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Abstract

This paper studies the determinants of companies' performance during the crisis based on their short-term (sales changes) and medium-term (exit) reaction, using firms' data from the EFIGE survey and combining them with balance-sheet statistics. The results show that vulnerability to the crisis depended on a company's position within a GVC and modes of international operation. While exporters were more affected than non-exporters during the first crisis, their survival rates were not lower five years later. Moreover, more sophisticated internationalization modes increased firms' resilience in the first and second waves of the crisis. The paper also investigates the mediating role of intangible assets and financial constraints in the relationship between internationalization and companies' response to the crisis. While intangible assets were very important for preventing a drop in sales for internationalized firms immediately after 2008, they amplified the probability of firms' exit five years after the crisis in weaker European countries (Spain and Italy). At the same time, financial constraints increased companies' probability of exit. Innovation prevented a drop in firms' sales and firms' exit.

Keywords: global value chains, crisis, intangible assets, financial constraints.

JEL classification codes: O3, E22, G01

1. Introduction

The Information and Communication Technologies (ICTs) revolution has allowed firms to fragment their production processes beyond the national boundaries, giving rise to a second unbundling based on Global Value Chains (Baldwin, 2011)[1]. While internationalization strategies allowed for increasing efficiency by exploiting national differences in factor abundance and/or input costs, they made companies more fragile to downturns due to stronger international input/output linkages (Baldwin, 2009).

In particular, during the 2008 crisis, trade flows fell much more than GDP. Moreover, the fall in trade was also quite matched across countries. As documented by Araujo and Oliveira Martins (2009), more than 90% of OECD countries simultaneously saw a fall in foreign trade exceeding 10%. Those authors call it "great synchronisation" of trade collapse measured in historical terms. Baldwin and Evenett (2009) describe the trade decrease more precisely and emphatically as "severe, sudden and synchronised".

Global Value Chains (GVCs) were a channel of real and financial shocks transmission and contagion contributing to the "great trade collapse" (Baldwin, 2009) but also to a more rapid recovery described in Altomonte et al. (2012) as a "bullwhip effect". It can mean that a GVC may to some extent increase volatility of trade (Ferratino and Taglioni, 2014). Recent research has also shown that the influence of the crisis on firms' performance and robustness might be conditioned by the way in which global operations are organized (Altomonte et al., 2012) as well as firms' position and interrelations within GVCs (Bekes et al., 2011). From a different (but complementary) perspective, the literature on global value chains has pointed out that firms which control technology and use them internationally are likely to extract high rents from GVCs (Mudambi, 2008; Dedrick et al., 2010). Overall, the ability to gain profits from internationalization and modes of governance becomes an important feature in the value chain (Gereffi et al., 2005).

[1] On the first and second "unbundling" see more: Baldwin (2006).

This paper contributes to both streams of literature by empirically assessing whether the relationship between firms' internationalization and their response to the downturn depends on firms' governance capabilities. In order to answer this question, we exploit information on internationalization strategies of European firms and indicators of firms' potential governance capabilities (innovation and investment in intangible assets) taken from the EFIGE database. We focus on both the short-run impact of the downturn on firms' growth immediately after the crisis and on the medium-term impact on firms' exit in the five years after the crisis.

Firstly, we find that GVC involvement influenced participating firms (in terms of sales decline in the 2008/2009 crisis and in terms of firms exit five years later) conditionally on modes of operation and position within the chain. Internationalization seems to be an important channel of self-selection and "promotion" of the most sophisticated internationalization forms.

Secondly, we state that intangible assets (contributing to swimming up within a GVC) might have had a dampening effect in the face of the global trade decrease in the first wave of the crisis. They improved firms' dynamic capabilities including risk sharing, diversification of assets and the number of strategic solutions.

Thirdly, the value and importance of assets intangibility weakened in time as financial constraints increased. In the second crisis, tangibility of assets became a more important factor of survival. Overall human capital, innovations, product quality and labour productivity proved important factors for firms' resilience both by leading to a smaller drop in sales immediately after the crisis and by preventing firms' exit five years later.

