

2024
December

***PROFIT MARGINS
OF NON-FINANCIAL CORPORATIONS
IN EUROPEAN COUNTRIES***

***A Statistical Analysis based on
Accounting Data***

FSA (Financial Statement Analysis) WG

European Committee of Central Balance Sheet
Data Offices (ECCBSO)



***With the contribution of BACH (Bank for the
Accounts of Companies Harmonized) WG***



Members of the Financial Statement Analysis Working Group (FSA WG):

Nicoletta Berardi (Chairwoman)

Banque de France

Paula Silva

Banco de Portugal

Gonca Zeynep Özdemir (Vice-chairman)

Central Bank of the Republic of Türkiye

Ewa Sokolowska

Narodowy Bank Polski

Santiago Martínez

Banco de España

Heraklios Lykiardopoulos

Bank of Greece

Valentina Nigro

Banca d'Italia

Margarita Skiada

Bank of Greece

Letizia Sampoli

Cerved Group Spa

Venetia Gkouli

Bank of Greece

Disclaimer

The views expressed in this report are those of authors and do not necessarily represent those of the ECCBSO or those of the national central banks.

Contents

1. Introduction	2
2. Methodology.....	3
3. Evolution of profit margins over time.....	4
4. Dispersion of profit margins.....	6
5. More detailed results.....	10
5.1 Profit margins by firm size.....	10
5.2 Profit margins by sectors of activity.....	12
6. Conclusions	18
Box 1 : Indicators of the macroeconomic context	18
Box 2: Vulnerable firm clusters and rising interest rates	23
Annexes.....	26
Annex I: Methodology.....	266
Annex II – Firm size criteria and classification of sector of activity	27
Annex III – Number of companies by firm size and sector	288
Appendix	288

1. Introduction

This report analyzes the profit margins (PM) of non-financial corporations (NFC). It covers a time span ranging from 2000 to 2022, which is the most recent year with available financial statement data. Results relate to five countries participating in the ECCBSO Financial Statement Analysis working group: France, Italy, Poland,¹ Portugal, and Spain.

In the context of relatively high inflation, corporations' profit margins have attracted attention and their potential contribution to inflation has spurred a debate about the so-called "greedflation". Indeed, firms may have reacted to the accumulation of shocks that characterized the period 2020-2022 (Covid crisis, supply chain bottlenecks, soaring energy prices) by partially or fully passing through the burden to their customers to preserve their margins, or by even taking the opportunity to increase them, possibly to compensate their previous losses or to build buffers.

Note that, taking advantage of the availability of micro data, we compute profit margins at the firm level. There are two main payoffs. The first one is that we are able to assess the characteristics and the evolution of the whole distribution of profit margins. Therefore, we can analyse the percentiles by country and year by year. In particular, we focus on quartiles and extreme centiles (5th, 10th, 90th and 95th centiles), which provide precious insights on the situation of firms doing worse and best in terms of profit margins. The second advantage of computing margins at the firm level is that micro data allow computing not only the levels, but also the growth rates of individual firms' ratios from one year to another, that is the evolution of profit margin firm by firm². This provides rare information on whether, whatever the level of firms' margins, they are compressing or expanding.

Our indicator of profit margins and its growth are explained in the following section about methodology. Section 3 and 4, respectively, analyze the evolution since 2000 of profit margins across European countries and the dispersion of their distribution within each country. Section 5 details the analysis of profit margins by firm size and sector of activity. Finally, section 6 concludes, summarizing the main findings on the evolution and the dispersion of profit margins.

This report includes also two boxes contributed by the BACH working group of the ECCBSO. The first one presents some macroeconomic indicators for the countries whose profit margins are investigated in this report. The second box identifies vulnerable firm clusters in the context of rising interest rates that started in 2022.

¹ Polish data are available since 2005.

² Whenever data for a firm is available for y and $y-1$.

2. Methodology

Exploiting the micro data underlying the BACH dataset,³ in this report we measure profit margin as margin on sales and, specifically, as the ratio between EBITDA and sales⁴. The components of this indicator, as well as the trimming of outliers, are detailed in Annex I.

We focus on the median values⁵ of profit margins and also analyse the bottom and upper quartiles of the distribution. Moreover, we investigate extreme centiles (5th, 10th, 90th and 95th centiles). As mentioned above, micro data also allow computing the evolution of profit margin firm by firm. Since a firm's profit margin can be negative (or null), it is not possible to simply compute log differences. Therefore, we compute the inverse hyperbolic sine. The details are reported in Annex I.

Details about firm size criteria⁶ and sectoral classification are reported in Annex II. The number of companies in each country by firm size and sector is reported in Annex III.

³ The Bank for the Accounts of Companies Harmonized (BACH) database contains aggregated and harmonized annual accounting data of non-financial enterprises for several European countries.

⁴ When profit margins are computed based on national account data, the denominator of the ratio is typically gross value added. The two margin indicators provide different information. The margin on sales (=EBITDA/sales) is useful to analyze the pass-through of production costs into prices, while the margin on GVA (=EBITDA/GVA), is useful to analyze the distribution of surplus between capital and labor. An occasional paper of Banca d'Italia (Colonna, F., Torrini, R. and Viviano, E., "The profit share and firm mark-up: how to interpret them?", Occasional Paper No 770, Banca d'Italia, May 2023) recently argued that the former is better suited to indicate whether companies' pricing strategies are a driving force behind inflation, while the latter may in fact rise even in the case of constant mark-up when the price of intermediate inputs rises faster than labor costs and input substitutability is limited. Since in this report profit margins are computed at the individual firm level, it is not appropriate to use GVA as denominator. Indeed, in the case of firms recording negative GVA in a given year, the margin on GVA would be misleading.

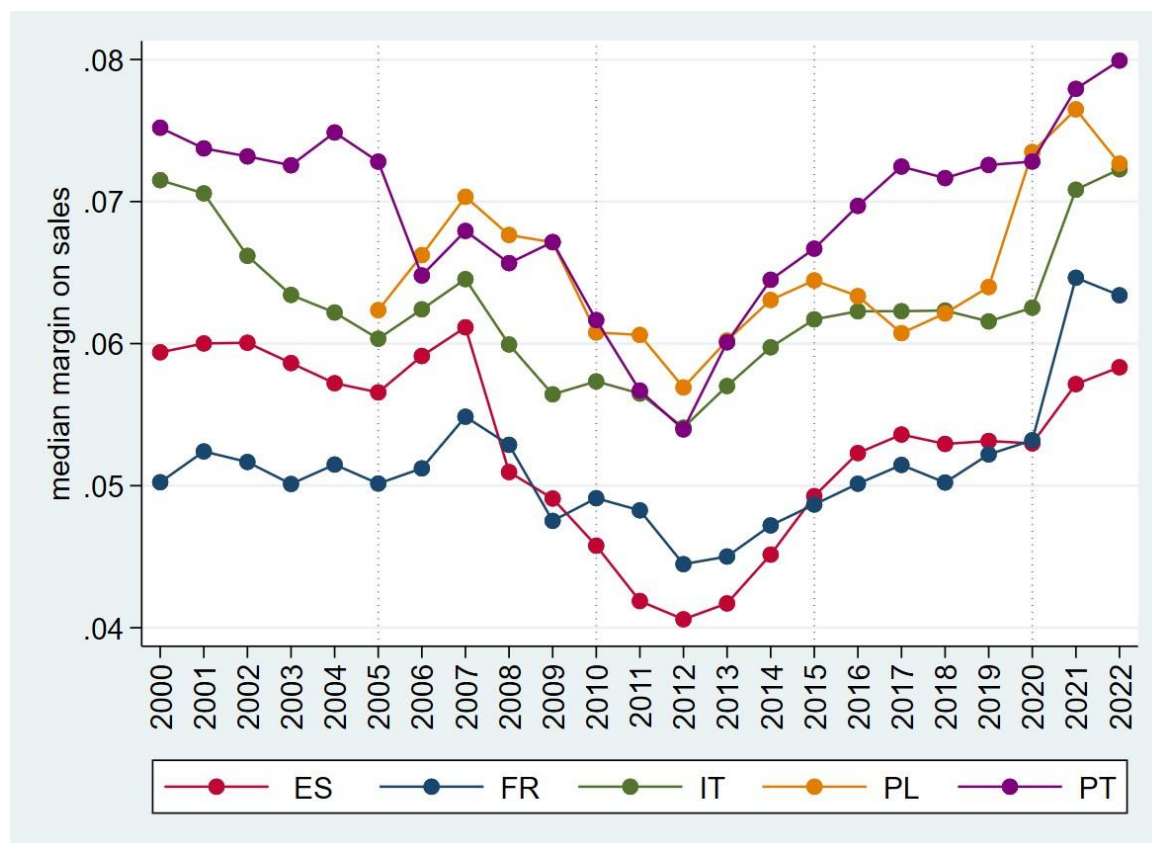
⁵ Median values are more robust than weighted means. Notice that the weighted mean of individual firms ratios basically correspond to computing the profit margin ratio at the aggregate level, that is, summing for all firms the values of numerators and denominators and then taking ratios of these aggregates (e.g., the sum of EBITDAs over the sum of sales).

⁶ Micro companies, defined as firms with sales below 2 million euros, are excluded throughout the report. Indeed, their coverage is heterogeneous across countries in the BACH dataset. In the case of Spain, for which the coverage of micro companies is satisfactory, the Appendix reports some results including micro companies.

3. Evolution of profit margins over time

In order to assess the evolution of profit margins over time, we first focus on the median country by country.⁷ Figure 1 suggests that, although the level of margins is heterogeneous across countries, the trends have been very similar: stagnation and overall decrease between 2000 and 2012, substantial and almost uninterrupted increase since 2013, and especially strong in 2021.

