Coping with Economic Crisis: Cluster Associations and Firm Performance in the Basque Country

Isabel González-Bravo, Santiago M. López, and Jesús M. Valdaliso

Abstract Economic crises, such as that which started in 2007, increased business turbulence and threaten firms' survival in many different ways. Economic instability plays a role akin to a natural selection mechanism, allowing the best performing and most competitive firms to survive. The aim of this work is to analyse to what extent firms belonging to cluster associations can "shelter" from adverse economic scenarios, and promote a better recovery, when economic conditions begin to improve. The paper analyses the performance of 405 firms that operate in key sectors, covered by five cluster associations in the Basque Country region of Spain, during the years 2011–2014. We employ seven performance ratios commonly used to measure firms' economic and financial conditions to check if operating performance, during a period of economic instability, presents significant differences between affiliated and non-affiliated firms that may result in higher adaptation, and resilience, of the former ones. The results suggest that associationism does indeed provide certain advantages in periods of economic growth in the wake of a recession. There is a positive and significant relationship between membership of a cluster association and certain performance indicators, mainly sales growth. The affiliated companies perform better even in adverse economic environments, retaining their ability for differentiation, compared to non-affiliates, and, furthermore, this capability would be bolstered when the recovery begins.

Keywords Clusters · Crisis · Two-step cluster · Firm performance

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1 Introduction

At some time, all organisations suffer from periods of economic instability, caused by external and/or internal forces (Krueger and Willard 1991; Burbank 2005). Operational or strategic problems can cause structural deficiencies that lead to an enterprise's failure or even its demise. In other cases, volatile economic environments or periods of recession may threaten an enterprise's survival, if they are not properly managed and even more if they coincide with operational and/or strategic issues. Although it is not possible to gauge the extent to which external forces cause enterprises to fail, there is evidence that shows that the percentages of business failures vary in certain environments (Bruno et al. 1987) and that the boundary of such failure shifts depending on economic cycles (Neophytou and Mar Molinero 2005). Along these lines, Amat (2010) specifically contends that during the first years following the outbreak of the 2007 global economic and financial crisis, the crisis had devastating impacts on businesses, provoking high firms' failure rates.

Economic crises, such as the one that started in 2007, increased business turbulence and threaten enterprises' survival in many different ways. Economic instability plays a role akin to natural selection, by allowing the best performing and most competitive enterprises to survive by suitably adapting to the new environment (Kahl 2001). In this vein, several studies show that those enterprises that have successfully managed to recover from tough times offer a better performance in variables such as *sales*, *profitability*, and *productivity* (Pearce and Doh 2002; Kahl 2001).

Some authors have also highlighted interfirm collaboration as a business strategy for coping with uncertainty (Child et al. 2005; Skalholt and Thune 2014) and achieving a higher rate of resilience. Business literature reports the existence of a positive relationship between the geographic concentration of enterprises, their related industries, firms' competitive advantage, and economic performance. Clusters facilitate cost management (Hsu et al. 2014), allowing enterprises to introduce economies of scale and achieve higher income efficiency (Spencer et al. 2010), giving them access to new sources of finance (Henry et al. 2006), fostering innovation processes (Li and Geng 2012), and, more generally, allowing enterprises to improve their *competitiveness*, *profitability*, *productivity*, and *growth* (Porter 1998; Bagwell 2008). Ultimately, intangible advantages, stemming from cluster affiliation, mitigate the economic risk of the enterprises involved, which is a positive outcome in times of economic instability.

The aim of this work is to analyse the extent to which cluster associations (CAs)—e.g., organisations promoting cluster development—can "shield" their affiliated companies from adverse economic scenarios and promote a better recovery when economic conditions begin to improve. The paper analyses the performance from 2011 to 2014 of 405 enterprises operating in key sectors, covered by five CAs (ACE, energy; GAIA, electronics and ICTs; FMV, maritime industries; HEGAN, aeronautics; and Papermaking) in the Spanish Basque Country—one of the regions that pioneered a cluster policy in Europe in the early 1990s. After a slight improvement in 2010, those sectors, and the Basque economy as a whole, faced a further

period of crisis and uncertainty between 2011 and 2013 that seemed to be over by 2014, when many economic indicators, such as GDP per capita, returned to the levels of 2009. Before describing the variables, we need to remember that cluster policy is part of the ecosystem of innovation that, in the case of the Basque Country, has been created using funding from both the regional and the European administration, in line with what may be referred to as an "entrepreneurial state intervention" (Mazzucato 2013). Furthermore, it is associated with the notion of *Experimental Capitalism* and the development of high-tech industries (Klepper 2015).

We employ seven performance ratios commonly used to measure enterprises' economic and financial performances: *ROA*, *profit margin*, *asset turnover*, *productivity (two indicators)*, *liquidity*, and *leverage*. These ratios will allow us to verify whether operating performance, during a period of economic instability, records significant differences between (cluster) affiliated and non-affiliated companies.

