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**Profitability, equity capitalization and net worth at risk:  
update of the former ECCBSO Financial Statement  
Working Group paper with Spanish, Italian and Turkish  
data<sup>1</sup>**

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<sup>1</sup> This paper was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the meeting.

## PROFITABILITY, EQUITY CAPITALIZATION AND NET WORTH AT RISK

Update of the former ECCBSO Financial Statement Working Group paper with Spanish, Italian and Turkish data

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### Abstract

Since 2008-2009 financial crisis, there is still not enough information available for policy evaluation on how companies in different size classes were affected and which non-financial companies were able to participate in the catch-up process in the period. European Committee of Central Balance Sheet Data Offices Financial Statement Analysis Working Group (WG FSA) has produced some studies about the impact of the financial crisis on profitability and equity capitalization, and concentrate on the explanations for the observable differences between European countries. In this paper, we analyse post-crisis financial statements of non-financial companies through the concept of net worth at risk (NWaR) with subsequent two-year losses as conditional and the average of the last eight-year losses as unconditional. NWaR can be considered as very important because it is a kind of stress test to evaluate sector-size level performance when having heavy losses in the countries Spain, Turkey and Italy. The year before and after the financial crisis of 2008, the highest conditional NWaR has been recorded for the large manufacturing companies. As regards to the other sector-size combinations, conditional NWaR results were more severe between the years 2010-2013 due to the subsequent European Crisis implying that the companies should have greater equity cushions. Although conditional NWaR can reflect some country specific characteristics, the recovery has seen in almost all sectors in three countries. Difference between conditional and unconditional NWaR is a kind of way to assess the sensitivity of sector profitability to recessions. The differences between these two important measures have also become smaller after 2013.

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

JEL classification: E32, G32, L25

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# PROFITABILITY, EQUITY CAPITALIZATION AND NET WORTH AT RISK<sup>1</sup>

## THE RESILIENCE OF THE NON-FINANCIAL CORPORATIONS IN A CRISIS ENVIRONMENT

### ***Introduction***

The 2008-09 economic crisis revealed that only little information is available from the macroeconomic national accounts data on the relative severity of the crisis in different parts of the non-financial sector. Besides, 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 respect, European Committee of Central Balance Sheet Data Offices Financial Statement Analysis Working Group (WG FSA) conducted a study in 2013 to analyse 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. For the countries Belgium, Germany, Spain, France, Italy and Portugal, the WG FSA compared these two key financial ratios through quantiles. Because the countries have extensive balance sheet data available for a long time horizon, the group could relate the impact of the recent economic crisis to a longer period. This study is the extension of the former study until the year 2015 with Spain, Italian and Turkish data. Likewise, the former one, this study aims to create a tool for the stress test to evaluate if companies in sector, size and country classification are enough capitalized to afford a period of crisis with possibility of having heavy losses.

## DATA AND DEFINITION OF RATIOS

### **Data**

The financial statements used in this study are restricted to corporations and cooperatives. Partnerships and sole proprietorships are excluded. This study covers the period from 1987 to 2015. Depending on the availability of the data source, the starting year is later for some sectors. Individual financial statements that are reported in the form of generally accepted accounting principles (GAAP) are used. For the sectoral coverage, manufacturing, trade and construction are selected due to their importance in contribution to a national economy. Sectors have been differentiated according to the NACE Rev.2 classification. Demolition and site preparation is excluded from the construction sector. For analysing the data according to size classes; micro, small, medium and large enterprises are defined by applying the

<sup>1</sup> Former studies of the FSA WG: Delbreil, Michel; Esteban, Ana; Foulcher, Sandra; Elgg, Dominik; Favale, Vincenzo; Körting, Timm and Varetto, Franco (2005): *Net Worth at Risk*; Brun, Matthieu; Chai, Flavia; Elgg, Dominik; Esteban, Ana; van Gastel, George; Körting, Timm; Momo, Rossella; Nigro, Valentina; Poiares, Rita; Servant, François; Solera, Irune; Vivet, David (2013): *Profitability, Equity Capitalization and Net Worth at Risk. How resilient are non-financial corporations in a crisis environment?*

thresholds for turnover. The corresponding thresholds for separating micro, small, medium and large corporations are £2 million, £10 million and £50 million.

## **Definition of Ratios**

### ***Profitability***

In this study, profitability is measured as the ratio of "net income" in the income statement to the total assets in the balance sheet of non-financial corporations. For the total asset used in the denominator of the ratios, adjustments are made for equity. Subscribed capital uncalled (or unpaid), bond redemption premium, intangible fixed assets and investment grants are subtracted from total assets and discounted trade bills are added.

### ***Equity Capitalization***

Equity capitalization is the ratio of net worth to total assets. Net worth is simply the amount by which assets exceed liabilities. It is calculated by adding share issues, revaluation reserves, retained earnings, net profit or loss for the financial year and special tax based reserves. Subscribed capital uncalled (or unpaid) and intangible fixed assets are subtracted from the calculation. Net worth is divided by total assets for assessing equity capitalization as a percentage of total capital provision to a company.

### ***Net Worth at Risk (NWaR)***

NWaR is the share of cumulative losses (as a percentage of total assets) that companies may have to face with a certain level of confidence calculated over a given period of time. This ratio also serves as a benchmark of minimum capital required in a given sector-size class enabling companies to absorb losses that might potentially arise.

Two NWaR approaches are used: conditional and unconditional NWaR at three confidence levels: 95%, 90% and 80%. The first two levels of confidence represent rather worst-case scenarios and the last displays a rather moderate loss scenario. For practical issues, we use 90% confidence level for the comparison of figures at sector and size levels.

At 90% confidence level, conditional NWaR is calculated as follows: for each company cumulative two-year net income figures in terms of total assets are calculated<sup>2</sup>. From the resulting two-year net income distributions in each sector-size combination the 10<sup>th</sup> percentile is chosen; resulting in a time series of overlapping two year values. From the time series, the minimum level of the time span 1987-2015 is chosen for conditional NWaR 90%.

For the unconditional NWaR 90%, the mean of the last eight conditional NWaR 90% is used. The differentiation of conditional and unconditional NWaR is important to assess the impact of recessions on the income distribution.

<sup>2</sup> The sum of net income in period t and t+1 is divided by total assets in period t.

### **Percentage of the Companies with Net Worth below NWaR**

The ratio "Percentage of the companies with Net Worth below conditional NWaR" is calculated as a time series, because conditional NWaR represents a worst-case scenario independent of time. However, the ratio "Percentage of the companies with Net Worth below unconditional NWaR" is only represented for the specific year. The ratio is important in that this displays how well a sector is endowed with equity to cope with the NWaR loss scenario.

