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# THE DEBT OF ITALIAN NON FINANCIAL FIRMS: AN INTERNATIONAL COMPARISON

by Antonio De Socio* and Paolo Finaldi Russo*

**Abstract**

In the run-up to the financial crisis Italian firms significantly increased their debt in absolute terms and in relation to equity and GDP. The positive gap in firms' leverage between Italy and other euro-area countries has widened in recent years, despite the outstanding debt of Italian firms has decreased since 2011. In this work we document the magnitude of this gap using both aggregate macro data and firm-level information. We find that, controlling for several firm-specific characteristics (i.e. age, profitability, asset tangibility, asset liquidity, turnover growth), the leverage of Italian firms is about 10 percentage points higher than in other euro area countries. Differences are systematically larger among micro and small firms, whereas they are small and weakly significant for firms with assets above 300 million euros.

**JEL Classification:** G32.
**Keywords**: leverage, financial structure, euro area.

**Contents**



* Bank of Italy, Financial Stability Directorate.

# 1. Introduction

In the run-up to the crisis the debt of non-financial corporations (NFCs) increased in most advanced countries, making them more vulnerable to the downturn in the subsequent years.[1] In Italy the pre-crisis increase in debt was similar to that in other countries, but firms' financial fragility was exacerbated by a structurally lower level of capitalisation. During the crisis, balance sheet imbalances combined with the deterioration in profitability quickly led to severe difficulties in paying back debt, high numbers of bankruptcies and problems accessing new finance. Since firms' leverage was an important driving factor of these developments,[2] it is worthwhile to measure the differences in capital structure between Italian firms and those of other countries and to identify the most vulnerable segments of the Italian economy. Moreover, highly leveraged firms could underperform in terms of growth, investment rates and innovation because these outcomes tend to be positively correlated with the use of equity funds.[3]

We use both macro and micro data to describe the development of firms' debt in the last decade and evaluate the gap in firms' leverage between Italy and other euro-area countries. Micro data, in particular, allow us to control for firm-level characteristics that systematically influence leverage and to identify sectors or types of firms for which the differences are more significant. Following Rajan and Zingales (1995)[4], we define leverage as the ratio of financial debt (loans and securities) over their sum with equity. We exclude other kinds of debt, such as trade debt or pension fund reserves, because of limited international comparability (see also Welch, 2011). These liabilities are in fact influenced by different legal or fiscal

[1] Debt patterns of European firms are analysed by ECB (2013) and ECB (2014).

[2] Evidence for Italian firms is presented in Albareto and Finaldi Russo (2014) and Bonaccorsi di Patti et al. (2015).

[3] Empirical results on the positive correlation between equity financing and innovation are presented in Aghion et al. (2004), Carpenter and Petersen (2002), Brown and Petersen (2009) and, for Italian firms, Magri (2014).

[4] "*A more appropriate definition of financial leverage is provided by the ratio of debt (both short term and long term) to total assets. This measure, however, fails to incorporate the fact that there are some assets that are offset by specific non-debt liabilities. For example […] trade credit. […] Therefore, the effects of past financing decisions is probably best represented by the ratio of total debt to capital (defined as total debt plus equity)*" [Rajan and Zingales (1995), p. 1429]. The same definition of leverage is used in the Macroeconomic Imbalances Procedure of the European Commission.

frameworks at the national level; moreover, trade debts are frequently balanced by a comparable amount of trade credits among firms' assets and, for this reason, may represent a smaller threat for financial soundness compared with financial debt.

We find that macro and micro data provide coherent results in terms of international ranking and development of leverage over the last decade: Italian firms systematically emerge among the most leveraged ones. Based on aggregate financial accounts data, in 2014 the indicator was equal to 46 per cent, about 4 percentage points higher than in the euro area. An econometric analysis based on a sample of about 1 million euro area companies shows that, controlling for firms' sector of activity, age, profitability, asset tangibility, asset liquidity, and turnover growth, the average difference with the other countries is 10 percentage points. International differences are systematically larger among micro and small firms, whereas they are very limited for firms with assets above 300 million euros. We estimate that bridging the gap with the average for other euro-area countries would require about 230 billion euros of debt to be transformed into equity type funds, which corresponds to 18 per cent of firms' outstanding financial debt.

The work is organised as follow. The next section focuses on the dynamics of debt ratios in the previous decade based on aggregate data. Section 3 introduces firm-level information, highlights the differences with macro data and presents some descriptive statistics on leverage ratios in the European countries. In the fourth section we discuss the findings of the econometric analysis and, starting from these results, in Section 5 we propose an estimation of the amount of equity needed to rebalance the financial structure of Italian firms. Section 6 concludes.

## 2. Indebtedness across countries: the aggregate data

According to data drawn from national and financial accounts, between 2000 and 2009 the debt-to-GDP ratio of Italian NFCs increased steadily by 28 percentage points (see Tab. A1 in the Appendix). The dynamic has been similar across the main euro-area economies, with the major exception of Germany, but the size of the increase has been very different: smaller in

France (15 percentage points) and exceptionally high in Spain (about 60 percentage points). During the crisis, the indicator decreased slightly in Italy and Germany, whereas in France indebtedness continued to rise and in Spain it declined sharply.

Throughout this period, Italian NFCs did not increase equity as much as their debt; as a consequence, there has been a notable change in their financial structure towards a more leveraged model. Leverage rose by 12 percentage points between 2000 and 2014, more than double than the increase in the other three countries. A deleveraging pattern started from 2011, but the trend is slower in Italy than in the other economies. At the end of 2014, the leverage of Italian NFCs was equal to 46 percentage points, 11 points higher than in France and about 6 more than in Germany and Spain.

Fig. 1 shows the contributions of various components to the change in leverage over time for Italian firms[5]. Before the crisis, a large accumulation of debt, especially in the form of bank loans, provided a strong positive contribution to the change in the indicator; conversely, the contribution of debt became negative in 2011, 2013 and 2014. Throughout the period the changes in the indicator were heavily influenced by large fluctuations in stock market prices. Since 2012 the reduction in leverage has been partly due to increases in equity stemming from both a positive development of market prices and the increase of equity due to retained earnings and injection of new equity.[6]

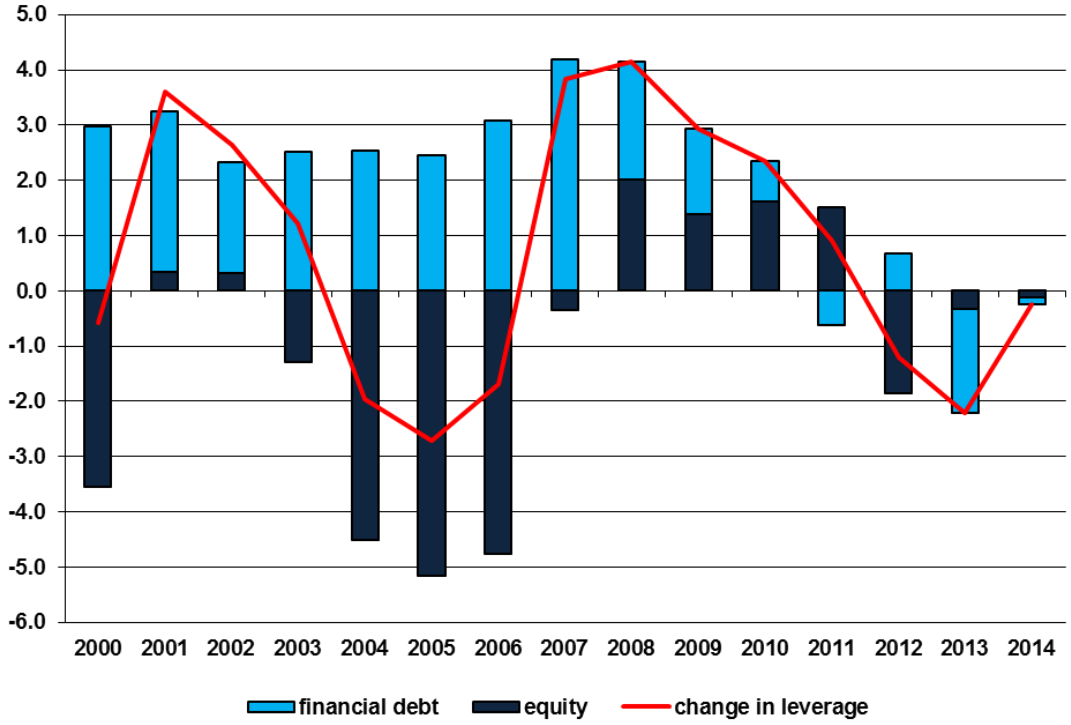
Two important points need to be made when leverage is computed on macro data from the financial accounts. First, equity is valued at market prices, so that cross-country differences are also influenced by heterogeneity in the dynamics of stock prices. Second, financial accounts provide an aggregate value for each country and do not allow an evaluation of the role played by differences in the structure of the economy, such as the firms' size or sector of activity. In the next sections, we use micro data from individual balance sheets to address these two shortcomings.

[5] The breakdown of the debt-to GDP ratio into its components provides similar results; see Fig. A1 in the Appendix.

[6] Information gleaned from the financial statements of Italian limited liability companies indicates that in this period equity contributed to deleveraging principally for the most profitable companies; capital increases were encouraged by the tax incentives introduced at the end of 2011 with the Allowance for Corporate Equity; see Bank of Italy (2015).

**Fig. 1: Contributions to changes in leverage of Italian NFCs**

*(per cent; annual rate of change)*




Source: Financial accounts.

Note: Contributions to growth are positive if financial debt increases or its sum with capital decreases and vice versa.

## 3. Firms' leverage: the micro data

Since in firms' balance sheet equity is valued at book value, the use of micro data allows us to reduce the procyclical effects of the changes in market prices on the dynamics of leverage.[7] Moreover, micro data allow to measure cross-country differences in leverage taking into account a large number of firms' characteristics that could influence the international comparison. On the other hand, micro data could have a relevant shortcoming due to the different – and sometime limited - coverage of the samples in each country, which could introduce a bias in the results due to less represented segments of the population of firms.

[7] Note that this valuation usually implies that leverage calculated from micro data is higher than the one derived from macro data, due to the inclusion of future income in market valuation. Anyway, the reverse could also happen when equity markets value negatively the prospects of firms in a country due to deep recessions or financial crises.

