

PROFITABILITY, EQUITY CAPITALIZATION AND NET WORTH AT RISK

How resilient are non-financial corporations in a crisis
environment?

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Profitability, Equity Capitalization and Net Worth at Risk

– How resilient are non-financial corporations in a crisis environment? –

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Abstract

We analyze the impact of the financial crisis on capital structure and on profitability in the corporate sector in six European countries. We compare the distributions of key financial ratios (profitability, equity capitalization) in the sectors manufacturing, construction and trade and four size classes. Three of the analyzed size classes form the SME category. Companies' profitability was heavily impacted by the financial crisis in all size classes, while manufacturing suffered the most compared to construction and trade. In the construction sector, divergent developments are visible in the observed countries. Additionally, lower-end profitable firms, particularly of the small and micro size class, were still fighting against the impact of the downturn in 2010. We also do a regression analysis showing that the correlation between the percentiles of profitability and GDP growth is positive and highest at the lower end of the distribution. With regard to capital structure, the reaction to the financial crisis was similar for all size classes: a deleveraging process took place leading to higher average equity ratios. Further, we show that micro entities' capital structure and profitability are much more heterogeneous than larger entities'. Finally, the analysis of firms' capability to absorb losses reveals that manufacturing has to bear the highest risk for losses, independently of size.

Keywords: profitability, capital structure, financial crisis, SMEs, Net Worth at Risk.

JEL classification: E32, G32, L25.

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List of abbreviations

CBA	Central de Balances Annual, Spanish: Central Annual Individual Balance Sheet Database of Banco de España
CBB/RM	Cuentas anuales depositadas en los Registros Mercantiles, Spanish: Deposit of Annual Individual Accounts Database of Banco de España (obtained from the Spanish Mercantile Registries)
CBSD	Central Balance Sheet Database of Banco de Portugal
CBSO	Central Balance Sheet Data Office
CeBi	Centrale dei Bilanci
CFaR	Cash Flow at Risk
EBIT	Earnings Before Interest and Taxes
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
ECCBSO	European Committee of Central Balance Sheet Data Offices
e.g.	exempli gratia, Latin: "for example"
EU	European Union
EVT	Extreme Value Theory
FIBEN	Fichier Bancaire des Entreprises, French: Companies Database of Banque de France
GAAP	Generally accepted accounting principles
GDP	Gross Domestic Product
GPD	Generalized Pareto Distribution
i.e.	id est, Latin: "that is" or "in other words"
IES	Informação Empresarial Simplificada, Portuguese: Simplified Corporate Information
IFRS	International Financial Reporting Standards
INE	Instituto Nacional de Estatística, Portuguese: National Statistical Institute of Portugal
INSEE	Institut National de la Statistique et des Études Économiques, French: France's national statistical office
No	Number
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne, French: European industry standard classification system
NWaR	Net Worth at Risk
POT	Peaks-over-Threshold model
pp	Pages
ROA	Return on Assets
ROE	Return on Equity
ROS	Return on Sales
VaR	Value at Risk

Executive Summary

The 2008-09 economic recession which originated in the bubble of the housing sector of the US economy and the incorrect pricing of risk by financial institutions also had a deep impact on the performance and stability of the corporate sector of EU economies. However, only little information is available from macroeconomic national accounts data on the relative severity of the crisis in different parts of the non-financial sector, e.g. how different sectors fared during this period and whether significant differences existed among EU countries in this respect. Also, little is known how companies in different size classes were affected and which non-financial companies were able to participate in the catch-up process seen in the period after the crisis. In this report, we analyze profitability and equity capitalization in six European countries for the manufacturing, construction and trade sector focusing on the economic crisis in the years 2008–2009 and one year later. As our institutions from Belgium, Germany, France, Italy, Portugal and Spain have access to financial statements data for decades, we are able to compare the effects of the latest crisis within a long term perspective. We keep size differentiation in mind as it is of major importance when studying non-financial entities. We provide empirical distributional statistics in order to discuss the effects of the crisis not only on an average entity but also on those entities represented in certain strata of the distribution. We also analyze – from a sectoral perspective - the capability of companies to absorb losses with the concept of Net Worth at Risk, which we introduced in 2005 in our last study.

Our key findings are:

- Owing to its exposure to the international context, manufacturing suffered the most significant effects of the economic crisis in 2008-09 among the three non-financial sectors under observation. A significant reduction in profitability can be observed over the whole distribution for all countries. To a somewhat lesser extent, the same may be said of the trade sector.
- In the construction sector, divergent developments are visible: as expected, our statistics show a strong downward trend in Spain, but also in Belgium, France and Portugal. By contrast, an impact in Germany is almost undetectable with large companies even showing significant increases partly due to countercyclical fiscal policy measures.
- In 2010 profitability improved in manufacturing and trade in all countries but pre-crisis levels could not be attained in most cases. In the construction sector a recovery failed to materialize in Belgium, Spain, France and Portugal, where setbacks had taken place.
- Lower-end profitable firms, particularly of the small and micro size class, were still fighting against the impact of the downturn in 2010. The firms that incurred consecutive losses were more vulnerable.
- The correlation between the percentiles of profitability and GDP growth is positive in line with intuition since, when the economic climate improves, profitability should increase too. Though correlation is highest at the lower end of the distribution and decreases along the upper end, which implies that less profitable firms are more sensitive to the business cycle.
- With regard to equity capitalization (measured as a percentage of total assets), an increase can be observed in 2009 in the median as well as in the higher areas of the distri-

bution. At first glance, this is surprising. Various reasons can be cited for this phenomenon, which are not necessarily applicable to all countries in our analysis. Though declining business activities and halted investments leading to a decrease of total assets play a very important role.

- In some countries' sectors and size classes, lower capitalized companies show decreases in their equity ratio revealing the effects of the severe crisis in 2009. The fact that less profitable firms are in general also less capitalized has proven harmful in the crisis.
- Higher equity levels could be preserved in 2010 in several sectors and size categories of the countries analyzed. Consequently many of the corporations included are generally in a good position with regard to their risk-bearing capacity to absorb losses. However, the success of corporations in some countries of the euro area depends on solving persistent structural problems at a national level so that corporations can return to sound levels of profitability. This is also true of companies in those countries with fewer structural problems but which rely heavily on exports in Europe owing to the weak growth in the continent's economy over the past few years.
- A long-term analysis shows a significant increase in equity capitalization in Belgium, Germany and France in the decade before the crisis. In these countries, equity ratios reached their highest levels within the timeframe of our analysis, reaching in some sector-size combinations Spanish and Portuguese levels or going even beyond. Italian figures show lower capitalization with remarkably low dispersion.
With regard to sector differences, manufacturing has generally higher equity capitalization than construction or trade.
- A long-term analysis of net income figures shows that the lower strata of the distribution of the six countries, ie the loss-making companies, have converged somewhat during the last decade.
- With regard to size effects, companies' profitability was in all classes heavily impacted by the financial crisis. Also the reaction of the capital structure was similar for all entities. Though we show that micro entities have much more heterogeneity in its capital structure and profitability than larger entities.
- Differences exist between the levels of equity capitalization in our countries. These differences result from heterogeneous fiscal and legal – including accounting - rules or institutional arrangements like the Belgian tax incentive concept of “notional interests”, the German “Hausbank” relationships, the protection of creditors in Germany and Italy, or the use of multi-bank-channels in Italy.
- The analysis of the companies' capability to absorb losses reveals further differences between sectors and sizes. Generally manufacturing has to bear the highest risk for losses, independently of size. This exposure can be explained by a higher persistence of costs in times of crisis due to large scale capital intensity (i.e. larger operating leverage) and by higher international competition in this sector. However, when comparing the loss potential to the equity capitalization, large entities in construction are particularly less endowed with own risk-bearing capital in Germany, Spain, France and Italy.

1 Introduction

A comprehensive understanding of profitability in the corporate sector together with its level of indebtedness has always been important from a monetary policy perspective. Indeed non-financial companies' success of business activity together with a sound equity capitalization is a key determinant for the credit risk of banks' existing loan portfolios and, of course, also for the ongoing assessment of new credit applications coming from the real sector. Although this bank lending view is not the only important perspective, the strengths and weaknesses of the corporate sector have a direct impact on its investment and employment decisions and, consequently, on the growth prospects of an economy.

The aim of this report is to analyze mainly the impact of the economic crisis of 2008-09 on profitability and equity capitalization in manufacturing, construction and trade in six European countries: Belgium, Germany, Spain, France, Italy and Portugal.¹ We compare the distributions of two key financial ratios – profitability and equity capitalization - of the three sectors in four size classes. The latter is important when analyzing financial statements, as particularly smallest and largest entities show more pronounced developments.

The distributions of profitability and equity capitalization are compared in this study through quantiles. This analysis has been chosen as a continuation of the last report on Net Worth at Risk which analyzed the loss potential of companies from a macroeconomic perspective based on the lower end of the profitability distribution.² This approach is based on the fact that different strata of a distribution can behave differently compared, for example, to only the median, the simple arithmetic mean or the weighted arithmetic mean, with the arithmetic mean being highly dependent on extreme values and the weighted average being highly dependent on large entities.

Also as a result of the feedback from earlier studies produced by the group, the analysis is extended to two further non-financial sectors: construction and trade, both being sensitive to the business cycle. Altogether, this report analyses 12 different sector-size-combinations for each country allowing a detailed view of the effects of the latest crisis.³ In addition to the focus on the recent economic crisis, we also relate these impacts to a longer time-frame, i.e. the last two decades, as our institutions have extensive balance sheet data available for such a long time horizon. Because of the vast variety of figures, we visualize our statistics with the help of Box-Whisker-Plots in order to identify differences between sectors, sizes and countries more easily.

¹ The order of countries in this report follows the common sequence within EU organizations resulting from the name of the country in the official national languages, ie België/Belgique, Deutschland, España, France, Italia, Portugal.

² See Delbreil et al. (2005).

³ For the financing of SMEs see also Task Force of the Monetary Policy Committee of the European System of Central Banks (2007). For recent evaluations on SMEs and corporate indebtedness in the euro area in general, see ECB's regular [Survey on the access to finance of SMEs in the euro area \(SAFE\)](#) and ECB (2012).

Compared to the preceding report, we also have refined the concept of Net Worth at Risk (NWAR), which measures the loss potential of a certain sector-size combination as a worst case scenario. We introduce a third confidence level (80% beneath 90% and 95%) and differentiate between conditional and unconditional NWaR figures of an economic crisis.

The remainder of the report contains three main sections. While section 2 describes basic variables, data sources, coverage analysis and the methodology used, section 3 focuses on the general characteristics of the distributions of profitability and equity capitalization, the impact of the crisis and the long-term developments as well as factors explaining differences between our countries. In section 4 we report the findings on the NWaR figures together with an analysis of the percentage of companies that have an equity capitalization below NWaR. Section 5 summarizes our findings.

The Study Group of the European Committee of Central Balance Sheet Data Offices

This report has been compiled by the Study Group of the European Committee of Central Balance Sheet Data Offices (ECCBSO). The ECCBSO brings together central banks, statistical offices and similar institutions within the European Union that have access to financial statements data of non-financial enterprises. In most cases these datasets are much more extensive than those available from commercial data providers. The objective of the ECCBSO is to exchange views and produce joint studies in order to improve the analysis of financial statements, particularly for assessing the creditworthiness of companies and for statistical purposes. This goal is achieved through four working groups dedicated to specific tasks. In particular, the ECCBSO maintains the BACH database containing harmonized annual accounts statistics of non-financial enterprises from nine European countries.⁴

The downside to the large samples maintained by ECCBSO members is, in many cases, that data is restricted by confidentiality rules and cannot be shared with other institutions. Thus, international comparisons within the framework/concept of a pooled database (containing individual data from all countries) are impossible to perform with these datasets. For this reason, the Study Group of the ECCBSO takes advantage of the large datasets publishing reports on international comparisons of financial statements data on a non-regular basis. The research topics have mainly a descriptive character.⁵

⁴ This database can be accessed at the [BACH-website of Banque de France](#). The database is maintained by one working group of the ECCBSO. A second working group has been set up for risk assessment (see also Working Group on Risk assessment (2007)), a third working group analyses the impact of IFRS on the databases maintained by the ECCBSO members. For more information on these working groups as well the ECCBSO in general, see the [ECCBSO website](#).

⁵ The data cannot even be interchanged by group members, which makes advanced methodological analysis difficult. For more information see the [website of the Study Group of the ECCBSO](#). The publications of the Study Group as well as from other working groups can be downloaded at the [main ECCBSO website](#).

2 Methodology and Data Sources

2.1 Type of companies, time horizon, sectors and size classes

Non-financial corporations and cooperatives

Like the three previous research papers of the Study Group, this one has been conducted on the basis of extensive samples using the financial statements included in the databases managed in each country. These databases are described in the following sub-section. The samples used in this study are, however, restricted to corporations and cooperatives. Partnerships and sole proprietorships are excluded since these companies have specific features and differ fundamentally from those of incorporated companies. A significant portion of operating assets is, in general, not shown in their balance sheets for tax reasons or because of the legal form of the company. Moreover, while sole proprietorships and partnerships typically do not set up reserves, these represent a considerable share of the net equity shown in the balance sheets of corporations. In addition, the recorded equity of sole proprietorships and partnerships can often be negative, since an excessive debt burden does not necessarily lead to bankruptcy. As a result, balance sheet statistics which include data on partnerships and sole proprietorships show comparatively lower equity ratios calculated by aggregated values.

Cooperatives, in contrast, were included in this study. Although their annual accounts are atypical to some extent, they represent an important share of economic activity in some of our countries analyzed, particularly in the Italian construction sector.

Time horizon

The Study Group of the ECCBSO traditionally uses a long-term perspective for its analyses. We start our research from 1987 onwards, as this was the year in which the 4th EU Directive was implemented in Germany and a major break in the German database occurred. For some countries, the starting year is somewhat later, depending on the availability of the respective data source. The long analysis horizon has the advantage that the impacts of two downturn periods can be monitored next to each other: the recent economic crisis starting in 2008, which is still ongoing in the EU and the recession in the early 1990s which was the first major downturn of the economy in the two decades we analyze. Of course, each crisis has characteristics of its own and conclusions from such comparisons should be assessed carefully. However, it is helpful to show the effects these crisis had on the statistical distributions of key financial indicators such as equity capitalization and profitability.

Further, when assessing the development of indicators over more than the last 20 years, one should keep in mind that the economic structures and activities have undergone substantial changes, especially after the creation of the Economic and Monetary Union. For example,

mergers and acquisitions led to a stronger concentration in this period, which is proven by the growing percentage of companies belonging to a group.

The second limitation when analyzing corporate balance sheet data over such a long horizon is the sensitivity of changes in the data samples. As the way of collecting data has generally undergone improvements in the last 20 years, the underlying samples did increase as well in size. This has led to changes in structural composition of the samples which might impact the percentiles computed.⁶ For this reason the size of the sample in each sector-size combination is presented in the tables of Annex II.

Our time horizon ends with the year 2010 to show how the statistical measures of the financial ratios we use change again after the strong impact of 2008-2009. However, some sector-size combinations at the time of writing still lack a significant number of observations for 2010 due to the lag of data entry.⁷ In this respect, analyses carried out on Belgian or German data showed that accounts that were available early are sounder than others, resulting in a somewhat upward bias of the financial situation in this year. In some countries (e.g. France), a further potential sample bias could stem from the fact that some financial statements were not submitted to the national banks during the economic crisis as the companies withheld their accounts. However, we have no indication that this significantly influenced the statistics published in this report.

Type of financial statements

We use exclusively individual financial statements taking full advantage of the datasets available in our institutions. The underlying accounting regimes are mostly national generally accepted accounting principles (GAAP). Some of these national GAAPs have narrowed the International Financial Reporting Standards (IFRSs) though important differences apply based on the underlying 4th EU Accounting Directive. In some European member countries, entities can opt for IFRS instead of using national GAAPs or IFRS is even required for all or only a subset of entities. This is e.g. the case in Italy: the use of IFRS is compulsory for financial companies and listed companies, but it is on voluntary basis for non-financial companies. Most of the few Italian non-financial companies opting for IFRS are holding companies. Thus there is practically no impact of IFRS on the international comparisons displayed in this study. In contrast, other institutional and structural differences as elaborated in section 3.3 significantly impact the presented statistics.

⁶ The French micro and small size class for trade is strongly affected by an increase in the sample in a specific way. An increasing inclusion of pharmacies from 2005 on, which have particularly low levels of equity, leads to a strong decrease of the 10th percentile of net worth in terms of total assets. Thus this percentile is not presented after 2004 for this variable in the two sector-size combinations.

⁷ This study is based on information available up to February / March 2012.

Sectoral coverage

In the last reports of the Study Group, the emphasis of the analysis was on the manufacturing sector, which allowed the industrial core to be highlighted. Still this is of major interest from an economic point of view. However, to provide more insights into non-financial enterprises, the Study Group extended the scope of the analysis with this study to the construction and trade sectors. The construction sector undoubtedly makes a very important contribution to a national economy, especially in Spain over the past decade, for example. The scope of the research was extended to the trade sector as well. As it belongs to the services sector, it is interesting to see how key financial ratios in the trade sector compare with those of the production sectors.⁸

Sectors have been differentiated according to the NACE Rev. 2 classification. Demolition and site preparation (NACE Rev. 2, Group 43.1) is excluded from the construction sector as annual accounts of companies in these fields show quite different characteristics.

Size classes

In this report, we follow the EU Commission Recommendation concerning the definition of micro, small, medium-sized and large enterprises.⁹ However, we only apply the thresholds for turnover, particularly because, in some of our samples, the data variable “number of employees” is of insufficient quality. The corresponding thresholds for separating micro, small, medium-sized and large corporations are €2 million, €10 million and €50 million. In order to control for inflation-induced migration of companies into the next highest size class over such a long time horizon, the threshold values have been computed using national consumer price indices as deflator. Year 2005 is the base year for these figures.

Due to the severity of the crisis years 2008-09, some companies fell into a lower size class since their turnover declined substantially. As a constant sample analysis cannot be implemented over the long time period we evaluate (from 1987 to 2010), this has an impact on the volatility of the sector-size results.

Although the institutions' databases can be generally considered as comprehensive, the representativeness within the micro size class in some countries is not as good as for the other size classes. This originates from the widely distinct ways of collecting balance sheet data in the six participating countries. The national banks of Belgium and Portugal¹⁰ gather data on the whole population of firms. The datasets of Italy and Spain used in this study can also be considered to give a satisfactory and complete picture. However, this is not the case for the German and French database and there is a selection bias due to data entry procedures

⁸ The sectors were selected taking into account data availability in each country, its relevance, and the degree of cross-country comparability.

⁹ See [EU Recommendation of 6 May 2003](#).

¹⁰ For Portugal since 2005, see section 2.3.

and/or choice of threshold. The German database has a general bias that micro entities do not enter the database completely. The French database only includes companies with a turnover of at least €0.75 million or companies with bank loans of at least €0.38 million. Consequently, the statistics based on micro size entities are difficult to compare among the different countries. Therefore, the micro size class has been excluded from the direct comparative analysis between the countries (and no country overview figures have been compiled). However, the micro class is compared within each country to the larger categories in order to single out common patterns of behavior, for example, for both profitability and equity capitalization, the micro class displays much more dispersion.¹¹

2.2 Key variables and basic statistical measures

2.2.1 Key variables¹²

Profitability

There are a large number of concepts and methods that can be applied to quantify the success of business activity in a given period. Some of these profit measures only take the operating activity (like operating profit or EBIT, Earnings Before Interest and Taxes) into account. Others include the financial result owing to the financing structure of a company. A further common differentiation is whether taxes are included in the analysis. Besides, EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization) adds back depreciation and amortization thereby cancelling out the effects of different asset bases and depreciation allowances. These income concepts can be related to several determinants to calculate different profitability ratios. The most common concepts are Return on Assets (ROA), Return on Equity (ROE) and Return on Sales (ROS). All of them have a specific perspective, can be applied with numerous variations and can be related to different benchmark values and business risk measures.

We measure profitability with the variable “net income” - usually the last line¹³ in an income statement of a non-financial corporation - in terms of total assets. The denominator was chosen as in the NWaR analysis in section 4 we apply this profitability variable to the equity capitalization measured also in terms of total assets. As we use individual financial statements, part of this income might be distributed to mother companies if the entity belongs to a group.¹⁴

¹¹ See also section 2.3 on coverage and national data sources as well as section 3.5.

¹² See also the detailed discussions in Delbreil et al. (1997, 2000).

¹³ In German income statements, profit distribution and loss transfers from subsidiaries to mother companies are often included in the income statement despite being rather an allocation of net income. We add back these transfers in the accounts of the subsidiary to represent the financial value creation of the daughter companies.

¹⁴ Our main indicator for profitability should not necessarily be interpreted as "Return on Assets" since interest expense is not added back to net income in the numerator, which is often done in financial statements analysis.

Equity capitalization

Originating from the third study we use “net worth” and additionally equity capitalization as main terms for the provision of shareholders’ capital to the companies (relating to total assets).¹⁵ This term originates from the idea of determining the amount by which assets exceed liabilities. As “total assets” balance in financial statements with “total liabilities and shareholders’ equity”, shareholders’ equity (or simply equity) is equal to net worth. In detail, it is calculated using the book value of the following variables of our databases:¹⁶

Net worth	+ Share issues + Revaluation reserves + Retained earnings + Net profit or loss for the financial year + Special tax based reserves - Subscribed capital uncalled (or unpaid) - Intangible fixed assets
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For assessing equity capitalization as a percentage of total capital provision to a company, we divide net worth by total assets.

Total assets

Total assets, used in the denominator of our ratios, are defined according to the adjustments made for equity:

Total assets (adjusted)	= Total assets (as reported in the balance sheet) - Subscribed capital uncalled (or unpaid) - Bond redemption premium - Intangible fixed assets - Investment grants + Trade bills discounted ¹⁷
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Net Worth at Risk (NWAR)

The concept of Net Worth at Risk (NWAR) was introduced by the Study Group of the ECCBSO with its third study in 2005.¹⁸ NWaR is defined as the share of cumulative losses (as a percentage of total assets) that companies may have to face, with a certain level of

¹⁵ Further names for equity capitalization are used in the literature, such as capital, financial independence or own funds with modifications of these terms. Sometimes, the legal requirements to achieve a certain equity ratio are referred to as “solvability” (while equity itself has a detailed definition). See also the definitions of net worth and own funds in the European system of accounts, ESA 1995, 7.01 and 7.05.

¹⁶ See, for an extensive discussion of this definition, Delbreil et al. (1997), pp 20-23.

¹⁷ If information on trade bills discounted is available. In Spain and Portugal, the accounting method does not allow for the elimination of this item in the balance sheet. See for more details Delbreil et al. (1997), p 26.

¹⁸ See for more details Delbreil et al. (2005). See also Mouriaux and Foulcher-Darwish (2006).

confidence, calculated over a given period of time. Two NwaR approaches are used: on the one hand potential losses in a strong two-year economic downturn (conditional NwaR), on the other hand potential losses in two subsequent years independent of the phase of the business cycle (unconditional NwaR). NwaR is therefore a concept for measuring risk in a macroeconomic perspective.¹⁹ It also serves as a benchmark of minimum capital required in a given sector-size class enabling companies to absorb losses that might potentially arise.²⁰

NwaR figures are calculated in several steps.²¹ Eg conditional NwaR 90% is computed as follows:

1. For each company cumulative two-year net income figures in terms of total assets are calculated.²²
2. From the resulting two-year net income distributions in each sector-size combination, the 10th percentile is chosen, resulting in a time series of overlapping two-year values (generally 1987/88-2009/10). With the choice of only low percentiles (mainly) negative values result normally, these time series are consequently labeled Two-year Losses 90%.
3. The time series of Two-year Losses 90% is used to identify NwaR: the minimum level is chosen for (conditional) NwaR 90%.

For unconditional NwaR 90%, the mean of the last eight overlapping years (2002/03 – 2009/10) is used in step 3 above. The differentiation of conditional and unconditional NwaR can be used as a way to assess the impact of recessions on the income distribution.

We present altogether three confidence levels of NwaR: 95%, 90% and 80%. The first two represent rather worst-case scenarios (although with low probability) as the respective loss potential should be considered as high. The 80% confidence level, however, displays a rather moderate loss scenario.²³ For some countries' unconditional figures, even positive values emerge in several sector-size combinations. As a "positive" loss scenario (i.e. NwaR) is unfeasible for our analysis, these figures are excluded.²⁴

¹⁹ See also section 2.2.4 for a broader discussion of the NwaR concept. A related analysis was introduced by the German institution for business information service, Creditreform Wirtschaftsforum, which analysed how many companies have a ratio of total liabilities to total assets greater than 0.9 and are therefore in danger of over-indebtedness, a cause for insolvency. The results are generally in line with the German data presented in this study. See Creditreform Wirtschaftsforschung (2012), p. 28.

²⁰ The group also examined the possibility to extend the concept of NwaR to Cash Flow at Risk (CFaR), measuring the two-year cumulative impact of a crisis on cash flows from operations. However, due to data restrictions in some institutions, cash flows for a two-year period could only be estimated by adding back depreciation to the net income figures. Due to this data limitation, CFaR did not differ significantly from the NwaR figures and thus revealed no further insights.

²¹ See also section 2.2.3.

²² The sum of net income in period t and $t+1$ is divided by total assets in period t .

²³ As the location parameter is often close to the threshold zero (no profit, no loss).

²⁴ For the French small, medium-sized and large class in construction, this is even the case for the 90% confidence level.

With a given NWA_R figure the ratio “Percentage of Companies with Net Worth below NWA_R” is computed. This ratio displays how well a sector is generally endowed with equity to cope with the NWA_R loss scenario. It may be seen as an indicator of sector-size risk with regard to the key function of equity to absorb losses. The ratio “Percentage of Companies with Net Worth below conditional NWA_R” is calculated as a time series, as conditional NWA_R represents a worst-case scenario independent of time. However, as unconditional NWA_R values are calculated as the average of the last eight available years, the ratio “Percentage of Companies with Net Worth below unconditional NWA_R” is only presented for the year 2009 and 2010.²⁵

2.2.2 Basic statistical measures and visualization

The distributions of net income and net worth displayed in section 3 (both as a percentage of total assets) of the 12 sector-size combinations are analyzed with the 1st decile, 1st quartile, median (or 2nd quartile), 3rd quartile and 9th decile. As the resulting figures are quite numerous for six countries, we visualize these percentiles with Box-Whisker-Plots. We abstain from further distributional measures (in particular, the simple average) as this would imply an extensive identification process of extreme values difficult to harmonize within the samples over six countries.²⁶

A percentile approach is also used for the two-year losses in section 4.1, which are the bases for NWA_R figures. They indicate the 5th, 10th and 20th percentiles of the two-year net income in terms of total assets (see also section 2.2.1 on the NWA_R variable). However, we change the percentage indicators to 95%, 90% and 80% (100% minus x) in order to follow the usual VaR terminology and to emphasize the loss perspective.

2.2.3 Conceptual considerations on the Net Worth at Risk methodology

NWA_R is derived from the concept of Value at Risk (VaR), although it should be emphasized that both concepts are computed following different assumptions. VaR is calculated for a specific portfolio on the basis of the past variations of that single portfolio. One basic assumption is that past variations of the portfolio will apply to it in the future.

NWA_R for a specific company, on the other hand, is not computed. Instead, NWA_R is computed for specific sector-size combinations on the basis of the past losses of companies at the end of the profit and loss distribution. The NWA_R methodology assumes, therefore, that the losses that have to be borne (as a minimum) by a certain percentage of companies can happen to the rest of the companies with a certain probability. This assumption - losses of companies at the tail of the distribution might apply to every individual company, as well to

²⁵ Unconditional NWA_R could therefore be regarded as a recent picture of losses in a complete business cycle. In this respect the group decided not to apply these recent values to historical data. 2009 figures are computed as data for some sector-size combinations are not complete in 2010.

²⁶ Additionally, the NWA_R approach also focuses on percentiles. See box “Applying Extreme Value Theory to the Concept of Net Worth at Risk” in section 4.2.

well-performing companies - is debatable as companies can be seen, at least to some extent, as being independent of one another. There are a lot of companies which have not faced losses for a long time, even during economic downturns. Further, there are companies which are highly indebted (ie which have low net worth) but generate recurrent/stable profits, etc.²⁷

For this reason, it is important to keep in mind that the NWaR approach was developed from a macroeconomic perspective and not for the microeconomic assessment of individual companies.²⁸ As an accounting application of VaR, it is aimed at stress-testing of complete sectors within certain size classifications. The objective is not to obtain a company-specific risk parameter. Consequently, NWaR should be seen only as a country/sector/size-specific description of the magnitude of potential losses. Within the constraints stated above, different NWaR values might portray different risks for a sector-size perspective, but NWaR is not representative of the risk of individual companies.

The NWaR approach investigates the risk of potential losses and its impact on equity in a unique way. However, companies face additional (and correlated) risks in their operations, such as problems of liquidity, supply changes in output and input markets, restricted access to financial resources (among bank loans or trade credits), management quality or, generally, the stability of the financial and monetary system or the economic environment.²⁹ Hence, it is important to keep in mind that historical information on a given sector in a given country does not provide all the relevant information in order to assess potential risks for companies in a forward looking perspective. Structural changes, such as long-term shifts in banking regulation and financing conditions, are not taken into account when carrying out a risk assessment on the basis of the NWaR measure.

Summing up, NWaR analyses the loss side of the income distribution at three different levels in a unique way for the investigation of different sectors or sub-groups thereof. NWaR additionally combines this perspective on losses with the equity capitalization, in particular as one of the key functions of equity is the absorption of losses.

2.3 Coverage and data sources

Coverage

Since the data samples used in this study are – apart from the Italian sample – very similar to the ones on which the statistical aggregates in the BACH database are based, we report

²⁷ An alternative would be to use the past figures of each company to calculate individual NWaR values for each company. Thereupon statistical measures could be computed describing the situation in each sector-size combination. However, CBSOs lack long-term historical data for a lot of companies, which makes this alternative impractical.

²⁸ Clearly the probability of incurring a loss of the amount of NWaR for a company posting good profits for many years is below the probability of the respective NWaR level (at 95%, 90% or 80%). NWaR, rather, assumes that the percentiles taken from the distribution represent a probability of an average loss for a specific sector-size combination.

²⁹ Naturally, these factors are interdependent.

coverage rates of the samples from there. These coverage rates in terms of number of firms as well as sales differ substantially between the countries (see Table 1). This is not surprising if the country-specific data collection and processing procedures are taken into account (see the following sub-sections on data sources). By far the highest coverage rates approaching 100% can therefore be observed for Belgium and Portugal, but also, to a lesser extent, for Italy, implying that these data samples more or less contain the total population of companies. In contrast, Germany shows much lower coverage rates in terms of number of firms, while the corresponding figure in terms of sales is rather high in manufacturing. This discrepancy between the two rates points to an overrepresentation of larger firms in these samples. To a lesser extent, this is also valid for French manufacturing firms. The discrepancies between the coverage rates by number of firms and sales are prevalent in the construction and trade sectors for France and Germany. In contrast, the Spanish sample has considerably larger coverage rates in terms of number of firms.

TABLE 1 Coverage rates by country and sector

	Manufacturing		Construction		Trade	
	Coverage rate [%] in terms of ...					
	... firms	... sales	... firms	... sales	... firms	... sales
Belgium	97.2	n/a	96.1	n/a	96.4	n/a
France	47.4	80.8	30.5	77.2	36.3	81.0
Germany	15.2	88.7	5.1	37.1	9.4	74.0
Italy	85.7	98.1	64.6	93.1	83.2	98.2
Portugal	92.7	98.4	90.7	95.9	91.6	97.0
Spain	41.1	49.4	31.0	39.0	37.6	48.2

Source: BACH database (financial year 2008, figures reported for total sample ie without size differentiation) and own calculations.

Table 2 describes the importance of the three branches in each country based on Eurostat data. In 2010, the cumulative share of value added was between 27.8% (France) and 36.5% (Spain) in terms of national GDP. In all countries, the importance of manufacturing has been declining over recent years following the long-term deindustrialization trend faced by developed economies. In 2010, the share of manufacturing ranged from 11.5% (France) to 19.8% (Germany). By contrast, the importance of trade remained quite stable and ranged from 10.2% (Germany) to 13.9% (Portugal, only 2009 available). Finally, the situation of construction is more dispersed: in 2010, the share of the sector ranged from 3.7% in Germany to 11.7% in Spain, whereas the share of construction declined by 2 percentage points (the share remained relatively stable in Belgium, Germany, France and Italy). Despite this, the difference of 5 percentage points compared with the next runner-up is quite remarkable.

TABLE 2 Share of the analyzed sectors in the countries' GDP
(Percentage of total value added, in volume)

	2005	2010 ⁽¹⁾	Difference 2010-2005
Belgium			
Manufacturing industry	15.9%	13.7%	-2.2%
Construction	5.1%	5.3%	0.2%
Trade	13.0%	13.5%	0.4%
France			
Manufacturing industry	12.6%	11.5%	-1.1%
Construction	5.6%	5.1%	-0.5%
Trade	11.1%	11.2%	0.1%
Germany			
Manufacturing industry	22.0%	19.8%	-2.3%
Construction	4.1%	3.7%	-0.4%
Trade	10.4%	10.2%	-0.1%
Italy			
Manufacturing industry	17.8%	16.5%	-1.3%
Construction	6.2%	5.5%	-0.7%
Trade	11.5%	10.9%	-0.6%
Portugal			
Manufacturing industry	14.6%	13.2%	-1.4%
Construction	7.5%	6.1%	-1.3%
Trade	14.0%	13.9%	0.0%
Spain			
Manufacturing industry	15.3%	12.7%	-2.6%
Construction	13.6%	11.7%	-1.9%
Trade	11.3%	12.1%	0.8%

Source: Eurostat. - (1) Except for Portugal (2009).

Belgium

The Belgian CBSO was created in 1978 within the National Bank of Belgium. Almost all the companies incorporated under Belgian law have to publish their annual accounts and, if appropriate, their group consolidated accounts. Nearly all financial statements are now filed on-line, and they can be consulted free of charge on the Bank's website. For the financial year 2010, more than 320,000 accounts were filed by non-financial companies. Most companies have to draw up their accounts according to one of the two standardized presentations described in the law. Large companies are obliged to use the full presentation, while other companies can opt for the abbreviated presentation. More than 90% of the accounts are filed under the latter³⁰.

³⁰ For more information, see the [Belgian CBSO website](#). A recent analysis of the Belgian annual accounts can be found in Vivet (2012).

Germany

The main data source of the statistical part of the CBSO of the Bundesbank is the Financial Statements Data Pool. Starting with the financial year 1997, the pool is a voluntary facility of the Bundesbank in cooperation with institutions of the banking industry as well as other institutions with extensive financial statements data of non-financial corporations. The purpose of this facility is to bring together – in an anonymized form – the data of the institutions. In addition, the data pool is supplemented by financial statements which the Bundesbank obtains in connection with its refinancing operations as well as publicly accessible data from credit rating agencies. For the financial years prior to 1997, the financial statements submitted in the context of refinancing operations are the sole source of data for evaluations. The Financial Statements Data Pool gives the Bundesbank access to over 100,000 financial statements of German companies per year for its evaluations. Measured in terms of turnover from the Federal Statistical Office's turnover tax statistics, the corporations recorded in the data pool represent about two-thirds of the business activity of German firms outside the financial sector.³¹

Spain

The CBSO of Banco de España collects annual accounts from two data sources. Starting in 1983, CBSO collects information from a sample of enterprises that collaborate on a voluntary basis (CBA). Since 1990, it has also processed annual series obtained from the Mercantile Registries (CBB/RM). The information used for this study includes data from both CBA and CBB/RM.

CBA contains medium-sized and large companies operating mainly in the industrial and service sectors. The enterprises included in the data set cover a significant portion of economic activity (above 30% of the Gross Value Added of the non-financial corporation sector). The sample is not statistical and is biased to large companies. The level of detail of the information of this source is quite high and there is a direct contact with the companies in their filtered process.

Since 1990, Spanish companies have been obliged to deposit their annual accounts in the Mercantile Registers (CBB/RM). This has led to collaboration between Banco de España and the Mercantile Registries in order to facilitate the statistical use of the annual accounts. The level of detail and the quality of the accounting information in the CBB/RM are not as high as in the CBA. Consequently, all the accounting statements are automatically filtered, without contacting the enterprises, and eventually only those reporting fully consistent data are considered. For example, in 2008, out of an initial total of 790,000 enterprises, 602,000 were in-

³¹

In contrast to the three previous studies, companies from the new federal states in the East of Germany have been included in the German sample for this research. For more information, see the [website for the Bundesbank's Corporate financial statements statistics](#).

cluded in the statistics (approximately 16% of non-financial corporations' gross value added). This sample is not statistical either and is biased to micro and small companies.³²

France

The main data source for the Banque de France is the FIBEN Companies Database (*Fichier Bancaire des Entreprises*) which, besides a selected set of financial statements data transmitted by the companies themselves, collects information from a variety of other sources, including journals of legal notices, registrars of commercial courts, France's national statistical office (INSEE) and credit institutions. It was originally set up to facilitate the implementation of monetary policy, but is now used for other purposes as well, such as banking supervision, individual diagnosis, risk assessment of company failure, as well as for portfolio and other analysis.

The FIBEN database includes legal entities and natural persons which are domiciled or have registered offices in France. A broad range of information is gathered, including *inter alia*:

- balance sheets and profit-and-loss accounts, for companies with a turnover of at least €0.75 million or companies with bank loans of at least €0.38 million;
- companies with bank loans over €25,000, requiring disclosure to the Bank's central credit register;
- information on businesses' bill payment incidents or on the personal situation of their senior managers;
- legal information pertaining to judgments handed down by a commercial or a civil court ruling over a commercial case;
- companies with economic and financial ties to legal entities or sole traders;
- *de jure* managers of the companies;
- descriptive details, such as the firm's name, legal status and NACE business code, the address of its registered offices, a list of managers and partners, details of equity ownership, etc.³³

Italy

Although it is not a central bank, Centrale dei Bilanci (CeBi) was one of the founding members of the ECCBSO. As a private company, Centrale dei Bilanci focused on providing financial information on Italian firms to their owners, the Banca d'Italia and other commercial banks. In 2009, Centrale dei Bilanci was merged in several steps into Cerved Group spa; which is now a private company independent of its former owners. Centrale dei Bilanci, as an

³² For more information see the [CBSO website of Banco de España](#).

³³ For more information see the [FIBEN website of Banque de France](#).

affiliate of this group, continues to work on its traditional fields, providing financial information and credit risk diagnosis for Banca d'Italia and other Italian commercial banks.

The Italian database of accounting data on an individual basis used for this study includes two different sources:

1. CeBi database: this consists of over 45,000 companies' financial statements p.a. which are collected in cooperation with the branches of associated banks. The dataset is available from 1982 onwards. Since 1996, the database has been partially (approximately 50%) updated by Cerved Database. This sample is not representative from a statistical point of view, because it includes mostly larger Italian corporations (also collected with more details). The coverage for medium-sized and small companies is lower.
2. Cerved database: this includes from 1993 financial statements deposited each year at the Chamber of Commerce by all Italian corporations (in 2010 more than 900,000 firms).

The numbers of companies has increased since 1993 because of the improvement in the quality of accounting documents deposited. For the years at the end of the time frame of this study, it basically represents the total population of the corporations. Therefore, a breakdown in the time series in 1993 is observable, particularly for micro and small companies.³⁴

Portugal

The Central Balance-Sheet Database (CBSD) of Banco de Portugal stores economic and financial data of Portuguese non-financial corporations based on corporate accounting data on an individual basis. Up to 2004³⁵ the information was collected through an annual survey (replied on voluntary basis) and had data for around 17,500 companies per year, which corresponds to approximately 5% of the total number of non-financial corporations, 36% of the total number of employees and nearly 60% of the gross value added of non-financial corporations.

Annual data for 2005 onwards have been gathered through an innovative reporting system called "IES" – Informação Empresarial Simplificada (Simplified Corporate Information). IES is the electronic submission of information of an accounting, fiscal or statistical nature that companies usually have to submit to the Ministry of Justice, the Ministry of Finance, the Statistics Portugal (INE) and the Banco de Portugal. IES allows companies to fulfill four obligations, alongside four public entities, through one sole electronic submission and at a single moment in time. Almost all non-financial corporations are covered by the CBSD, with more than 300,000 corporations per year.³⁶

³⁴ For more information, see the [website of Centrale dei Bilanci](#).

³⁵ The CBSD started in 1983 and was successively enlarged. Since 1999 all sectors of economic activity have been covered (except financial activities, general government, households and extra-territorial organizations).

³⁶ For more information see the [CBSD website of Banco de Portugal](#).

3 Profitability and Equity Capitalization

3.1 Profitability: Impact of the crisis, general characteristics and long-term developments³⁷

Impact of the crisis

As the financial crisis spread from 2008 onwards to the European real economies, most non-financial companies in manufacturing, construction and trade were strongly affected and suffered a slowdown in their profitability. This can be observed immediately in the figures 3.1 to 3.3 in which net income ratios (net income as a percentage of total assets) of Belgian, German, Spanish, French, Italian and Portuguese corporations are presented. All Box-Whisker-Plots fall significantly in the crisis years. Nevertheless, there were differences in the strength and in the timing of the effects of the crisis across countries and across sectors which will be described in this section.³⁸

In the manufacturing sector, the downward pressure on profitability is clearly visible not only for the median, but also for the other four percentiles examined in this paper. As early as 2008 or in 2009 at the latest, the first quartile fell close to or below zero for the vast majority of all size classes in the six countries. That implies that roughly a quarter of the companies (or more) made losses over at least one of these two years. However, there is a difference in timing across countries. In Belgium, Spain, Italy and Portugal, the medium-sized companies suffered a drop in their profitability as early as from 2008 (see figure 3.2). The whole distribution in these countries also showed a clear downward trend. Nevertheless, the fall was higher, in particular for the 10% of firms with the worst ratio (ie the lower whiskers). This suggests that the percentage of companies facing high losses strongly increased in 2008. For these countries, 10% of the manufacturing medium-sized entities had a ratio of net income to total assets at most equal to -5%.

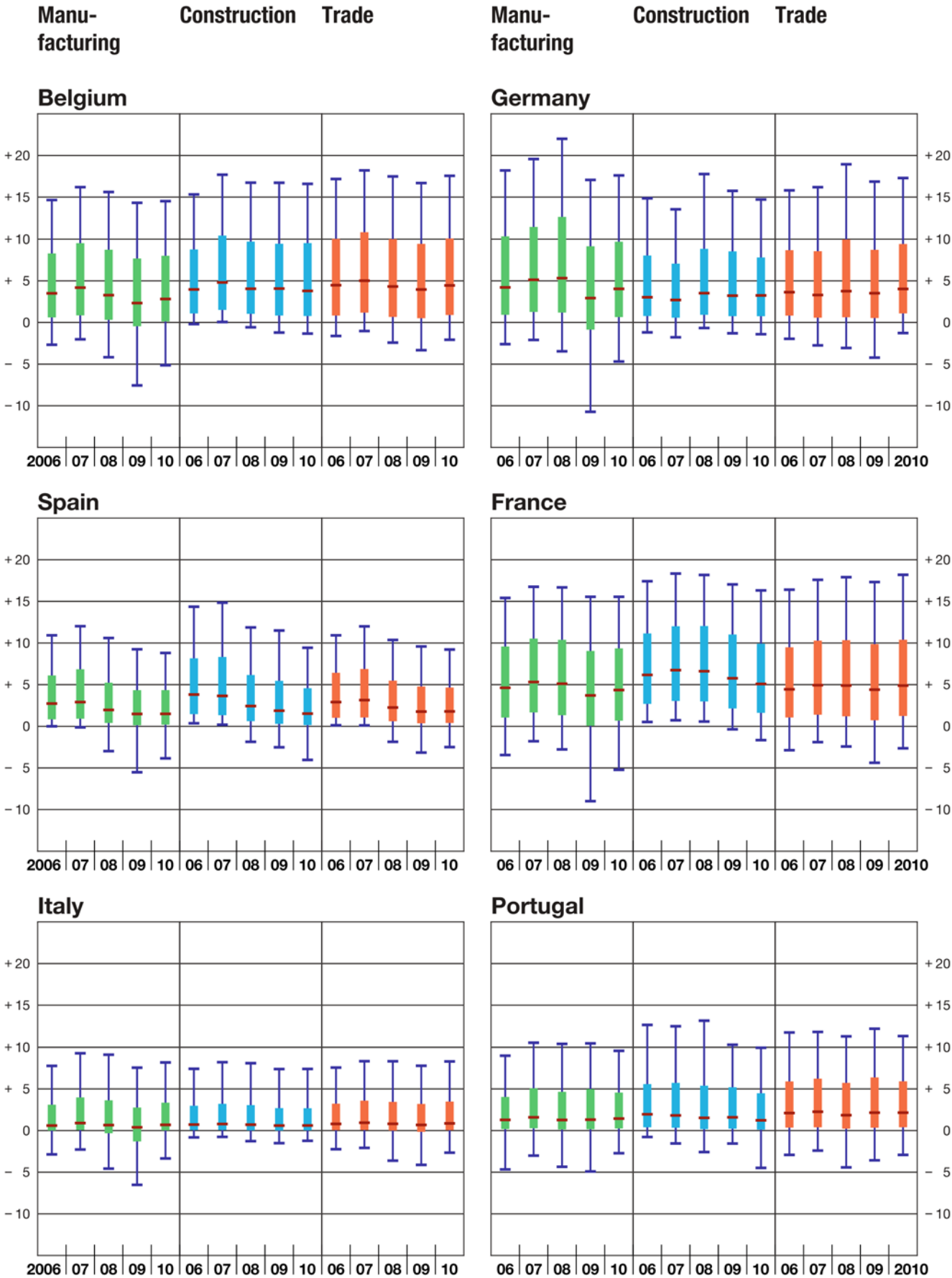
³⁷ Micro entities are excluded from the investigations in section 3.1 to 3.4 unless explicitly stated. Consequently, references to "all size classes" in these sections refer only to small, medium-sized and large entities. See also section 2.1.

³⁸ Békés, Halpern, Koren and Muraközy (2011) find similar significant heterogeneity across countries and firms in the manufacturing sector by means of a survey.

Net Income in % of Total Assets

Small size entities

Figure 3.1



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

The economic crisis hit French and German manufacturing medium-sized entities as well, but impacts on the profitability ratios are visible only from 2009 on. German manufacturing companies suffered the largest decline compared to the other countries (which is consistent to some extent with higher dispersion seen for German manufacturers, see below). However, the 90th percentile of the companies with the highest ratio, despite the fall, still registered a higher ratio than in the other countries' manufacturing companies. This assessment is verified for all German manufacturers' size classes.

Construction is also a key sector to evaluate within the non-financial entities, as it generally has a significant share of value added and employment and is, at the same time, generally sensitive to the business cycle. With regard to the impact of this economic crisis, however, the situation of the construction sector is more contrasted. Whereas it faced the bursting of a bubble noticeably in Spain – for example the median of net income as a percentage of total assets dropped by 2½ percentage points for large Spanish construction entities between 2006 and 2010 - it proved rather resilient in other countries thanks to governmental supporting measures (in Belgium and Germany, for instance). Taking medium-sized firms as an example, the decline in profitability in this sector for the median was, at 1 percentage point or even lower, less accentuated in Belgium, France, Italy and Portugal. In Germany, most medium-sized firms in this sector did not even seem to be concerned as governmental growth-stimulating packages were supporting this sector rather strongly. In particular, large German construction entities experienced a sharp increase in their profitability. At the very opposite extreme, Spanish construction companies were strongly affected by the recession in all size classes: the profitability distribution has been gradually shifted downwards since 2007 (except for the higher whisker which started to fall only from 2008 on).

In the trade sector, the economic crisis is clearly visible in Belgium and Spain. In Germany, large firms were more affected. Here, the sector composition might have been much more geared towards large wholesale companies, for which the economic crisis hit much harder in Germany than in the other two subsectors retail trade and trade of motor vehicles. For the other size classes as well as the three remaining countries (France, Italy and Portugal), the crisis is less visible. Only the lower whiskers have been more sensitive: an obvious decrease in this percentile shows up for all sizes of firms in these countries.

Net Income in % of Total Assets

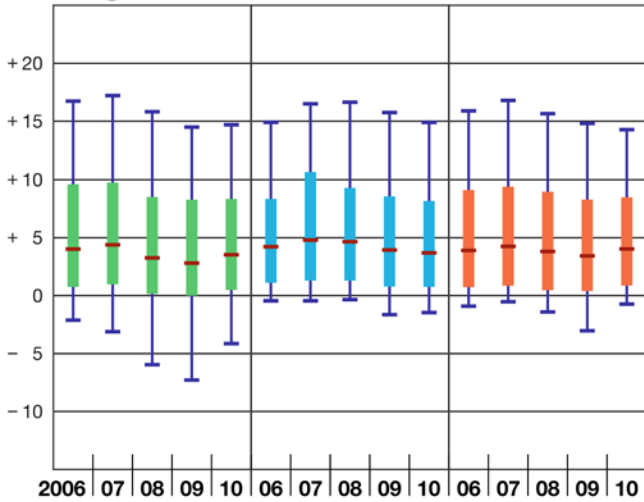
Medium size entities

Figure 3.2

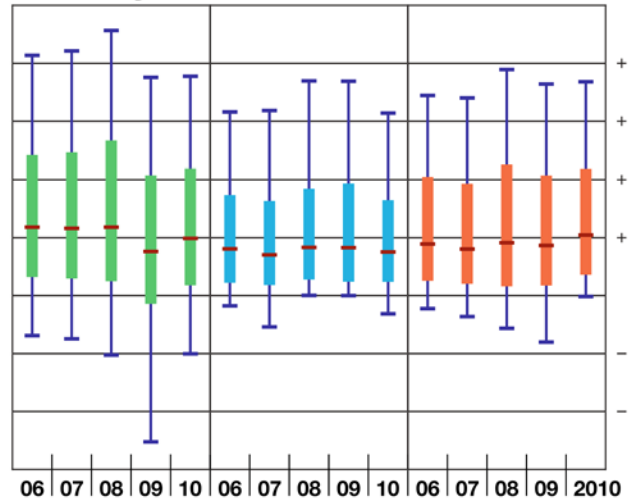
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Manu-
facturing Construction Trade

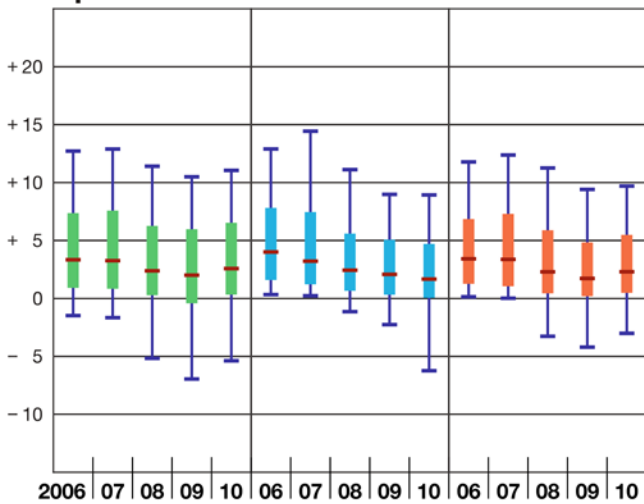
Belgium



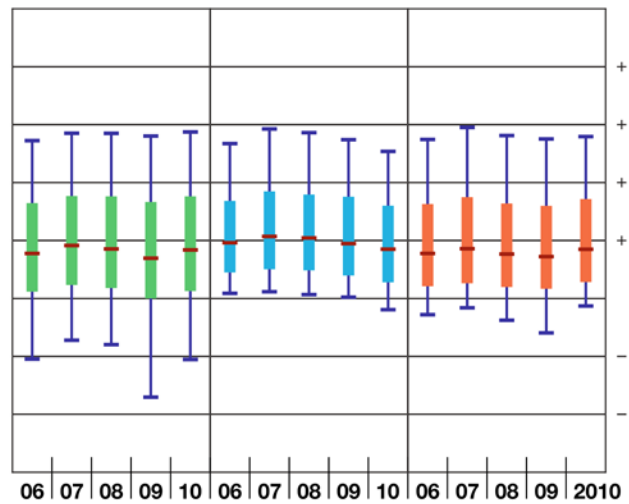
Germany



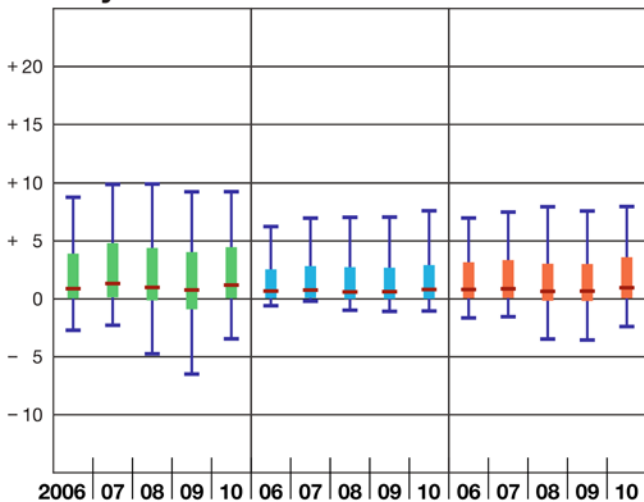
Spain



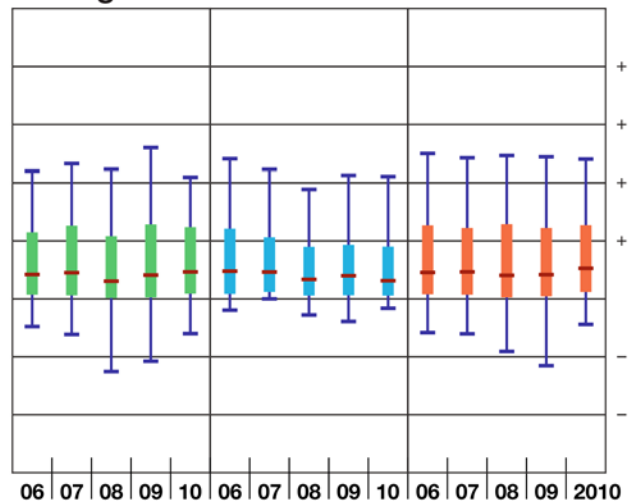
France



Italy



Portugal



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Finally, the very low of the crisis period was overcome as early as from 2010 in the manufacturing and trade sectors, helped by the recovery in international demand. In each country, there is a more or less concrete improvement in the distribution of medium-sized firms of these sectors. However, pre-crisis levels could not be attained in several cases. This outcome is also clearly noticeable for large firms and somewhat visible in the case of small firms. However, the figures from the construction sector make clear that the crisis was still prevalent in most of the countries during 2010. In Belgium, Spain, France and Portugal, most strata of the distributions continued to fall for all size class, or at least there were no improvements in these countries. In Italy, the levels remained stable but with a strong advance for large, higher profitable firms (3rd quartile and 9th decile). Medium-sized construction companies in Germany were unable to sustain their improvements from government packages during the crisis as the distribution falls. Yet, the upward trend for large firms continued in 2010 and the small-sized construction entities' distribution were quite stable for Germany, so that altogether this sector experienced an improvement of one-tenth in its annual results.³⁹

Dispersion differs more between countries than between sector-size combination

Analyzing the dispersion with inter-quartile and inter-decile ranges, significant differences across countries are observable. Two countries particularly stand out from the others: in Italy, the dispersion is the lowest and, at the opposite end, Germany has very broad distributions. This observation applies to all sector-size combinations. In the case of the Italian construction sector, this can be explained by the large number of cooperatives. These are often non-profit-maximizing in comparison to corporations, which leads to a lower dispersion of profitability, less than 10 percentage points for inter-decile ranges. The lower dispersion in Italy can further be explained by breaking down the ratio into the components "Net Income/Turnover" and "Turnover/Net Assets". In Italy, the latter ratio is lower than in other countries, due to different asset composition, as Italian firms are characterized by higher inventories and longer delays in collection and in payments.⁴⁰

In contrast, large German manufacturing companies had an inter-decile range over 30 percentage points in 2009. Before that crisis year, this dispersion measure is still slightly over 25 percentage points. For the other countries, the range does not generally exceed 20 percentage points (this result applies to all size firms). Except for the crisis years, there are no major variations noticeable in the inter-decile distance over time. In the crisis years 2008-09, applicable to most country-sector-size combinations, the distribution broadens to some extent but tends to shrink again in 2010.

³⁹ See Deutsche Bundesbank (2011), page 35.

⁴⁰ The reason can be found in the different organization of production processes, different institutional competition and market characteristics. See Conti/ Varetto (2004), in which the Italian model of corporate finance is explained displaying differences in the composition of the total assets among Italy, Germany and France considering the BACH database. This can also explain lower levels of profitability.