Figure 1: Median of margin on sales over time across country



In particular, the median margin on sales was relatively stable or slightly decreasing between 2000 and 2005 (with the exception of Italy, where it decreased by one percentage point), temporarily increased in the period 2005-2008 but then, after the global financial crisis, it fell until 2012, reaching a point below its 2005 level. Since 2013, the median margin on sales has substantially increased (especially in 2021) and, in 2022, it was well above that in 2000 for France, Portugal and Poland⁸ countries. Such increase after 2012 has been almost uninterrupted until 2017. From 2017 to 2020,

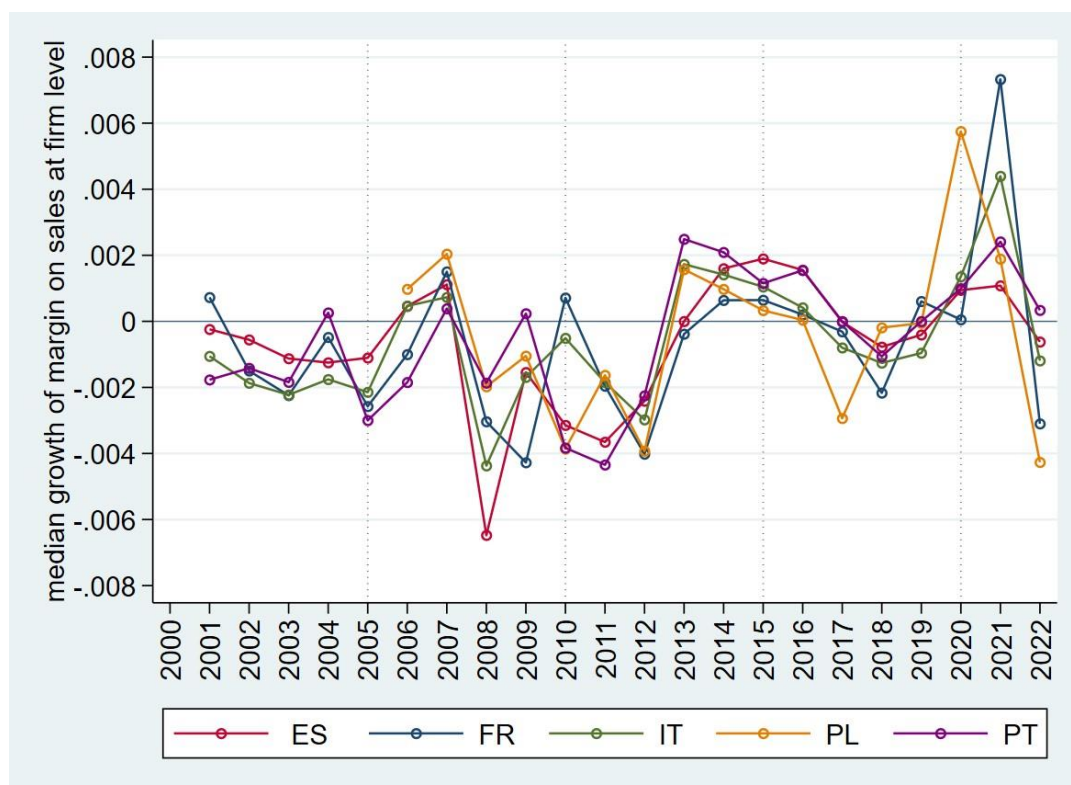
⁷ Figure A1 in the Appendix provides the evolution of the median margin on sales with and without micro companies for Spain.

⁸ Considering 2005 as its starting point.

margins seem stable for all countries (except Poland). In all countries, 2021 was characterized by a spike in the median margin of sales, which was especially strong in France and Italy. In Italy, Spain, and Portugal, the median profit margin further increased, though moderately, in 2022, while in France and Poland it decreased.

Figure 2 shows, instead, the median growth of the margin on sales year over year, computed for firms present in consecutive years in our micro data.⁹ This provides rare insights about the median evolution of profit margins at the firm level. In particular, the median growth of margins on sales appears markedly negative during the financial and sovereign debt crises (with almost exclusively negative growth), while a remarkable spike took place in 2021 (when the median growth was noticeably positive in all countries except Poland, where the spike took place in 2020), which reduced drastically in 2022. Focusing on the median growth highlights the dynamics of profit margins at the firm level and brings out clearly the struggle of the median firm between 2008 and 2012 (especially in Spain), as well as the post Covid surge in 2021. It is also interesting to note the resilience of firms' margins at the outbreak of the Covid pandemic in 2020, possibly resulting from policy interventions.

Figure 2: Median growth of margin on sales over time across country



⁹ Note that this is different from the growth rate of the median margin on sales, because it is computed at the firm level and not at the aggregate one.

4. Dispersion of profit margins

Having described the median evolution over time of profit margins, this section focuses on their distribution. More specifically, we restrict our attention to the 5th, 10th, 25th, 50th,¹⁰ 75th, 90th, and 95th centiles. Figure 3 represents them over time by country and is especially useful to analyze the lower and upper centiles on margins on sales. The first finding is that, irrespectively of the year, the margins above the median are much more dispersed than below the median, implying that the upper percentiles of companies enjoy profit margins as large as multiple times the median firm.¹¹ Second, in several countries, the 75th, 90th, and particularly 95th centiles show little evidence of suffering at the time of the financial crisis (one exception is Spain), while their post-Covid surge is especially pronounced. The third message provided by Figure 3 is that the lower centiles (25th, 10th, and particularly 5th centiles) do exhibit signs of low, and even negative margins in some instances, in particular during the financial crisis as well as in 2020. In conclusion, margins on sales are extremely heterogeneous across firms and high profit margins are especially dispersed and resilient during difficult times.

Figure 3: Distribution of margin on sales over time by country

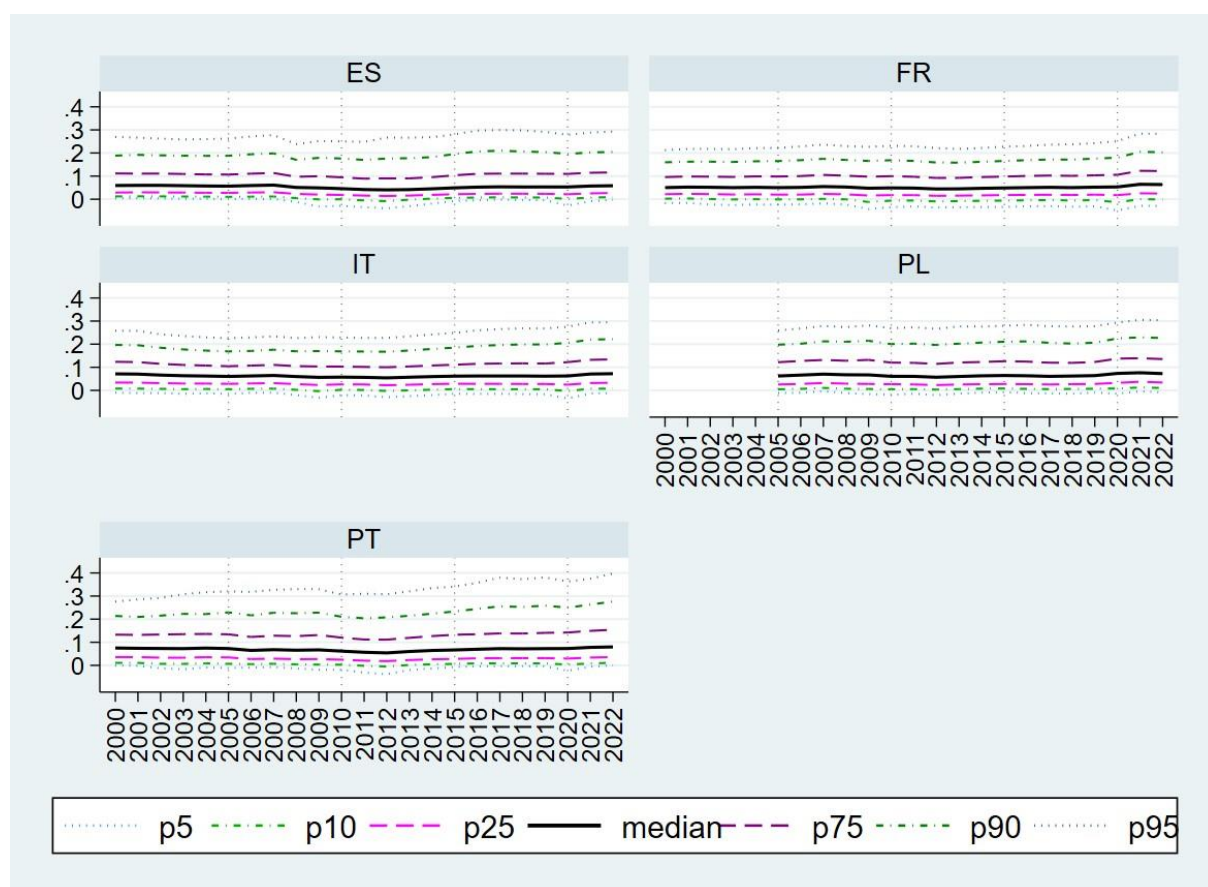
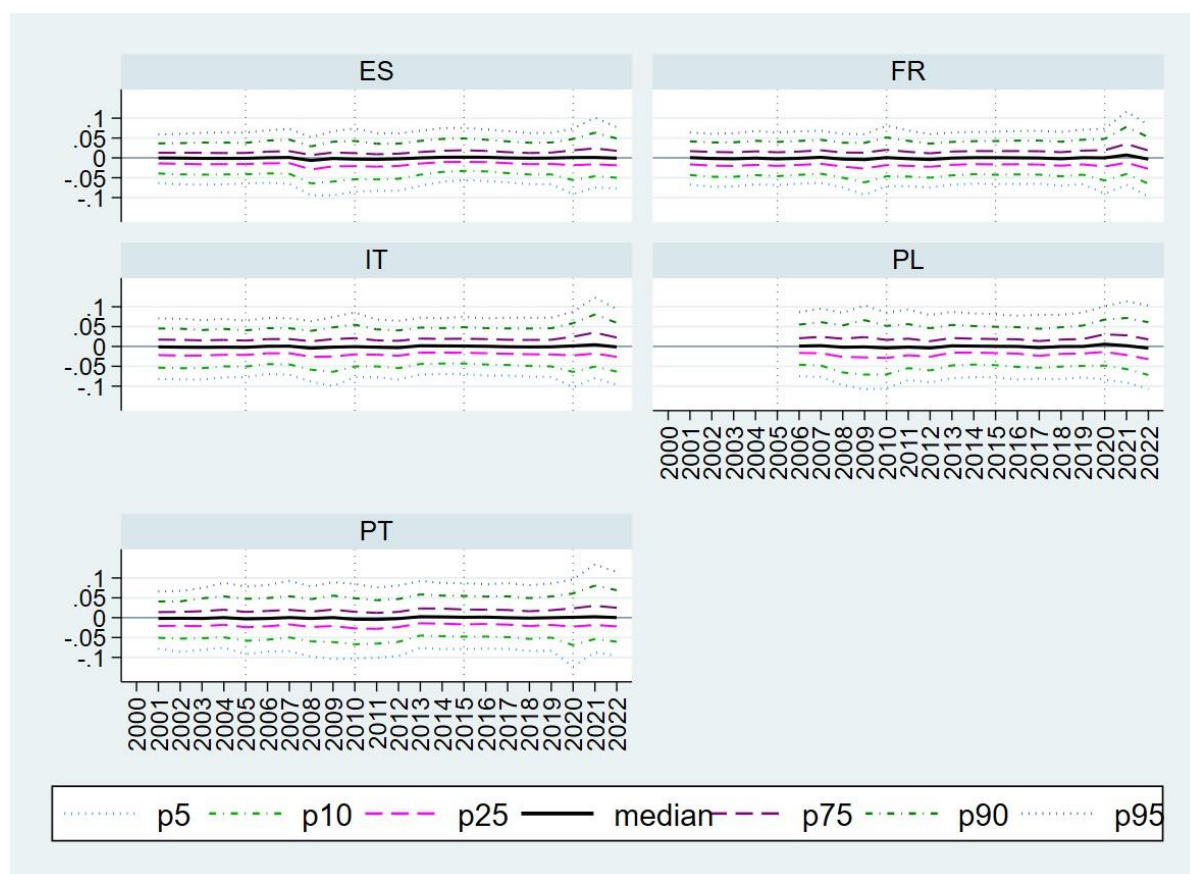


Figure 4 represents, instead, the 5th, 10th, 25th, 50th, 75th, 90th, and 95th centiles of growth of margin on sales year over year. It reveals more clearly the evolution of margins for firms experiencing very low and very high growth of profit margins. It highlights the dynamics of profit margins at the firm level, amplifying some stylized facts already suggested by Figure 3. Indeed, for firms characterized by profit margin growth above the median, the figure reveals in several countries a limited decrease of margin growth in 2008. In other words, there appear to be firms that manage to preserve a strong growth of their margins even during downturns. During the Covid crisis, firms' whose margins are characterized by strong growth even benefitted from an increase in 2020 and then a surge in 2021. At the same time, firms characterized by profit margin growth below the median experienced a sharp decline at Covid outbreak. Finally, in contrast with Figure 3, which suggested that high levels of margins are more dispersed than low levels of margins, Figure 4 reveals that the growth of margins on sales is characterized by a similar dispersion below and above the median growth.