*3.1 The Orbis database*

In this work the source of individual data is the database Orbis, provided by Bureau van Dijk, which includes harmonised and comparable financial information for public and private limited liability companies in several countries. The database includes firms' data from 2004 to 2013 for the 18 countries belonging to the euro area in 2014. Sample coverage is frequently above 50 per cent (see Tab. A8 in the Appendix); it is generally lower for micro firms and, among the largest countries, for Germany.[8] One feature of the database is especially relevant for the purpose of our analysis: since larger companies are better covered by the sample, the aggregation of firm-level data is representative of the leverage computed with financial accounts at the country level.[9]

In the Orbis database more than 30 per cent of firms do not present any financial debt; the share is larger for micro firms and, among largest countries, in Italy (see Fig. A5 and A6 in the Appendix). In our analysis, we focus on companies with positive values of financial debt for the following two reasons. First, in some not identifiable cases financial debt could be included, together with other kind of debt, in other items of firms' liabilities; this may be because the distinction between financial debt and other debt is missing even in the national sources of data.[10] Second, even if the number of these firms is high, their impact at aggregate level is negligible, since in almost all countries (including the four largest ones) they account for less than 15 per cent of total assets. After excluding companies without financial debt and cleaning outliers, the final database includes on average about 1 million firms in each year.

*3.2 Firms' leverage in the euro area*

The dynamics of leverage at aggregate level described in the previous section are substantially confirmed by the data based on individual balance sheets. Since leverage is computed using equity valued at book value, which is less volatile than market value, it is

[8] The second section of the Appendix describes more precisely the database and its coverage in different countries and classes of size.

[9] A comparison between macro and micro data in presented in Section 3.2.

[10] In the fourth section of the Appendix, we describe the case of Italian firms: in the Cerved database (which includes virtually all Italian limited liability companies) around 40 per cent of firms without financial debt report a positive amount of total debt but not the specific values for financial debt or other kind of debt (fig. A7).

simpler to distinguish the build-up of firms' indebtedness and the following phase of deleveraging: the ratio increased in the years before the crisis and started to decrease after 2008. Deleveraging has been marked among more leveraged firms: the median and the third quartile of the distribution increased by 11 percentage points between 2004 and 2008, and then decreased by 6 percentage points in the following years; the corresponding values for the first quartile are only 6 and 3 percentage points respectively.

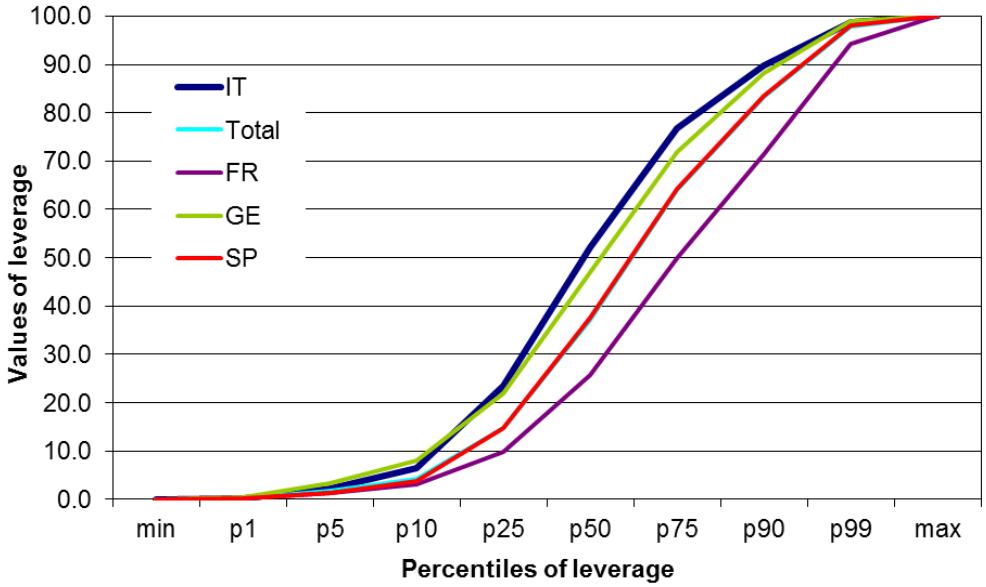
The inverse u-shaped evolution of leverage was similar among size classes and sectors (see Tab. A2 in the Appendix). The increase before the crisis has been larger for micro and small firms (10 and 15 percentage points between 2004 and 2008) and in the construction and real estate sectors (15 percentage points in the same period). Similarly to the evidence based on aggregate data, among the largest economies Germany is the only country showing a decrease in leverage over the whole period, while leverage rose in Italy, France and Spain before the crisis and decreased thereafter. As expected, the fluctuations observable in micro data are narrower than those in financial accounts which are influenced by market valuation.

Micro data confirm that Italian companies' leverage is high by international comparison. The difference with other countries does not depend on a limited number of heavily indebted firms but holds true for the whole distribution of the indicator. Fig. 2 shows the value of leverage in 2013 for several percentiles in the four largest countries of the euro area and in the aggregate sample. Differences with the euro area are especially large for the central part of the distribution (by 9, 15 and 13 percentage points for the first, second and third quartile respectively). The corresponding differences are larger with respect to France, and more limited in comparison with Germany.

These cross-country differences are much greater than those observed at macro level and those based on weighted averages of individual data: for the two latter measures, differences between Italy and the euro area in 2013 were 3.5 and 2.2 percentage points. This is mainly due to the fact that a few very large companies influence aggregate values: in fact, excluding very large firms (with total assets above 300 million euros) increases the differences at aggregate level up to 6.5 percentage points (see Fig. A2 in the Appendix).

**Fig. 2: Percentiles of leverage in the euro-area countries (2013)**

*(per cent)*




Source: Orbis.
Note: only leveraged firms are included.

Tab. A3 in the Appendix confirms that the difference in leverage between Italy and other countries is wide for micro and small companies (around 10 percentage points), whereas it becomes substantially nil for large companies. Among economic sectors, main differences concern construction, wholesale trade and ICT.

## 4. The econometric analysis

This section develops a more detailed empirical analysis of the differences in leverage between Italian firms and other euro-area countries. It is based on a multivariate approach that allows cross-country differences to be measured taking into account firm-specific features that influence the level of leverage. We focus on 2013 to obtain the most up-to-date picture of cross-country differences needed to estimate (in the following section) the magnitude of the financial structure rebalancing necessary to bring the leverage ratio for Italian firms into line with that of euro-area ones.[11]

[11] The results of the regressions run with data from previous years are substantially similar (some evidence is presented in Section 4.4).

*4.1 The empirical model and methodology*

The analysis relies on the use of dummies to evaluate the difference between Italian firms and other euro area companies.[12] More specifically, we estimate the following five regressions:

*(Base)* *LEV2013=IT + constant*

*(1)* *LEV2013=IT + d_size + constant*

*(2)* *LEV2013=IT + d_size + d_sectors + constant*

*(3)* *LEV2013=IT + d_size + d_sectors + profitability + constant*

*(Final)* *LEV2013=IT + d_size + d_sectors + profitability + other characteristics + constant*

The variable of interest is the dummy IT, whose estimated coefficient represents the difference in the mean of leverage between Italian firms and other euro-area companies. Starting from the Base regression other variables are added to develop the analysis. Model (1) includes dummies for six size classes, ranging from very small to very large firms (those with total assets below 1 million and above 300 million euros respectively). Model (2) includes dummies for eight economic sectors. Model (3) adds a variable of firms' profitability (measured by operating income over total assets), which is a proxy of the internal resources generated by firms that are expected to be negatively correlated with leverage. The Final regression includes other variables that are commonly used in the literature:[13] *i)* the ratio of tangible assets to total assets, a proxy of the real guarantees that a firm could offer (with a positive expected sign of the estimated coefficient); *ii)* the ratio of cash to total assets, a measure of precautionary funds that could be used to finance firms' operating activity and investment (with a negative expected sign); *iii)* the rate of growth of turnover, a proxy of the needs for external financing to support the increased volume of activity (with a positive expected sign); and *iv)* firms' age, which could have a non-monotonic relation to leverage as younger firms have more difficulty finding external resources owing to their opaqueness,

[12] The analysis extends a previous work by De Socio (2010), developed on a smaller database (Amadeus) which included mostly medium and large firms.

[13] Two recent surveys of the literature on firms' financial structure are Murray and Vidhan (2009) and Graham and Leary (2011).

while larger firms usually rely more on internal resources.[14] All firm level variables are one-year lagged with respect to the dependent variable.

This stepwise strategy of estimations from the Base to the Final model is an attempt to measure the effect of the variables progressively added to the specification on the coefficient of the dummy IT. In this way we obtain a measure of the difference in leverage between Italian and other euro-area countries firms, once firms' characteristics are taken in account.

*4.2 Results*

Tab. 1 presents the estimated coefficients of the dummy IT included in the regressions.[15] On average, the difference in leverage between Italy and other euro-area countries is about 13 percentage points when other variables are not included. It remains substantially similar when dummies for size classes and sectors and the ratio of operating income over total assets are added. The inclusion of other characteristics of firms in the Final model reduces the difference to 10 percentage points. Among the variables included in the last regression, the liquidity ratio contributes the most to the reduction in the difference with the other euro-area countries.[16]

This evidence suggests that firm-specific characteristics matter, but also that differences remain high when they are taken into account. These findings are in line with recent works relating to the euro area (De Socio and Nigro, 2012; ECB, 2013), to OECD countries (Faccio and Xu, 2015) and to a larger panel of 42 developed and developing countries (e.g. Fan et al., 2012): differences in country-level characteristics such as the tax rate, the legal system, and the development of financial markets influence firms' choices of financial structure. In particular, higher statutory tax rates, less developed equity markets, stronger protection of

[14] Some descriptive statistics of the variables used in the regressions are presented in the third section of the Appendix (see tab. A9).

[15] The complete results of the regressions are reported in the first section of the Appendix.

[16] The average value of the liquidity ratio for Italian firms is around 7 percentage points lower than in other countries. As the estimated coefficient of the liquidity ratio is -0.42, this should explain about 3 percentage points of the lower value of the IT coefficient in the Final regression with respect the Base one. For the other firm-specific variable included in the Final regression the corresponding values are negligible.

legal rights, and longer bankruptcy processes have a positive effect on leverage at country level.[17]

**Tab. 1: Estimated differences in leverage between Italy and other euro-area countries (2013)**

*(estimated coefficient of the dummy IT; per cent)*

| | **Base** | (1) with dummies for size classes | (2) with dummies for size classes and sectors | (3) with dummies for size classes and sectors, and profitability | **Final** with dummies for size classes and sectors, and other characteristics of firms |
|---|---|---|---|---|---|
| 17 countries | 12.9 | 12.9 | 13.4 | 13.5 | 10.2 |
| 16 countries (excl. FR) | 8.7 | | | | 7.4 |
| IT vs FR | 18.2 | | | | 13.0 |

Note: The estimated coefficients are all significant at the 1 per cent level. Tables A4 and A5 in the Appendix show the coefficients of all the variables included in the estimations.