Net Income in % of Total Assets

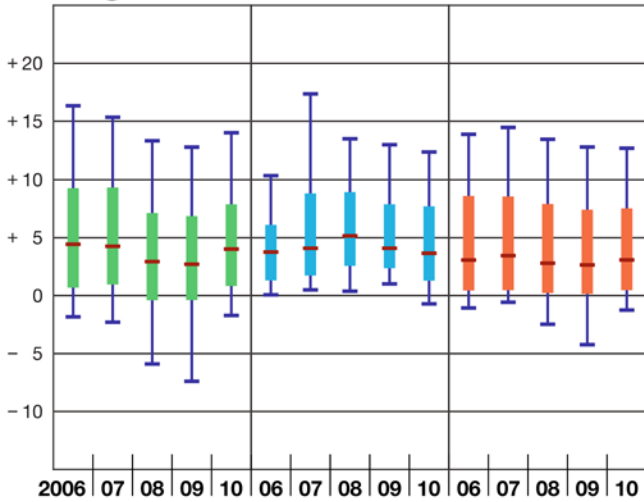
Large size entities

Figure 3.3

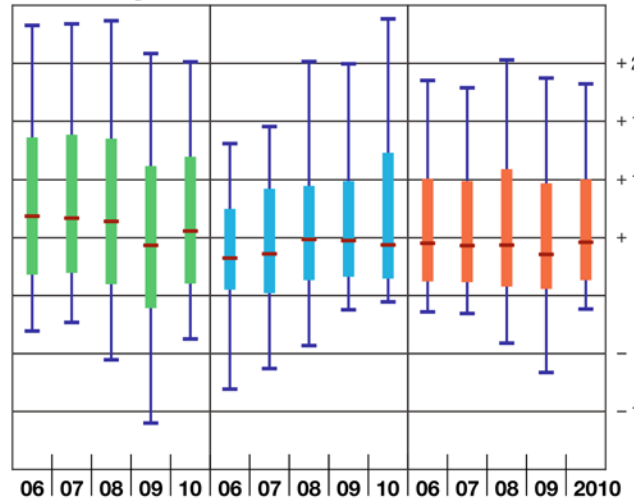
Manu-
facturing Construction Trade

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facturing Construction Trade

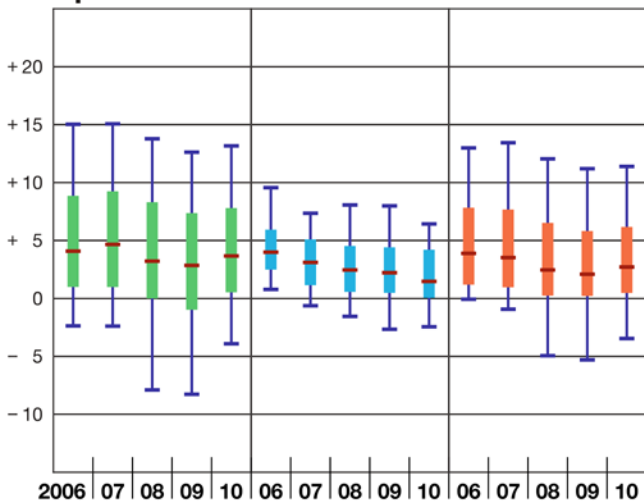
Belgium



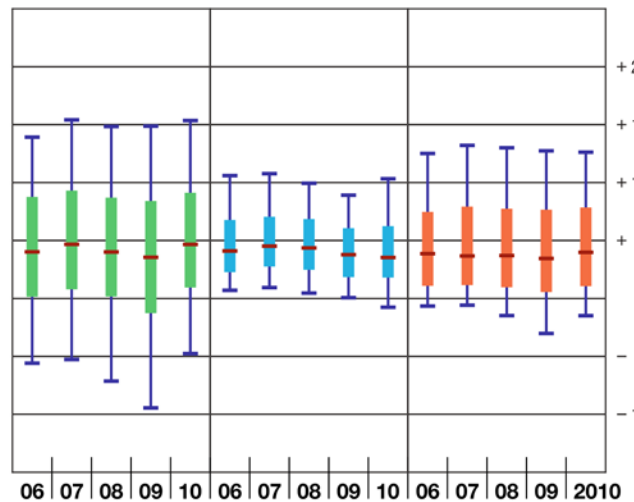
Germany



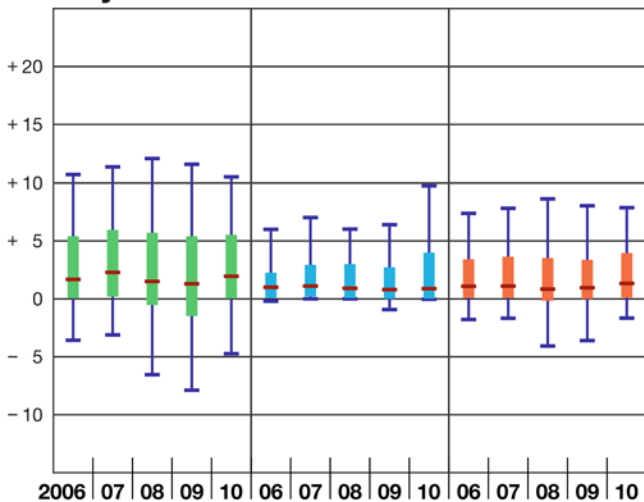
Spain



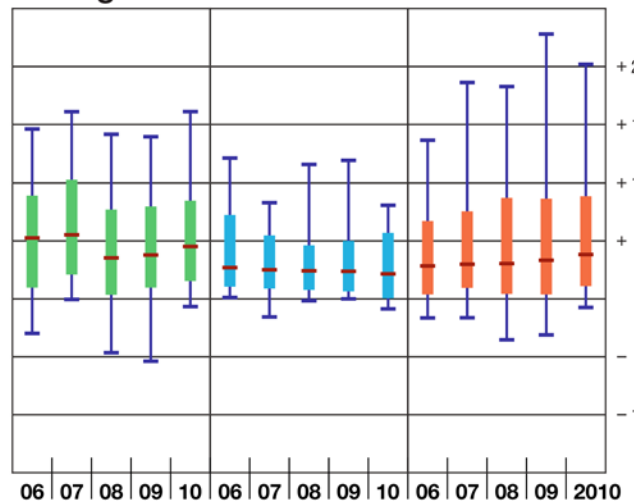
France



Italy



Portugal



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

For sectoral comparison, the dispersion of small- and medium-sized firms in manufacturing, measured with inter-deciles ranges, has been higher than in the other two sectors. From inter-quartile ranges lower dispersion is perceptible in construction. This may be due to lower product diversity and higher competition in this sector.

Differences in levels of profitability

Comparing levels across countries, two groups can be formed with Belgium, Germany and France having higher profitability levels than Italy, Spain and Portugal. Median levels are clearly smallest in Italy (between 0.6% and 1.8%), followed by Spain and Portugal (generally around 2.5%), while Belgium, Germany and France generally have median levels close to 5%. A similar order can be observed for the other percentiles under analysis across size classes and sectors. Differences in the percentiles are observable in the crisis years 2008-09, the ones of weaker companies (1st decile and 1st quartile) were hit more strongly by the crisis than the ones of more profitable companies, and the percentiles of large companies reacted more sensitively to changes in GDP (for more details, see next section).

In terms of differences in levels between sectors, a distinct order cannot be determined as national peculiarities are present. Though in the lower part of the distributions, the construction and trade sector are by and large more profitable.

3.2 Relation between the economic cycle and percentiles of profitability

As can be seen from the description in the last section, the economic cycle influences the whole distribution of profitability: figures 3.1 to 3.3 as well as the profitability figures in the annex show that, for a majority of country/sector/size combinations, both the most and the least profitable strata of the population are affected by the economic climate. Favorable periods coincide with an upward shift of the entire distribution, whereas downturns coincide with a downward movement. It is also visible that the two recession periods (early 1990s, 2008-2009) and their subsequent recoveries often led to larger variations at the lower extremity of the distribution, especially in manufacturing and trade. This suggests that the lower extremity is more sensitive to the cycle.

In order to investigate this point in a systematic way, correlation coefficients between percentiles of net income in terms of total assets and national GDP year-on-year growth rates were calculated.⁴¹ This analysis first shows that, in most cases, the correlation between the various percentiles and GDP growth is positive. This outcome corresponds to intuition since it means that when the economic climate improves, profitability improves too. Second, the correlation is at its highest at the lower end of the distribution (10th and 25th percentile), and it decreases as long as we move to the upper end (75th and 90th percentile), where, in some

⁴¹ Depending on the countries' data availability, correlations were computed on different time periods.

cases, it even reaches negative values. Figure 3.4 illustrates these results for Belgian and Portuguese firms.

Since, strictly speaking, the correlation coefficient measures the degree of linear association between two variables, regressions were also tested between GDP growth rate ($=X$) and the various profitability percentiles ($=Y$). Those simple regressions showed that

- Estimated coefficients tend to be higher and more significant for the lower percentiles, and to decline as long as we move to the upper percentiles.
- R^2 s decrease when moving from the lower percentiles to the upper percentiles. This means that the change in GDP growth explains a higher proportion of the change in profitability at the lower end of the distribution.

Thus, in the context of these simple regressions, the relation between profitability and GDP is steeper and more significant for the lower percentiles than for the higher percentiles.

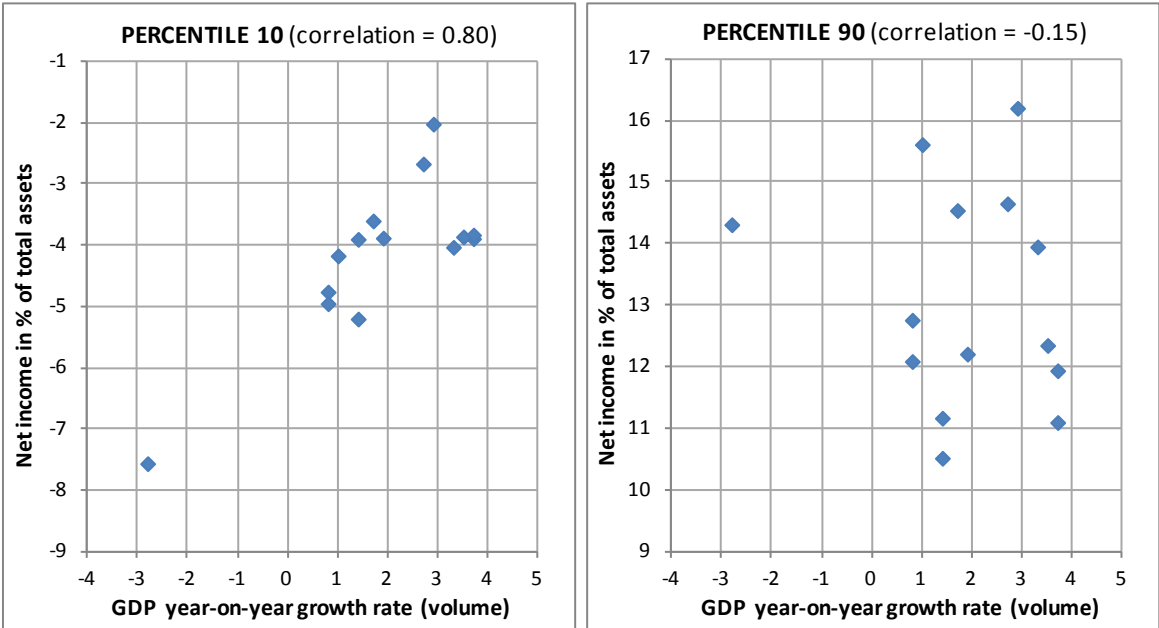
These results can be interpreted in another way. Indeed, a decrease in the 10th percentile can be seen as an increase in the percentage of companies with a low profitability: for instance, if the 10th percentile moves from -10% to -15%, the proportion of companies with profitability below -10% automatically increases. In the same way, a decrease in the 90th percentile can be seen as a decrease in the proportion of firms with a high profitability. According to this interpretation, the aforementioned regressions show that the share of firms with a low profitability is more reactive to a change in GDP growth than the proportion of firms with a high profitability.

These analyses have also been carried out using sectoral figures of value added growth rather than national ones. In most cases, correlations are higher (independently of the percentile chosen), but, at the same time, the decrease in correlation from the 10th percentile to the 90th percentile was of a lower magnitude. In any case, these results strongly confirm the interest of studying different strata of the population.

Figure 3.4: Scatter Plots between Profitability Percentiles and GDP Growth

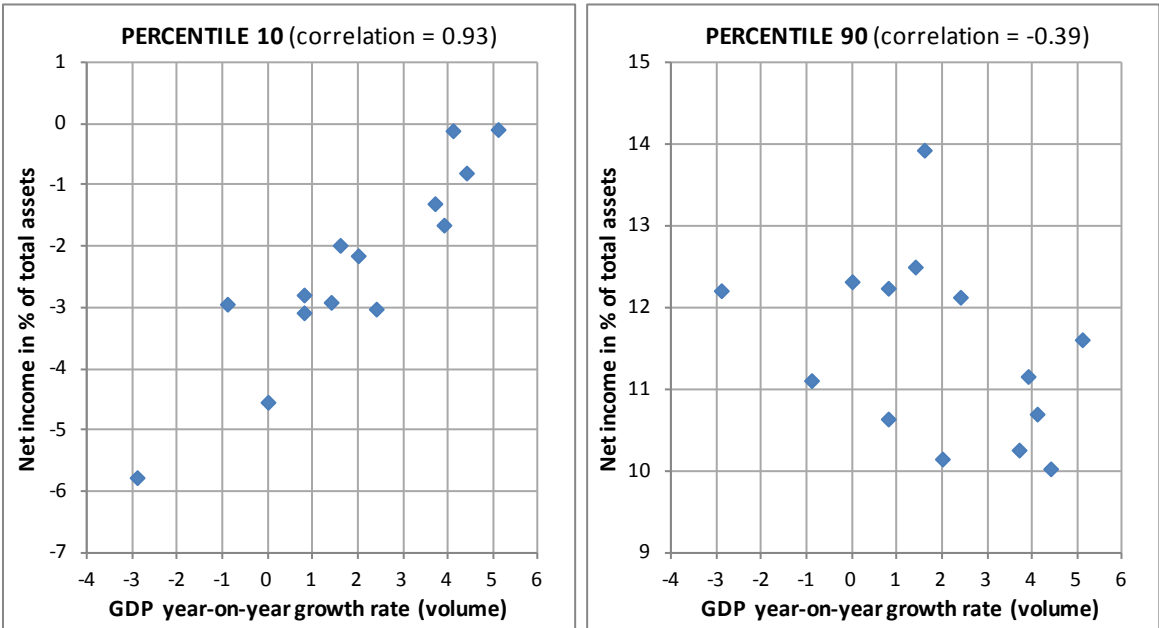
1. Belgium, Manufacturing, Small entities

(Period 1996-2009)



2. Portugal, Trade, Medium-sized entities

(Period 1996-2009)



3.3 Equity capitalization: Impact of the crisis, general characteristics and long-term developments

The crisis has not affected net worth ratios negatively

Surprisingly, the 2008/2009 crisis did not have a negative impact on the net worth ratio of most companies (see figures 3.5 to 3.7), despite the fall in profitability. In particular, for small

and medium-sized entities, there has been generally an upward trend, for example of the median. This trend is also visible for the highest quantiles (3rd quartile and 90th percentile). On the other side, lower percentiles remained relatively stable or even decreased. Consequently, the dispersion tends to broaden.

One explanation for the ratio resilience is, for some countries like Germany, Spain and Italy, as business activities dropped heavily in 2009, this led to a significant decrease in total assets. On the asset side, e.g. trade receivables decreased and investments were halted, the latter resulting in a reduction in fixed assets taking into account scheduled depreciations. Further, securities and some unessential assets were sold in order to maintain liquidity (cash increased nominally). On the liability side, a deleveraging process took place, bank credits were reduced in total as new bank credits slowed (explained, for example, by the break in investments). Trade credits also declined, corresponding to the active counterpart, as well as other provisions that are mainly short-term in nature like warranties, tax provisions or further personal provisions.⁴² Although in Italy, especially for smaller firms, there was an extension of trade credit terms, leading to a growth in the external funding requirements.⁴³ In total, this led to a reduction in total assets resulting in an increase in the equity ratio, although nominal equity was kept stable or was affected by losses (see also box “Determinants of the Increasing Equity Ratio in 2009” in this section).

One other reason is that, despite a slowdown in profitability in 2008 and 2009, equity levels continued to rise because of increases in the allocations to available reserves (retained earnings and other reserves) instead of paying these earnings to the shareholders, which was applicable to small- and medium-sized companies. An increase in the issue premiums for large firms is also observed. Thus, the level of nominal equity went up and the net worth ratio followed this trend. This situation applies to Spain and France⁴⁴.

⁴² For the importance of provisions see footnote 55.

⁴³ See Banca d'Italia (2010), Annual report for 2009, p. 123-129.

⁴⁴ See Banque de France (2011).

Net Worth in % of Total Assets Small size entities

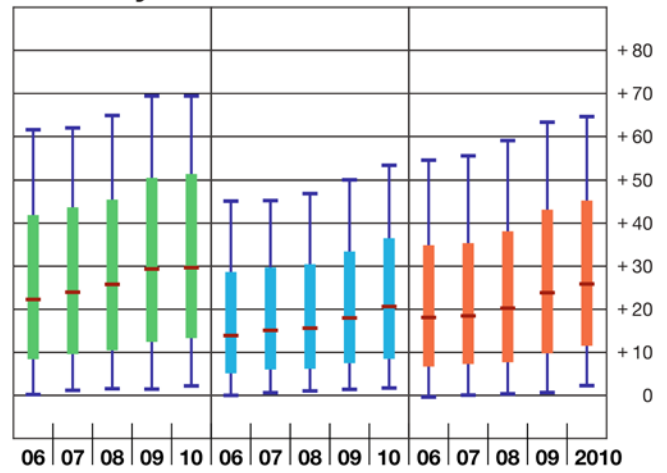
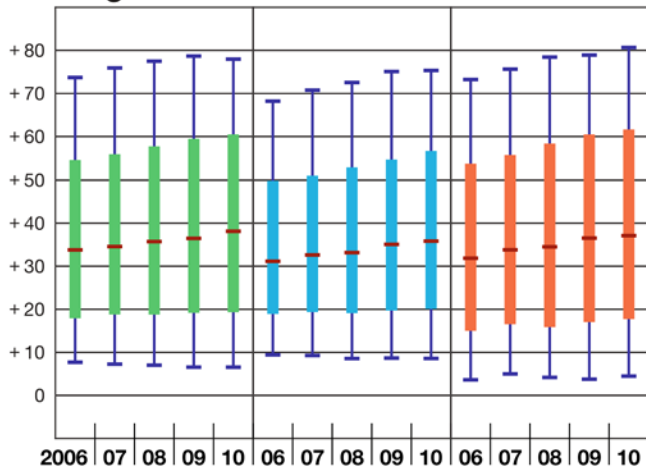
Figure 3.5

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Manu-
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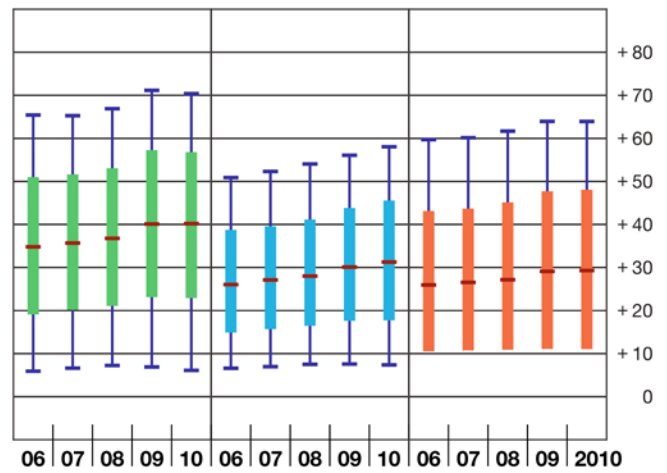
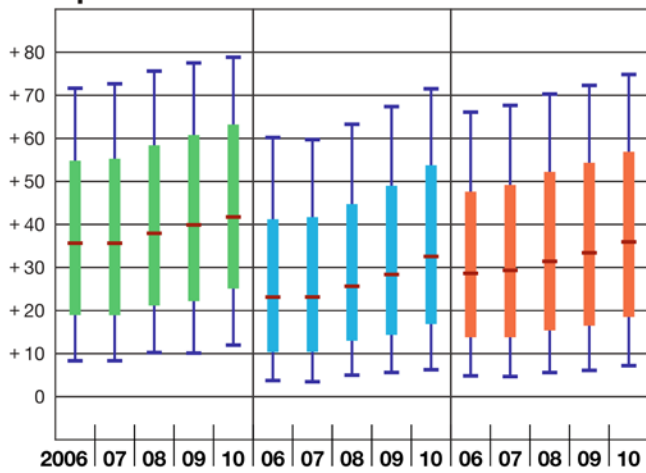
Belgium

Germany



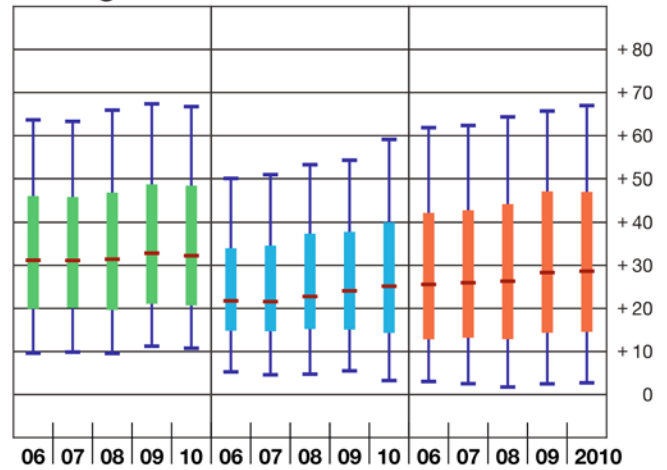
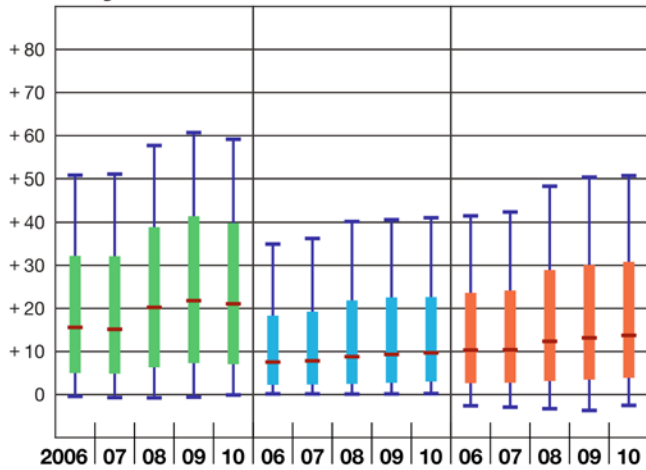
Spain

France¹



Italy

Portugal



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.
¹ 10th percentile for the French micro and small size class in trade not available from 2005 onwards due to sample selection bias.

Box: Determinants of the Increasing Equity Ratio in 2009

In order to gain some insight into the surprising pattern of increasing equity ratios during the economic contraction in 2009, three mutually exclusive sub-groups have been generated from the German, Spanish and Italian samples in a separate analysis:

1. The “pure contraction case”: firms show an increasing equity ratio due to a decrease in equity and total assets. This scenario implies the decrease in total assets outstrips the decrease in equity.
2. The “double impact case”: firms show an increasing equity ratio while equity is increasing and total assets are decreasing, ie both changes are pushing the equity ratio simultaneously.
3. The “standard case”: firms show an increasing equity ratio due to an increase in equity and total assets, ie the increase in equity outweighs the increase in total assets.

For the analysis, the percentage of firms of these sub-samples in the total sample was computed for each size-sector combination in each year of the period 1998 to 2009.

For all three national samples similar results are found suggesting that decreasing total assets have been a strong influential factor in explaining the unexpected and, in many cases, strong rise of the equity ratio in 2009.

In the German sample, for the “pure contraction” sub-group, an increase can be observed in its share from 2008 to 2009 for the manufacturing sector (e.g. from 7% to 11% for German medium-sized firms), while for the other two sectors the figures remain nearly unchanged from 2008 to 2009. However, the percentage of firms belonging to the “double impact” sub-group gains much more ground. Over all three sectors and four size classes’ substantial increases of more than 10 percentage points can be observed. For example, the share rises from a pre-crisis level of 21% to 30% in 2009 in the case of medium-sized manufacturing firms. In the construction sector, the share even jumps from 18% to 36% for large firms. Not surprisingly, the share of the remaining “standard case” sub-group shrinks substantially in all sectors and size classes, e.g. the figure drops from 36% to 28% for medium-sized firms in the manufacturing sector.

In the Spanish sample, an increase can be observed in the share of the “pure contraction” sub-group from 2007 to 2009 for the three sectors manufacturing, construction and trade, from 4% to 13% for medium sized firms. In the second case, the “double impact” the percentage of firms is even higher. It raises more than 10% points in the manufacturing sector, from 18% to 32% for the medium-sized firms and from 16% to 37% for the large firms in the construction sector. As observed in other countries, the share of the remaining “standard case” sub-group falls in all sectors and size classes. For example in the trade sector it decreases from 33% to 20% for medium-sized firms. Similar figures are shown in all other sectors. The analysis was extended in the Spanish case to 2010. As the economy in Spain started to experience a slight recovery, the ratio of net equity/total assets drops in the first two cases (pure contraction and double impact) while the “standard case” increased marginally.

In the Italian sample the share of the sub-group “pure contraction” increases from 2008 to 2009, in some cases more than doubling to levels between 5% and 13%. The “double impact” sub-group also gains ground while the “standard case” sub-group significantly decreases (maximum decrease of more than eight percentage points for medium-sized manufacturers).

A "cleaning" effect probably did not contribute much to the stability of the ratio in the sense that more companies with lower capitalization became insolvent and thus exited from the data samples used in our study. A side analysis showed Spanish entities that were undertaking an arrangement with creditors or a similar procedure under national law during 2007 to 2010 had, as expected, a low equity capitalization which also decreased strongly during the crisis. These entities were extracted from the sample in order to analyze their impact on equity ratios. The results show that the distribution of Net Worth/Total Assets remains almost the same in the three sectors. Apparently, the decrease in total assets is the main cause of the increasing equity ratio.

In contrast to the higher strata, the lower quantiles of net worth are not affected in many sector-size combinations by these significant increases; some percentiles even fall. This finding corresponds to a side analysis undertaken by the group: lower profitable firms have in general a much lower equity capitalization. Specifically, the distribution of net worth of the 10% least profitable companies⁴⁵ was compared with that of the rest of the sample. Depending on sector-size combinations, differences in the median of between 5 and 30 percentage points occur. As these less profitable entities are even more affected by the crisis, lower profits or losses impacted directly on their net worth and the (adverse) improvement in their equity ratios did not take place.

Some countries' particular features also explain this phenomenon. In Belgium, the concept of notional interests may outweigh other factors (see end of this sub-section). In Italy, a significant leap in firms' equity capitalization is already visible in 2008. This is due to revaluations in fixed assets, which were allowed by the Italian government in 2008 and 2009 in order to improve corporate equity, to increase fiscal revenue and to adjust the accounting values to actual values. These revaluations were possible for depreciable and non-depreciable property.

⁴⁵ In terms of the two-year figures of net income as a percentage of total assets.

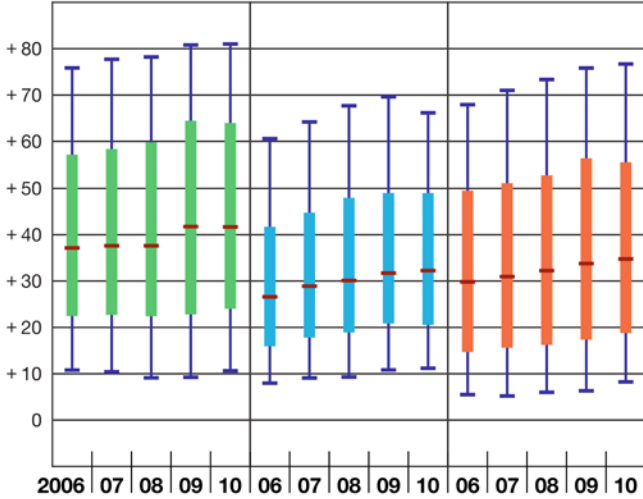
Net Worth in % of Total Assets Medium size entities

Figure 3.6

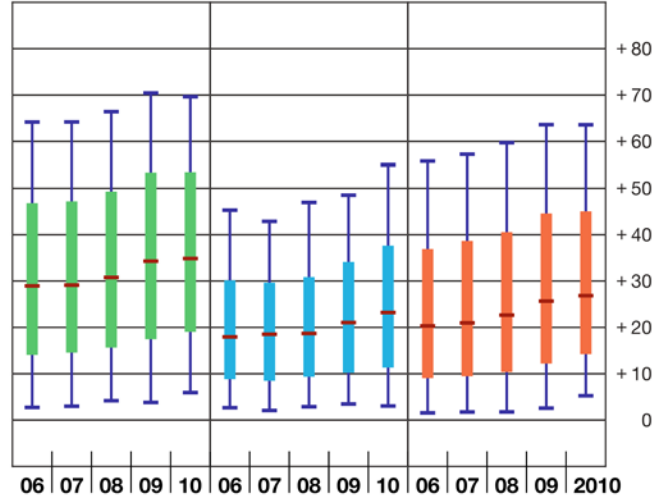
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facturing Construction Trade

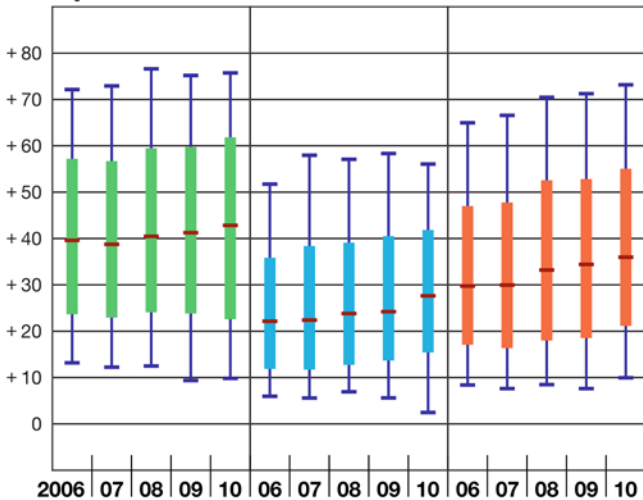
Belgium



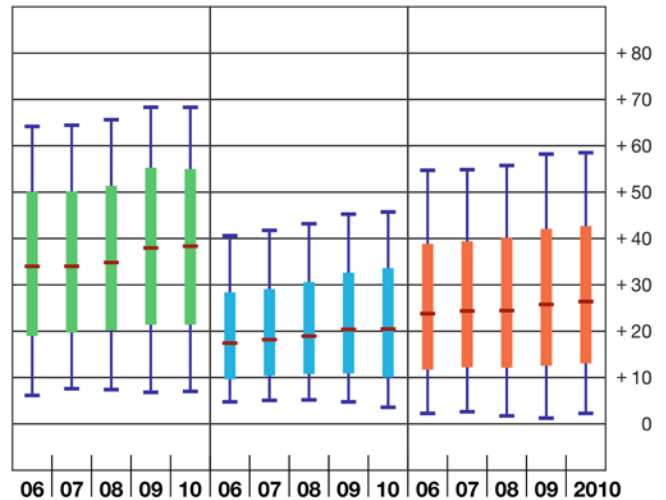
Germany



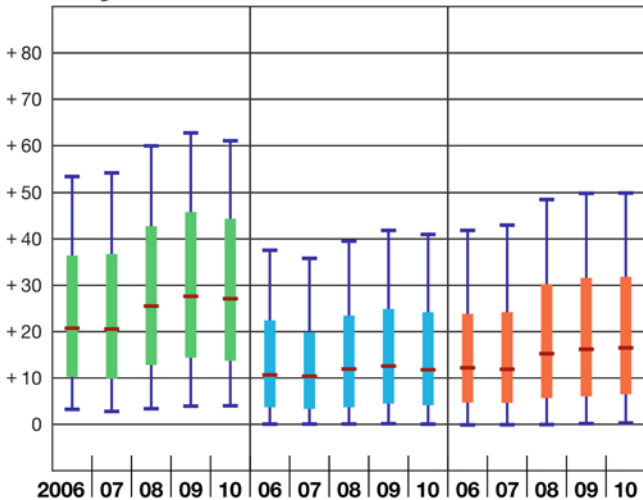
Spain



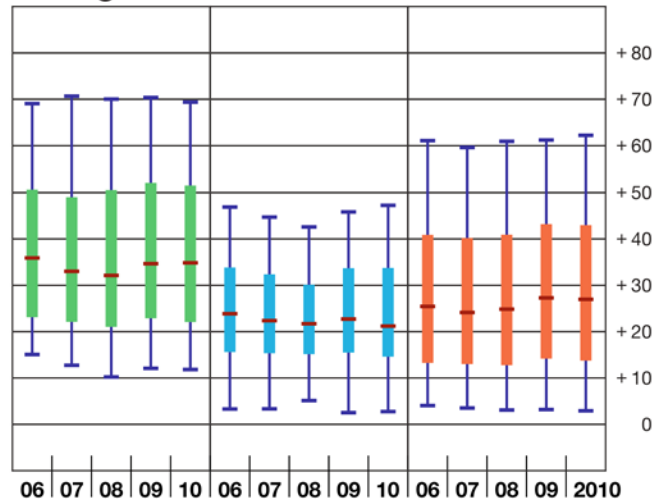
France



Italy



Portugal



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Dispersion and levels

Like for the profitability ratio, there is a high dispersion of the net worth ratio noticeable in the manufacturing sector. Substantial differences between countries are visible only in this sector, however. Belgium, Germany and Spain show the highest dispersion. While 25% of medium-sized companies had an equity ratio of more than 60% in Belgium, only 10% of these firms had an equity ratio greater than 60% in Italy. In terms of levels, for all manufacturing entities, countries can be pooled into four groups: Belgium and Spain with a median of the net worth ratio near 40%, then France and Portugal with a median of around 35%, followed by Germany and, finally, Italy with medians of around and below 30%, respectively. However, for Portugal the results change slightly depending on the company size: large manufacturers are closer to the group consisting of Belgium and Spain.

For all countries, manufacturing entities have generally higher equity ratios than in the construction and trade sector. In particular the three quartiles show significant differences. The trade sector shows somewhat higher levels than the construction sector.

In the construction sector for small and medium-sized entities, a lower dispersion is visible originating from lower 1st quartiles compared to manufacturing, but most strikingly from lower 3rd quartiles. With regard to levels, Germany, France and Portugal have a median of around 20%. Belgium and Spain are again above this value (around 30% or higher in 2010), while Italy stands clearly below (only around 10%). In Italy independent of size, the lower whiskers are at 0%, meaning that 10% of the Italian construction firms have at most zero or negative equity.

The trade sector is set between manufacturing and construction: the dispersion is generally broader than in the construction sector, but smaller compared than in the manufacturing sector. In terms of levels, the medians are generally closer to the construction sector, particularly for small- and medium-sized entities. Levels are generally high in Belgium, Spain, Portugal, Germany and France, and remain low in Italy. In the lowest stratum of the samples, low levels of capitalization – 0% and below - can be observed for Italian and German small entities independent of the sector as well as for large French trade entities.

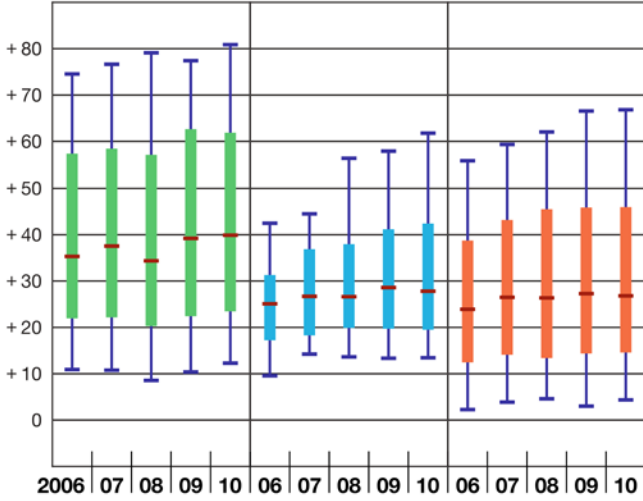
Net Worth in % of Total Assets Large size entities

Figure 3.7

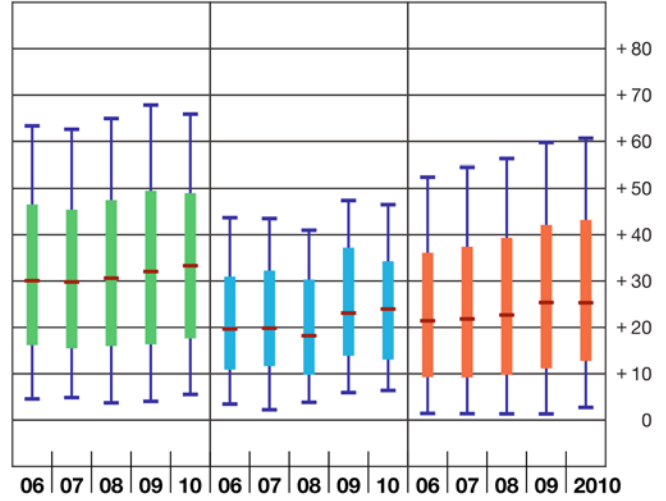
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Manu-
facturing Construction Trade

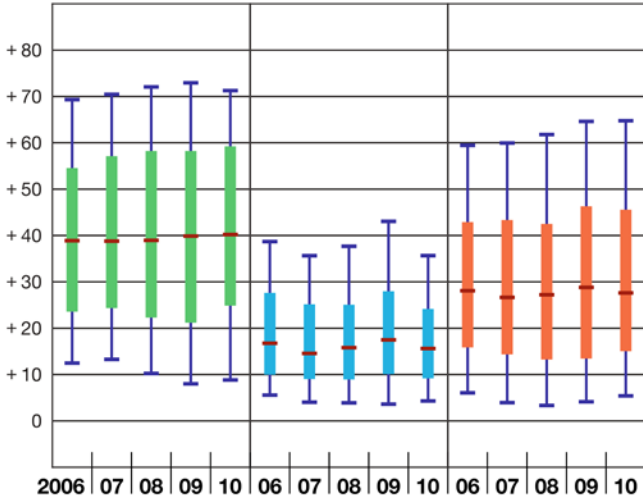
Belgium



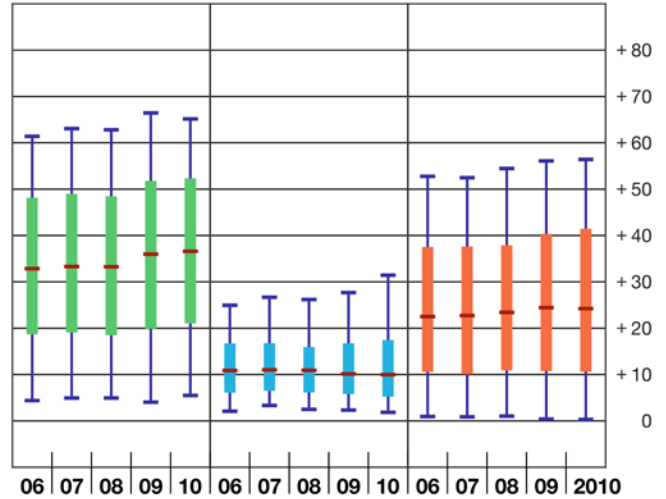
Germany



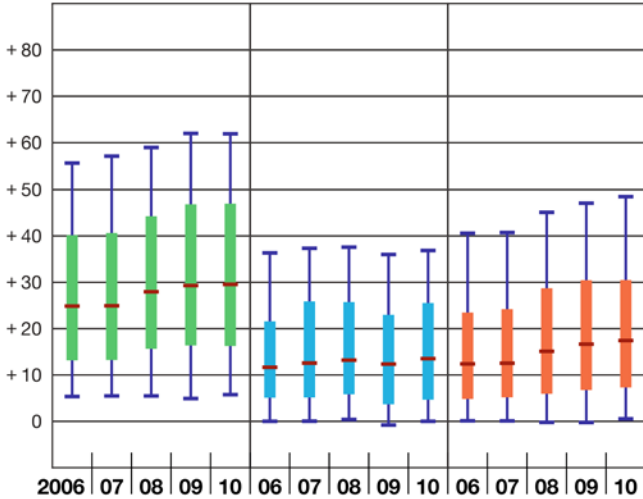
Spain



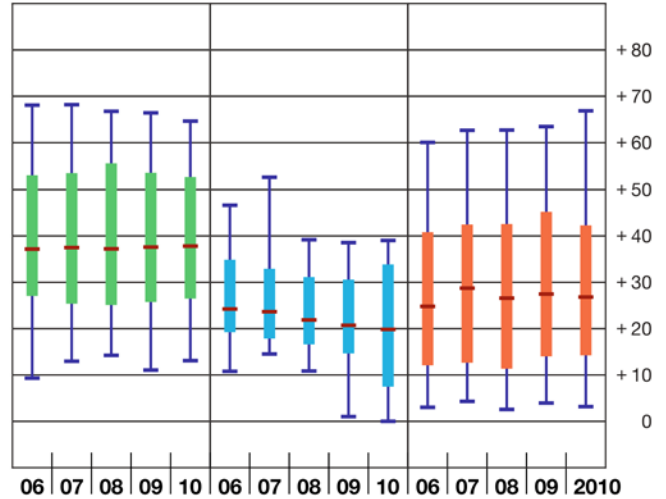
France



Italy



Portugal



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Explanations for the disparity of equity levels

There are large disparities in equity capitalization for companies within the same country, sector and size class. Several factors can explain this heterogeneity.

First, subsector effects can impact on the distribution over broad sectoral aggregates like manufacturing and trade, such as whether an industry is more capital intensive or not or in the case of trade, whether a company belongs to the retail trade, the wholesale trade or to motor vehicle sales. In the retail trade, e.g. pharmacies have significant lower equity levels, namely explained by the subtraction of substantial intangibles (goodwill in most cases) from nominal equity.⁴⁶ Thus, equity ratios between the numerous subsectors might be somewhat heterogeneous.⁴⁷

Furthermore, we suppose that belonging to a group introduces additional sources of financing. For example, some affiliates in the manufacturing sector use their parent company's machinery equipment, resulting in fewer total assets. Similarly, companies organized in a mix of different legal forms (but which cannot be necessarily regarded as a group) might contribute to a stronger volatility of equity levels⁴⁸. In addition, some companies rely more heavily on trade receivables and payables, leading again to different levels of balance sheet totals. The same consequences result when companies use operating leases to finance equipment (which is very prevalent in the case of companies' vehicle fleets in Germany, for example).⁴⁹

The different reasons elaborated in the preceding paragraph all imply a volatility of total assets that lead to differences in equity capitalization in terms of the balance sheet sum. The general lower disparity of net worth ratio for large companies, where differences in the use of total assets are assumed to be lower, can be seen as supporting this reasoning.

Finally, some family-owned companies opt to keep total control of their business, not allowing banks to enter as creditors into their firm, implying for such entities higher equity ratios. This might contribute to the wide dispersion.

⁴⁶ Pharmacies have gained considerable importance in the French sample after 2004, generating a statistical bias particularly in the first decile of the distribution. Two factors are contributing simultaneously to this matter; i. the fact that bigger businesses in this sub-sector may have a corporate legal form in France, making them eligible for further statistical data collection; ii. the increase in the valuation of their intangible assets over the past years, progressively leading their total balance sheet beyond the data collection threshold.

In the Belgian sample, all pharmacies which have the form of a corporation are included (approximately 4%). For Germany, pharmacies are mostly in the legal form of unlimited liability and are therefore not part of the study.

⁴⁷ A separate analysis of Deutsche Bundesbank for medium-sized companies in manufacturing showed that the lower and upper quartiles of net worth in the four digit NACE sub-sections showed some volatility (2009 data). However, the analysis also made clear that more than 90% of the sub sections had an interdecile range of at least 29%. The respective interdecile presented in this study is 36%. Thus wide disparities exist also in sub sectors and consequently the general disparity in a main aggregate is not caused by huge capitalization differences in sub-sectors.

⁴⁸ For example, the popular mixture of legal forms in Germany called "GmbH and Co KG" which includes in its simplest form a private limited partnership (*Kommanditgesellschaft*, KG) and a corporation (*Gesellschaft mit beschränkter Haftung*, GmbH).

⁴⁹ See also the further elaborations on leasing in the next sub-section.

Explanations for differences in equity capitalization across countries

As can be seen from the discussion above, differences in the levels of net worth can be observed for different sectoral and size classifications which might have a different influence in the six countries under analysis. However, it is important to note that differences in the equity capitalization between countries are explained rather by national characteristics, in particular legislation and tax rules or just different ways of doing business in the real sector stemming from cultural differences or institutional settings.

Probably the most influential factors explaining such national differences are national peculiarities in taxation. In Belgium, over recent years, government measures have tried to support companies in the form that the financial independence degree is encouraged by the risk capital allowance, better known as the "*notional interests*" deduction, which has taken effect since the 2007 fiscal year. The measure enables companies to deduct from their tax base an amount of fictitious (notional) interest calculated on the basis of their adjusted equity capital. The adjustments made to the equity are intended to prevent cumulative deductions, to exclude assets which are tax exempt in Belgium under double taxation agreement, and to prevent potential abuse. During the first years of application, the rate of the allowance was equal to the average interest rate on ten-year linear bonds issued by the Belgian state, with a 0.5 percentage point premium for SMEs. For the 2010 fiscal year, the rates thus reached 4.473% for large companies and 4.973% for SMEs. Over recent years, due to budgetary constraints, the impact of the measure has declined, however. Starting from the 2013 fiscal year, a maximum rate is set at 3.0% (3.5% for SMEs). Although it is difficult to estimate, it is now acknowledged that the *notional interests* deduction has had a positive impact on most companies' equity. It also has led to a massive inflow of foreign capital into Belgium in the form of shares in Belgian companies. The foreign counterparties are mainly affiliated companies or companies with capital ties to the target company.

The German case of taxation of retained profits also provides impressive evidence of this. Until 2000 retained earnings were taxed at a higher rate than distributed earnings to shareholders, resulting in a clear incentive not to keep profits within the company. Since this was changed in the fiscal rules for an even taxation, the equity levels have improved strongly (for example, by 17 percentage points for small manufacturers).⁵⁰

Based on the works of Modigliani and Miller (1958) which come to the conclusion that capital structure is irrelevant to a company's value in a perfect, frictionless world without taxation, a lot of research has been undertaken to analyze if this proposition can be maintained when relaxing these strict assumptions.⁵¹ Recent empirical research e.g. by De Socio and Nigro (2012) shows a positive association between leverage and taxation of corporate income in 13 European countries owing to the interest deduction benefits. They also find that the relation between debt and taxation is stronger for highly profitable firms. This result is not in con-

⁵⁰ See also section 3.4.

⁵¹ See also ECB (2012) p. 95-97.

trast to the findings in this report - lower profitable firms have lower net worth ratios – as tax deductible debt and equity are not the sole balance sheet items of capitalization. Similar to De Socio and Nigro (2012), Hartmann-Wendels, Stein and Stöter (2012) show a significant positive relationship between the marginal tax benefit of debt and the debt ratio for German firms using a similar dataset as the one in this study.

Legal rules on leasing, generally linked to taxation, also contribute to different equity levels in terms of the balance sheet. Of key importance is whether a lease can be generally classified as operating or finance (naturally subtle changes apply in country's definitions on leasing). For example, while operating leases are much more common than financial leases in Germany, the reverse is true in Spain. This results from different tax incentives in both countries. It is noteworthy that differences in equity capitalization would rather increase between the two countries if operating lease obligations were capitalized for German entities. Though this approach is not feasible with the German dataset because of missing variables on operating leases.

Besides taxes, one example for the relevance of institutional settings is the legal protection of creditors.⁵² For example, German law is very protective towards secured creditors in the event of insolvency as e.g. banks benefit from a claim or a preferential right to payment. Creditors are also protected in Italy by a legal framework that systematically gives priority to secured creditors ahead of other claimants in the case of insolvency. Thus Italian banks have easier access to guarantees or collaterals when the company cannot pay. Consequently, it might be easier to obtain a bank loan in Germany or Italy. In contrast, a creditor's position in France and, to a lesser extent, in Spain is weaker as priority is often given to salvaging companies rather than protecting the right of secured creditors. This explains at least partially the structural differences in equity capitalization of these countries' entities.⁵³ In Portugal, the legal framework has been traditionally based on German law. Also in Portugal secured creditors are protected in the event of insolvency. Though recent changes (beginning of 2012) have moved the Portuguese framework of insolvency in the direction of France and Spain.

Further different setups in the banking system also explain discrepancies in countries' equity ratios. In Germany, the so-called "Hausbank" relationship between banks and companies leads to lower equity levels. The *Hausbank* in this system is the main and, in many cases, sole partner of a company for its supply of bank credit, but also for further financial services. In particular, small and medium-sized entities - which are in many cases family-owned – have close relationships with a *Hausbank*. Such a long-term partnership leads to less asymmetric information so that risks can be better assessed. Consequently, banks are more will-

⁵² See also the works of La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997, 2000) and Coeurderoy (1997).

⁵³ See also, for the complete subsection, Delbreil et al (2005), pp 30-32.

ing to provide a loan or better loan conditions and less equity might be necessary when new capital is needed.⁵⁴

In Italy the situation is diametrically opposed to the one in Germany, as the use of multiple credit lines is traditionally very widespread in this country. The bank lending portfolio is often shared over a large number of banks (multi-banking), some of them with a limited exposure. Consequently, banks reduce their risk and lend relatively more. On the borrowers' side, multi-banking relations lead to lower average interest rates. In the Italian sample used in this study, multi-banking is common for all size classes, though the share of companies with more than one bank is increasing with size. In the micro size class, 44% of all companies have bank relations with more than one bank, the respective share in the small size is 82%, in the medium-sized and large size class the share is 91% (2007 figures). It is not unusual to deal with more than a handful of banks, e.g. 5% of small, 23% of medium-sized and 43% of large firms deal with more than 8 banks.

Alternative financing sources are also relevant for understanding differences in countries' equity levels. For example pension provisions play an important role in Germany in contrast to Spain, France, Italy and Portugal. The same can be said for the role of short-term provisions in Germany.⁵⁵ Moreover, differences among countries with regard to the vertical integration of companies within groups may exist, thus equity provisions might be substituted by loans from groups and associated companies.⁵⁶

On the other hand, in all countries besides Germany, companies rely much more on trade payables in their financing choice. Sector-specific differences can be observed for the remaining countries as well. The Italian manufacturing sector and the Spanish construction sector show the highest trade credit levels in their countries.⁵⁷ These differences are also explained by different legal rules for factoring. In Spain, France, Italy and Portugal, two types of factoring may apply: factoring with recourse, where the non-financial corporations are responsible for the solvency of the debtors, or without recourse, where the factoring company assumes the risk of insolvency of the debtors. In the case of factoring with recourse, trade receivables remain on the balance sheet, although they have been sold.

Economic policy measures beyond tax incentives naturally also influence equity capitalization. E.g. revaluations were allowed in Italy with Decree 185/2008 for depreciable property like industrial and commercial buildings as well as leased assets, but also for non-depreciable property like non-building areas or non-industrial and non-commercial buildings.

⁵⁴ Some argued in the mid 2000s that the "Hausbank" relationship would die with the introduction of the Basel II regime. Although this relationship may have lost some importance, particularly for larger companies, this "elegy" has not come true for many SMEs. On an aggregate level, a reduced reliance on bank credit during the last decade can be seen, see Bundesbank (2012).

⁵⁵ The BACH-ESD database shows e.g. that for manufacturing medium-sized companies the median of the ratio Provisions/Total assets is up to 11 % for Germany, 4.7% for Italy but for Belgium, Spain, France and Portugal only between 0 and 1%.

⁵⁶ See for some quantification Delbreil et al (1997), pp 18-20.

⁵⁷ BACH statistics corroborate these statements. See also section 3.1 and footnote 40.

The revaluation had to be applied in the 2008 or 2009 balance sheet. The aim of the decree was threefold, to enforce the equity and the financial situation of the companies, to allow the adjustment to actual values of property and to increase fiscal revenue.

In Spain, the government extended certain economic measures in order to tackle the economic downturn that is facing the non-financial entities. In particular, the government has relaxed the dissolution causes of a company. This means that, temporarily, many entities will survive even with low equity levels due to their cumulative losses, whereas in normal times these entities would have to file for insolvency.

To end with accounting rules, differences in the application of the 4th EU Directive on accounting guidelines have an impact on the levels of net worth. In Germany, for instance, the different interpretation of the prudence principle as well as the influence of the tax return coming from the German *authoritativeness principle* can be cited.⁵⁸ In Spain, a new general accounting plan was published in 2007, replacing the plan from 1990. Among the recent developments was the introduction of revenues and expenditures recognized directly in equity. Originating from IFRSs, these revenues and expenditures are mainly related to the assessment of available-for-sale financial assets and other financial assets, cash flow hedges and actuarial gains and losses. Similarly, in Portugal, a new general accounting plan was implemented for 2010 in line with IFRSs. Though this had a significant impact in the values reported only by a limited number of companies.

3.4 Longer run patterns in the past two decades

In section 3.1, we focused on recent years in order to give an insight into the impact of the economic crisis on European firms' profitability and equity. Yet, the available data also enable us to follow the trend of these ratios over the past two decades. Prior to the recent crisis, there is clearly a break in 1992/93 owing to the economic crisis at that time (see figures in Annex 1 on pages 2-10 and 11-19). Two time periods will thus be analyzed: from 1987 to the mid 1990s, including *de facto* the crisis in the early 1990s and from the mid 1990s to 2007, predating the 2008 crisis.

Profitability

In the first sub-period, for medium-sized companies in manufacturing, there was a downward trend in profitability that started at the end of the 1980s/beginning of the 1990s in the countries analyzed.⁵⁹ This decrease in profitability was strongly enforced by the economic crisis of 1992/93. From 1994 onwards, improvements for all countries are observable but without

⁵⁸ *Maßgeblichkeitsprinzip* in German. With the Act Modernising Accounting Law (*Bilanzrechtsmodernisierungsgesetz*) of 2009 (in most cases applicable for fiscal year 2010), although the *authoritativeness principle* was weakened the principle was generally retained to help SMEs in particular. However, the highly criticized "*reverse authoritativeness principle*" was abandoned.

As already mentioned in the last report, such accounting differences are almost impossible to measure.

⁵⁹ For Portugal there is no data available before 1990.

reaching the pre-crisis levels of 1989-90. The recession of that time seems to have had an influence on the figures similar to that of the most recent crisis, although the effects on national accounts were much more pronounced this time. This appears also to apply to medium-sized companies of construction and trade and small entities which fared similarly to the medium-sized ones, except small Spanish companies in construction which did not suffer much before 1992. Large firms in manufacturing and trade followed also a similar pattern. In large construction, however, no strong signs of improvement are visible by the mid 1990s. The dispersion in this sector-size combination is particularly low showing nevertheless stronger volatility.

In the period from the mid 1990s to 2007, profitability rates of medium-sized manufacturing firms improved evenly all over the distribution in Germany. This tendency can be partially observed in Belgium from 2002 on. In France, a very slight improvement in profitability is also visible, particular in the upper strata (3rd quartile and 9th decile). For Italy and Portugal, medium-sized manufacturers' profitability fluctuated slightly, remaining stable on average in that time period. The net income ratio of Spanish medium-sized firms in manufacturing diminished progressively from 2000 though, after strong improvements between 1994 and 1999. Similar trends are observable for small and large entities in manufacturing. The construction sector reveals more differences across countries. In Belgium, for the medium-sized class, the distribution went up until 2006 and simultaneously from 2001, the dispersion broadened. In France and Germany, there is a clear upward movement throughout the period whereas Italy and Portugal still had a really stable distribution of their profitability rates. Finally, Spain shows an improving ratio from 1996 to 2003, then a gradual decline in the distribution. Generally, small and large firms followed the same pattern in this time period with somewhat more volatile evolutions for large entities. In trade, these trends can be observed as well, though Spanish entities displayed rather stable profitability from 2003 to 2007.

Equity Capitalization

Before the mid 1990s, the Belgian, Spanish and Portuguese medium-sized companies in manufacturing had similar distributions. They had an inter-deciles range of around 60 percentage points with high median levels (in Belgium approximately 30%, in Spain and Portugal approximately 40%). In Spain, the distribution remained mostly unchanged in this period, while in Belgium there was a slight downward trend by the end of the 1980s. In Portugal, the levels went up from 1990 to 1993. Besides these three countries, the dispersion and levels in France were smaller (median between 25% and 30%). However, there was a clear upward trend in the median as well as in the distribution as a whole, which progressively broadened until 1994. Germany and Italy displayed comparable patterns: shorter inter-deciles range and a downward trend in the distribution (in Germany for the lower and middle part of the distribution). In addition, they had particularly low median levels compared to the above-mentioned countries. In Italy, the median started from 25% and went down to 20%. In Germany, it never exceeded 20%, which was half of the Spanish median.

These considerations hold in general also for small and large manufacturers. As already mentioned in section 3.3, construction and trade display lower equity levels. Also particularly in construction, a significantly lower dispersion is observable, not only for this time period.⁶⁰ In contrast to manufacturing, Spanish equity in construction and trade showed more volatility, while the levels decreased for small and medium-sized construction entities as well as small and large trade companies.

Again, there is no obvious negative sign of the 1992/1993 crisis in the equity ratio distribution. Rather, slight increases are visible in some sector-size combinations.

From the mid 1990s, the Spanish equity ratio dispersion as well as levels of medium-sized firms in manufacturing remained really constant until 2007. Belgian dispersion and levels showed the same pattern until 2000, followed by an upward trend due mainly to the introduction of notional interest. In Germany, there was also a considerable improvement in equity levels. In the past few years, the median of German medium-sized companies in manufacturing almost matched the levels of Portugal (i.e. a median of approximately 35%). The first explanation for this remarkable trend is a change in tax laws: Since 2000, retained earnings have been taxed at the same level as distributed earnings. Prior to that, the retention was taxed more highly than profit distributed to shareholders.⁶¹ This was accompanied by a second factor: the influence of Basel II. German entities – being aware that they did not have appropriate equity in their balance sheet for bank-internal credit assessments - adjusted their pay-outs of earnings downwards accordingly in order to increase their equity. In France, the tendency was also upward but at a lower degree than in Belgium and Germany. Italian figures show stability from 1995 to 2007, particularly in the lower part of the distribution (median, 1st quartile and decile). There was a slow but continuous increase in the 3rd quartile and in the 9th decile. In the last three years, the obvious break in the time series was caused by the revaluation described in section 3.3. Finally, Portuguese figures give a more heterogeneous picture in their evolution of the past two decades, though the dispersion generally has widened somewhat.⁶²

The improvements of equity levels in Belgium, Germany and France are also visible in the other size classes of manufacturing and in construction and trade (except for French large construction, see particularly the figures of these three countries on page 17-24 in Annex 1). For Spain, small improvements of equity capitalization took place for small entities in manufacturing (at a high level) and trade, while levels remained stable in small and medium-sized construction (with more volatility for the latter) and medium-sized and large trade companies. However, in large manufacturing, the distribution of net worth was decreasing – from a high level – from the mid 1990s until 2007. In Spanish large construction, a decrease of equity capitalization took place around the turn of the century and in the three years before the re-

⁶⁰ Portuguese medium-sized (large) construction figures are only available from 1997 (1996).