The paper is organized as follows. Section 2 discusses the literature on firms' resilience to the crisis and the role of internationalization. Section 3 develops testable hypotheses and introduces the empirical strategy. Section 4 presents data and descriptive statistics. Section 5 discusses the econometric results, and Section 6 concludes and draws policy implications.

2. Related literature

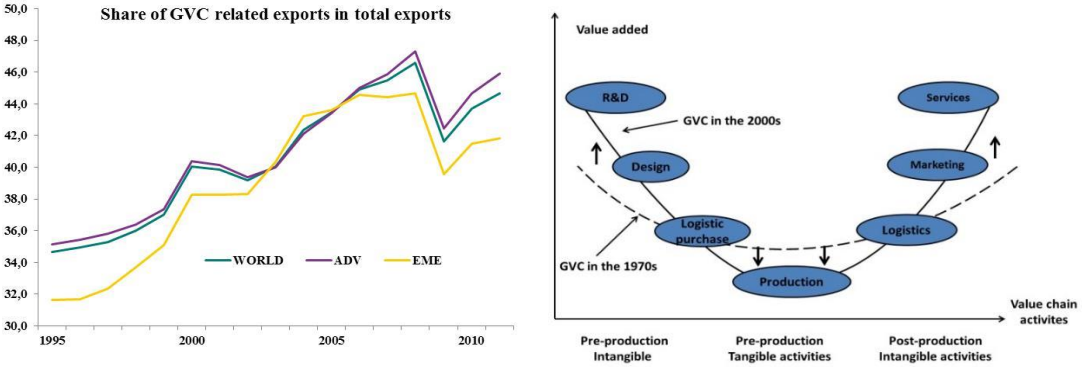
Global Value Chains phenomenon

The first symptoms of Global Value Chains (GVC) activity can be found in the American automotive industry in the 1960s and in the Asian electronics in the 1980s (Ferratino and Taglioni, 2014)[2]. Current state of GVC sophistication is strongly related to the globalization phase which speeded up in the 1990s and especially in the 2000s. It was spurred by coincidence of many long-term as well one-off processes with structural influence such as unprecedented trade liberalization, inclusion of many emerging economies into global trade since the 1990s, (including the biggest – China), increasing presence of Foreign Direct Investment (FDI) and Multinational Corporations (MNCs) in developed and developing countries, the euro introduction, fostering global financial integration and unprecedented international capital mobility between 2002 and 2007, lower transport and transaction costs accompanied by the ICT revolution (Baldwin and Taglioni, 2014; ECB, 2016). Jones and Kierzkowski (1990) also highlighted an important role of specialized and internationalized services in fragmentation of global trade. All of these factors resulted in relatively higher trade than the world GDP growth, driven increasingly by developing countries (see figure 1, left panel).

GVC has become a more important structural element of the global labour and capital division since the late 1990s. According to WTO (2013), in 2010 GVCs organized by MNCs within intra-firm and inter-firm trade accounted for about 80% of the global value. A statistical result of goods traded among countries several times were increasing gross volumes of trade. As indicated by WTO (2013), GVCs are responsible for about one third of "double counting" in global trade.

[2] The "Smiling Curve" as a graphic illustration of production fragmentation was devised by Stan Shih, the founder of the Acer company in the early 1990s (Elms and Low, 2013).

Figure 1. GVC participation (left panel) and the smiling curve – value added along the GVC (right panel)



Source: ECB, 2016; OECD, 2013.

Due to the ICT revolution and decreasing coordination costs, specialization and simultaneous fragmentation of production became one of the important forms of companies' and countries` internationalization (Baldwin, 2006). The main feature of the GVC is using more intermediate semi- products and products which are components of the final goods delivered to customers. "Lean thinking" and "lean management" accompanied by fragmentation of the production cycle along the value chain allowed multinational companies to identify the most costly parts of production processes and outsource them internationally and keep the most profitable parts at home and/or close to the decision making centre (see Figure 1, right panel). Specific intangible assets became more efficient if used internationally.