We repeated the estimations of Base and Final models excluding France and directly comparing Italy and France. There are two main related reasons for these checks. The first is that French companies represent more than 30 per cent of the firms used in the analysis; the second is that they are among the less leveraged ones. As a consequence, French firms strongly influence the mean values of leverage in the euro area and it is useful to check whether the estimated coefficient of the dummy IT only reflects the differences with this specific country.

The results show that the difference between the leverage of Italian firms and that of the other countries is reduced to about 7 percentage points in the Final model when France is excluded, but remains largely significant (second row of Tab. 1). When only France is considered as benchmark country, the gap widens to 13 percentages points (third row of Tab. 1).

[17] All these variables represent structural differences between countries, apart from the taxation rate, which can be changed more easily. The effect of this last variable is not negligible: based on the results of De Socio and Nigro (2012), it is estimated to explain around one quarter of the differences between the leverage of Italian and euro area firms.

*4.3 Results by size classes*

In this second step, we replicate the analysis for each class of size for two main reasons. The first is that the descriptive analysis suggested that cross-country differences could vary markedly according to firm dimension; the second is that the previous results on the overall mean of leverage could be driven by smaller firms, whose number is higher. In particular, we include in the Base and Final models 12 interaction terms between the dummies of size and the two dummies IT and EU (equal to zero when IT is equal to one and vice versa).

**Tab. 2: Estimated differences in leverage between Italy and other euro-area countries by size classes (2013)**

*(estimated difference between the dummy IT and EU; per cent)*

| | **Base** | **Final** |
|---|---|---|
| ***Differences IT-EU*** | **12.9** | **10.2** |
| *micro (assets <1 mln)* | 10.0 | 6.9 |
| *micro (assets >= 1 mln)* | 19.2 | 15.2 |
| *small* | 16.3 | 14.6 |
| *medium* | 11.6 | 10.8 |
| *large (assets <300 mln)* | 10.8 | 9.4 |
| *large (assets >=300 mln)* | 3.0* | 2.0** |
| ***Differences IT-EU (excl. FR)*** | **8.7** | **7.4** |
| *micro (assets <1 mln)* | 5.6 | 3.8 |
| *micro (assets >= 1 mln)* | 14.9 | 13.6 |
| *small* | 12.1 | 11.9 |
| *medium* | 7.8 | 7.6 |
| *large (assets <300 mln)* | 7.3 | 6.0 |
| *large (assets >=300 mln)* | 0.7## | 0.2## |
| ***Differences IT-FR*** | **18.2** | **13.0** |
| *micro (assets <1 mln)* | 14.7 | 9.7 |
| *micro (assets >= 1 mln)* | 25.0 | 17.7 |
| *small* | 24.8 | 18.9 |
| *medium* | 21.7 | 17.6 |
| *large (assets <300 mln)* | 19.6 | 16.8 |
| *large (assets >=300 mln)* | 9.4 | 6.7 |

Note: The estimated coefficients are all statistically significant at the 1 per cent level, except for values with symbols "##"(not statistically significant), "*" or "**" (statistically significant at 5 and 10 per cent level, respectively). Table A6 in the Appendix shows the coefficients of all the variables included in the estimations.

The results summarised in Tab. 2 indicate that, including all firms' characteristics, differences are larger (around 15 percentage points) for small and micro firms with total assets above 1 million euros. Moreover, the differences are small (2 percentage points) and not statistically significant at the 1 per cent level for very large firms (with assets over 300 million euros), whose financial structure is therefore similar across countries.[18]

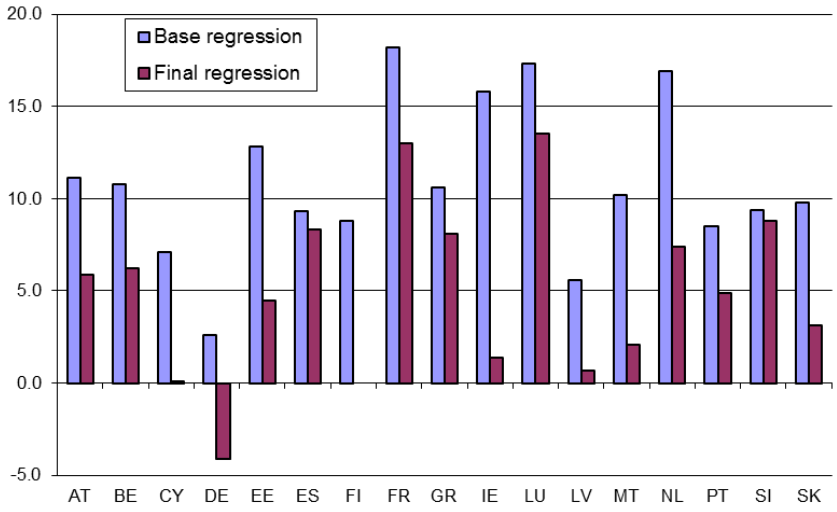
These results are also confirmed if France is excluded from the sample: in this case the difference in leverage for very large firms becomes not statistically significant. In the models that compare Italian firms with French ones, the differences in leverage for very large firms became instead significantly positive.

*4.4 Alternative specifications and other robustness checks*

In order to check whether our results are driven by differences with few specific countries (beside those with France that have already been addressed) the Base and Final regressions have been replicated comparing Italian firms with those of each country, one by one. The results confirm that Italian firms are significantly more leveraged than in each of the other euro-area countries (Fig. 3).

**Fig. 3: Bilateral estimated differences in leverage between Italy and other euro-area countries (2013)**

*(estimated coefficient of the dummy IT; per cent)*




[18] These similarities across very large firms could be due to their capacity to access the international financial market: anyway, since only a minority of these firms is listed, it is reasonable to assume that size itself, independently of access to the market, influences the capital structure.

In some cases (Germany, Finland, Ireland, Cyprus and Latvia) firm-specific characteristics explain a large part of the differences in leverage: the coefficient of the dummy IT estimated in the "Final" model is negative or close to zero. The analysis run separately for each class of size substantially confirms these results for a large number of firms of intermediate size (from micro firms with assets over 1 million euros to large firms with assets below 300 million euros).[19]

The regression analysis presented in this section is based on balance sheets for 2013. We also run some regressions based on data from 2008 to 2012:[20] Fig. A4 in the Appendix presents the estimated coefficient of the dummy IT in the Final model run in each year separately and in a comprehensive regression based on pooled OLS with the inclusion of yearly time dummies. The results indicate that the difference in firms' leverage between Italy and other euro-area countries slightly increased by 1.2 percentage point between 2009 and 2011, peaking at 10.4 per cent, and remained broadly stable thereafter. This evidence is substantially consistent with the picture based on the aggregate data described in the second section.

## 5. The equity gap of Italian firms

In this section we provide a quantification of the equity gap, i.e. the amount of debt to be transformed into equity type funds in order to fill the leverage gap with other countries. To do this we combine data from financial accounts, Italian firms' balance sheets (Cerved data) and the results of the regressions presented in Section 4.3.

Tab. 3 summarises the preliminary steps of this process. First, we start from the aggregate value of firms' financial debt derived from financial accounts, which was equal to 1,273 billion euros at the end of 2013 (Tab. 3, col. 2).[21] Second, we distribute this amount of debt among the six size classes used in the regressions. This estimation relies on the data on

[19] Fig. A3a-A3f in the Appendix, Section 1, show the results for each size class.

[20] The main reason for excluding the years before 2008 is the large increase in the number of observations between 2004 and 2006 (see Appendix, Section 2). As regressions are based on one-year-lagged variables (including turnover growth), the data used in this robustness analysis starts from 2006.

[21] We use the end-of-2013 data as this is the last year for which a full sample of balance-sheet data is available in the Cerved archives.

financial debt calculated from the 2013 balance sheets in the Cerved database. We rely on this source as its level of coverage for Italian firms is very high: the amount of financial debt based on Cerved (about 1,000 billion euros) represents about 80 per cent of the aggregate financial debt derived from financial accounts (col. 3). As the coverage of the Cerved sample, in terms of number of firms and value added, is higher for the largest size classes,[22] we assume that the financial debt of large firms is observed entirely through the balance sheet data. The residual part of the aggregate value of debt is assigned to small and medium enterprises proportionally to their share of financial debt in the Cerved database (col. 4 and 5).

**Tab. 3: Estimation of financial debt by classes of firms' size (2013)**

*(billion euros)*

| **Size classes** | Financial accounts | Cerved database | *% composition* | Estimated values of financial debt by size classes |
|---|---|---|---|---|
| micro-firms - assets<1 mln. | | 36 | *7.1* | 58 |
| micro-firms - assets>=1 mln. | | 196 | *37.9* | 309 |
| small firms | | 140 | *27.1* | 221 |
| medium-sized firms | | 144 | *27.9* | 228 |
| **Total SMEs** | | **516** | *100.0* | **815** |
| large firms - assets<300 mln. | | 97 | | 97 |
| large firms - assets>=300 mln. | | 361 | | 361 |
| **Total large firms** | | **458** | | **458** |
| **Total** | **1,273** | **974** | | **1,273** |

The subsequent steps are based on Orbis data. First, we calculate the mean level of leverage of Italian firms in each size class. Then, we draw a benchmark level of leverage for each size class using the gap estimated in the regressions shown in Tab. 2 (if significantly different from zero at the 1 per cent level). Finally for each size class we calculate the decrease in debt shown in Tab. 3 (and the corresponding increase in equity) needed to bring Italian leverage

[22] Cerved's better coverage of larger firms emerges clearly from a comparison with Istat data ('Business size and competitiveness' database): in terms of number of firms, the coverage ratio increases from about 15 per cent among micro firms, to 33 per cent among small firms and to nearly 99 per cent for the larger size classes.

into line with that of other countries, leaving unchanged the size of their liabilities (equity plus financial debt).

The results presented in Tab. 4 indicate that, in order to reach the same average level as other euro-area countries, Italian firms should transform about 230 billion euros of financial debt into equity type finance, corresponding to 18 per cent of their outstanding debt. The gap is largest, at around 28 per cent of outstanding debt, for small firms and micro firms with over 1 million euros of assets.

A large part of the estimated corrections is due to the comparison with French firms, which on average have one of the lowest levels of leverage in Europe. Excluding these companies, the equity gap would drop to 180 billion euros.

