of heterogeneity across groups and over time, in the following section we provide an econometric investigation of the main determinants of the leverage. We also try to assess whether the reported Italian higher average leverage is due to particular characteristics of Italian specialization pattern or is an idiosyncratic peculiarity.

4. The empirical investigations

4.1 Our model

The empirical investigation is carried out through a panel estimation with interactive fixed effects of the following form:

$$Lev_{ict} = \beta_1 Prof_{ic,t-1} + \beta_2 Growth_{ic,t-1} + \beta_3 Size_{ic,t-1} + \beta_4 Others_{ic,t-1} + \alpha_c + \delta_t + \gamma_{ct} + \varepsilon_{ict}$$

where the leverage Lev_{ict} of group *i*, belonging to country *c*, and observed in year *t*, is estimated as the linear combination of lagged group's profitability $Prof_{ic,t-1}$, turnover rate of growth $Growth_{ic,t-1}$, assets size $Size_{ic,t-1}$, and a set of other variables $Others_{ic,t-1}$ among which debt composition, assets tangibility, a proxy for financial distress, cash flow and liquidity. We also add a four-period time trend term δ, a country effect α and the interaction term between country and time γ. While the additive country effect is removed by the within-group transformation, the interaction term will be estimated in a fixed effects approach. This model allows us to test the significance of homogeneous period effects across countries (additive effects) versus heterogeneous impacts (interactive effects), with particular regard to the Italian case (Bai, 2009). We will present first a naïve pooled OLS estimation with *ad hoc* fixed effects to subsequently turn to a more robust fixed effects model which includes also interactive terms.

4.2 Results

The results of the estimations are largely in line with our ex-ante expectations. The variable composition has always a positive sign suggesting that groups with a higher bond ratio are more leveraged. The coefficient is statistically significant and the economic interpretation is as follows: an increase in the bond ratio of 10 percentage points is associated with an increase in leverage of around 0.5 percentage points.

More profitable firms (according to the ROA) are those with a higher leverage. At the same time, also higher turnover growth and larger total assets are associated with higher levels of leverage. The availability of collaterals (as proxied by the tangibility variable) is positively correlated with leverage. Also financially distressed groups (i.e. those with higher level of interest over total asset) are positively correlated with leverage. Finally, a larger liquidity is associated with a lower leverage. However, this results is not robust to the method of estimation, suggesting that liquidity is a firm characteristics which does vary significantly over time.

When we introduce in the pooled OLS regression *ad hoc* fixed effects concerning the size and the nationality of the groups (column 2), we discover that larger firms are those with a significant lower leverage ratio (about 4.5 percentage points lower than that of small and medium groups) and that country effects are indeed relevant. The finding reported in the previous section about the geographic clustering is confirmed: non-financial groups from Italy, Portugal and Spain have a leverage which *ceteris paribus* is significantly higher than that of the Northern countries (ranging from 5.2 to 13.7 percentage points with respect to Austria).

A further interesting possibility of analysis is given by the introduction of time dummies. Nevertheless, in the pooled OLS regressions there seems to be no structural diversity in the four periods (tranquil period, Great recession, Sovereign crisis, post-crisis). When the time trend is directly taken into account in the FE regression (column 4), the OLS results are confirmed just as regards the sign of the coefficients. The Great recession coefficient turns out to be larger than the OLS estimate and statistically significant at 5%. In particular, this results is entirely driven by Italian firms. Indeed, when Italy is introduced in the regression (column 5), the magnitude of the Great recession coefficient reduces and

becomes non-significant and Italy shows a large (though non-significant) positive coefficient.