A preliminary exploratory study, through two-step cluster analysis, reveals the existence of differences between cluster affiliated and non-affiliated companies, according to the seven aforementioned performance ratios. However, these findings have not found a relationship of causality between the two variables. In other words, do cluster affiliated companies record better results because they belong to a CA or, the other way round, because the most efficient and productive enterprises are the ones that tend to be affiliated to CAs? The second part of this paper seeks to analyse this issue. Our findings show that, in the period studied, there is a positive relationship between cluster affiliation and firm sales which will ultimately improve the other ratios considered.

2 Cluster Affiliation and Resilience in Turbulent Economic Scenarios

When a volatile economic environment poses a major threat by triggering a recession, enterprises need to make strategic decisions in order to adjust effectively. Nevertheless, external conditions do not have the same impact on industrial sectors across the economy or within the same sector (Bruno et al. 1987).

One might assume that belonging to a CA may be one of those inherent characteristics that confer upon enterprises' certain advantages, and strengths, when facing and coping with recession scenarios. CAs do indeed promote cooperation among their members, but they also encourage them, and the cluster as a whole, to be competitive within a context of global competition (Porter 1998; Newlands 2003). The underlying theory suggests that the geographic concentration of interrelated enterprises and industries leads to a gain of competitive advantages in those businesses and improves their financial results. The localisation in a cluster allows a reduction of production and transaction costs (Hsu et al. 2014), implementing economies of scale, achieving higher earnings (Spencer et al. 2010), stimulating innovation processes (Li and Geng 2012), and, in general, obtaining benefits such

as improvements in *competitiveness*, *profitability*, *productivity*, and *growth* (Bagwell 2008). Affiliated companies will be in a position to compete in better conditions than the unaffiliated, when the environment is stable, and these advantages are expected to be upheld when the economic conditions are not the most ideal ones. The advantages gained should reinforce an enterprise's position when it needs to adjust to crisis, as those advantages permit it to compete with a greater capacity for reducing costs, when faced with lower demand, but also because they ensure greater efficiency and higher level of activity, which have been considered typical features of enterprises undergoing a recovery process.

Sundry investigations have shown the advantages over the nonassociated firms that enterprises affiliated to a CA have obtained in such aspects as *productivity* and *competitiveness* (Aranguren et al. 2014; Franco et al. 2014). Li and Geng (2012) confirmed the possible differences in the performance of enterprises located inside a cluster against those located outside. The study by Aranguren et al. (2014) also showed that enterprises belonging to CAs are more productive. These results do indeed suggest that affiliated companies compete and adapt better in adverse situations.

Nevertheless, the results cannot be considered conclusive. Enterprises belonging to a CA perform better in variables such as *job creation* and *sales* (Spencer et al. 2010), but both these are overall indicators of an enterprise's level of activity, and not so much of its *productivity* and competitive advantage. Moreover, even studies such as those by Kalafsky and Macpherson (2002), and McDonald et al. (2007), which have looked at variables based on growth in sales and employment, have not found a significant relationship between cluster memberships and performance. In contrast, variables that better reflect firm competitiveness, such as labour output, returns such as *ROA* and *ROS*, and innovation (Li and Geng 2012; De la Maza et al. 2012; Aranguren et al. 2014), reveal the possible existence of a positive relationship. Yet in many cases, there are also other factors that appear to be involved, together with CA membership, in the achievement of greater competitiveness.

Although there are no conclusive results regarding the existence of a causality between CA membership and financial performance, sundry studies posit that CA membership does have effects of an intangible nature, which are not manifested in the short term, and may indirectly have economic implications for the firm (Bell et al. 2009; De la Maza et al. 2012; Aranguren et al. 2014). Specifically, the theory of the resource-based view of the firm states that the ultimate competitive advantage of an affiliated company, as opposed to the one that is not, lies in the possibility of sharing a broad range of resources and capabilities (Li and Geng 2012). Firm performance is determined by factors such as a better access to sources of finance (Henry et al. 2006; Skalholt and Thune 2014), implementing economies of scale, better access to information and labour, and the typical benefits to be gained when enterprises complement one another (Porter 2003; Navickas and Malakauskaite 2009), sharing information on key areas of management, such as marketing, finances, innovation, and technology (Hall and Teal 2013). These intangible advantages provided by membership of a CA mean that affiliated companies compete asymmetrically with

their non-affiliated counterparts, which ultimately gives them a competitive advantage also in a volatile economic environment that calls for a rapid adjustment.

Moreover, scenarios of economic crisis may constitute a handicap for innovation processes by limiting the capacity for accessing resources, but they also offer new opportunities and a fertile ground for innovation (Harfi and Mathieu 2009; Antonioli et al. 2013). Sharing the costs of R&D activities may be a major driver in periods of economic turbulence (Skalholt and Thune 2014). This means that the strengths clusters have are in their greater ability to access funds, as well as in the ability to organise cooperative R&D activities.