As a result, the final product produced in a GVC is an outcome of many interactions among many partners (including mainly foreign ones). It also means a higher share of foreign content in exports which is one of the general measures of global production defragmentation. "Just in time" organization of delivery and operational activity with high cross-border trade exposed GVC participants to a more synchronized vulnerability to common and global shocks (Gereffi and Luo, 2015). As shown in Ferratino and Taglioni (2014), automotive industry was one of the most defragmented and outsourced sectors before the crisis, also strongly affected during the crisis. Those authors indicated that more concentration on trade in intermediaries led to a greater exposure to the crisis than final demand (called *bullwhip effect*). They

also revealed that a deeper reaction of intermediaries was heterogeneous across sectors and countries. Simultaneously, intra-EU GVC trade seems to be more sensitive to bullwhip behaviour than global trade.

Position within GVC

According to the literature, we can claim that the position of the company within stages of the value chain may influence its performance and survival. The importance of intangible assets allows for assuming that their higher value could imply a higher position among stages of the value chain and more flexibility and room for operational and strategic manoeuvre. Kirca et al. (2011) confirmed that multinationality accompanied by intangible assets is a source of more efficient organizational operations. It leads to more optimal use of firm-specific assets and higher returns thanks to the multinational dimension of the firm's market.

Some groups of International Business models assume that due to its complex nature internationalization can be seen as an innovation (Andersen, 1993). It is in line with the definition of innovation proposed by Schumpeter (1960), indicating that a new market, including a foreign one, might be an example of innovation activity. It implies that the most sophisticated forms of internationalization and position within a GVC should be interrelated with intangibility, innovation, higher human capital and quality of production factors.

Following the OECD (2012) definition of GVC, it means that*: A value chain identifies the full range of activities that firms undertake to bring a product or a service from its conception to its end use by final consumers*.

A more in-depth analysis, such as by Agostino et al. (2014), noticed that relationships between GVC participants may be organized around different types of governance. Based on previous research, those authors identified three modes of cooperation: relational, modular and captive. *Relational* participation is connected with close relationships between suppliers and leading companies which are directly involved in strategic pre-production activities like R&D, product design and development. In the case of *modular* value chains cooperation, the leading company provides instructions to supplier firms that deliver semi-products. *Captive* value

chains relations mean that competing (usually based on prices) suppliers can serve as sources of the same intermediate good. In conclusions, the authors indicate that a supplier in a GVC with higher export and more innovative (in comparison to non-exporters and non-innovators) achieves the productivity level comparable or higher than in the case of firms selling traded goods in final markets.

Brancati and Brancati (2015) differentiate the following forms of companies' involvement in a GVC. *Arm-length*, which means that suppliers are not connected by any stable relationship with client firms. *Hierarchical* relations include subsidiaries of corporate groups with strong influence of the parent company on its "daughter" companies. *Quasi-hierarchical* mode includes entities with stable relationships with cooperating companies but minor participation in designing the final product (subcontractors rely on buyers' detailed specifications on production processes).

Relational involvement covers stable relationships between buyers and suppliers and high degree of contribution to the final product creation. Firms cooperate closely but their autonomy and flexibility is higher than in the case of *quasi-hierarchical* model. In their paper based on Italian companies research, Brancati and Brancati (2015) confirmed that being a part of a GVC increases innovation propensity but this effect is dependent on the nature of relations between partners. Those companies which have stable relationships within a GVC and are more involved in the final product might gain more in terms of innovation.

Based on EFIGE data, including four euro area countries (France, Germany, Italy and Spain), Békés et al. (2011) showed very heterogeneous reactions of companies to the crisis based on changes in total sales and exports between 2008 and 2009. One of the general conclusions of the research is that because of rapid and synchronized trade collapse, companies that were exporters suffered more than non-exporters[3]. The second conclusion is that importers suffered less in terms of sales

[3] In terms of sales and export decline, Germany and Italy experienced similar patterns in that sense that in both categories contraction was similar. However, this decline was about 8% for Germany, and much lower than 13% in Italy. In the case of Spain, which suffered the most severe contraction, export decrease (12%) was lower than total sales decrease (17%). In France, export declined (16%) more than total sales (12%). The magnitude of sales decline is irrespective of company size and highly differentiated across sectors and countries. Even in an inconvenient environment, 10–20% of companies did well in the most severely affected sector like metals and countries like Spain (Békés et al., 2011).

decline. The explanation is that importing companies could respond to shocks more flexibly because of supply diversification channels as opposed to firms that were not able to adjust on import channel.