**Tab. 4: Change in financial debt needed to rebalance the financial structure of Italian NFCs, by firms' size (2013)**

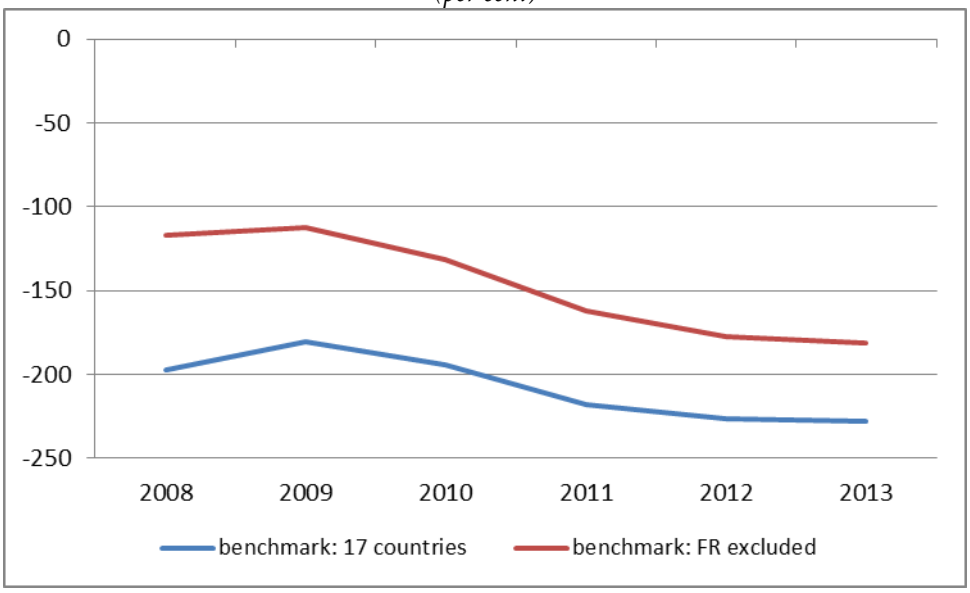
*(billions euros and rates of change)*

| Firms' size classes | Financial debt - 2013 | (1) Benchmark: 17 countries; firm-level controls | | (2) Benchmark: 16 countries (excl. FR); firm-level controls | |
|---|---|---|---|---|---|
| | *bn.* | *bn.* | *% rate of change* | *bn.* | *% rate of change* |
| micro (assets <1 mln.) | 58 | -8 | *-14.4* | -5 | *-7.9* |
| micro (assets >=1 mln.) | 309 | -85 | *-27.5* | -76 | *-24.6* |
| small | 221 | -63 | *-28.4* | -51 | *-23.2* |
| medium-sized | 228 | -52 | *-22.6* | -36 | *-15.9* |
| large (assets<300 mln.) | 97 | -21 | *-21.4* | -13 | *-13.7* |
| large (assets>=300 mln.) | 361 | 0 | *0.0* | 0 | *0.0* |
| **TOTAL** | **1,273** | **-228** | ***-17.9*** | **-181** | ***-14.2*** |

We replicated the analysis on previous years to evaluate the change in the equity gap during the crisis. The results indicate that the gap has widened somewhat since 2009, from about 180 to 230 billion euros (Fig. 4); the increase is mostly due to the change in the estimated coefficients of the dummy IT between 2009 and 2011 (as shown in Fig. A4 in the Appendix).

**Fig. 4: Change in financial debt needed to rebalance the financial structure of Italian NFCs (2008-2013)**

*(per cent)*




## 6. Conclusions

In the run-up to the financial crisis, Italian firms stepped up considerably their use of debt, especially bank loans, benefiting from the low cost and large availability of credit. Their leverage reached historically high levels. A similar development occurred in the other major economies, so that the differences in the international comparison remained substantially unchanged in qualitative terms.

In this work we document the amplitude of this gap using both aggregate macro data and firm-level information. We find that the two sources of data, notwithstanding the different accounting of firms' equity (respectively, at market and at book values), give similar results in terms of ranking and development of leverage among the main euro area countries. Italian firms systematically emerge among the most leveraged ones.

An econometric analysis, based on a large sample of firms operating in the euro area, shows that the leverage of Italian firms is about 13 percentage points higher than in other countries. Estimated differences do not change significantly when controlling for the composition by size and by economic sectors in the various countries. Instead, the gap is reduced to 10

percentage points when other firm-specific characteristics (i.e. age, profitability, asset tangibility, asset liquidity) are considered. International differences in leverage are systematically larger among micro and small firms, whereas they are not significant for firms with assets above 300 million euros. Some robustness checks confirm that the differences are positive with respect to virtually all other euro-area countries and increased somewhat in the period 2009-2011.

Finally, combining the econometric results with macro data, we estimate that filling this gap would imply transforming about 230 billion euros of debt into equity type funds, which corresponds to 18 per cent of the firms' outstanding financial debt. However, this gap is estimated on the basis of a static approach (fixing the total amount of firms' financial sources), whereas in a dynamic framework, assuming a growth in firms' total assets, the change could benefit from higher inflows of equity and/or lower inflows of debt. Indeed, recent evidence based on aggregate data shows that the debt of Italian firms has been diminishing constantly since the middle of 2011, even if at a slower pace than in the other countries.

The Italian Government recently put in place some incentives to encourage recourse to equity financing by reducing the debt tax shield: a cap on the amount of interest expense that could be deducted from taxable income and tax deductions linked to increases in equity (according to the Allowance for Corporate Equity scheme). Similarly, other measures have also been aimed at strengthening the supply of risk capital for Italian firms.[23] The results of our analysis suggest that Italian firms still need this kind of incentives to strengthen their financial structure.

[23] The Treasury holds shares in some private equity funds through the Cassa Depositi e Prestiti SpA, with the aim is of supporting the growth and internationalisation of Italian firms (Italian Investment Fund and Italian Strategic Fund). Fiscal incentives have also been put in place to support the activity of venture capitalists and business angels.

# Appendix

*1. Tables and figures*

**Tab. A1: Indebtedness of non-financial firms**

*(per cent)*

| | Financial Debt / GDP | | | | Leverage | | | |
|---|---|---|---|---|---|---|---|---|
| year | IT | GE | FR | SP | IT | GE | FR | SP |
| 2000 | 56.3 | 57.7 | 97.8 | 73.3 | 34.1 | 39.5 | 29.3 | 35.5 |
| 2001 | 58.8 | 59.3 | 102.2 | 80.8 | 37.7 | 41.6 | 36.0 | 37.7 |
| 2002 | 60.2 | 60.2 | 101.5 | 83.6 | 40.3 | 50.8 | 39.0 | 41.4 |
| 2003 | 62.0 | 60.8 | 99.6 | 86.1 | 41.6 | 47.4 | 36.1 | 38.9 |
| 2004 | 63.6 | 57.3 | 100.0 | 91.2 | 39.6 | 45.1 | 34.8 | 39.1 |
| 2005 | 66.2 | 55.9 | 101.2 | 100.0 | 36.9 | 42.4 | 32.9 | 38.8 |
| 2006 | 69.8 | 56.0 | 102.8 | 115.5 | 35.2 | 40.4 | 29.7 | 39.6 |
| 2007 | 75.2 | 55.9 | 104.0 | 125.0 | 39.0 | 38.6 | 28.8 | 41.6 |
| 2008 | 78.0 | 56.8 | 108.8 | 128.2 | 43.2 | 46.8 | 40.3 | 49.4 |
| 2009 | 83.8 | 58.2 | 112.6 | 131.1 | 46.1 | 44.5 | 37.2 | 48.6 |
| 2010 | 83.4 | 55.7 | 111.7 | 132.9 | 48.5 | 41.5 | 35.8 | 48.6 |
| 2011 | 80.7 | 53.4 | 116.8 | 132.3 | 49.4 | 43.7 | 39.2 | 48.2 |
| 2012 | 83.0 | 53.5 | 120.4 | 124.7 | 48.2 | 40.9 | 37.8 | 45.1 |
| 2013 | 80.2 | 55.8 | 119.6 | 117.6 | 46.0 | 39.2 | 34.9 | 41.8 |
| 2014 | 79.6 | 54.7 | 123.6 | 111.1 | 45.7 | 38.5 | 34.9 | 40.0 |

Source: Financial and national accounts.

**Tab. A2: Leverage in the euro-area**

*(median values, per cent)*

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *by size* | | | | |
| micro | 32.5 | 40.7 | 41.8 | 42.0 | 42.9 | 43.0 | 42.7 | 41.7 | 39.5 | 36.5 |
| small | 28.8 | 35.6 | 39.0 | 43.3 | 43.8 | 42.9 | 42.1 | 42.9 | 42.1 | 38.5 |
| medium | 36.2 | 39.3 | 41.1 | 42.6 | 42.6 | 41.7 | 41.4 | 41.8 | 41.0 | 38.5 |
| large | 33.2 | 35.9 | 36.9 | 37.2 | 38.2 | 36.9 | 36.2 | 36.2 | 36.2 | 35.0 |
| | | | | | | *by sector* | | | | |
| hotel and food | 41.9 | 50.6 | 51.7 | 51.9 | 51.9 | 51.8 | 51.0 | 50.0 | 47.9 | 44.1 |
| construction | 28.8 | 37.5 | 40.6 | 42.0 | 44.1 | 43.3 | 42.1 | 41.1 | 39.2 | 35.0 |
| energy, gas, water | 33.6 | 39.3 | 40.5 | 42.0 | 47.8 | 52.4 | 55.9 | 61.4 | 59.3 | 57.8 |
| ICT and R&D | 26.1 | 34.2 | 35.5 | 36.0 | 35.7 | 35.4 | 35.4 | 34.9 | 33.3 | 31.1 |
| manufacturing | 32.3 | 39.4 | 40.9 | 42.5 | 42.0 | 42.3 | 42.1 | 41.8 | 40.4 | 38.1 |
| oth. services | 25.5 | 32.0 | 33.3 | 33.3 | 35.0 | 35.0 | 34.9 | 34.0 | 32.7 | 29.7 |
| retail trade | 33.3 | 41.9 | 43.8 | 45.0 | 46.4 | 46.5 | 45.9 | 45.2 | 42.9 | 39.7 |
| transport, storage | 35.4 | 42.4 | 42.0 | 41.7 | 43.8 | 43.1 | 43.2 | 42.9 | 41.3 | 37.5 |
| wholesale trade | 32.1 | 38.6 | 40.5 | 42.7 | 43.2 | 42.6 | 42.0 | 41.5 | 40.1 | 37.3 |
| | | | | | | *by country* | | | | |
| Italy | 56.5 | 58.6 | 59.6 | 60.0 | 56.3 | 56.0 | 56.0 | 56.3 | 54.5 | 52.1 |
| Germany | 56.2 | 53.5 | 50.3 | 52.5 | 53.4 | 51.1 | 49.6 | 49.1 | 48.8 | 47.0 |
| Spain | 38.2 | 39.5 | 40.5 | 42.4 | 45.6 | 45.0 | 44.6 | 43.3 | 40.8 | 37.6 |
| France | 20.7 | 28.1 | 28.6 | 28.5 | 29.2 | 29.7 | 29.5 | 29.3 | 28.4 | 25.8 |
| **Total** | **31.8** | **39.2** | **41.0** | **42.2** | **43.0** | **42.8** | **42.3** | **41.8** | **40.1** | **37.0** |

Source: Orbis.

