HOW THE PUBLIC SPENDING ON DEFENSE CAN AFFECT BUSINESS SURVIVAL? THE CASE OF SHIPBUILDING IN SPAIN

RAMON-DANGLA, Remedios. Universidad de Alicante
YÁÑEZ-MUÑOZ, Leonardo. Universidad de Alicante

Abstract
The shipbuilding is a technology intensive sector and it requires a long production process. Hence, it needs a financial leverage and it depends on economic policy decision. This work aims to reveal the footprints of the crisis and the variables with the most influence on the industry's results. For that purpose we obtained a sample of companies from the SABI database, constructed financial ratios and analysed them for statistically significant changes by testing hypotheses with a 95% confidence level. In addition, statistical regression was used to find the economic variables that best explain the evolution of income in the set of firms and they are Ministry of Defence and business re-investment costs.

Key words: Shipbuilding Industry, Financial Crisis, Public Budget, Financial Autonomy, Yield, Business Survival.
JEL: H57, M40, L62, L92

1. Introduction

The shipbuilding industry is crucially important in many countries because, as López and Fariña (2012) and Guisado, Vila and Ferro (2002) point out, it is fully globalised and therefore very dynamic with a major technological component. In addition, as Suaz (2012), Cerezo (2005), Marjolein C. J. Caniëls, Eugène Cleophas and Janjaap Semeijn (2016) explain, because it manufactures a singular product with high unit value and long construction period, it is not only exposed to fluctuations in the economic cycle and international competition, but also to national economic policy decisions.

Furthermore, the Spanish shipbuilding industry is a synthesis industry: the shipyards subcontract part of their production to the auxiliary industry thus driving the economy and jobs in the area where they are located. As a result, Novoa and Carneros (2012) argue that the sector requires special support from public authorities.

The international financial crisis that reached Spain in 2008 caused financial margins to plummet and cut off access to credit with the consequent collapse in the productive economy as noted in Fuente and Velasco (2015); Grau and Reig (2014); Małgorzata and Marek (2013); Rojas and López (2013) and Martin (2011). The situation obviously had a knock on effect on the balance sheets and results of businesses in general and shipbuilding in particular. Our objective therefore, is to contribute towards clarifying how Spanish shipyards survived the crisis by analysing the evolution of their Financial Statements.

Although the crisis reached Spain in the second quarter of 2008 and worsened in 2010 as a consequence of the sovereign debt crisis, as Ortega and Peñasola (2012) and Rojas and López (2013) show, contraction of the international economy from 2007 must have been affecting the economic and financial results of Spanish shipyards because, following Freire, González and País (2012), during the years of economic recession the reduction in international trade and shipping generated excess available capacity in shipping lines. These activities are closely related to shipbuilding and so there was a gradual downturn in orders placed with shipyards.

Furthermore, as Cuerpo and Ramos (2015), Laborda and Fernández (2012) and Metcalfe (2012) point out, the enactment in 2010 of Spain's Law on Budgetary Stability (LEP) which sought to contain public spending and the European Commission's decision to declare Spain's "Tax lease" illegal must have had an even greater impact on the evolution of the Annual Accounts and Results of Spanish shipyards.

The shipbuilding industry has been studied by authors such as Suaz (2012), Cerezo (2005) and López and Fariña (2012) who describe the situation and prospects of Spanish shipyards in recent years. Other authors like Guisado et al. (2002) and Valdaliso (2003) analyse the effects of previous crises on shipyards in Galicia and the Basque Country respectively. More recent works include Marjolein et al. (2016) who analyse drivers for supply chain participation of suppliers in the shipbuilding industry or García-Canal (2016) establishing the significance of technological and relational risk applied to the evolution of a specific shipyard; the study by Pérez de Guzmán (2012) which investigates the power of collective bargaining over policy decisions in Cadiz shipyards; and the study by Novoa and Carneros (2012) which examines R+D+i as one of the sector's strategies for overcoming the crisis and ensuring future viability.