In order to assess the role of specific GVC relations, Békés et al. (2011) distinguished three dimensions of companies' features related to the organization of production, technological place and institutional (ownership/control/governance) position within value chains. The first group of factors is related to the way in which production is organized (like produced to order – *passive outsourcer* or outsourcing of some semi-products and products – *active outsourcer*). Research indicates that firms manufacturing more products to order experienced a greater drop in sales. Firms which outsourced at least some part of their production were less exposed to the trade collapse. The second group of factors collects features that allow for describing the technological place of the firm in the supply chain measured at the industry level by the share of used intermediate production. A general conclusion is that using more intermediates in total output results in greater exposure to the crisis because these products are more exposed to demand shocks. The third group of factors reflects ownership and control within supply chains. It seems that controlling firms, understood as firms that have their own affiliates or are at the top of the channel, experienced less sales reduction while controlled (members of a network or acquired by another firm) firms suffered more. This pattern was also confirmed at the employment level – controlling firms reduced their employment to a smaller degree because a diversified network of companies might have given the opportunity to push problems to the GVC "periphery". Controlling other companies gives more flexibility in shock absorption than being just a subsidiary within a chain.

Similar conclusions were found in other studies. As shown in Altomonte and Ottaviano (2009), the so-called "arm's length trade" (where buyers and sellers act independently and without sophisticated relations) and offshoring active companies performed worse than companies operating within more integrated structures. This result can be explained by the fact that within-firm cooperation helps overcome financial constraints.

Altomonte et al. (2012), based on a French sample of companies, differentiated two alternative modes of firms' inclusion within global production: within-group trade based on more long-lasting relations and arm's length trade. Results confirmed that companies operating based on more integrated relations within a GVC experienced a faster decrease in trade at the beginning of the crisis but also faster recovery than companies participating in trade based on arm's length mode. Worse performance at the beginning of the crisis could be a result of higher reliance on intermediaries and adjustment of stocks to new environment and prospects (bullwhip effect). Better performance during the recovery is explained as GVCs' higher ability to manage stocks and inventories more optimally thanks to more efficient communication and coordination.

Accetturo and Giunta (2013), examining firms' performance measured by sales in the first phase of the crisis in Germany and Italy, based on EFIGE data, confirmed that the position within a GVC influences companies' resilience. They documented that intermediate companies were more affected by the crisis than final firms but those which had higher human capital performed even better.

Intangibility of assets and innovation

There is quite broad microeconomic literature indicating that intangible assets improve firms' performance during "normal times" because of increasing absorptive capacity as well as the use of technology, more flexible market adaptation and productivity (Fagerberg et al., 2010; Battisti et al., 2014). Intangible assets including designs, software, organizational and management skills, reputation, technology licences (Barney et al., 2001) could improve adaptability and flexibility of companies, especially during turbulent time.

Intangible assets are also related to innovative activity (Montresor and Vezzani, 2014) working through DUI model (*learning by Doing, learning by Using and learning by Interacting*) channels and resulting in more incremental innovations as opposed to the STI model (*Science, Technology, Innovation*) where radical innovation takes place more often (Jensen, 2007). As a result, equipped with intangible assets, even companies operating in traditional sectors are more productive and customer-,

process- and marketing-oriented. According to the resource-based theory of the firm, Esteve-Pérez and Mañez-Castillejo (2008) indicate that unique firm-specific resources that are difficult to imitate (mixed tangible and intangible) are helpful in accommodation in a new environment and increase survival prospects.