Note: only leveraged firms are included.

**Tab. A3: Leverage in the euro-area (2013)**

*(median values, per cent)*

| | Italy | Germany | Spain | France | Total |
|---|---|---|---|---|---|
| | | | by size | | |
| micro | 50.7 | 49.2 | 34.3 | 31.6 | 38.6 |
| small | 49.9 | 46.7 | 39.2 | 28.8 | 41.6 |
| medium | 47.7 | 47.2 | 41.6 | 30.3 | 42.7 |
| large | 38.6 | 38.1 | 44.1 | 42.1 | 40.0 |
| | | | by sector | | |
| hotel and food | 49.1 | 37.1 | 45.9 | 39.0 | 44.6 |
| construction | 58.6 | 57.0 | 48.1 | 37.4 | 51.1 |
| energy, gas, water | 45.9 | 41.1 | 42.9 | 33.4 | 42.6 |
| ICT and R&D | 45.3 | 21.2 | 38.1 | 21.3 | 36.9 |
| manufacturing | 40.0 | 29.8 | 36.6 | 29.7 | 36.1 |
| oth. services | 36.4 | 45.2 | 43.5 | 41.3 | 38.5 |
| retail trade | 40.1 | 54.1 | 40.6 | 26.2 | 35.8 |
| transport, storage | 34.9 | 44.5 | 49.7 | 67.8 | 48.9 |
| wholesale trade | 48.2 | 42.7 | 34.4 | 33.4 | 40.7 |

Source: Orbis.

Note: only leveraged firms are included.

## Tab. A4: Leverage

*(OLS estimations)*

| | **Base** | (1) with 5 size classes | (2) with 5 size classes and 8 sectors | (3) with 5 size classes, 8 sectors and profitability | **Final** with 5 size classes, 8 sectors, profitability and other firm characteristics |
|---|---|---|---|---|---|
| | | | | | |
| IT | 0.129*** | 0.129*** | 0.134*** | 0.135*** | 0.102*** |
| | (172.01) | (170.74) | (175.55) | (179.35) | (136.31) |
| *dimensions* | | | | | |
| micro_<1mln asset | | 0.029*** | 0.031*** | 0.035*** | 0.020*** |
| | | (5.26) | (5.46) | (6.29) | (3.68) |
| micro | | 0.040*** | 0.040*** | 0.039*** | 0.021*** |
| | | (7.04) | (7.11) | (6.91) | (3.87) |
| small | | 0.018*** | 0.019*** | 0.019*** | 0.019*** |
| | | (3.27) | (3.44) | (3.37) | (3.50) |
| medium-sized | | 0.011** | 0.013** | 0.015*** | 0.018*** |
| | | (2.02) | (2.35) | (2.72) | (3.32) |
| large | | -0.020*** | -0.015** | -0.009 | -0.006 |
| | | (-3.25) | (-2.45) | (-1.56) | (-1.02) |
| *sectors* | | | | | |
| hotel and food | | | 0.115*** | 0.111*** | 0.070*** |
| | | | (57.37) | (56.07) | (36.17) |
| construction & RE | | | 0.051*** | 0.048*** | 0.041*** |
| | | | (28.59) | (27.22) | (23.82) |
| energy, gas, water | | | 0.189*** | 0.195*** | 0.098*** |
| | | | (61.71) | (63.09) | (34.99) |
| manufacturing | | | 0.050*** | 0.045*** | 0.032*** |
| | | | (28.68) | (25.72) | (19.02) |
| oth. services | | | 0.011*** | 0.016*** | 0.009*** |
| | | | (5.97) | (8.49) | (5.29) |
| retail trade | | | 0.082*** | 0.079*** | 0.064*** |
| | | | (45.13) | (43.09) | (36.18) |
| transport | | | 0.065*** | 0.057*** | 0.035*** |
| | | | (31.19) | (27.49) | (17.53) |
| wholesale trade | | | 0.056*** | 0.051*** | 0.043*** |
| | | | (31.65) | (28.88) | (25.28) |
| *firm characteristics* | | | | | |
| Gross oper income/Asset (t-1) | | | | -0.403*** | -0.317*** |
| | | | | (-155.10) | (-116.47) |
| age_0_2 | | | | | 0.186*** |
| | | | | | (82.70) |
| age_2_5 | | | | | 0.169*** |
| | | | | | (152.02) |
| age_5_10 | | | | | 0.104*** |
| | | | | | (105.36) |
| age_10_25 | | | | | 0.050*** |
| | | | | | (59.32) |
| Tang. Asset/Asset (t-1) | | | | | 0.121*** |
| | | | | | (87.73) |
| Turnover growth (t-1) | | | | | 0.009*** |
| | | | | | (18.54) |
| Liquidity/Asset (t-1) | | | | | -0.374*** |
| | | | | | (-204.19) |
| | | | | | |
| Observations | 801357 | 801357 | 801357 | 779846 | 779846 |
| R-sq | 0.039 | 0.040 | 0.052 | 0.083 | 0.175 |

Note: OLS Regressions with robust standard errors. Dependent variable is firms' leverage in 2013. Firm characteristics refer to 2012. IT measures the difference in firms' leverage between Italy and other euro area countries. Only leveraged firms are included. From the second column the reference entity's size is very large (asset>300 mln), its sector is ICT and its age it is above 25 years old; t-statistics in parentheses; significance levels: * p<0.10, ** p<0.05, *** p<0.01.

## Tab. A5: Leverage

*(OLS estimations)*

| | Excluding France | | Italy vs France | |
|---|---|---|---|---|
| | **Base** | **Final** with 5 size classes, 8 sectors, profitability and other firm characteristics | **Base** | **Final** with 5 size classes, 8 sectors, profitability and other firm characteristics |
| | | | | |
| IT | 0.087*** | 0.074*** | 0.182*** | 0.130*** |
| | (106.55) | (89.26) | (219.19) | (148.12) |
| *dimensions* | | | | |
| micro_<1mln asset | | 0.029*** | | 0.044*** |
| | | (4.80) | | (5.56) |
| micro | | 0.032*** | | 0.065*** |
| | | (5.24) | | (8.12) |
| small | | 0.032*** | | 0.056*** |
| | | (5.24) | | (7.07) |
| medium-sized | | 0.029*** | | 0.036*** |
| | | (4.73) | | (4.49) |
| large | | 0.005 | | 0.004 |
| | | (0.73) | | (0.48) |
| *sectors* | | | | |
| hotel and food | | 0.068*** | | 0.102*** |
| | | (26.46) | | (43.09) |
| construction & RE | | 0.057*** | | 0.056*** |
| | | (27.02) | | (26.65) |
| energy, gas, water | | 0.083*** | | 0.128*** |
| | | (24.31) | | (34.36) |
| manufacturing | | 0.035*** | | 0.043*** |
| | | (17.02) | | (20.45) |
| oth. services | | 0.011*** | | 0.014*** |
| | | (4.90) | | (6.19) |
| retail trade | | 0.054*** | | 0.082*** |
| | | (24.33) | | (37.90) |
| transport | | 0.034*** | | 0.049*** |
| | | (14.07) | | (18.50) |
| wholesale trade | | 0.043*** | | 0.047*** |
| | | (20.81) | | (21.88) |
| *firm characteristics* | | | | |
| Gross oper income/Asset (t-1) | | -0.341*** | | -0.317*** |
| | | (-90.28) | | (-91.73) |
| age_0_2 | | 0.146*** | | 0.193*** |
| | | (50.00) | | (69.91) |
| age_2_5 | | 0.139*** | | 0.179*** |
| | | (92.88) | | (133.66) |
| age_5_10 | | 0.110*** | | 0.099*** |
| | | (86.12) | | (81.38) |
| age_10_25 | | 0.048*** | | 0.050*** |
| | | (45.16) | | (46.47) |
| Tang. Asset/Asset (t-1) | | 0.046*** | | 0.096*** |
| | | (28.45) | | (47.14) |
| Turnover growth (t-1) | | 0.009*** | | 0.004*** |
| | | (17.48) | | (6.61) |
| Liquidity/Asset (t-1) | | -0.431*** | | -0.360*** |
| | | (-147.25) | | (-161.95) |
| | | | | |
| Observations | 541266 | 519757 | 469329 | 469327 |
| R-sq | 0.021 | 0.120 | 0.096 | 0.229 |

Note: OLS Regressions with robust standard errors. Dependent variable is firms' leverage in 2013. Firm characteristics refer to 2012. IT measures the difference in firms' leverage between Italy and other euro area countries. Only levered firms are included. leveragedFrom the second column the reference entity's size is very large (asset>300 mln), its sector is ICT and its age it is above 25 years old; t-statistics in parentheses; significance levels: * p<0.10, ** p<0.05, *** p<0.01.