## COUNTRY EXPERIENCES BETWEEN THE YEARS 1987-2015<sup>3</sup>

### **Spain**

Two-year cumulative losses for the whole time span reveal that the couple of years for the worst losses in all size classes of manufacturing companies is 1992/1993. This ratio is the highest for the micro companies with -48.1. Large companies has higher ratio than medium and small companies with -35.0. This result is similar for the actual losses for the financial crisis (2008/2009). The losses is the worst for the micro companies with -39.7. Large companies still have the higher ratio than small and medium companies do in 2008/2009 however closer values to these size classes than in 1992/1993 figures. After the financial crisis, couple of years with the worst losses for the micro companies is 2011/2012. Although the year with the highest risk values for different size classes of the manufacturing companies can change from 2009 to 2012, for all them, the recovery in profitability has started from 2013. Like the manufacturing sector, the couple of years for the worst losses in all size classes of trade sector are also 1992/1993.

#### **Spain- Unconditional Net Worth at Risk and Cumulative two year losses at 10<sup>th</sup> percentile**

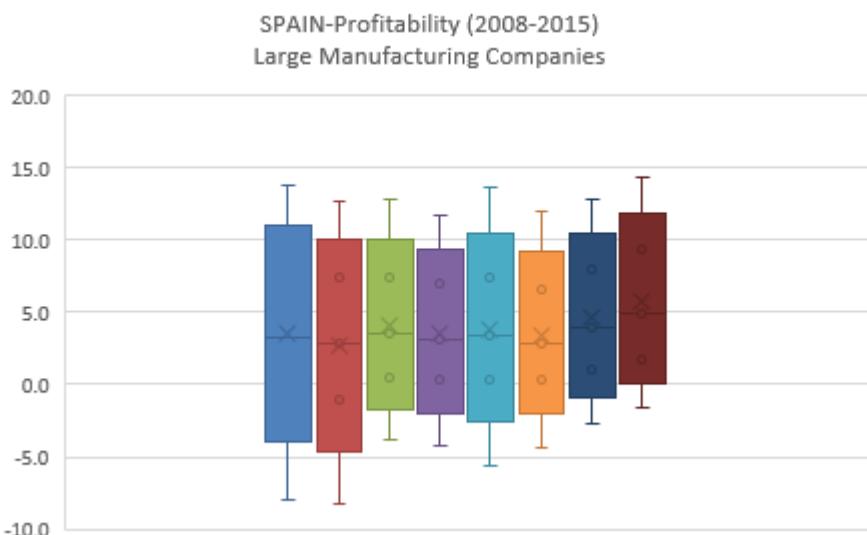
#### **Manufacturing, Trade and Construction Companies ( NACE Rev.2 C,G,F sectors)**

Table 1

	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	Unconditional
<b>C-micro</b>	-26.9	-39.7	-43.3	-43.0	<b>-45.7</b>	-43.2	-33.7	-25.6	-37.6
<b>G-micro</b>	-34.7	-43.7	-44.1	-45.4	-50.2	<b>-51.1</b>	-47.3	-39.6	-44.5
<b>F-micro</b>	-33.6	-42.7	-45.2	-46.8	<b>-48.4</b>	-42.9	-34.2	-26.5	-40.0
<b>C-small</b>	-2.7	-7.2	-7.1	<b>-8.2</b>	-7.0	-6.3	-3.9	-0.8	-5.4
<b>G-small</b>	-1.1	-4.6	-5.0	-5.5	<b>-6.9</b>	-5.6	-3.4	-0.8	-4.1
<b>F-small</b>	-0.7	-3.3	-6.5	-11.9	<b>-12.2</b>	-9.5	-7.5	-2.7	-6.8
<b>C-medium</b>	-5.5	-11.7	<b>-12.0</b>	-8.9	-9.2	-8.2	-5.5	-2.7	-7.9
<b>G-medium</b>	-1.9	-6.2	-5.5	-5.5	<b>-7.4</b>	-5.5	-3.6	-1.6	-4.7
<b>F-medium</b>	0.0	-3.2	-10.8	-12.4	<b>-19.9</b>	-18.6	-12.4	-5.9	-10.4
<b>C-large</b>	-8.6	<b>-12.7</b>	-11.2	-7.0	-9.0	-9.9	-6.2	-3.4	-8.5
<b>G-large</b>	-4.2	-7.0	-9.2	-6.1	<b>-10.6</b>	-7.0	-4.6	-3.3	-6.5
<b>F-large</b>	-0.2	-6.6	-4.3	-10.1	-14.3	<b>-21.4</b>	-14.0	-10.6	-10.2

<sup>3</sup> Please note that in this study, there are data for previous years but the table is restricted to the last 8 years

The level of the worst-case loss and the loss in financial crisis time is much worse in micro trade companies compared to manufacturing micro. Although, on average profitability is higher in small, medium and large manufacturing companies than the same size of trade companies, the risk level of loss is higher due to the higher percentage of the companies with negative net profit or loss to total assets ratio. For the micro trade companies, the worst losses has seen in 2012/2013, the ratio -51.1 is worse than the 2008 crisis year ratio of -43.7. For other size classes of trade sector, the worst losses after crisis has seen one year before in 2011/2012 and the ratio is worse than the crisis year ratio similar to the micro companies. Likewise, the manufacturing sector, the recovery has started from 2013. For the construction sector, the couple of the years with worst losses is 2011/2012 after the financial crisis. The conditional NWaR of the micro construction companies is -48.4, very close to the micro manufacturing NWaR (-48.1) and lower than the micro trade NWaR (-54.1). The difference between the conditional and unconditional NWaR is the highest in large construction companies because the worst loss in 2012/2013 is differently higher than other years after the financial crisis. In 2012, the dispersion between lowest and highest percentile profitability is the highest since 1987. 2015 is the year of increasing in profitability of construction sector except for the large companies. In this year, the median profitability is the highest for small companies.



Unconditional net worth at risk, the mean of the years 2007/2008 to 2014/2015, is lower than the conditional NWaR for all size classes of manufacturing. In addition, the results are lower than the actual losses for the financial crisis. However, for the micro and small companies these results are very close. The differentiation of the conditional and unconditional NWaR is important to assess the impact of recessions on the income distribution. Therefore, it can be said that manufacturing companies have recovered better after the crisis as size increases. For the trade sector, the mean of the worse loss levels are lower in all sizes than manufacturing sector. Although, the average profitability is higher in manufacturing sector, the dispersion between the 90<sup>th</sup> and the 10<sup>th</sup> percentile of profitability ratio is also higher for all size classes.

The reduction of the percentage of the companies with capital below NWaR is a good indicator to show how well a sector is endowed with equity to cope with NWaR loss scenario. For micro manufacturing companies, this percentage is in a declining trend after 2008. In addition, percentage of the companies with equity over total assets higher than 50% has increased in the same period. The increase in the equity

ratio can be caused either from the contraction of the total assets or an increase in equity. 2014 and 2015 are the good years for the large manufacturing companies in terms of profitability and net worth. Equity capitalization below zero is higher in micro trade companies than other size classes of trade sector. We can see more companies in the highest range (over 50% equity capitalization ratio) in small and medium sized trade companies. For the large construction companies, different from large companies in other sectors, the percentage of the companies with net worth to total assets ratio over 50% is very low. The percentage of the companies is concentrated between the ratios of 10% and 25% in this sector-size level. Therefore, the capability of large construction companies to cope with the NWaR loss scenario is worse than the other large companies in the manufacturing and trade sector. As a result, the percentage of companies that cannot cope with the loss scenario has decreased in these years. In 2015, the percentage of companies with capital below NWaR is the lowest in all the sectors and sizes.