⁶¹ As mentioned in section 3.3.

⁶² A sample effect influences the results of 2005 as introduction of the new Portuguese-wide system (IES, see section 2.3) allowed an increase in the sample to include all corporations.

cent crisis broke out in 2008. The Italian improvement in the upper strata of equity capitalization described for medium-sized manufacturers took also place for other sizes and sectors. For Portugal, net worth improved particularly for small companies in this time frame, though large manufacturers showed decreases in their own funds.

3.5 Micro companies: much more heterogeneity than in other size classes

Micro size entities are defined as companies with a turnover smaller than €2 million. As it has been pointed in section 2.3, ways of collecting balance sheet data differ widely between the countries participating in this study. Some countries gather data on the whole population of firms (Belgium, since 2005 Portugal). In others, there is a selection bias due to sample selection and/or threshold selection. Consequently, micro size entities are difficult to compare between our countries. Therefore, conclusions from a comparison across should be drawn only with a high degree of caution. However, the situation of the micro class can be compared within each country to the larger categories and a common pattern of behavior can be identified.

In general, for all countries, the micro-sized companies are much more heterogeneous than the other size classes (see figures in Annex 1 on pages 11-16 and 26-31). They have by far the widest dispersion of profitability ratio, whichever the sector is. In each country, the 10% of micro-sized companies with the worst profitability show the worst levels compared to the other size classes. However, this also holds for the 10% of companies with the best profitability, except for Portugal and Spain. In the manufacturing sector, the micro-sized firms in Belgium, Germany, Spain, Italy and Portugal suffered more from the crisis: in 2009, a quarter of them had net income ratios lower than -5%, while a quarter of the other size companies had ratios lower than 0%.

In the trade sector, the gap between the micro-sized firms with the worst 10% profitability and the other size classes is bigger than in the other sectors, particularly in Portugal, Belgium, Germany and Italy.

France's micro size class is the closest to the other size classes in terms of dispersion and levels, which is due mainly to sample selection. In France, the national statistics count over three million companies, but the Banque de France only collects around 250,000 financial statements p.a. The high thresholds remove the largest part of micro-sized firms. Hence, the presented results reflect only the bigger micro-sized entities, leading to less dispersion in the distribution of micro-sized companies. Despite a broader dispersion, there is no big gap when comparing each quantile across size classes. As stated above, this is not the case in the other countries.

In terms of the equity ratio, the same pattern shows up: micro size companies have a much broader distribution. The lower whiskers are, particularly in the trade sector, are quite remarkable. Besides in Italy, this ratio reaches levels between -40% to -60%⁶³.

It should be noted that company age might influence the broader distribution of capitalization in this size class. As young firms tend to be more risky than older ones, they might have less equity after facing losses in the first few years. As a consequence, owing to a higher degree of asymmetric information, they might face difficulties in obtaining bank loans, thus limiting growth prospects.

In terms of levels, the differences between the countries as set out in section 3.3 might have an even stronger influence in the micro size class. For some countries, micro entities have only restricted access to bank loans. In other countries, micro firms may have generally less equity as a source of funding and more debt towards their own partners or intra-group companies.

⁶³ French lower whiskers from 2005 onwards are not available due to the sample selection bias described in footnote 46.

4 Net Worth at Risk

4.1 Two-year losses

Two-year net income figures in terms of total assets are the basis for the computation of the conditional and unconditional NWR indicators, more specifically their lower distribution referring to the 80%, 90% and 95% percentiles which are denoted as two-year losses in this report. The analysis of these time series generally confirms the net income analysis of section 3, although some peculiarities are visible (see figures 4.1 to 4.3). Manufacturing was the sector with the lowest profitability levels in these three low tails of the distribution and with the greater downturn caused by the crisis. The last recession also had a strong impact on construction in Spain and France as well as on large trade companies, particularly in Spain.

Considering the lowest part of the distribution (ie the 95% percentile) in medium-sized manufacturing, Spain faced the largest decreases in the recent crisis, where the two-year losses increased from -10.1%, to -25.7% between the mid-2000s and 2009-10. In the same period, Germany had losses ranging from -19.0% to -27.4%, Belgium from -15.5% to -22.7%, France from -20.9% to -22.6%, and Portugal from -16.3% to -18.7%. Italy ranked favorable with losses at -16.3% in 2009-10 from -11.5%.

Considering the construction sector, Spanish companies suffered larger losses independently of the size of the firms (with a very high loss level for the medium-sized entities at -24.0%), followed by France and Portugal for small and medium-sized entities. Belgium and Italy show a less pronounced development. In total contrast to other countries, the German construction sector showed improvements in the two-year losses, which were strongest for large entities from -35% to -5% at the 95% level. A deep drop has been experienced for large-sized trade in Spain (from -6.0% to -19.8%) and in Germany (from -11.2% to -21.5% in 2008-09).

These figures are, in general, confirmed by the 80%- and 90%- percentiles, although the 95%-percentile shows greater volatility in all sectors and in all countries while the 80% percentile appears rather stable in comparison of the other two indicators.⁶⁴

Large firms underwent a recovery in the two-year losses 2009-10 for most country/sector combinations independently of percentiles (apart from construction in France and Belgium and trade in France and Spain). Small and medium-sized firms showed a less pronounced recovery. Indeed, some country/sector classes even increased their losses (small manufacturers in Belgium, small and medium-sized manufacturers in Germany and France; small and medium-sized construction entities in Spain, France and Portugal). Some of these cases of deterioration stand in contrast to the trends of the 1st decile in one-year figures in the respective sector-size class.⁶⁵ This suggests that, although there was a general upward trend in the

⁶⁴ See also section 3.2.

⁶⁵ See also figures 3.1 and 3.2 in section 3.1.

economy in 2010, many of those entities particularly affected by the crisis in 2008/09 were not yet able to recover in the following year.

It is also noticeable that the last crisis did not generally match the high level of losses recorded in the early 1990s (see figure 4.4). Spain is the country which had the strongest deterioration in losses in 1992/93 because of its high level of inflation and its interest rates, which hurt its firms before entering the European Union. Germany also showed high losses in manufacturing at that time, as the strength of the recession in the wake of the reunification was the main factor affecting these results. Only a few size/sector combinations showed worse performance in the recent crisis. This was the case in Belgium for small and medium-sized manufacturing, in France for medium-sized and large manufacturing, and in Portugal for trade and medium-sized construction⁶⁶.

⁶⁶ The change in the sample (IES) may be a reason.

Two-year Losses in % of Total Assets

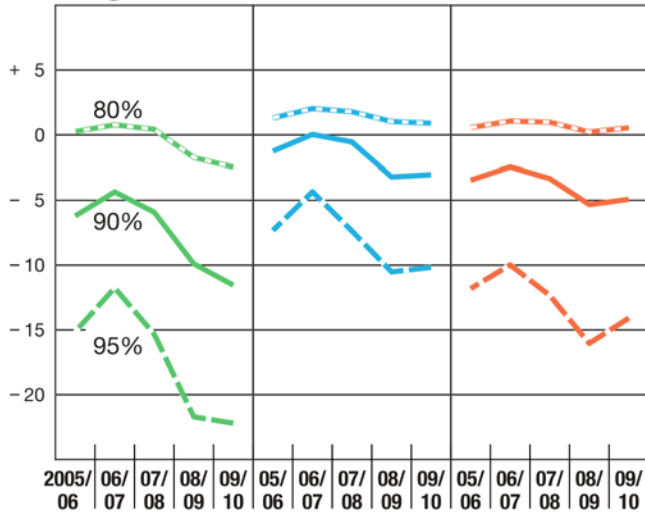
Small size entities

Figure 4.1

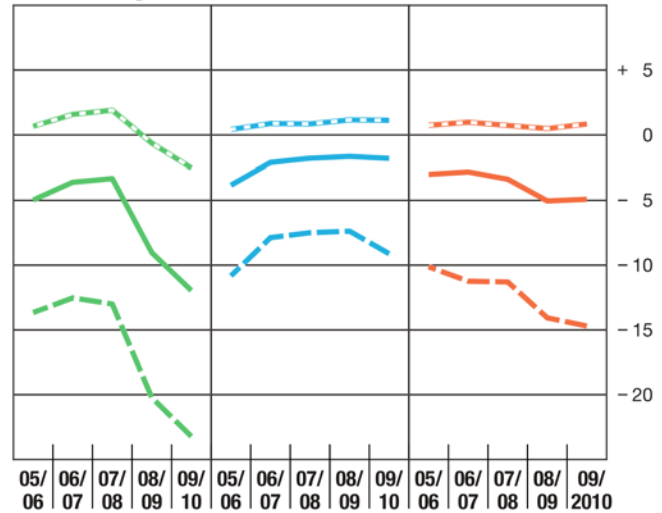
Manu-
facturing Construction Trade

Manu-
facturing Construction Trade

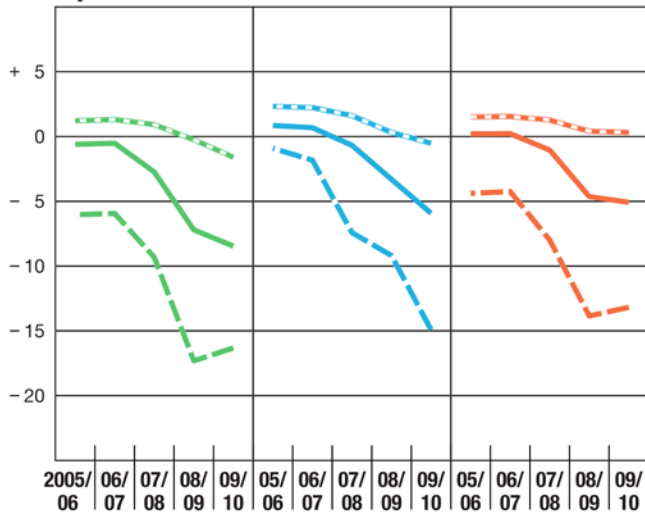
Belgium



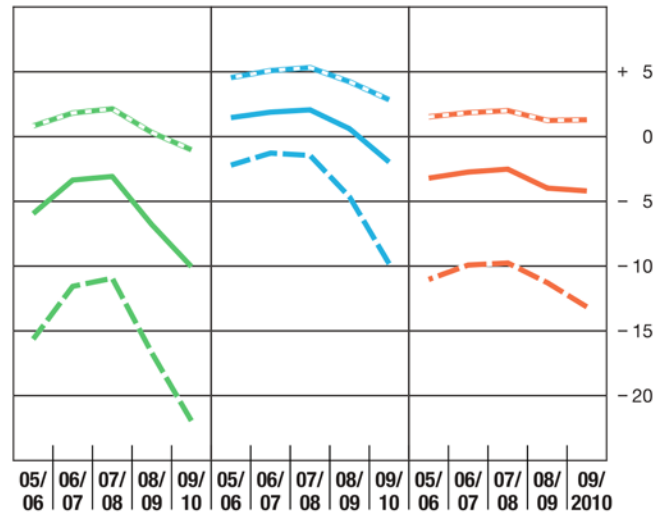
Germany



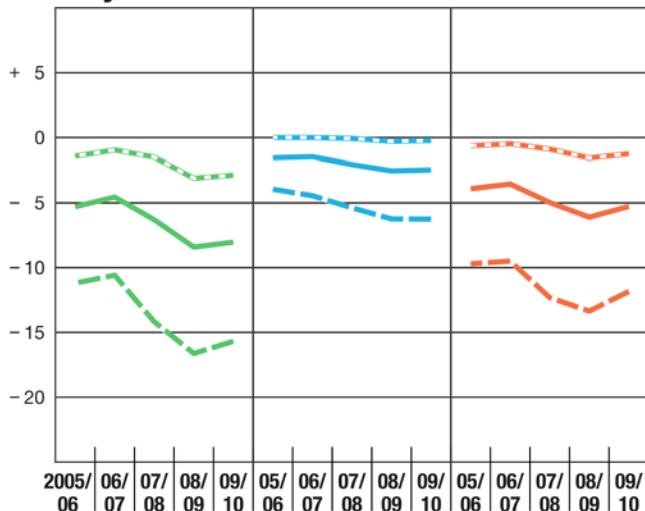
Spain



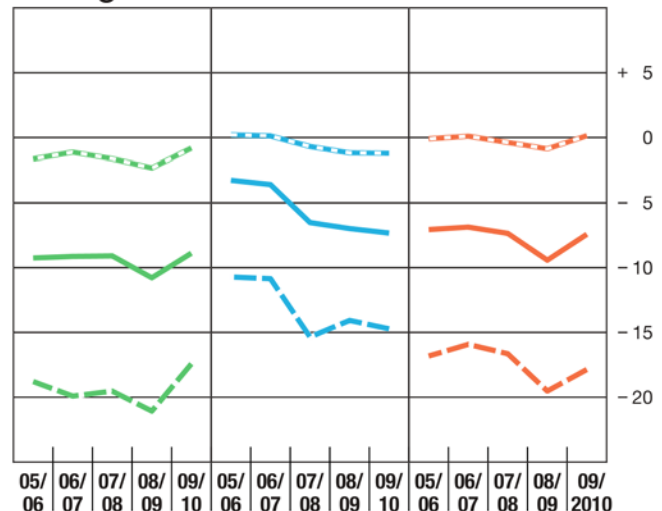
France



Italy



Portugal



The lines indicate different percentiles of two-year net income in terms of total assets: the sum of net income in period t and $t+1$ is divided by total assets in period t .

Two-year Losses in % of Total Assets Medium size entities

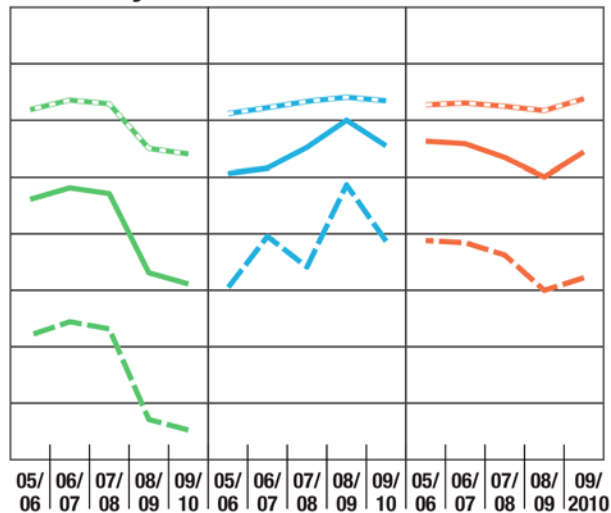
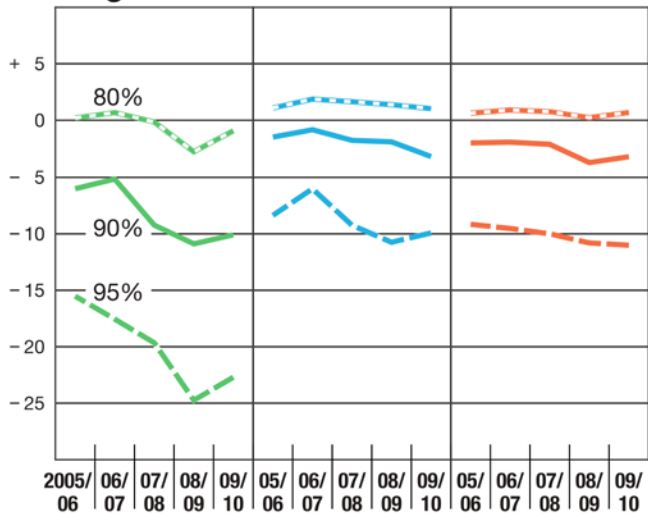
Figure 4.2

Manu-
facturing Construction Trade

Manu-
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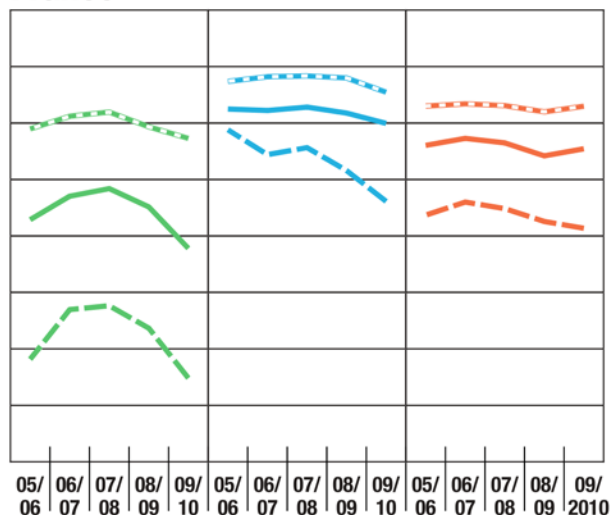
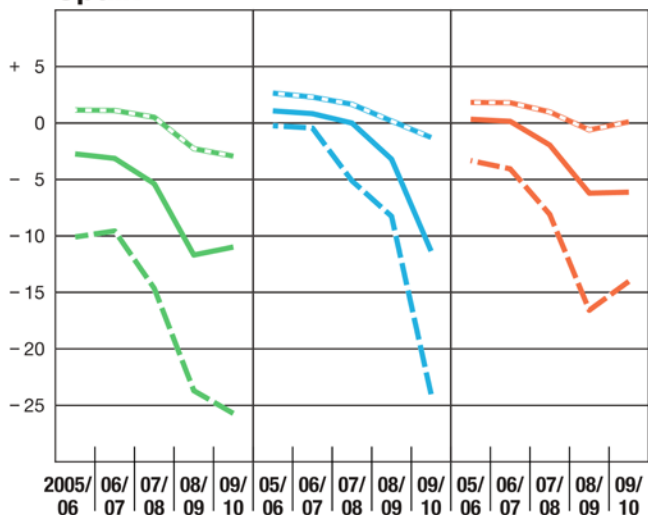
Belgium

Germany



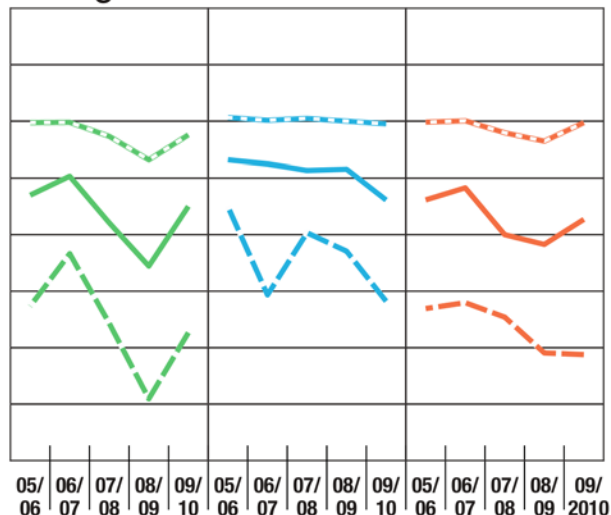
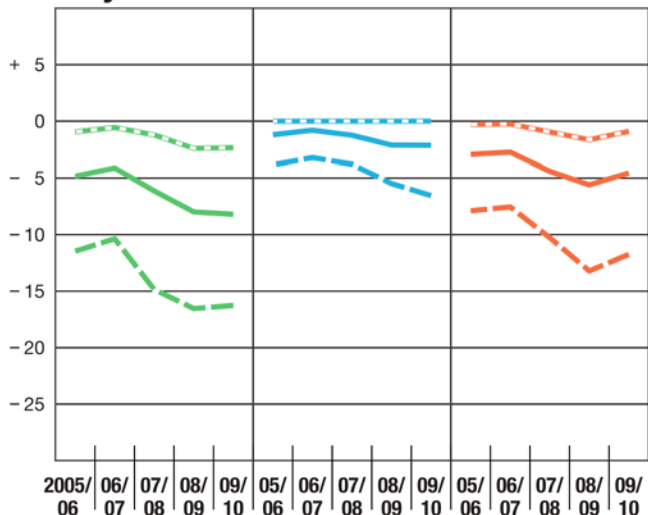
Spain

France



Italy

Portugal



The lines indicate different percentiles of two-year net income in terms of total assets: the sum of net income in period t and t+1 is divided by total assets in period t.

Two-year Losses in % of Total Assets

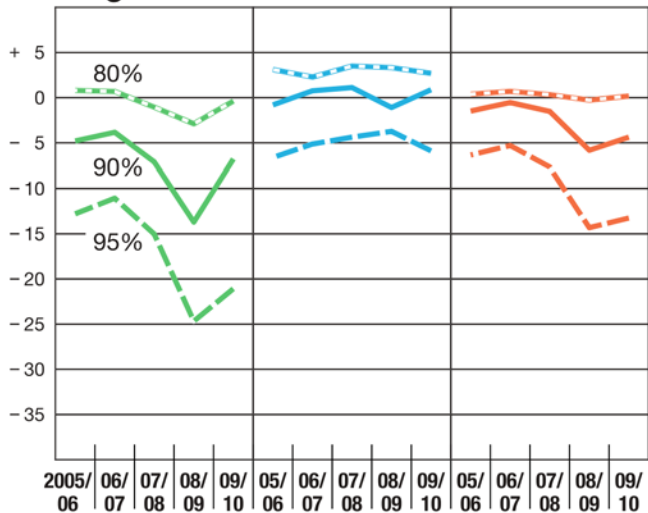
Large size entities

Figure 4.3

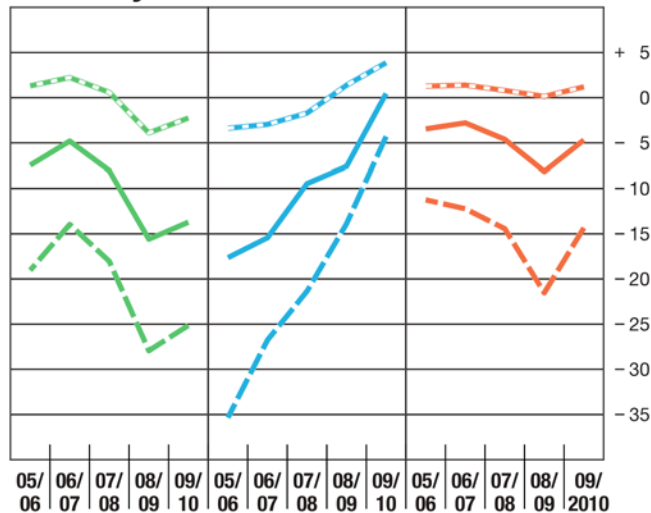
Manu-
facturing Construction Trade

Manu-
facturing Construction Trade

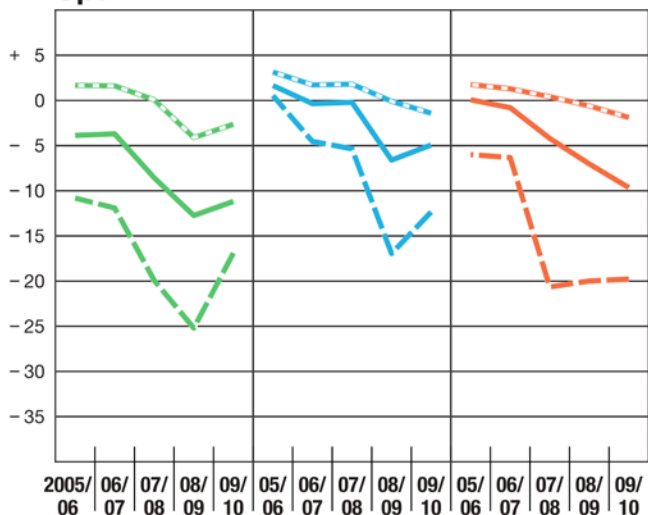
Belgium



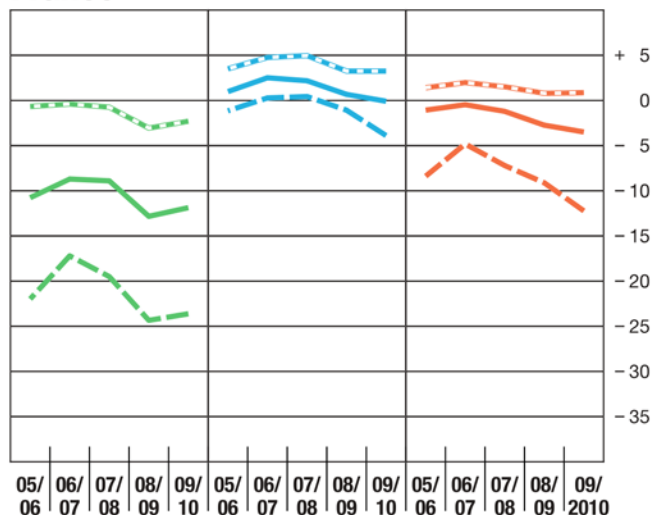
Germany



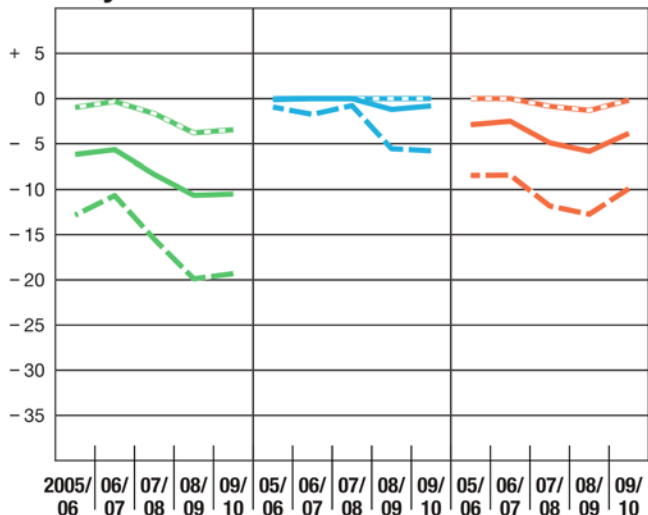
Spain



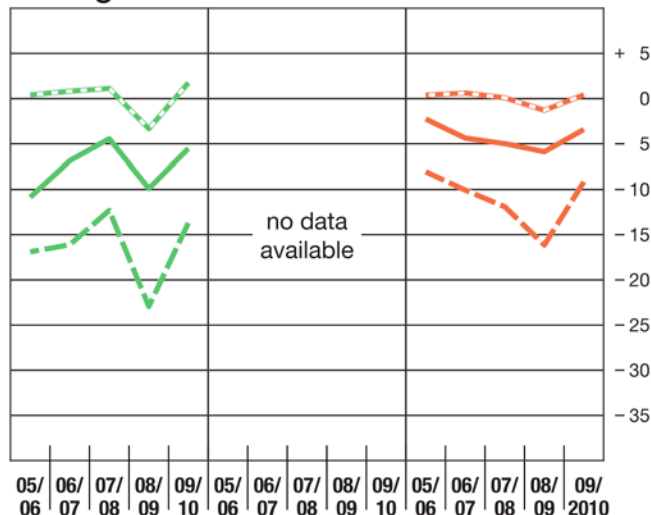
France



Italy



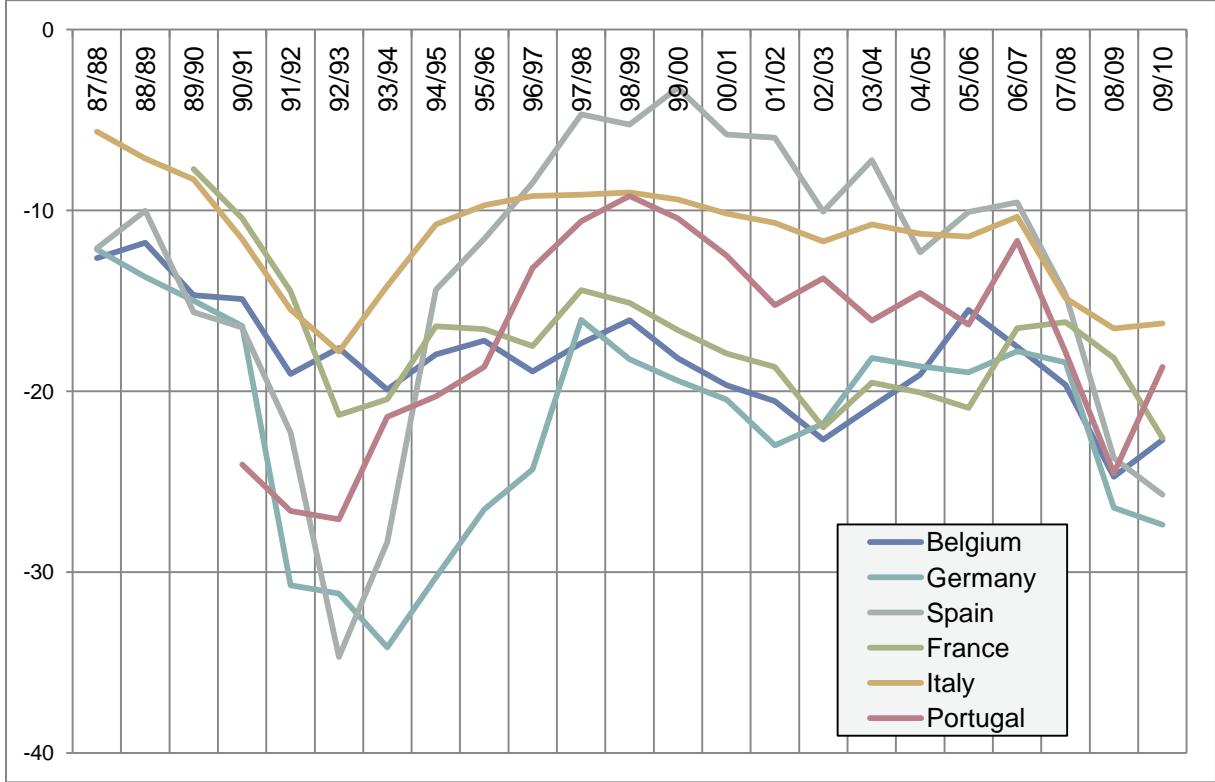
Portugal



The lines indicate different percentiles of two-year net income in terms of total assets: the sum of net income in period t and t+1 is divided by total assets in period t.

When looking at the long-term trend over the past 20 years, it becomes apparent in many sector-size combinations that the two-year losses have converged in the past decade for the six countries observed. One potential explanatory factor could be the advanced integration of the countries within the European Union by means of the single market, at least up to the outbreak of the economic crisis.

Figure 4.4: Two-year losses in % of Total Assets, 95th percentile, Manufacturing, Medium-sized entities, 1987/88 – 2009/10



In contrast to the other sizes, micro firms showed higher two-year losses in the trade sector, apart from Germany and France where manufacturing performed worse. This reflects the higher dispersion in profitability in trade compared to the other sectors for this size class (see section 3.5).

4.2 Net Worth at Risk: conditional and unconditional

Net Worth at Risk (NWAR), measures the potential losses in two consecutive years a typical firm in a sector may face in terms of total assets and with a certain level of confidence.⁶⁷ Two variables are calculated: Unconditional NWaR on the one hand measures a loss potential as an average of the two-year losses of the last eight years independent of a crisis. On the other hand, conditional NWaR reflects a worst-case scenario with regard to profitability affecting a

⁶⁷ In the beginning of this research phase, NWaR for three consecutive years was evaluated as some rating models have a three-year timeframe. The 3-year NWaR figures calculated were only to some degree higher than the two-year figures. Looking at two-year losses, there were no differences in some years, i.e. losses are outweighed by gains. Altogether, the three-year figures did not reveal any further insight. Consequently, the additional 3-year approach was not pursued.

sector in a crisis.⁶⁸ As noted in the previous section, for the latter concept, the crisis years in the early 1990s were mostly the basis⁶⁹, only in some cases the latest crisis was more severe. Figures 4.5-4.7 illustrate NWaR for all countries in the observed sector-size combinations.

Following lower profitability figures, manufacturing generally has the highest conditional NWaR for all levels of confidence and independently of size. This could be explained by a higher permanence of costs in times of crisis due to the rigidity of labor costs and the capital intensity in this sector.⁷⁰ Higher NWaR levels suggest that firms in manufacturing should have a greater equity cushion to handle a possible recession. This is valid in general for all countries and may be compared with higher equity levels in manufacturing shown in section 3.3.

As a measure of spread in the lower distribution, the interpercentile range between the 80% and 95% conditional NWaR may be used. This NWaR dispersion gives the range of the minimum two-year losses with a 15% probability, excluding those values below the 95%-percentile. A higher level of the range means that two-year losses vary more in that part of the distribution. For the small and medium-sized class the spread is broader in manufacturing, ranging from 16.5% to 25.6% for small entities (while it ranges from 11.1% to 19.2% for construction and from 14.0% to 20.4% for trade) and from 15.4% to 29.1% for medium-sized companies (compared with from 11.3% to 16.2% for construction, apart from Spain, and from 11.0% to 21.8% for trade). The greater range in manufacturing depends on the lower levels of the 95% NWaR. In this respect the greater potential losses at the 95% confidence level can be associated with the larger variability of the net worth ratio to the upper side (see section 3.3), since NWaR may be interpreted as a factor driving firm capitalization.

Looking at the dispersion of NWaR across size classes, the data reveal different patterns in some of the countries observed: all Spanish large size classes and the German large size class in construction and trade are more dispersed.

⁶⁸ It should be noted once more that NWaR is not a company-specific risk parameter but should be seen only as a country/sector/size-specific description of the magnitude of losses. See section 2.2.3.

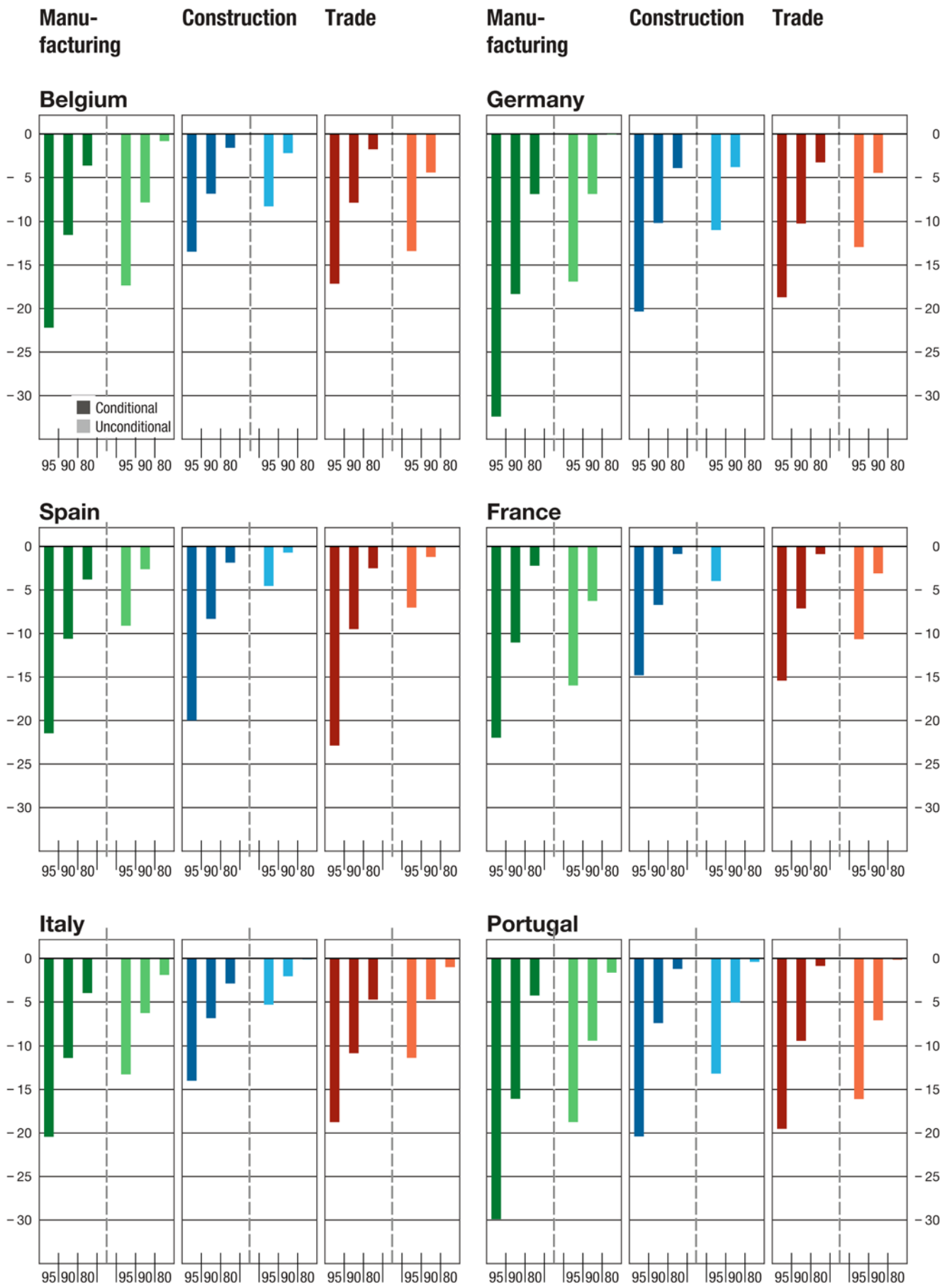
⁶⁹ For German and French construction sector, losses peaked by the mid 1990s or later.

⁷⁰ Capital-intensive manufacturing generally has a larger weight of depreciation on fixed assets, given the same level of revenues across sectors. During the crisis, as manufacturing suffered large falls in revenues (due to a drop in export and domestic demand), depreciation costs remained, leading to stronger decreases in profitability.

Net Worth at Risk

Small size entities

Figure 4.5



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWA_R.

While conditional NWaR may reflect some specific country characteristics of a certain period, unconditional NWaR, which is calculated as the average of two-year losses during the last eight years, is influenced by more or less the same business cycle of the six countries under analysis. It is therefore a measure of potential losses independent of the current position in the cycle. Consequently unconditional NWaR figures are lower than their conditional counterparts. The country which displays higher differences between the two NWaR indicators is Spain (more than 20 percentage points), resulting from the particularly bad period in the crisis of the early 1990s determining conditional NWaR. Besides this exception, the difference between conditional and unconditional NWaR can be used as a way to assess the sensitivity of a sector's profitability to recessions. The impact is generally higher in manufacturing and construction than in trade while the large construction sector particularly stands out again. Though these sector differences between the NWaR concepts result from conditional NWaR figures, as construction generally shows lower unconditional NWaR levels.

Further, the 80% confidence level for unconditional NWaR are often not determined as the average of the last 8 years result in positive values for small, medium-sized and large size classes.⁷¹ In the other cases it is often close to zero. This is particularly observable in construction. This means that in "normal times" a loss potential is not prevalent or not significant at this confidence level.

⁷¹ In the French construction size classes, even unconditional NWaR at 90% are not determined, the loss potential is zero at this confidence level.

Box: Investigation of Applying Extreme Value Theory to the Concept of Net Worth at Risk⁷²

In this and the preceding paper on Net Worth at Risk (NWAR), the Study Group applies a non-parametric estimation approach of Value at Risk (VaR) within the framework of accounting. This estimation technique is less accurate than the parametric one, however. In the context of the parametric estimation of VaR, empirical data are frequently assumed to be normally distributed. Unfortunately, the assumption of normality is often violated by empirical data – especially in the case of return distributions. Instead, their distributions often reveal so-called heavy or fat tails, ie extreme values occur more often than a normal distribution would suggest. This, in turn, leads to very high standard deviations and therefore – via the parametric estimation – to totally implausible VaR figures. The Study Group therefore decided to use the non-parametric approach in its research on NWaR by just taking the empirical percentiles as VaR figures. However, this implies that the confidence levels expressed in these percentiles are, to some extent, imprecise. This is the starting point of EVT, since it allows for explicitly modelling the shape of the tail of a distribution and, hence, yields a more accurate estimate of VaR in terms of the underlying distribution. In order to assess the pros and cons of applying EVT to the concept of NWaR, a small sub-study is presented by using the figures of biannual losses in the German sample.

In a first step, a graphical analysis is applied to the data of the sliding sample 2004-05 of German manufacturing corporations. A normal quantile plot⁷³ provides clear evidence that the distribution of biannual losses in the sample is characterized by fat tails. The sub-study does not intend to give a comprehensive review of all possible methods of EVT. Instead, it focuses only on the Peaks-over-Threshold model (POT),⁷⁴ since this method seems to be the most illustrative. The basic approach of POT is to estimate parametrically the tail of the distribution by using observations above a certain sensibly chosen threshold. These observations are the excess losses or excesses. The central assumption of EVT is that with an increasing threshold, the distribution of the excesses converges to a generalized Pareto distribution (GPD) with two parameters characterizing the shape of the tail. However, there is a trade-off between the convergence to the GPD (asymptotic properties) due to raising the threshold, on the one hand, and a sufficiently large number of observations for estimation purposes due to lowering the threshold, on the other. The threshold can be visually identified via the mean excess function which plots the mean of the excesses above a threshold against an increasing threshold. The plotted values showing an upward trend is a sign of a heavy tail. Moreover, if the excesses above a certain threshold follow more or less a straight line,⁷⁵ this indicates that the distribution of excesses can be modelled with a GPD (Consigli and Frascella, 2001). For the sample used here and with a very generous interpretation of this rule of thumb, this pattern begins approximately with a biannual loss of 20.00%, which represents roughly the 96%-percentile of the empirical distribution. Esti-

⁷² Please note that – following the frequently applied EVT and VaR terminology – the concepts outlined here are based on a reversed profit and loss distribution, ie profits are located on the left side (negative sign) of the distribution whereas losses are on the right side (positive sign).

⁷³ The values of the empirical quantiles (y-axis) are plotted against the theoretical normal quantiles (x-axis) in ascending order. Departures of the empirical values from the bisecting line therefore reveal violations of the normality assumption.

⁷⁴ See McNeil (1999) for a more detailed presentation.

⁷⁵ The literature is somewhat ambiguous about what constitutes exactly a straight line here (c.f. McNeil and Saladin (1998)).

mating via maximum-likelihood the parameters of the GPD above this threshold leads to a VaR of 25.94% for the 97th percentile of biannual losses. This value is rather close to the 97th percentile of the empirical distribution (24.76%).

This exemplary application of EVT to the concept of NWR emphasizes that it should only be used in the case of very high percentiles (determining the threshold of 20% via the mean excess function demonstrates this clearly) – therefore the computation of an EVT-corrected NWR based on the relatively high 97%-percentile. With a stricter interpretation of the term “straight line”, we would have ended up choosing a threshold as high as 45%, implying a confidence level of nearly 99%. By contrast, the NWR figures of the Study Group so far have been based on much lower percentiles like the 80%, 90% and 95% level. On the one hand, the application of EVT does not seem appropriate for such lower percentiles. The implementation of higher percentiles would imply much higher NWR figures. This would lead to broad majority of firms (high as 75%) having equity ratios which are too low to absorb these extreme losses. This raises the more basic question of whether EVT should be applied by the Study Group on a large scale. In this context, the workload involved in applying EVT consistently is another consideration which should not be underestimated.

A case-wise investigation of the most extreme values on the loss-side of the distribution shows that the least profitable company in the sample exhibits biannual losses to total assets of 1,584%. The second and third-largest losses are 309% and 133%, respectively. After this, the distribution of losses starts to enter a more or less continuous pattern. In a further step, the reasons for these extreme losses have been analysed. The two highest losses do not result from operative losses but from extraordinary losses. In addition, in the case of the maximum loss, the extreme result is mainly due to the complete deduction of intangible assets from total assets, which drastically inflates the calculated percentage figure. There is no question that these firm-specific high values do not represent realistic loss scenarios for the firms in our sample. This casts doubts on the EVT calculations, as these high values play an important role in estimating the GPD. Interpreting these values as outliers and therefore excluding them from the parametric estimation leads to more reasonable parametric estimates of percentiles, which are closer to the non-parametric ones.

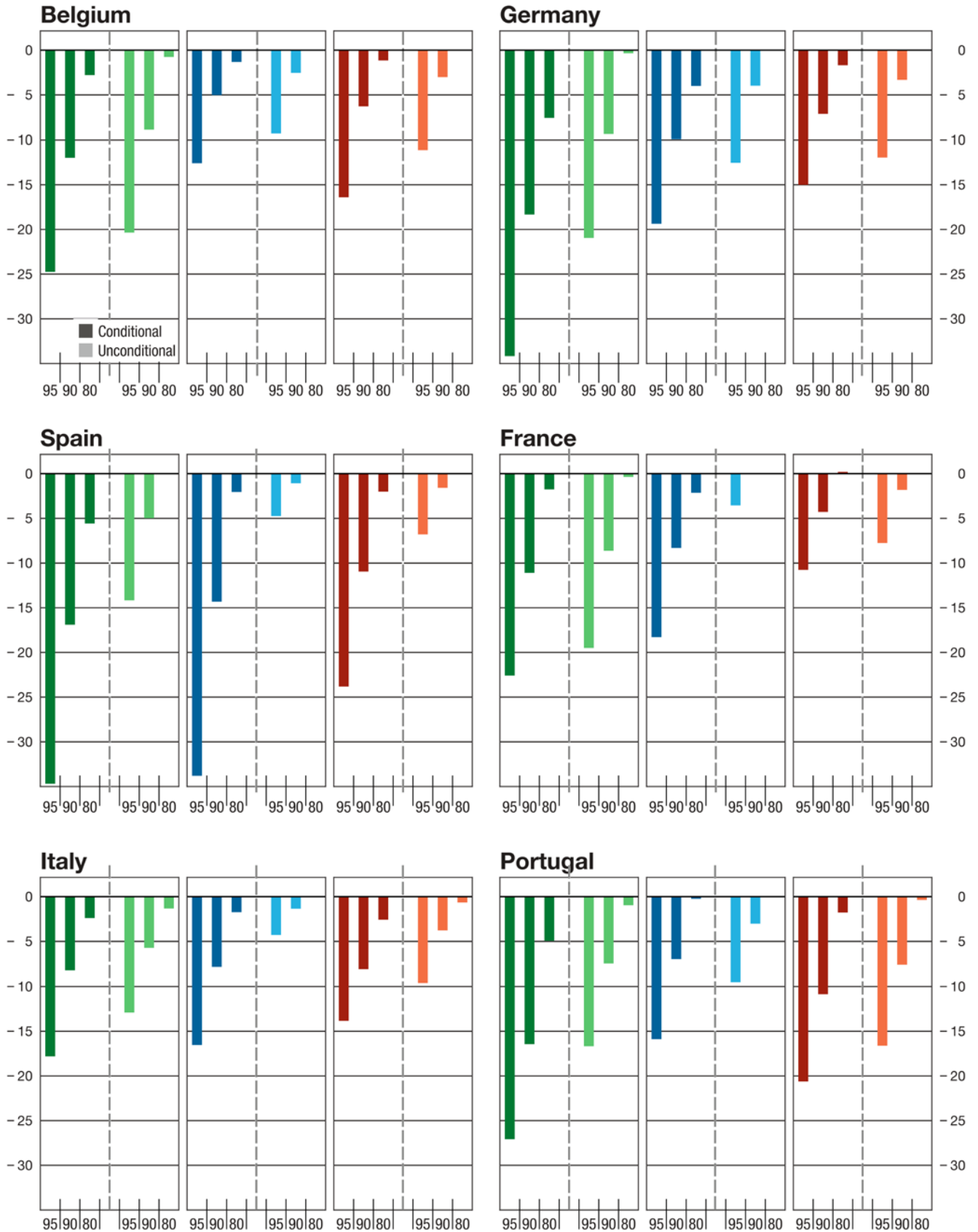
Taken together, EVT does not seem to be the appropriate approach within the concept of NWR for several reasons. First, EVT can only deal with the percentile area above the percentiles used in this report. Second, the outlier analysis has shown that the extreme values of biannual losses in question should not be part of the analysis presented here. And, finally, the procedures to detect the relevant thresholds and to estimate the parameters by maximum-likelihood are much too complex and burdensome to produce the wide scope of figures presented in this report.

Net Worth at Risk

Medium size entities

Figure 4.6

Manu- Construction Trade Manu- Construction Trade
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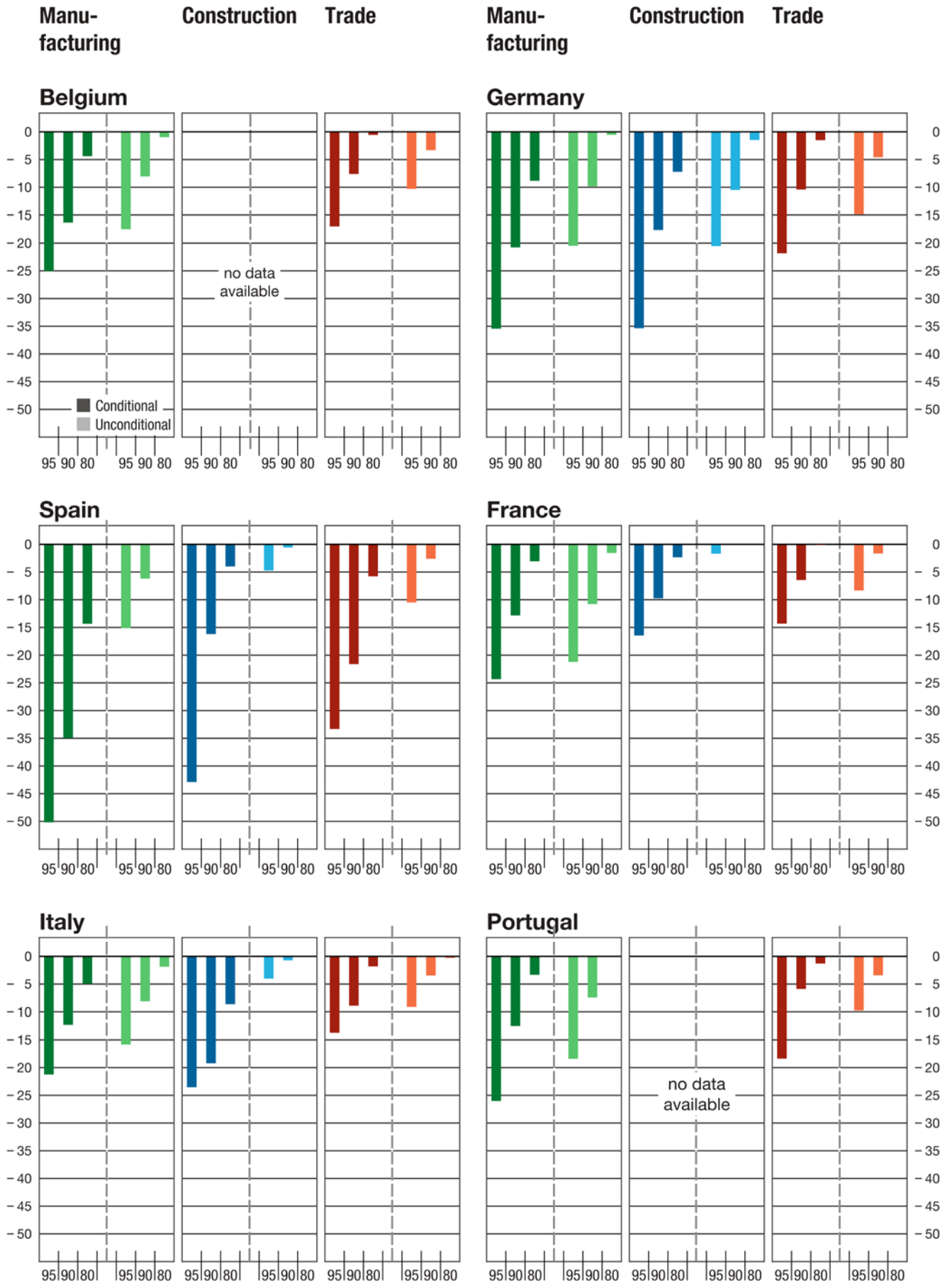


The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWA_R.

Net Worth at Risk

Large size entities

Figure 4.7



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWAR.

As regards the micro size class, the NwAR levels are much higher than for other sizes, independent of the sector and of the country (see figures in Annex 1, page 32-37). This is due to the more fragile conditions of micro firms, which show much more volatility in profitability.⁷⁶ Consequently, this size class was affected more by the crisis and also shows stronger NwAR dispersion.

Comparing the three sectors in the micro size class, in contrast to the other three classes, the values of conditional and unconditional NwAR are particularly high in the trade sector for Belgium, Italy, Portugal and Spain, while German and French manufacturing have higher NwAR values in the lowest size class.⁷⁷ The trade sector is also the one which presents more cross-country variation. Moreover, for the micro size class, the crisis of the 1990s was not the worst downturn for all countries. The 2008-09 economic crisis was more severe for the micro size class in Belgium, Portugal⁷⁸ and Spanish construction. Also the differences between conditional and unconditional NwAR figures are much higher in the micro size class than in other classes, backing the presumption that profitability in this size class is stronger affected by recessions. Further, unconditional NwAR figures, in contrast to other size classes, result in significant levels, implying that a general loss potential is more prevalent for micro entities than for other size classes.⁷⁹

4.3 Percentage of companies with equity below NwAR

Given NwAR figures, the proportion of firms having a net worth ratio below NwAR is computed. While NwAR figures give an indication of how a sector or size is susceptible to losses, these resulting ratios “Percentage of Companies with Net Worth below NwAR” can display how a sector is generally endowed with equity to cope with these loss scenarios. These ratios may be seen as an indicator of sector-size risk with regard to the function of equity to absorb losses (in times of crisis for the conditional levels).⁸⁰

The ratios “Percentage of firms with Net Worth below NwAR” reveal a lot of variability (see figures 4.8-4.10), which is caused by the underlying two variables, net worth and net income, and their respective differences with regard to dispersion and levels. When comparing sectors across countries at the conditional 95% confidence level for the small and medium size class, manufacturing generally ranked worst for Belgium, Germany and Portugal, while construction had the last position for Spain, France and Italy. Though it is noteworthy that the

⁷⁶ See also section 3.5.

⁷⁷ It should be kept in mind that the German and French micro samples are less representative than for the other countries, see section 2.3.

⁷⁸ As already indicated the change in the sample (IES) may be a reason.

⁷⁹ Except for France. Though the French micro class sample is significant different than for the other countries, see section 2.2.

⁸⁰ Given a certain confidence level of NwAR. The ratio “Percentage of Companies with Net Worth below NwAR” should not be understood displaying the equity endowment to the loss perspective for each individual company. Moreover, it should be kept in mind that the level of net worth is also driven by country-specific institutional characteristics (see section 3.3).

large size class in construction is particularly less endowed with capital from the perspective of this risk analysis in the four countries for which data are available: Germany, Spain, France and Italy.

Looking at the size categories, percentage figures increase with the firm size class in Spain independently of the sector, while small companies were worst in Italy due to lower equity capitalization, except for construction. The medium-sized entities were better endowed with capital in France and Germany in this respect, while in Belgium and Portugal there were generally no relevant differences across the three size classes.

With regard to the micro size classes, the ratio “Percentage of Companies with Net Worth below NwaR” is much higher than in the other three size classes more or less in all countries and sectors, except for large entities in construction as noted above (and French medium-sized construction, see figures in Annex 1, page 38-43). This is again due to much higher dispersion in the two underlying variables net income and net worth compared to other sizes classes.⁸¹ Comparing the three sectors of the micro size class, higher percentages in trade are visible in all countries apart from Germany, followed by manufacturing. The slight lead in trade is the consequence of higher NwaR levels, as described in chapter 4.2.

As noted in the section 3.3, the recent crisis did not have a negative impact on the net worth ratio but even showed improvements in medium and upper quantiles. Therefore the percentage of firms with net worth below conditional NwaR decreased in 2008-09.⁸² The fall is particularly evident for the manufacturing sector in Italy and in Germany (for instance, in the case of medium-sized firms, it was more than 12 and 8 percentage points lower, respectively).

These drops have brought all countries closer together both in manufacturing and trade (much as noted in section 4.1, but for a different reason). Prior to the crisis, it is notable that Germany had been experiencing a strong positive trend in the percentage ratio since 2000. As for the Net Worth ratio itself, this is caused by internal tax reforms and Basel II requirements (as mentioned above in section 3.3).

Unlike the other classes, the micro class did not show either a downward trend or country-convergence in the percentage of companies. After the latest crisis, slight decreases can be observed in Germany, Spain, Italy and Portugal for all sectors and in France for construction.

⁸¹ French micro entities are an exception. However, as discussed in section 2.3, this size class in France is biased to quite “larger” micro companies.

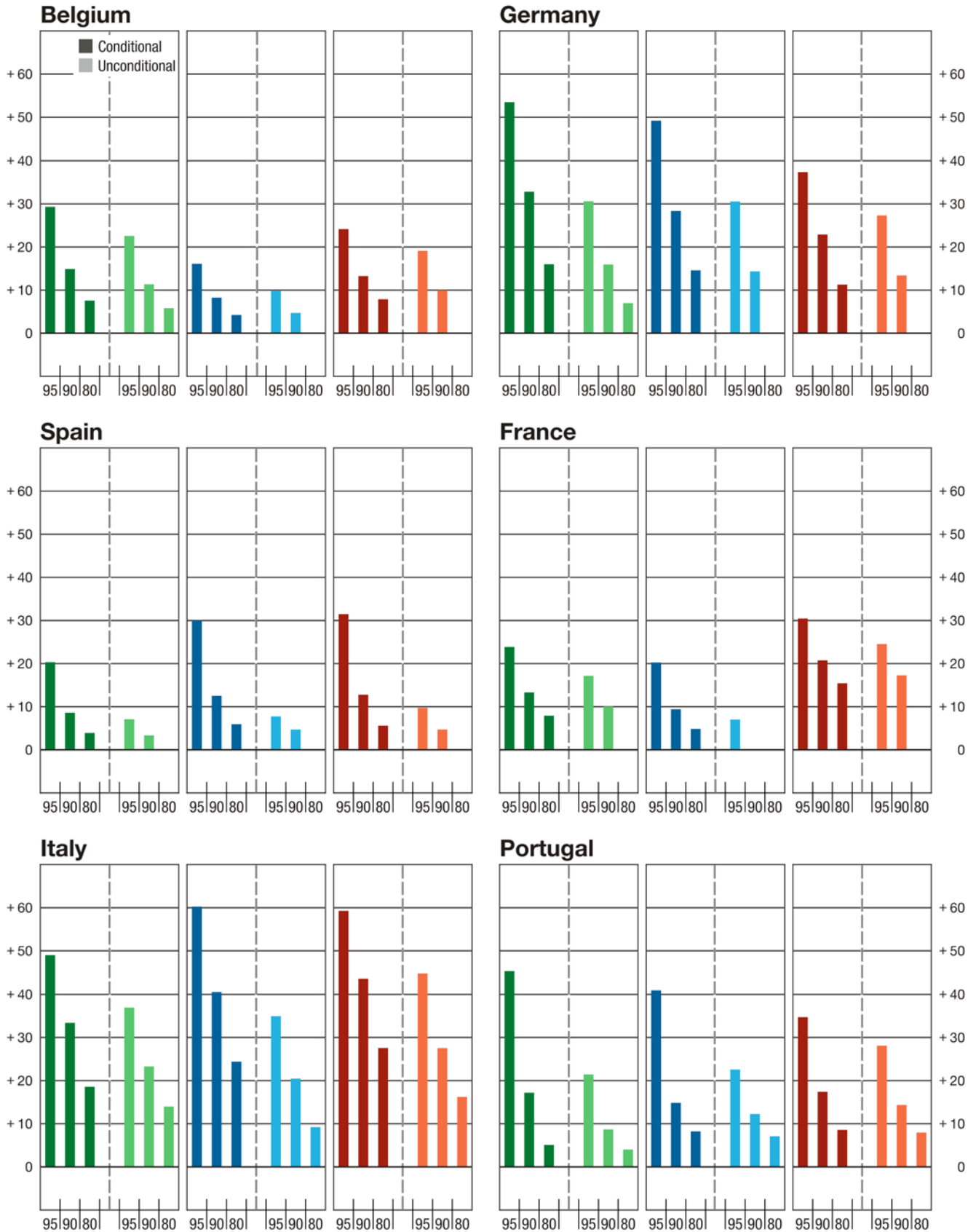
⁸² The time series of the figures “Percentage of firms with net worth below conditional NwaR” are included in Annex 2.