Figure 4: Distribution of margin on sales growth over time by country



¹⁰ The median corresponds to the series already represented in Figure 1.

¹¹ Figure A2 in the Appendix compares the median and weighted mean margin on sales and also suggests that that few companies enjoy profit margins much higher than the median firm.

We now restrict the previous analysis about the distribution of profit margins and their growth to the period between 2019 and 2022, in order to zoom on the recent period and see more clearly the evolution of profit margins during the last few years available. Figure 5 focuses on the recent evolution of the 25th, 50th, and 75th centiles of the distribution of margin on sales, country by country. Between 2019 and 2020, the first quartile of profit margins decreased in all countries, except Poland. The median remained rather stable in several countries. However, the third quartiles increased even in 2020 (with the exception of Spain). Between 2020 and 2021, margins on sales improved by at least 0.5 percentage point (p.p.) for all quartiles of its distribution and all countries. In particular, the second and third quartiles of margins expanded by about 1 p.p. in Italy and even by more in France. Afterwards, in 2022, two different evolutions emerged. In some countries all quartiles of profit margins declined slightly (France and Poland), while in others they continued increasing to some extent (Spain, Italy, and Portugal). Overall, comparing 2019 and 2022, Figure 5 entails that, in 2022, all quartiles of the distribution of margins on sales were above their 2019 level, in all countries.

Figure 5: Quartiles of margin on sales between 2019 and 2022 by country

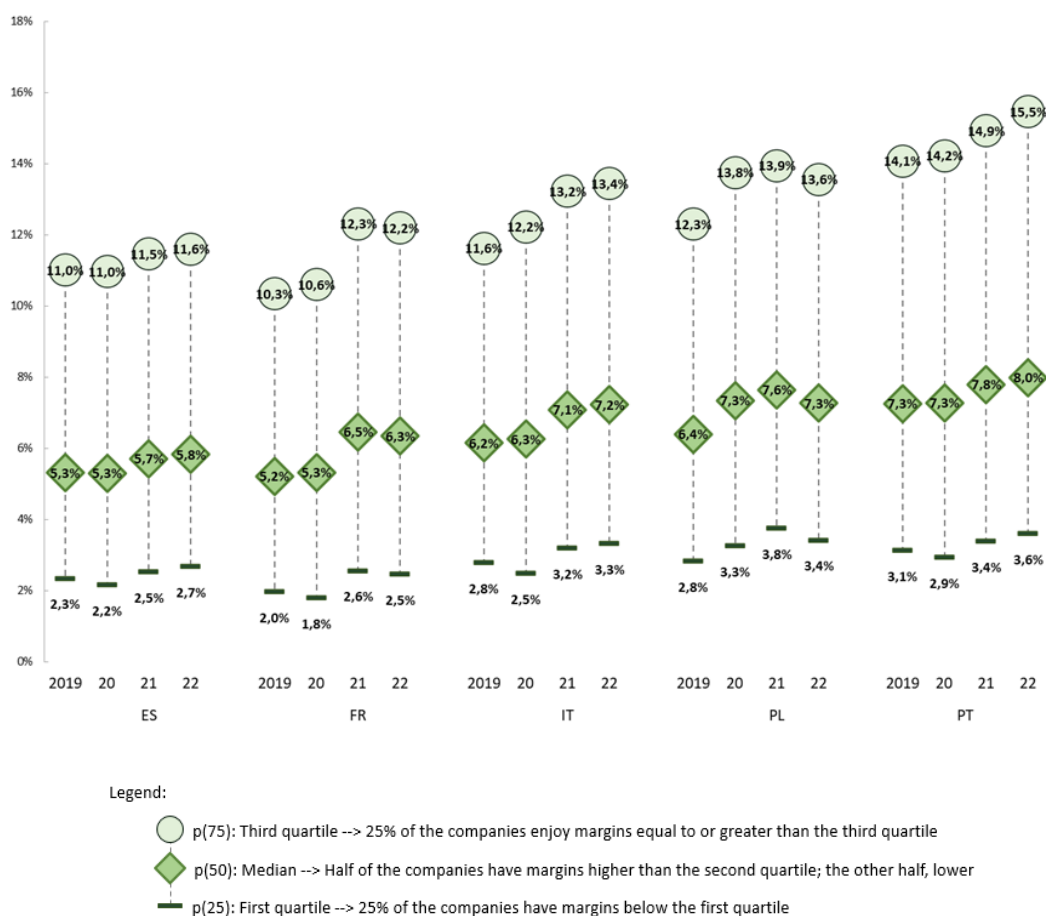
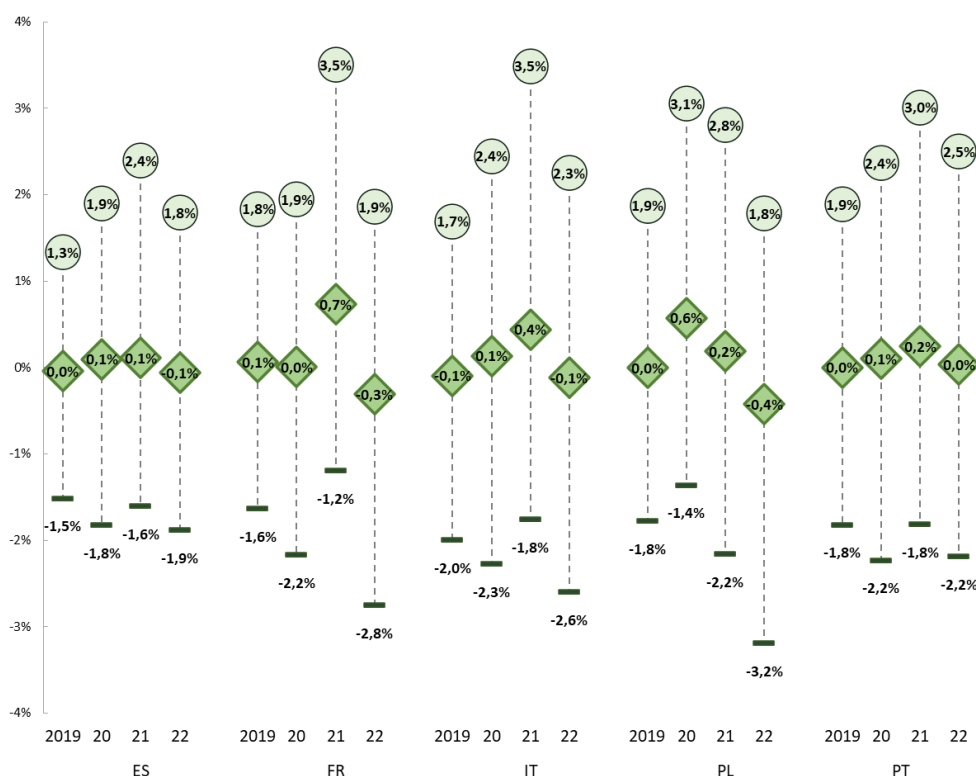


Figure 6 focuses, instead, on the evolution, between 2019 and 2022, of the 25th, 50th, and 75th centiles of the distribution of margin on sales growth by country. It confirms that 2020 was characterized by plunging margins for firms suffering from below median growth of margins, in all countries (except in Poland). At the same time, firms enjoying from above median growth of margins experienced a considerable increase at the Covid outbreak, in most countries. Between 2020 and 2021, all quartiles of growth of margins on sales were higher than the previous year, in all countries (except for Poland) and especially in France and Italy. In 2022, on the contrary, all quartiles of growth profit margins declined in all countries. Therefore, even in countries like Spain, Italy, and Portugal where the levels of margin quartiles increased between 2021 and 2022, the quartiles of margin growth computed at the firm level sharply declined.

Figure 6: Quartiles of growth of margin on sales between 2019 and 2022 by country

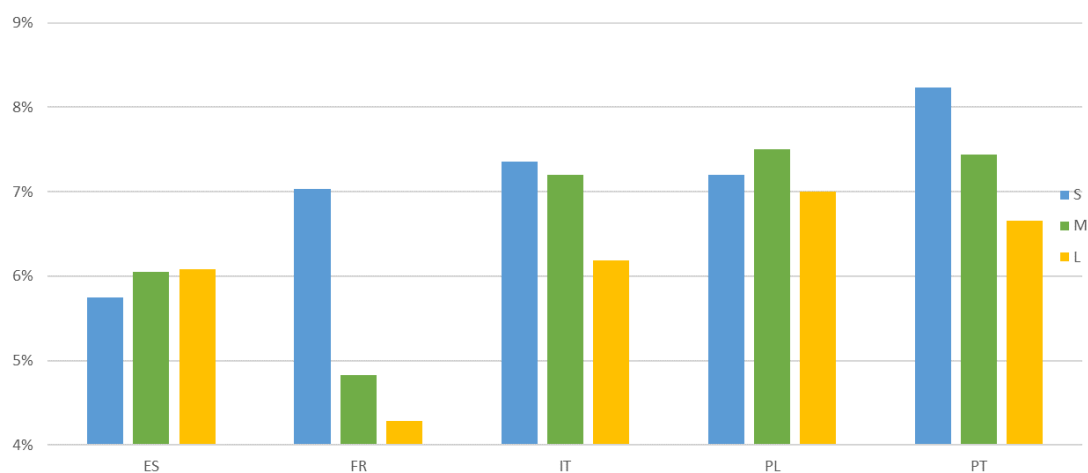


5. More detailed results

5.1 Profit margins by firm size

This section details profit margins by firm size.¹² Figure 7 represents the median margin on sales by country and size, in 2022. It reveals that, at least in 2022, the median large firm (represented by yellow bars) had lower profit margins than smaller ones in each country (except Spain). In the majority of countries, the median small-size firm (represented by blue bars) enjoyed higher margins than other sizes. In Poland and Spain, instead, the median margin on sales was slightly higher in medium-size firms (represented by green bars) than small ones.