Other authors, like Azofra and Rodriguez (2012); Rojas and López (2103); Maudos (2013) and Małgorzata and Marek (2013) have studied the effects of the crisis and credit restrictions on Spanish businesses. There are also studies that establish the evolution of an industry before the crisis or seek the reasons for its collapse, like those by González and Jareño (2014); Ramón-Dangla (2016a, 2016b) and Lado-Sestayo, Otero-González, Vivel-Bua and Martorell-Cunill (2016) focusing on the hotel industry, commerce and commercial distribution respectively and the study by Akin et al. (2014), Roig and Soriano (2015) or Botzem and Dobusch (2017) which examines the construction and real estate industries in Spain and in Europe. But no study has analysed the effects of the crisis in the shipbuilding industry by analysing shipyard annual accounts. Our aim therefore is to analyse financial information from the surviving firms to describe how and why they survived the crisis.

Financial information from businesses is essential for deciphering the consequences for firms of different economic measures and contexts as Sánchez (2002); Godoy (2004) and Gonzalo, Pérez and Serrano (2000) have already described. For example, according to Amat (2000) and Gonzalo et al. (2000), analysis of financial statements facilitates economic and financial decision-making by third parties, and ratios produced through coefficients are extremely useful in this task. Our work is divided into this first introductory section. The second section is a review of the literature on the main economic aspects of study which are the starting point for this research and the formulation of our hypotheses. The third section explains the variables used and the methodology for achieving the proposed aims. The fourth section provides an analysis of the results and a final point presents the conclusions, including a discussion of the results, the limitations of the study and future research lines.

2. Shipbuilding industry and financial crisis. hypotheses

A financial crisis will affect yields, solvency and business efficiency to a greater or lesser extent. Shipyards, however, may be even more vulnerable because the industry is very globalised and given that a large part of its production is for export (Table 1) other international political and economic factors may also affect their evolution. In the late 20th Century, aggressive commercial and pricing policies in some countries, bordering on

unfair competition as López-Quiroga (2002), Suaz (2012), and Guisado et al. (2002) emphasise, caused shipbuilding orders to shift to Asian countries and Korea in particular.

Table 1: Percentage weight of exports over total new CGT[1] per year

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
0.49	0.76	0.64	0.97	0.93	0.91	0.92	0.87	0.94	0.43

Source: Gerencia del Sector Naval. Own elaboration

Furthermore, as shipbuilding is an industry where public and private shipyards coexist and they produce a custom-made, technology-intensive product with a high unit value, requiring a lengthy construction period, they are very exposed to national economic policy decisions as Cerezo (2005), Pérez de Guzmán (2012), Guisado et al. (2002) point out. Thus, when the European Commission began proceedings in 2011 on the system of tax credits that declared the Spanish "Tax Lease" illegal and the possibility of having to return almost 3,000 million euros, the demand for private ships fell and was aggravated by national policy decisions which eliminated the demand for public ships (Table 2). The entry into force of the Law on Budgetary Stability (2010) as Cuerpo and Ramos (2015), Laborda and Fenández (2012) and Metcalfe (2012) explain, restricted public spending and investment in all projects causing ship orders from the Spanish Ministry of Defence and the Spanish Navy to disappear.

Table 2: Evolution of weighted production in the sector (CGT)

	2003	2006	2008	2009	2010	2011	2012	2013	2014	2015
Public	149,76	0	10,528	10,528	10,528	0	0	0	5,60	41,547
Private	250,96	294,96	393,07	351,10	236,63	175,42	106,92	160,93	148,09	137,90
Total	400,72	294,96	403,60	361,63	247,16	175,42	106,92	160,93	153,69	179,44

Source: Gerencia del Sector Naval

After 2007 the drop in Gross Domestic Product (GDP) in most countries caused major downturns in international trade and freight which led to overcapacity in the international merchant fleet and a readjustment in the demand for new ships. However, production in private Spanish shipyards did not begin to contract until 2009, when the crisis was well advanced even in Spain and only after 2011 did it collapse, coinciding with the declaration that Spain's "Tax Lease" was illegal.

Production in public shipyards evolved in the same way. The policies introduced to contain spending from 2010 eliminated the demand for ships from the Spanish Ministry of Defence, and made 2012 the worst year for the shipbuilding industry. Although the new century had begun with considerable weighted production which continued even after the start of the crisis, from 2009 and until 2012 production in private shipyards

[1]CGT (Compensated Gross Tonnage) is the unit for measuring shipyard production determined by the OECD Compensated Gross Tonnage (CGT). It relates the amount of work required to build a ship and the size, expressed by GT (Gross Tonnage) and a degree of sophistication is introduced by using a coefficient that grows with the complexity of the type of ship.

gradually fell to 70% of what it had been in 2008 and production in public shipyards disappeared.