Table 3.2: contributions to changes in yearly average leverage

		OLS	OLS	FE	FE	FE
		(1)	(2)	(3)	(4)	(5)
Composition		0.034*	0.067***	0.041**	0.046***	0.045***
		(0.019)	(0.021)	(0.016)	(0.016)	(0.016)
Profitability		-0.262***	-0.243***	-0.158***	-0.160***	-0.158***
		(0.048)	(0.045)	(0.034)	(0.034)	(0.034)
Turnover growth		0.000***	0.000**	0.000***	0.000***	0.000***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Assets size		1.354***	1.674***	4.197***	4.477***	4.801***
		(0.293)	(0.438)	(0.263)	(1.403)	(1.376)
Tangibility		14.157***	5.743**	7.531*	7.691*	8.215*
		(3.040)	(2.760)	(4.404)	(4.464)	(4.311)
Interest coverage		612.2***	573.9***	140.4**	136.2**	135.7**
		(203.333)	(196.058)	(62.349)	(59.708)	(58.009)
Liquidity		-3.011**	-2.843**	-0.641	-0.640	-0.587
		(1.296)	(1.217)	(0.414)	(0.416)	(0.393)
Cash flow		0.000	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Period						
	Great Recession	.439	.482		1.229**	0.757
		(0.962)	(0.842)		(0.620)	(0.673)
	Sovereign Crisis	.244	.234		0.031	-1,161
		(0.779)	(0.727)		(0.730)	(0.785)
	Post-Crisis	0.169	-0.361		-0.438	-2.007**
		(0.825)	(0.867)		(0.912)	(0.948)
	Great Recession # Italy					1,319
						(1.182)
	Sovereign Crisis # Italy					4.728***
						(1.641)
	Post-Crisis # Italy					6.413***
						(1.963)
Size						
	Medium		-0.39			
			(1.305)			
	Large		-4.472**			
			(2.227)			
Country						
	Belgium		-5.629**			
			(2.775)			
	France		-0.769			
			(2.072)			
	Germany		-4.381**			
			(2.177)			
	Italy		7.543***			
			(2.383)			
	Portugal		13.685***			
			(3.537)			
	Spain		5.226*			
			(2.909)			
Sector		NO	YES	-	-	-
Country		NO	YES	-	-	-
Fixed effects		NO	NO	YES	YES	YES
Observations		9,063	9,063	9,063	9,063	9,063
Number of clusters		1,416	1,416	1,416	1,416	1,416

NOTE: Dependent variable: leverage. Time-varying covariates are one-year lagged. Standard errors are robust and clustered at non-financial group level for OLS regression. Symbols *, ** and *** denote significance at 10%, 5% and 1%, respectively.

The introduction of Italy in the regression largely alters also the coefficients concerning the sovereign debt crisis and the post-crisis period. As for the former, it switches from a non-significant positive to a large negative coefficient (though barely non-significant). Italy in the same period reports a striking value of 4.7 (significant at 1%), which can be interpreted as the extra leverage Italian firms show in the period with respect to all other firms under the *ceteris paribus* condition. Even more significant is the change in the coefficients estimate for the latest post-crisis period. For the whole set of countries, the negative value increases in (absolute) magnitude and becomes statistically significant, while Italy shows an extra-leverage of 6.4 for the same period. This results is somewhat at odds with the previous finding that Italy showed a declining leverage in the last three years. However, it must be noted that in 2013 leverage reached a peak in Italy (thus upward biasing the period estimate), and that the regression estimates take into account all other sources of influence (the *ceteris paribus* condition). Thus, even taking into account a possible overestimation, the coefficients suggest that Italy did not improve its leverage position with respect to other euro-area countries in the post-crisis period even if its leverage recently declined.

5. Conclusions

The paper studies the evolution of the leverage of non-financial business groups and its main components over the period 2006-2016 for seven euro-area countries. By relying on consolidated balance sheet data we avoid the distortions due to capital reallocation within each single group. In particular, it is well known that distortions are significantly higher in crisis times – when the usual sources are less disposed to provide funds. In addition, also the structure of the group may make the phenomenon more relevant when a single entity of the group is the main funding vehicle of the whole group.

The leverage display a marked geographic pattern: the four Northern countries (Austria, Belgium France, Germany) having a significantly smaller leverage than the three Southern countries (Italy, Portugal, Spain) both in 2006 and in 2016.

Focusing on Italy, the country for which the leverage increased the most (3.2 percentage points), we show that the change in leverage is due to a large change in equity and bank loans of a similar magnitude but opposite direction (over 9 percentage points each)

and a positive contribution of 3.5 percentage points by bonds. However, the contribution of bonds is concentrated in the years of the Sovereign debt crisis, when funds from banks were more difficult to obtain.