## Tab. A6: Leverage

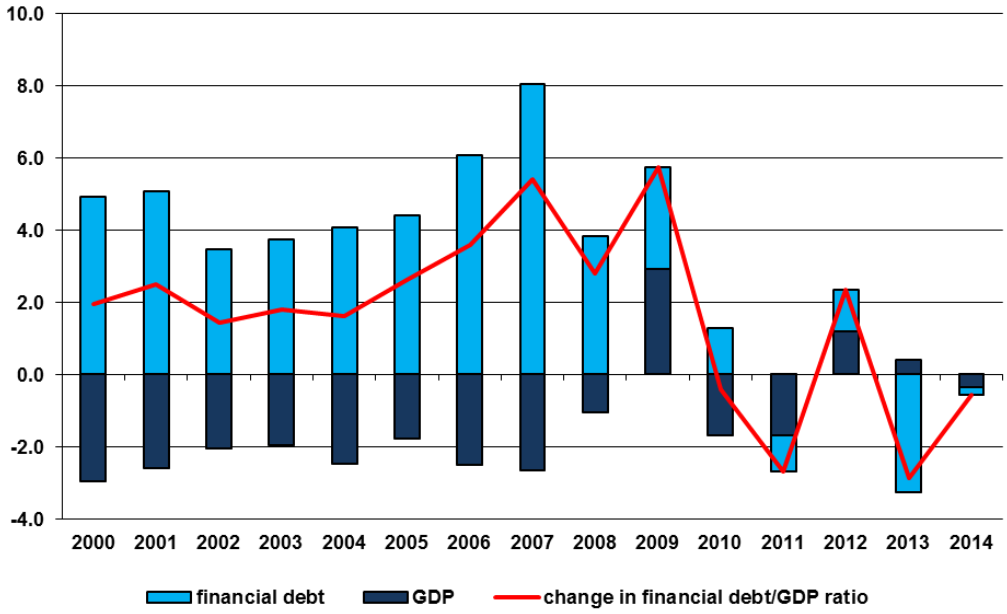
*(OLS estimations)*

| | All countries | | Excluding France | | Italy vs France | |
|---|---|---|---|---|---|---|
| | **Base** | **Final** with 5 size classes, 8 sectors, profitability and other firm characteristics | **Base** | **Final** with 5 size classes, 8 sectors, profitability and other firm characteristics | **Base** | **Final** with 5 size classes, 8 sectors, profitability and other firm characteristics |
| IT_micro<1mln asset | 0.480*** | 0.382*** | 0.480*** | 0.407*** | 0.480*** | 0.379*** |
| | (516.42) | (200.63) | (516.42) | (181.73) | (516.42) | (166.34) |
| EU_micro<1mln asset | 0.380*** | 0.313*** | 0.424*** | 0.369*** | 0.333*** | 0.282*** |
| | (874.34) | (169.56) | (682.95) | (161.95) | (565.88) | (122.02) |
| IT_micro | 0.553*** | 0.440*** | 0.553*** | 0.463*** | 0.553*** | 0.440*** |
| | (338.12) | (187.24) | (338.12) | (177.16) | (338.12) | (164.12) |
| EU_micro | 0.361*** | 0.288*** | 0.404*** | 0.327*** | 0.303*** | 0.263*** |
| | (314.42) | (142.03) | (255.22) | (124.36) | (191.74) | (103.63) |
| IT_small | 0.514*** | 0.434*** | 0.514*** | 0.456*** | 0.514*** | 0.433*** |
| | (393.41) | (207.11) | (393.40) | (191.25) | (393.40) | (176.85) |
| EU_small | 0.351*** | 0.288*** | 0.393*** | 0.337*** | 0.266*** | 0.244*** |
| | (386.89) | (151.80) | (349.41) | (142.69) | (189.40) | (100.45) |
| IT_medium-sized | 0.477*** | 0.410*** | 0.477*** | 0.432*** | 0.477*** | 0.409*** |
| | (205.16) | (147.87) | (205.16) | (145.25) | (205.16) | (134.44) |
| EU_medium-sized | 0.361*** | 0.302*** | 0.399*** | 0.356*** | 0.260*** | 0.233*** |
| | (234.10) | (136.80) | (220.70) | (132.52) | (98.18) | (72.55) |
| IT_large | 0.439*** | 0.376*** | 0.439*** | 0.397*** | 0.439*** | 0.375*** |
| | (92.75) | (76.94) | (92.75) | (79.72) | (92.75) | (74.32) |
| EU_large | 0.331*** | 0.282*** | 0.366*** | 0.337*** | 0.243*** | 0.207*** |
| | (113.84) | (86.09) | (107.13) | (86.66) | (47.52) | (38.37) |
| IT_large>300mln asset | 0.401*** | 0.327*** | 0.401*** | 0.353*** | 0.401*** | 0.327*** |
| | (38.09) | (31.78) | (38.09) | (34.12) | (38.09) | (31.54) |
| EU_large>300mln asset | 0.371*** | 0.307*** | 0.394*** | 0.351*** | 0.307*** | 0.260*** |
| | (57.76) | (46.97) | (52.65) | (46.43) | (25.46) | (21.09) |
| | | | | | | |
| Observations | 801357 | 779846 | 541266 | 519757 | 469329 | 469327 |
| R-sq | 0.679 | 0.724 | 0.708 | 0.737 | 0.689 | 0.734 |

Note: OLS Regressions with robust standard errors. Dependent variable is firms' leverage in 2013. Only leveraged firms are included. "Final" regressions include also firms characteristics present in the "Final" regression of table A4; t-statistics in parentheses; significance levels: * p<0.10, ** p<0.05, *** p<0.01.

**Fig. A1: Contributions to changes in the debt-to-GDP ratio for Italian NFCs**

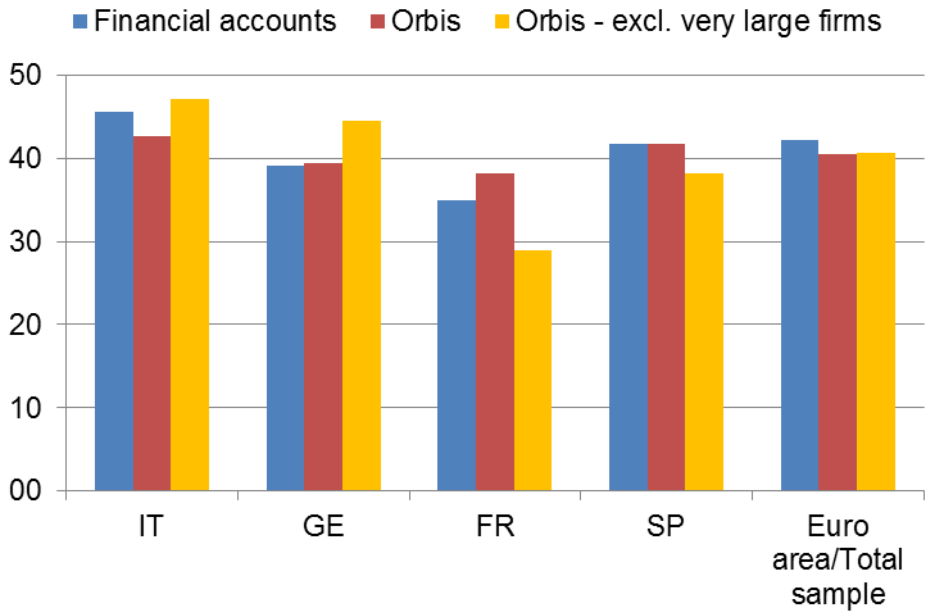
*(per cent; annual rate of change)*




Source: Financial and national accounts.
Note: Contributions to growth are positive if financial debt increases or GDP decreases and vice versa.

**Fig. A2: Leverage in euro-area countries: data comparison (2013)**

*(per cent)*

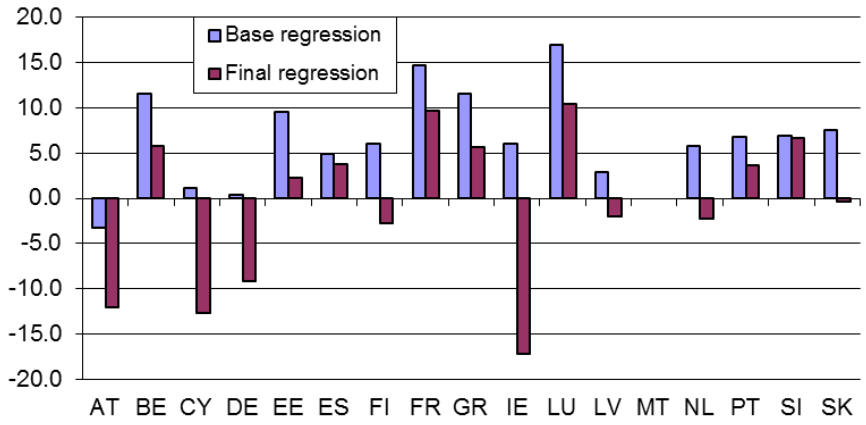



Source: Financial accounts and Orbis.
Note: Orbis data are weighted averages and include only leveraged firms.

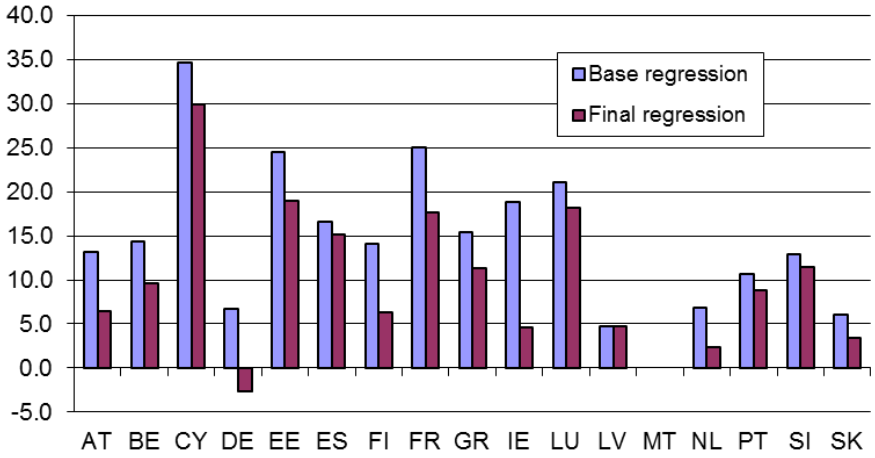
**Fig. A3: Bilateral estimated differences in leverage between Italy and other euro-area countries (2013)**

*(estimated coefficient of the dummy IT; per cent)*

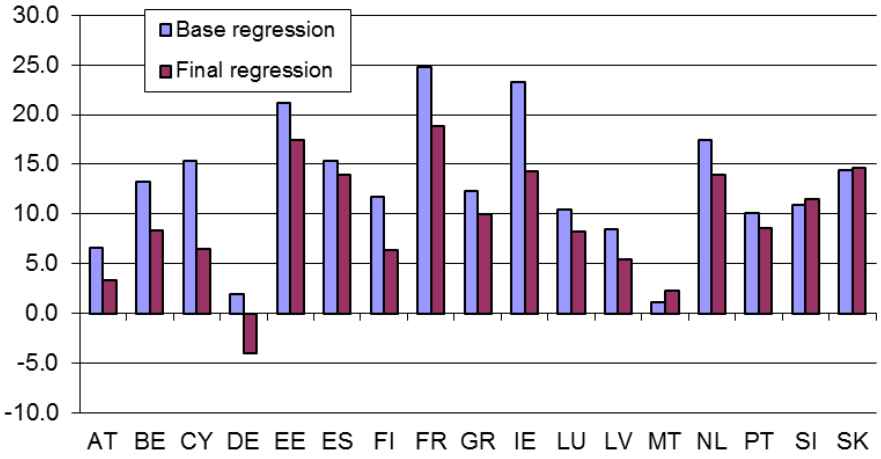
*(a) Micro firms (total assets<1 million euro)*