Percentage of Companies with Net Worth below NWR in 2010

Small size entities

Figure 4.8

Manu- Construction Trade Manu- Construction Trade
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The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWR.

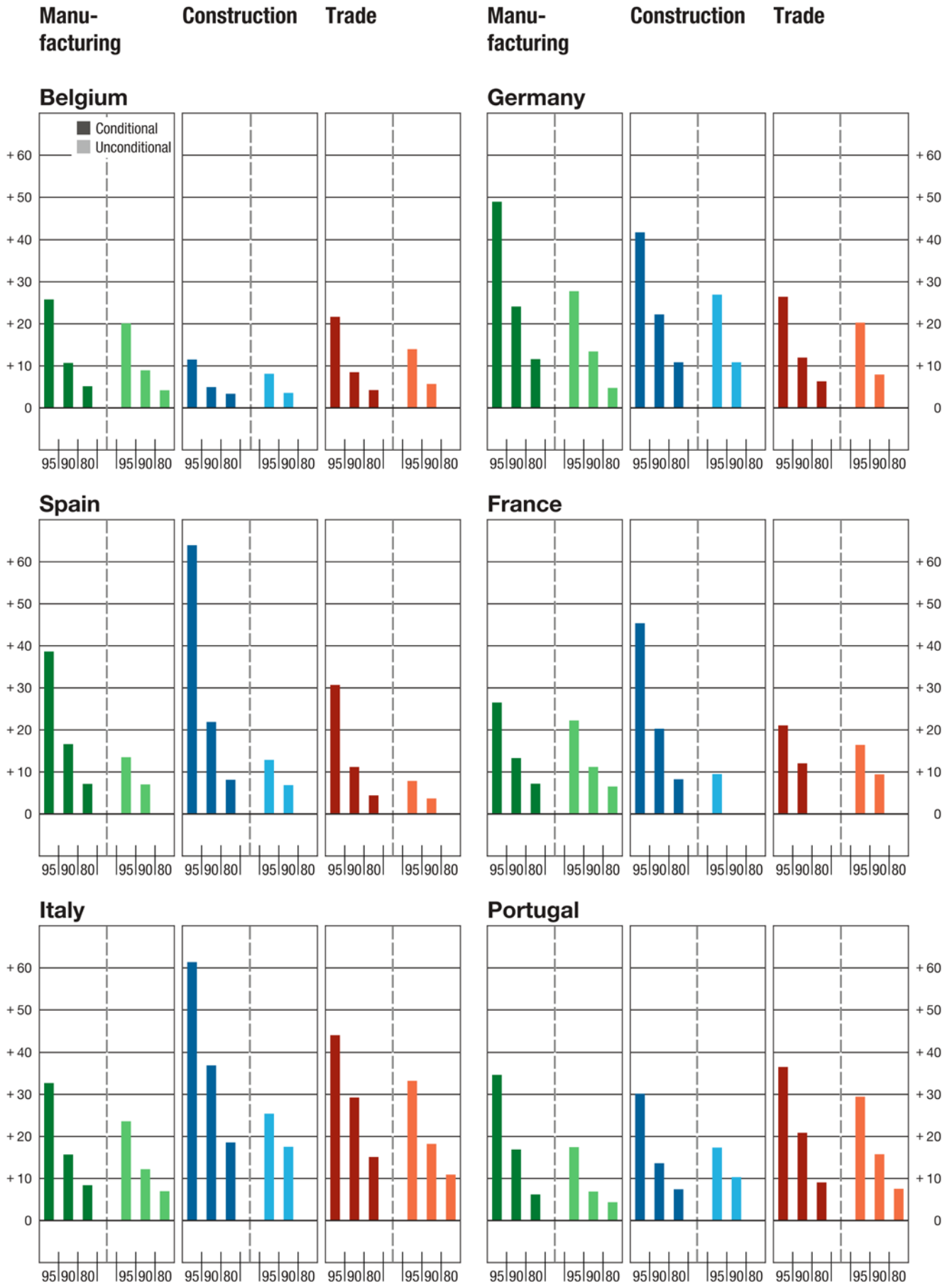
The ratios for the unconditional confidence levels of the ratio “Percentage of companies with equity below NwaR” are by definition lower than the conditional ones. Though for some countries’ sectors, differences are notably high like in German manufacturing, French and Italian construction and in Spain in general. For the 95% confidence level, differences amount to more than 20 percentage points. For the large construction sector, differences range between 30 and 80 percentage points. These large differences in the share of companies reflect the high values of conditional NwaR, in relation to the two-year losses in the recession of the early 1990s, which was particularly severe in Spain (independently of the sectors) and in Germany (apart from trade). They also make visible how much more a sector-size class is sensible to losses in times of crisis.

Similarly to conditional figures, micro firms are less endowed with capital with regard to a loss scenario independent of a crisis compared to other size classes. This stands across sectors and in all percentiles.

Percentage of Companies with Net Worth below NWR in 2010

Medium size entities

Figure 4.9

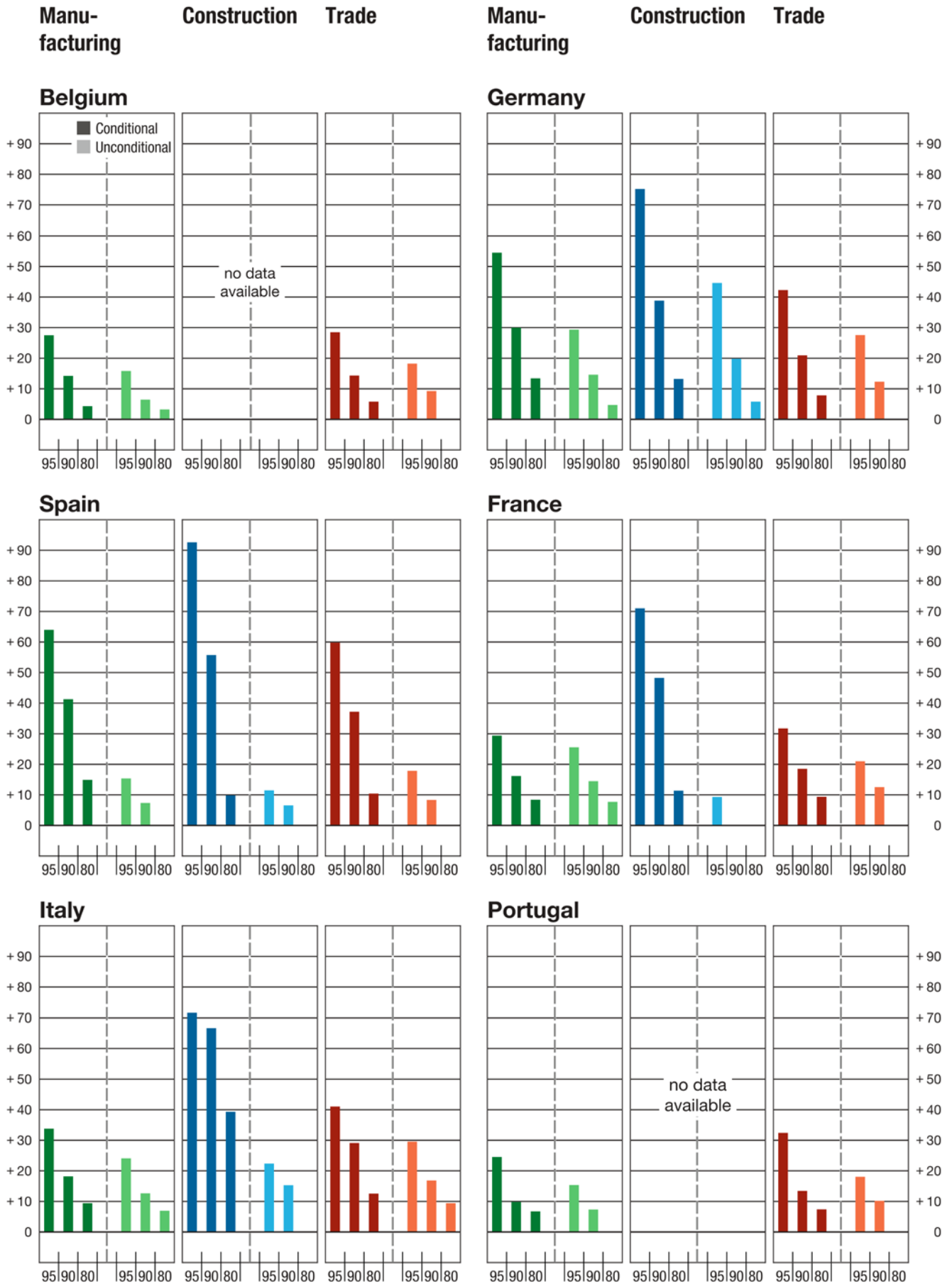


The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWR.

Percentage of Companies with Net Worth below NWR in 2010

Large size entities

Figure 4.10



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWR.

5 Conclusions

Corporate firm-level data from financial statements has proven again to be essential when analyzing the economic situation. In this report, the profitability and the equity capitalization within the corporate sector has been investigated, revealing the strong impact of the economic crisis for the years 2008-2009 on corporate financial statements. However, major differences exist between such prominent sectors as manufacturing, construction and trade. The same applies to size effects, which should always be kept in mind when analyzing annual accounts. The availability of extensive datasets on firm level data also allowed us to investigate different strata of the distributions on net income and net worth, revealing differences that would have been hidden if we had investigated solely averages instead.

With regard to profitability, the report shows that all three sectors under observation were affected to different degrees by the severe economic crisis of 2008-09. Inevitably, manufacturing was hit hard by the strong decline in global trade in these years. The same can be said of the trade sector, although the retail trade mitigated the effect. Our figures show that the construction sector in Spain was particularly affected. A significant decline in profitability is also seen for French and Portuguese firms in this sector. In contrast, the German construction sector fared well, mostly due to the government measures implemented upon the outbreak of the downturn. The study also finds evidence that less profitable firms are more sensitive to the business cycle. Additionally, less profitable firms generally have lower equity capitalization.

Quite surprisingly, equity levels to total assets generally improved in the crisis years. Various factors can explain these results, mainly the decrease in total assets as investments were halted and the increase of retained earnings and other reserves. However, in some countries' sectors and size classes, in the left tail of the distributions, equity capitalization shrank slightly due to the crisis in 2009.

The study also shows that manufacturing has a higher potential of losses (NWR) because of a higher permanence of costs in times of crisis. However, when relating these potential losses to the equity capitalization, large construction entities are notably less capable of absorbing losses.

Aside from the economic crisis of 2009-10, many of the differences between the countries presented in this report result from differences in legal rules or institutional settings. The Study Group of the ECCBSO will continue to use the potential of their data sets in order to investigate structural differences in corporate finance between EU countries.

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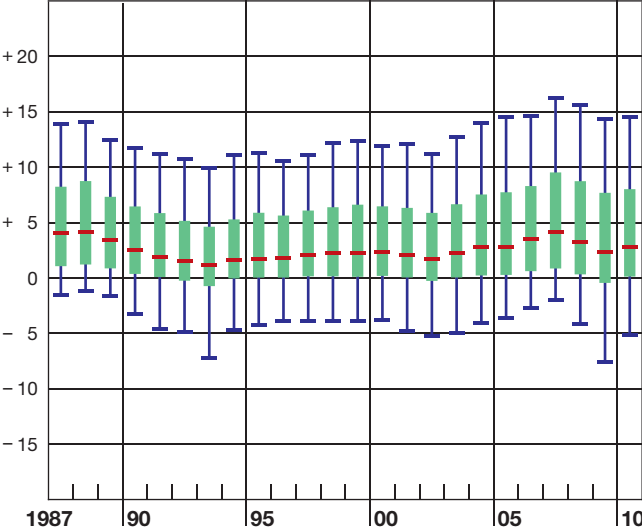
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Annex I: Figures

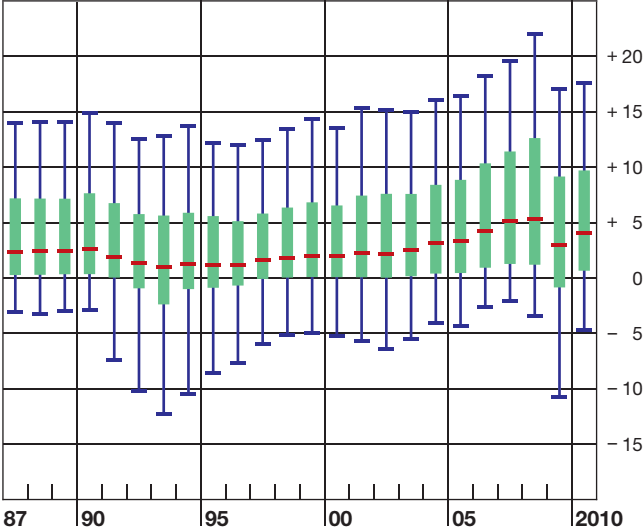
Net Income	Page	Net Worth at Risk	Page
(in % of Total Assets)		Across Sizes	
Manufacturing		Belgium	32
Small size entities	2	Germany	33
Medium-sized entities	3	Spain	34
Large entities	4	France	35
Construction		Italy	36
Small size entities	5	Portugal	37
Medium-sized entities	6		
Large entities	7		
Trade			
Small size entities	8	Percentage of Companies	
Medium-sized entities	9	with Net Worth below	
Large entities	10	NWaR in 2010	
Across Sizes		Across Sizes	
Belgium	11	Belgium	38
Germany	12	Germany	39
Spain	13	Spain	40
France	14	France	41
Italy	15	Italy	42
Portugal	16	Portugal	43
Net Worth			
(in % of Total Assets)			
Manufacturing			
Small size entities	17		
Medium-sized entities	18		
Large entities	19		
Construction			
Small size entities	20		
Medium-sized entities	21		
Large entities	22		
Trade			
Small size entities	23		
Medium-sized entities	24		
Large entities	25		
Across Sizes			
Belgium	26		
Germany	27		
Spain	28		
France	29		
Italy	30		
Portugal	31		

Net Income in % of Total Assets Manufacturing, Small size entities

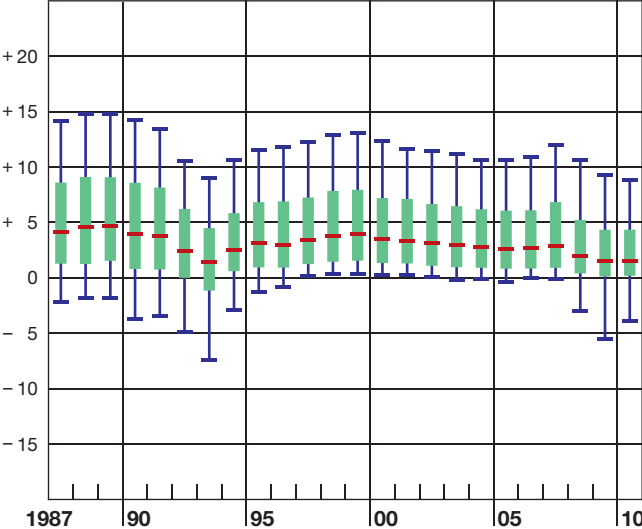
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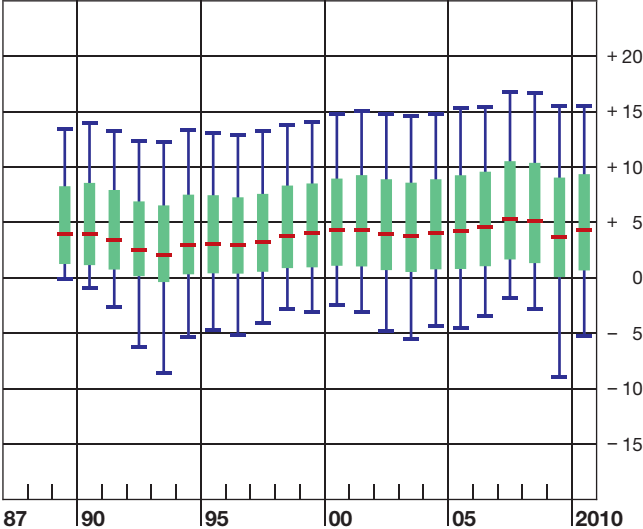
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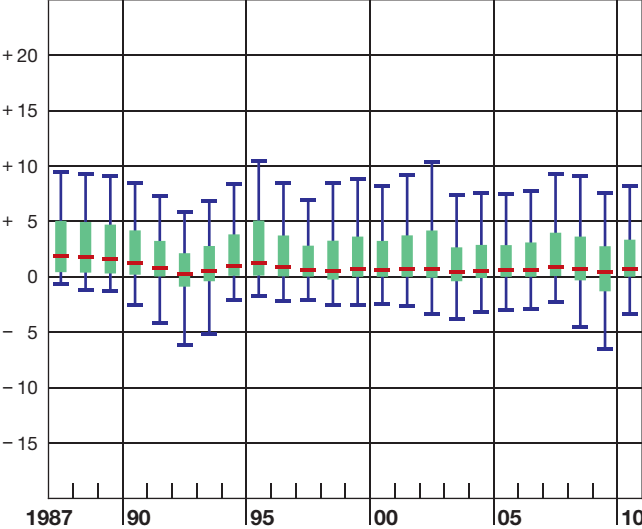
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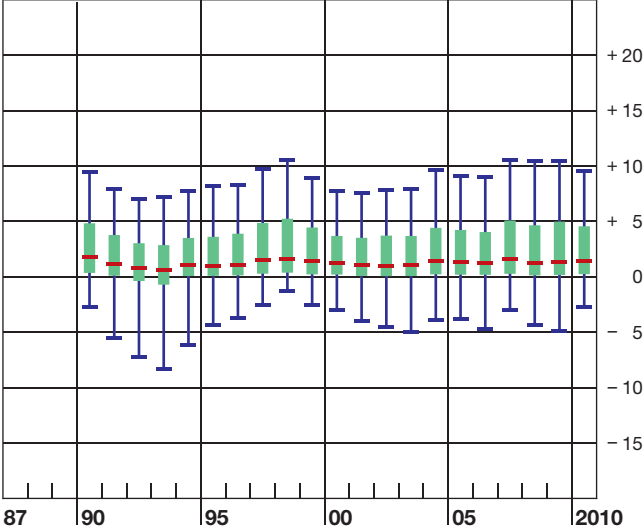
France



Italy



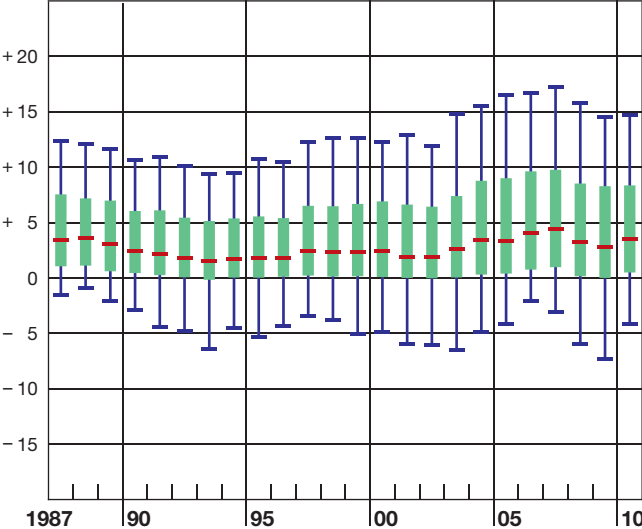
Portugal



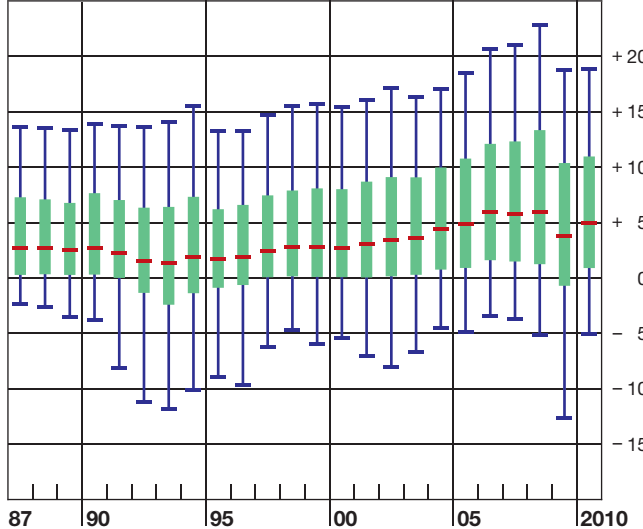
Box and Whisker Plot: The upper and lower limit of the green box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Net Income in % of Total Assets Manufacturing, Medium size entities

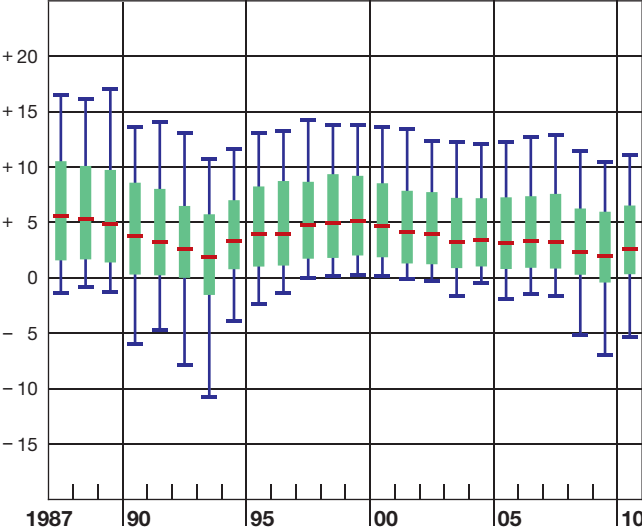
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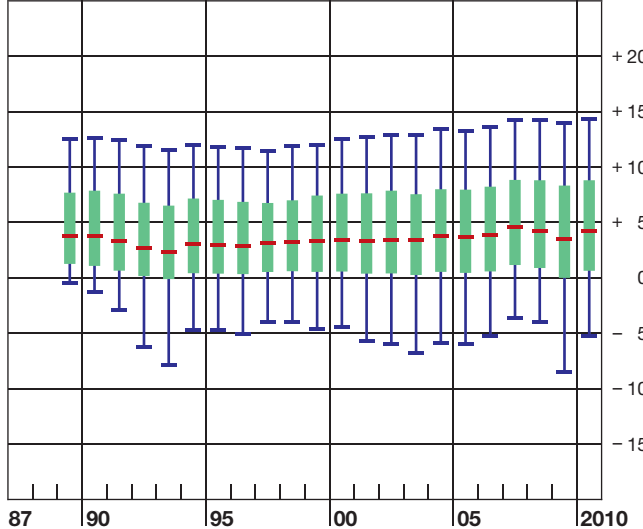
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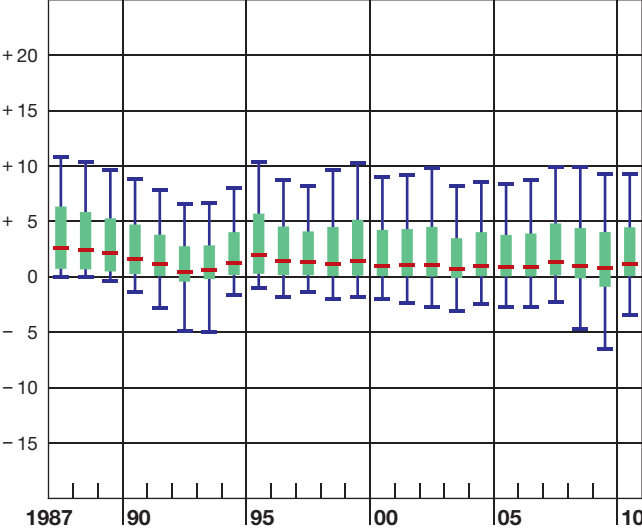
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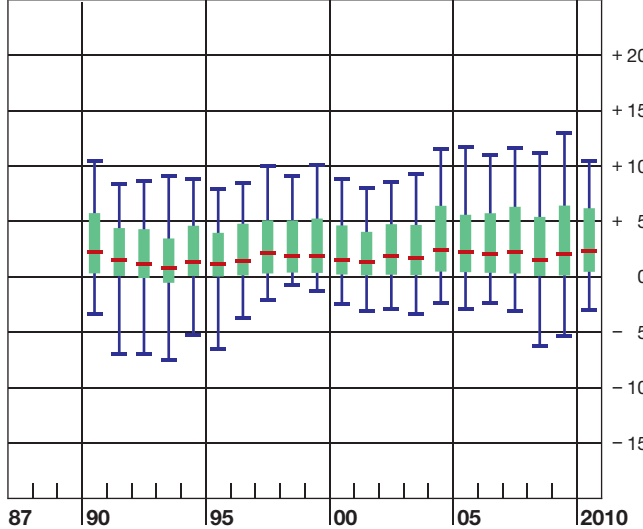
France



Italy



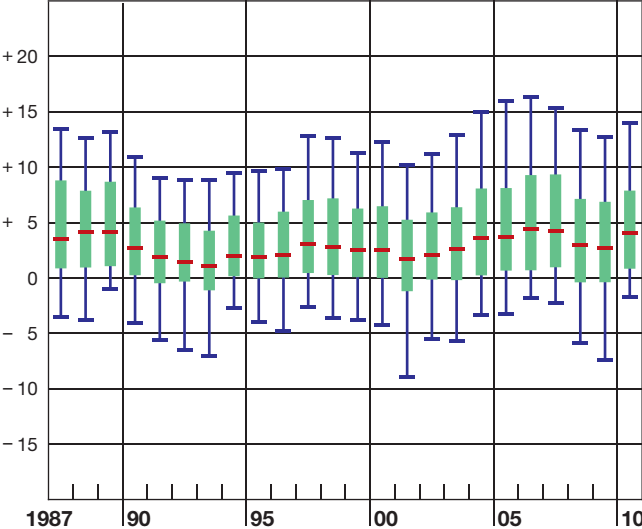
Portugal



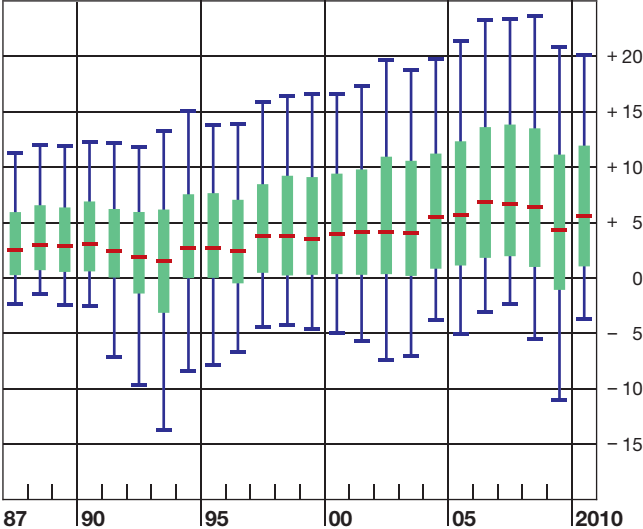
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Net Income in % of Total Assets Manufacturing, Large size entities

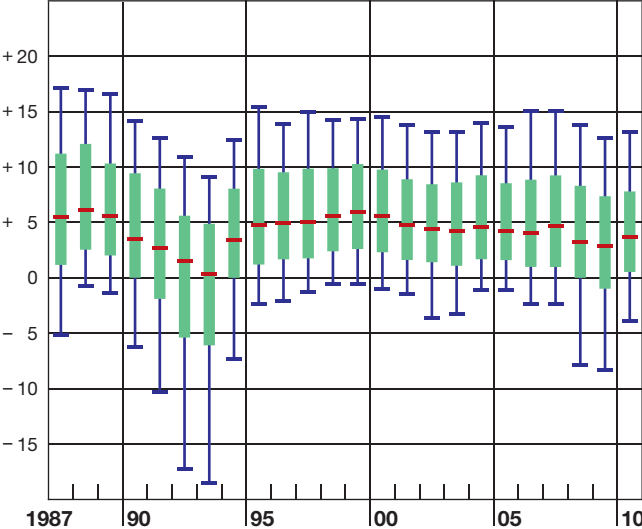
Belgium



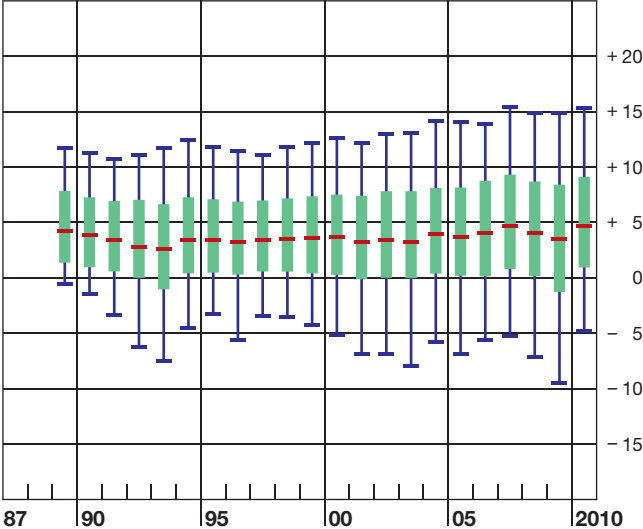
Germany



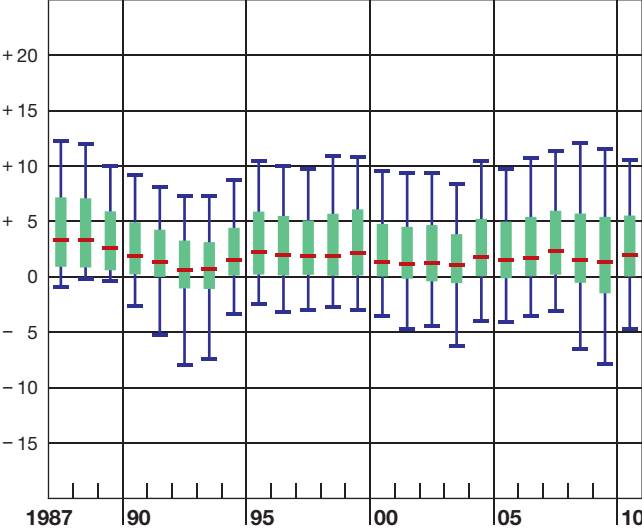
Spain



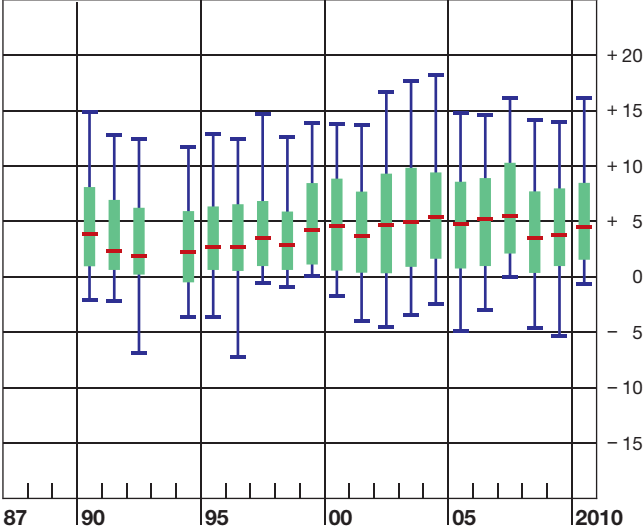
France



Italy



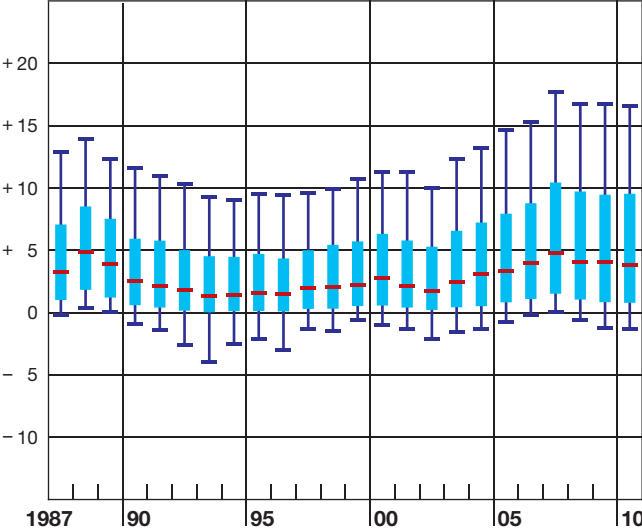
Portugal



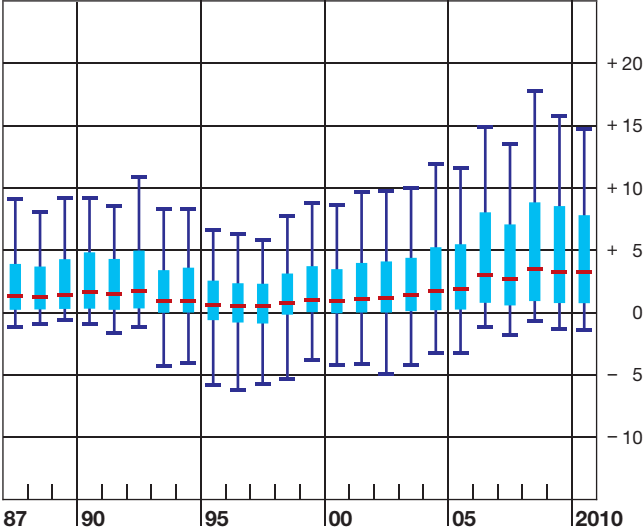
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Net Income in % of Total Assets Construction, Small size entities

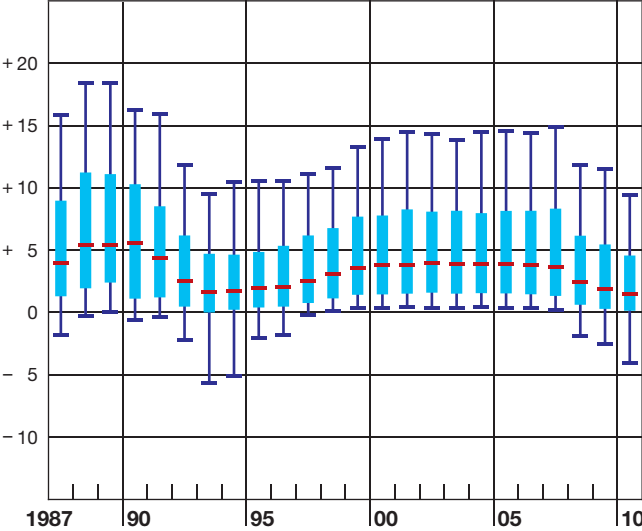
Belgium



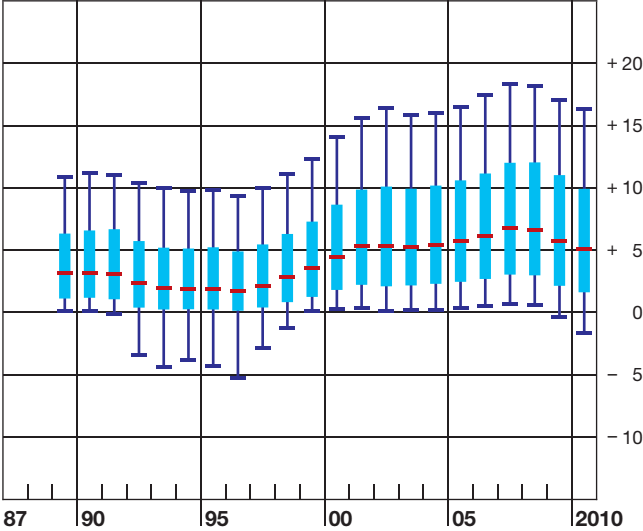
Germany



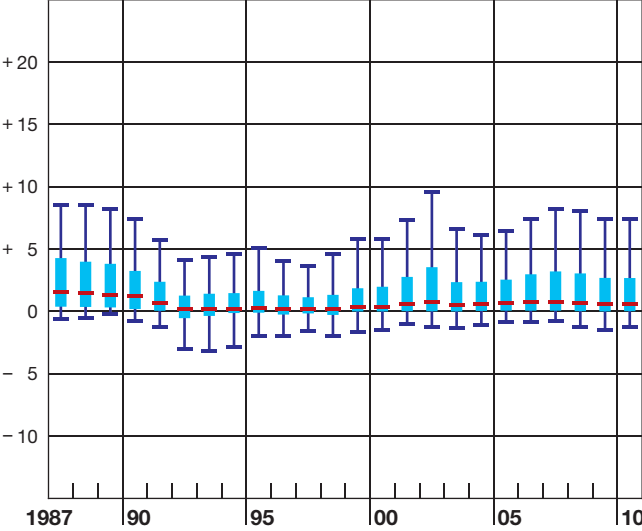
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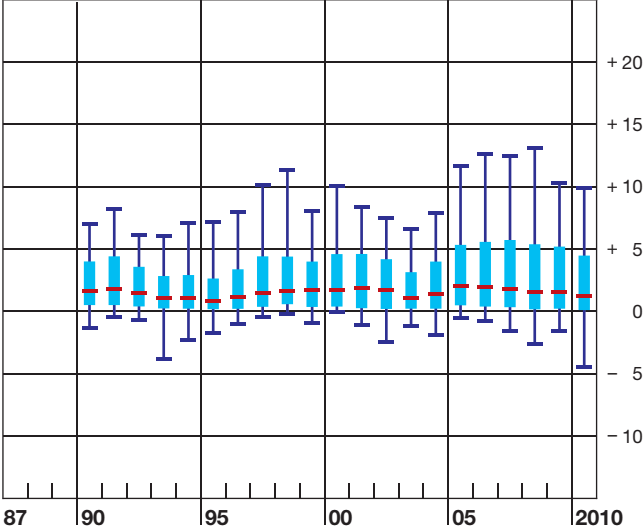
France



Italy



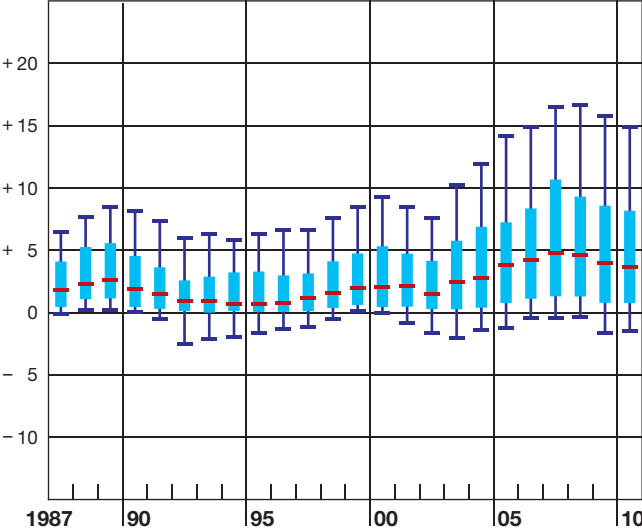
Portugal



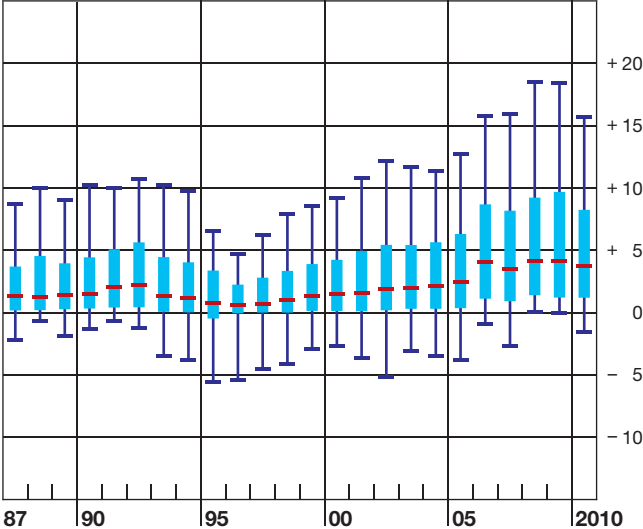
Box and Whisker Plot: The upper and lower limit of the blue box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Net Income in % of Total Assets Construction, Medium size entities

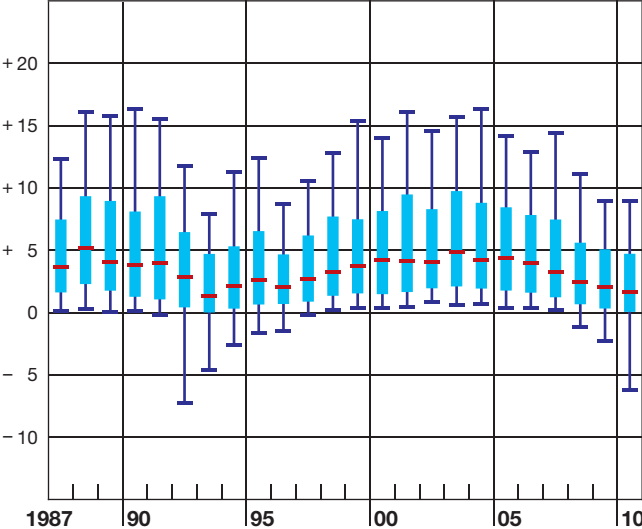
Belgium



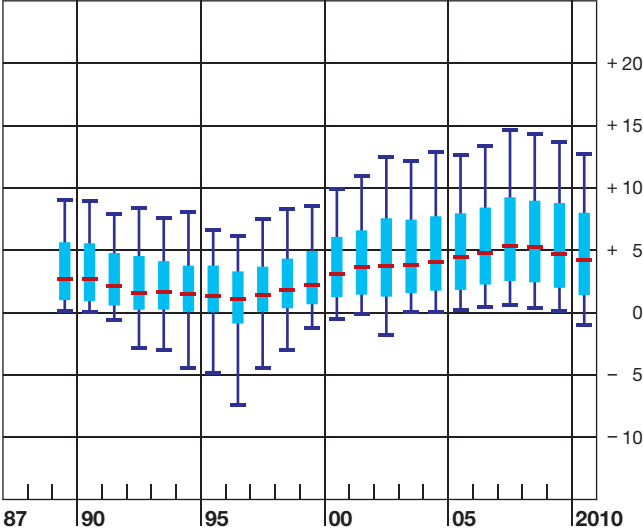
Germany



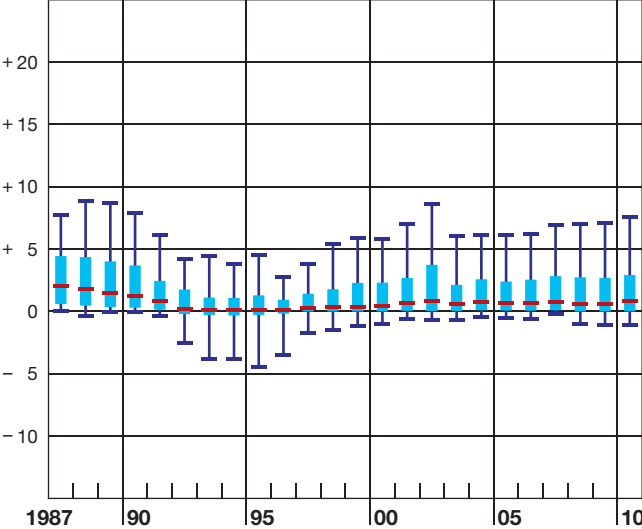
Spain



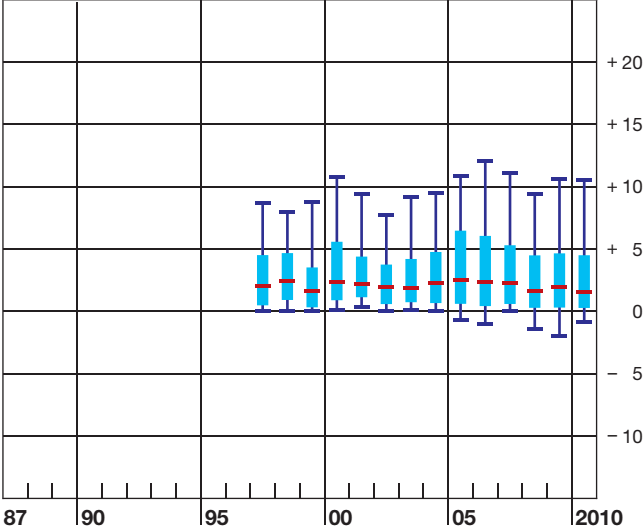
France



Italy



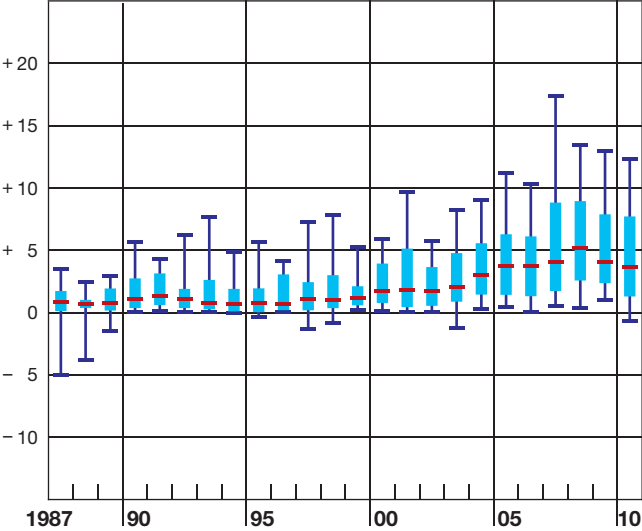
Portugal



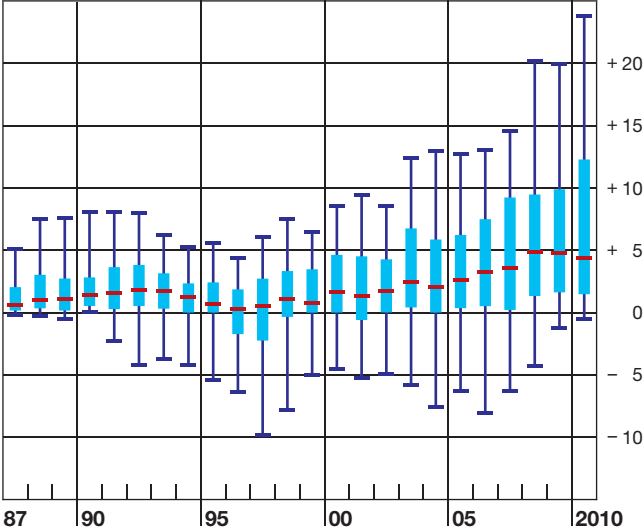
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Net Income in % of Total Assets Construction, Large size entities

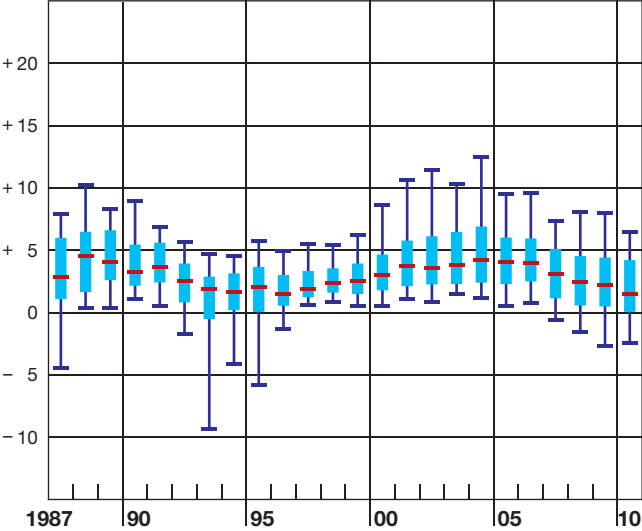
Belgium



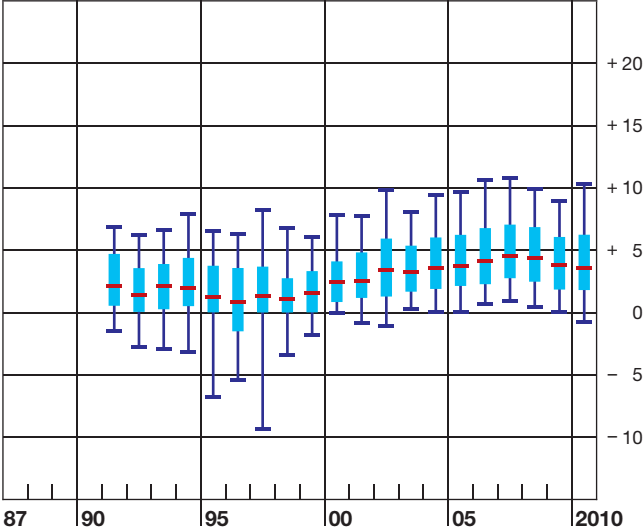
Germany



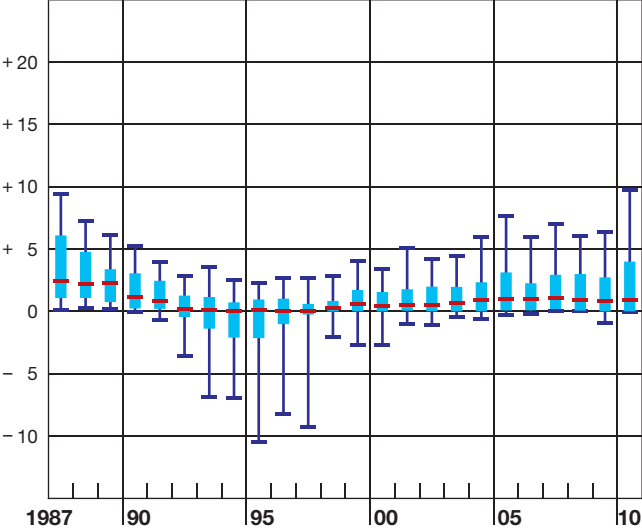
Spain



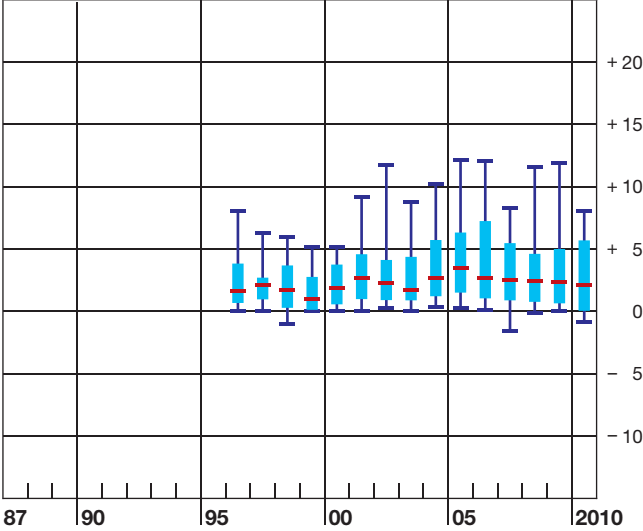
France



Italy



Portugal

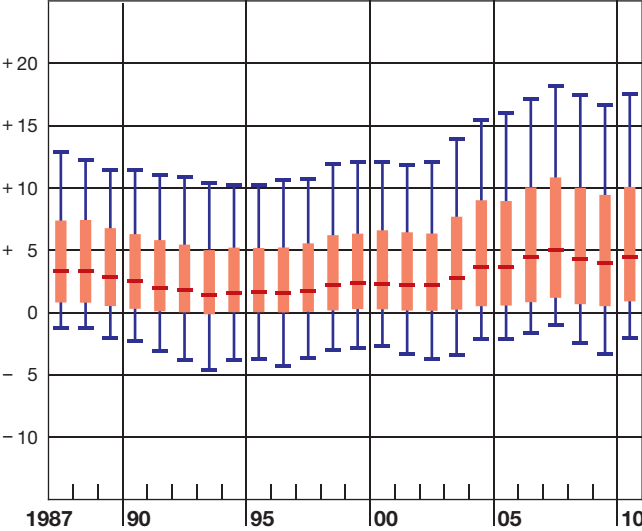


Box and Whisker Plot: The upper and lower limit of the blue box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

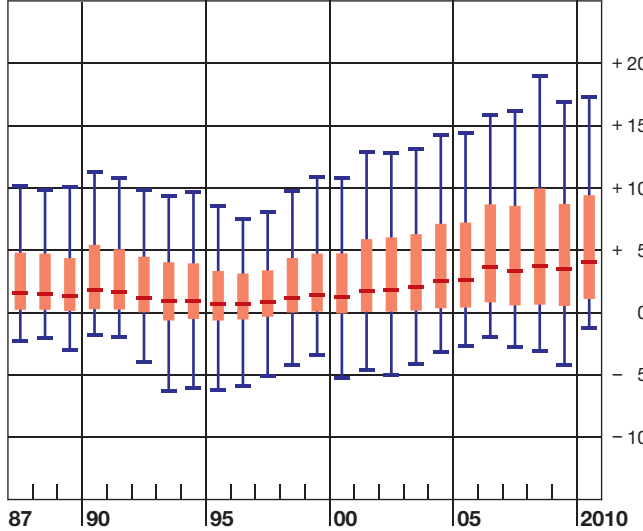
Net Income in % of Total Assets

Trade, Small size entities

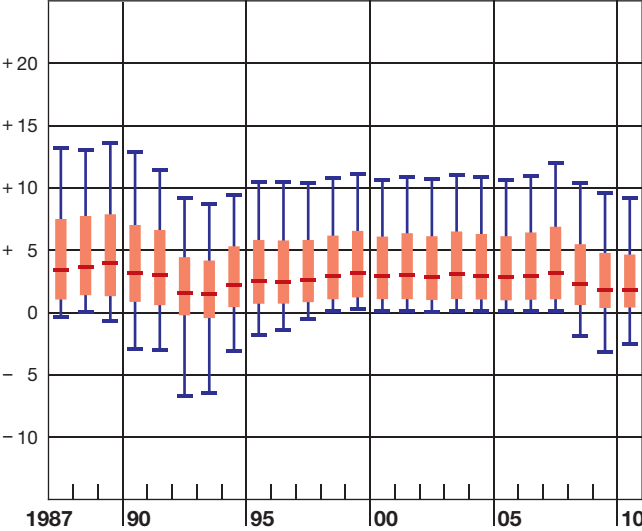
Belgium



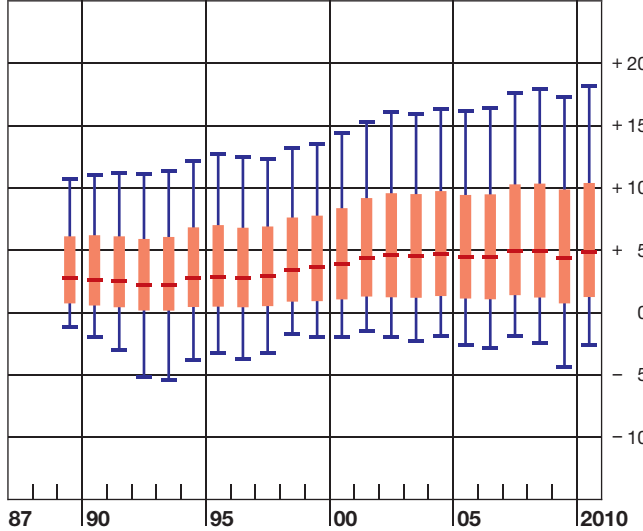
Germany



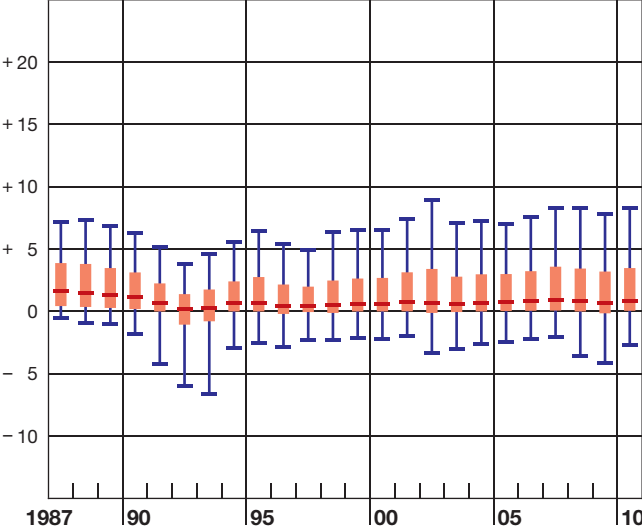
Spain



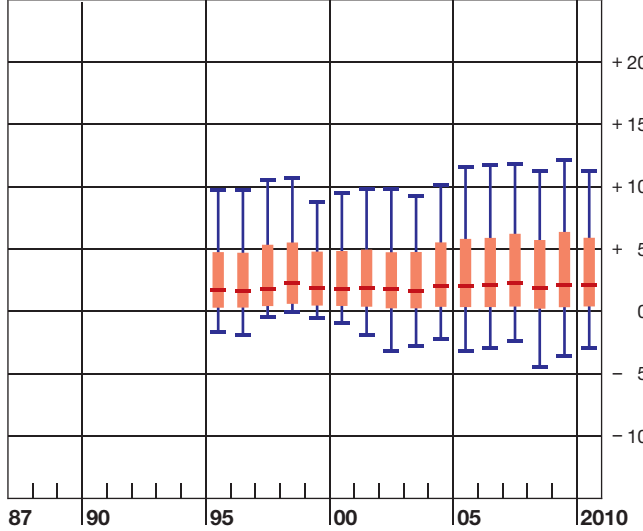
France



Italy



Portugal

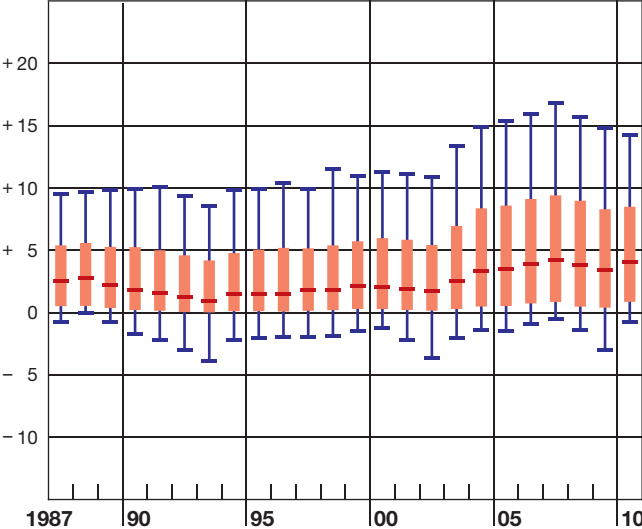


Box and Whisker Plot: The upper and lower limit of the red is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