#### **Spain-Percentage of the Companies with capital below Unconditional NWAR**

#### **Manufacturing, Trade and Construction Companies ( NACE Rev.2 C,G,F sectors)**

Table 2

	2007	2008	2009	2010	2011	2012	2013	2014	2015
C-micro	<b>63.8</b>	61.9	60.6	60.1	58.7	56.5	56.3	55.2	52.8
G-micro	<b>74.0</b>	72.3	70.7	69.7	68.6	66.6	66.4	65.9	64.2
F-micro	<b>66.0</b>	65.6	64.2	62.7	61.1	58.7	57.6	56.3	54.8
C-small	<b>6.9</b>	5.7	5.8	5.5	5.8	5.1	4.8	4.8	3.9
G-small	<b>9.1</b>	8.1	8.1	7.7	7.7	8.0	7.3	6.7	5.6
F-small	<b>17.0</b>	12.9	11.9	11.8	12.3	9.9	6.7	6.9	4.5
C-medium	6.6	6.5	8.8	<b>9.5</b>	8.4	8.2	6.1	6.7	6.2
G-medium	6.6	6.8	6.7	7.5	7.7	<b>7.9</b>	7.4	7.7	7.2
F-medium	19.9	17.9	18.1	<b>24.7</b>	20.5	16.8	20.1	16.2	7.1
C-large	7.0	9.0	10.1	10.2	9.5	<b>10.4</b>	10.1	9.3	7.9
G-large	13.3	13.7	13.4	13.4	12.8	<b>14.9</b>	13.3	12.1	10.1
F-large	4.6	6.2	6.5	7.1	<b>12.6</b>	10.3	11.2	10.3	10.8

As a measure of spread in the lower distribution, the interpercentile range between the 80% and 95% conditional NWaR may be used. For the micro companies, the year with the highest range is 2011 and for the trade companies, the spread is wider in the low distribution. As the size increases, the highest dispersion went back to the financial crisis years. For the construction companies, 2013 is the year for the highest differences.

#### **Italy**

Two year cumulative losses for the whole time span show that the years with worst losses are in the crisis period of 1992/1993<sup>4</sup> for all firms' sectors of activities. In particular, for manufacturing companies the income losses during the financial crisis are very close to the conditional NWaR value. In fact, in the whole time horizon, the

<sup>4</sup> Please note that Italian data has a jump in the sample size for micro and small firms between 1992 and 1993

distribution of NWaR is quite stable, less cyclical than in Spain and Turkey. Micro firms had greater losses: the range of their NWaR is between -15 to -30; for the other size classes is between -1 to -12. After 2009/2010, the recovery started in the manufacturing sector for all size classes. In recent years, median profitability has overshot the pre-crisis level. As regards the companies active in the trade sector, they had the worst actual losses in the years 1992/1993 and 1993/1994. At each size level, conditional NWaR is very similar to manufacturing figures.

**Italy - Unconditional Net Worth at Risk and  
Cumulative two year losses at 10<sup>th</sup> percentile**

**Manufacturing, Trade and Construction Companies  
( NACE Rev.2 C,G,F sectors)**

Table 3

	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	Unconditional
<b>C-micro</b>	-20.4	-23.1	-24.0	-20.1	<b>-21.1</b>	-21.1	-19.1	-15.2	-20.5
<b>G-micro</b>	-24.1	-25.7	-24.7	-23.5	-25.5	<b>-26.6</b>	-24.1	-20.3	-24.3
<b>F-micro</b>	-9.4	-10.2	-10.2	-10.1	<b>-11.9</b>	-13.2	-13.2	-10.9	-11.1
<b>C-small</b>	-6.3	-8.5	-8.3	<b>-6.6</b>	-6.9	-6.5	-4.9	-3.1	-6.4
<b>G-small</b>	-5.1	-6.2	-5.6	-5.3	<b>-6.6</b>	-6.9	-5.4	-2.9	-5.5
<b>F-small</b>	-2.1	-2.5	-2.6	-3.0	<b>-4.2</b>	-5.2	-4.6	-2.6	-3.3
<b>C-medium</b>	-6.2	-8.0	<b>-8.4</b>	-6.0	-7.2	-6.5	-4.6	-3.1	-6.3
<b>G-medium</b>	-4.5	-5.6	-4.9	-4.9	<b>-5.8</b>	-6.2	-4.4	-2.0	-4.8
<b>F-medium</b>	-1.5	-2.2	-2.0	-2.8	<b>-5.8</b>	-5.1	-5.3	-2.7	-3.4
<b>C-large</b>	-7.9	<b>-10.5</b>	-10.6	-8.4	-9.3	-9.2	-8.1	-5.1	-8.6
<b>G-large</b>	-4.6	-5.5	-4.3	-3.6	<b>-4.9</b>	-6.5	-5.2	-3.3	-4.7
<b>F-large</b>	0.0	-0.8	-0.3	-3.6	-3.7	<b>-5.8</b>	-4.6	-0.4	-2.4

The worst years 9 are 2012/2013 for all size classes of trade companies after the actual losses of 2008/2009. As regards the construction sector, after the great financial crisis, the worst years were during the European Crisis (2012/2013) similarly to the trade sector. In 2015, the percentage of the companies in the highest profitability class (above 5%) increased for all size classes of the construction sector.

Unconditional NWaR is lower than the conditional NWaR for all size classes of manufacturing. The difference has increased as the size decreased. Therefore, like the Spanish companies, Italian manufacturing companies have recovered better after the crisis as size level increases.



After 2011, firms' capitalization improved: for all sector and size combinations, the percentage of companies with capital below NWaR is in a declining trend. Micro firms appear relatively undercapitalised, especially in the trade sector where there is the highest percentage of the companies with net worth below NWaR. Among the large firms, manufacturing companies are the least capitalized.

Also, the percentage of companies with equity capitalization over 50% has increased in the same period. The increase in the equity ratio can be caused either from the contraction of the total assets or an increase in equity. The upper percentile level of net worth to total asset ratio has increased after 2013. Also, the net profit ratio has increased in these years, this may imply the net worth increase due to the increase in the net profit.