Larger enterprises tend to be more prone to join CAs (de la Maza et al. 2008), and, generally speaking, large and productive enterprises are more resilient to volatile situations (Martin et al. 2013; Altman and Hotchkiss 2006). In fact, *size* is a variable that informs about firm performance and *productivity* (Lee 2009; Niresh and Velnampy 2014).

Few studies have analysed the effect that membership has on cluster firms in times of crisis (Skalholt and Thune (2014). Their results show that clusters reduce uncertainty in times of crisis and permit better access to certain resources, such as financing. In contrast, Martin et al. (2013) report that the competitiveness of affiliated companies in recession suffers more than that of non-affiliated. Specifically, during the 2008–2009 crisis, enterprises belonging to clusters did not appear to maintain their advantages, which are generally manifested in higher export flows. The authors attributed this to the dependence that companies, within the clusters, had on the "leaders", which are immediately affected. These results suggest that in situations of crisis, affiliated companies that are small may be highly dependent on the larger ones.

We may formulate the following hypotheses:

H1 During times of economic adjustment, CA enterprises will adapt better to crisis than those that are not affiliated.

H2 During periods of economic recovery, CA enterprises will record better results in performance than those that are not affiliated.

H3 Firm size impacts upon the adjustment process during recessions.

3 Sample and Variables

The analysis has involved a sample of 405 enterprises operating in the Basque Country specialised in those industrial sectors mentioned earlier: ACE, FMV, GAIA, HEGAN, and Papermaking cluster (Table 1). Out of the 405 enterprises, 90 were affiliated at the beginning of the period analysed and have remained so during the years under study. The analysis addressed the periods 2011–2014, following the recession of 2007. The Basque economy recorded further downturns in 2012 and 2013, with an improvement finally in 2014. The years of recession

Table 1 Distribution of the Basque enterprises studied. Affiliated/non-affiliated

Cluster association	Total enterprises	Affiliated companies	
GAIA (electronics and information technologies)	300	65	21.6%
ACE (energy)	39	6	15.4%
Papermaking (paper Tech.)	34	5	14.7%
FMV (maritime industries)	23	12	52.2%
HEGAN (aeronautics and aerospace)	9	2	22.2%
	405	90	22.2%

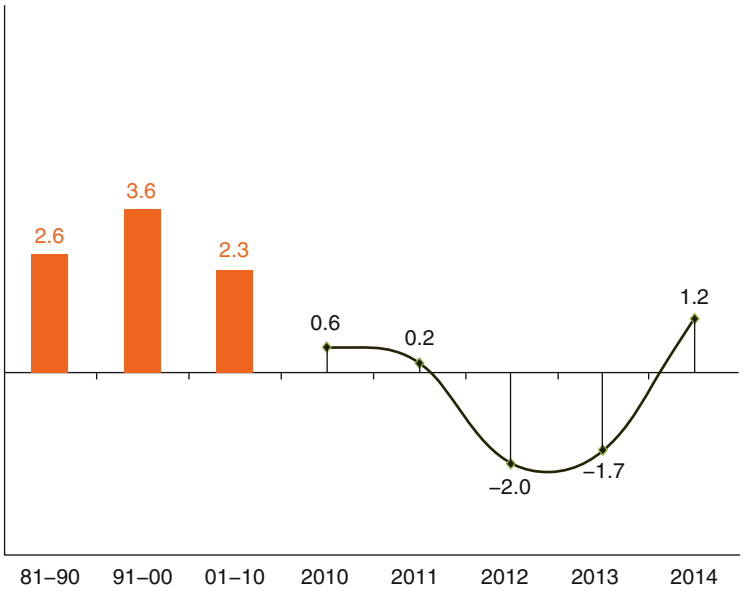

Fig. 1 Evolution of GDP in the Basque Country

recorded a significant fall in economic activity which is reflected in a fall of GDP, employment, industrial output, and sales, creating an adverse environment. In 2014, the rate of GDP growth, while not high, was the best of the last 6 years, driven mainly by the increase of the domestic demand (Basque Directorate for the Economy and Planning 2015). The graphs (Figs. 1 and 2) show the evolution of the Basque Country's main macroeconomic figures.