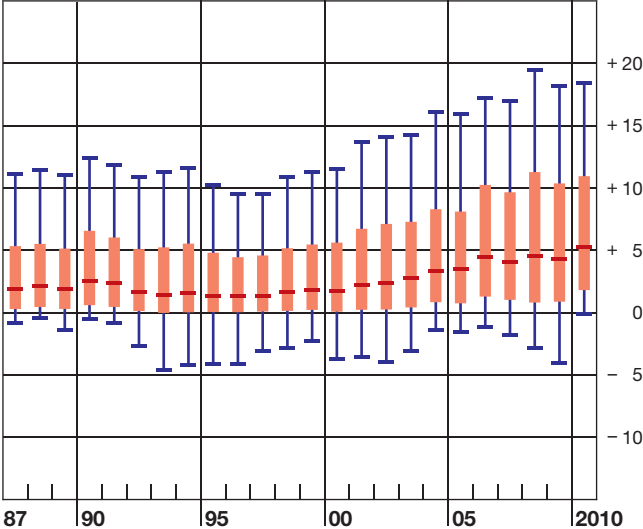
Net Income in % of Total Assets

Trade, Medium size entities

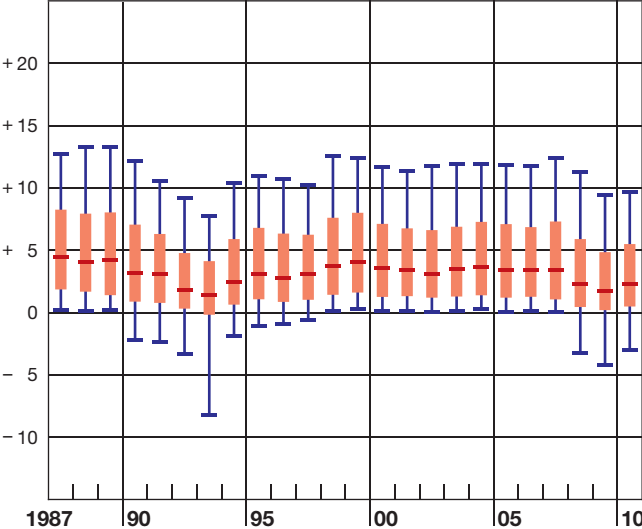
Belgium



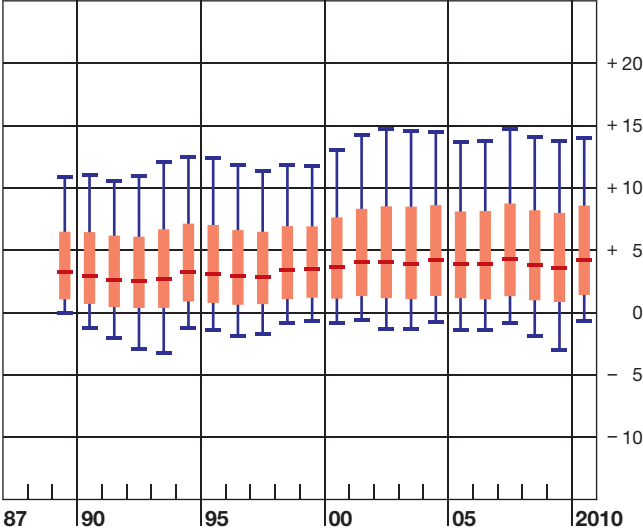
Germany



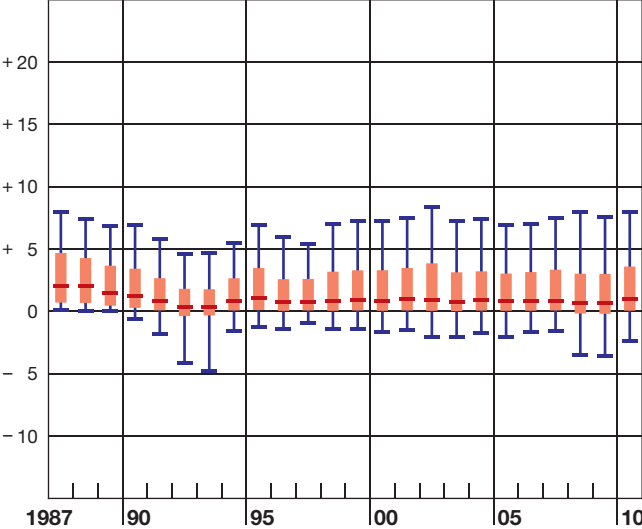
Spain



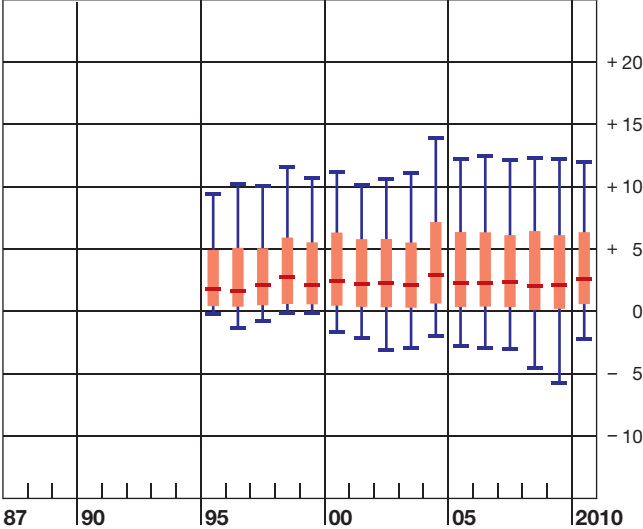
France



Italy



Portugal

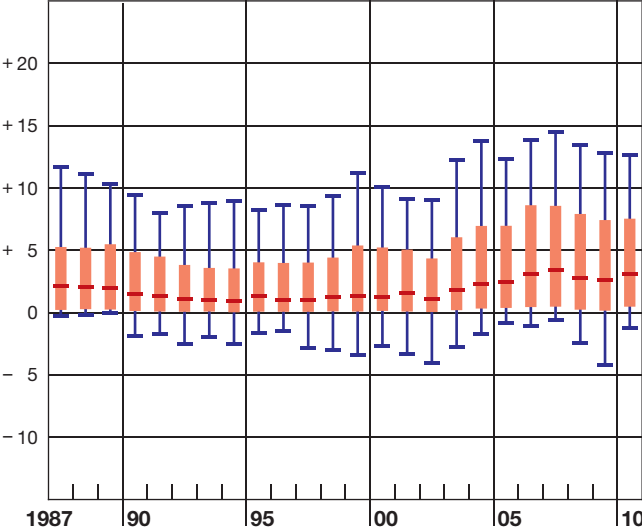


Box and Whisker Plot: The upper and lower limit of the red box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

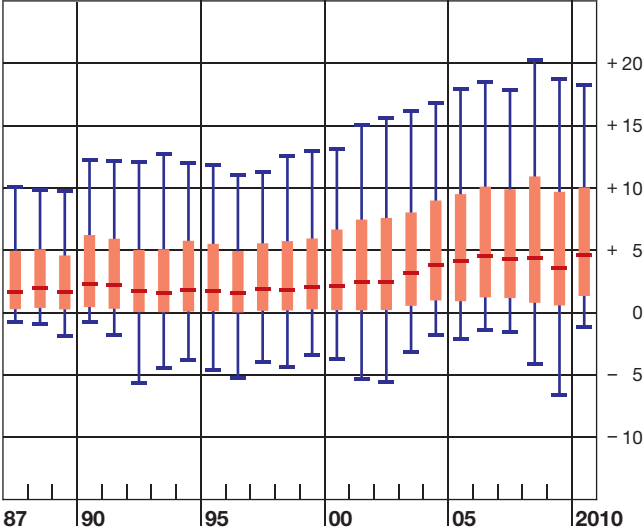
Net Income in % of Total Assets

Trade, Large size entities

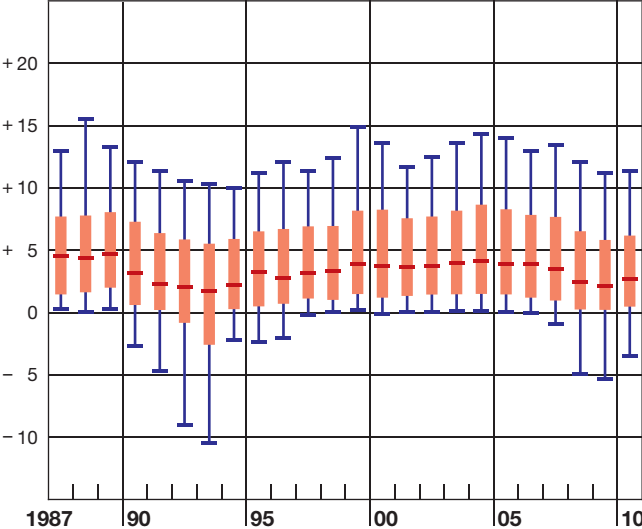
Belgium



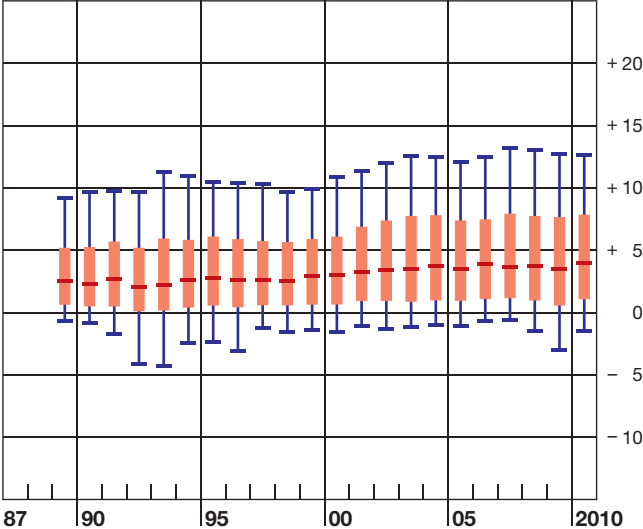
Germany



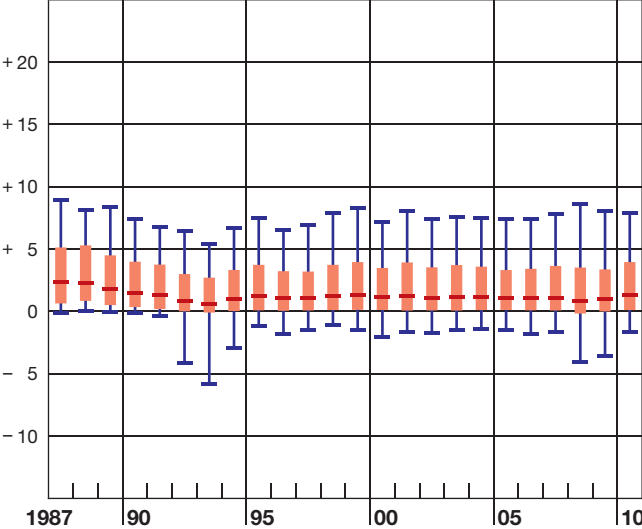
Spain



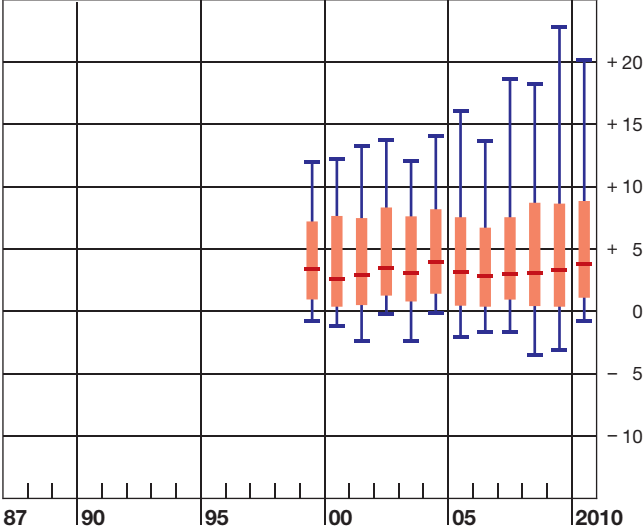
France



Italy



Portugal



Box and Whisker Plot: The upper and lower limit of the red box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Belgium

Net Income in % of Total Assets

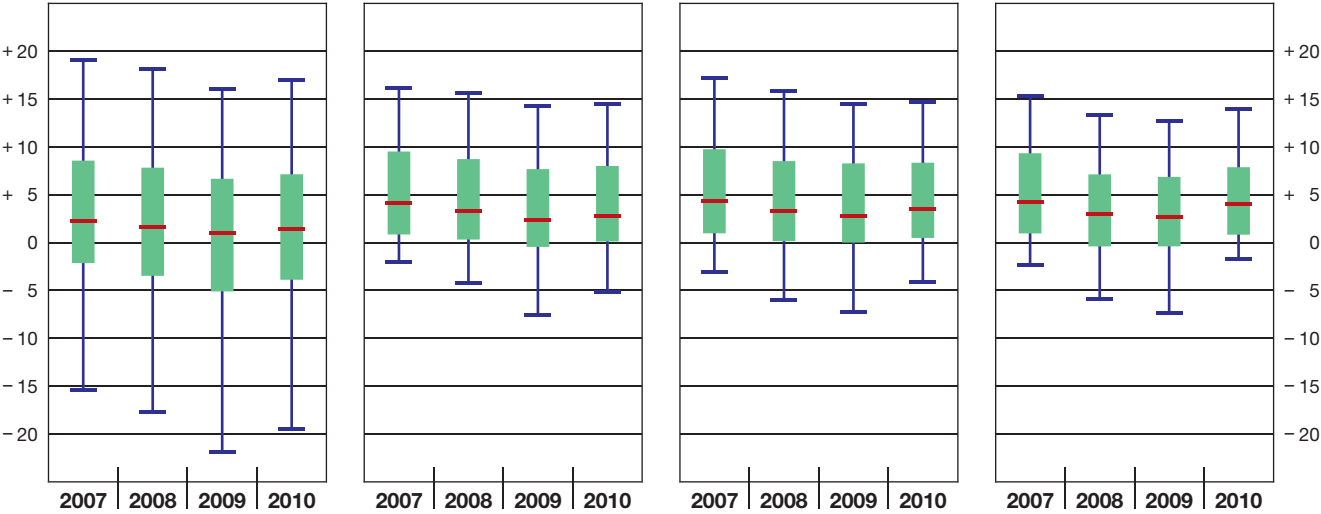
Micro

Small

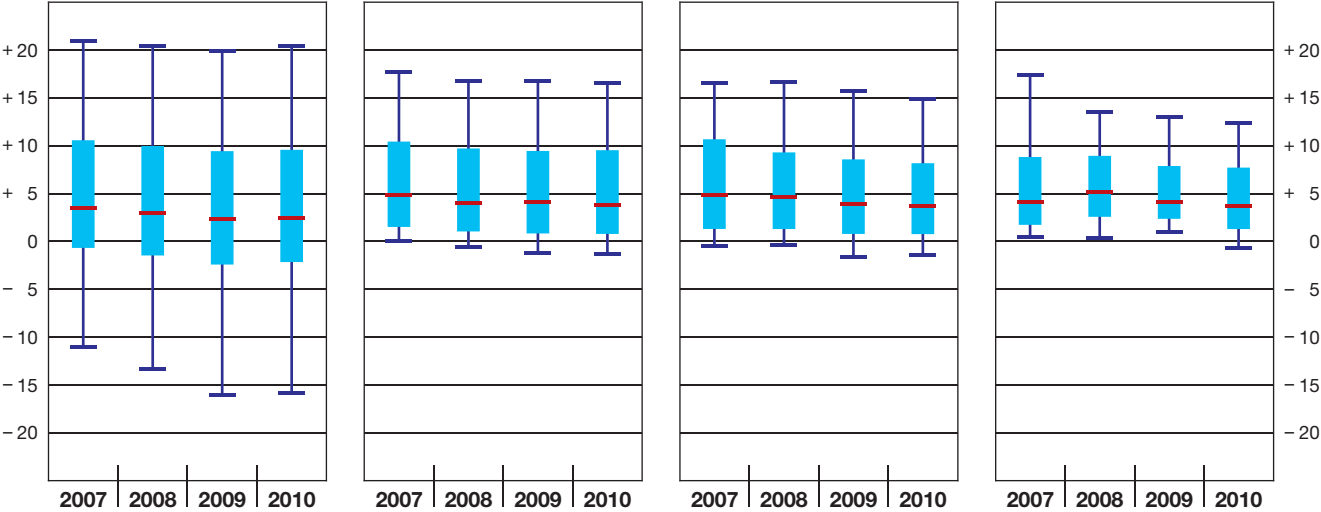
Medium

Large

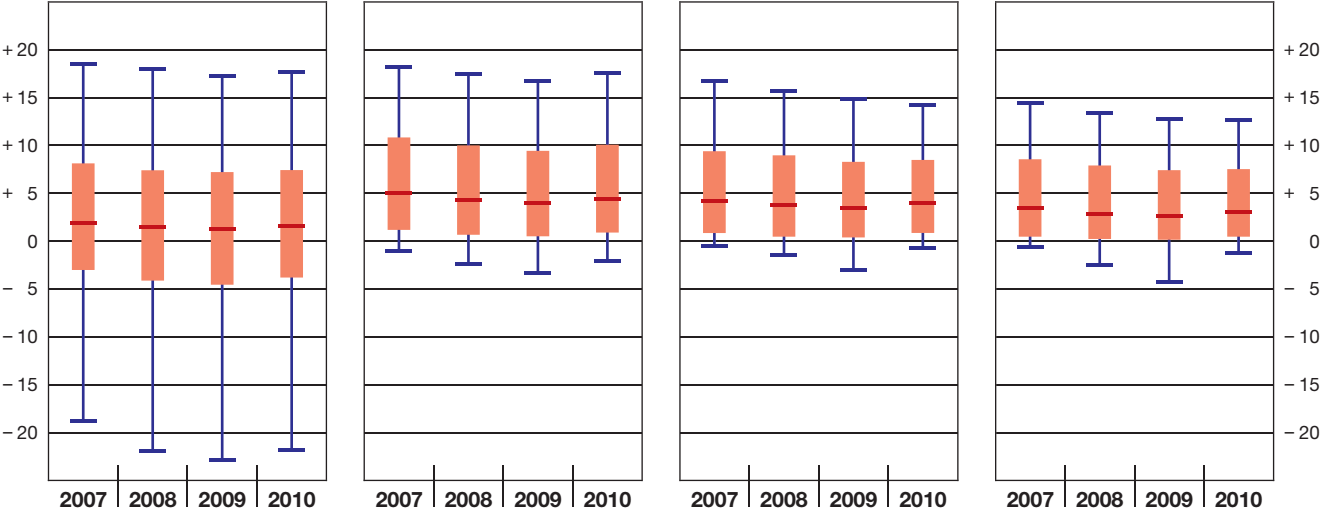
Manufacturing



Construction



Trade



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Germany

Net Income in % of Total Assets

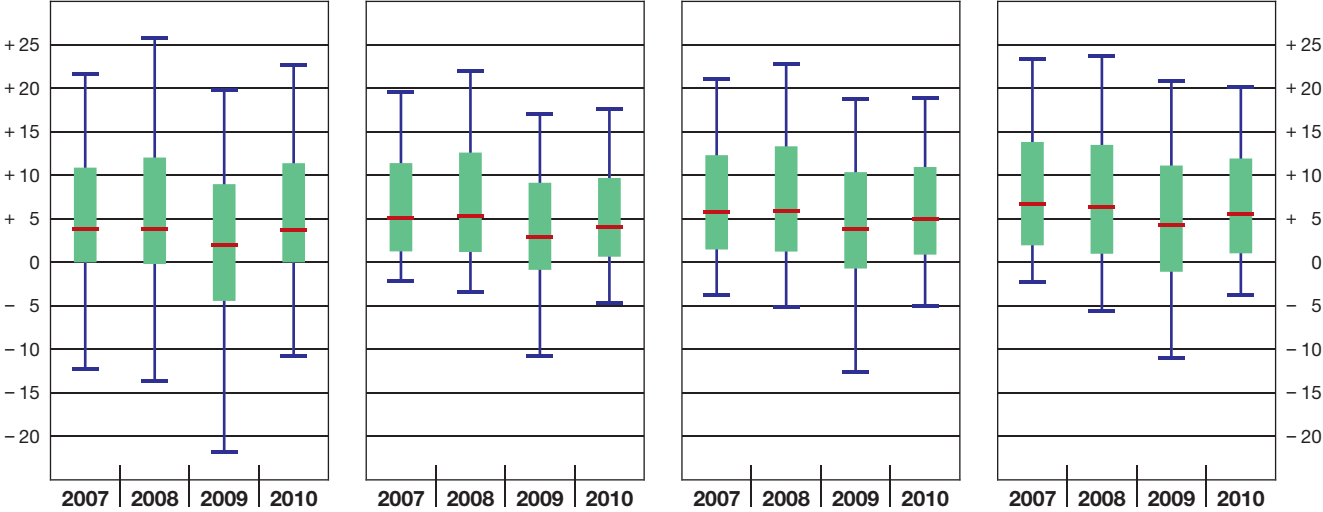
Micro

Small

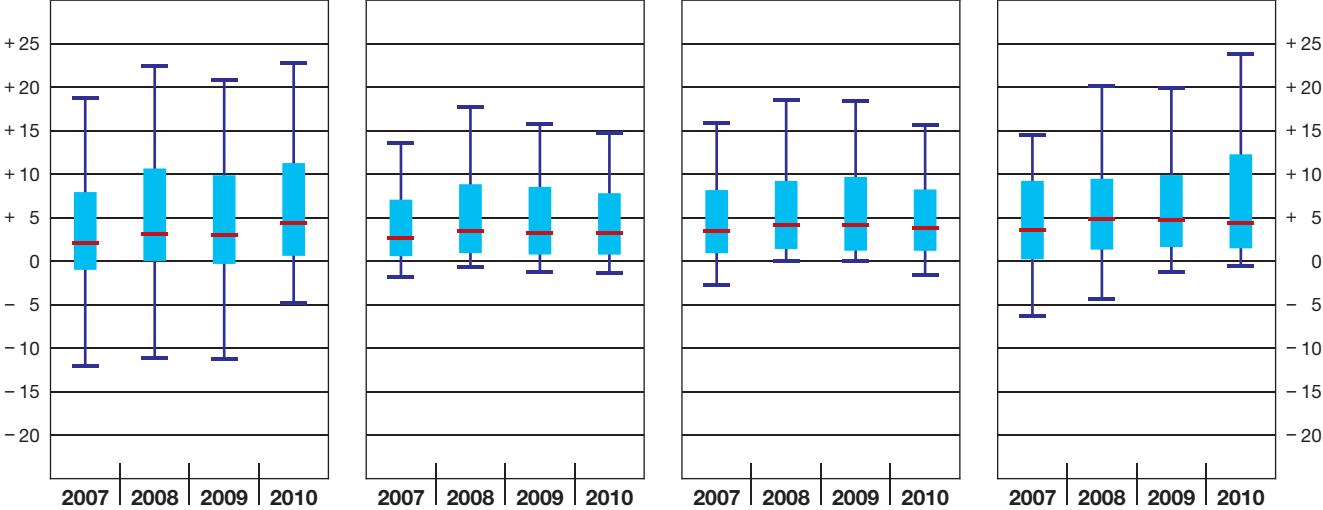
Medium

Large

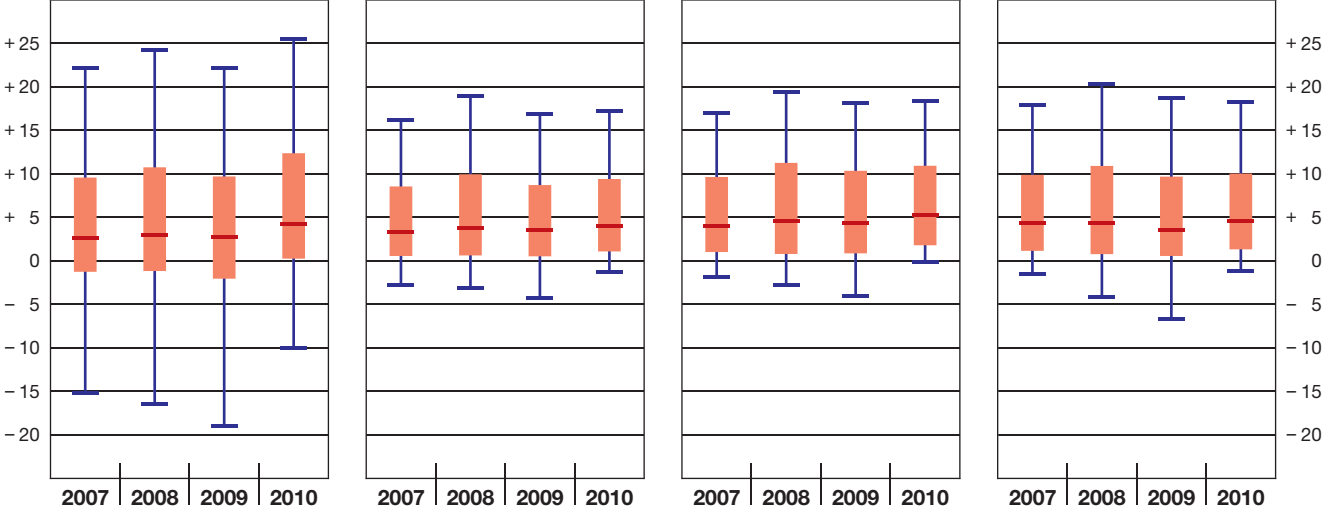
Manufacturing



Construction



Trade



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Spain

Net Income in % of Total Assets

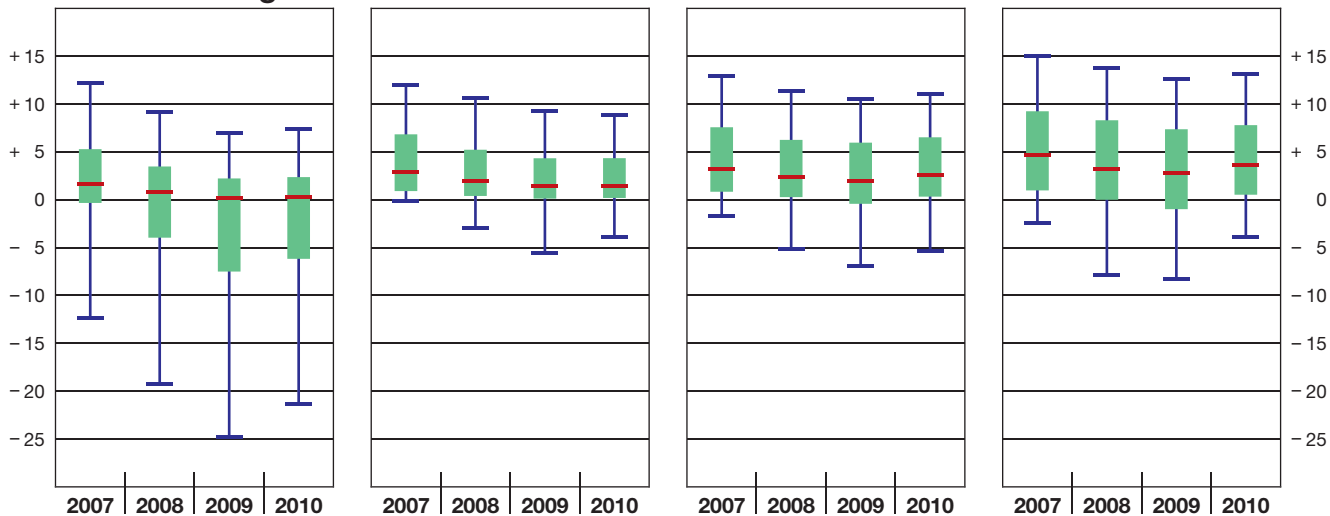
Micro

Small

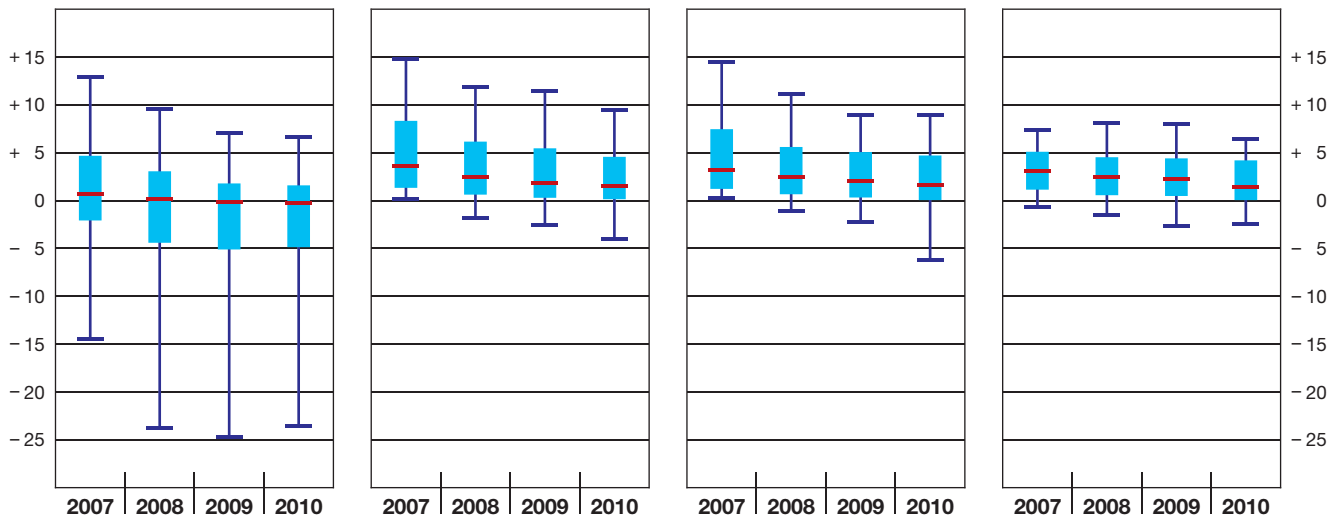
Medium

Large

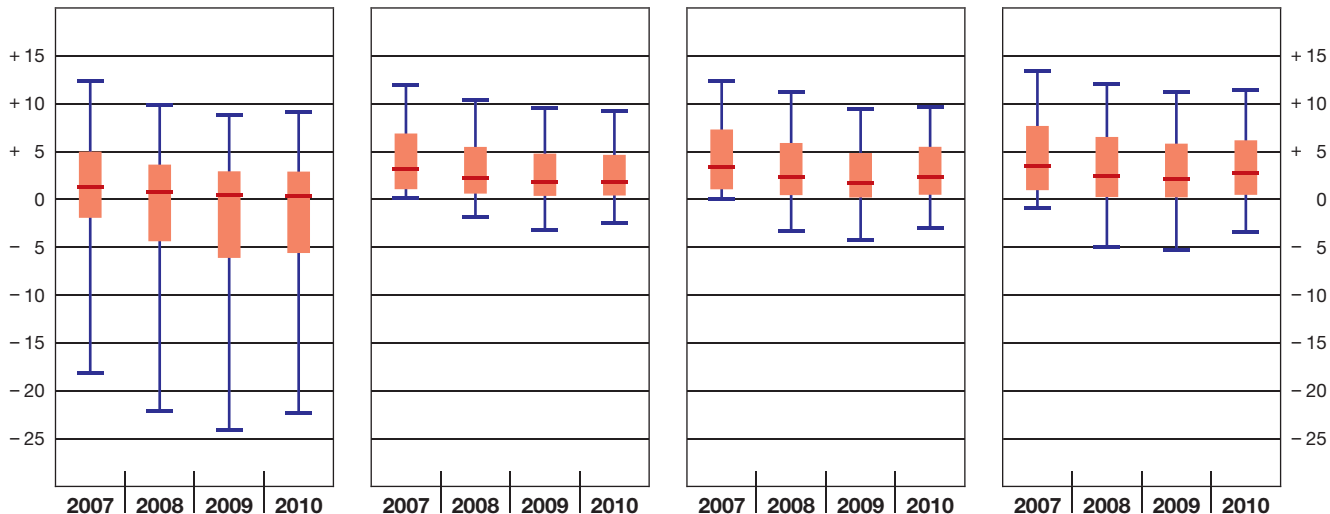
Manufacturing



Construction



Trade



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

France

Net Income in % of Total Assets

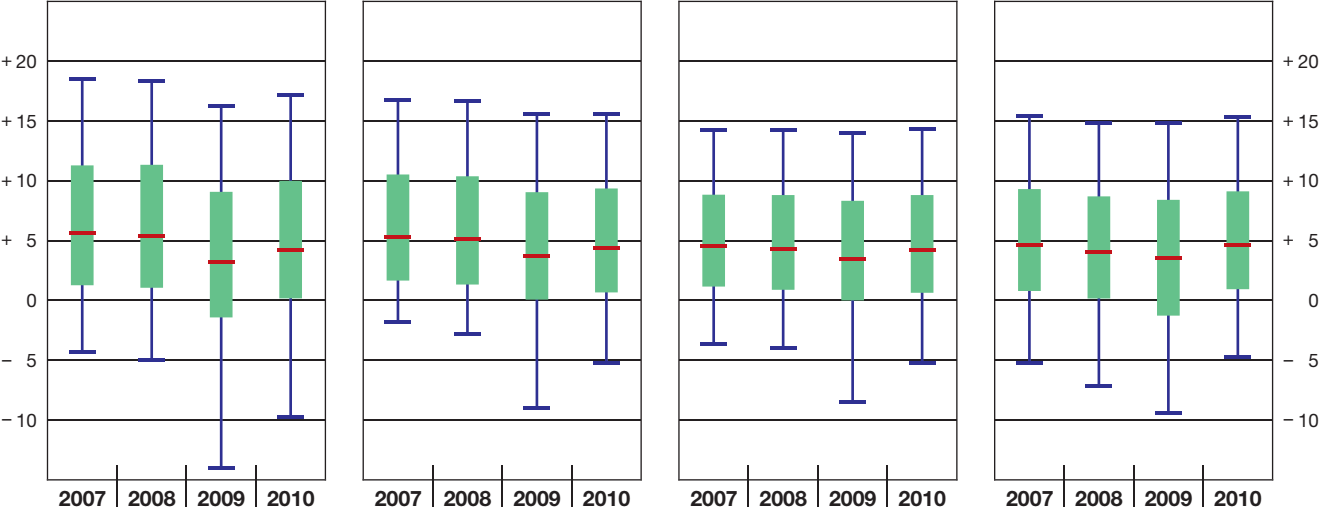
Micro

Small

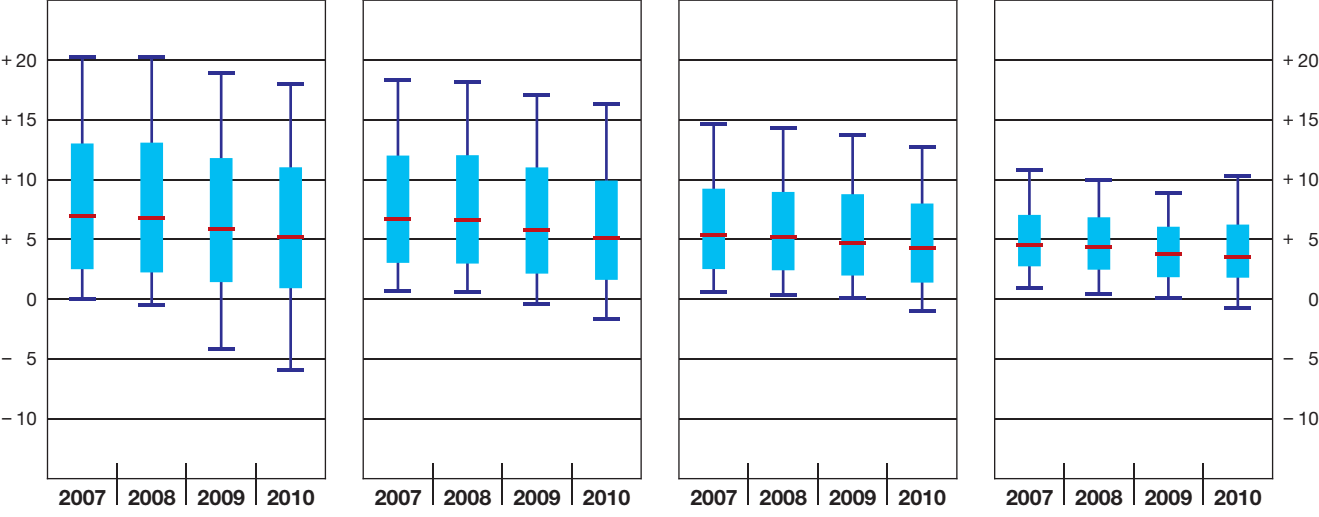
Medium

Large

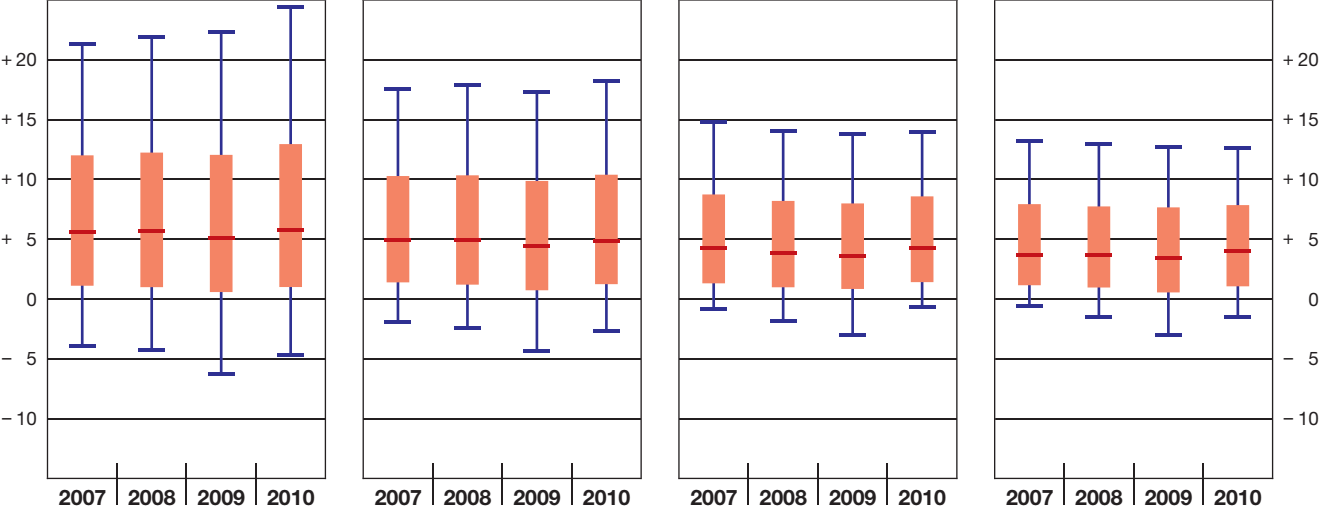
Manufacturing



Construction



Trade



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Italy

Net Income in % of Total Assets

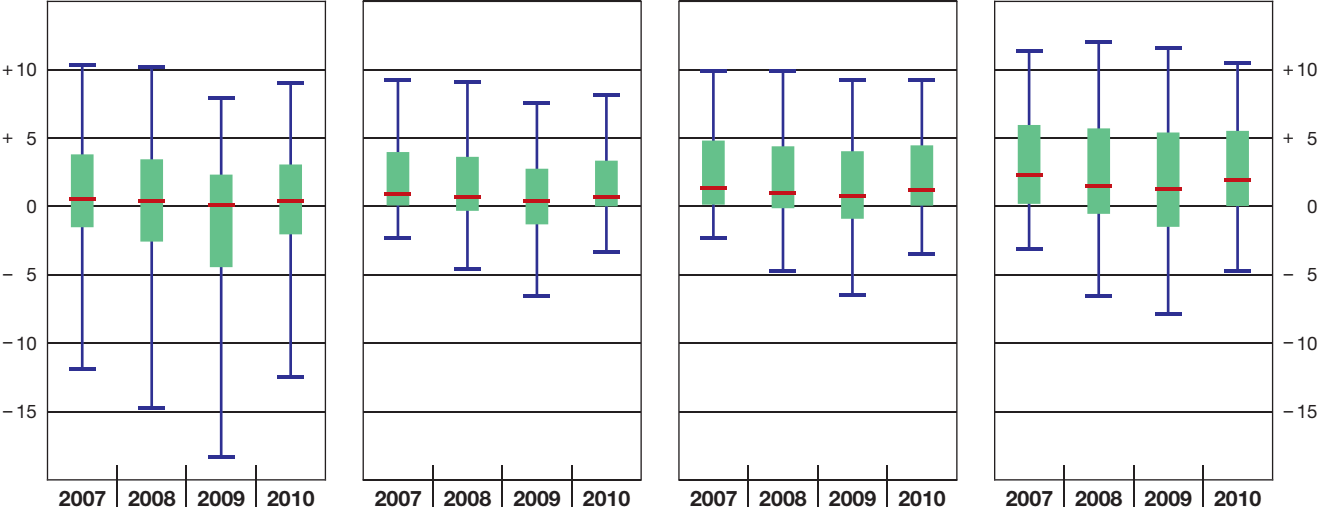
Micro

Small

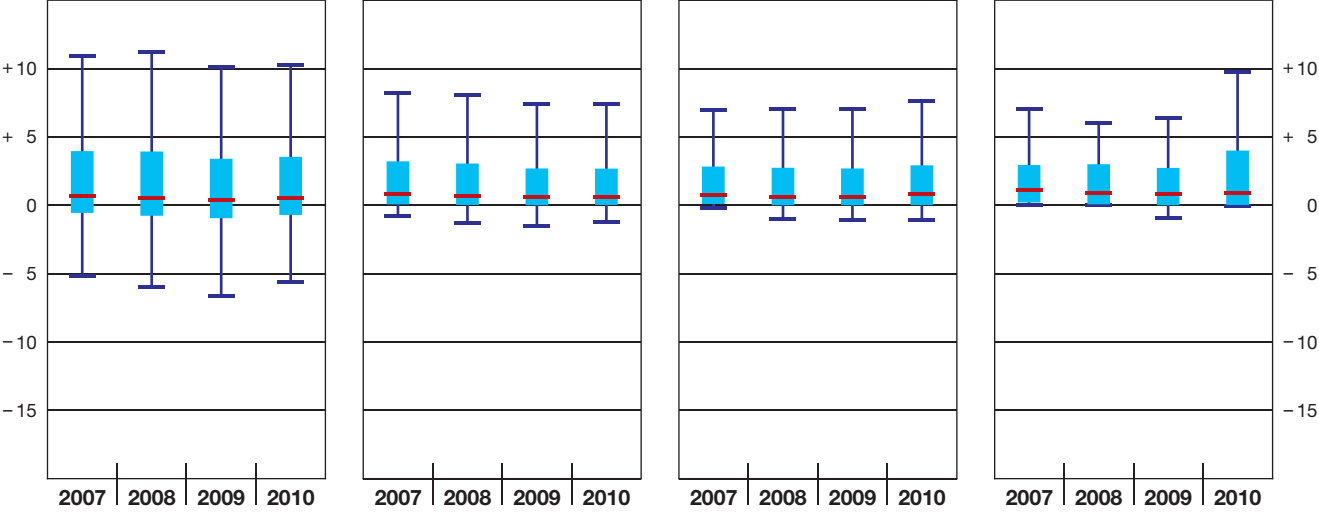
Medium

Large

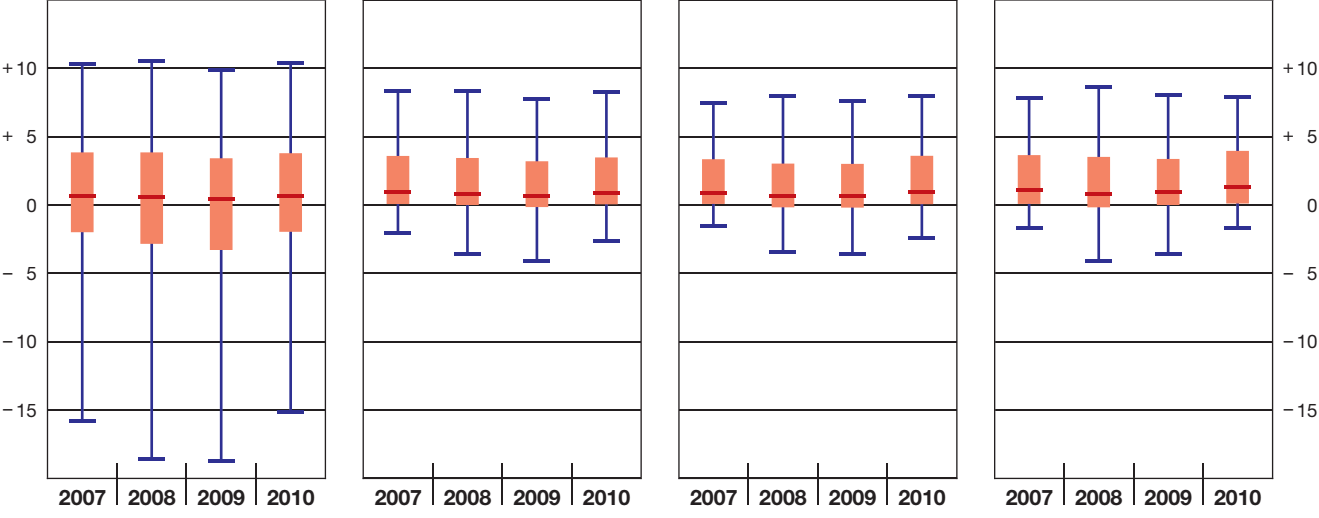
Manufacturing



Construction



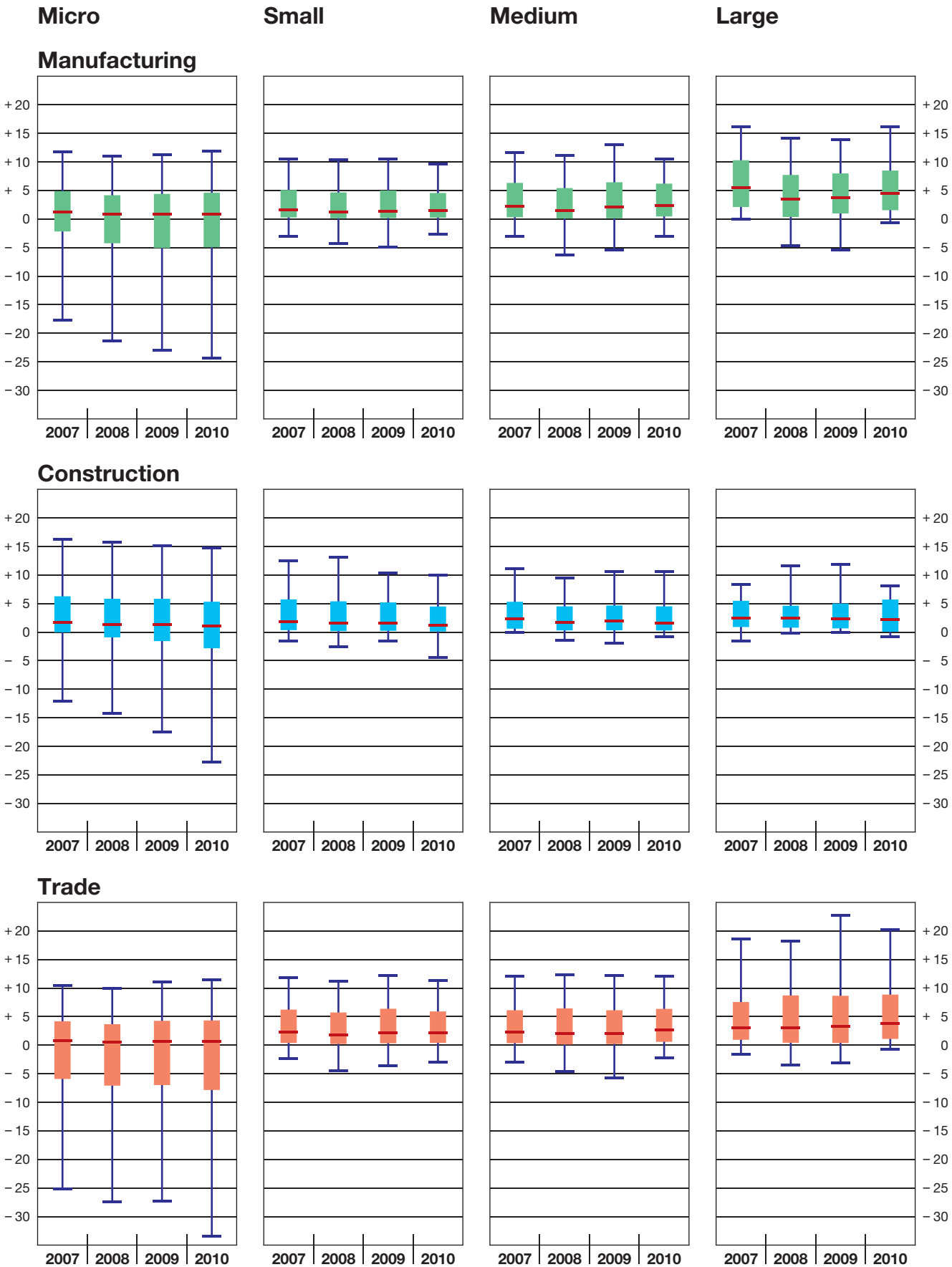
Trade



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Portugal

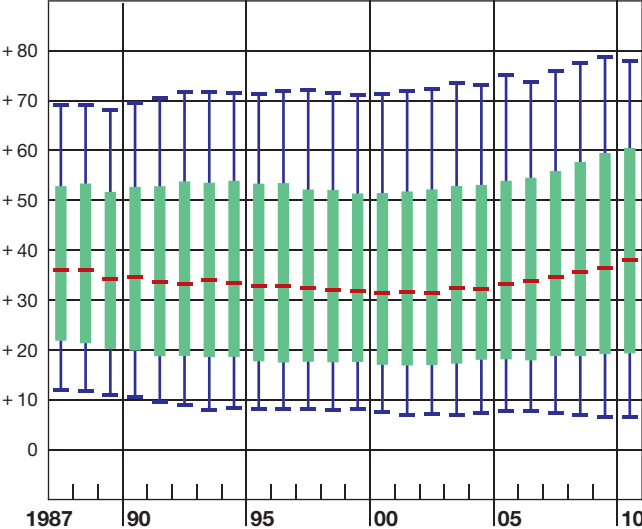
Net Income in % of Total Assets



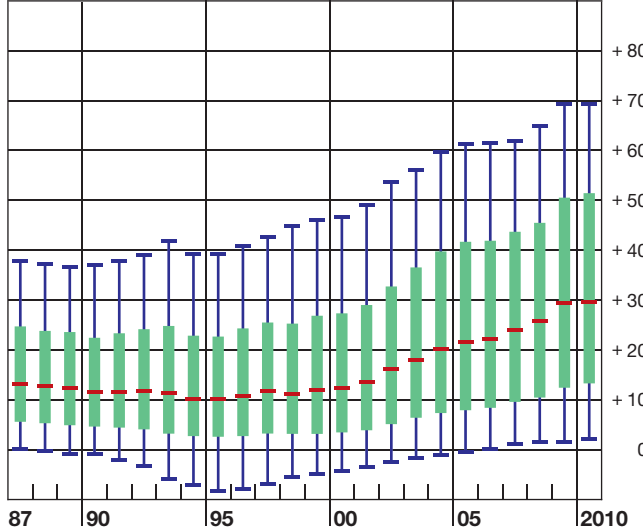
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Net Worth in % of Total Assets Manufacturing, Small size entities

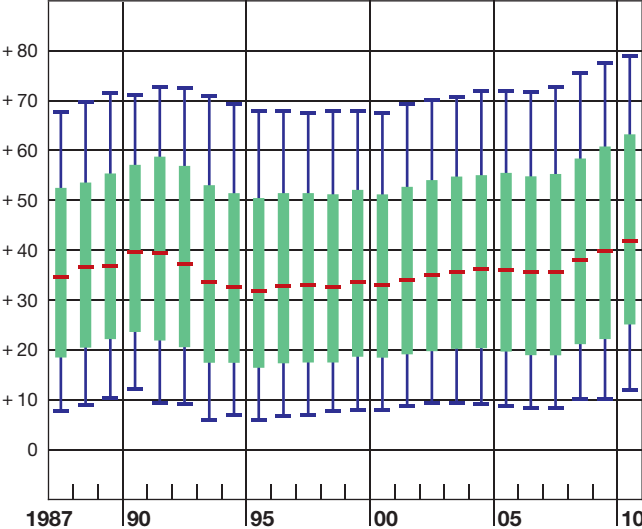
Belgium



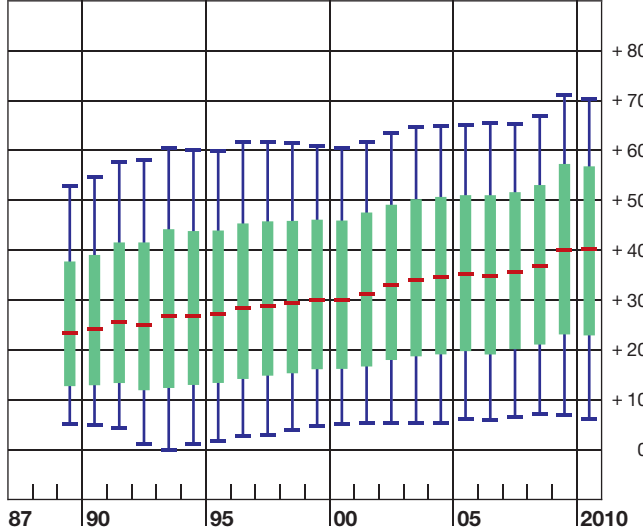
Germany



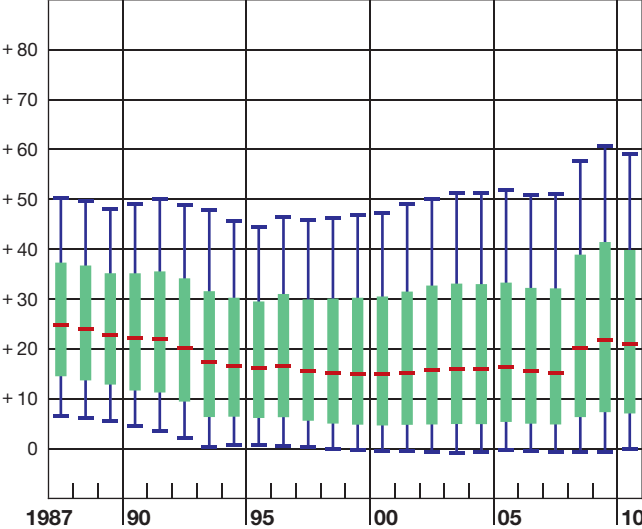
Spain



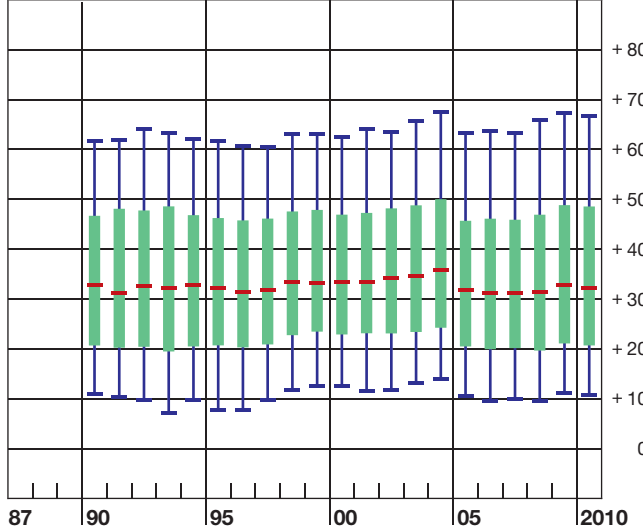
France



Italy



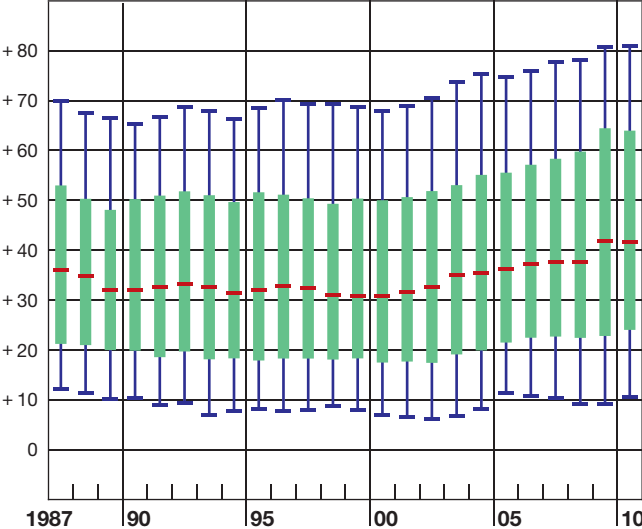
Portugal



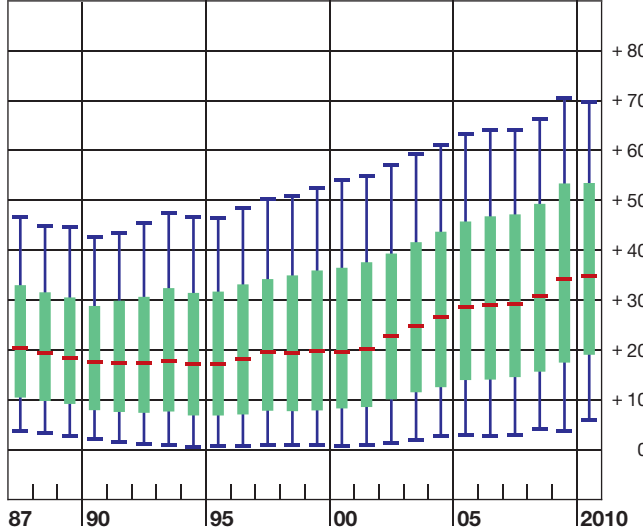
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Net Worth in % of Total Assets Manufacturing, Medium size entities