The shipbuilding industry is a strategic industry from the political and economic point of view as in 2014 it provided 44,273 jobs of which 16% were direct jobs and 84% were in the auxiliary industry. Shipbuilding contributed more than 1% to Spain's Industrial Production Index (IPI) and in the ranking of Spain's industrial sectors it has always been among the top 25 out of more than 100. In addition, as the both the employers' association of small and medium shipyards (Pymar) and the workers' union, CC.OO, agree, the ability for the sector to maintain a competitive, technologically advanced offering tailored to customer needs has enabled Spanish shipyards to be the only ones to offer tailor-made production. Spanish shipyards stand out in international markets for their ability to design and build different types of multi-functional ships.

By becoming a synthesis industry where the shipyard coordinates a global project, building the hull of the ship and integrating other components supplied by the auxiliary industry, the shipbuilding industry has managed to maintain high production quality and extended its prospects of survival. However, the fact of not shrinking production when the international crisis began in 2007 and not increasing it after 2013 when the international recovery began suggests that the sector is highly influenced by variables that do not strictly concern developments in the economy. Therefore:

H1: *Political and economic variables condition the evolution of the shipbuilding industry more than the economic situation.*

The peculiarities of the shipbuilding industry make it highly dependent on outside credit and therefore very exposed to credit markets. In this regard, studies like those of Jordà, Schularik and Taylor (2011) show that corporate debt is closely linked to the evolution of macroeconomic variables, with a clear relationship between financial leverage and the economic situation even the bankruptcy as explain Succurro and Mannarino (2014). On the other hand, Shobha S (2011) conclude for the shipbuilding industry that the home region of a firm and prior acquisition experience increases the probability of acquisitions of a company while prior partnership experience decreases it but the level of synergy and degree of market uncertainty do not affect the mode of alliance choice between partner or acquire.

However, according to Rajan and Zingales (1995); Demirgüç-Kunt and Maksimovic (1999); Booth, Aivazian, Dermirguc-Kunt and Maksimovic (2001); Hanousek and Shamshur (2011) or Faulconbridge and Muzio (2009), companies' debt preferences are determined by their specific characteristics and the peculiarities of the country or as Gill de Albornoz and Giner (2013) indicate, by the type of sector where they operate. Thus Rubio and Sogorb (2011) conclude that Spanish companies moved quickly towards objective debt ratios during downswings in the economic cycle: the credit squeeze and rising cost of credit meant that firms with previously high debt levels tried to deleverage. The low returns on revenue made loan repayments difficult and evidenced excessive indebtedness which led to a continuous restructuring of corporate liabilities. More recent studies like the one by Fuente and Velasco (2015) conclude that in the case of Spain's listed companies, financial restrictions increased agency costs of internal capital markets above the benefits offered, thereby negatively affecting firms' values and Carbó-Valverde et al. (2017) affirm that the rise in the interest rate causes divergence in the cost of trade credit among firms in the same industrial sector or Clemente-Almendros and Sogorb-Mira (2016) show the importance of tax benefits of debt for Spanish firms. According to

Lorain, García and Sastre (2015) there were increasingly frequent differences between the anticipated results of Spanish firms' financial deleveraging and what actually happened. Therefore:

H2: *Although the peculiarities of the shipbuilding industry mean it has major financial needs, the crisis forced it to change its financial structure towards greater autonomy.*

3. Description of variables, sample and methodology.

The aim of this work is to examine, through the financial statements of Spanish shipyards, the footprint of the crisis in companies in the sector comparing survivors with non-survivors and whether changes occurred at the same rate as developments in the national economy and international maritime trade.

The study uses data from companies with the Spanish Economic Activity Code for Shipbuilding (CNAE2009-Rev2 (301)) from the SABI (Iberian Balance Sheet Analysis System) database for 2006-2015.

The initial population was 513 companies but we eliminated all the companies that did not present financial information in a consistent manner. That is, we eliminated firms whose accounting information was inconsistent and whose assets could not be reconciled. Thus 340 firms remained in the purged sample, the size of which was found to be representative of the original population with 95% certainty, a 3% margin of error and an expected proportion of 50%.