The analysis of firm performance has involved seven indicators that are generally associated with an enterprise's economic and financial stability or growth: *ROA*, *profit margin*, *asset turnover*, *productivity (two indicators)*, *liquidity*, and *leverage*. They are all variables that can be used to detect and assess firms' performances and therefore the possible existence of differences between affiliated and non-affiliated

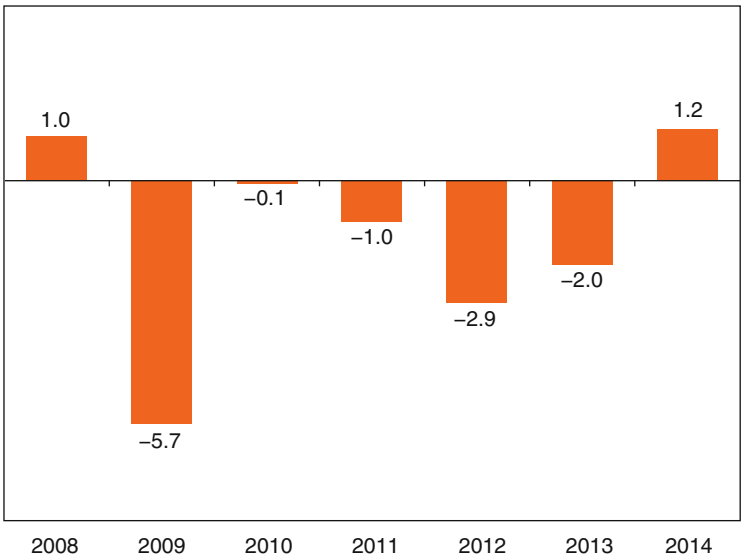

Fig. 2 Evolution of Domestic Demand in Basque Country. Source: Basque Government, Directorate for the Economy and Planning (2015)

Table 2 Variables used in the analysis

Indicator	Variables
ROA (*return on assets*)	Earnings before interest and taxes (EBIT)/ total assets
Profit margin	Earnings before interest and taxes (EBIT)/ sales
Asset turnover	Sales/total assets
Productivity_1	Value added/employees
Productivity_2	Sales/employees
Liquidity	Current assets/current liabilities
Leverage	Shareholder equity/total liabilities

companies. Table 2 provides the definitions and components for each one of these indicators.

ROA provides a basic measure of firm performance from an economic perspective. *ROA* is broken down into a further two key indicators, namely, *profit margin* and *asset turnover*. Both are suitable for measuring performance and for reporting on the efficiency, capability, and optimality of the investment (González-Bravo and Mecaj 2011; Pearce and Robbins 1993; Smith and Graves 2005; Jostarndt 2006; Kahl 2001; Routledge and Gadenne 2000).

Liquidity and *leverage* are linked to the enterprise's financial structure and enable us to appraise its self-sufficiency and solvency, as well as its ability to attract additional funds or renegotiate its debts. The two *productivity* indicators selected—*value added/employees* and *sales/employees* (Martin et al. 2011; de la Maza et al. 2012; Aranguren et al. 2014)—can offer some dynamic view about the

Table 3 Distribution of the mean values for *size*, *activity*, and *results*

	Assets	Employees	EBIT	Net income	Value added	Sales
2011. Mean data (in thousands of euros, except for Employees)						
CA companies	593,374	133	29	2407	23,209	119,679
NCA companies	85,905	51	7581	5562	13,805	51,694
Total enterprises	198,675	69	5902	4861	15,895	66,802
2014. Mean data (in thousands of euros, except for Employees)						
CA companies	702,944	136	12,518	5042	26,667	134,871
NCA companies	107,344	51	5432	3369	12,632	26,634
Total enterprises	237,386	70	6968	3725	15,669	50,386

CA companies: enterprises that belong to a cluster association
NCA companies: enterprises that do not belong to a cluster association

positive effect that CA companies have realised. Finally we measured *net income* (revenue after taxes) and *EBIT* (earnings before interest and taxes).

3.1 Characteristics of the Enterprises Analysed

We will focus here on various dimensions: *size* (assets and employees), *level of activity* (value added and sales), and *results* (EBIT and net income). Table 3 contains the mean values of the variables for each one of the groups of enterprises studied: affiliated and non-affiliated.

We can observe that both for 2011 and 2014, CA companies record much higher performances (measured by mean value) especially for those indicators linked to the variable *size* (measured by two proxies: assets and employees), reinforcing the hypothesis that CA enterprises localised in business clusters are of larger size and are characterised by a higher *level of activity* (income from sales and value added), (de la Maza et al. 2008; Aranguren et al. 2014). This result could also be explained initially by the size effect rather than by CA membership, since size leads to many advantages and it is considered one of the factors determining performance. Nevertheless, there is no overall consensus on the intensity and direction of the possible cause-effect relationship between the two variables (Niresh and Velnampy 2014).

In dynamic terms, moving from 2011 to 2014, the affiliated companies have performed better in terms of assets, employees, sales, value added, and net income. The greatest effect may be seen in EBIT, which more than doubles the figure recorded by non-affiliates.

Although affiliated companies appear to obtain advantages in variables related to the level of activity, the individual indicators linked to *profitability* and *productivity* need to be analysed in order to verify whether there are differences in performance during the period analysed with regard to non-affiliated companies.