#### Italy -Percentage of the Companies with capital below Unconditional NWaR 90%

#### Manufacturing, Trade and Construction Companies ( NACE Rev.2 C,G,F sectors)

Table 4

	2007	2008	2009	2010	2011	2012	2013	2014	2015
C-micro	63.9	60.6	59.9	60.2	59.7	58.8	58.1	57.6	55.6
G-micro	69.8	67.6	66.6	65.9	65.6	64.5	63.9	63.2	61.5
F-micro	53.7	52.4	51.7	50.1	48.8	47.2	45.7	43.8	40.4
C-small	29.7	25.7	23.8	24.3	25.2	23.7	22.7	21.7	20.0
G-small	35.1	32.5	31.5	30.6	31.1	29.8	28.5	26.8	24.5
F-small	30.5	29.6	28.1	27.4	26.9	26.4	24.7	22.8	19.6
C-medium	17.0	13.8	12.5	13.5	13.5	13.5	11.9	11.0	9.3
G-medium	25.7	22.6	21.7	21.3	22.1	21.0	20.0	18.7	15.4
F-medium	25.5	24.3	22.9	23.6	24.0	24.5	25.1	23.1	22.8
C-large	15.5	13.6	12.9	13.7	13.2	14.0	13.0	11.8	9.9
G-large	24.2	22.5	21.1	19.6	20.1	18.6	17.2	15.5	14.5
F-large	18.6	13.2	20.0	19.7	26.5	27.2	23.7	20.7	19.5

The interpercentile range between the 80% and 95% conditional NWaR is the highest for the micro trade companies; the years just before and after the financial crisis

showed the highest dispersion. For the other size classes, the years between 2010 and 2012 represented the highest results.

## Turkey

Two year cumulative losses for the whole time span reveal that the couple of years with worst losses are the years of financial crisis in Turkey. The NWaR in these years are higher than the actual losses in the 2008/2009 financial crisis. The years with the lowest profitability levels have changed according to sector size combinations. For the micro manufacturing companies, these are 1994/1995; for small and medium sized; the years just before and after the financial crisis of 2001; for large companies; these years are exactly the financial crises of 2008. In the trade sector results, it can be said that 2001 crisis had the important effect on the profitability of the companies. The couple of the years with the worst losses have fluctuated around 2001. The results have been valid for the construction companies except for the medium and large companies with the worst result in 2014/2015: probably due to the geopolitical unrest in the countries that these companies working with and the exchange rate effect. Exchange rate effect also decreased the profitability of large manufacturing companies in these years due to the fact that the majority of the FX debt is belonged to the large corporates in Turkey.

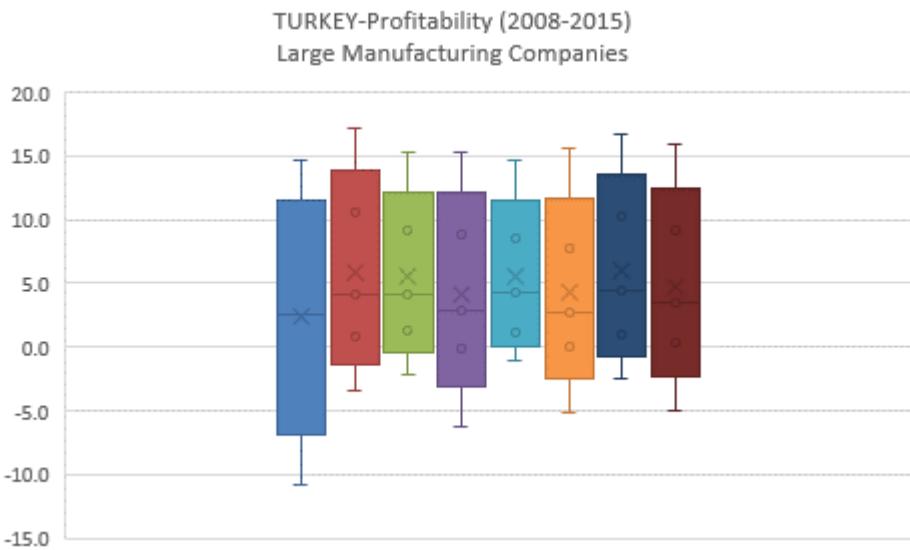
### **Turkey - Unconditional Net Worth at Risk and Cumulative two year losses at 10<sup>th</sup> percentile**

**Manufacturing, Trade and Construction Companies  
( NACE Rev.2 C,G,F sectors)**

Table 3

	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	Unconditional
<b>C-micro</b>	-13.3	-17.8	-17.7	-27.6	<b>-30.0</b>	-24.6	-25.1	-27.8	-23.0
<b>G-micro</b>	-11.3	-16.9	-19.2	-21.6	-32.7	<b>-9.8</b>	-13.2	-22.3	-18.4
<b>F-micro</b>	-8.1	-10.6	-12.8	-21.7	<b>-19.9</b>	-14.3	-16.9	-14.0	-14.8
<b>C-small</b>	-9.9	-14.7	-12.1	<b>-19.3</b>	-16.1	-7.7	-12.0	-10.2	-12.7
<b>G-small</b>	-6.5	-9.1	-5.9	-15.0	<b>-15.4</b>	-5.3	-7.6	-7.8	-9.1
<b>F-small</b>	-3.2	-5.0	-4.8	-17.9	<b>-11.3</b>	-11.4	-9.4	-8.7	-9.0
<b>C-medium</b>	-10.5	-14.7	<b>-6.2</b>	-9.9	-8.6	-4.4	-5.6	-5.4	-8.2
<b>G-medium</b>	-9.1	-12.9	-4.8	-10.2	<b>-7.9</b>	-1.6	-3.8	-3.8	-6.7
<b>F-medium</b>	-1.5	-7.5	-6.2	-11.3	<b>-12.3</b>	-6.0	-7.1	-17.0	-8.6
<b>C-large</b>	-9.4	<b>-11.2</b>	-4.4	-6.8	-5.7	-6.0	-6.2	-6.9	-7.1
<b>G-large</b>	-3.2	-8.7	-4.7	-5.3	<b>-4.5</b>	-3.0	-3.0	-3.4	-4.5
<b>F-large</b>	-2.3	-5.1	-2.2	-4.6	-5.5	<b>1.2</b>	-2.9	-5.5	-3.4

After 2008 financial crisis, the years with the worst losses are 2010/11 or 2011/12. These are the years of the subsequent European Crisis after the Great financial crisis of 2008. Due to the international trade relations, it is not surprising that the companies in Turkey have also experienced lower profitability figures in these years. 2010/2012 are also the years of rapid credit growth. In these years, the dispersion between low and high percentile of profitability has increased.



Unconditional NWaR results have been more moderate than the conditional NWAR because after 2001 crisis, there are so many precautions have been taken in Turkey for debt management and the stability of the banking sector. Therefore, the losses after 2001 did not generally match the high level of losses recorded in early years. The unconditional NWaR is the lowest for the large construction companies; the profitability of the construction has increased and contributed most to the GDP of the country.

Percentage of the companies with capital below unconditional NWaR reveals that after 2012, for all sizes and sector combinations the percentages have increased, the capability to cope with the loss have decreased. After 2001, net worth to total assets ratio has decreased for the large trade companies. This is either because of the percentage of bank credit increase in the total assets and the decrease in equity; or just decrease in equity due to the decrease in the profitability at that class. The percentage of the companies in the low-level class, the ratio of the class level of profitability between 0% and 1%, has increased in these years. In terms of the large companies' profitability, the average of the high-upper percentile of the profitability is the highest in large construction companies among the others.

Likewise, the other countries, the interpercentile range between the 80% and 95% conditional NWaR is the highest for the micro trade companies around the year 2011. The years just before and after the financial crisis showed the highest dispersion as the size classes increases. Like in the Spain, 2013 showed the highest spread in the lower distribution.