In order to check whether the differences in leverage across countries can be attributed not only to basic groups' characteristics (profitability, debt composition, assets tangibility) but also to the different industrial specialization and the different group magnitude, we run a panel estimation with interactive fixed effects. By introducing four time periods (Pre-crisis, Global financial crisis, Sovereign debt crisis, Post-crisis) and interacting them with the country dummy for Italy, we show that Italian non-financial groups have an idiosyncratic attitude at working with a higher leverage, which goes beyond the different groups characteristics. In addition, the distance with respect to Germany and France has increased in the most recent period even in a context of declining leverage.

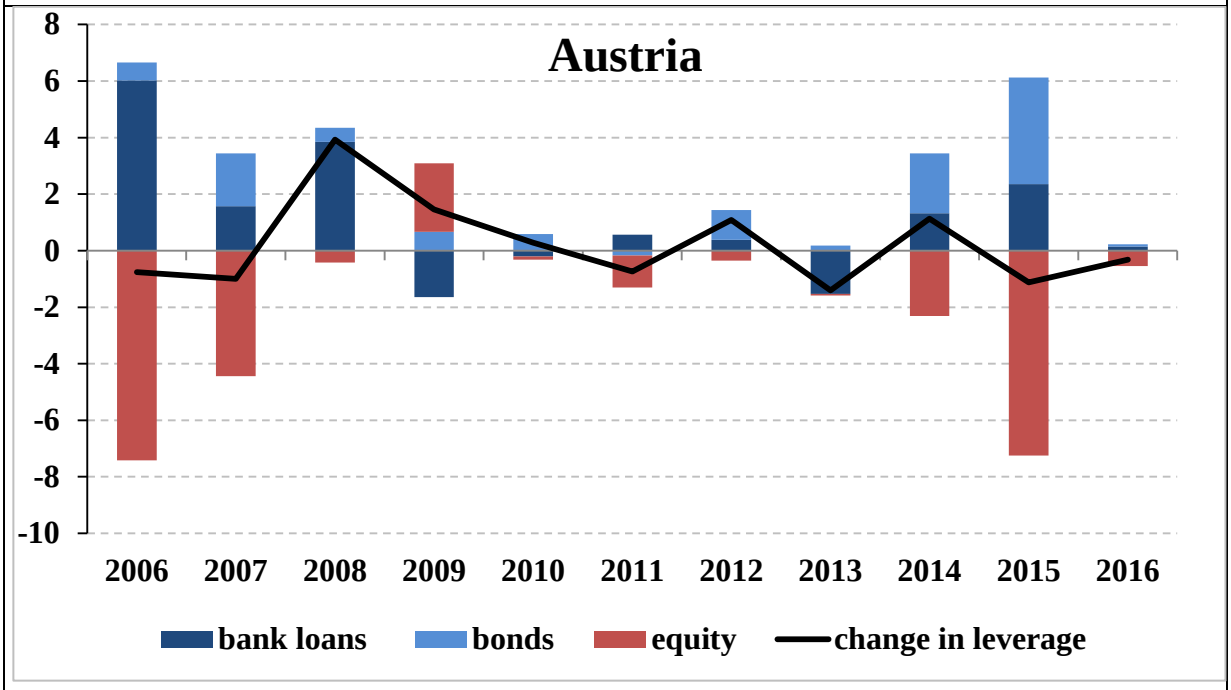
Annex

Table A.1: Sector aggregation according to NACE rev.2

Sector	Nace rev.2 section	Nace rev.2 division (d)
Agriculture, Forestry, Fishing and Mining	A+B	$d \leq 9$
Manufacturing	C	$d > 9 \cap d \leq 33$
Energy, Gas and Water supply	D+E	$d > 34 \cap d \leq 43$
Construction and Real estate	F+L	$d > 40 \cap d \leq 43 \cup d = 68$
Wholesale trade	G	$d > 44 \cap d \leq 46$
Retail trade	G	$d = 47$
Transportation and Storage	H	$d > 48 \cap d \leq 53$
Accomodation and Food	I	$d > 54 \cap d \leq 56$
Information, Communication and R&D	J+M	$d > 57 \cap d \leq 63 \cup d = 72$
Other Services	M+N	$d > 68 \cap d \leq 75 \cup d > 79 \cap d \leq 82$
Other Sectors	N+O+P+Q+S	$d > 76 \cap d \leq 79 \cup d > 83$