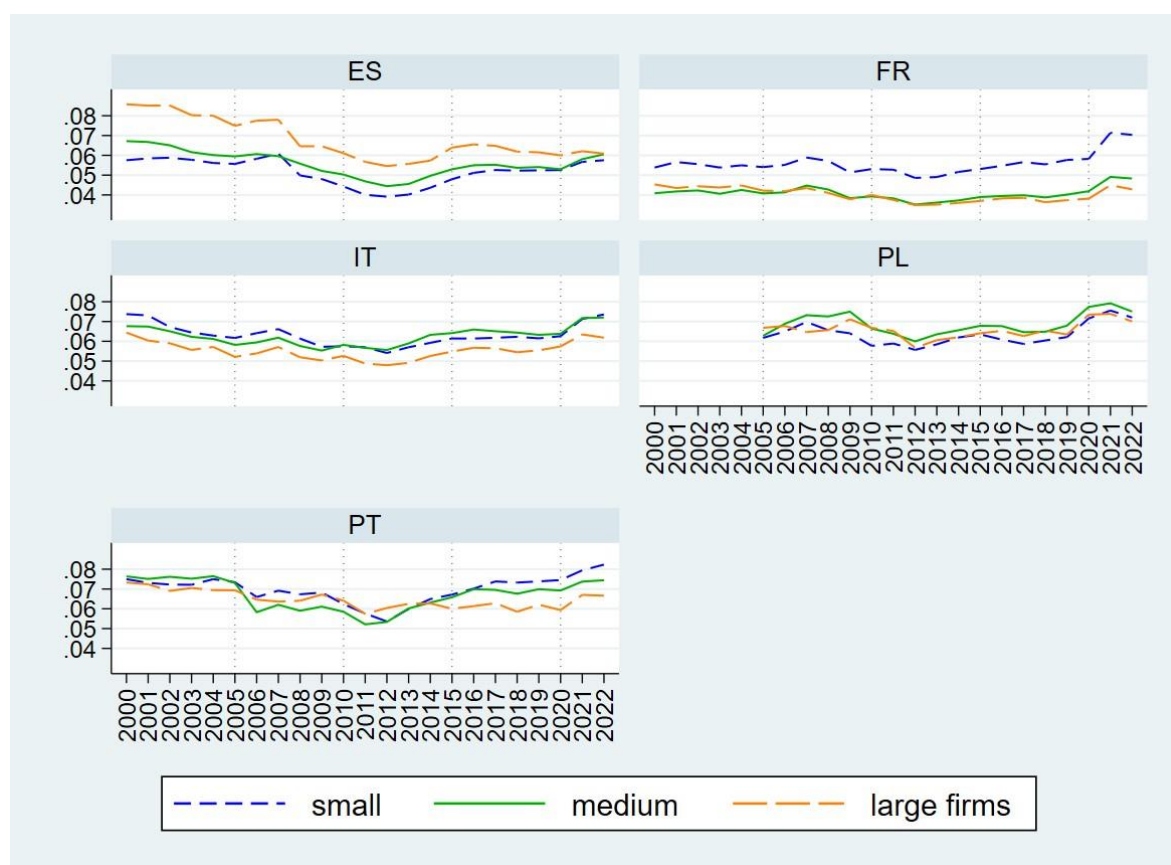
Figure 7: Median margin on sales, by country and size in 2022



The fact that large firms have lower profit margins than smaller ones has not been always the case everywhere before 2022. Figure 8 shows the evolution of margin on sales for different firm sizes within countries over time. Large firms have consistently lower margins than smaller sizes in Italy. On the contrary, in Spain, large firms enjoy higher margins than other sizes, although over time margins tend to converge among sizes. In France, large and medium size firms have similar levels of margins, while small size firms have consistently higher margins over time. For other countries, the ranking of margins on sales of small size firms relatively to other sizes is not stable over time.

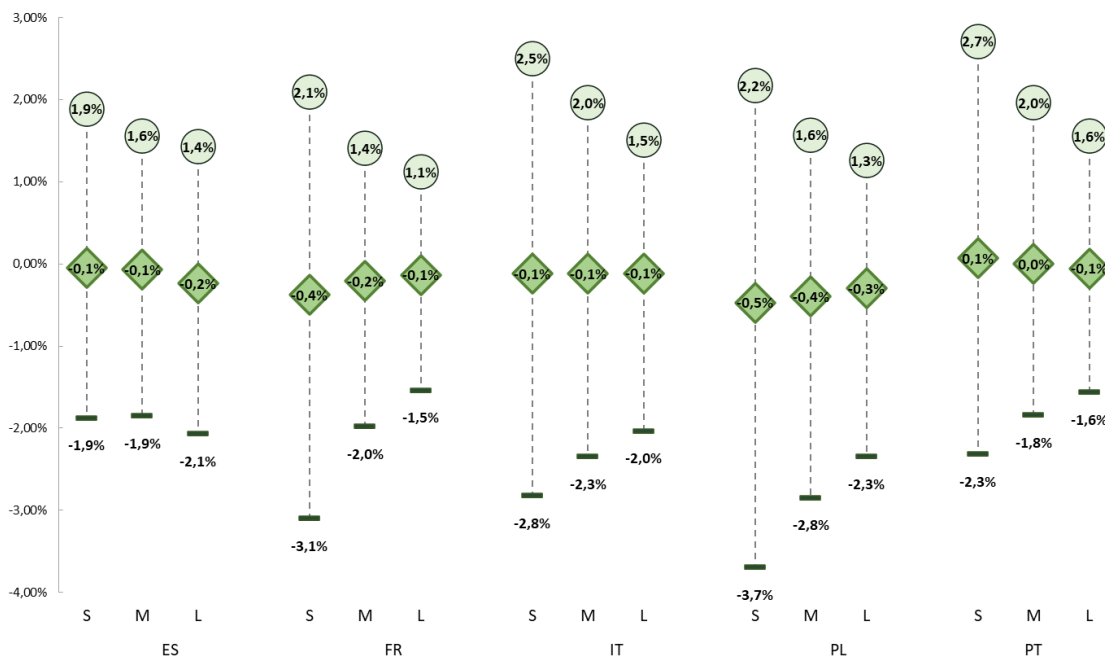
¹² Micro firms are excluded from the analysis, due to heterogeneous coverage of the latter across countries. Figure A3 in the Appendix provides the median margin on sales also for micro companies in 2022 for Spain.

Figure 8: Median margin on sales, by country and size



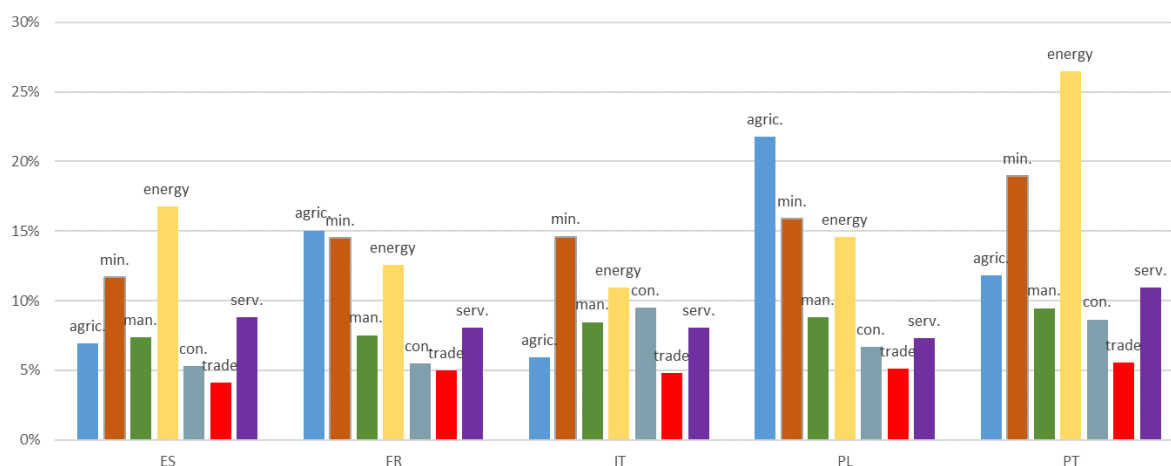
While we noted that large firms had lower profit margins than small ones in 2022 (except Spain), the dispersion of the growth of margins at the firm level between 2021 and 2022 was sensibly more limited for large firms than for smaller ones. Figure 9, indeed, shows that the interquartile range was the smallest for large firms in all countries. More specifically for large firms, while the third quartile is relatively low, the first quartile corresponds to relatively large margin growth. This finding suggests large firms are less affected by uncertainty about the evolution of their margins with respect to firms of smaller size. Moreover, this stylized fact appears monotonic with firm size for all countries, with the exception of Spain where the first quartile for large firms is lower than those for smaller firms. In other words, the smaller the firm, the higher the dispersion of its margin growth and, therefore the exposure to extremely good or bad performance in terms of profit margins.

Figure 9: Quartiles of margin on sales growth between 2021 and 2022 by country and firm size



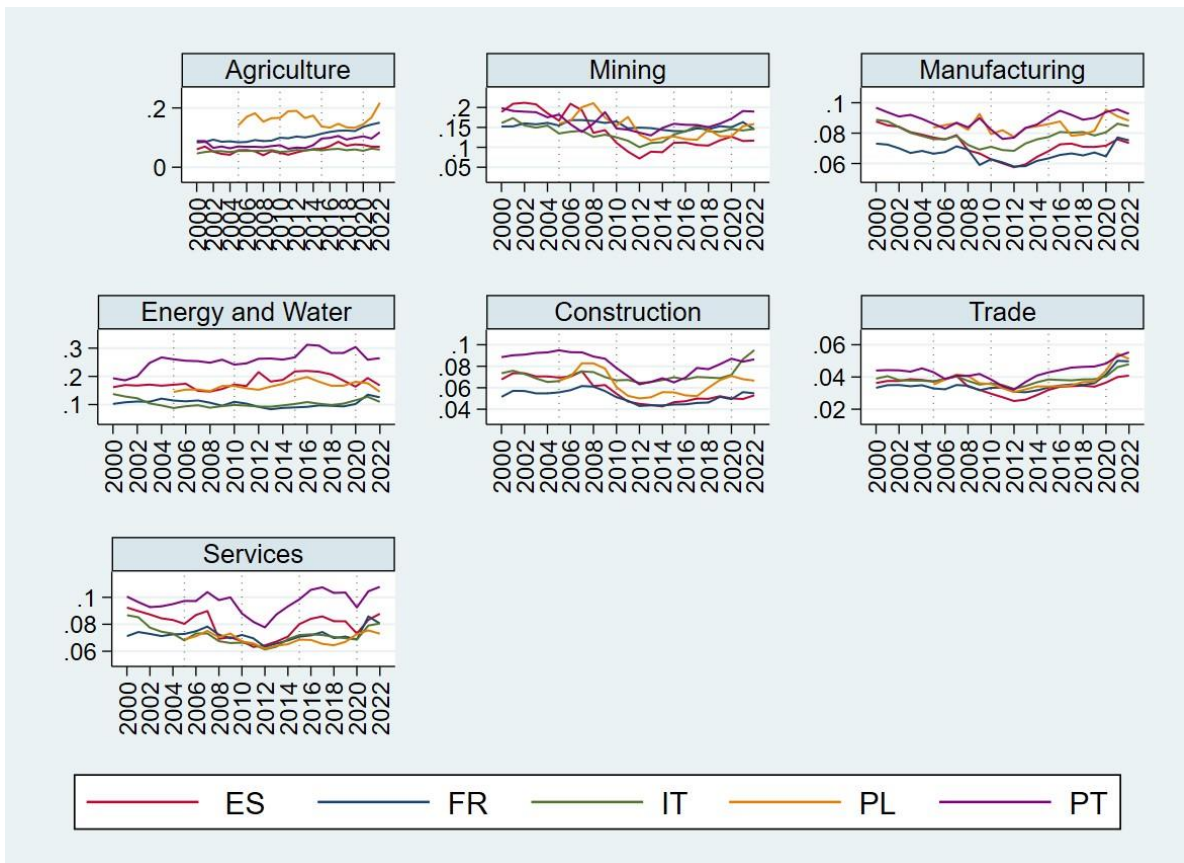
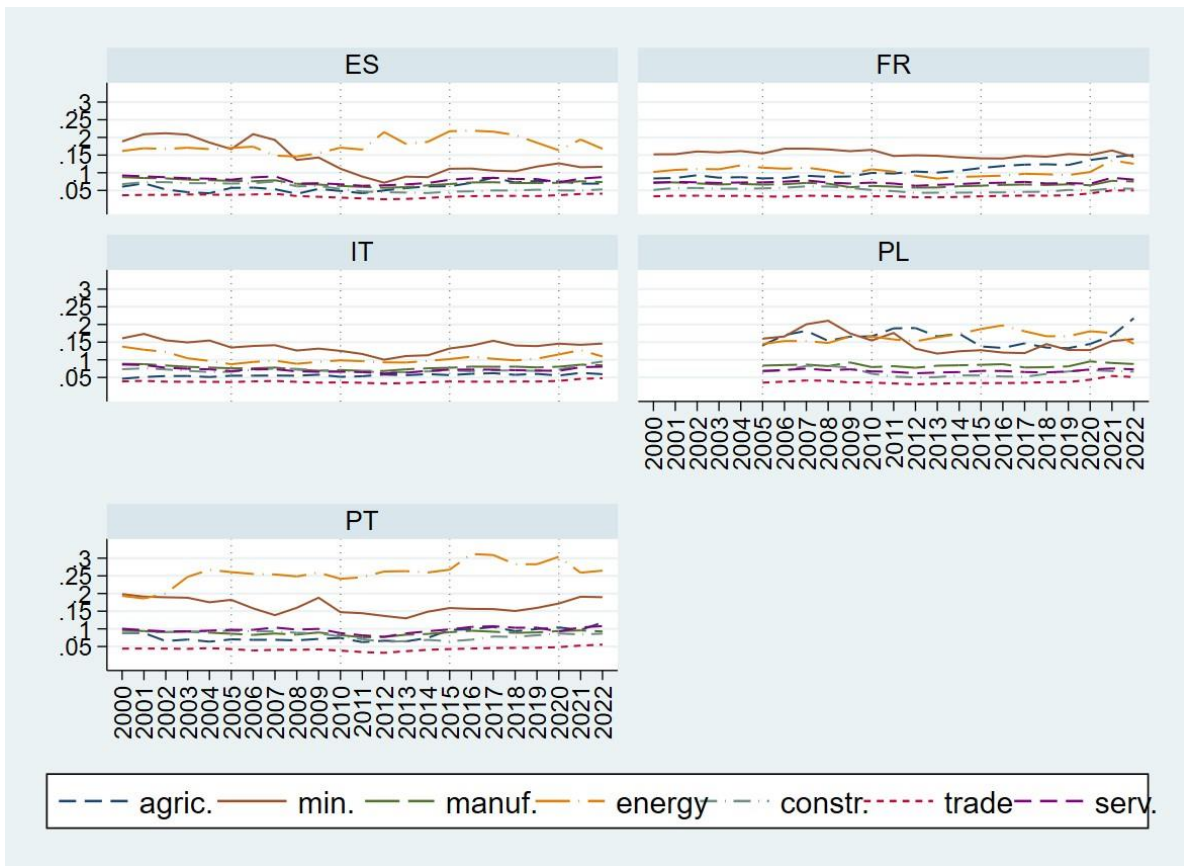
5.2 Profit margins by sectors of activity