Then the companies were classified according to whether they survived the crisis or not and were created before the crisis began or not, which gave 4 subgroups of companies: those which survived the crisis having been created before it began are denominated "Generation 2006-15" (127 firms). Those which were created during the crisis and managed to survive: "Generation Crisis-2015" (48 firms). Those which existed before the crisis but did not survive: "Generation 2006-Disappeared" (214 firms) and those which were created and disappeared during the crisis "Fleeting Generation" (23 firms).

Then for the analysis the set of financial ratios for measuring key economic dimensions in a firm's activity were defined following Foster (1986); Rivero (1996), Gonzalo et al. (2000), Garrido and Íñiguez (2012), Archel et al. (2008) Amat (2000), Esteo (1998) that is, a firm's economic structure, yield, financial leverage, solvency, liquidity and operativeness or efficiency. (Table 3). Then we produced a dashboard and compared the average value of the study ratios using one-way and multivariate analysis of variance.

As the empirical analysis must not simultaneously incorporate all the economic ratios due to problems of specification, multicolinearity and data redundancy, following authors like Lev (1969:7), Lee and Wu (1988:2), Peles and Schneller (1989:62) and Gallizo and Salvador (1997:14) ratios with a high correlation with each other were rejected: Pearson's correlation coefficient above 50% and which like Altmant (1968:23), did not comply with the normality and homogeneity of the variances. Thus the ratios chosen for the empirical analysis are ROA, ROE, GR, IN, EE1, CR, O2 and O3

Then we checked for changes in sample averages for each of the ratios chosen for each generation of firms using bilateral hypothesis testing for a confidence interval of 95%. The F statistic and p-value in the Anova test were used to test the null hypothesis of equality of averages for each group of ratios in the study period. Then Tukey's range test or two factor Manova was applied to our groups of variables to see whether in cases where the null hypothesis of equality of resources was rejected all the pairs of averages are affected or just one of them. The findings suggest that firms were surviving the crisis

with small yields and slow changes in their economic and financial structures, especially in the oldest surviving generation: "Generation 2006 -15".

Table 3: Definition of variables

Factor	**Variable**	**Definition**
Yield	Yield 1 (R1)	Operating Result/Total Assets
	Operating Margin (MEX)	Operating Result/Net Revenues
	Return on Equity (ROE)	Year's Result / Net Worth
	Return on Assets (ROA)	Result before Tax and Interest / Total Assets
Solvency	Guarantee Ratio (GR)	Total Assets/Total Liabilities
	Solvency 1 (S1)	Non-current Liabilities/ Total Assets
	Solvency 2 (S2)	Current Liabilities/Total Assets
Financial equilibrium	Indebtedness (IN)	Total Liabilities/Net Worth
	Equilibrium 1 (EQ1)	Net Worth/Non-current Assets
	Equilibrium 2 (EQ2)	Non-current Assets/Non-current Liabilities
Economic Structure	Economic Structure 1 (EE1)	Non-current Assets/ Total Assets
	Treasury (T)	Treasury/Total Assets
Liquidity	Current Ratio (CR)	Current Assets/Current Liabilities
	Liquidity 1 (L1)	(Current Assets-Inventory)/Current Liabilities
Operativeness or Efficiency	O1	(Current Assets-Current Liabilities)/Net Revenues
	O2	Net Revenues/Total Assets
	O3	Staffing Costs/Net Revenues

Source: Own elaboration

In addition, and to check the relationship and dependency of the oldest surviving companies ("Generation 2006-15") with other macroeconomic variables, we built a dependency model based on Multiple Linear Regressions (MLR) (1). The MLR model was chosen not only because of its broad application to describe and predict the behaviour of a quantitative variable on the basis of the values of other explanatory variables but also because of the availability of data.

$$NRi=\alpha+\beta_1 GDP_{pmi}+\beta_2 NCA_i+ \beta_3(Defensa)_i+ \beta_4(TMI)_i+\varepsilon \qquad (1)$$

Where the dependent variable: NRi is the average Net Revenue of firms in the shipbuilding industry in "Generation 2006-15" for each year i.
NRi is regarded as dependent because it is a key variable in the profit and loss account and indicates the progress of a firm's turnover as it comprises product sales or service provision amounts corresponding to ordinary activities, after deducting discounts and other reductions on sales, as well as value added tax and other taxes directly related to the turnover.