**Turkey -Percentage of the Companies with capital  
Below Unconditional NWAR**

**Manufacturing, Trade and Construction Companies  
( NACE Rev.2 C,G,F sectors)**

Table 6

	2007	2008	2009	2010	2011	2012	2013	2014	2015
C-micro	15.6	19.7	19.1	21.4	31.7	28.9	34.7	39.2	<b>38.8</b>
G-micro	18.1	19.1	26.3	24.3	33.7	33.9	41.5	53.1	<b>49.0</b>
F-micro	26.4	32.0	29.0	37.0	43.4	42.0	52.4	<b>59.3</b>	57.3
C-small	5.6	9.4	8.0	9.7	19.0	12.1	16.9	<b>23.5</b>	22.8
G-small	6.0	10.6	11.9	10.0	20.6	16.6	22.1	<b>25.3</b>	24.0
F-small	21.6	24.5	24.5	21.7	38.1	28.2	30.7	36.7	<b>39.1</b>
C-medium	1.8	6.2	3.5	3.9	7.2	4.4	6.2	7.5	<b>10.5</b>
G-medium	4.3	10.5	6.2	6.2	12.2	8.5	11.0	<b>13.0</b>	11.9
F-medium	18.8	26.5	22.5	19.0	29.5	20.3	27.2	33.3	<b>36.2</b>
C-large	0.2	<b>5.9</b>	1.0	1.3	5.6	2.4	4.4	2.5	4.6
G-large	3.3	<b>8.1</b>	5.8	4.6	<b>8.1</b>	4.3	4.6	6.1	4.5
F-large	0.0	0.0	5.3	2.2	8.2	8.6	5.0	<b>13.5</b>	7.1

## CONCLUSION

Micro level analysis for non-financial corporations at sector and size level and their cross-country comparisons is crucial to understand the performance of the real sector and develop macroeconomic policies accordingly. Financial Statement Analysis Working Group that is a sub-group of European Committee of Central Balance Sheet Data Offices performs common microeconomic research on specific topics of the economic and financial situation of the non-financial entities in an international setting. The group introduced the concept of "Net Worth at Risk" as a kind of stress test evaluate if companies in sector, size and country classification are enough capitalize to afford a period of crisis with possibility of having heavy losses. This study is an update of the previous study from 1987 to 2015 for the countries Spain, Italy and Turkey.

Net Worth at Risk is an important concept to evaluate if companies in sector, size and country classification are enough capitalize to afford a period of crisis with possibility of having heavy losses. Conditional NWaR is the share of cumulative (as a percentage of total assets) that companies may have to face with %95,%90 and %80 confidence level calculated for consecutive two years. The mean of the last eight overlapping years is unconditional NWaR influenced by the business cycle of the countries. Before 2008, the highest conditional NWaR belonged to the years 1992/1993 in Spain and Italy. NWaR values showed that Spain had stronger deterioration in losses because of high inflation and interest rates in these years. In Turkey, the highest conditional NWaR has experienced in the years of financial crisis of 1994 and 2001. Following lower profitability figures before 2008, manufacturing generally has the highest conditional NWaR for all levels of confidence and independently of size. This could be explained by a higher performance of costs in times of crisis due to the rigidity of labour costs and the capital intensity in this sector.

It is also noticeable that the last crisis did not generally match the high level of losses recorded in earlier 1990s or 2000s.

From 2008 to 2015, NWaR results have been more severe between the years 2010-2012 due to the subsequent European Crisis after the Great Financial Crisis of 2008. These are also the years of the credit enlarging, the figures show us the dispersion between the profitability of the lower and upper quartile has increased for micro, small and medium companies in these years. This implies that the companies particularly in the lower percentile should have a greater equity cushion to handle a possible recession. In Turkey, it is noticeable that manufacturing and trade companies of same size has experienced the worst NWaR in the same years after 2008. Medium and large construction companies have lower profitability figures in the years 2014/2015 due to the some geopolitics unrest in the regions working and the exchange rate effect. However, in general for all three countries, the recovery has seen after 2013 in the profitability figures. The percentage of the companies with capital below NWaR has decreased after this year. Although conditional NWaR can reflect some country specific characteristics, the recovery have seen in almost all sectors in three countries. Difference between conditional and unconditional NWaR is a kind of way to assess the sensitivity of sector profitability to recessions and these differences have become smaller after 2013.



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Ninth IFC Conference on "Are post-crisis statistical initiatives completed?"

Basel, 30-31 August 2018

## Profitability, equity capitalization and net worth at risk: update of the former ECCBSO Financial Statement Working Group paper with Spanish, Italian and Turkish data<sup>1</sup>

Merve Artman,  
Central Bank of the Republic of Turkey

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<sup>1</sup> This presentation was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the meeting.



TÜRKİYE CUMHURİYET  
MERKEZ BANKASI



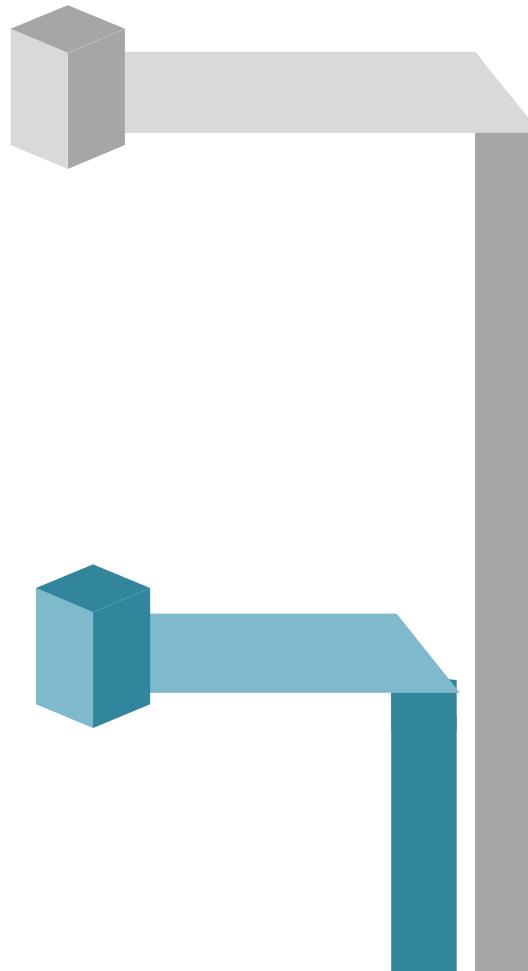
# Profitability, Equity Capitalization and Net Worth at Risk

ECCBSO Financial Statement Analysis Working Group

30 August 2018 | 9th biennial IFC conference

## AGENDA

- ▶ Motivation and Importance
  - ▶ Profitability, Equity Capitalization, Net Worth at Risk





# MOTIVATION AND IMPORTANCE

# Motivation and Importance

## Financial Statement Analysis Working Group (WG FSA)

-  Working Group of The European Committee of Central Balance-Sheet Data Offices (ECCBSO)
-  Scope is common microeconomic research on specific topics of the economic and financial situation of non-financial entities in an international setting.
-  Any field of financial statement analysis like profitability, equity endowment, liability structure or asset composition.
-  Structural, cross-sectional and time-series analyses are mainly applied.
-  Investigate whether accounting or institutional characteristics can explain differences in the results.