This section details profit margins by firms’ sector of activity. Figure 10 represents the median margin on sales by country and sector, in 2022. It distinguishes seven major sectors of activity: agriculture, mining, manufacturing, energy, construction, trade, and services. While the relative ranking of sectoral median margins in general differed across countries, trade was always the sector enduring the lowest margin on sales, possibly due to competition. In most countries, construction followed (with the exception of Italy, where it ranks third lowest). In all countries, manufacturing and services had somewhat similar levels of margins. These levels were typically intermediate, most often below those in agriculture (with the exception of Italy and Spain), energy, and mining. Agriculture was the sector of activity enjoying the highest margins in Poland and France, energy in Portugal and Spain, and finally mining in Italy.

Figure 10: Median of margin on sales in 2022 by country and firm sector of activity

In the majority of countries, the ranking of median margins on sales across sectors has been mostly stable over time, as shown in the upper panel of Figure 11. Another way of looking at the median sectoral margins over time is analyzing the relative ranking of countries sector by sector. In order to do so, instead of focusing on margins across sectors within each country, we represent the same median margins on sales over time by sector across countries in the lower panel of Figure 11. Sector by sector, the ranking of median margins on sales across countries has also been rather stable over time, at least for some activities. In particular, Polish and French firms in the agricultural sector have consistently higher median margin on sales over time than for the rest of the countries. During the 2000-2020 period, Portuguese and Polish manufacturing firms enjoyed the highest margins, followed by Italian and Spanish ones, while French manufacturing firms have always been characterized by the lowest ones. French firms have been also typically on the lower part of the distribution in the construction sector. On the contrary, Portuguese firms have consistently enjoyed the highest margins in energy & water and services, and often in construction and trade sectors, with respect to other countries.

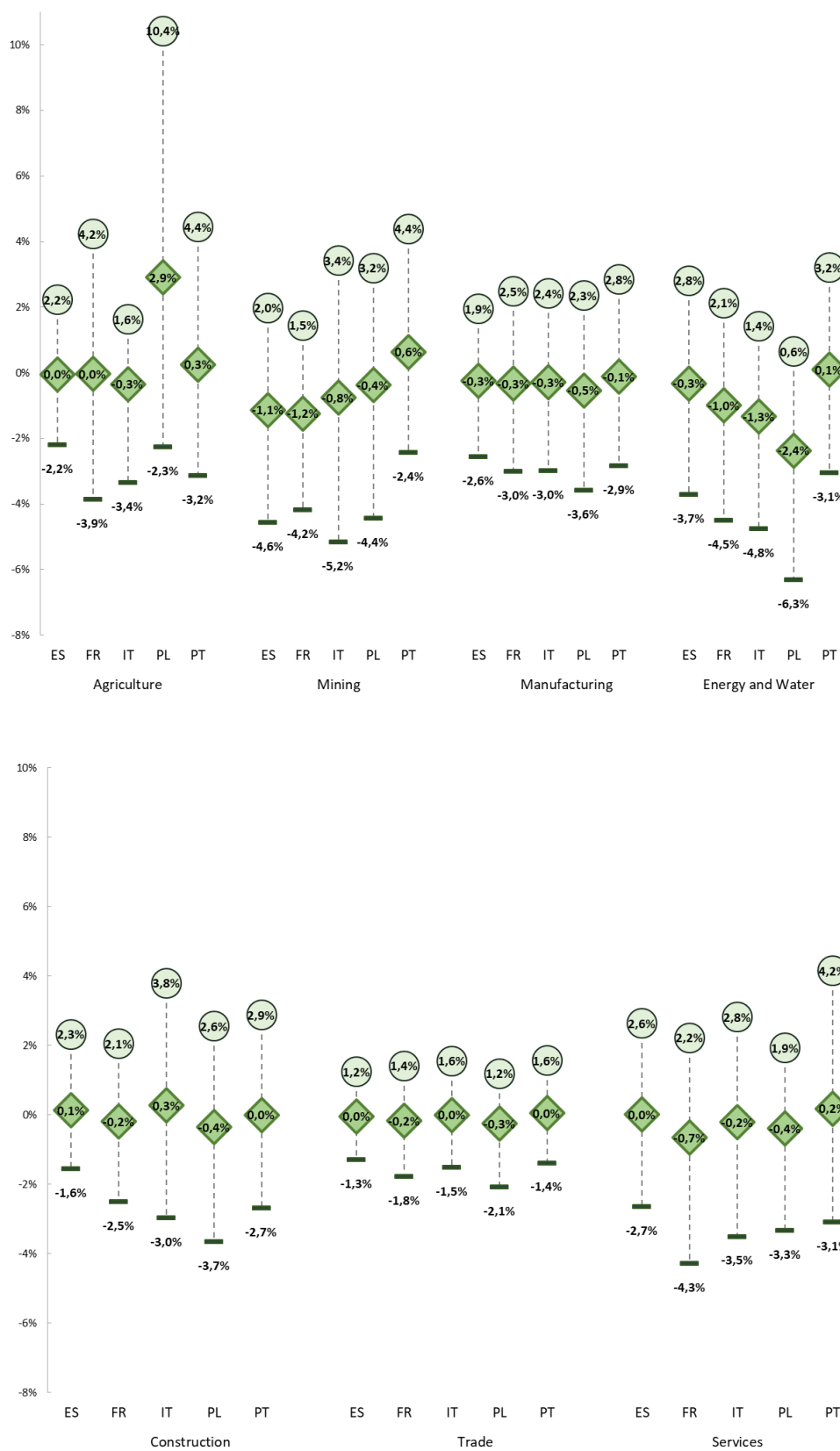
Figure 11: Median of margin on sales over time by country and firm sector



However, the relative stability of the ranking of median margins on sales across countries characterizing at least some sectors could hide a more complex picture when zooming in and distinguishing across subsectors. For instance, while the ranking of countries is similar across manufacturing subsectors, it may be very different within the trade sector depending on whether we look at the wholesale or retail subsector (France, for instance, typically has the highest margin in the retail subsector and the lowest in the wholesale one) and within services (for example, Spain has highest margins in real estate and lowest ones in accommodations).

Taking advantage of the micro data underlying our analysis, we can investigate not only sectoral levels of median margin, but also the growth of sectoral margins at the firm level and its dispersion. Representing the quartiles of margin growth between 2021 and 2022 sector by sector, Figure 12 indicates that the dispersion of margin growth was heterogeneous across sectors. The sector where firms experienced the smallest dispersion, as far as the growth of their margin on sales is concerned, was trade, which interestingly was also the sector with the lowest median margins in all countries. Focusing instead on the country dimension, Figure 12 also suggests that, between 2021 and 2022, the growth of margins was higher in Portugal than in the other analysed countries for most quartiles and sectors.

Figure 12: Quartiles of growth of margin on sales between 2021 and 2022 by firm sector of activity and country



6. Conclusions

The key finding of this study on margins on sales of non-financial corporations in some European countries, over the period 2000-2022, are as follows:

1. The median of margins dropped during the global financial and sovereign debt crises, while they have been mostly increasing since 2013; they were preserved at the Covid outbreak in 2020, spiked in 2021 and stabilized in 2022 at high levels.
2. Not only the median but all quartiles of the distribution of margins increased between 2019 and 2022. Moreover, the distribution is much more dispersed above the median than below.
3. The evolution of the median growth of margins brings out clearly the struggle of the median firm between 2008 and 2012, as well as the post Covid surge in 2021. It is also interesting to note the resilience of firms' margins and growth of margins at the outbreak of the Covid pandemic in 2020.
4. While median growth of margins remained rather stable between 2019 and 2020, the analysis of centiles of the growth of margins reveals that some firms suffered and some actually benefitted.
5. Exploring the heterogeneity related to firms' size, we find that margins tend to be decreasing in size to some extent, while the dispersion of growth of margins is decreasing in firm size, i.e. large firms seem less affected by uncertainty about the evolution of their margins with respect to firms of smaller size.
6. Margins and their growth are also heterogeneous across sectors of activity. Over time, the ranking of margin levels appears relatively stable across sectors. Trade is consistently the sector with the lowest levels of margins and the smallest dispersion of their growth.