GDP_{pmi} is Gross Domestic Product at market prices for year i
NCA_i is average Non-Current Assets for our group of companies for each year i. NCA is regarded as the variable that can approximate the amount of investment in capital goods because intangible assets have a big impact on NCA in this type of firm.
$Defensa_i$ is Ministry of Defence spending on projects for the Navy, included in Chapter 6.5 of the expenditure budget.
TMI_i is International Maritime Traffic measured through loaded tonnes of all types of goods for each year.
Each β represents the relative significance of each variable in explaining Net Revenue with a 95% confidence interval.
ε is random perturbation.
The method used to approximate the model (MLR) was the "backward" method. All the variables in the equation are introduced in the model and then extracted one after the other as long as they satisfy the elimination criterion of low partial correlation with the dependent variable. The model was developed by SPSS21 after finding that hypotheses of normality of the error term and linearity of the response variable were fulfilled compared to predictive variables and that the model offered a high explanatory power represented by an "R-squared" and "corrected R-Squared" close to 1. From the linear regression fit we were able to approximate the macro-magnitudes with the greatest impact on the evolution of Net Revenue in the Spanish shipbuilding industry.

4. Results

The statistics suggest two basic ideas. One, the firms that overcame the crisis did so with very small, but never negative yields and as soon as the yield became negative, the firm disappeared. Two, the degree of indebtedness in the set of companies was very high, especially in the case of surviving firms created during the crisis. Nevertheless, during the crisis, the two surviving groups of firms made efforts to reduce their degree of leverage with the youngest firms making the most effort.
The Anova analysis results used to verify whether the average of each ratio differed significantly or not throughout the crisis. We rejected the null hypothesis of equality of resources with a 95% confidence interval in all the ratios which achieved a p-value<0.05. This was corroborated by the Manova analysis which compared the value of each ratio every two years to check whether the cases where the null hypothesis of equality of resources was rejected affected all the pairs of years or only some.
The F statistic and the p-value given by the Anova analysis show that the business generations created before the crisis have more ratios with statistically significant changes. That finding is in complete contrast to what happens with the fleeting generation of businesses, their few years of life did not allow them to make many changes either. They were created at a difficult time, when orders were falling and with inflexible economic and financial structures which prevented them from overcoming the economic situation.
Among the firms that survived the crisis, the oldest: "Generation 2006-15" are the only ones that maintained small but positive economic yields (ROA) throughout the period. The youngest survivors have supported slightly negative values. Length of time in the business is an advantage that may have allowed the oldest companies to benefit from better positioning in the markets, in contrast, the young firms were learning to restructure to survive. Hence we can surmise that their profitability will grow, especially taking into

account that the Financial Yield (ROE) has already begun to do so, and although between 2010 and 2013 sales and yields did not take off, from 2014 the increase in ship building contracts will make[2] them grow.

The Financial Equilibrium ratios indicate that the sector began the crisis with high levels of debt but closure of the financial markets and the credit crunch caused the ratio of indebtedness (IN) to fall in all surviving companies, and especially in the new companies where the ratio shows statistically significant changes. The new companies were created with high levels of debt, well above those of the oldest companies, but they evolved towards more autonomous positions in a very short time. Deleverage happened so fast that when economic recovery began, their indebtedness values are very similar to those of the oldest companies. Replacing short term debt with Equity in both groups of surviving companies suggests that although the sector is a major demander of credit due to its activity, the crisis has made firms reorganise their debt towards more stable and more autonomous positions. The Economic Structure of our study companies does not appear to have varied significantly during the crisis. The proportion of Non-current Assets in relation to the total amount of investments is around 30% without variations for all the surviving firms. However, the descriptive statistics point to a slight increase in the case of the oldest companies which takes them to around 40% Having smaller levels of debt and smaller but positive yields has enabled them to reinvest profits in recent years. The relationship between Net Revenue and Total Assets expressed by O2 supports that finding: generation 2006-15 firms are renewing their assets.

The liquidity ratios (CR) show that there have only been significant changes in the firms that went under during the crisis: the negative, decreasing yields during the economic crisis limited their ability to pay off their short-term debts which may have triggered the disappearance of these firms.