## Motivation and Importance

### NET WORTH AT RISK (NWaR)

- The concept first introduced by FSA WG in 2005
- NWaR can be considered as very important because it is a kind of stress test to evaluate sector-size level performance when having heavy losses
- Serves as a benchmark of minimum capital required in a given sector-size class enabling companies to absorb losses that might potentially arise
- For each company cumulative two-year net income figures in terms of total assets are calculated
- 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 negative values result normally, these time series are consequently labeled Two-year Losses 90%.

## Motivation and Importance

### Conditional and Unconditional NWaR

- Conditional NWaR is calculated as follows: for each company cumulative two-year net income figures in terms of total assets are calculated . 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. From the time series, the minimum level of the time span 1987-2015 is chosen for conditional NWaR 90%.
- For the unconditional NWaR 90%, the mean of the last eight conditional NWaR 90% is used. The differentiation of conditional and unconditional NWaR is important to assess the impact of recessions on the income distribution.
- Percentage of the companies with Net Worth below conditional NWaR” is important in that this displays how well a sector is endowed with equity to cope with the NWaR loss scenario.

# Profitability, Equity Capitalization and Net Worth at Risk

# Unconditional Net Worth at Risk and Cumulative two year losses at 10th percentile

## Spain- Unconditional Net Worth at Risk and Cumulative two year losses at 10<sup>th</sup> percentile

### Manufacturing, Trade and Construction Companies ( NACE Rev.2 C,G,F sectors)

Table 1

	<b>07/08</b>	<b>08/09</b>	<b>09/10</b>	<b>10/11</b>	<b>11/12</b>	<b>12/13</b>	<b>13/14</b>	<b>14/15</b>	<b>Unconditional</b>
<b>C-micro</b>	-26.9	-39.7	-43.3	-43.0	<b>-45.7</b>	-43.2	-33.7	-25.6	-37.6
<b>G-micro</b>	-34.7	-43.7	-44.1	-45.4	-50.2	<b>-51.1</b>	-47.3	-39.6	-44.5
<b>F-micro</b>	-33.6	-42.7	-45.2	-46.8	<b>-48.4</b>	-42.9	-34.2	-26.5	-40.0
<b>C-small</b>	-2.7	-7.2	-7.1	<b>-8.2</b>	-7.0	-6.3	-3.9	-0.8	-5.4
<b>G-small</b>	-1.1	-4.6	-5.0	-5.5	<b>-6.9</b>	-5.6	-3.4	-0.8	-4.1
<b>F-small</b>	-0.7	-3.3	-6.5	-11.9	<b>-12.2</b>	-9.5	-7.5	-2.7	-6.8
<b>C-medium</b>	-5.5	-11.7	<b>-12.0</b>	-8.9	-9.2	-8.2	-5.5	-2.7	-7.9
<b>G-medium</b>	-1.9	-6.2	-5.5	-5.5	<b>-7.4</b>	-5.5	-3.6	-1.6	-4.7
<b>F-medium</b>	0.0	-3.2	-10.8	-12.4	<b>-19.9</b>	-18.6	-12.4	-5.9	-10.4
<b>C-large</b>	-8.6	<b>-12.7</b>	-11.2	-7.0	-9.0	-9.9	-6.2	-3.4	-8.5
<b>G-large</b>	-4.2	-7.0	-9.2	-6.1	<b>-10.6</b>	-7.0	-4.6	-3.3	-6.5
<b>F-large</b>	-0.2	-6.6	-4.3	-10.1	-14.3	<b>-21.4</b>	-14.0	-10.6	-10.2

# Unconditional Net Worth at Risk and Cumulative two year losses at 10th percentile

## **Italy - Unconditional Net Worth at Risk and Cumulative two year losses at 10<sup>th</sup> percentile**

### **Manufacturing, Trade and Construction Companies ( NACE Rev.2 C,G,F sectors)**

Table 3

	<b>07/08</b>	<b>08/09</b>	<b>09/10</b>	<b>10/11</b>	<b>11/12</b>	<b>12/13</b>	<b>13/14</b>	<b>14/15</b>	<b>Unconditional</b>
<b>C-micro</b>	-20.4	-23.1	-24.0	-20.1	<b>-21.1</b>	-21.1	-19.1	-15.2	-20.5
<b>G-micro</b>	-24.1	-25.7	-24.7	-23.5	-25.5	<b>-26.6</b>	-24.1	-20.3	-24.3
<b>F-micro</b>	-9.4	-10.2	-10.2	-10.1	<b>-11.9</b>	-13.2	-13.2	-10.9	-11.1
<b>C-small</b>	-6.3	-8.5	-8.3	<b>-6.6</b>	-6.9	-6.5	-4.9	-3.1	-6.4
<b>G-small</b>	-5.1	-6.2	-5.6	-5.3	<b>-6.6</b>	-6.9	-5.4	-2.9	-5.5
<b>F-small</b>	-2.1	-2.5	-2.6	-3.0	<b>-4.2</b>	-5.2	-4.6	-2.6	-3.3
<b>C-medium</b>	-6.2	-8.0	<b>-8.4</b>	-6.0	-7.2	-6.5	-4.6	-3.1	-6.3
<b>G-medium</b>	-4.5	-5.6	-4.9	-4.9	<b>-5.8</b>	-6.2	-4.4	-2.0	-4.8
<b>F-medium</b>	-1.5	-2.2	-2.0	-2.8	<b>-5.8</b>	-5.1	-5.3	-2.7	-3.4
<b>C-large</b>	-7.9	<b>-10.5</b>	-10.6	-8.4	-9.3	-9.2	-8.1	-5.1	-8.6
<b>G-large</b>	-4.6	-5.5	-4.3	-3.6	<b>-4.9</b>	-6.5	-5.2	-3.3	-4.7
<b>F-large</b>	0.0	-0.8	-0.3	-3.6	-3.7	<b>-5.8</b>	-4.6	-0.4	-2.4