Box 1: Indicators of the recent macroeconomic context

This section examines key macroeconomic indicators for France, Italy, Poland, Portugal, and Spain from 2014 to 2022. Macroeconomic indicators provide context for the evolution of profit margins among non-financial corporations (NFCs). The years 2020–2022 were characterized by significant economic challenges, including the Covid pandemic, global supply chain disruptions, and a sharp increase in energy prices. These events were accompanied by higher inflation rates and increasing in interest rates.

The inclusion of macroeconomic indicators offers a broader perspective on the external environment impacting firms' financial performance. Metrics such as inflation, GDP growth rate, and interest rates provide insights into the pressures faced by firms and their potential responses, including adjustments of profit margins. These indicators are essential for understanding how external economic conditions have shaped the financial dynamics observed at the firm level.

From 2014 to 2022, all the countries in this study experienced a growth in the number of enterprises (Figure B1.1). Poland saw the most significant increase (72%) supported by SMEs. In contrast, Italy showed a more moderate growth (22%), though still notable given its large base of enterprises.

Figure B1.1: Number of enterprises by country (millions) and size classes (thousands) between 2014 and 2022

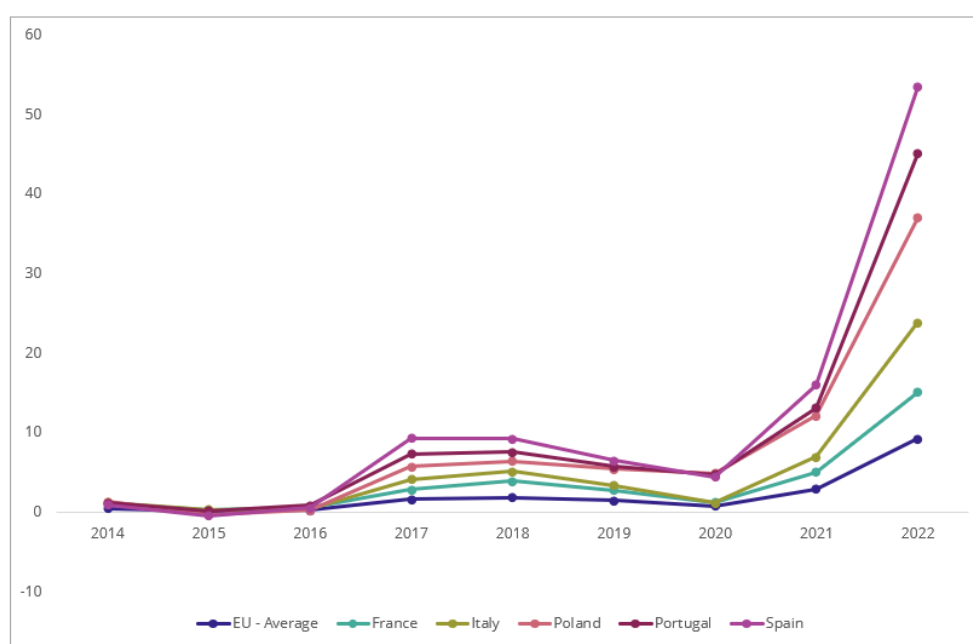


From 2014 to 2018, inflation (Figure B1.2) remained relatively stable and low for all countries, reflecting subdued price pressures in the European economy. However, inflation levels began to diverge slightly, with Poland showing a steady upward trend while inflation in other countries remained more restrained. This divergence became more apparent from 2018 to 2020, a period during which most countries experienced a gradual decline in inflation rates. On the other hand, Poland stood out as an exception, with inflation rising steadily even as other countries faced declining price pressures.

The most striking feature of the graph is the sharp increase in inflation observed from 2020 to 2022 across all countries. This surge coincides with the post-pandemic economic recovery, supply chain constraints, and soaring energy prices, which together fueled significant inflationary pressures. Poland recorded the steepest increase, reaching levels far above its European counterparts (and the European Union average). France recorded a more moderate increase than the countries studied.

Overall, the graph underscores the inflationary challenges faced by European countries during the post-pandemic recovery and highlights the variability in inflation dynamics between countries, particularly Poland, which consistently displayed higher rates throughout the period. The inclusion of inflation data provides essential context for understanding the broader economic conditions impacting firms' financial performance and their profit margin dynamics.

Figure B1.2: Inflation rate (%) between 2014 and 2022

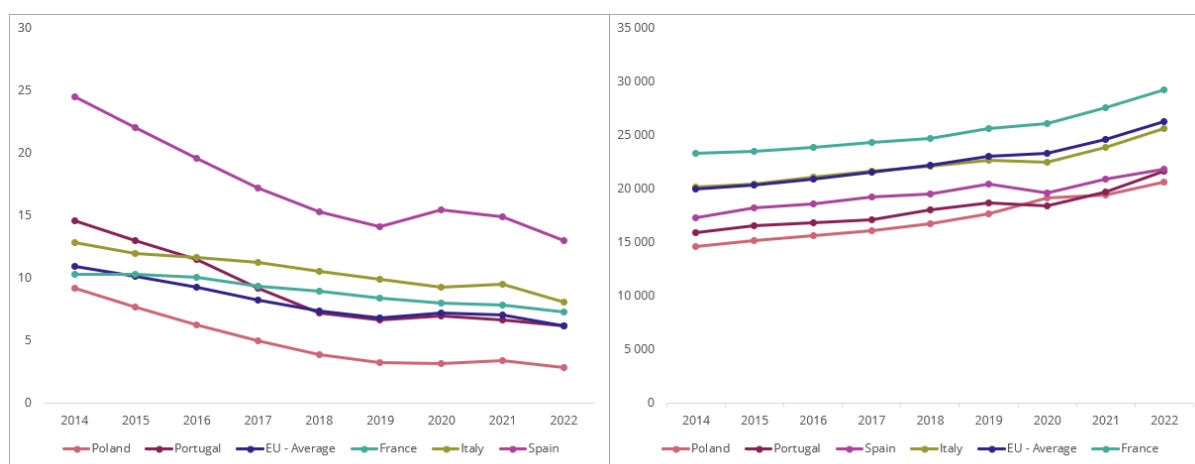


Source: Database Eurostat

From 2014 to 2022, labor markets across European countries exhibited steady improvements, with unemployment rates declining significantly (left panel of Figure B1.3). Poland and Portugal showed the most pronounced reductions in unemployment. Spain, despite experiencing a notable decrease, continued to report the highest unemployment rates throughout the period, reflecting structural challenges in its labor market.

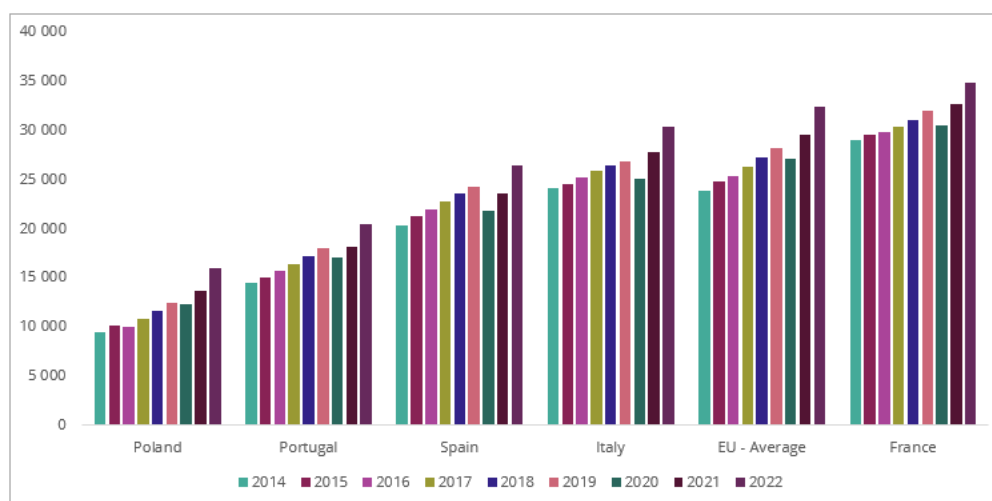
During the same period, adjusted gross disposable income per capita rose consistently across all countries analyzed, as shown in the right panel of Figure B1.3. France stood out with disposable income levels substantially higher than the EU average, reflecting its stronger economic position and higher labor costs. Countries like Poland and Portugal, while showing positive trends in income growth, remained below the EU average, indicating continued disparities in purchasing power among European countries.

Figure B1.3: Unemployment rate (%) and annual gross income per capita (EUR) between 2014 and 2022



Source: Database Eurostat

Figure B1.4, illustrating GVA (Gross Value Added) per capita from 2014 to 2022, highlights persistent disparities across European countries. France consistently recorded the highest GVA per capita (among the countries studied), above the EU average. Italy maintained values near the EU average. Spain and Portugal exhibited significantly lower GVA per capita figures, emphasizing their comparatively smaller contributions to economic output per individual. Despite steady growth over the period, Poland remained at the bottom among the analyzed countries, underlining its developing economy and the ongoing gap in productivity relative to other European nations. The consistent upward trends across all countries suggest gradual economic progress, although the pace and magnitude of growth differed substantially, reinforcing existing disparities.

Figure B.1.4: Gross value added per capita (EUR) between 2014 and 2022

Source: Database Eurostat

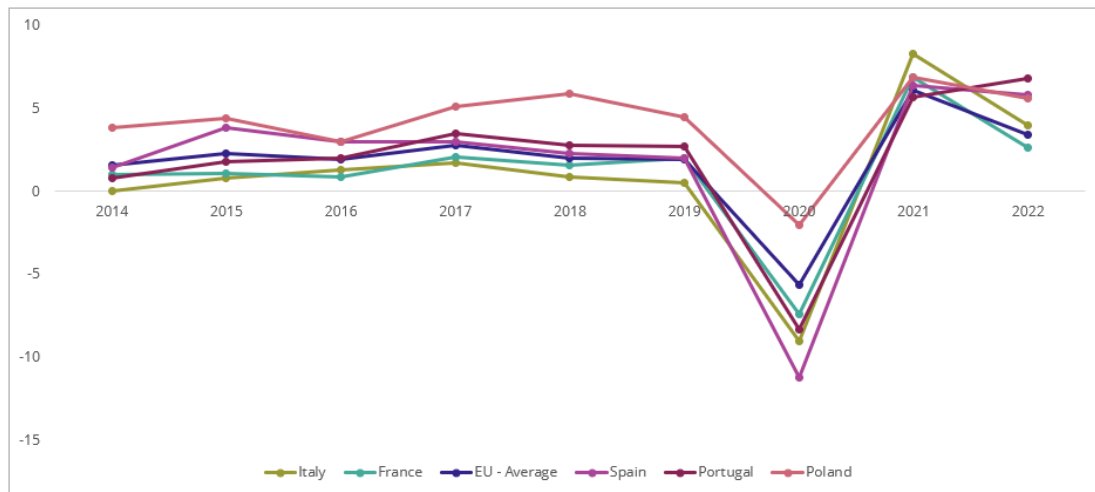
From 2014 to 2019, GDP growth across European countries exhibited steady trends. As shown in Figure B1.5, Italy, and France experienced GDP growth rates below the EU average, while Poland consistently outpaced other countries in GDP growth during this period.