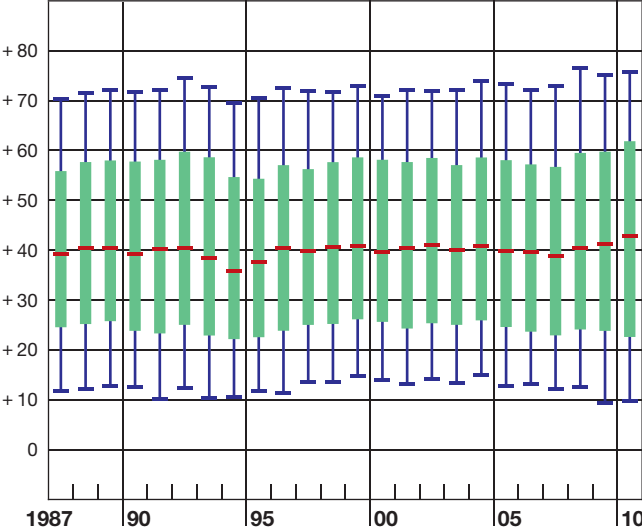
Belgium



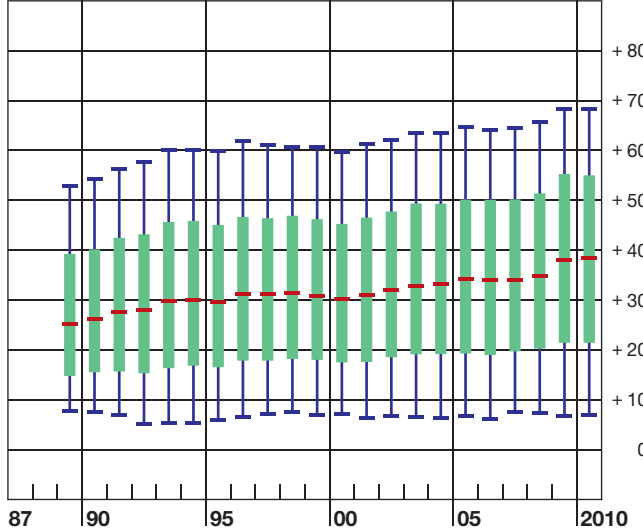
Germany



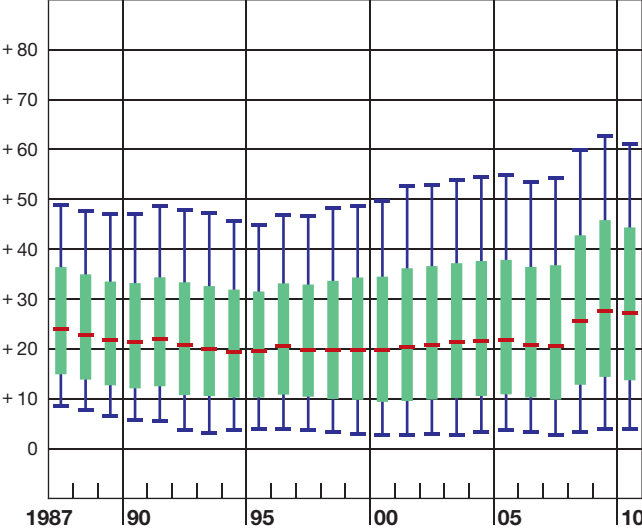
Spain



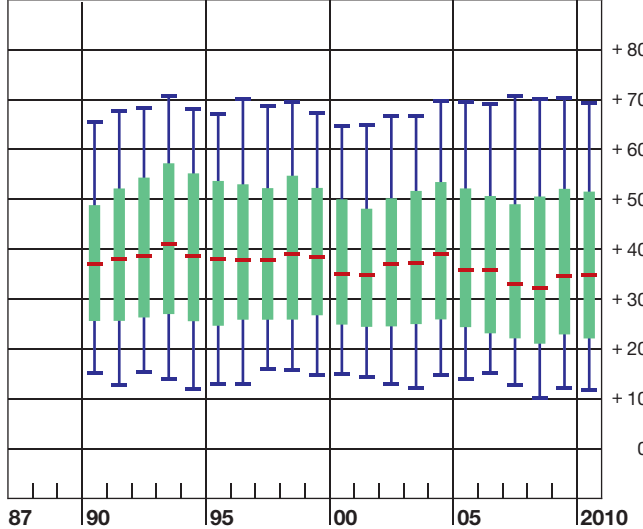
France



Italy



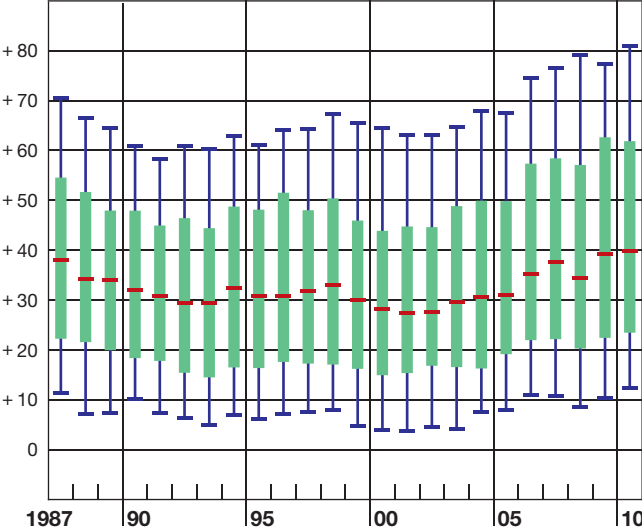
Portugal



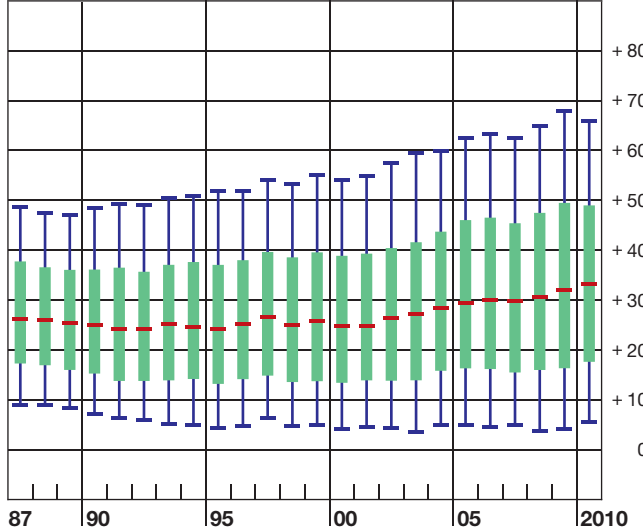
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Net Worth in % of Total Assets Manufacturing, Large size entities

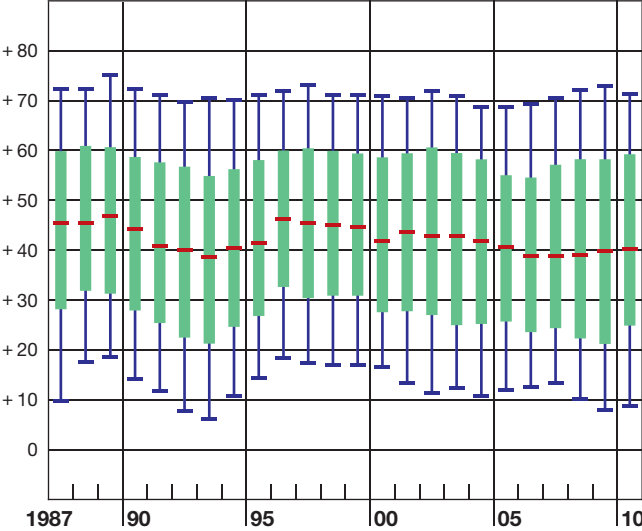
Belgium



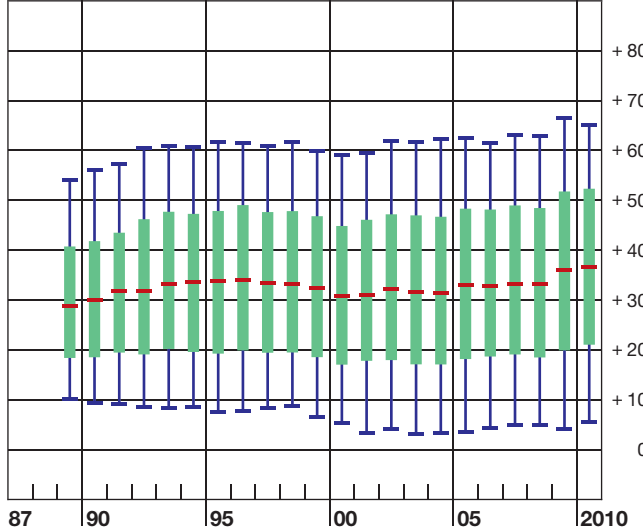
Germany



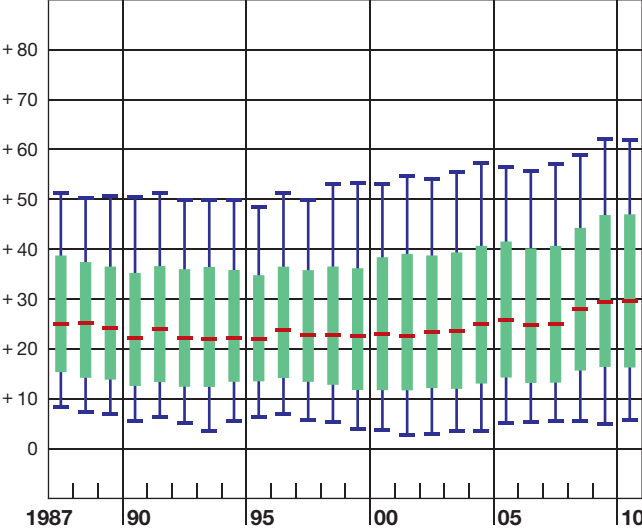
Spain



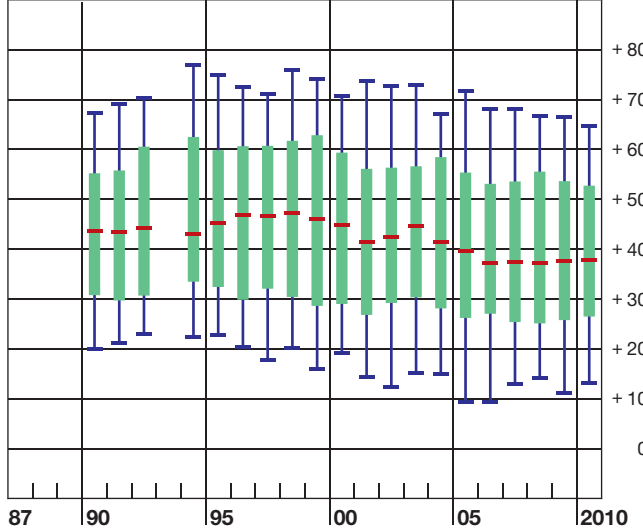
France



Italy



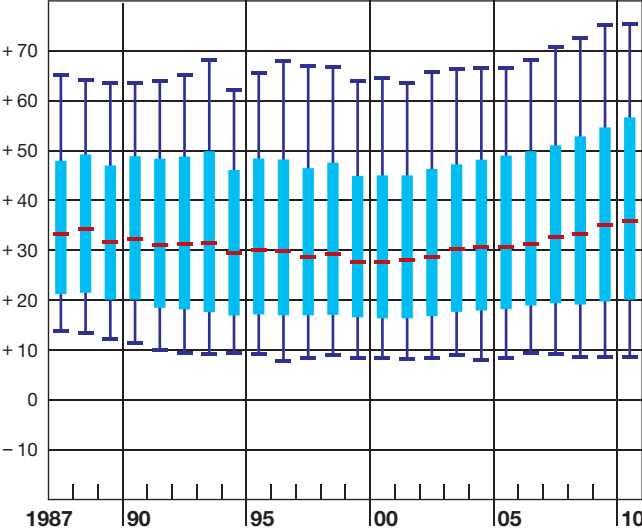
Portugal



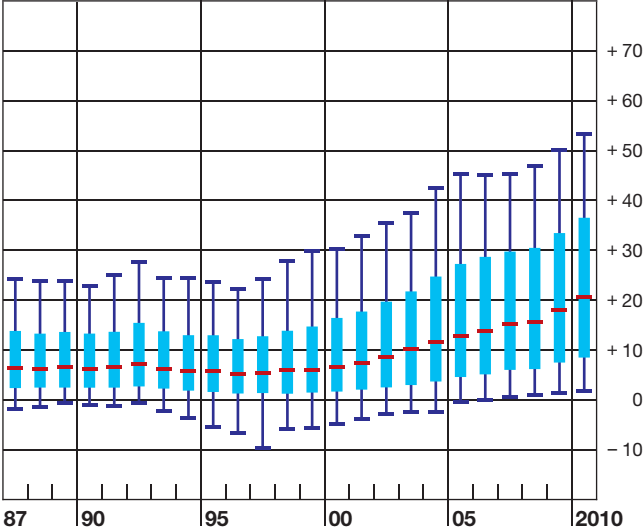
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Net Worth in % of Total Assets Construction, Small size entities

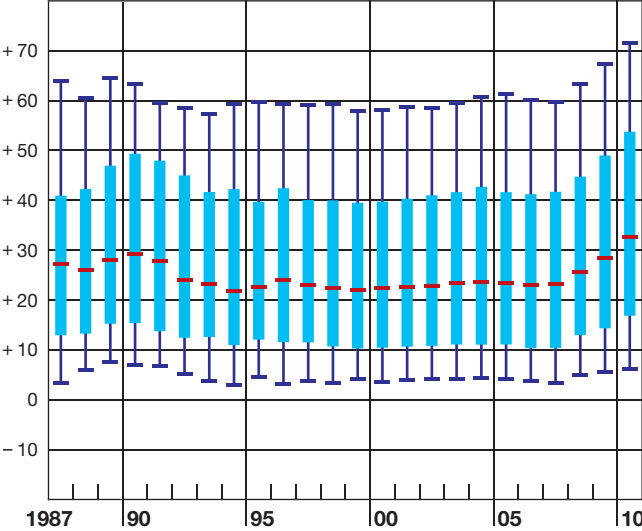
Belgium



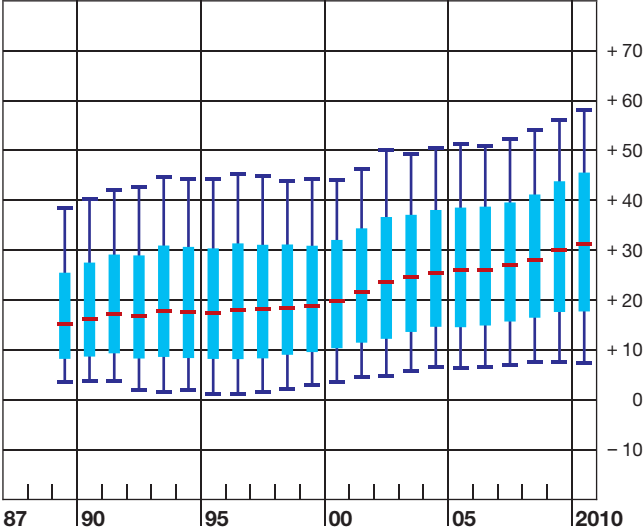
Germany



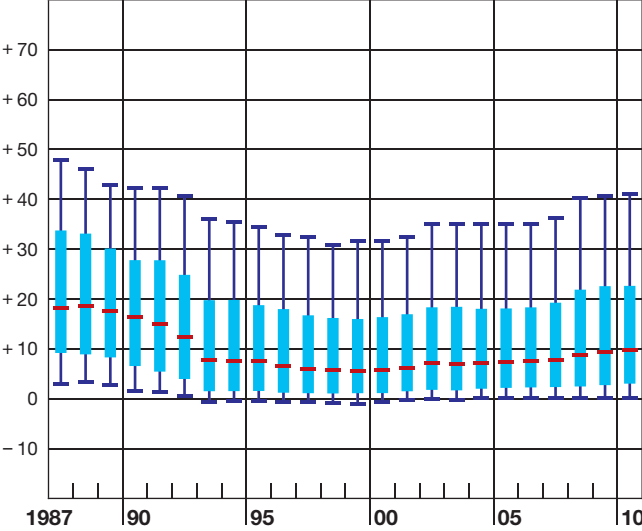
Spain



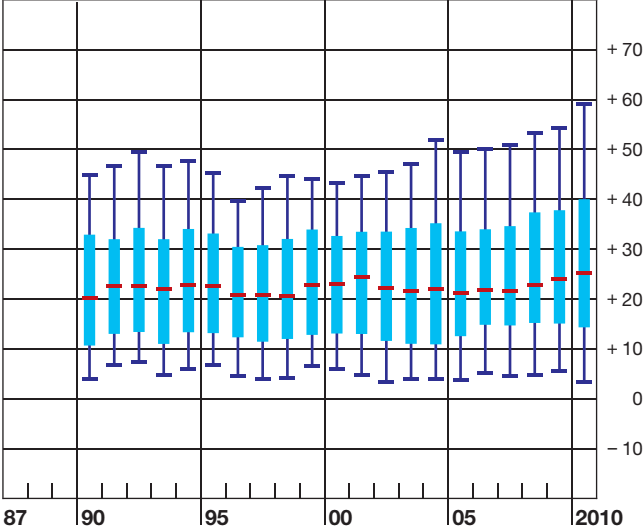
France



Italy



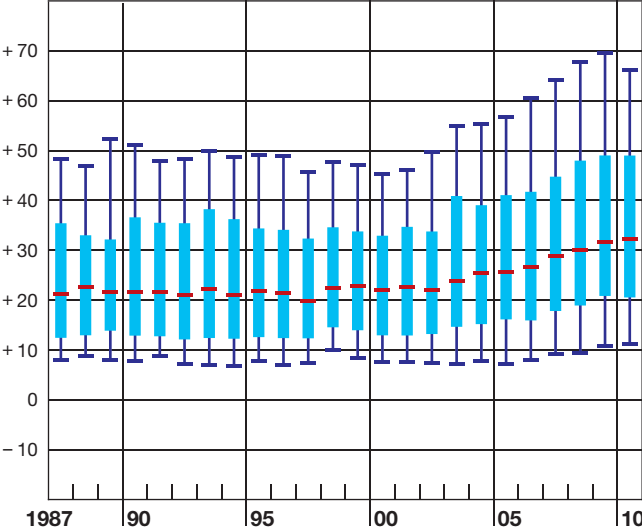
Portugal



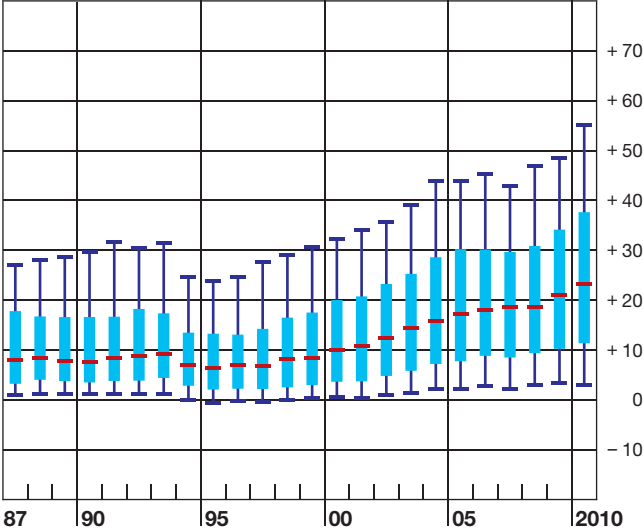
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Net Worth in % of Total Assets Construction, Medium size entities

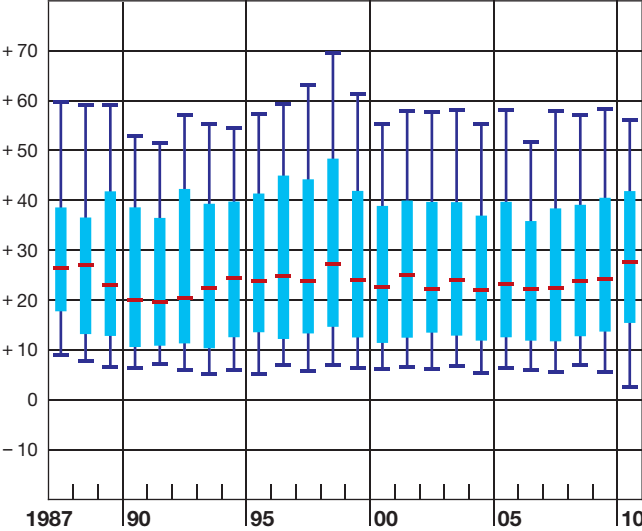
Belgium



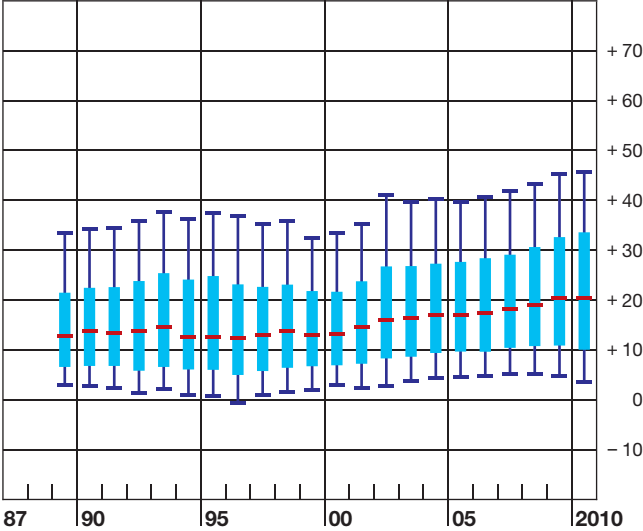
Germany



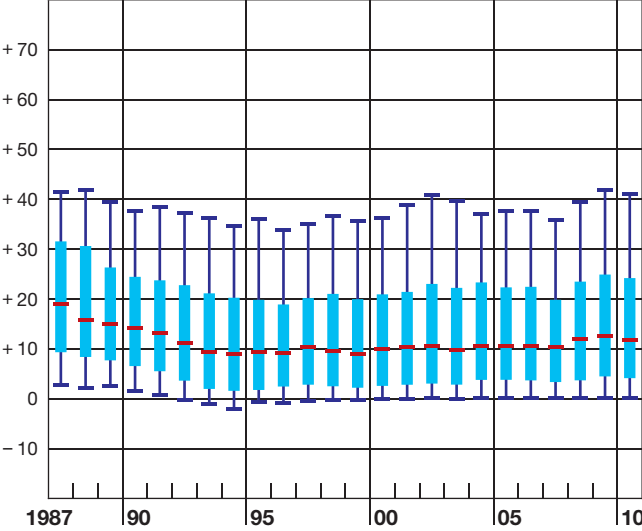
Spain



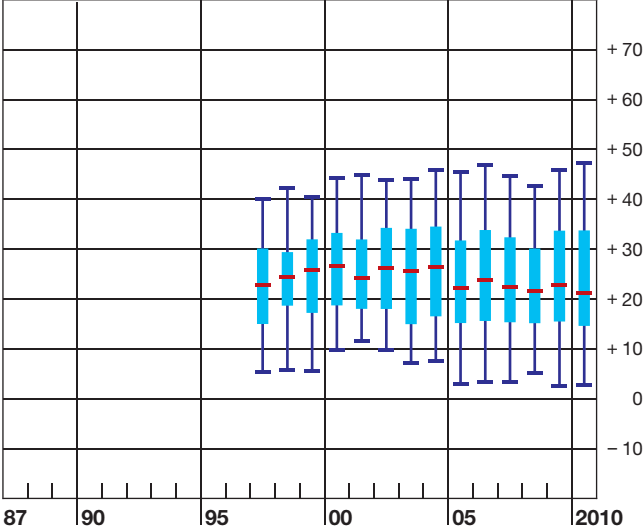
France



Italy



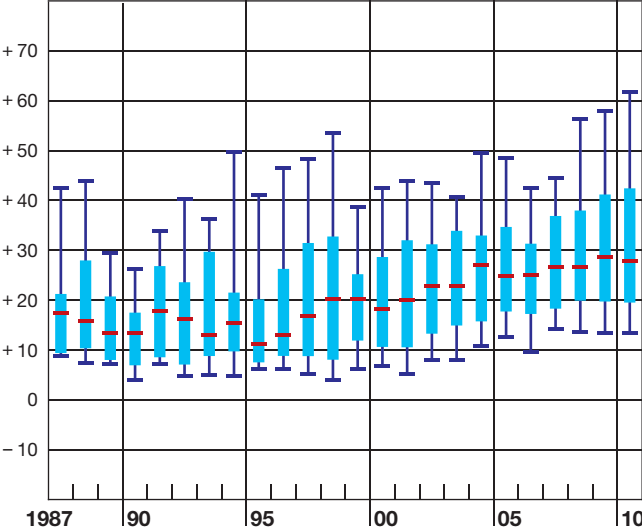
Portugal



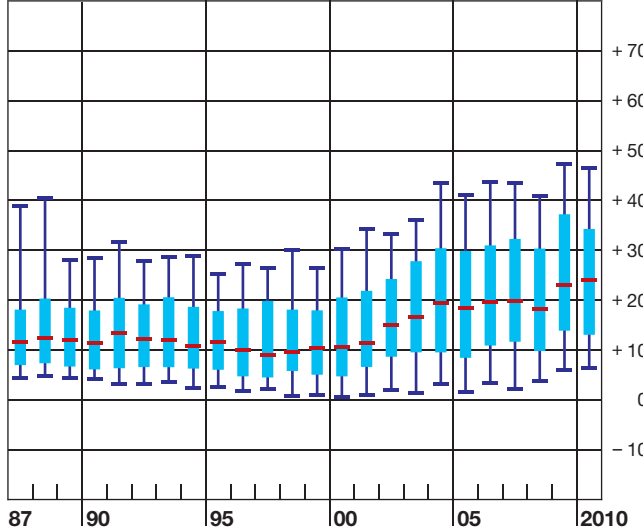
Box and Whisker Plot: The upper and lower limit of the blue box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Net Worth in % of Total Assets Construction, Large size entities

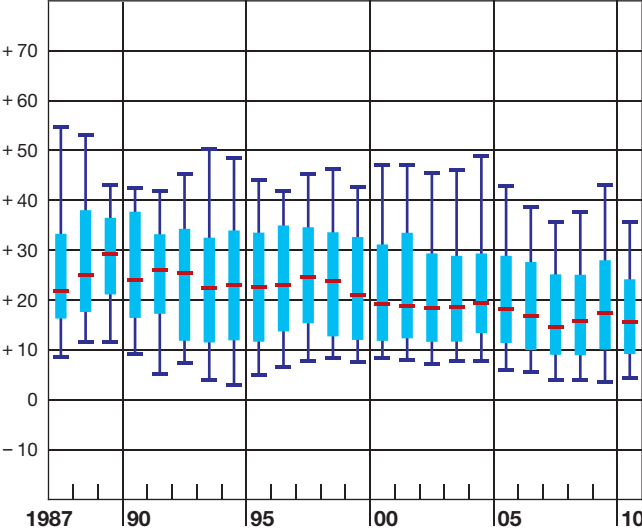
Belgium



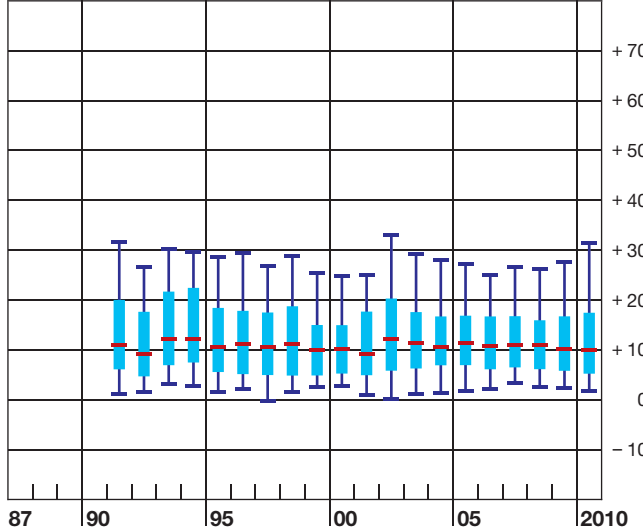
Germany



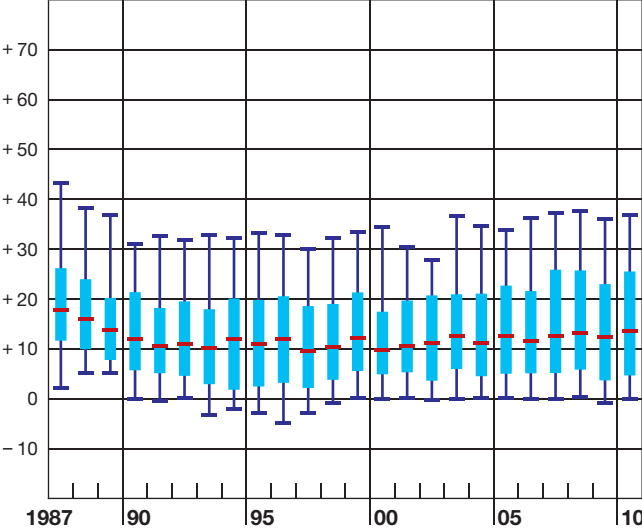
Spain



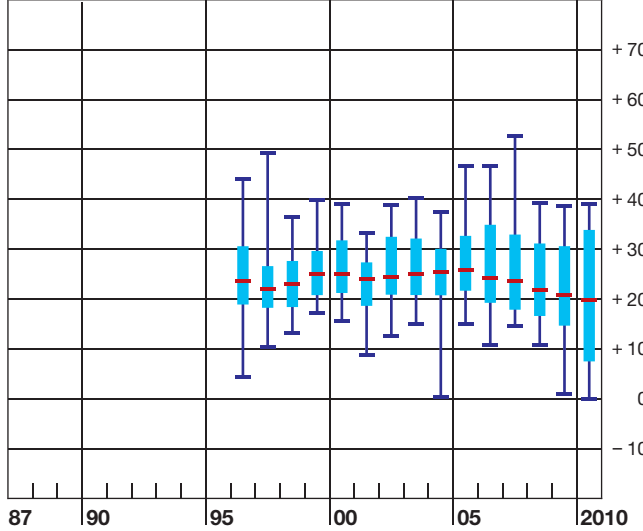
France



Italy



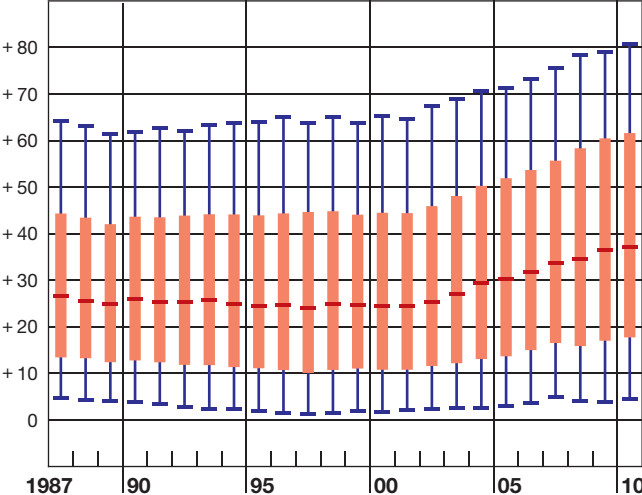
Portugal



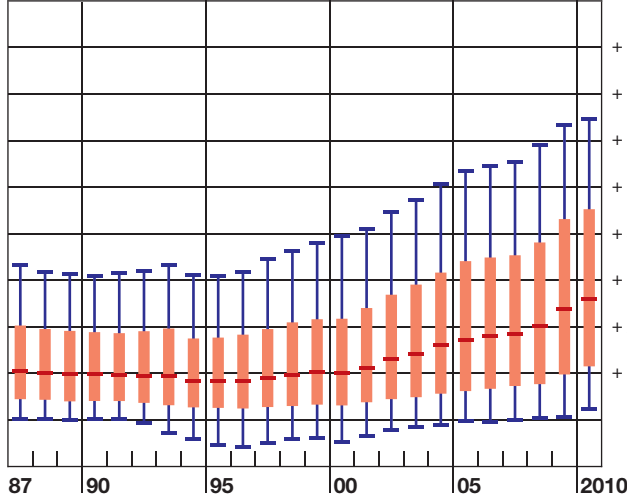
Box and Whisker Plot: The upper and lower limit of the blue box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Net Worth in % of Total Assets Trade, Small size entities

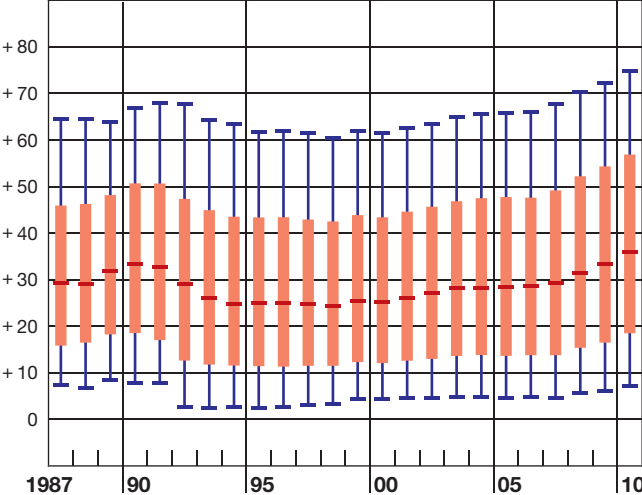
Belgium



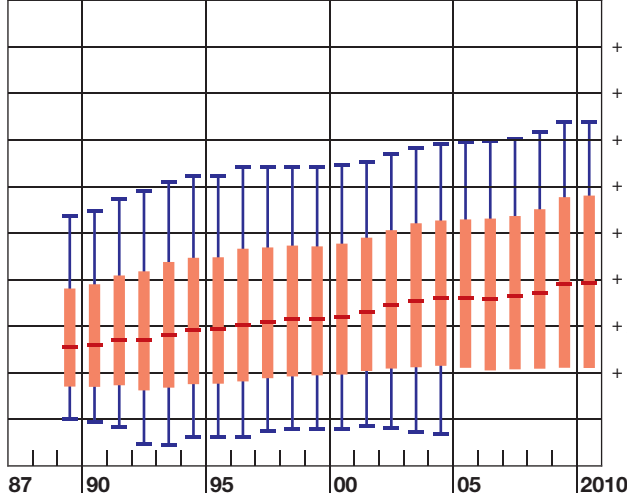
Germany



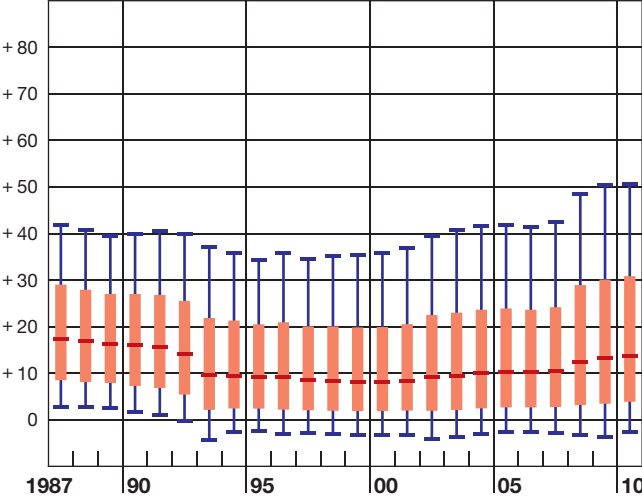
Spain



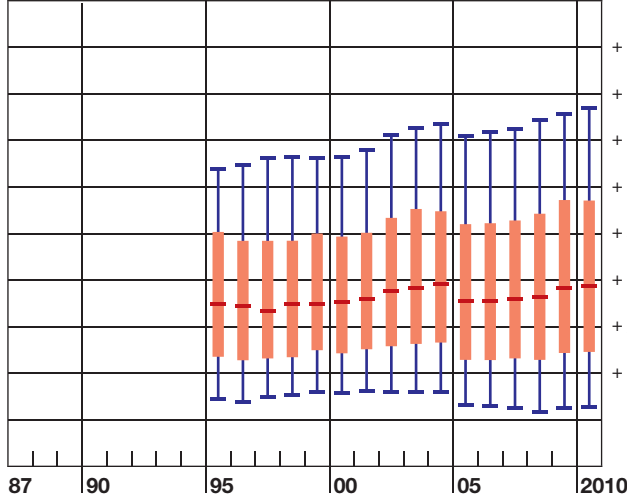
France¹



Italy



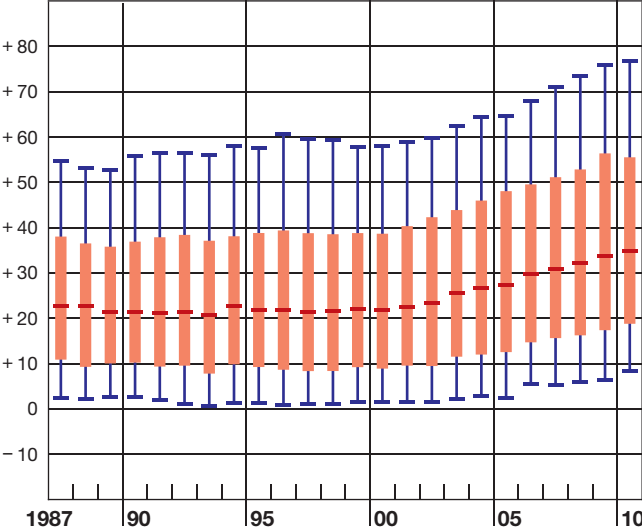
Portugal



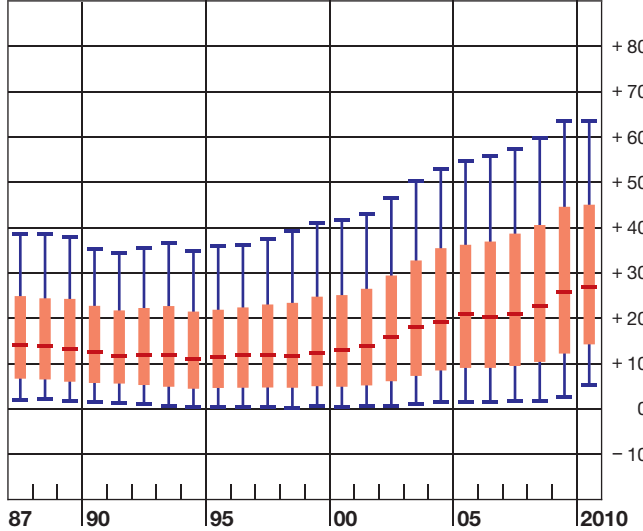
Box and Whisker Plot: The upper and lower limit of the red box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.
¹ 10th percentile for the French micro and small size class in trade not available from 2005 onwards due to sample selection bias.

Net Worth in % of Total Assets Trade, Medium size entities

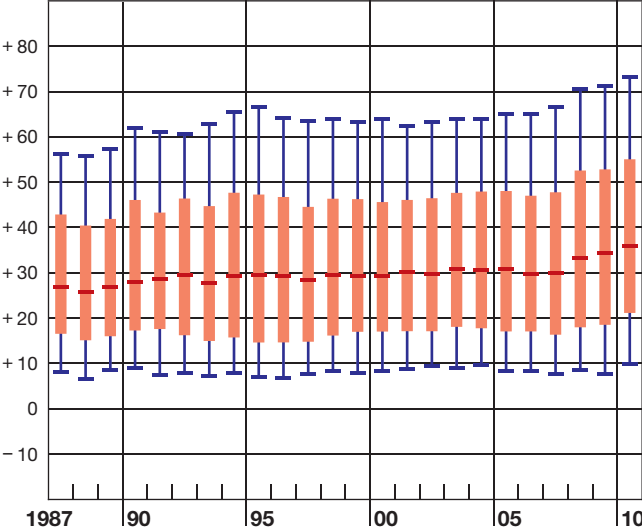
Belgium



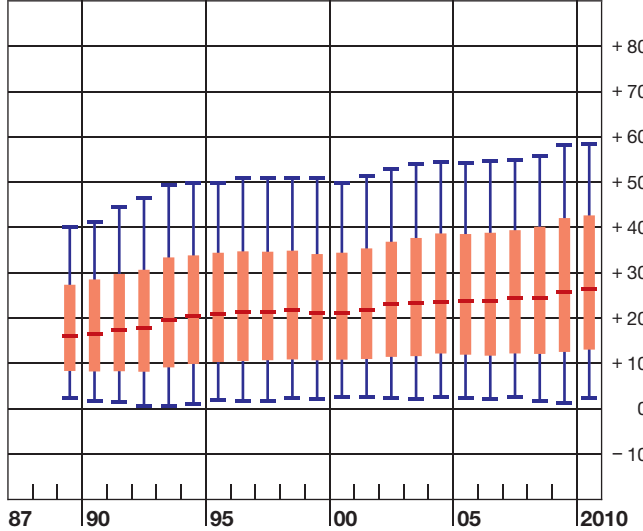
Germany



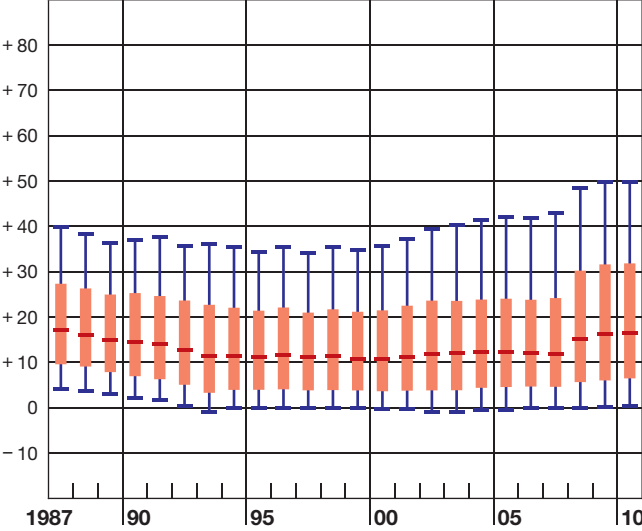
Spain



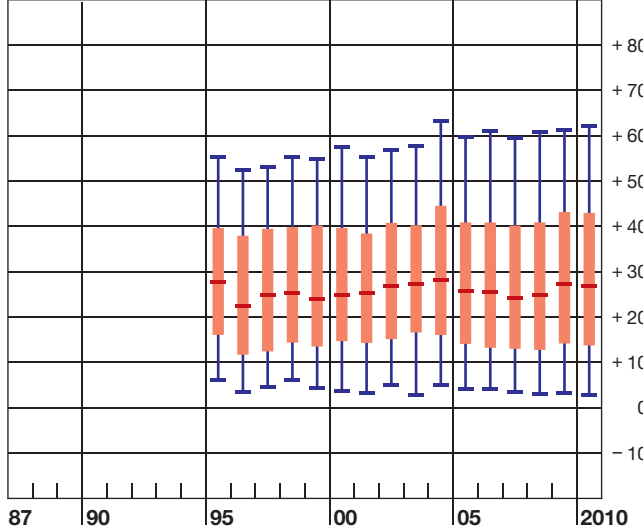
France



Italy



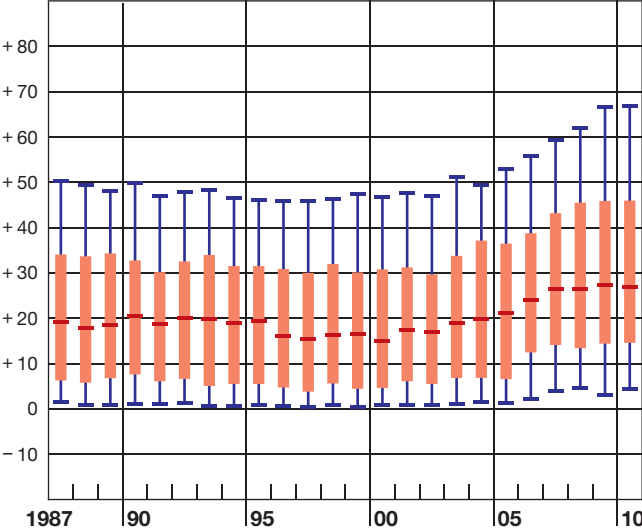
Portugal



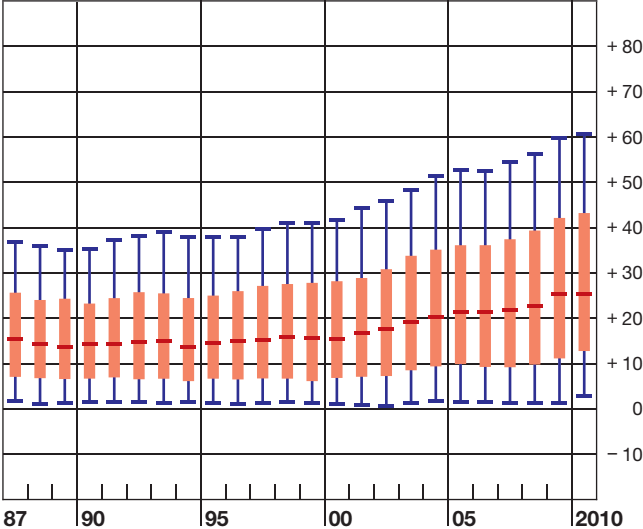
Box and Whisker Plot: The upper and lower limit of the red box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Net Worth in % of Total Assets Trade, Large size entities

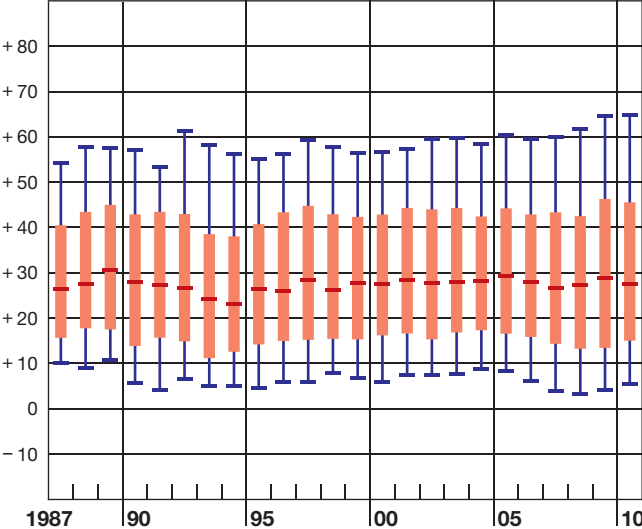
Belgium



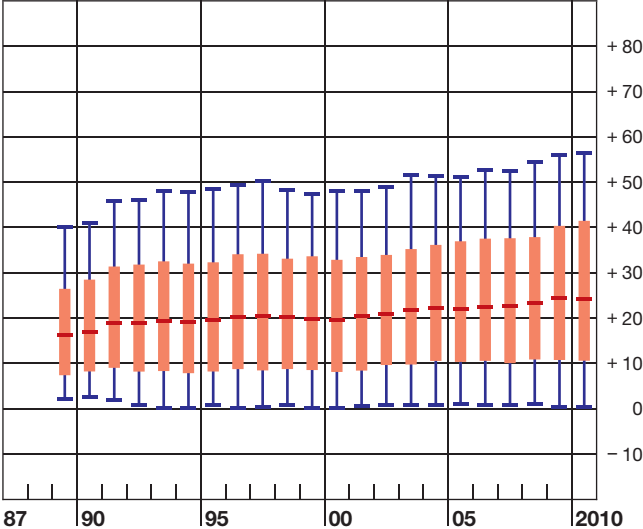
Germany



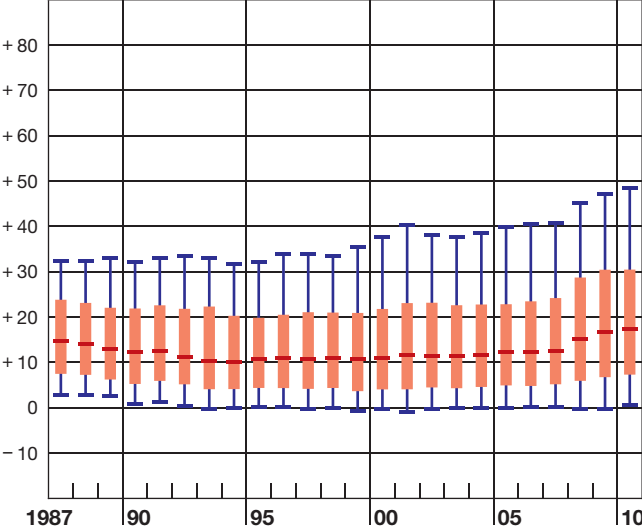
Spain



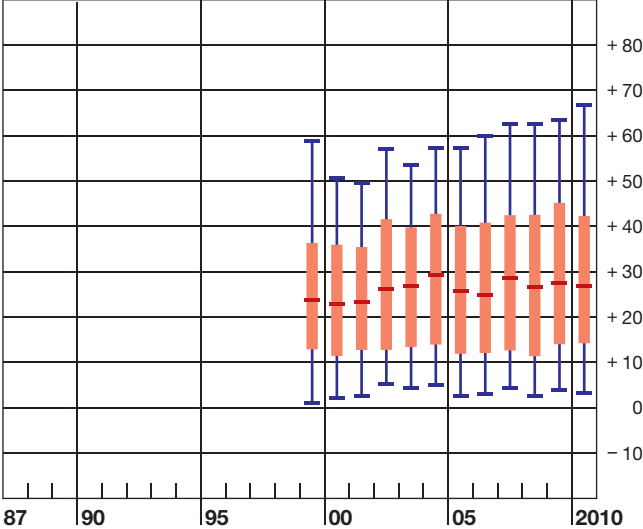
France



Italy



Portugal



Box and Whisker Plot: The upper and lower limit of the red box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Belgium