Table 4 shows the ability of some macro-magnitudes and investment in Non-current Assets to explain the evolution in Net Revenues (NR) in the regression model. At the end of the variable selection process, International Maritime Traffic (TMI) and GDP were excluded as explanatory factors of the model as their significance levels were above 0.05. In contrast, Non-current assets (NCA) and Ministry of Defence spending on the Spanish Navy did show a capacity to influence (Sig<0.05).

Model 3 is the model that best explains the evolution of Net Revenues in shipbuilding firms and in addition, is more consistent in offering a significance for zero regression. Mathematically, it would be expressed by (2).

$$NRi=\alpha+\beta_2 ANC_i+ \beta_3(Defensa)_i+\varepsilon \quad (2)$$

Substituting β values gives (3)

$$NR_i=\alpha+0{,}68ANC_i+0{,}49(Defensa)+ \varepsilon \quad (3)$$

[2]During 2014, Spanish shipyards signed 24 new contracts and in 2015, a further 44. Gerencia del Sector Naval.

Table 4: Weight of macro-magnitudes on the evolution of Net Revenue

Model		Sig of the regression (p)	Typified coefficients (β_i)	Sig.	R-squared	Corrected R-squared
1	Regression	0.01			0.94	0.89
	Constant					
	ANC_i		0.66	0.44		
	GDP_{pm}		0.06	0.83		
	DEFENSA		1.69	0.15		
	TMI		0.12	0.90		
2	Regression	0.00			0.93	0.89
	Constant					
	ANC		0.56	0.04		
	GDP		0.06	0.81		
	DEFENSA		0.55	0.11		
3	Regression	0.00			0.93	0.89
	Constant					
	ANC		0.68	0.00		
	DEFENSA		0.49	0.01		

Source: own elaboration

Variations in revenue in the shipbuilding industry are explained by variations in the same direction as their Non-current assets (NCA) and Ministry of Defence spending on the Navy. Thus, keeping everything else constant, variations in one unit in NCA would cause 0.68 times variations in the same direction in Net Revenue and if the budget for Ministry of Defence spending on the Navy varies by one unit, sales in the sector would increase 0.49 times.

Hence the reductions in Spain's GDP and even in International Maritime Traffic during the crisis did not drag turnover in the shipbuilding with them in the same proportion. What is more, Net Revenues grew until 2009 when Spain's GDP and international trade were in recession and did not take off again until 2013 when the economy reawakened

If the reduction in International trade and GDP were not sufficient stimuli to reduce sales in the industry until 2009 it must be because other types of orders maintained turnover. However, between 2010 and 2013, when the economy started to recover, Spanish shipbuilding collapsed: the introduction of the spending contention policies in 2011 eliminated the demand for ships from Spain's Ministry of Defence, which together with the European Commission's decision in 2011 to declare the Spanish "Tax lease" illegal were the variables that cut off business in the sector. In 2012 the volume of orders in private Spanish shipyards was almost a third of what it had been in 2008 and only in 2013 when the Ministry of Defence began to place new orders and European justice declared the "tax lease" in the Spanish shipbuilding sector legal did sales improve. This finding reinforces the idea that evolution in the sector is determined more by political and economic variables than by the economic situation.

5. Conclusions

The aim of this work was to find the footprint of the crisis in Spain's shipbuilding industry through the analysis of financial statements and to find out whether the evolution

of the sector is influenced by variables other than the economy itself. The study has found significant changes during the crisis only in some ratios, in particular those concerning the yield and indebtedness of the companies that survived the crisis.

The 2007 international financial crisis drastically lowered yields on assets in all the business generations, but the oldest generation: "Generation 2006-15" never reached negative ROA: their age acted as an advantage and enabled this set of companies to benefit from better positioning in the markets. In contrast, the generations that disappeared during the crisis experienced negative yields which got worse the longer they tried to survive.

Sales were contracting while operating costs remained almost invariable, thereby reducing yields. The lack of orders damaged liquidity and 214 shipbuilding firms created before the crisis were unable to repay their creditors and disappeared.