The period from 2019 to 2022 saw notable fluctuations in GDP growth across countries, with a significant contraction occurring in 2020 due to the impact of the Covid pandemic, which disrupted business activities, reduced consumer spending, and led to widespread economic uncertainty. As a result, all countries experienced a substantial decrease in GDP during 2020. The recovery phase began in 2021, as economies adapted to pandemic-related challenges and implemented stimulus measures to support businesses and households. By 2022, most countries had shown signs of economic rebound, although the pace of recovery varied. In 2022, Portugal recorded the highest GDP growth rate at 6.8%, while France had the lowest at 2.6%.

Following the inflationary spike previously described the long-term interest rates¹³, which had been on a declining trend until 2021, saw significant increases across most countries in 2022. This rise was influenced by the escalating inflation, as central banks raised rates to curb further inflationary pressures. Poland recorded the highest interest rate at 6.05%. The European Union average was 2.46%, with Italy exceeding this rate, while France, Portugal, and Spain remained below it. This increase in borrowing costs set the stage for challenges faced by vulnerable companies, who are likely to face difficulties due to higher financing costs in 2023.

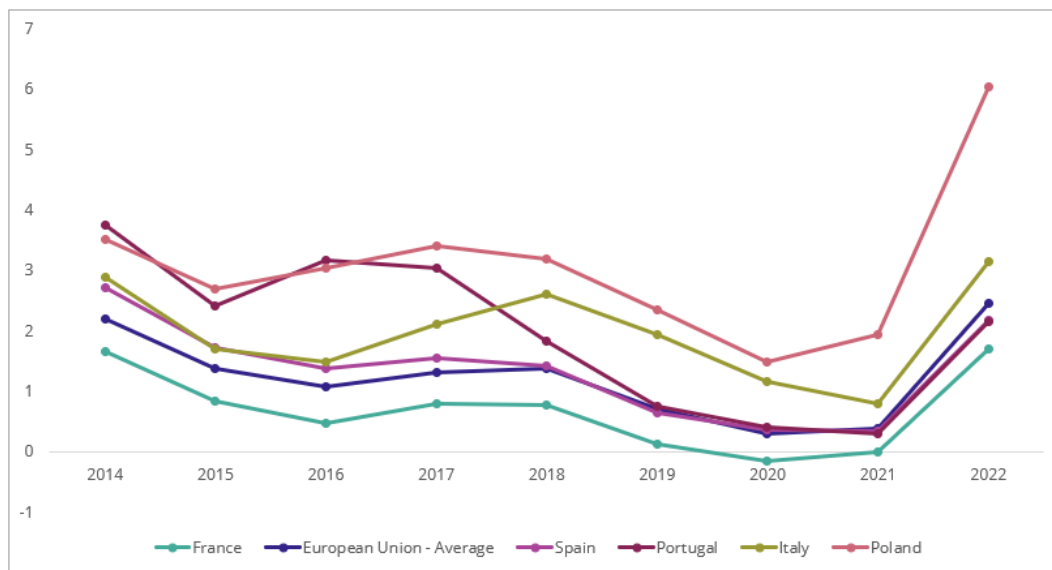
¹³ The long-term interest rates represent the 10-year government bond yields, used as the EMU convergence criterion.

Figure B1.5: GDP growth rate (%) between 2014 and 2022



Source: Database Eurostat

Figure B1.6: Long term interest rates (%) between 2014 and 2022



Source: Database Eurostat

Box 2: Vulnerable firm clusters and rising interest rates

The analysis presented in this box complements the main findings of the report by briefly examining the overall impact of rising interest rates on firm clusters with varying degrees of financial resilience. Against the backdrop of the recent monetary tightening cycle, studying the heterogeneous responses of firm cluster with different degrees of financial resilience provides a deeper understanding of how interest rate shocks interact with firm profitability.

In 2022, as central banks started raising interest rates to combat inflation, firms faced higher borrowing costs, directly impacting their financial resilience. The analysis of this section leverages data from the semi-aggregated BACH dataset providing country, sector, and firm size-level data, to analyse the impact such a surge in credit costs will have on firms' profitability.

First, we identify firm clusters (i.e., groups of firms of the same country-sector-size) that are vulnerable based on their 2018-2021 average Interest Cover Ratio ($ICR = \text{Gross operating profit} / \text{Interest expenses}$) and financing costs ($R29 = \text{Interest expenses} / \text{Financial liabilities}$)¹⁴. Firm clusters are classified as vulnerable if their average ICR falls into the lowest quartile of the ICR distribution within their country and their financing costs are in the highest quartile, as shown in Figure B2.1. Conversely, firm clusters with ICRs in the top quartile and financing costs in the lowest quartile are labeled as resilient. Therefore, vulnerable firm clusters represent firms that have struggled to cover their interest expenses due to limited earnings and high financing costs between 2018 and 2021.

Second, we track changes in key balance sheet indicators from 2021 to 2022 and compare weighted average percentage point changes across countries for vulnerable, neutral, and resilient firm clusters.¹⁵ We conclude that, overall, vulnerable firms appear to have adopted a conservative strategy, managing their expenses and debt level in order to face the increased interest burden (Figure B2.2).

¹⁴ Financing costs are defined as interest expenses over financial liabilities and correspond to the variable R29 in the BACH dataset, like the ratio investigated by the FSA working group recurrent report "Financing costs on non-financial corporations in European countries: a statistical analysis based on accounting data".

¹⁵ Whenever we aggregate data beyond the levels present in the BACH database (country, sector, size), i.e. when grouping clusters depending on their degree of vulnerability within country, we weigh the statistics by the corresponding share of total assets.

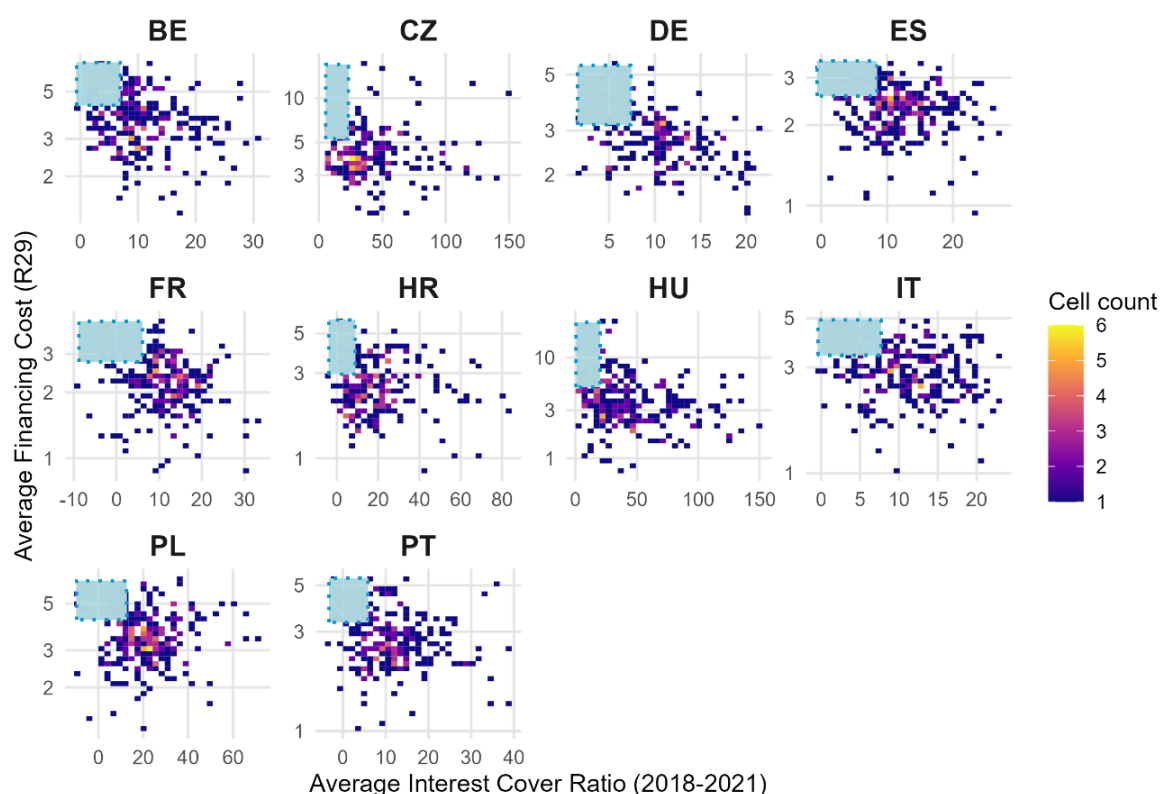
This response includes strategic cost reductions, financial prudence, and a focus on profitability retention:

1. Cost reduction: vulnerable firm clusters generally prioritized reducing operational expenses, such as staff costs, which led to a reduction in total expenses.
2. Financial prudence: vulnerable firm clusters have strengthened their financial position by cutting non-current debt and increasing their equity ratio.
3. Profit retention: despite higher financing costs, these firm clusters managed to avoid large drops in profitability and retain earnings, while increasing their equity.

Figure B2.1: Identification of vulnerable firm clusters

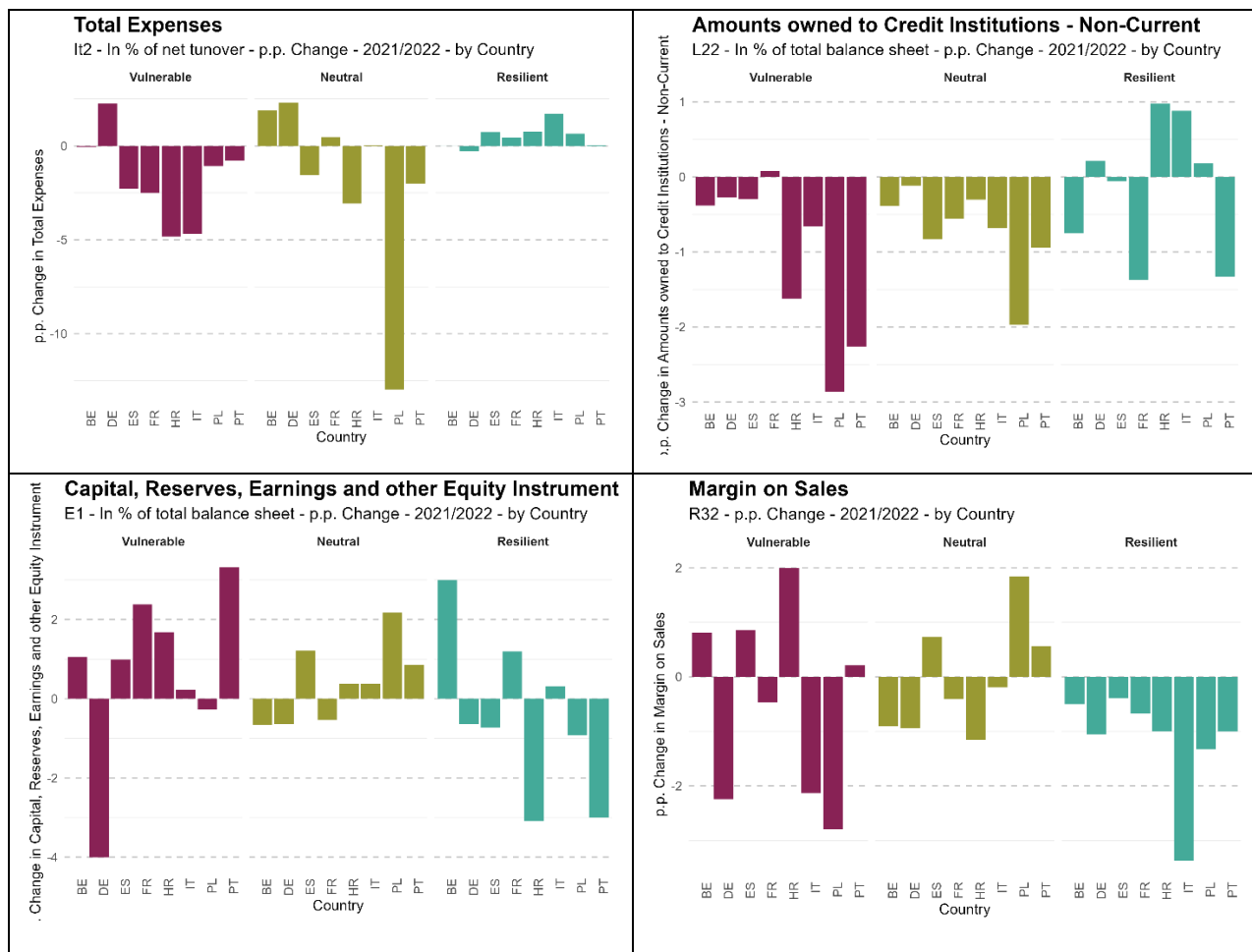
Vulnerability of Firms by ICR and Financing Cost (2018-2021)