# Unconditional Net Worth at Risk and Cumulative two year losses at 10th percentile

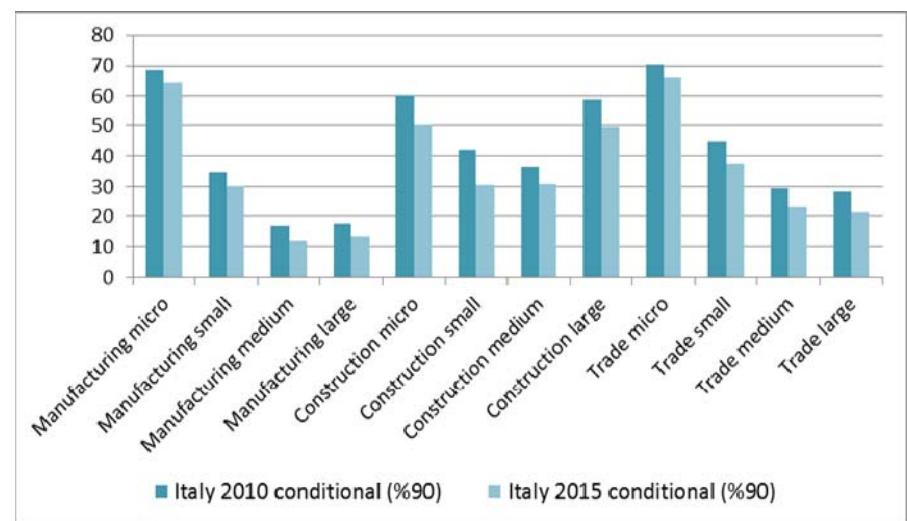
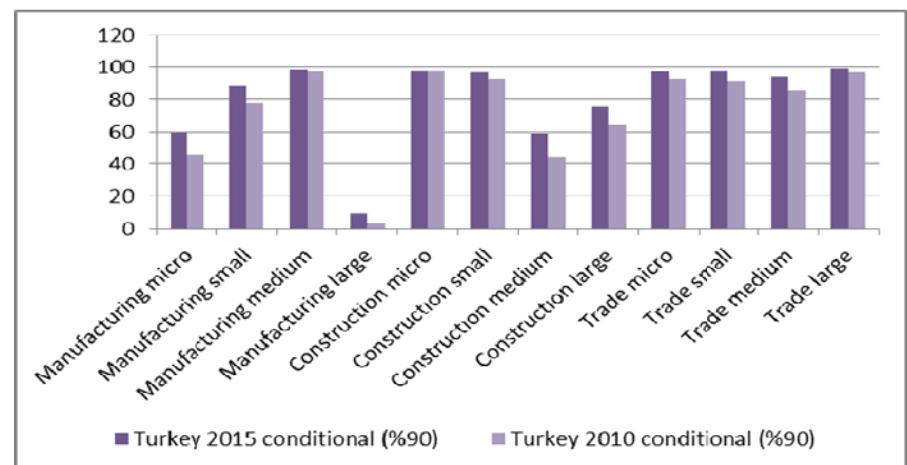
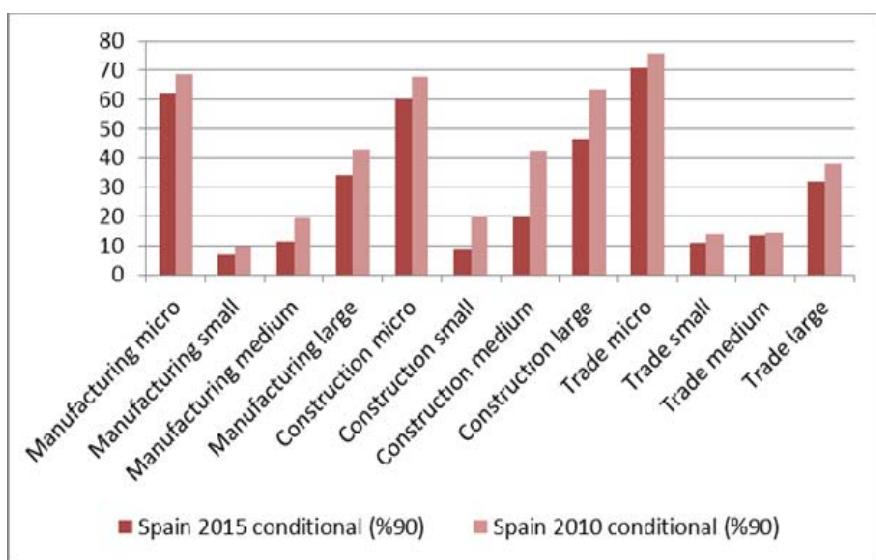
## Turkey - Unconditional Net Worth at Risk and Cumulative two year losses at 10<sup>th</sup> percentile

### Manufacturing, Trade and Construction Companies ( NACE Rev.2 C,G,F sectors)

Table 3

	<b>07/08</b>	<b>08/09</b>	<b>09/10</b>	<b>10/11</b>	<b>11/12</b>	<b>12/13</b>	<b>13/14</b>	<b>14/15</b>	<b>Unconditional</b>
<b>C-micro</b>	-13.3	-17.8	-17.7	-27.6	<b>-30.0</b>	-24.6	-25.1	-27.8	-23.0
<b>G-micro</b>	-11.3	-16.9	-19.2	-21.6	-32.7	<b>-9.8</b>	-13.2	-22.3	-18.4
<b>F-micro</b>	-8.1	-10.6	-12.8	-21.7	<b>-19.9</b>	-14.3	-16.9	-14.0	-14.8
<b>C-small</b>	-9.9	-14.7	-12.1	<b>-19.3</b>	-16.1	-7.7	-12.0	-10.2	-12.7
<b>G-small</b>	-6.5	-9.1	-5.9	-15.0	<b>-15.4</b>	-5.3	-7.6	-7.8	-9.1
<b>F-small</b>	-3.2	-5.0	-4.8	-17.9	<b>-11.3</b>	-11.4	-9.4	-8.7	-9.0
<b>C-medium</b>	-10.5	-14.7	<b>-6.2</b>	-9.9	-8.6	-4.4	-5.6	-5.4	-8.2
<b>G-medium</b>	-9.1	-12.9	-4.8	-10.2	<b>-7.9</b>	-1.6	-3.8	-3.8	-6.7
<b>F-medium</b>	-1.5	-7.5	-6.2	-11.3	<b>-12.3</b>	-6.0	-7.1	-17.0	-8.6
<b>C-large</b>	-9.4	<b>-11.2</b>	-4.4	-6.8	-5.7	-6.0	-6.2	-6.9	-7.1
<b>G-large</b>	-3.2	-8.7	-4.7	-5.3	<b>-4.5</b>	-3.0	-3.0	-3.4	-4.5
<b>F-large</b>	-2.3	-5.1	-2.2	-4.6	-5.5	<b>1.2</b>	-2.9	-5.5	-3.4

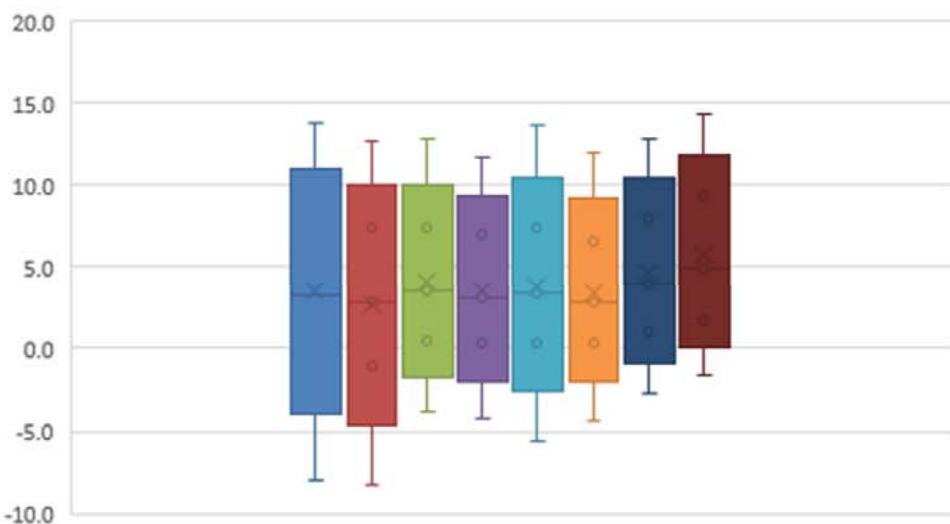
## PERCENTAGE OF COMPANIES WITH EQUITY BELOW UNCONDITIONAL NWaR COMPARISON FOR YEARS 2010 AND 2015