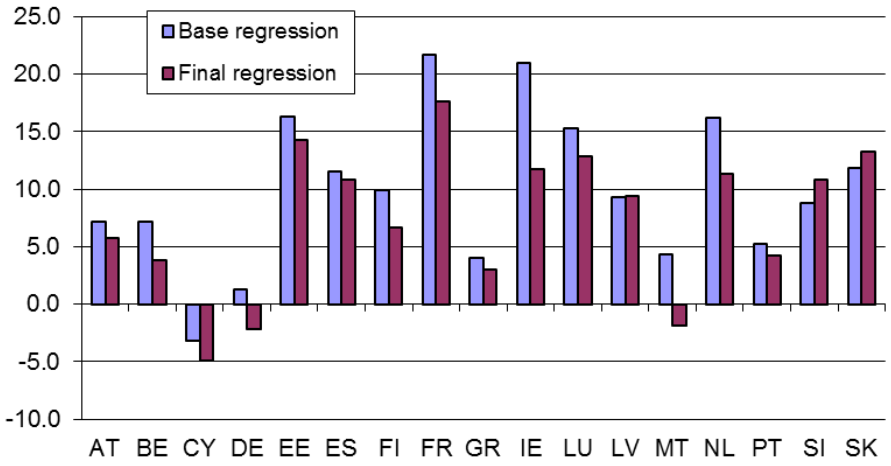

*(b) Micro firms (total assets>=1 million euro)*



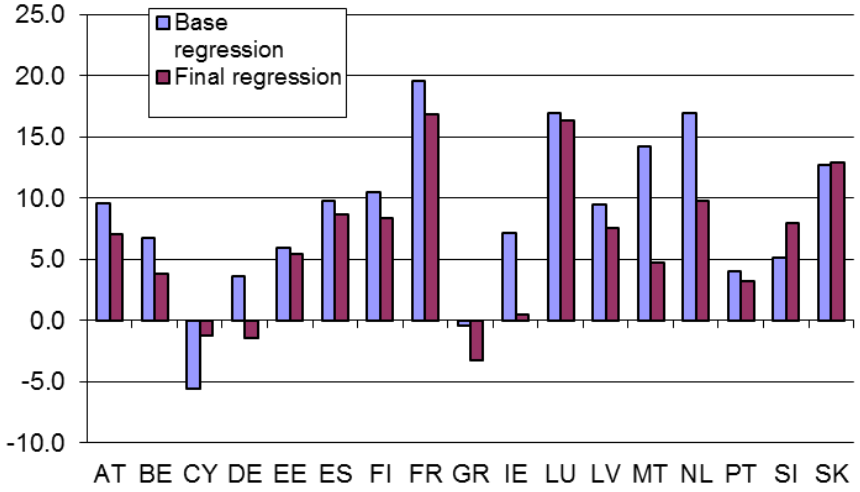

*(c) Small firms*



*(d) Medium sized firms*




*(e) Large firms (total assets<=300 million euro)*




*(f) Large firms (total assets>300 million euro)*

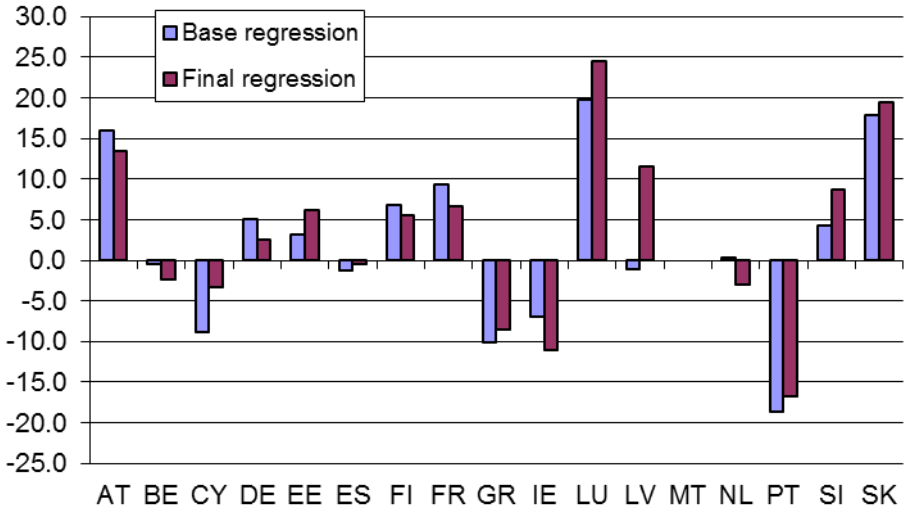
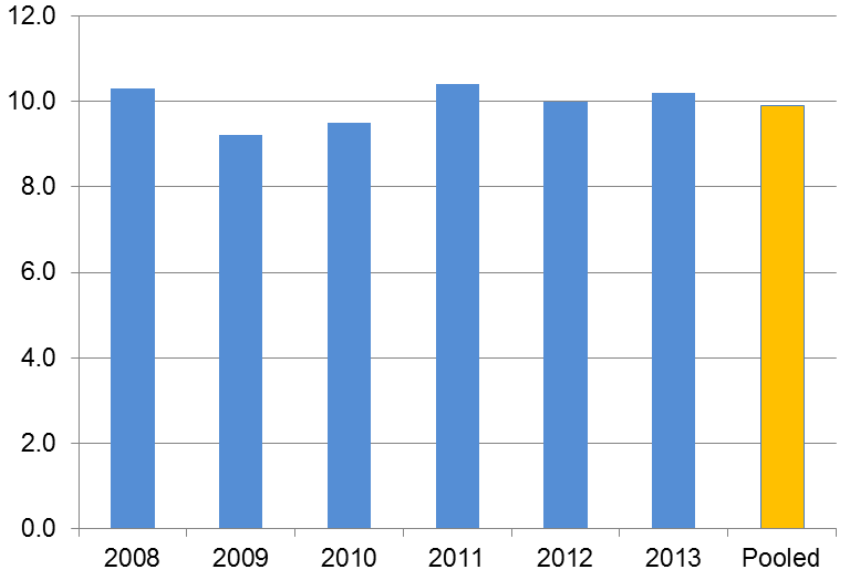


**Fig. A4: Estimated differences in leverage between Italy and other euro-area countries (2008-2013)**

*(per cent)*



*2. The Orbis database*

The main source of data used in this work is the Orbis database (by Bureau van Dijk), which includes harmonised financial statements for public and private limited liability companies. We have selected firms located in 18 euro area countries (except Lithuania), excluding firms with nil value of assets, turnover, and debt (see the fourth section of this Appendix for further details about this last requirement) and firms with outliers values. Furthermore, we included only firms with at least three consecutive observations, as the lagged value of turnover growth is considered in the regression analysis.
Balance sheets used in this work refer to the period 2004-2013. Table A7 presents the number of companies in each country for each year.

**Tab. A7: Number of firms: country and years**

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 174 | 407 | 1,001 | 1,340 | 1,962 | 2,054 | 2,239 | 2,322 | 2,341 | 1,830 |
| Belgium | 5,421 | 5,822 | 6,302 | 6,590 | 6,883 | 7,114 | 7,621 | 8,074 | 7,780 | 7,230 |
| Cyprus | 0 | 64 | 74 | 125 | 179 | 215 | 235 | 174 | 104 | 32 |
| Germany | 10,269 | 20,577 | 33,533 | 64,507 | 114,953 | 118,627 | 115,736 | 115,549 | 92,548 | 26,543 |
| Estonia | 7,760 | 8,946 | 10,621 | 12,069 | 12,936 | 13,220 | 14,168 | 14,724 | 14,272 | 12,956 |
| Spain | 142,260 | 162,185 | 183,969 | 32,593 | 216,590 | 229,472 | 237,064 | 229,388 | 201,080 | 158,812 |
| Finland | 11,061 | 14,877 | 17,052 | 19,859 | 21,428 | 21,902 | 22,708 | 23,394 | 20,953 | 18,215 |
| France | 208,833 | 241,936 | 271,543 | 293,439 | 316,889 | 332,656 | 349,416 | 359,590 | 331,730 | 260,091 |
| Greece | 10,114 | 11,033 | 12,044 | 12,894 | 13,711 | 14,704 | 14,670 | 13,601 | 11,345 | 8,743 |
| Ireland | 418 | 645 | 1,122 | 1,443 | 1,611 | 1,682 | 1,750 | 1,621 | 1,389 | 592 |
| Italy | 49,246 | 138,266 | 169,880 | 205,424 | 205,061 | 217,358 | 239,935 | 262,438 | 253,194 | 209,238 |
| Luxembourg | 151 | 226 | 321 | 350 | 341 | 365 | 495 | 458 | 390 | 191 |
| Latvia | 1,846 | 2,372 | 2,979 | 3,006 | 2,340 | 1,880 | 9,424 | 10,819 | 10,617 | 9,599 |
| Malta | 117 | 136 | 171 | 177 | 232 | 271 | 276 | 250 | 179 | 32 |
| Netherlands | 144 | 307 | 478 | 514 | 521 | 723 | 697 | 773 | 678 | 407 |
| Portugal | 11,989 | 22,300 | 73,592 | 80,059 | 87,120 | 91,299 | 85,871 | 84,775 | 76,520 | 68,392 |
| Slovenia | 0 | 0 | 3,848 | 5,425 | 5,574 | 6,371 | 16,350 | 16,423 | 16,124 | 5,506 |
| Slovakia | 1,868 | 3,485 | 4,855 | 5,820 | 6,504 | 11,011 | 12,409 | 14,160 | 14,026 | 12,948 |
| Total | 461,671 | 633,584 | 793,385 | 745,634 | 1,014,835 | 1,070,924 | 1,131,064 | 1,158,533 | 1,055,270 | 801,357 |

Tab. A8 reports the distribution by country and size of firms[24] in 2013. Green cells indicate an estimated coverage above 50 per cent based on the number of firms in Eurostat data; as Eurostat groups firms according to the number of employees only whereas this work uses also turnover and total assets, the comparison must be viewed with caution. The representativeness is high almost in all countries for large, medium-sized and small firms. Among the largest countries, only Germany presents a poor coverage for SMEs.

[24] See the next section for the definition of the classes of size.

**Tab. A8: Number of firms: country and size classes (2013)**

| | micro | small | medium | large | total |
|---|---|---|---|---|---|
| Austria | 93 | 259 | 939 | 539 | 1,830 |
| Belgium | 1,032 | 2,771 | 2,530 | 897 | 7,230 |
| Cyprus | 7 | 12 | 9 | 4 | 32 |
| Germany | 7,465 | 13,094 | 4,162 | 1,822 | 26,543 |
| Estonia | 10,086 | 2,282 | 519 | 69 | 12,956 |
| Spain | 111,394 | 38,269 | 7,130 | 2,019 | 158,812 |
| Finland | 13,399 | 3,633 | 880 | 303 | 18,215 |
| France | 213,023 | 35,606 | 8,598 | 2,864 | 260,091 |
| Greece | 3,500 | 3,911 | 1,084 | 248 | 8,743 |
| Ireland | 186 | 121 | 181 | 104 | 592 |
| Italy | 130,841 | 60,274 | 14,176 | 3,947 | 209,238 |
| Luxembourg | 61 | 40 | 51 | 39 | 191 |
| Latvia | 5,698 | 2,952 | 823 | 126 | 9,599 |
| Malta | 1 | 7 | 15 | 9 | 32 |
| Netherlands | 46 | 31 | 132 | 198 | 407 |
| Portugal | 47,881 | 16,822 | 3,143 | 546 | 68,392 |
| Slovenia | 2,891 | 1,802 | 652 | 161 | 5,506 |
| Slovakia | 8,788 | 2,983 | 928 | 249 | 12,948 |
| Total | 556,392 | 184,869 | 45,952 | 14,144 | 801,357 |

Note: green cells identify size classes in each country where the estimated coverage of the Orbis dataset is above 50 per cent.