Sources: ERICA and own computations

Table A.2: yearly average change in leverage and its contributions



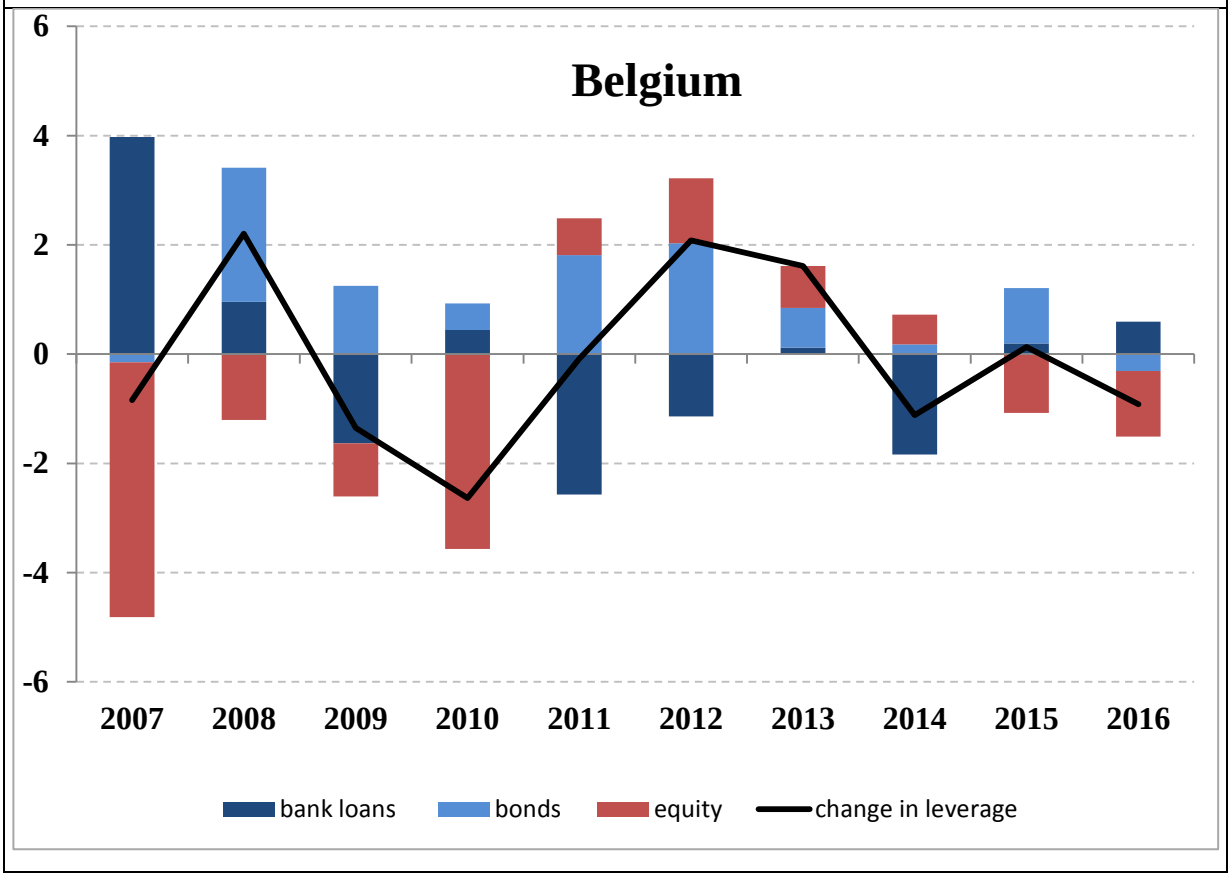
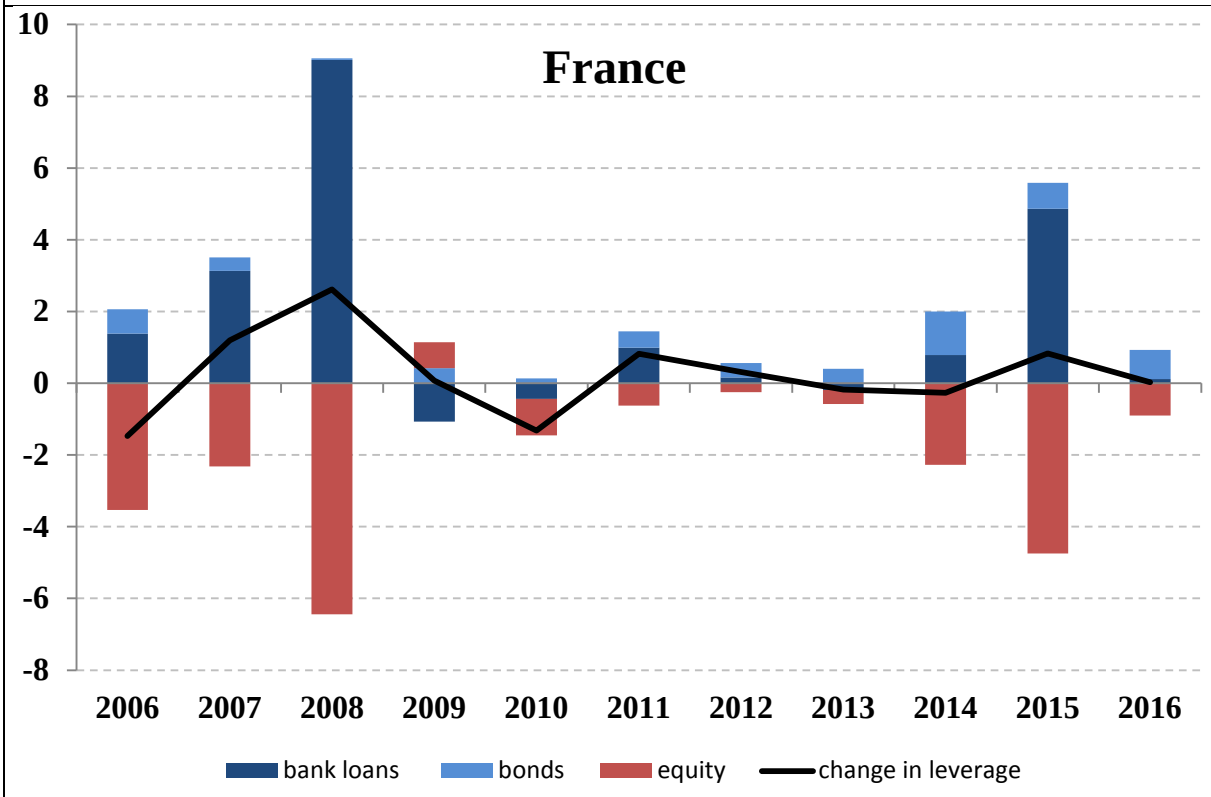