Much less attention has been paid in the literature to examining the role of intangibility of assets in sustainability of companies' performance and survival during crisis episodes. Because of the above-mentioned reasons in favour of intangibility, Landini et al. (2015) indicate that this feature could improve firms' resilience capacity during turbulent times and simultaneously increase their ability to cope with shocks. Intangibility played a more important role in decreasing probability of firms' exit mainly during the first phase of the crisis (till 2010). Financial constraints were more important than intangibles as a factor explaining companies' exit in the second stage of the crisis (2011–2014). Finally, they claim that during financial and economic turbulence, intangible assets can reduce the risk of exiting. The condition might be their coexistence with a sound financial position and liquidity.

Innovation and innovativeness are a different dimension or result of intangibility. Most of what has been told in the literature about innovation and firms' survival is related to the experiences, with no much reference to the crisis time when business environment is much more unstable and unpredictable. But even in the literature based on "normal times" evidence, there is still inconsistency on the influence of innovation on firms' survival.

On the one hand, we can claim that innovation is a very complex and risky activity which can increase the probability of firms' exit because of high level on uncertainty, especially in the case of radical and capital-consuming innovations. Buddelmeyer et al. (2010) indicated that radical innovation increases the probability of failure, while incremental innovation is related to lower failure probability. Those authors indicated that the problem with analysing the innovation and survival relationship is that researchers usually use ex-post data on innovation which are related to "successful" activity but do not include failures. That is why innovation is associated with survival.

On the other hand, there is also important evidence that innovation might be a factor increasing companies' success (Roper and Xia, 2014). Cefis and Marsili (2005), based on Dutch manufacturing companies, indicated that there exists "innovation premium" increasing probability of companies' survival irrespective of age and size (which also increases chances of survival, as they confirmed). Process innovations played a more important role and companies operating in science-based and specialized supplier sectors (aggregated according to Pavitt classification) experienced higher probability to survive. Ortega-Argiles and Moreno (2007), based on a sample of Spanish firms, confirmed that product and process innovation decreases exit probability in the case of smaller companies but for larger ones only process innovation was important. Cefis and Marsili (2012), based on Dutch manufacturing companies analysis, confirmed that both product and process innovations decrease the probability of exit.

The area of interrelations between innovations and survival during a crisis is much less explored. Based on Russian manufacturing firms' performance in 2007–2012, Golikova and Kuznetsov (2016) confirm that the crisis was less severe for companies that had been innovation active before the crisis and their recovery was faster (in terms of sales growth). Moreover, they claim that companies globalized (through import, export, FDI, formal relations with foreign partners) before the crisis went through the crisis more smoothly. Those authors also indicate that innovation and globalization are complementary and reinforcing factors, which means that globally active innovators experienced better results in post-crisis recovery. Frenz and Lambert (2011), based on UK companies CIS research, show that despite falling activity innovation during the crisis, both kinds of innovation, new to the market and new to the firm, had a positive influence on performance.

Nunes et al. (2013), examining the crisis effects on companies depending on innovation types, reveal that companies operating within knowledge networks increase resilience. Moreover, they indicate that companies which combined two types of innovation modes (DUI and STI) were more robust during the crisis. In the conclusions, they highlight the prevalence of the networking model as opposed to the in-house model as governance mechanisms of the innovation strategies.

An opposite view was proposed by the World Bank economists analysing the crisis influence on sales in the case of innovative and young companies in seven Eastern European countries (Correa and Iootty, 2015). They indicated that innovative companies suffered a bigger decline in sales (as opposed to non-innovative ones, which can mean a negative innovation premium), as was the case of young companies in comparison to the old ones.

Financial constraints and tangibility of assets

Financial constraints are an important obstacle to firms' growth in general, but their importance and burden increase during crises and often become a decisive factor of survival. Because of existing sunk costs, exporting and innovative companies might be most affected by financial constraints (Rodrik, 2008; Melitz, 2003).

The significance of financing during crises is not only the result of the fact that companies use financing for their everyday activity but also of the fact that during turbulent times the so-called *financial accelerator* increases costs of financing and restricts access to money, even for stable and credible companies (Guariglia et al., 2016).