In order to discover whether there are possible differences a priori between both groups of enterprises, as well as in the patterns of behaviour and evolution, an initial

exploratory investigation has been conducted through a two-step cluster analysis (Chiu et al. 2001). This methodology reveals the natural groupings of individuals, according to certain specific variables that could not otherwise be detected. This procedure is characterised by the ability to manage both categorical and continuous variables, the automatic selection of the number of clusters (homogeneous groups), and the ability to analyse large data files. The Bayesian information criterion (BIC) (Schwarz 1978) has been used to determine the number of suitable groups being computed for each possible solution of the number of clusters. The Schwarz's Bayesian criterion considers that the model's best fit is achieved with the smallest BIC value.

4 Results

4.1 Performance of Affiliated and Non-affiliated Companies During the Adjustment Process

The two-step cluster procedure identified three groups for 2011, 2013, and 2014 and four for 2012. Nevertheless, as shown in Table 4, the results evidence the existence of two main groups of enterprises over the 4 years and analysed: a clearly differentiated group of affiliated companies (CA), on the one hand, and of non-affiliated ones (NCA), on the other (see bold percentages Table 4).

The concentration from the start of the two types of enterprises into two groups allows us to consider the existence of clear intergroup differences and strong intragroup similarities. Although the analysis identifies other groupings that could include all the other affiliated and non-affiliated companies, they involve insignificant percentages.

The interpretation of each one of the groups has involved an analysis of the centroids for each one of the variables. This analysis permits us to profile the characteristics of each one of the groupings and reveal the extent to which there are differences between the enterprises belonging to each one of them (Table 5).

In 2011, non-affiliated companies have a greater *asset turnover* and higher value added. Affiliated companies perform better in terms of income from sales, and they carry less debt. Regarding *profit margin*, *ROA*, and *liquidity*, the two groups of enterprises have very similar values.

In 2012, when the economy, in the Basque Country, reached the lowest point, the differences in favour of non-affiliates are observed in practically all the performance-related indicators. By contrast, affiliated companies are better positioned from a financial perspective, with greater *liquidity* and a better debt ratio, although the gap has narrowed regarding the group of non-affiliates.

In 2013, there is a change in favour of the affiliated companies, whereby they have become more productive and stronger from a financial perspective (greater *liquidity* and less debt). Non-affiliated companies prevail solely in the indicator of

Table 4 Results of firm distribution according to a two-step cluster analysis

2011			2012			2013			2014		
Cluster group	NCA	CA	Cluster group	NCA	CA	Cluster group	NCA	CA	Cluster group	NCA	CA
1	4.76	3.33	1	**92.06**	0.00	1	0.00	**97.78**	1	**93.59**	0.00
2	**95.24**	0.00	2	0.95	8.89	2	3.17	2.22	2	6.41	3.80
3	0.00	**96.67**	3	6.98	0.00	3	**96.83**	0.00	3	0.00	**96.20**
			4	0.00	**91.11**						

Table 5 Centroids of the groups for each one of the variables

		2011			2012				2013			2014		
Variables	Groups	1	2	3	1	2	3	4	1	2	3	1	2	3
Profit margin	Mean	−0.94	0.04	0.03	0.04	−1.22	−0.33	0.01	−0.03	−9.39	−0.02	0.01	−1.31	0.05
	Std. dev	3.38	0.19	0.15	0.19	2.67	0.78	0.19	0.33	23.22	0.43	0.25	2.82	0.18
ROA	Mean	−0.03	0.03	0.04	0.03	−0.01	−0.31	0.02	0.00	0.22	−0.01	0.02	−0.37	0.03
	Std. dev	0.94	0.14	0.09	0.13	0.26	1.04	0.11	0.14	2.22	0.18	0.14	0.82	0.15
Asset turnover	Mean	2.14	1.48	1.17	1.33	0.81	4.31	1.17	1.06	3.65	1.38	1.34	2.85	1.12
	Std. dev	3.12	1.10	0.71	0.90	1.21	4.23	0.66	0.74	4.85	1.10	0.93	2.66	0.76
Productivity_1	Mean	1038.94	84.43	69.18	81.16	1875.27	70.69	63.44	89.16	1417.74	82.79	77.92	944.58	83.92
	Std. dev	3342.22	184.78	101.40	164.35	4289.14	182.41	72.75	228.74	4086.02	170.79	137.92	3226.98	121.06
Productivity_2	Mean	3151.87	209.36	253.06	209.22	5663.99	133.81	153.60	242.23	4435.90	201.56	184.76	2621.79	285.47
	Std. dev	8219.52	452.18	723.56	487.11	8973.69	341.71	275.40	759.05	8682.07	473.56	306.52	7033.65	810.32
Liquidity	Mean	11.04	2.21	2.22	2.24	6.66	1.44	2.28	2.66	5.93	2.24	2.47	15.78	3.49
	Std. dev	19.97	1.95	1.97	1.85	10.28	1.61	1.67	2.65	14.31	2.02	2.76	67.78	8.03
Leverage	Mean	171.01	62.48	57.33	59.38	61.73	256.90	54.12	56.33	343.23	62.84	57.87	186.42	54.33
	Std. dev	251.87	37.39	23.47	37.63	35.97	392.98	21.33	23.95	512.43	50.16	38.42	199.65	24.30