Table A.2: yearly average change in leverage and its contributions (continued)



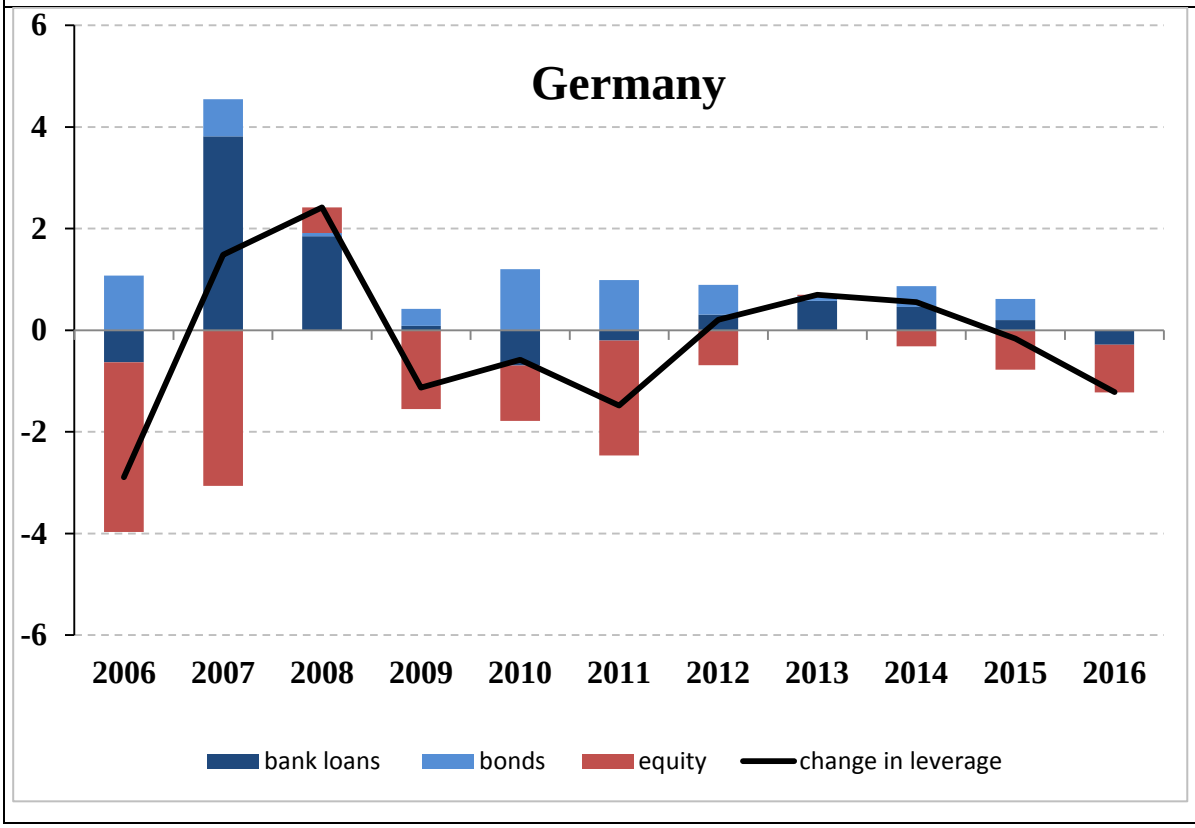
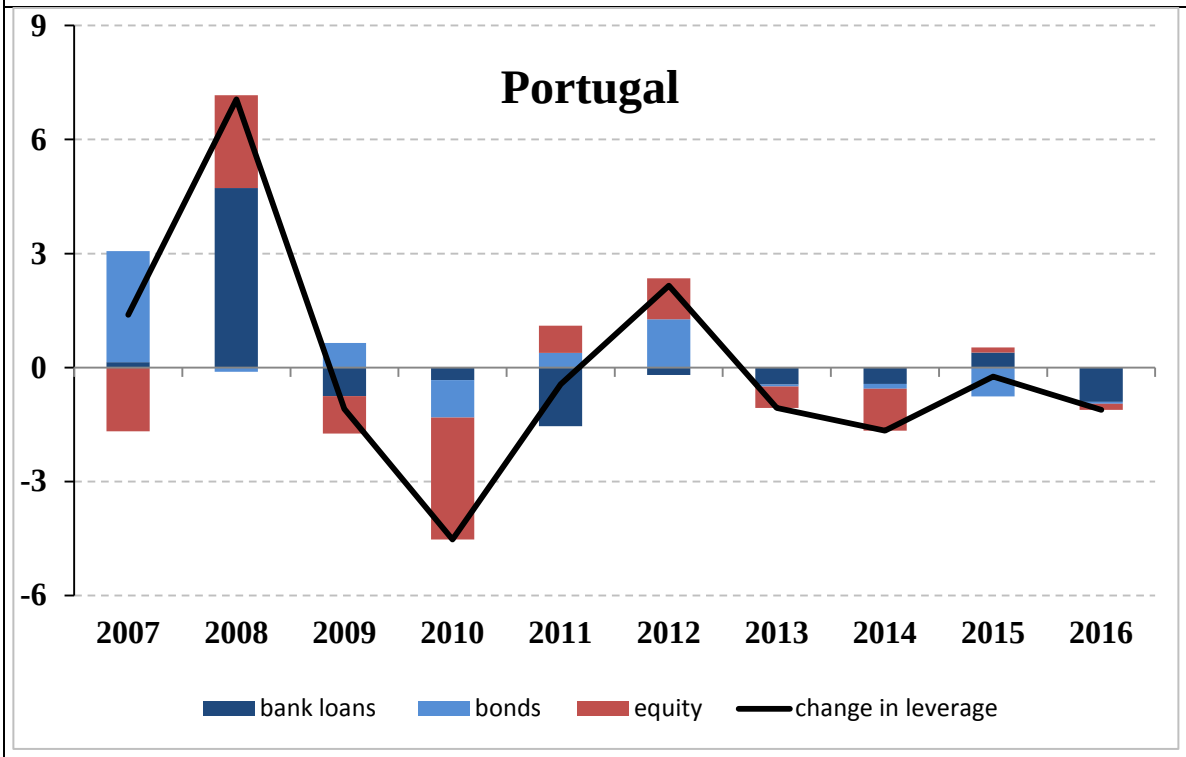