Net Worth in % of Total Assets

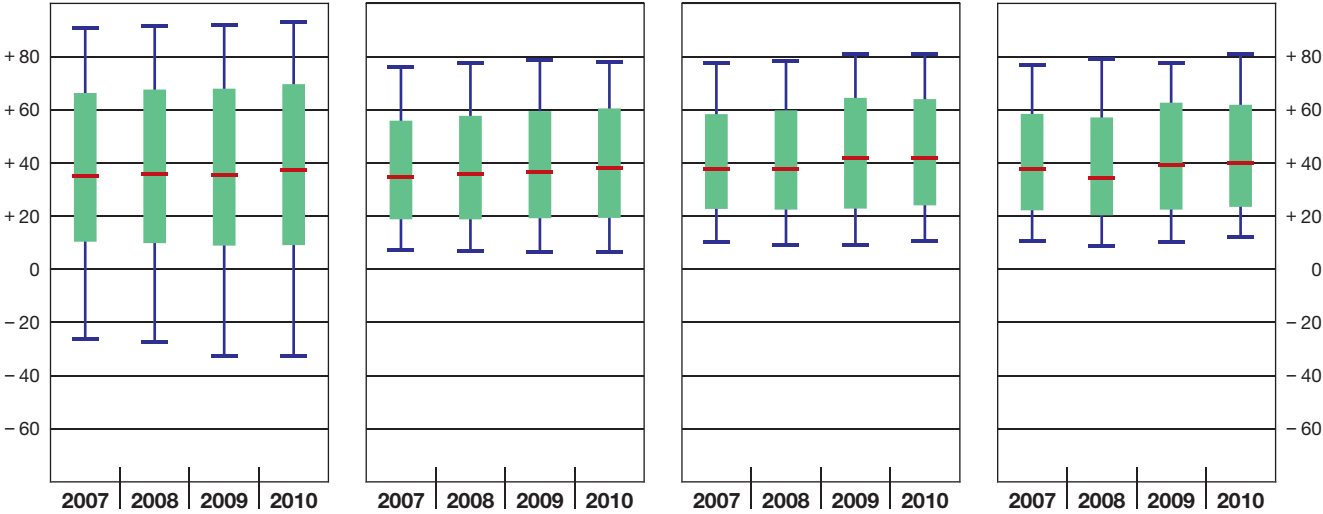
Micro

Small

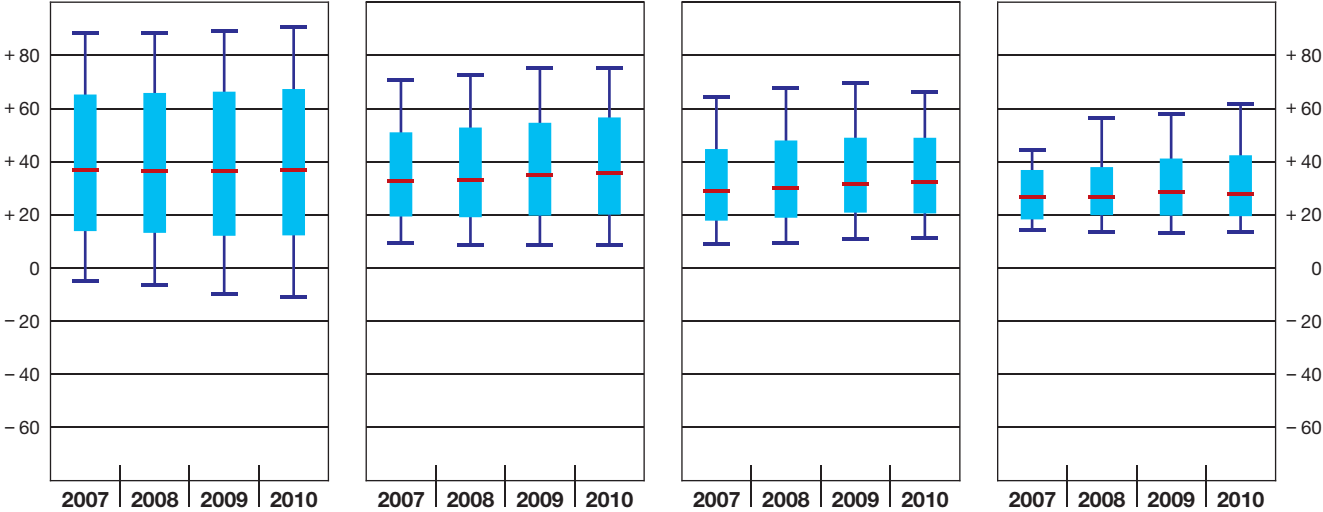
Medium

Large

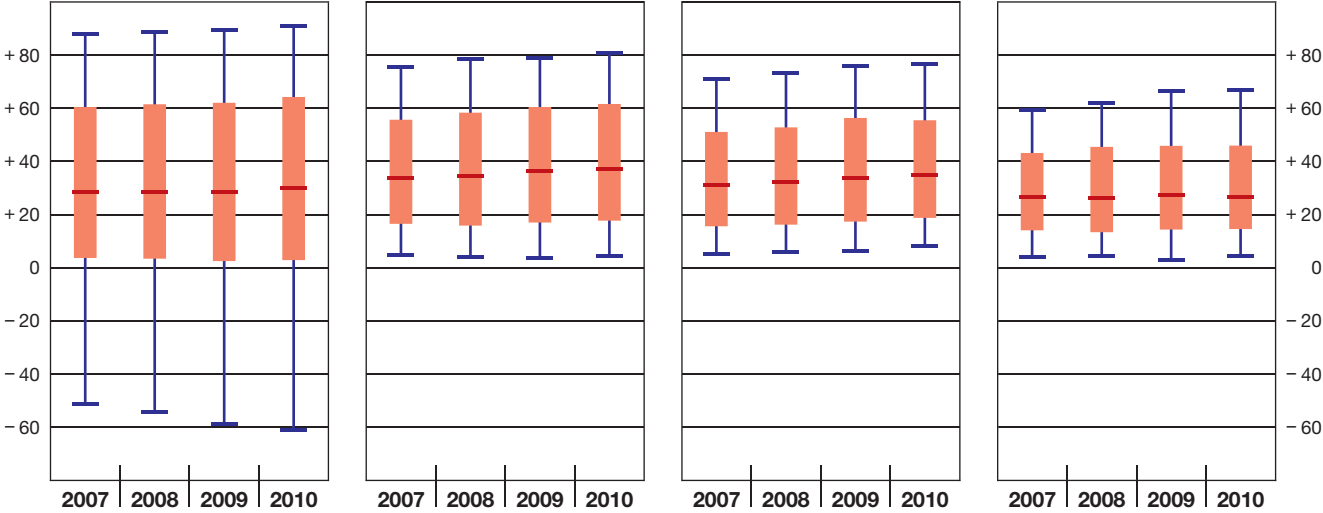
Manufacturing



Construction



Trade



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Germany

Net Worth in % of Total Assets

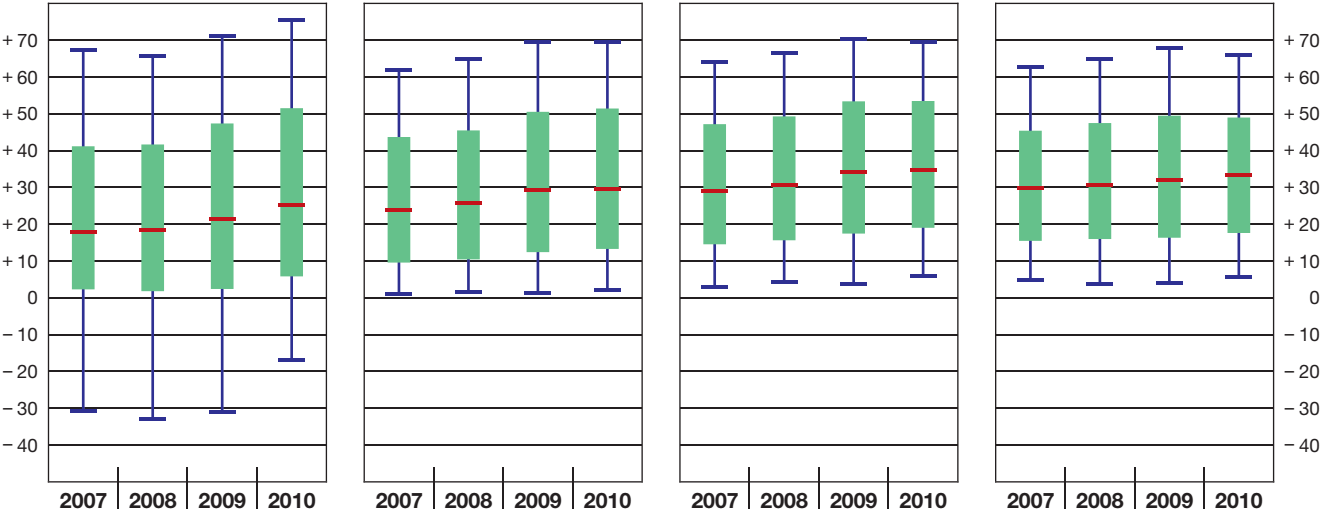
Micro

Small

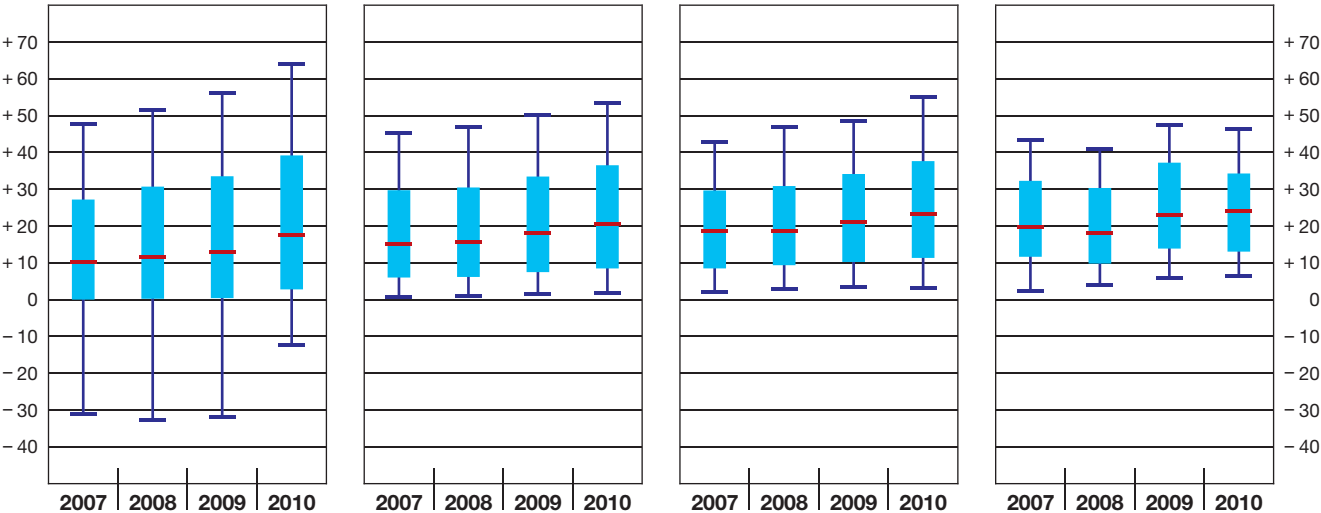
Medium

Large

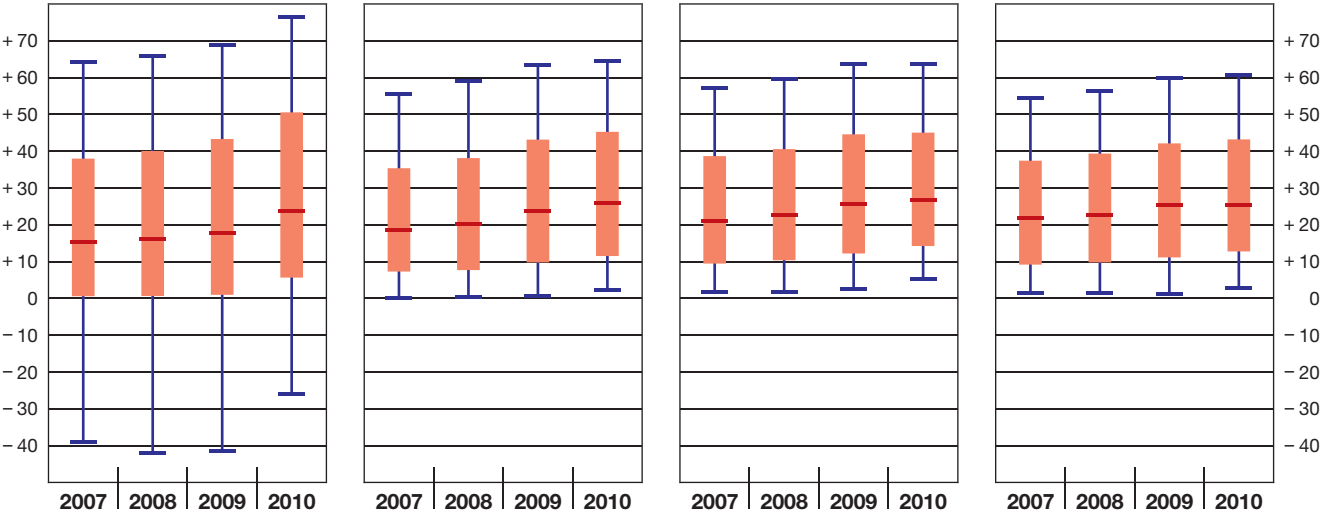
Manufacturing



Construction



Trade



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Spain

Net Worth in % of Total Assets

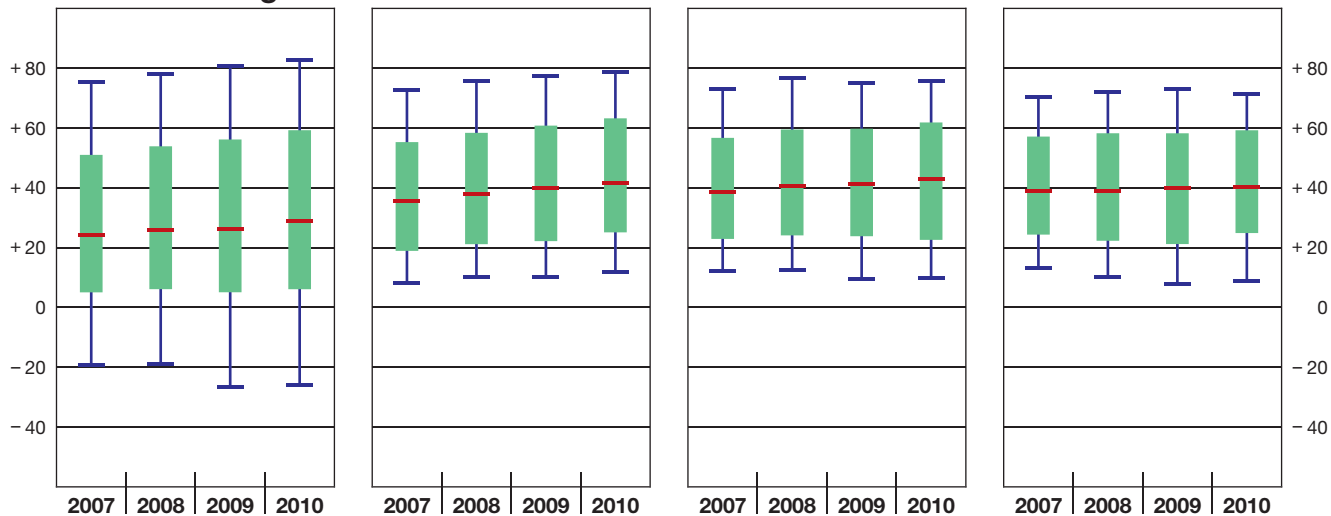
Micro

Small

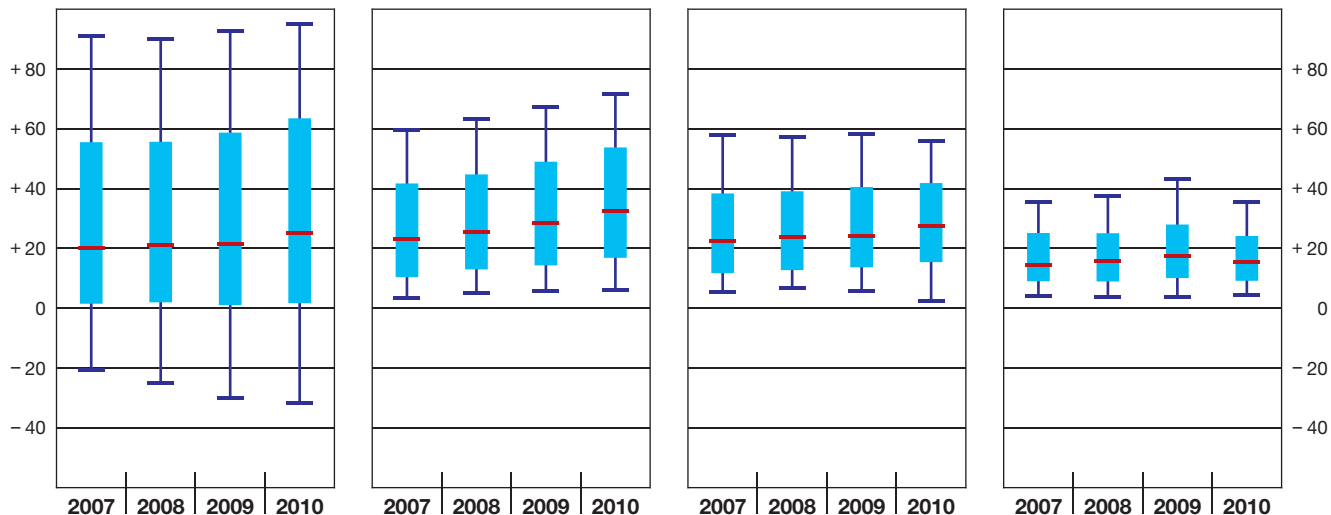
Medium

Large

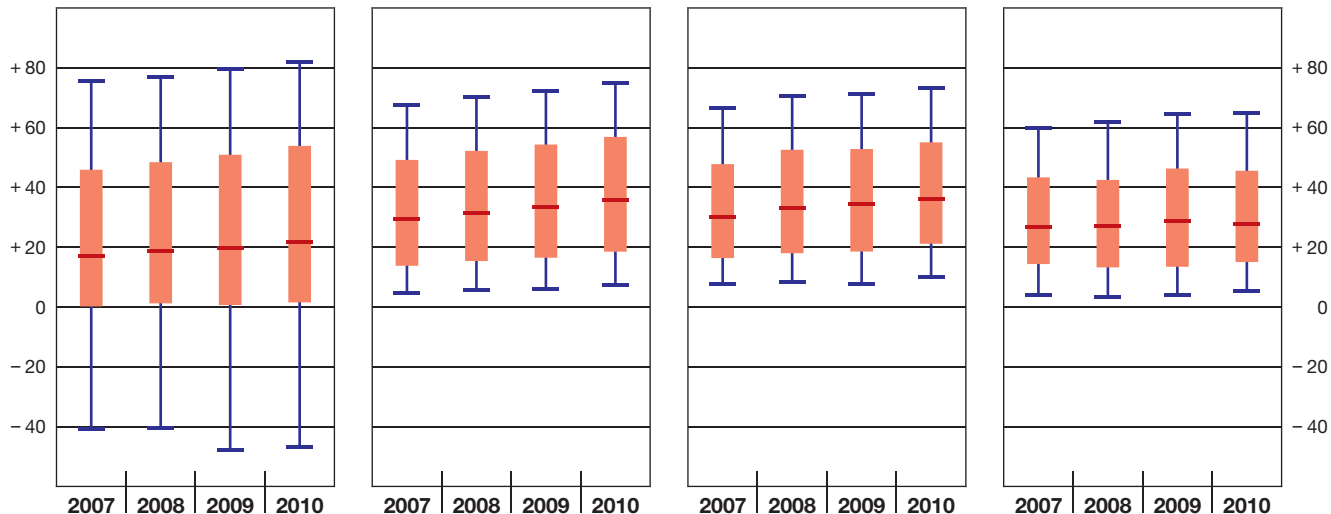
Manufacturing



Construction



Trade



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

France

Net Worth in % of Total Assets

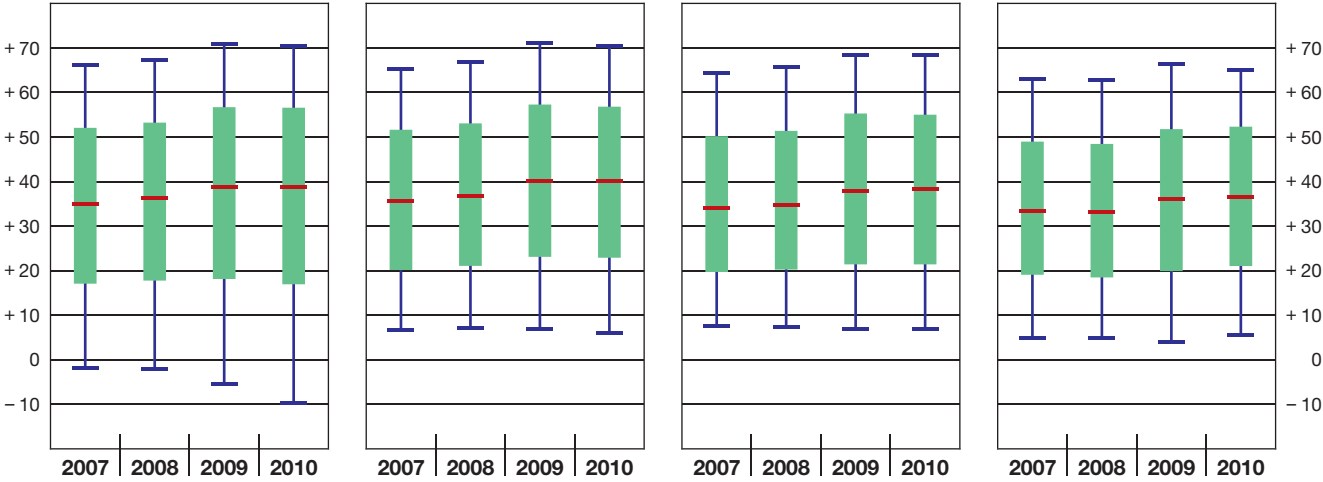
Micro

Small

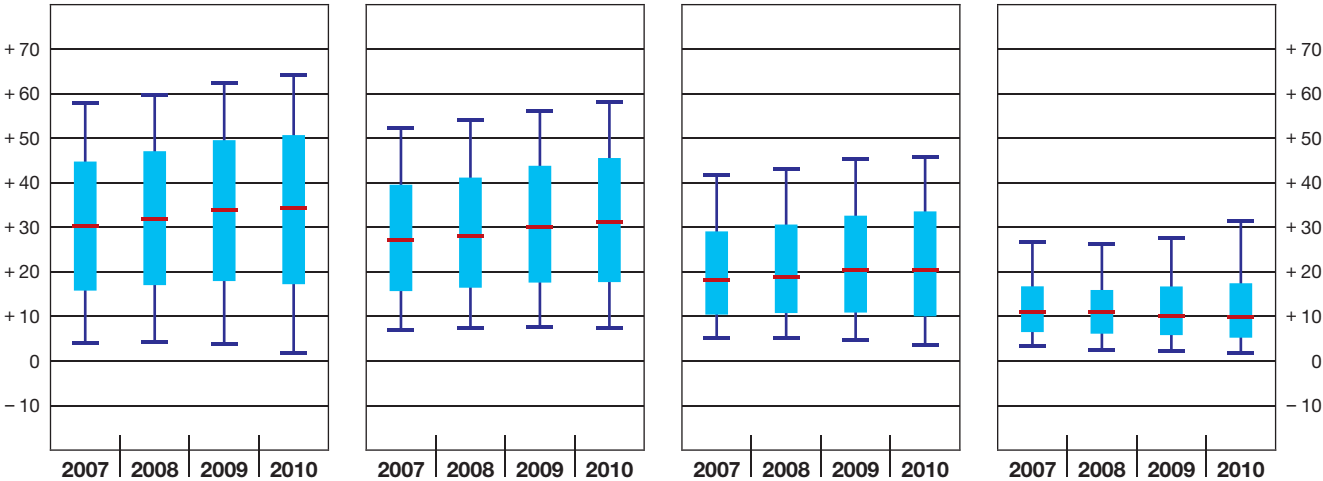
Medium

Large

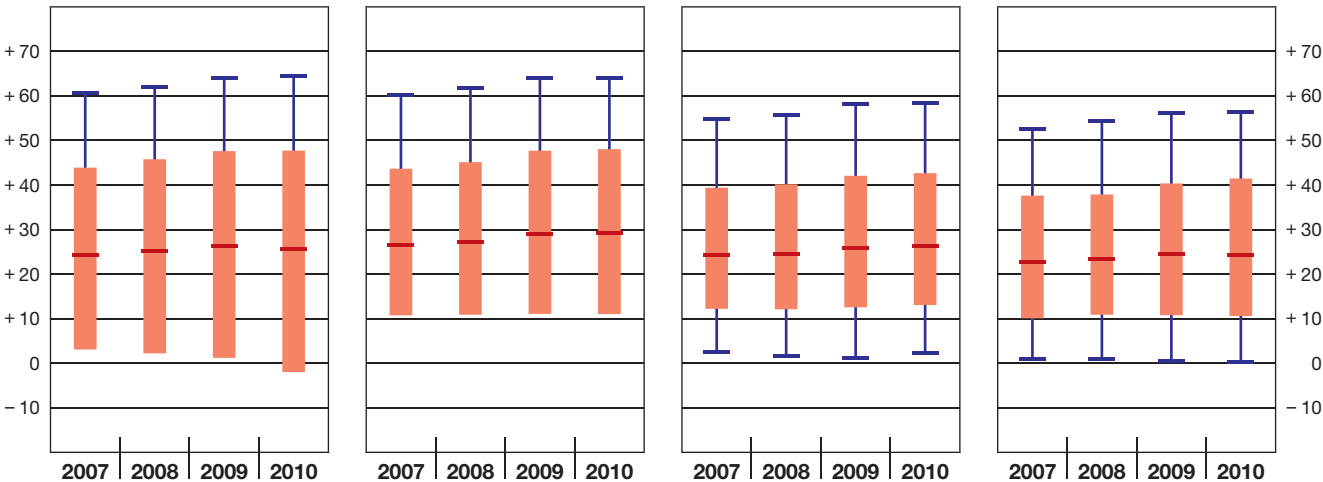
Manufacturing



Construction



Trade¹



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.
¹ 10th percentile for the French micro and small size class in trade not available from 2005 onwards due to sample selection bias.

Italy

Net Worth in % of Total Assets

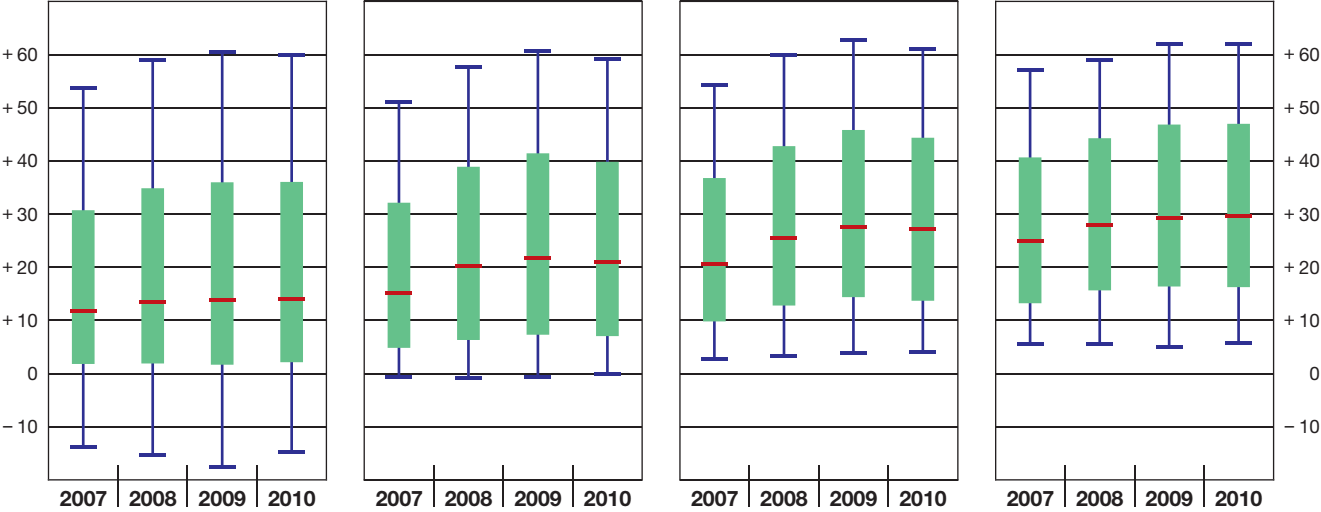
Micro

Small

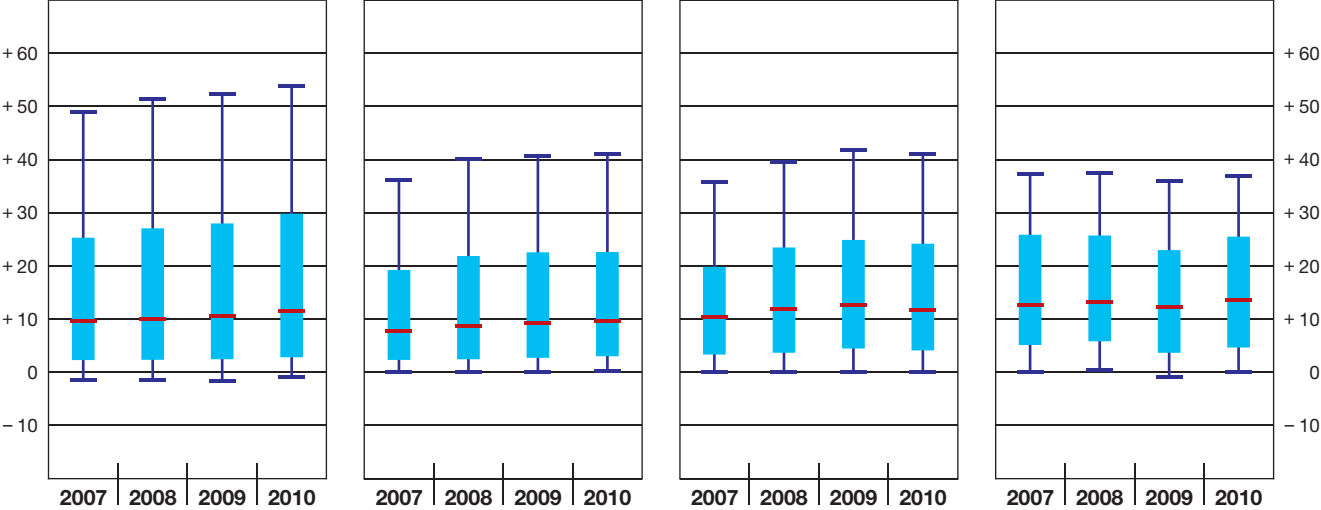
Medium

Large

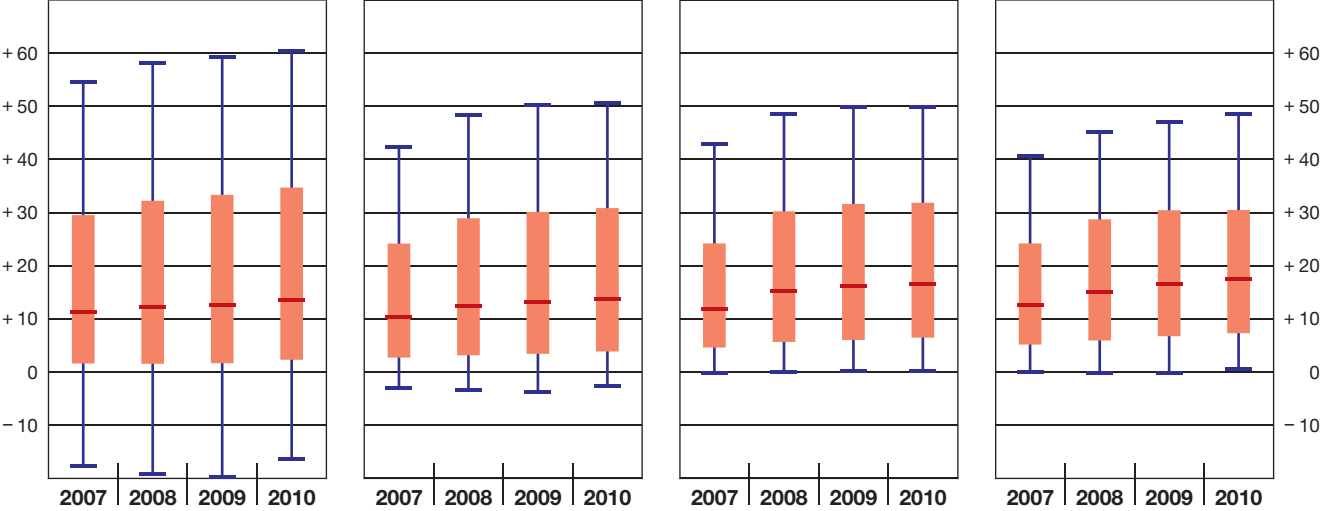
Manufacturing



Construction



Trade



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Portugal

Net Worth in % of Total Assets

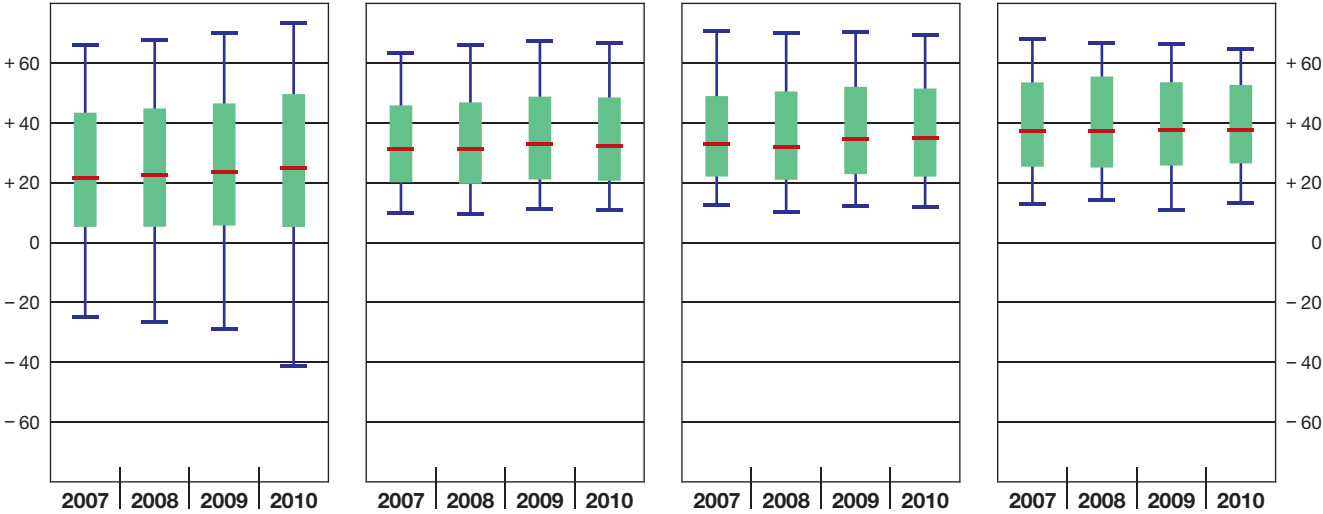
Micro

Small

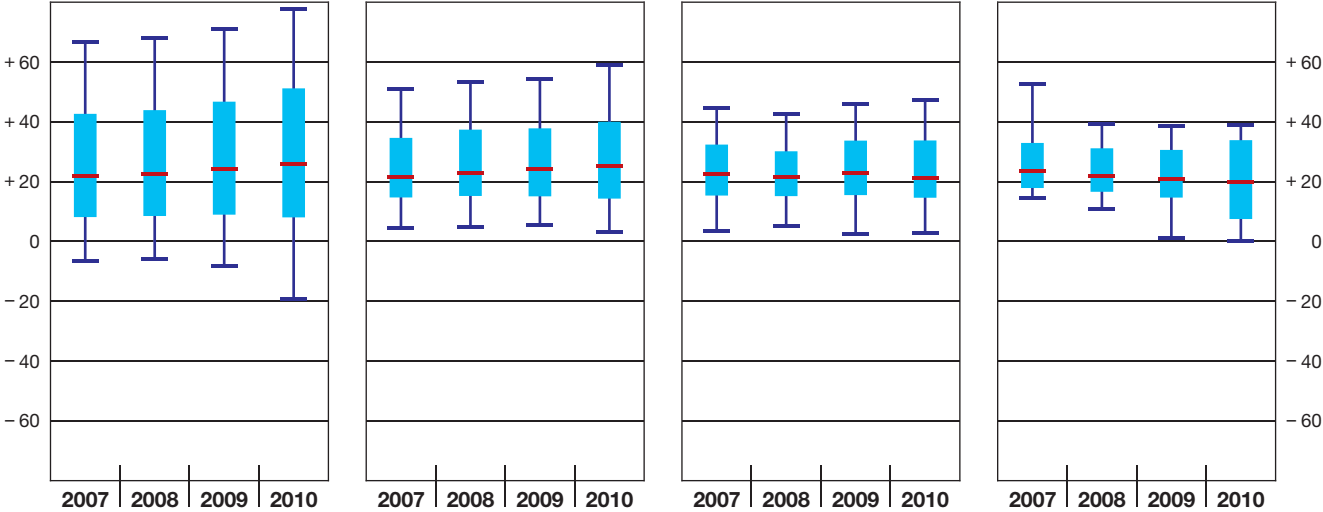
Medium

Large

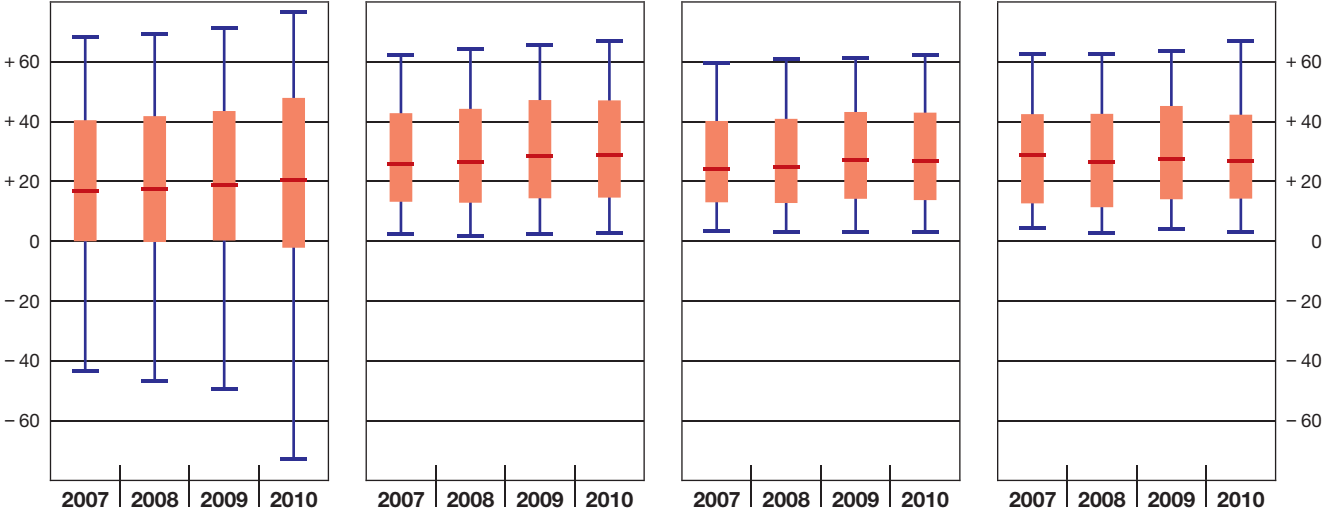
Manufacturing



Construction



Trade



Box and Whisker Plot: The upper and lower limit of the box is defined by the first and third quartile of the distribution. Thus the length of the box represents the interquartile range. The red line inside the box is the median (or second quartile). The end of the lower whisker is defined by the first decile, the end of the upper whisker by the ninth decile.

Belgium

Net Worth at Risk

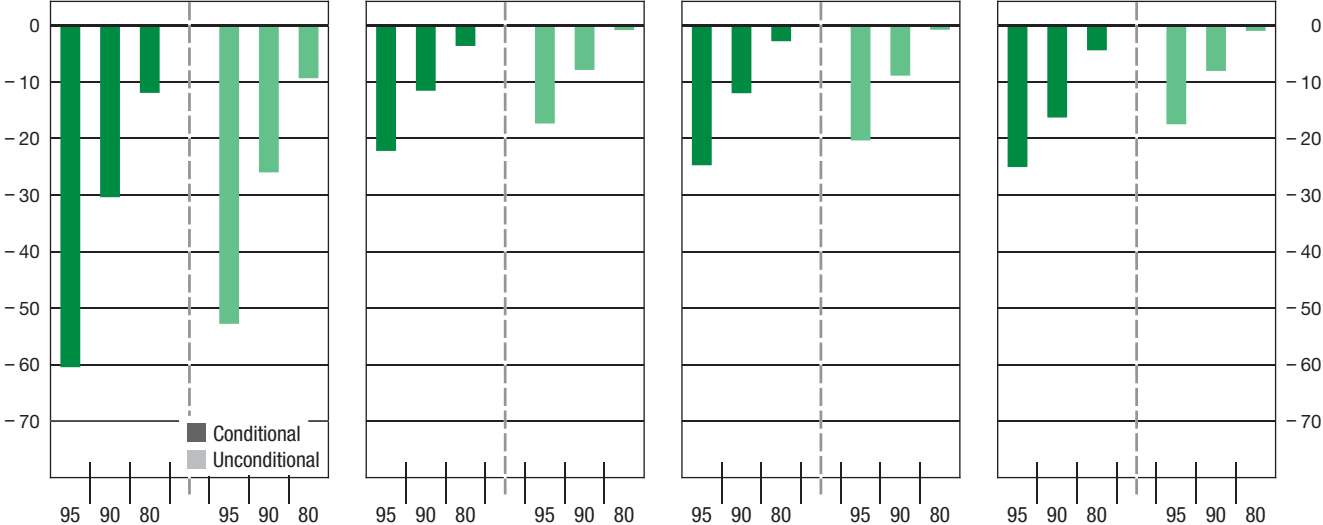
Micro

Small

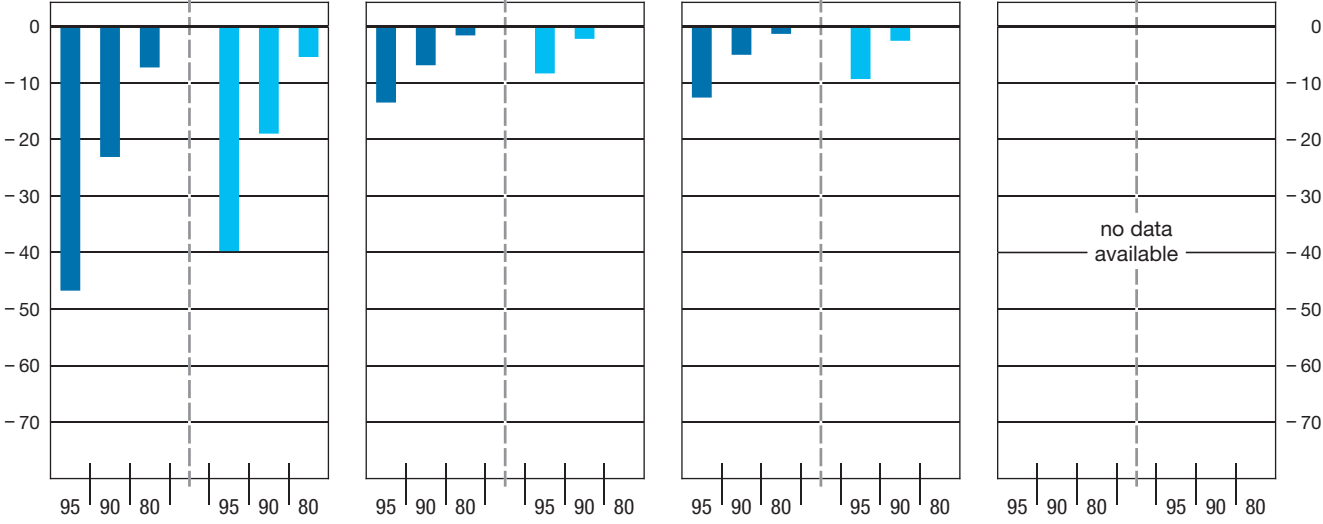
Medium

Large

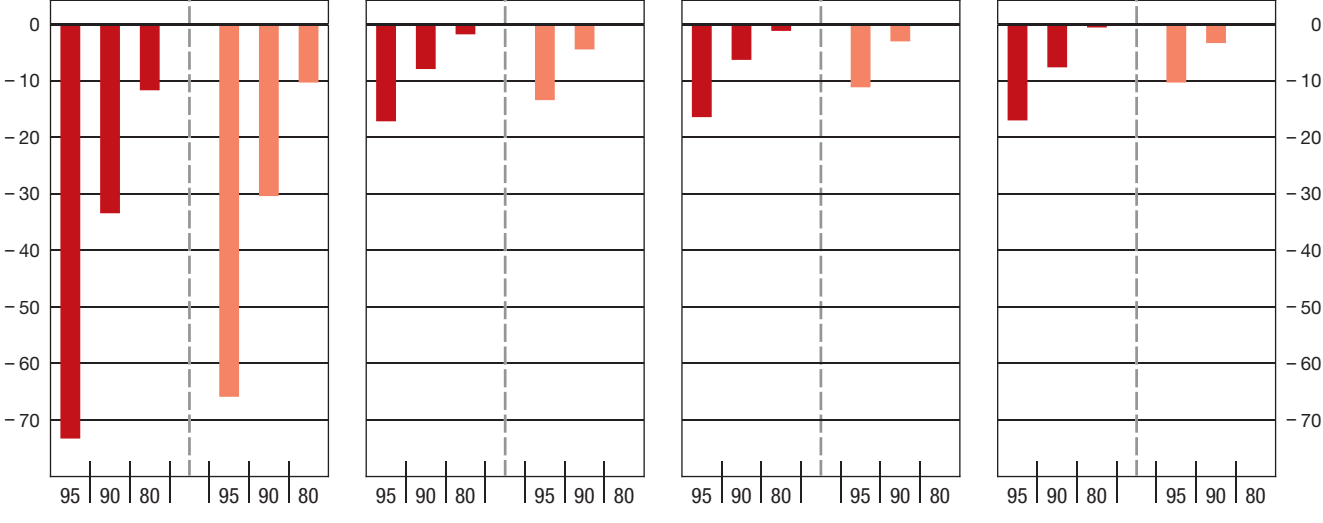
Manufacturing



Construction



Trade



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWAR.

Germany

Net Worth at Risk

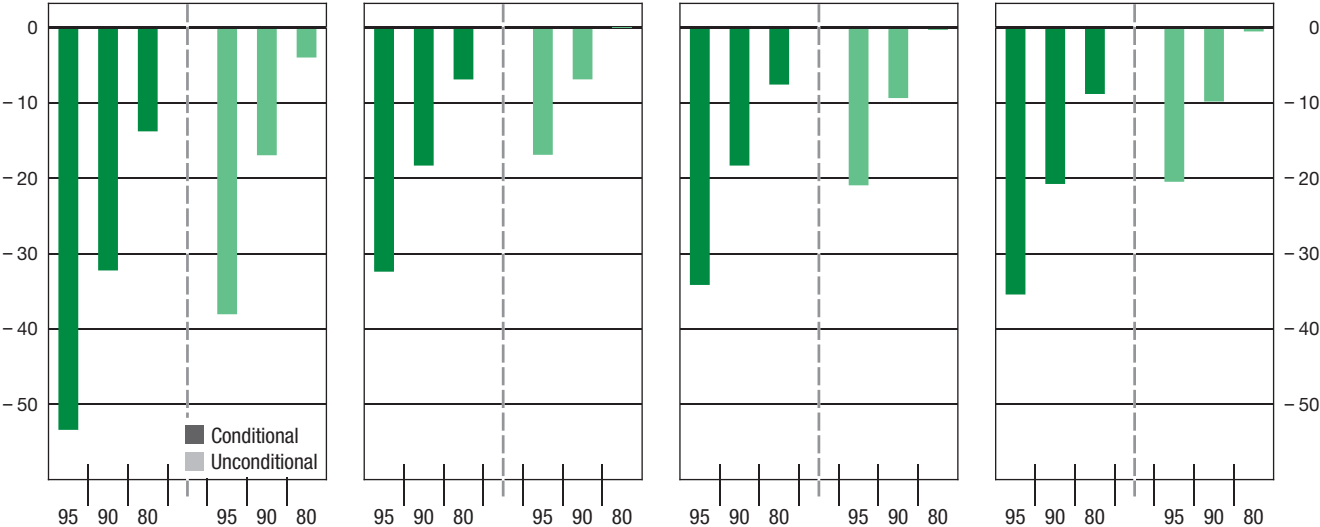
Micro

Small

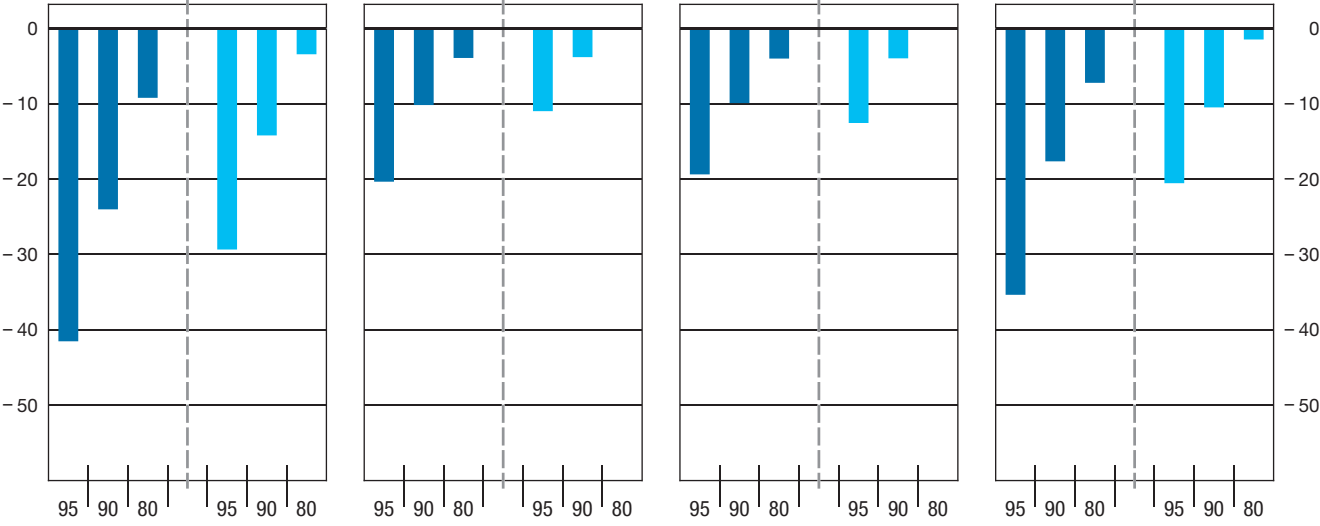
Medium

Large

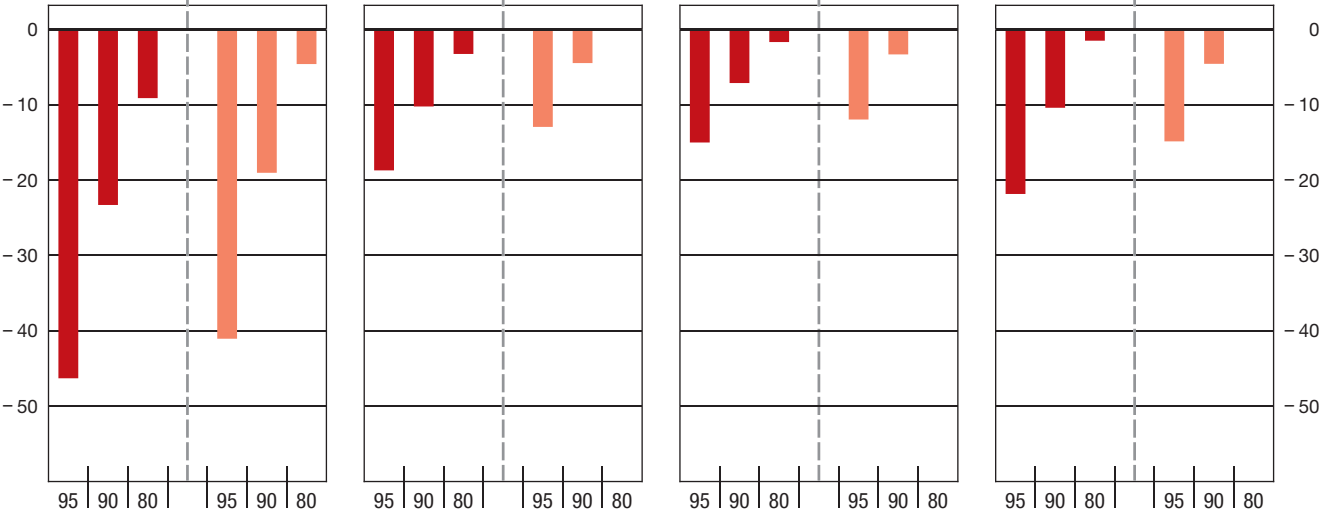
Manufacturing



Construction



Trade



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWA_R.

Spain

Net Worth at Risk

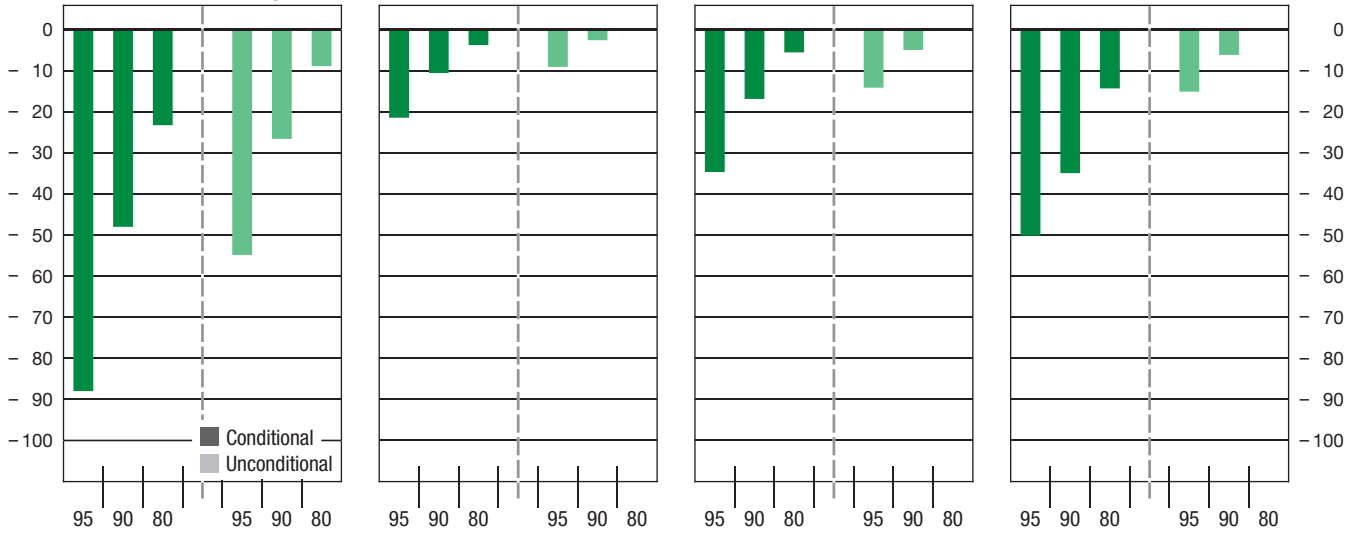
Micro

Small

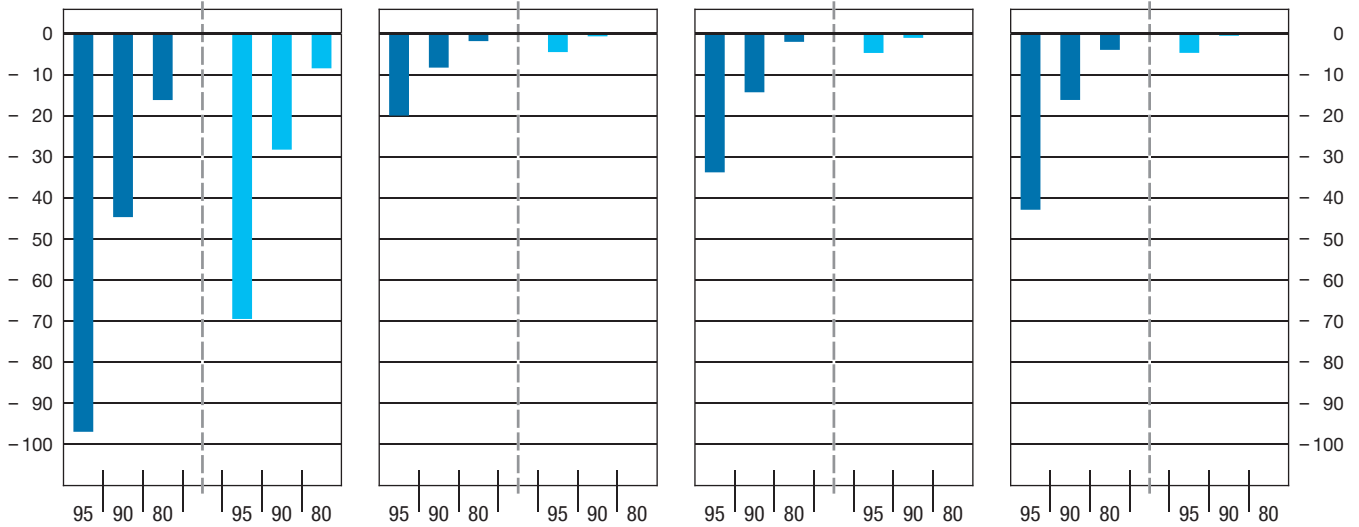
Medium

Large

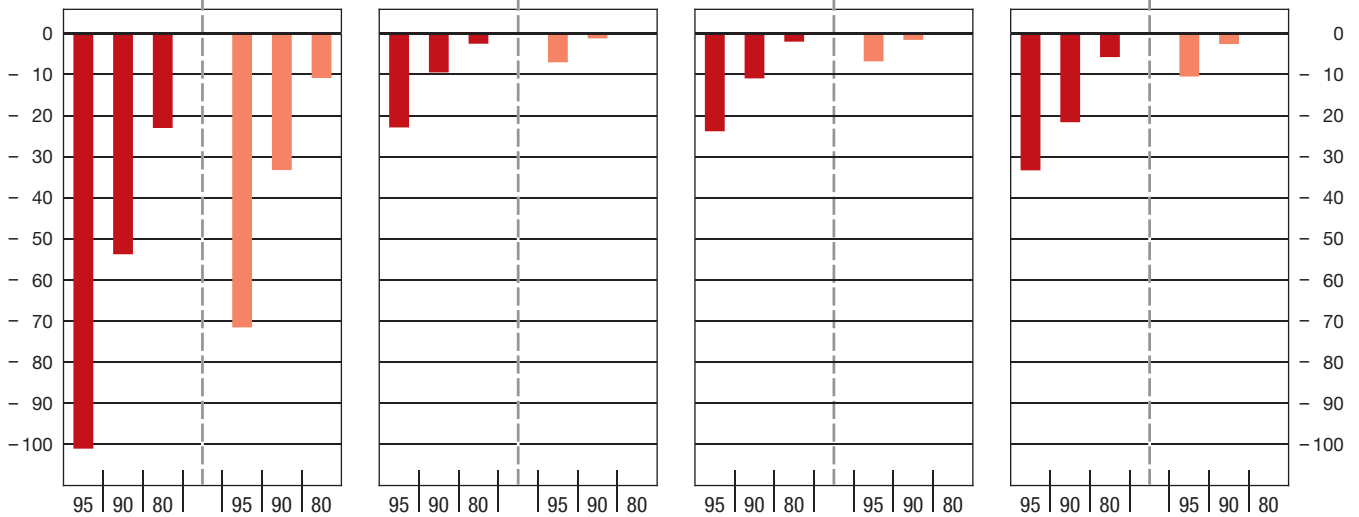
Manufacturing



Construction



Trade



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWA_R.

France

Net Worth at Risk

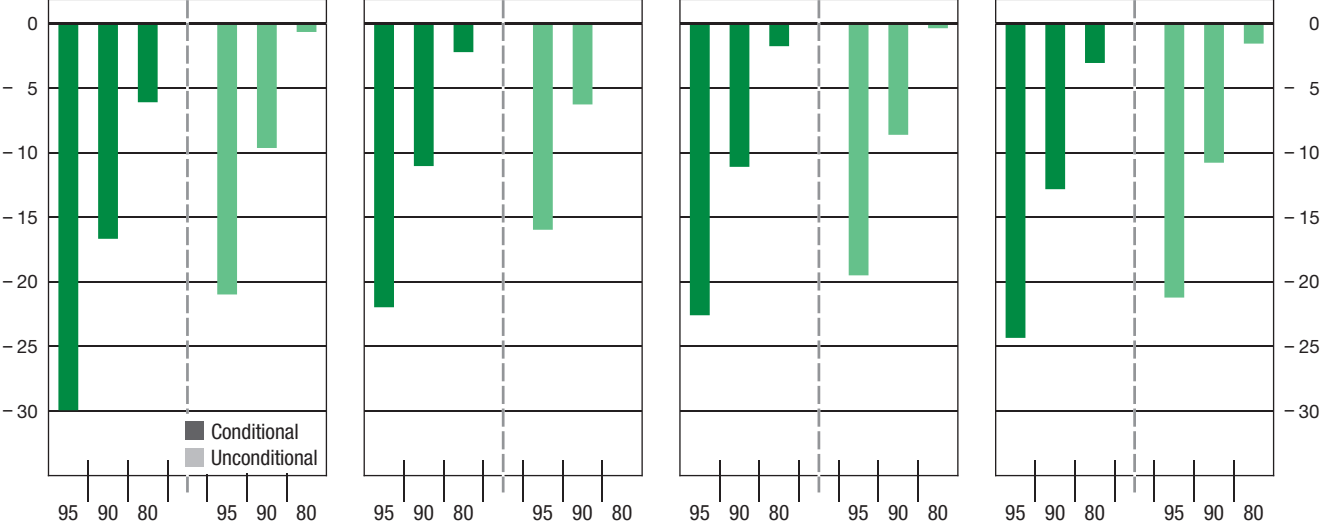
Micro

Small

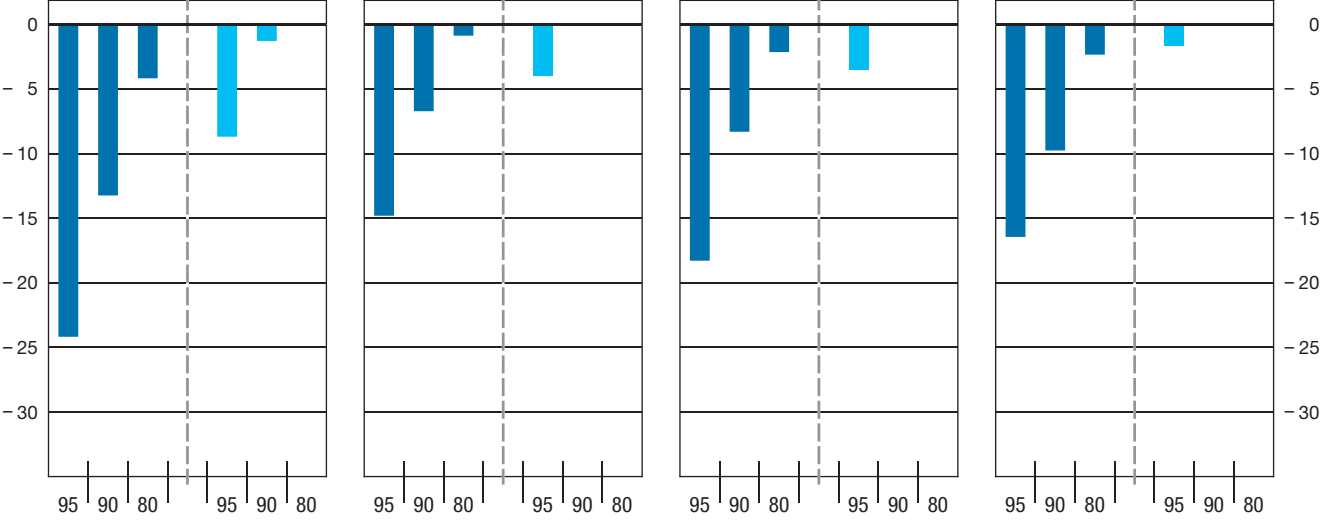
Medium

Large

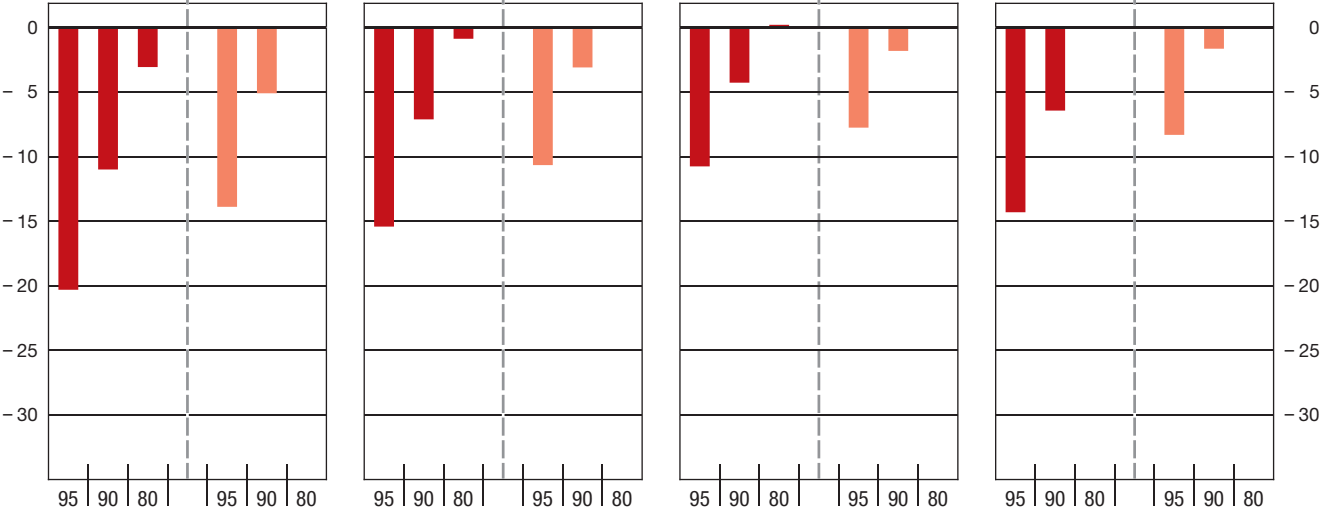
Manufacturing



Construction



Trade



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWA.R.