Note: see Table 4 for the number of cluster group in which CA and NCA appear

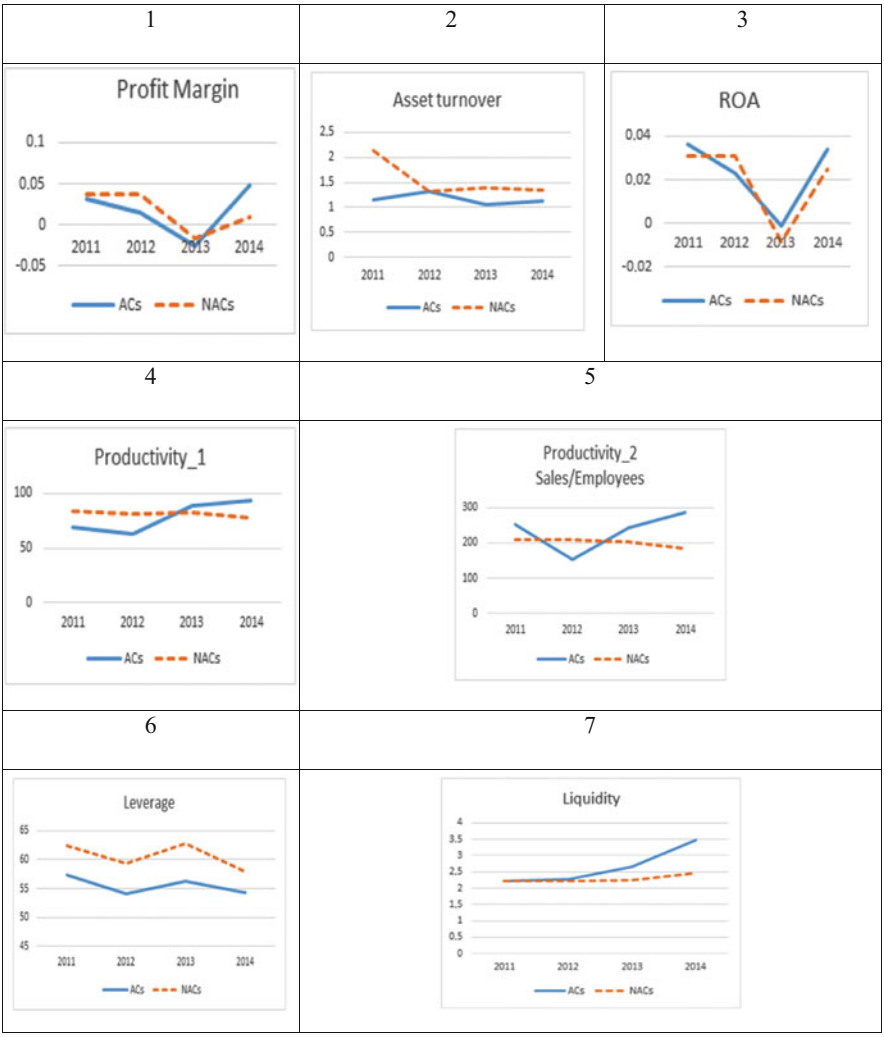

Fig. 3 Means of the groups' centroids for each variable. Source: Table 5

income from sales per unit invested. However, all enterprises report some losses from an economic perspective.

In 2014, with the exception of the *asset turnover* indicator, affiliated firms show a better financial perspective compared to non-affiliates. They emerge stronger from the years of the recession.

For a better understanding of the two trends, we report the following graphs (Fig. 3, 1–7) containing the positioning of the centroids in each year.

The graphs provide a clear snapshot of the evolution followed by the two groups of enterprises over the period analysed. The affiliated companies record a better

recovery, in the final years, following the general trend of the Basque economy, with the exception referred to the variable *asset* (a variable which is conditioned by the size of the investment in assets). Regarding the variables that are representative of *productivity*, non-affiliated companies maintain stable levels over the entire period. This evidence coincides with the findings in the study by Martin et al. (2013). During the periods 2013–2014, CA membership companies showed a better performance in all indicators associated with *profitability* and *productivity*.

4.2 Significant Variables for Forming Groups

Although centroids allow us to profile the main features of one group of enterprises over another, the two-step cluster analysis also provides an opportunity to compare each variable's level of significance for the forming of cluster groups, through a Chi-square for the categorical variables and a Student's *t*-test for the continuous variables. The graphs in Fig. 4 report these variables for each year and each group, mainly containing the affiliated and non-affiliated companies, according to the percentages of classification mentioned in Table 4. The variables in these graphs are plotted by order of importance.