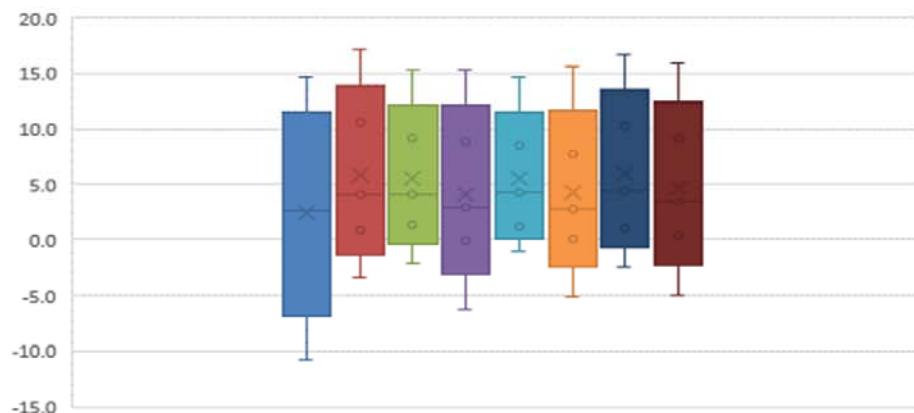
## PROFITABILITY-LARGE MANUFACTURING COMPANIES

Net Profit or Loss/Total Assets (2008-2015)

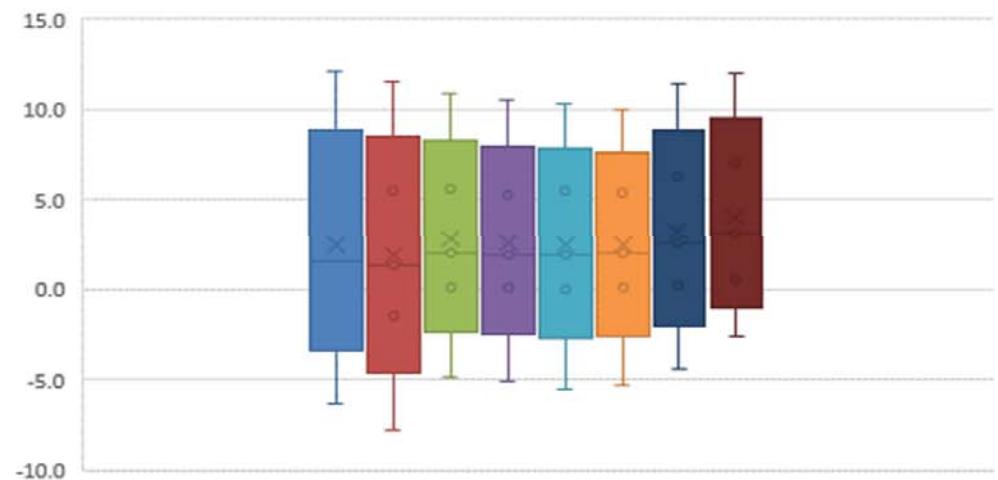
SPAIN-Profitability (2008-2015)  
Large Manufacturing Companies



TURKEY-Profitability (2008-2015)  
Large Manufacturing Companies



ITALY-Profitability (2008-2015)  
Large Manufacturing Companies



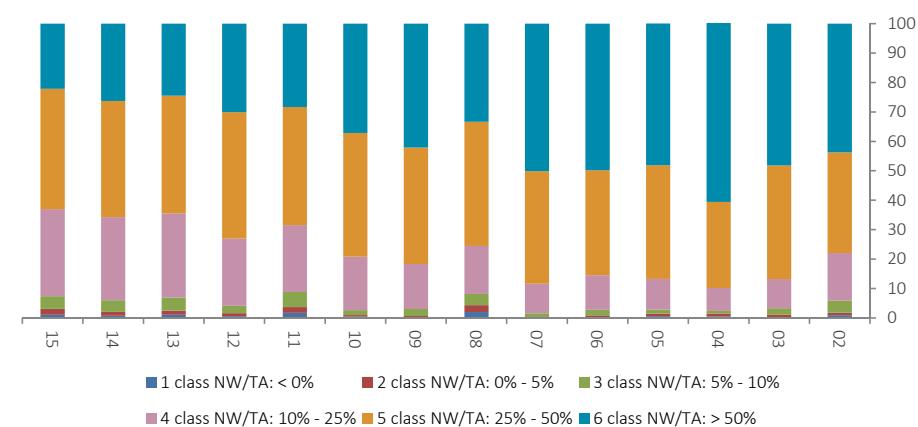
## EQUITY CAPITALIZATION-LARGE MANUFACTURING COMPANIES

Net Worth/Total Assets (2002-2015)

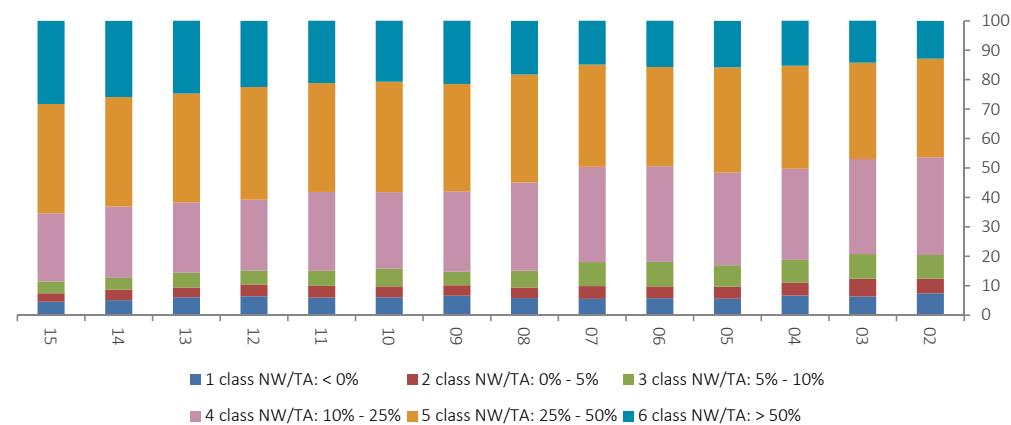
SPAIN



TURKEY



ITALY



# THANK YOU

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