Italy

Net Worth at Risk

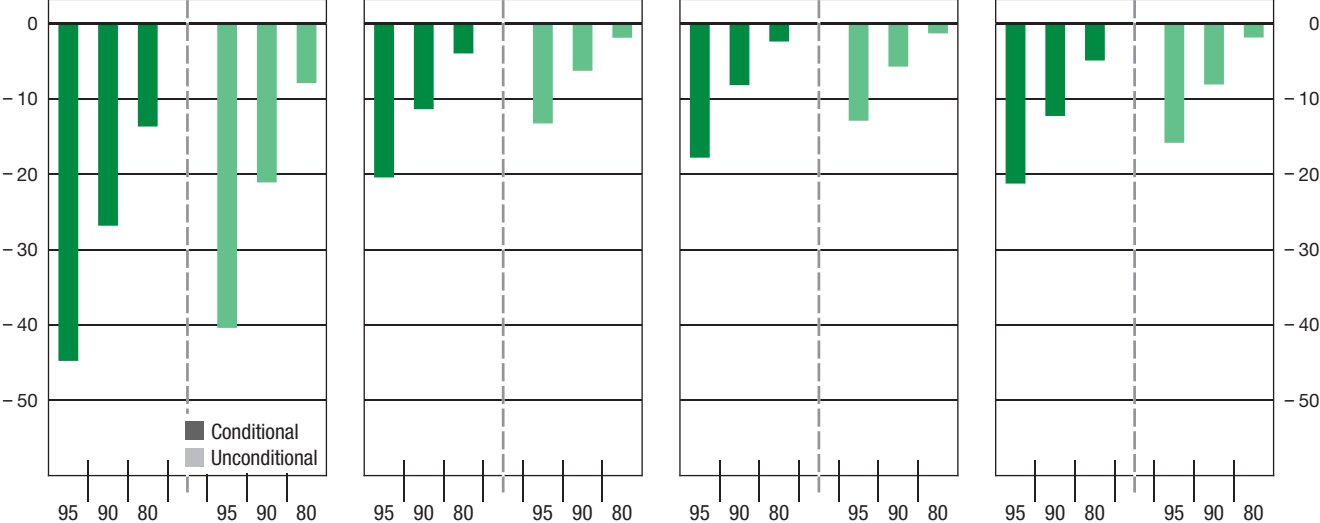
Micro

Small

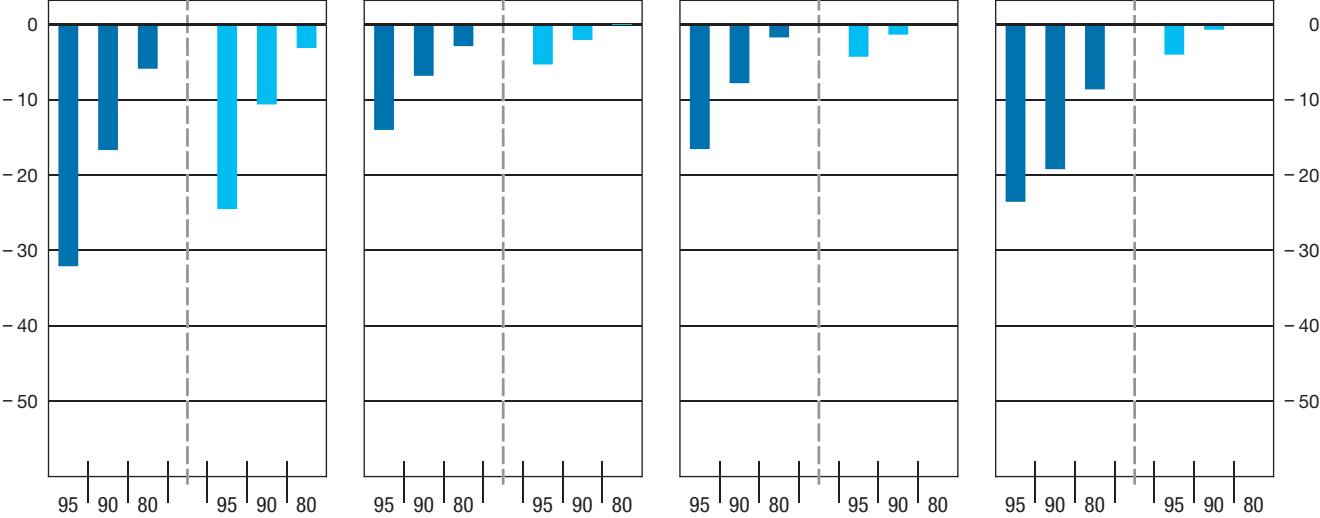
Medium

Large

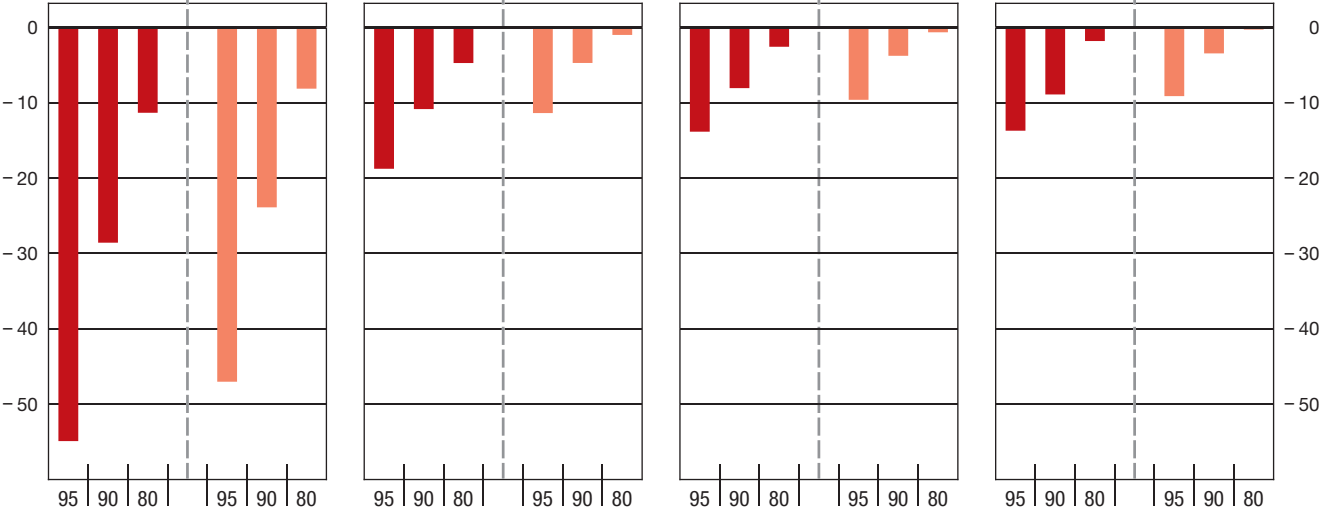
Manufacturing



Construction



Trade



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWA_R.

Portugal Net Worth at Risk

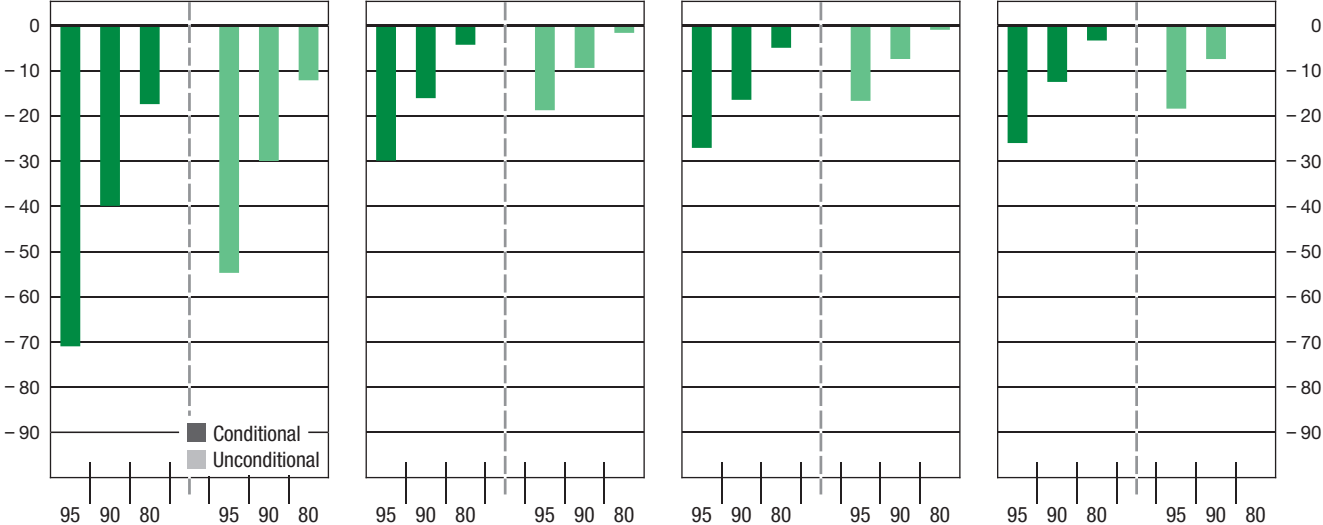
Micro

Small

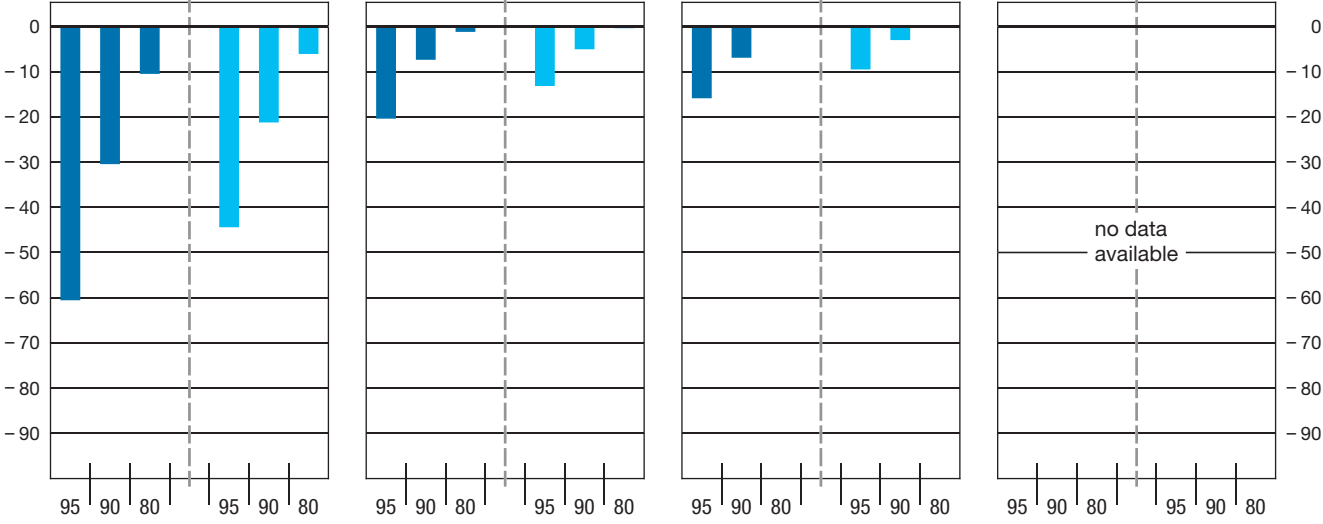
Medium

Large

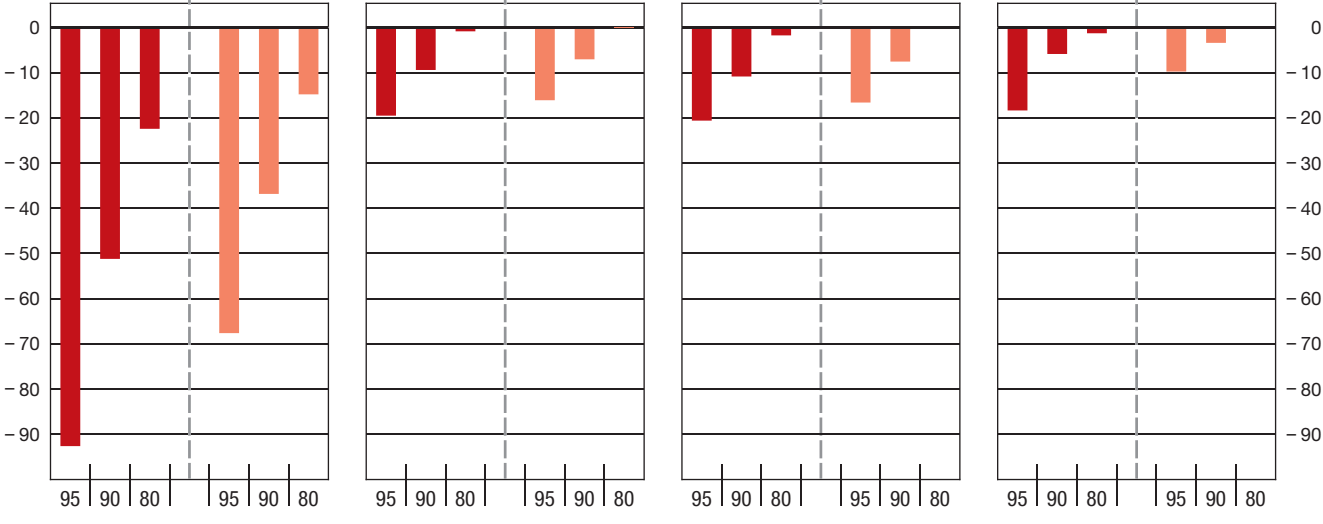
Manufacturing



Construction



Trade



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWA_R.

Belgium

Percentage of Companies with Net Worth below NWR in 2010

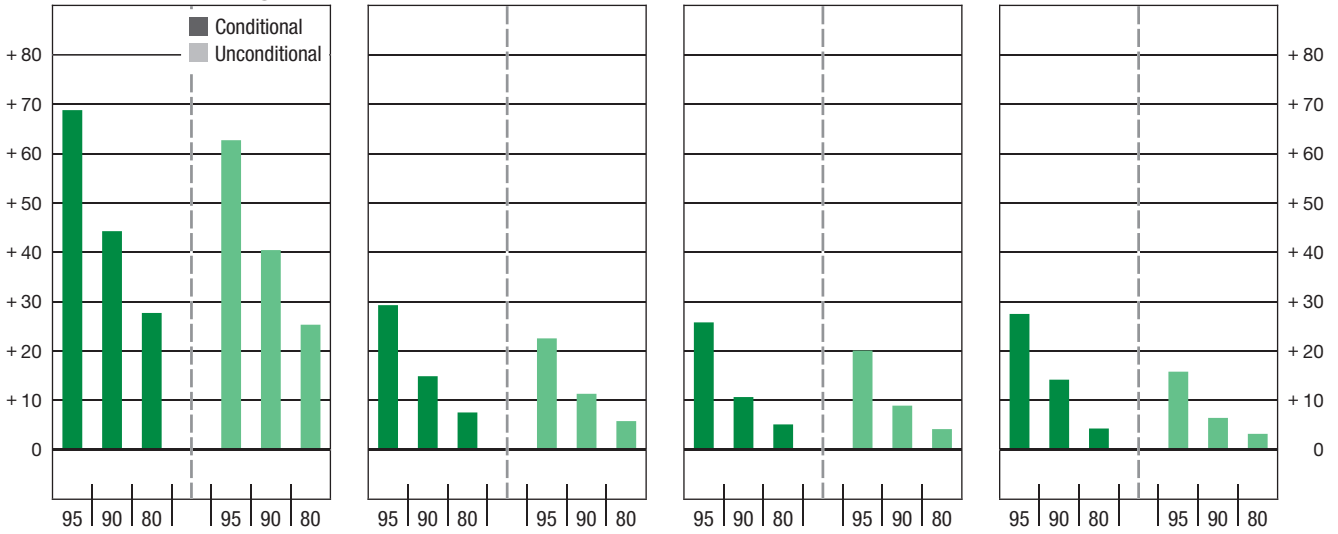
Micro

Small

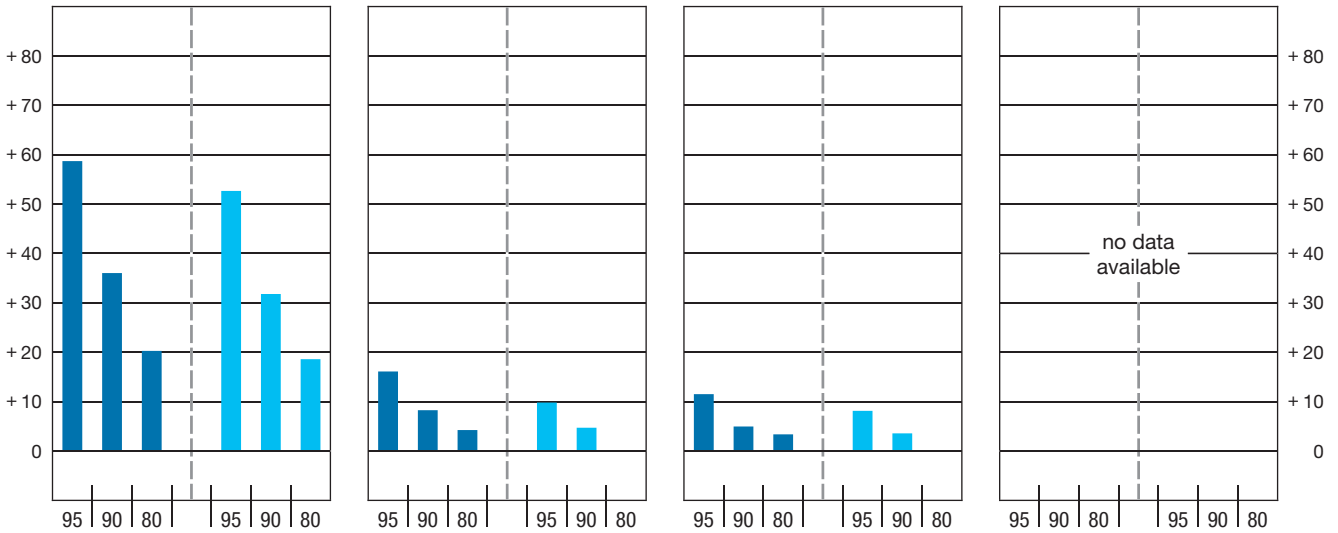
Medium

Large

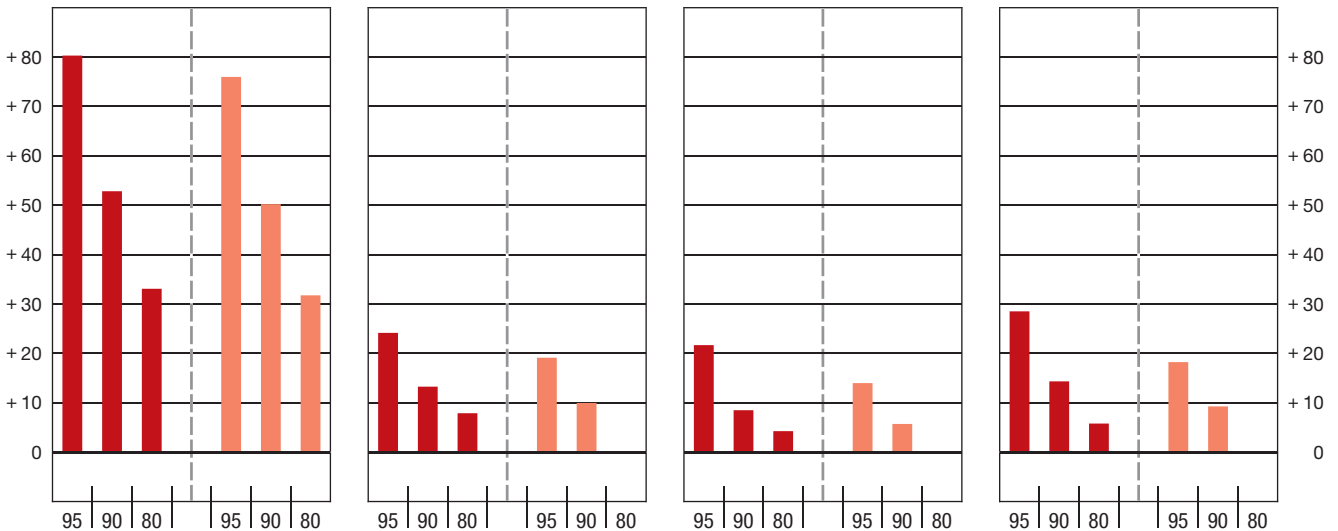
Manufacturing



Construction



Trade



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWR.

Germany

Percentage of Companies with Net Worth below NWR in 2010

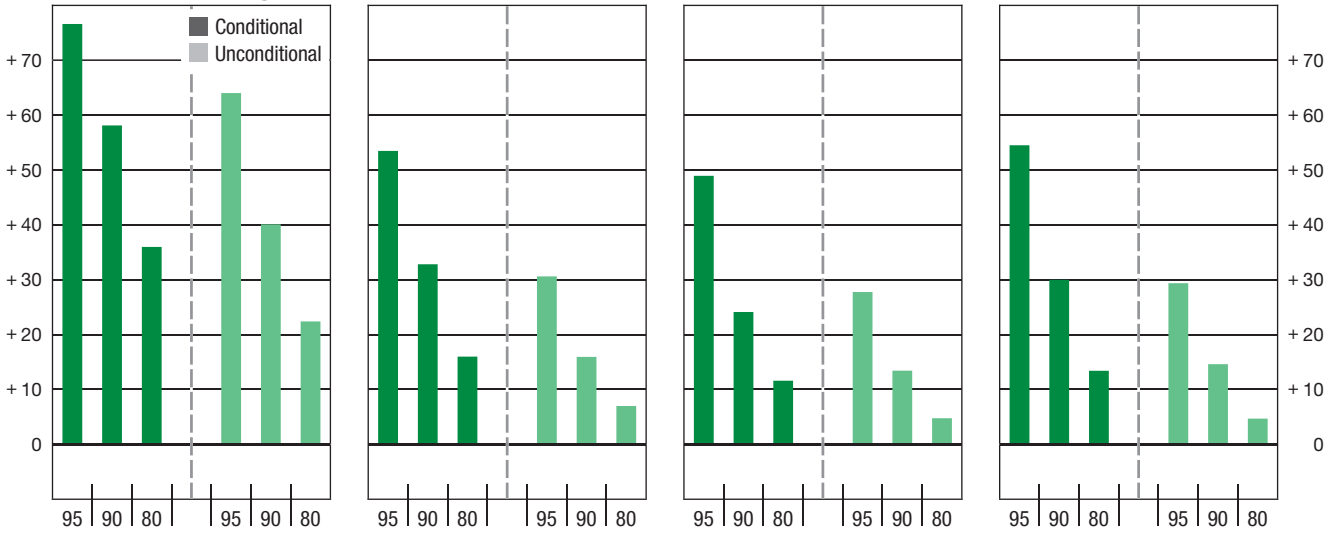
Micro

Small

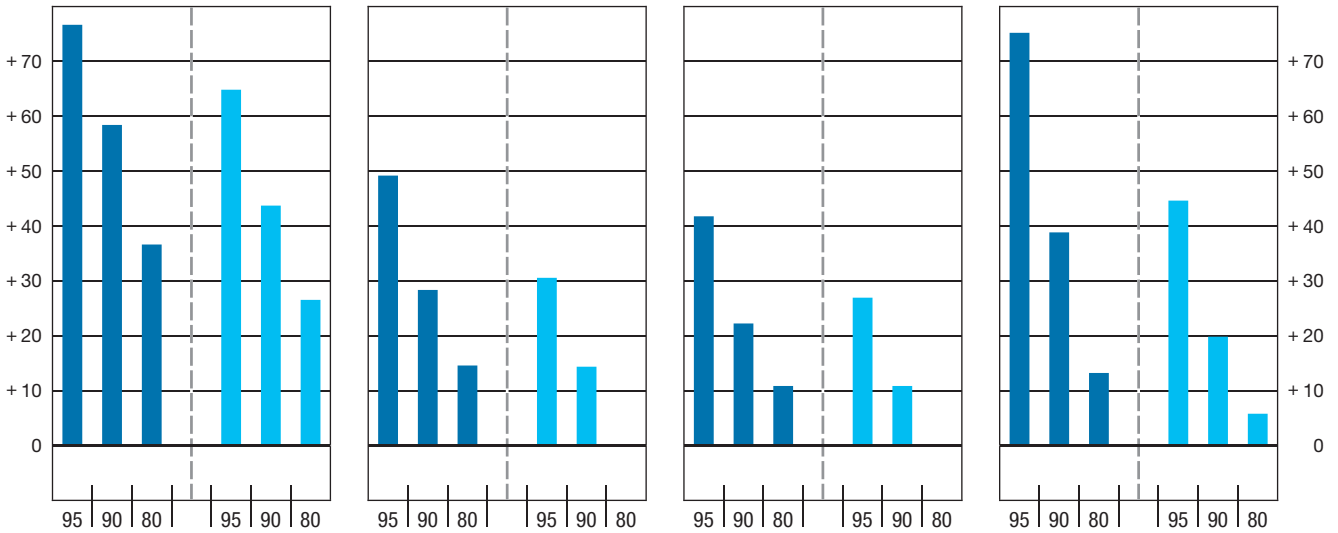
Medium

Large

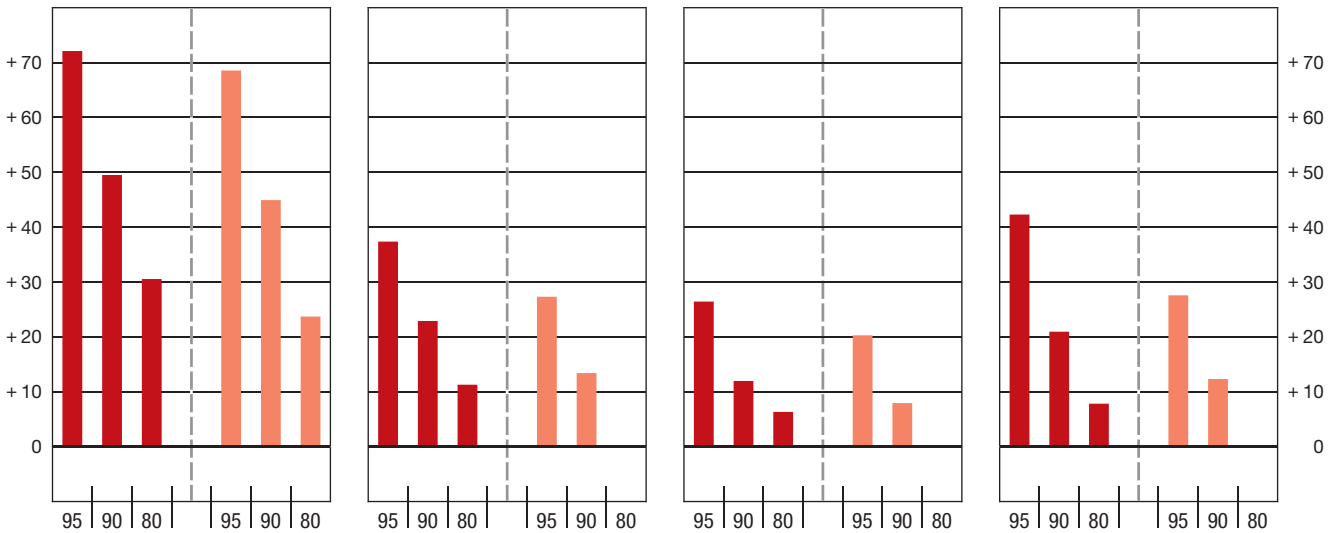
Manufacturing



Construction



Trade



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWR.

Spain

Percentage of Companies with Net Worth below NWA in 2010

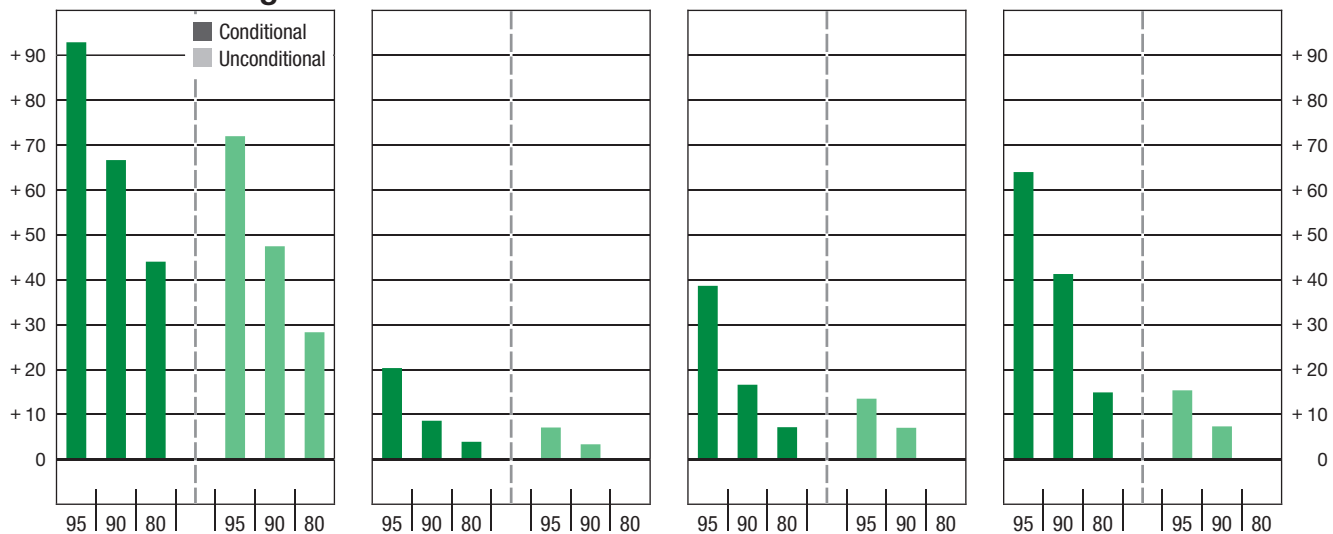
Micro

Small

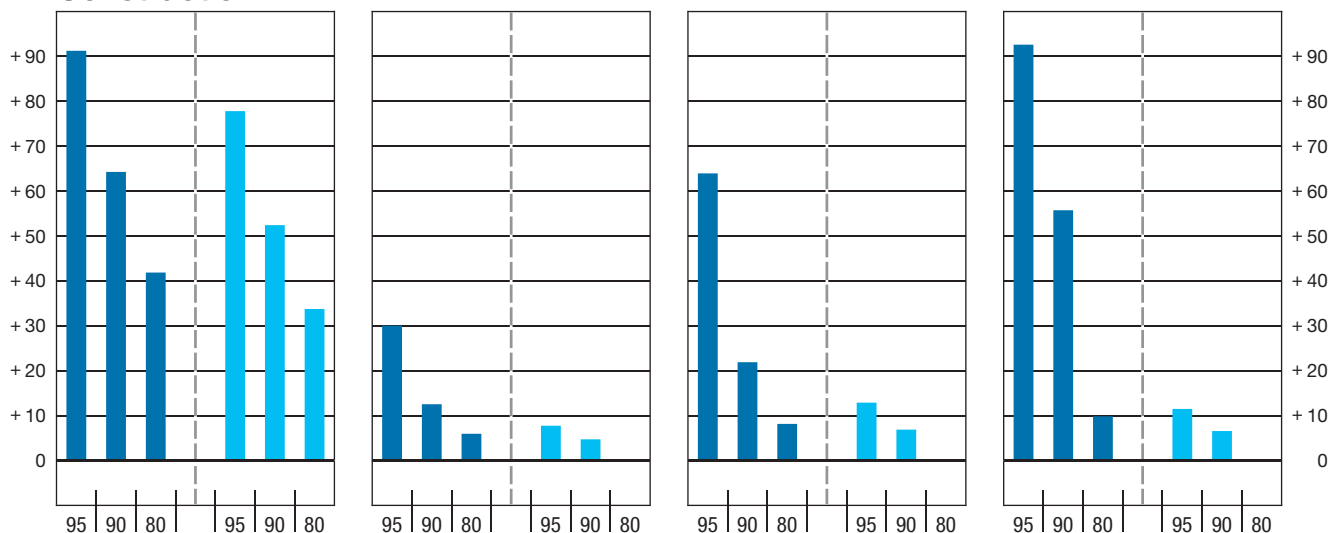
Medium

Large

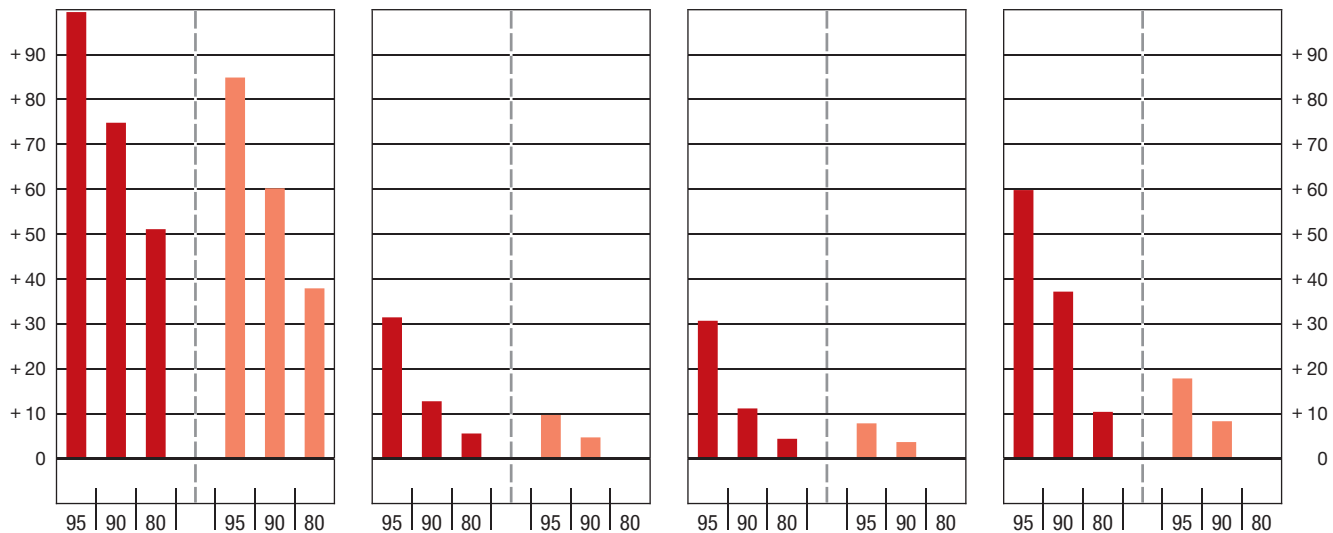
Manufacturing



Construction



Trade



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWA.

France

Percentage of Companies with Net Worth below NWR in 2010

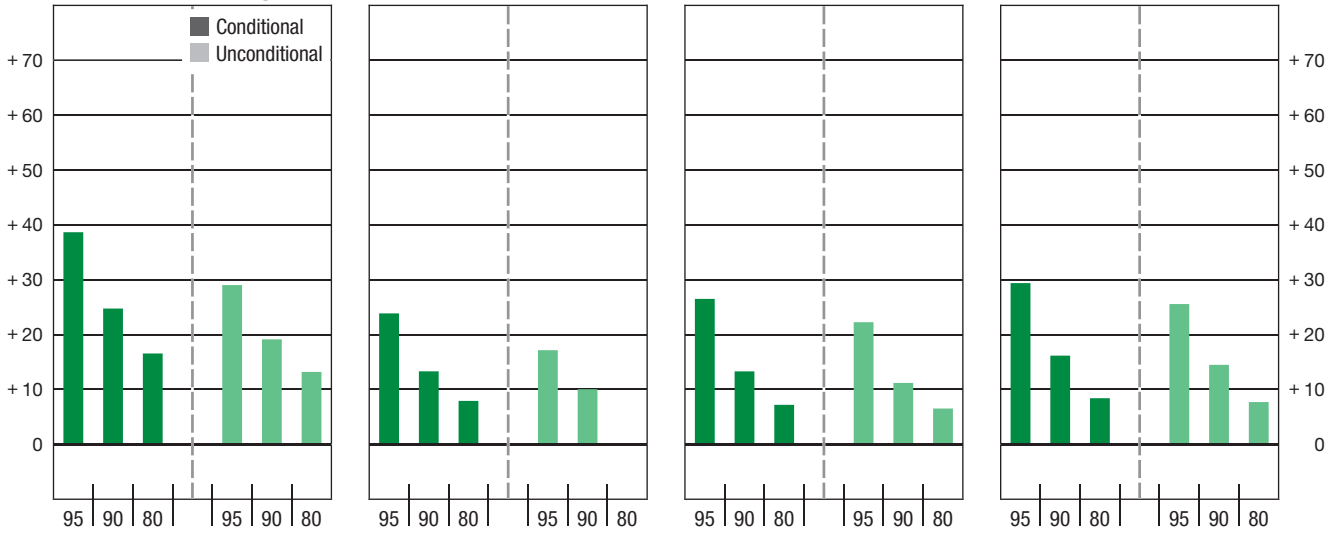
Micro

Small

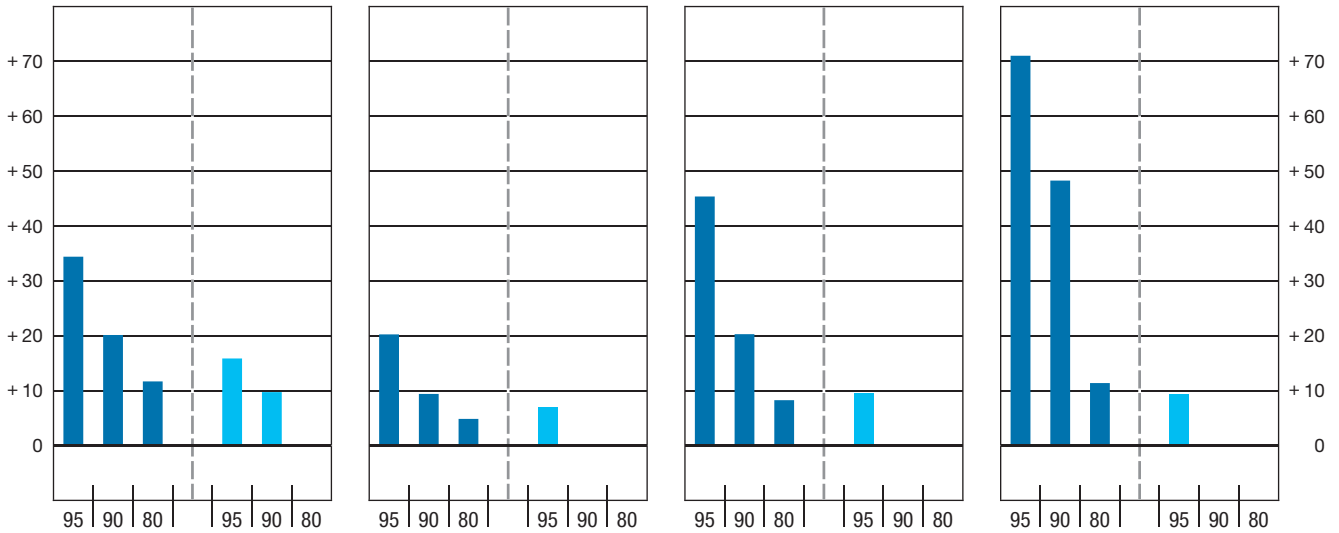
Medium

Large

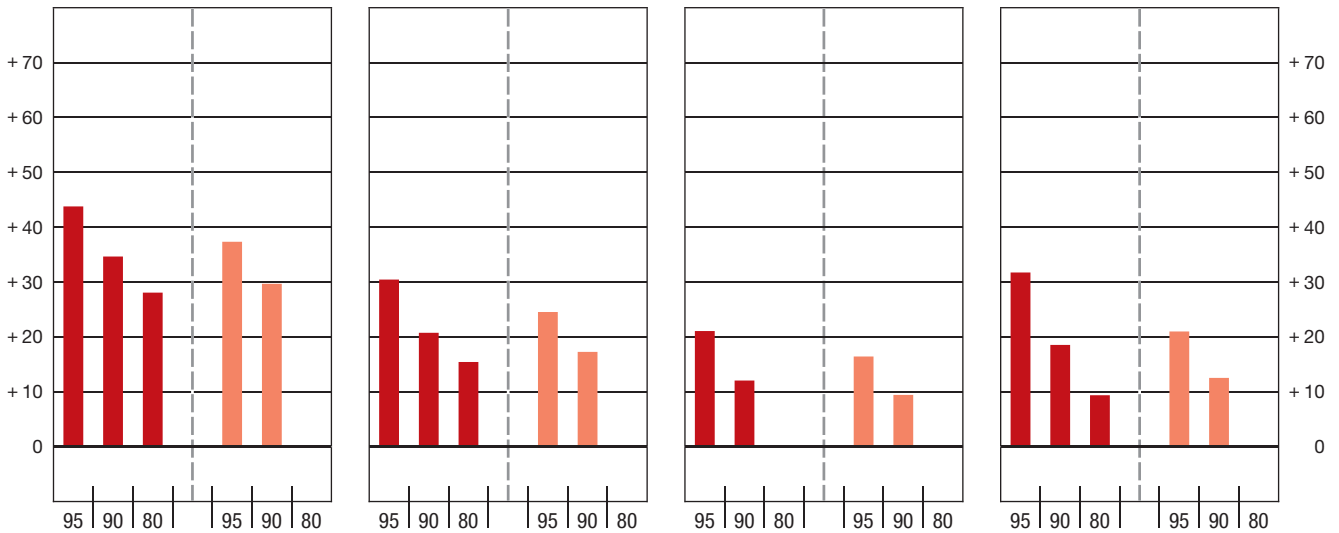
Manufacturing



Construction



Trade



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWR.

Italy

Percentage of Companies with Net Worth below NWR in 2010

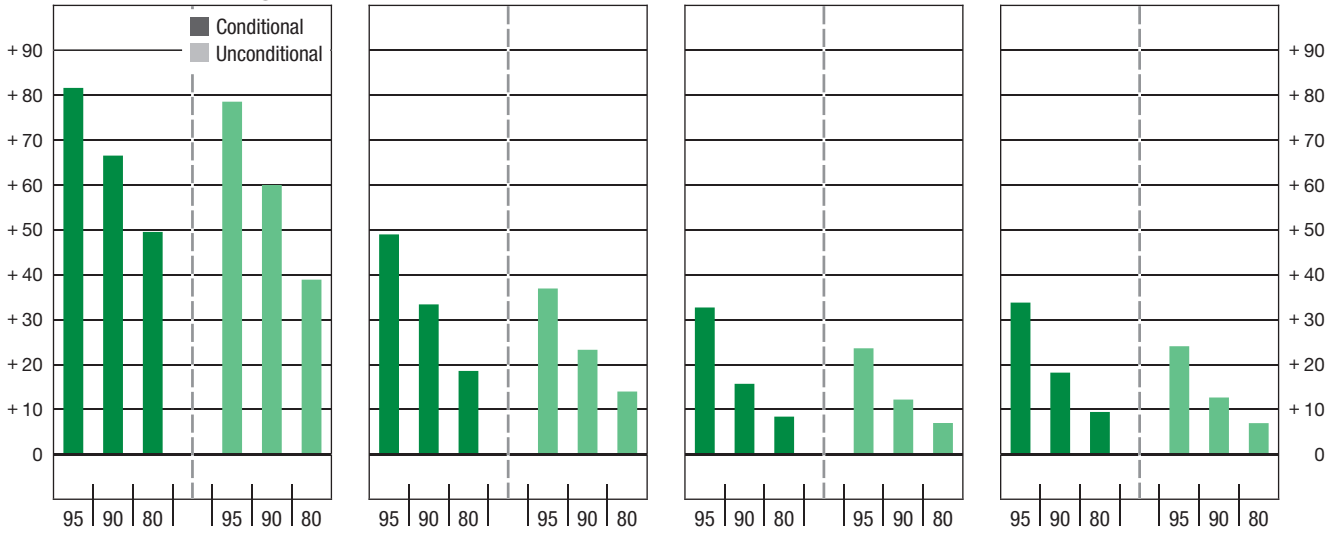
Micro

Small

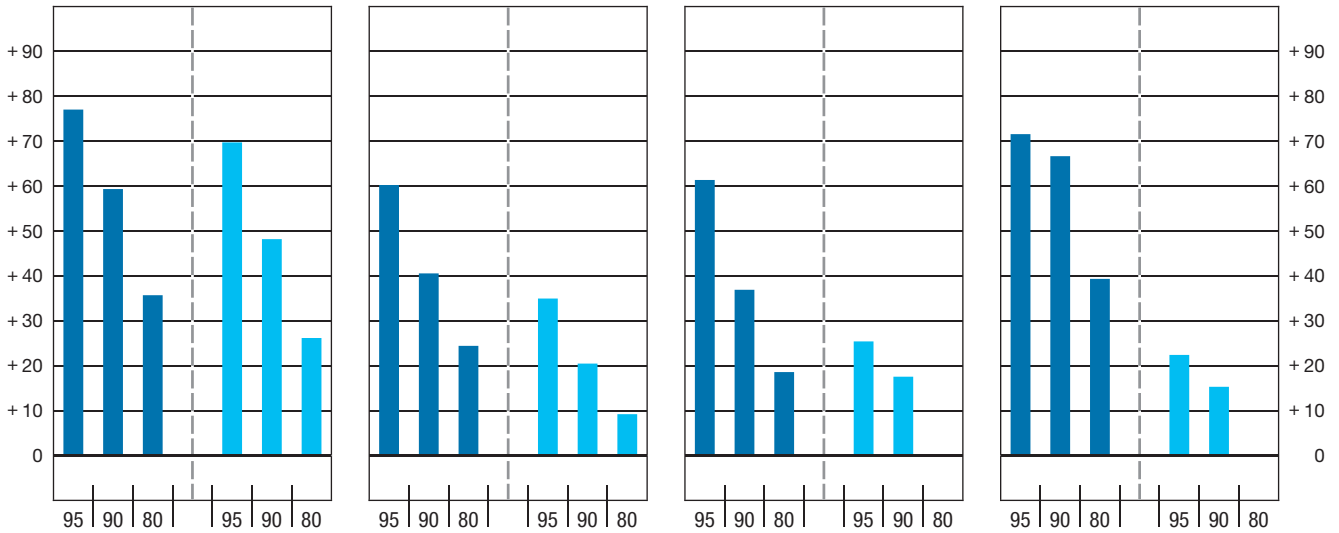
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Large

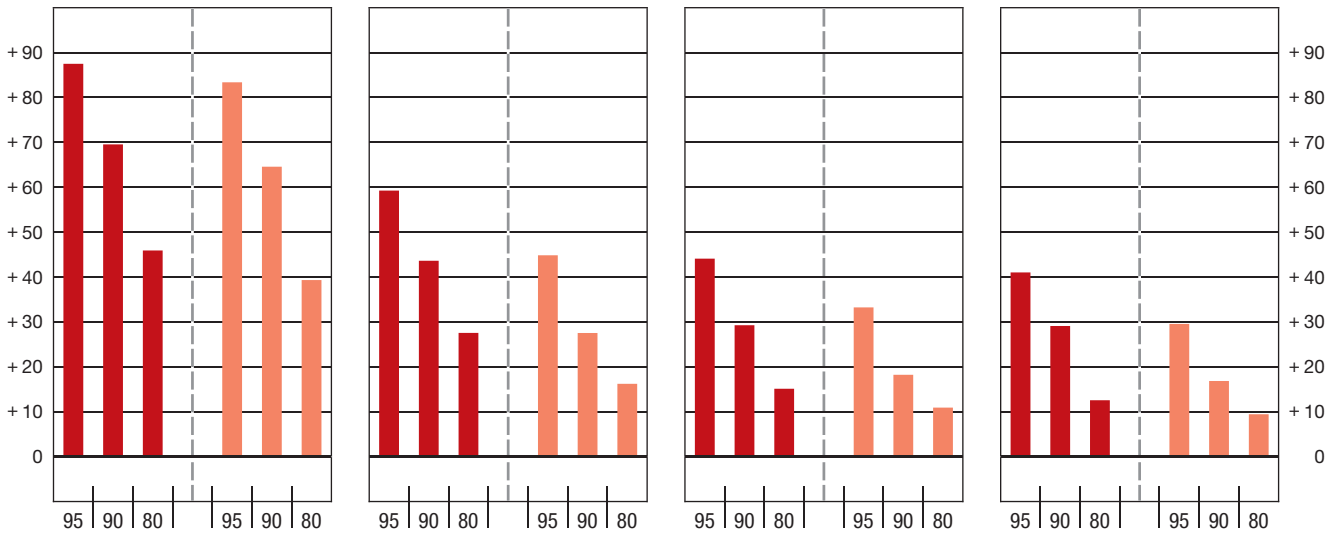
Manufacturing



Construction



Trade



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWR.

Portugal

Percentage of Companies with Net Worth below NWA_R in 2010

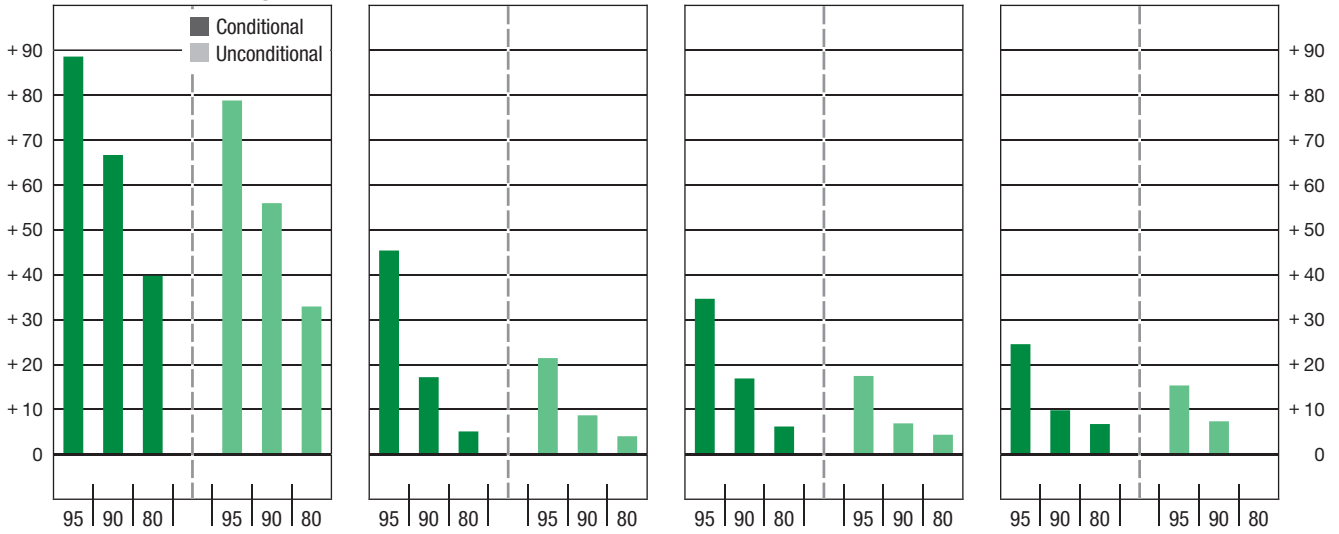
Micro

Small

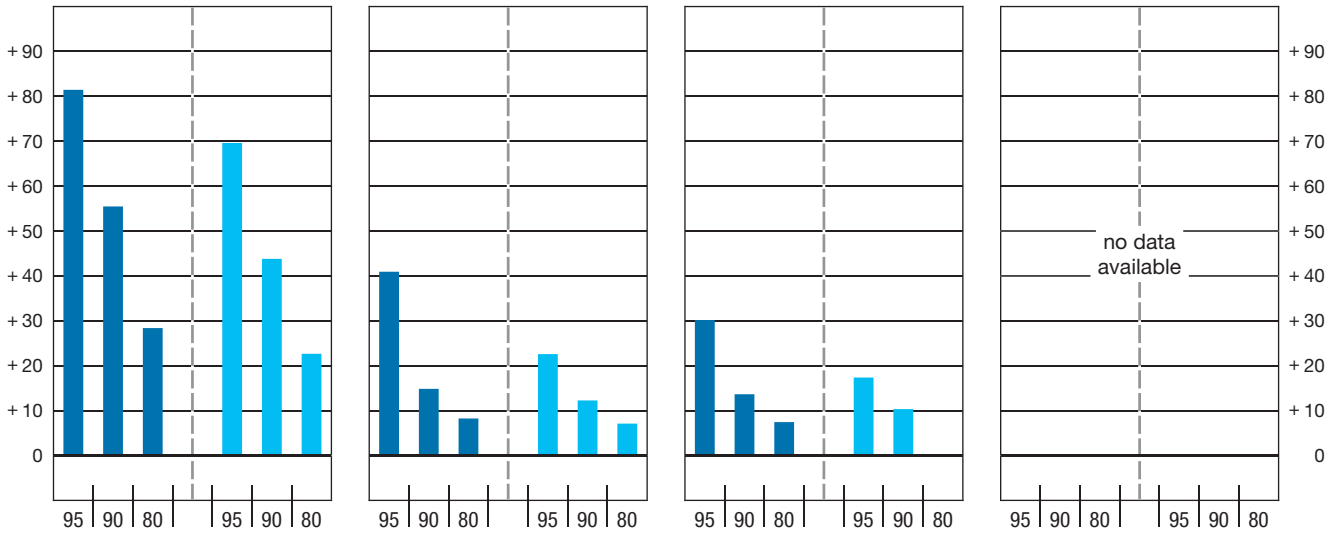
Medium

Large

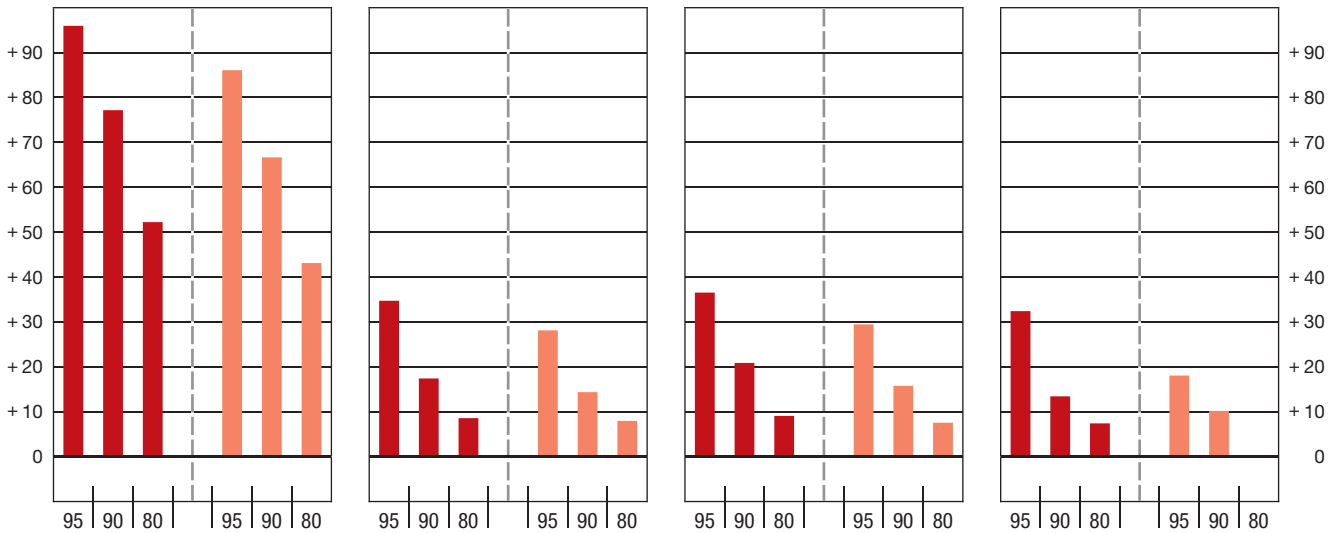
Manufacturing



Construction



Trade



The numbers on the x-axis refer to the three confidence levels of conditional and unconditional NWA_R.