The vertical dotted lines show the value used to determine whether a variable is significant. If the variable's *t*-statistic exceeds this line, in both a positive and negative direction, this variable will be identified as making a significant contribution to the formation of this specific group. When the variable's *t*-statistic records negative/positive values (toward the left/right of the graph), it means the values for that group of enterprises are generally above/below the mean. Those variables that do not reach the dotted lines are not important for the formation of the groups. The graphs can therefore be used to confirm, or not, the trends observed in the first of the groups' centroids.

Those CA enterprises are characterised by having a *profit margin*, and once the economy begins to recover, affiliated companies are also defined by a higher *profit margin* in 2014. If there is one weakness that characterises affiliated companies, it is their low level of monetary units obtained over their level of investment (*asset turnover*). This implies that they recover the investments made much more slowly, and this circumstance can be explained mainly by the typical size of this group of enterprises.

It is confirmed that affiliated companies have a much stronger financial structure for coping with challenging economic climates because their low levels of debt are significant in each one of these years. In turn, the *liquidity* of non-affiliated companies is also below the mean—a characteristic that becomes a vulnerability when dealing with adverse environments.

The graphs also evidence that the *productivity* of non-affiliated companies is below the mean too, and the same applies for the labour output of affiliated companies. This situation is readily explained because the analysis revealed, as already noted, the existence of a tiny cluster group that precisely involves enterprises