Table A.2: yearly average change in leverage and its contributions (continued)



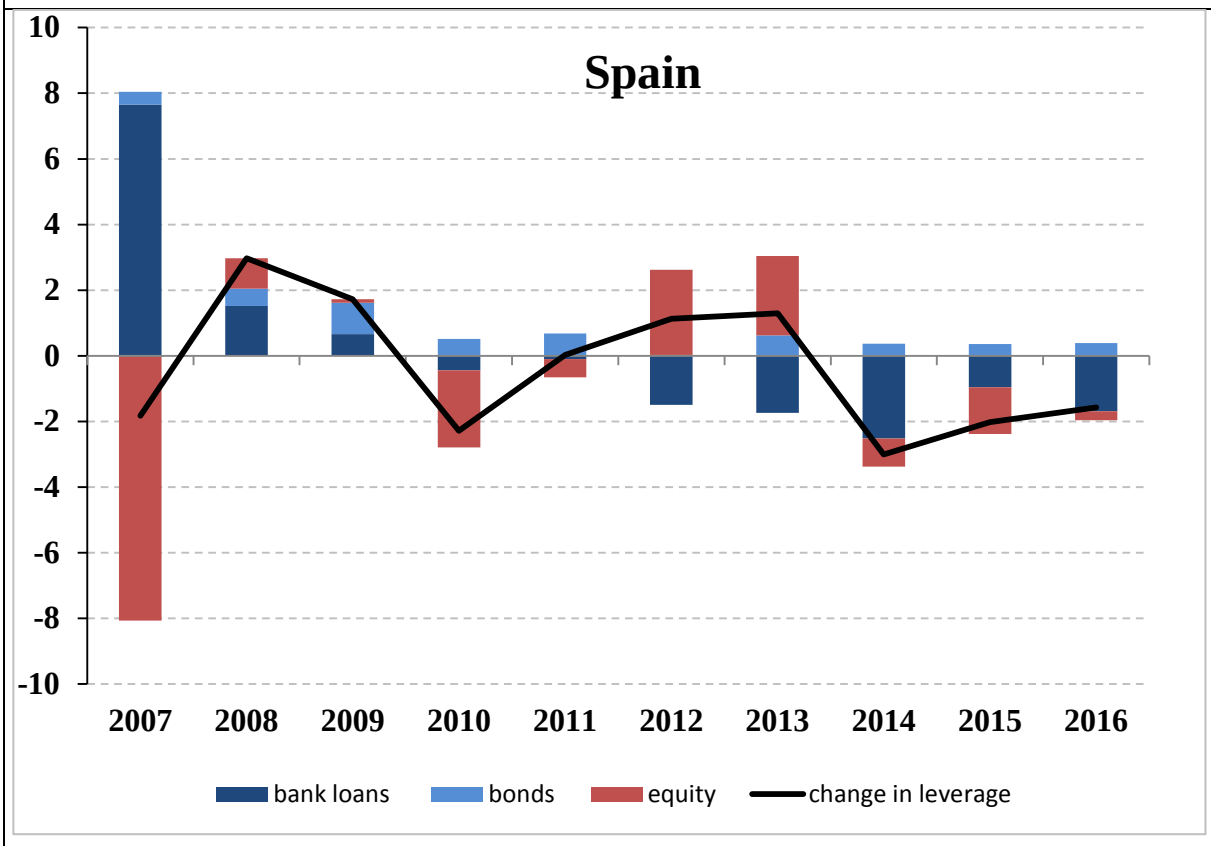
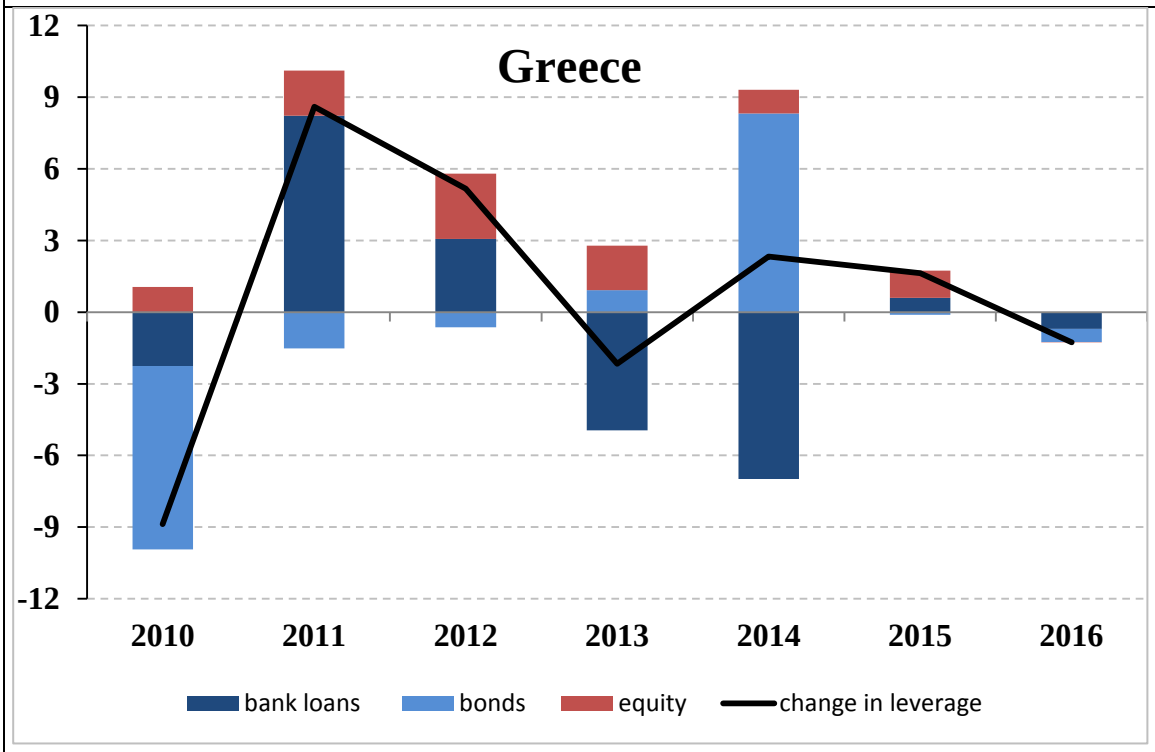