### *3. Definition of the variables*

The size classes are defined using information on turnover, assets and the number of employees (if recorded). The classification is based on the ceilings defined by the European Commission.[25] Micro firms have fewer than 10 workers and turnover or assets of less than 2 million euros. The corresponding figures for small firms are 50 workers and 10 million euros, for medium-sized firms 250 workers, 50 million euros of turnover and 43 million euros of assets. Above these cut-offs firms are classified as large.

The sector classification is based on NACE 2 codes. Firms whose code is not available are excluded from the dataset. Also firms operating in agriculture, fishing, mining, financial activities, the public sector, education, health, entertainment, and other services (Sections A, B, K, O, P, Q, R and S) are excluded. More in detail, the classification is the following:

- Manufacturing: Section C, divisions 10-33
- Energy, gas and water supply: Section D and E, divisions 35-39
- Construction and real estate: Section F, divisions 41-43, and Section L, divisions 68
- Wholesale trade: Section G, divisions 45-46
- Retail trade: Section G, divisions 47

[25] See http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm.

- Transportation and storage: Section H, divisions 49-53
- Accommodation and food: Section I, divisions 55-56
- Information, communication and R&D: Section J, divisions 58-63, and Section M, division 72
- Other services: Section M, divisions 69-71 and 73-74, and Section N, divisions 80-82

The main variable derived from balance sheets is leverage, which is calculated as the ratio between Loans and Long Term Debt and its sum with Shareholders Funds.[26] Firms with negative capital are excluded.
The other firm level variables are derived from the Orbis database as follows:

- Profitability: Operating Profit/Total Assets
- Liquidity: (Cash and Cash Equivalent)/Total Assets
- Tangibility: Tangible Fixed Assets/Total Assets
- Growth: Yearly rate of growth of Turnover
- Age: is calculated from the start of the business activity.

All variables except age are windsorised at the 1st and 99th percentiles, calculated for each sector and year in each country; due to the smaller number of firms, the windorisation is only at the country level for Cyprus and Malta and only at country and year level for Ireland and the Netherlands. Tab. A9 presents the main descriptive statistics of the variables used in 2013 for the total sample and for the main countries.

**Tab. A9: Descriptive statistics (2013)**

| | | Italy | France | Germany | Spain | Total |
|---|---|---|---|---|---|---|
| Leverage | mean | 50.1 | 31.9 | 47.5 | 40.8 | 40.6 |
| | st. dev. | 30.1 | 25.7 | 29.0 | 28.9 | 28.8 |
| Profitability | mean | 4.0 | 6.4 | 9.5 | 1.7 | 4.5 |
| | st. dev. | 8.8 | 12.3 | 11.9 | 10.0 | 11.2 |
| Liquidity | mean | 7.0 | 20.4 | 15.9 | 10.4 | 13.5 |
| | st. dev. | 11.5 | 20.4 | 18.5 | 13.9 | 17.4 |
| Tangibility | mean | 21.7 | 16.3 | 24.2 | 29.9 | 22.9 |
| | st. dev. | 25.1 | 18.3 | 22.6 | 27.1 | 24.4 |
| Growth | mean | 6.2 | 4.4 | 4.5 | 3.4 | 5.4 |
| | st. dev. | 66.7 | 32.0 | 23.6 | 61.6 | 54.9 |
| Age | mean | 17 | 15 | 27 | 16 | 17 |
| | st. dev. | 13 | 13 | 27 | 10 | 13 |

Note: only leveraged firms are included.

[26] Financial debt is not perfectly identified in the Orbis database. In particular, a part of the long-term financial debt may be included among Other non-Current Liabilities. However, this residual item contains several items, such as provisions, that could differ among countries.

*4. Firms without financial debt*

The analysis presented in the paper includes only leveraged firms. As the information from the Orbis database includes firms without financial debt, some descriptive statistics on these firms are presented below. The database includes a large share of firms with zero financial debt (around 35 per cent); among the largest countries Italy has the highest percentage (43 per cent; Fig. A5). The differences between the sectors are smaller (Fig. A6b), as are mostly related to the different size classes of firms (Fig. A6a). In particular, around 40 per cent of very small firms (those with assets below 1 million euros) have zero leverage.

It is important to point out that even if the number of these firms is large, their impact at aggregate level is negligible: in fact, in most countries (including the four largest ones) they account only for 10 to 15 per cent of total assets.

The large proportion of firms with zero financial debt could be due to several factors. First, it could depend on the inclusion of financial debt among other liabilities items in the Orbis database. Second, especially for smaller firms, the distinction between financial debt and other debt is not precise even in national sources: according to Cerved data, around 40 per cent of Italian firms with zero leverage (the red part of the histograms in Fig. A7) report a positive amount of total debt but not the specific values for financial debt or other kinds of debt.

**Fig. A5: Firms without financial debt (2004-2013)**

*(per cent)*

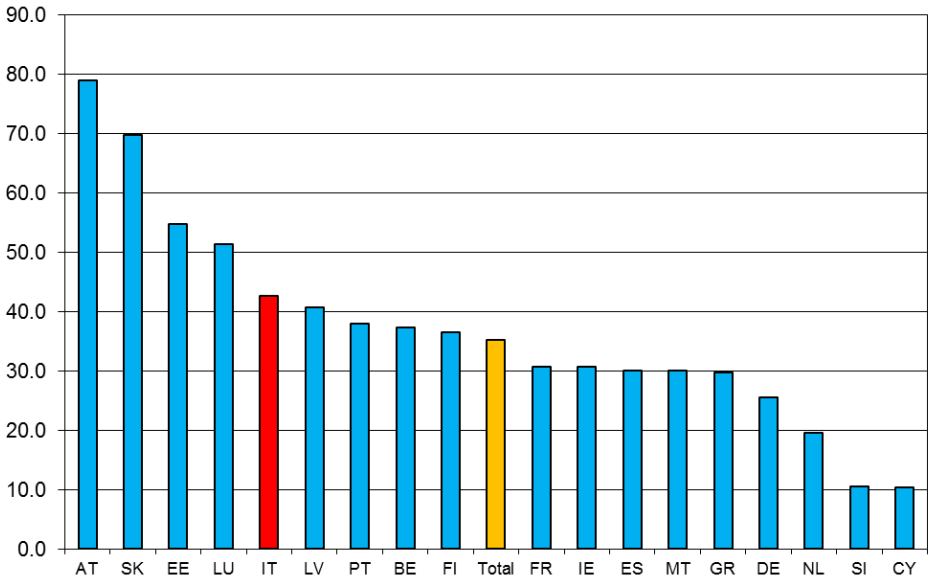
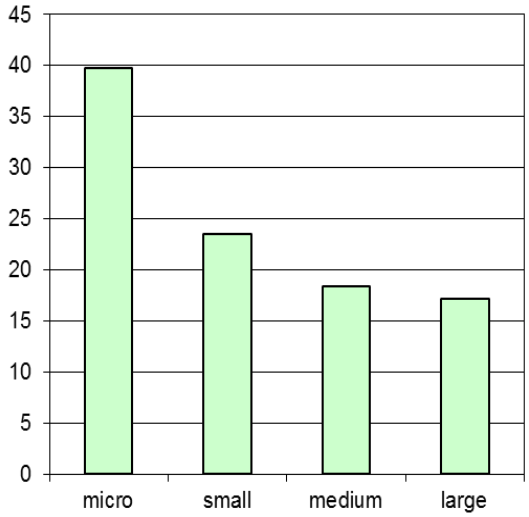


**Fig. A6: Firms without financial debt, by size class and sector (2004-2013)**

*(per cent)*

*(a) by size class*




*(b) by economic sector*

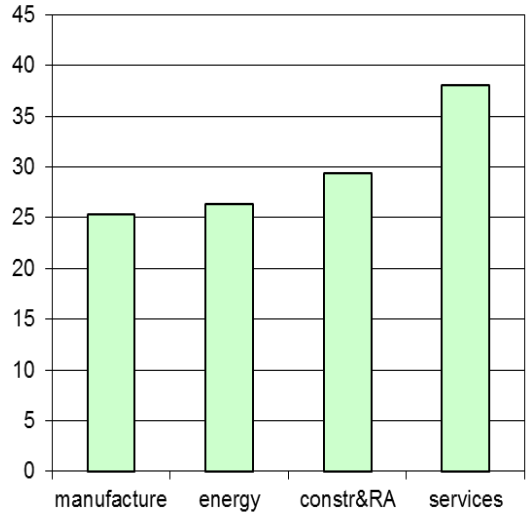
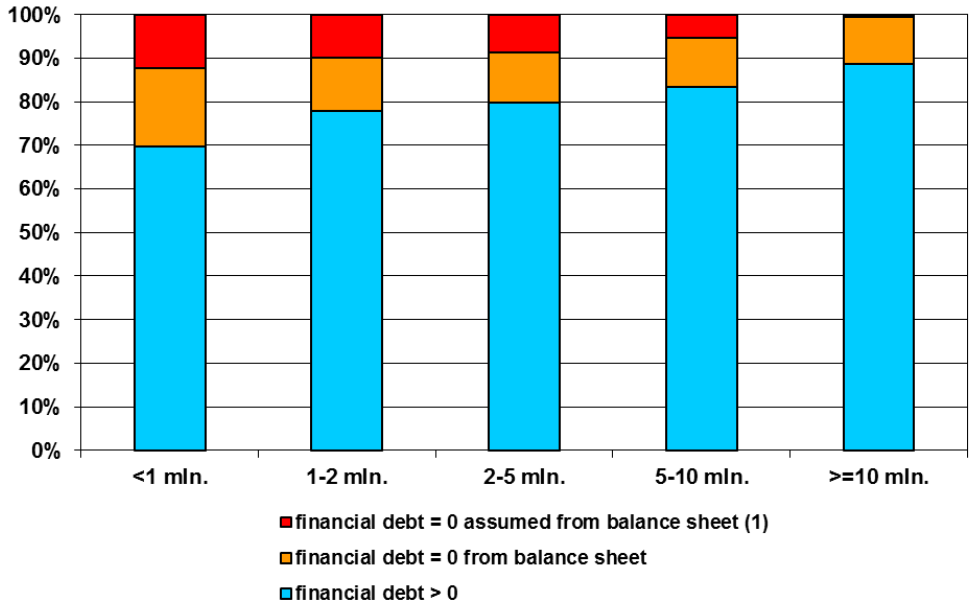



**Fig. A7: Italian firms without financial debt**

*(per cent)*




Source: Cerved Group.

(1) Values for both financial debt and other kind of debt are zero even if the total debt is positive.

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