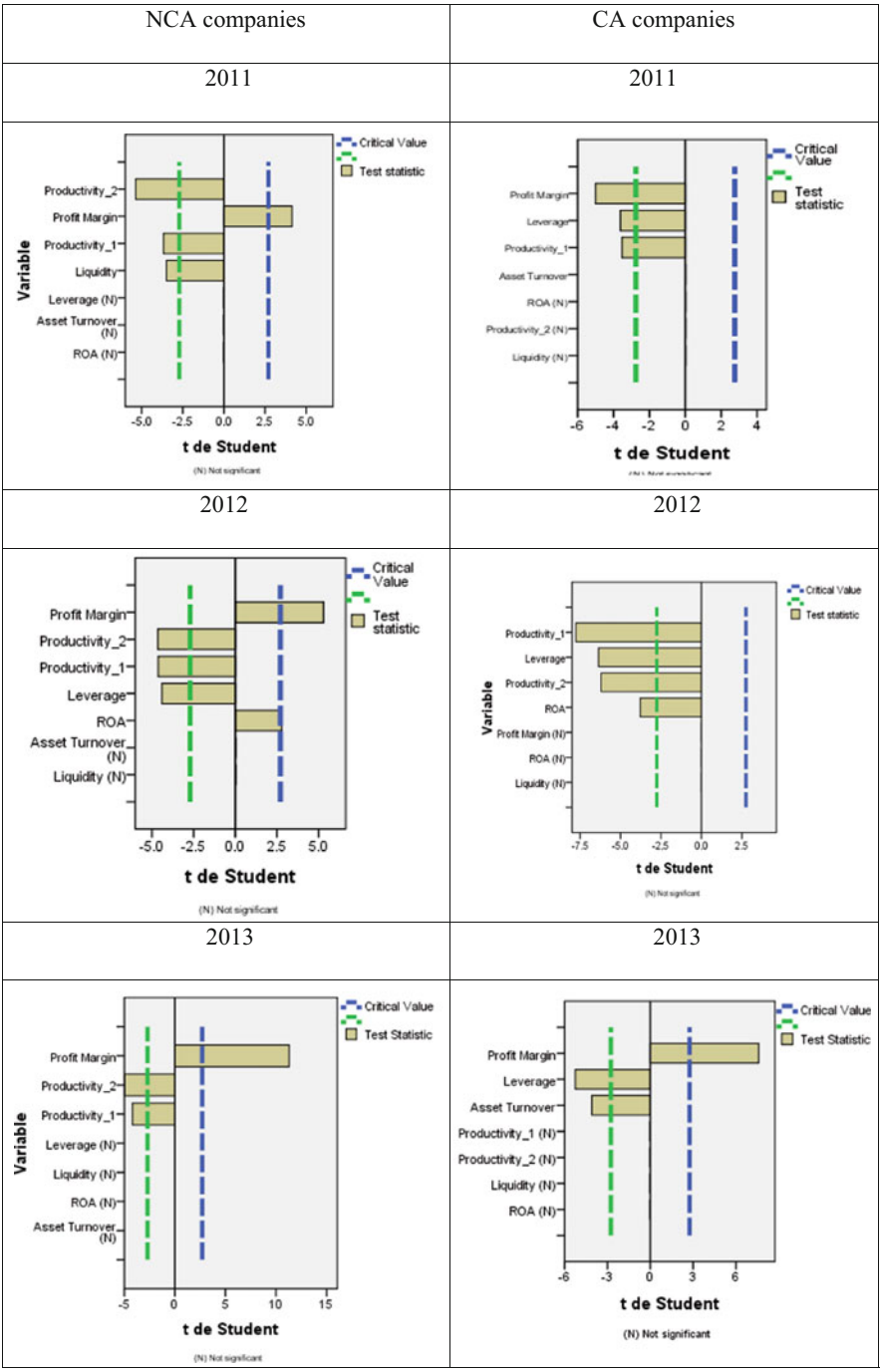

Fig. 4 Level of each variable's significance in the formation of groups

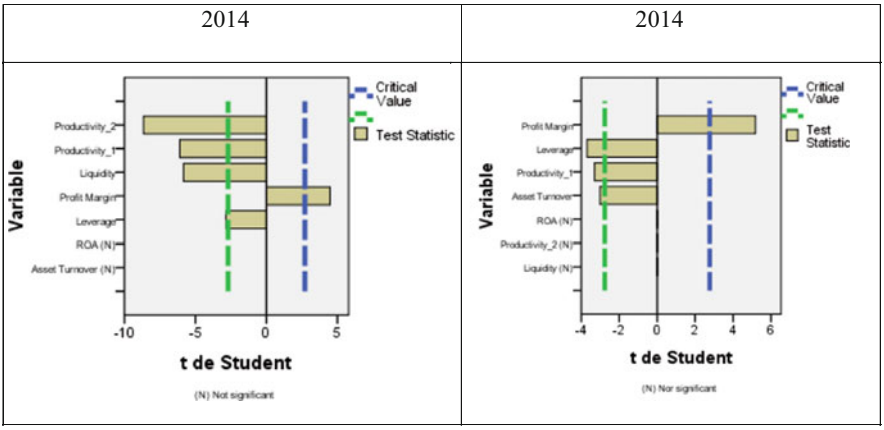

Fig. 4 (continued)

with high levels in both these indicators. They are, nonetheless, a very small number of enterprises that account for the residual percentages in both groups.

4.3 A Regression Analysis

The aim of our analysis was to confirm the significance of CA membership on performance indicators during the times of economic crisis and after the recovery. The following regression is therefore proposed:

$$\text{VAR\_Ind}_{(14-11)} = \beta 0 + \beta 1^{*}\text{Cluster} + \beta 2^{*}\text{Size} + \varepsilon t \qquad (1)$$

where *Var_Ind* $_{(14\_11)}$ corresponds to the variation recorded in each one of the variables between 2011 and 2014. *Cluster* is a dichotomous variable that reflects membership of a CA (value 1) or not (value 0). *Size* is a variable that reflects firm size, taking values of 1–4, depending on employees' levels. The values have been assigned according to the EU criteria set forth in the Commission Recommendation of 6 May 2003, concerning the definition of micro-, small-, and medium-sized enterprises. Accordingly, *size* takes the value 1 for microenterprises with fewer employees than 10, 2 for small enterprises with fewer employees than 50, 3 for medium-sized enterprises with fewer employees than 250, and 4 for large ones with more than 250 employees.

Table 6 shows significant results only for two variables: *asset* and *productivity* (considering *sales on employees)*. The coefficients of the variable that reflects CA membership are positive. This means that affiliated companies record better results in the return on their investments and in the *productivity* of sales per employee, which would enable us to accept H2. In contrast, H1 is not confirmed in our analysis, and H3 resulted to be not significant (see Table 6).

Table 6 Regression coefficients for the significant variables

	Var_asset turnover		Var_productivity_2	
Variables	Beta	Sig.	Beta	Sig.
Cluster (1,0)	0.568	0.024	0.300	0.011
Size (1…4)	−0.183	0.120	−0.067	0.227
R square	0.016		0.018	

In contrast, the size variable appears not significant for the two variables reported in Table 6.

5 Conclusions

The aim of this work was to analyse the extent to which CA affiliation could "shield" from adverse economic scenarios, and promote a better recovery, when economic conditions begin to improve.

Once the period of economic recovery had begun, in 2014, CA affiliated enterprises recorded a significant upturn in turnover, level of activity, and operating margin, whereas non-affiliated ones recorded a downturn. This would suggest that associationism does indeed provide certain advantages, which exert their influence not during the downturn but during the recovery. This appears not to be an effect of size that in our data is not significant. Affiliated companies record better results in the indicator *value added/employees* in 3 of the 4 years analysed. It may therefore be affirmed that affiliated companies generate more wealth than non-affiliated ones. There is a positive and significant relationship between CA membership and sales. These findings are consistent with those of certain studies that focus on analysing the advantages of associationism: affiliated companies perform better in sales growth. Perhaps the most important thing to note is that this ability to generate growth in sales is what really helps affiliated companies to better adapt to recessions. The fact that sales growth is a typical characteristic of affiliated companies gives them a further advantage for competing and surviving in hostile environments.

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