Nevertheless, the survival of 127 firms created before the crisis "Generation 2006-15" and another 48 created during the crisis "Generation crisis-15" is a ground for optimism over the industry's future, especially as both groups have evolved towards more stable and more autonomous financial equilibrium positions. As we have seen, levels of debt in the sector were high at the start of the crisis but as it progressed the indebtedness ratio (IN) fell in the two surviving generations and especially in the youngest companies where the ratio shows statistically significant changes. "Generation Crisis-15" was created with high levels of debt, well above those of the oldest companies, but evolved towards much more autonomous positions in a very short time and thus entered the period of economic recovery with indebtedness values similar to those of "Generation 2006-15".

The replacement of external debts with Equity in both groups of surviving firms suggests that although the sector is a major demander of credit, it made efforts to delever during the crisis and the new composition of the debt has made the surviving companies less dependent on external credit.

In terms of economic structure, the surviving companies have not experienced significant changes in either the composition of their assets or their degree of liquidity. The weight of Non-current Assets which includes the industry's investment in renewal is above 30% of total investment during the entire period. However, firms in "Generation 2006-15" have been increasing the weight of Non-current Assets in recent years: their smaller levels of debt and smaller but positive yields enable them to reinvest the profits of recent years and they may already be renewing assets to make the most of the new economic environment. Therefore our second hypothesis H2: *Although the peculiarities of the shipbuilding industry mean it has major financial needs, the crisis forced it to change its financial structure towards greater autonomy* is accepted.

We have also seen the relationship of sales with Non-current Assets and macroeconomic variables like GDPmp, Ministry of Defence spending on the Navy and the evolution of International Maritime Trade. From this perspective, whereas the economy and International Maritime Trade collapsed between 2007 and 2009, Net Revenue fell less sharply, suggesting that the industry did not depend strictly on the evolution of the economy. This finding was clarified with a Multiple Linear Regression model where the macro-magnitudes with the most impact on revenue in the sector were Ministry of Defence spending on the Navy with a multiplier coefficient of $\beta 3=0.49$ and investments in Non-current Assets with a multiplier coefficient of $\beta 2=0.68$. The confidence interval is 95%.

The shipbuilding industry's lower dependency on evolution of Spain's GDP and International Maritime Trade together with the positive multiplier coefficients of Non-current assets and Ministry of Defence spending on the Navy support the idea that the industry is more dependent on government decisions and business reinvestment policy than on the economic situation, and so H1: *Political and economic variables condition the evolution of the shipbuilding industry more than the economic situation.* is accepted. However, the crisis has left its mark on shipyards' financial statements. The disappearance of 230 firms and survival with yields around zero or negative are not minor consequences. However, the costs of survival have not been borne equally, the oldest firms "Generation 2006-15" have found it easier to survive, their yields were not large, but their equilibrium structure, perhaps better composed than the youngest surviving companies ("Generation crisis-15") has enabled them to survive the crisis less traumatically and according to the increased weight of Non-current assets in their balance sheets, they are already reinvesting the new profits.

Thus the oldest companies, with amortised set up costs, better connections, with a customer network built up over more years and which benefited from high yields before the crisis, are those who experienced fewer changes as a result of the crisis. That does not mean they are not making efforts to recapitalise, and improve results, but they are doing so more slowly than the youngest companies have had to, thus making them a role model.

In the light of all this evidence, the present study contributes important information on an economic sector that contributes significantly to GDP, employment and Balance of Payments equilibrium. These findings may, however, be closely linked to both sample and country. Comparison with other equally important industries with similar characteristics like the aeronautics industry or railway construction industry, together with an extension of the period could provide differentiating and interesting results. As a future line of work and to improve the present paper, it would be interesting to compare different industries to find out whether the way Spanish shipyards restructured or their scanty dependence on the evolution of the economic situation is an inherent characteristic of the sector or can be generalised to others.