Shaded areas indicate the most vulnerable zones based on Interest Cover Ratio and Financing Costs



Note: The x-axis represents the average Interest Cover Ratio (ICR) of a country-sector-size cell in BACH between 2018 and 2021, a measure of firms' ability to meet interest payments, while the y-axis represents the average financing cost (R29) between 2018 and 2021. The y-axis is log-scaled to enhance comparison. The color scale reflects the count of BACH cells within bin, with lighter colors representing higher densities. Each facet corresponds to a country. The light blue shaded rectangles mark areas considered most vulnerable, where firms are at risk due to low ICR and high financing costs. Both ICR and financing cost thresholds are defined as the lowest ICR quartile and highest financing cost quartile within country – this country-specific definition, in certain countries, led to a rather different threshold compared the fixed definition used in the FSA analysis – which is of $ICR < 2$.

Figure B2.2: Evolution of balance sheet indicators between 2021 and 2022 for vulnerable, neutral, and resilient firm clusters



Note: Each bar represent the weighted average percentage point change between 2022 and 2021 of different indicators across countries and group status (i.e. vulnerable, neutral, and resilient).

Annexes

Annex I: Methodology

Profit margin on sales indicator

The margin on sales indicator of profit margin (PM) corresponds to the ratio EBITDA¹⁶ over sales and was computed as follows:

<i>Margin on sales indicator</i>	
<i>Numerator</i>	$I_1 + I_2 + I_3 + I_{41} - I_5 - I_6 - I_7 - I_{81}$
<i>Denominator</i>	I_1
<i>PM on sales</i>	$\frac{I_1 + I_2 + I_3 + I_{41} - I_5 - I_6 - I_7 - I_{81}}{I_1}$

Legend:

I₁: Net turnover

I₂: Variation in stocks of finished goods and work in progress

I₃: Capitalised production

I₄₁: Operating subsidies and supplementary operating income

I₅: Cost of goods sold, materials and consumables

I₆: External supplies and services

I₇: Staff costs

I₈₁: Operating taxes and other operating charges

Data selection

Some exclusion criteria were applied to the database to avoid statistical noise and outliers that could bias the results. More specifically, we consider outliers and trim observations with ratios below the 25th percentile (p25) of the distribution, minus six times the interquartile range (IQR), that is, the difference between the 75th (p75) and the 25th percentile. Symmetrically, we trim observations with ratios above p75, plus six times the IQR.

$$PM < P25 - 6 \times IQR$$

$$PM > P75 + 6 \times IQR$$

¹⁶ The definition of EBITDA in the BACH database is slightly different, as takes into account financial income and expenses. However, this definition is planned to be modified soon. The definition of EBITDA adopted here corresponds to the current definition of GOP in the BACH database.

Inverse hyperbolic sine

In order to compute the evolution (between t and t-1) of profit margin firm by firm, we apply the following formula (Inverse Hyperbolic Sine):

$$PM \text{ growth rate}_{t-1,t} = \ln(PM_t + \sqrt{PM_t^2 + 1}) - \ln(PM_{t-1} + \sqrt{PM_{t-1}^2 + 1})$$

Annex II – Firm size criteria and classification of sector of activity

Firm size

<i>Firm size criteria based on sales</i>	
<i>Micro</i>	<i>Sales</i> ≤ 2M €
<i>Small</i>	2M € < <i>Sales</i> ≤ 10M €
<i>Medium</i>	10M € < <i>Sales</i> ≤ 50M €
<i>Large</i>	<i>Sales</i> > 50M €

Note that micro firms are excluded from the analysis, due to their heterogeneous coverage across countries. Also note that in this report sales threshold are not deflated, each year, by the HICP (Harmonized Index of Consumer Prices).

Firm sector of activity

<i>Firm basic sector of activity based on NACE Rev.2</i>	
<i>Agriculture</i>	<i>A</i>
<i>Mining</i>	<i>B</i>
<i>Energy and water</i>	<i>D, E</i>
<i>Construction</i>	<i>F (excl. 431)</i>
<i>Trade</i>	<i>G</i>
<i>Services</i>	<i>H, I, L, M (excl. 701), N, P, Q, R, S</i>

Annex III – Number of companies by firm size and sector

Number of companies by firm size (excluding micro) in 2022

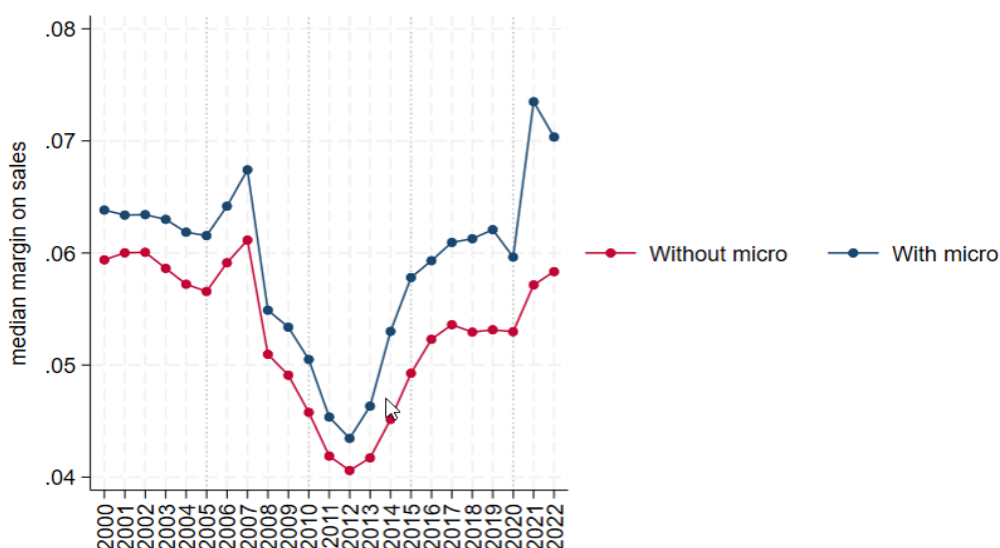
	Total	small	medium	large
ES	51,737	40,331	9,111	2,295
FR	158,077	117,432	31,571	9,074
IT	106,745	71,052	27,799	7,894
PL	23,879	13,600	7,368	2,911
PT	25,256	19,350	4,806	1,100

Number of companies by sector in 2022

	agriculture	mining	manufacturing	energy&water	construction	trade	services
ES	1,288	217	11,459	710	4,590	20,453	13,020
FR	1,927	532	24,301	2,423	18,102	60,207	50,585
IT	1,323	273	35,924	2,851	12,015	31,374	22,985
PL	342	146	7,144	1,211	1,846	6,453	6,737
PT	575	103	5,332	535	2,207	9,625	6,879

Appendix

Figure A1: Median of margin on sales over time for Spain including micro firms



Note: Medians including micro companies show an important decrease in 2020 and 2022, in line with the information provided by the Observatory of Margins in Spain ([OME](#)).

Figure A2: Median and weighted mean of margin on sales by country

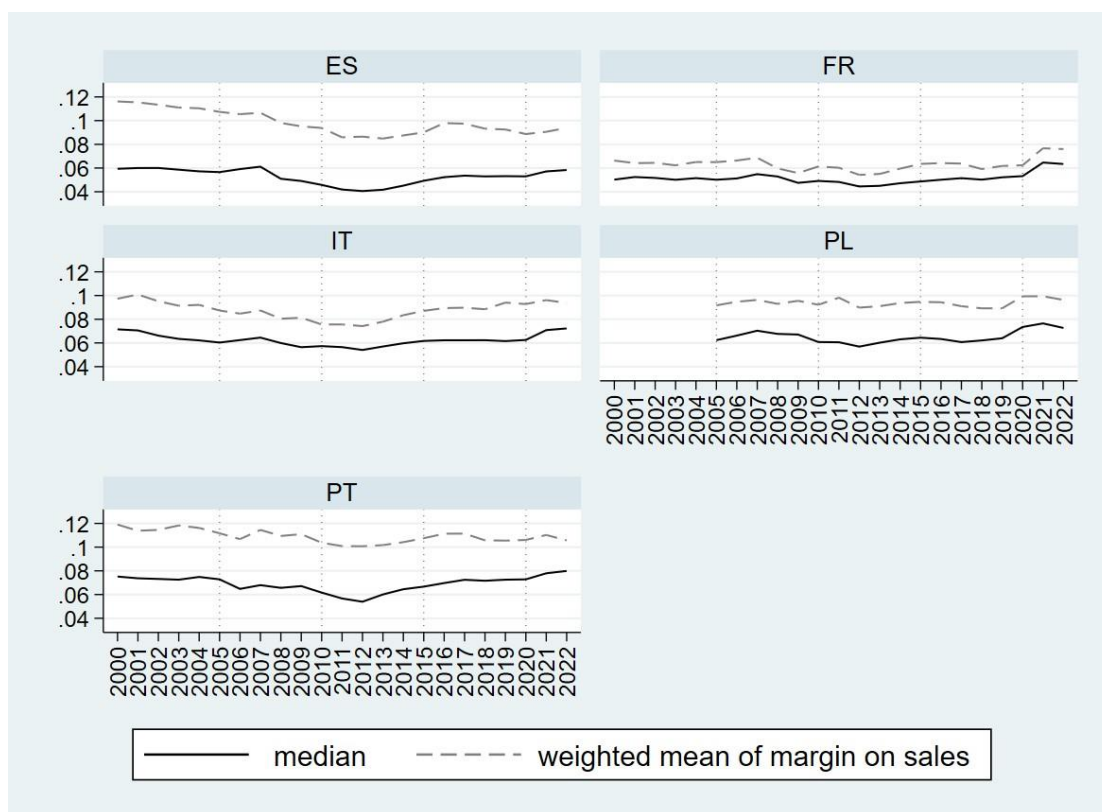


Figure A3: Median of margin on sales for Spain including micro firms