Table A.2: yearly average change in leverage and its contributions (continued)



References

Altomonte, C., Rungi A. (2013). Business groups as hierarchies of firms: determinants of vertical integration and performance. ECB Working Paper (1554).

Bai J. (2009). Panel data models with interactive fixed effects. *Econometrica,* 77 (4): 1229–1279.

Carlino L., Coppens F. et al. (2017). Decomposition techniques for financial ratios of European non-financial listed groups. *ECB Statistics Paper*, (21).

Carney, M., et al. Business group affiliation, performance, context, and strategy: A meta-analysis. *Academy of Management Journal* (54) 3: 437-460.

European Committee of Central Balance Sheet Data Offices (ECCBSO) - ERICA (European Records of IFRS Consolidated Accounts) WG. (2018). European non-financial listed groups: Analysis of 2016 data.

European Committee of Central Balance Sheet Data Offices (ECCBSO) - ERICA (European Records of IFRS Consolidated Accounts) WG. (2015). ERICA User's Guide.

Eurostat. (2008). Statistical classification of economic activities in the European Community.

Hamelin, A. (2013). Does Size Matter? Firm And Business Group Size Influence On The Benefits Of Group Affiliation. *Laboratoire de Recherche en Gestion et Economie (LaRGE), Université de Strasbourg*, (10).

Hovakimian, G. (2011). Financial constraints and investment efficiency: Internal capital allocation across the business cycle. *Journal of Financial Intermediation,* (20) 2: 264-283.

Khanna, T., Palepu K. (1997). Why focused strategies may be wrong for emerging markets. *Harvard business review*, (75) 4: 41-48.

Khanna T., Rivkin J.W. (2001). Estimating the performance effects of business groups in emerging markets. *Strategic Management Journal*, (22): 45-74.

Santioni R., Schiantarelli F., Strahan E. P. (2017). Internal capital markets in times of crisis: the benefit of group affiliation in Italy. *Banca d'Italia Working Papers* (1146).

Santioni R., Supino I. (2018). Internal capital markets in Italian business groups: evidence from the financial crisis. *Banca d'Italia Occasional Papers* (421).