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Appendix

Descriptive statistics

	Generation 2006 -15.			Generation 2006 -crisis			Generation crisis -2015.			Fleeting generation		
2006	Av.	S.D.	Median	Av-	S.D.	Median	Av.	S.D.	Median	Av.	S.D.	Median
ROA	0.02	0.18	0.03	-0.04	0.44	0.02						
ROE	0.07	0.72	0.08	0.03	1.88	0.10						
GR	2.30	4.01	1.47	1.77	2.79	1.18						
IN	8.03	37.49	1.73	9.05	25.80	2.34						
EE	0.32	0.24	0.27	0.27	0.24	0.19						
CR	1.89	3.30	1.26	1.84	3.95	1.09						
O3	0.73	4.24	0.28	4.58	43.01	0.36						
O2	1.47	1.58	1.19	1.65	2.41	1.10						
2009	Av.	S.D.	Median	Av-	S.D.	Median	Av.	S.D.	Median	Av.	S.D.	Median
ROA	0.01	0.23	0.02	-0.08	0.43	0.01	-0.09	0.54	0.04	-0.10	0.36	0.00
ROE	0.07	0.91	0.05	-0.19	4.63	0.07	-0.22	1.80	0.11	-0.20	1.40	-0.01
GR	3.43	7.89	1.61	3.88	20.37	1.34	1.45	0.89	1.21	1.63	2.34	1.14
IN	7.66	28.77	1.38	5.49	26.20	1.36	10.2	38.61	1.52	15.59	51.43	2.55
EE	0.34	0.26	0.28	0.32	0.28	0.23	0.20	0.25	0.18	0.31	0.25	0.23
CR	2.95	7.30	1.52	2.11	3.92	1.23	1.26	0.72	1.25	1.41	1.79	1.04
O3	0.89	3.20	0.35	1.93	10.52	0.45	0.29	0.29	0.16	0.91	3.23	0.20
O2	1.08	1.03	0.85	1.13	1.15	0.95	2.28	2.97	1.04	1.79	1.56	1.70
2012	Av.	S.D.	Median	Av-	S.D.	Median	Av.	S.D.	Median	Av.	S.D.	Median
ROA	0.03	0.25	0.01	-2.03	15.55	0.00	-0.03	0.40	0.01	-0.21	0.74	-0.02
ROE	1.73	18.80	0.01	-0.09	0.88	0.02	-0.75	4.71	0.17	0.31	1.47	0.31
GR	2.91	3.17	1.84	9.47	34.77	1.56	2.40	4.39	1.18	3.68	9.77	1.15
IN	3.00	13.43	1.00	0.64	10.35	0.72	17.57	77.49	1.64	-1.75	21.46	0.21
EE	0.37	0.26	0.35	0.36	0.30	0.27	0.28	0.26	0.25	0.34	0.30	0.26
CR	2.76	3.36	1.53	1.55	48.49	1.24	2.35	6.62	1.05	7.98	30.62	1.01
O3	0.85	3.46	0.41	1.02	2.66	0.39	1.51	5.00	0.23	0.24	0.27	0.11
O2	0.84	0.81	0.59	1.05	2.50	0.55	3.85	11.43	1.35	1.86	3.04	0.58
2015	Av.	S.D.	Median	Av-	S.D.	edian	Av.	S.D.	Median	Av.	S.D.	Median
ROA	0.01	0.11	0.02				-0.02	0.28	0.01			
ROE	0.00	0.43	0.04				0.31	1.22	0.22			
GR	2.94	3.33	1.70				1.89	2.83	1.26			
IN	2.00	12.65	0.89				2.75	12.57	1.82			
EE	0.39	0.28	0.37				0.25	0.26	0.13			
CR	3.00	4.45	1.86				3.21	7.90	1.22			
O3	0.43	0.47	0.33				0.37	0.27	0.33			
O2	0.92	0.88	0.61				1.67	1.36	1.53			

Source: Own elaboration. Notes: Av.=Average, S.D. = Standard Deviation

Hypothesis testing and Anova analysis of variance

	Generation 2006-15		Generation 2006 -crisis		Generation crisis-2015		Fleeting generation	
	F	**Sig**	**F**	**Sig**	**F**	**Sig**	**F**	**Sig**
ROA	2.2	0.01	2.0	0.03	0.3	0.92	0.7	0.62
ROE	0.8	0.55	0.8	0.60	2.6	0.01	0.4	0.84
GR	0.7	0.62	2.7	0.00	1.6	0.12	0.7	0.62
IN	0.9	0.49	0.9	0.48	1.9	0.07	1.0	0.40
EE	1.7	0.69	1.6	0.10	0.2	0.97	0.3	0.88
CR	1.3	0.20	2.0	0.03	1.2	0.26	0.8	0.53
O3	0.9	0.50	0.6	0.74	1.04	0.39	0.7	0.62
O2	6.0	0.00	1.3	0.20	0.8	0.55	0.7	0.60

Source: Own elaboration