Based on EFIGE data, Békés et al. (2011) indicated that companies experiencing financial constraints (and relying on external finance) were more affected by the crisis in terms of sales decrease. The factor that also decreased sales in France, Italy and Spain was reliance on local national banks as their main source of financing. It may reflect not only higher sensitivity of companies in those countries to financial constraints but also the magnitude of the financial crisis, especially in Spain, Italy and all the euro area peripheral countries (Acharya et al., 2015). Many other papers, such as e.g. Bricongne et al. (2011) based on French companies, also suggest that the crisis affected small and financially constrained companies more. Guariglia et al. (2016), based on UK firms, documented that the interest rate rise and increasing burden of debt servicing may have influenced firm survival, especially during the last crisis.

The evolving nature of the crisis revealed its more "financial" character when financial constraints became very severe, especially in the EU peripheral countries.

Because of capital outflow from these countries and partly inflow to Germany and France, as a result of the "diabolic loop" and self-fulfilling financial and debt crises, differences between interest rates paid by companies for credit were among the highest since the beginning of the euro area. However, one should also bear in mind that financial constraints could be (and were, as indicated in Kolasa et al., 2010; Claessnes, 2012) also severe in the first phase of the crisis, but perhaps intangible assets allowed for overcoming this problem to some extent.

While above we described the potential strength of asset intangibility, below we do confirm that tangibility of assets may also be a very important factor determining firms' success and survival, especially during a crisis. Through turbulent times, higher tangibility may give better access to financing (OECD, 2014). Higher market risk imputes stronger information asymmetry, higher costs of financing for companies with lower-quality collateral and less probability of repossessing companies' assets by banks. Popov and Udell (2012), looking at the supply side of the credit financing (banks' balance sheets), indicated that the financial condition of banks affected the availability of credit. Higher-risk companies and companies with a lower share of tangible assets were the most susceptible to banks' financial condition. Campello and Giambona (2011) claim that not all categories of tangible assets have the same importance in credit accessing and only assets that are redeployable play that role. Békés et al. (2011) indicated that during the latest crisis the companies examined (within the survey of EFIGE) that had many tangible assets in the form of properties suffered declining valuations of these assets. It resulted in worse access to financing and lower sales and exports. It may confirm that types of tangible asset also matter.

When it comes to the dampening factors which help to overcome financial constraints, close ownership relations are indicated in the first place. Kolasa et al. (2010), based on companies research, indicated that belonging to a foreign international group may help to overcome problems with financial constraints. Trade credit, which did not play an important role in the case of the EFIGE sample (Békés et al., 2011), is also usually indicated in the literature as an instrument decreasing financial pressure during crises, substituting banking credit (Bastosa and Pindado, 2013). Brunella et al. (2016) argue that an important factor that helps companies

overcome financial frictions is reliance on multiple bank relationships and internal resources. Cosci et al. (2016), who considered relationship lending and innovation activity, confirmed an important role of soft information exchange between bank and lender and long-lasting relationships.

3. Testable hypotheses and empirical specification

As already stated in the Introduction, during the 2008 crisis, trade flows fell much more than GDP and the fall in trade was quite homogeneous across all countries (Araujo and Olivera Martins, 2009). Wagner (2012) indicates that almost all of the decline in exports of German firms during the trade collapse in 2008/2009 was due to negative changes of exports in firms that continued to export (at the intensive margin) while the decrease in exports due to export stoppers (at the so-called extensive margin) was tiny. A similar pattern can be observed in research based on the EFIGE sample companies (Békés et al. 2011) and at the individual companies' level based on other databases in Spain (Altuzarra et al., 2016) and France (Bricongne et al., 2010).

While exporters suffered more due to the rapid and deep trade collapse all around the world, there are also arguments that their ability to survive during the crisis could be higher than that of non-exporting firms. It can be a result of the self-selection phenomenon confirming that only a small fraction of all companies is able to overcome the sunk cost related to expanding activity abroad. Only the most efficient and productive companies may internationalize through exports and more sophisticated forms (Melitz, 2003). Because of the above conclusions, we can claim that death rates in the case of exporters can be diminished in comparison to non-exporters. Based on this evidence, we put forward our first hypothesis:

HP1 *Exporting firms experienced a larger drop in their sales during the 2008 crisis but not a higher probability of exit compared to non-exporting firms.*

But what is the explanation for the great trade collapse?

Some authors have put forward the hypothesis that international supply chains amplify the trade effects of national downturns in demand (Yi, 2009). The argument is the following: trade is measured in gross value terms, and the same value added may cross borders within a GVC several times before becoming the final good. However, this mechanical explanation does not necessarily apply. As documented in Bénassy-Quéré et al. (2009), in the case of constant relative prices, fragmented trade flows within a GVC should react *proportionally* to a GDP decrease. This implies that high presence of supply chains does not automatically explain overreaction of the

world trade collapse to the world GDP drop (Altomonte and Ottaviano, 2009). Moreover, some factors can make firms participating in GVCs more resilient to the crisis while others may act in the opposite way. First, contractual long-term relationships along the chain entail fixed costs and are more stable in the short run. Second, multinational corporations with more ability to get financing in the global markets may solve the problem of financial constraints within the group and the entire supply chain.

On the other hand, the adjustment of inventories within supply chains and the presence of firms involved in selling produced-to-order goods abroad (passive outsourcers) may have exacerbated the reaction of firms to the crisis (Altomonte et al., 2012). It is in line with the literature investigation outlined in the *GVC phenomenon* part of this paper, which gives us arguments to claim that the character of relations and position within a GVC may influence the sensitivity to trade collapse. Some companies can be secured thanks to some kind of *risk sharing* with other partners, while other companies may be more exposed to economic problems.

HP2 *The drop in firms' sales during the 2008 crisis depends on the form of participation in GVCs and, more specifically, firms with long-term contracts and firms belonging to international groups should be less affected by the crisis while we expect passive outsourcers to be hit more strongly*

Another channel through which firms' internationalization may have exacerbated the 2008 crisis is through the drop in trade finance. This channel became very strong because the magnitude of world trade (80% to 90%) relies on short-term trade finance (Auboin, 2009). In the second part of 2008, because of international and national money markets freeze after Lehman collapse, subsequent "credit crunch" and expected deleveraging, financial markets delivered much less liquidity than was needed. As documented in Auboin (2009), spreads on short-term money exploded to between 300 and 600 basis points above LIBOR, compared to 10 to 20 basis points in normal times. Aversion to lend money extended very quickly all around global financial markets. The "flight to quality" of lenders spurred negative consequences of "financial accelerator", increasing the cost of financing and decreasing its

accessibility (Bernanke et al., 1996). It undermined incentives and ability to invest, including working capital, intermediates and import input which become final products. If the trade credit channel is partly responsible for the great trade collapse, we should expect that internationalized firms with financial constraints were more severely hit by the crisis compared to internationalized firms not suffering from financial constraints. We, therefore, put forward the following testable hypothesis:

HP3 *The relationship between firms' internationalization and their response to the crisis depends on the degree of firms' financial constraints*

The strand of literature related to internationalization highlights the advantages of multinationality and an important role of specific intangible assets in this process (Kirca et al., 2013). These assets employed internationally allow for gaining more returns. The literature on global value chains has also pointed out that firms equipped with more technology through mechanisms like patents and licenses are likely to extract maximum rents from GVCs (Mudambi, 2008; Dedrick et al., 2010). In downturns, such firms may be able to better respond to a negative shock in demand. In particular, according to Lengnick-Hall et al. (2011), the resilience capability is determined by two groups of factors: the amount and variety of resources available within the firm, and the firm's ability to combine these different resources and develop new routines. Landini et al. (2015) argue that during economic downturns intangible assets can mitigate the risk of failure via the strengthening of the firm's resilience capacity. Companies endowed with intangible assets have a larger portfolio of diversified assets they can rely on (variety effects) as well as a better capacity of combining them (dynamic capabilities effect) to find strategic solutions (Landini et al., 2015). Moreover, benefits from participation in a GVC (in terms of value added creation) increase with investment in intangible assets in advanced economies (Jona et al., 2016).

In line with these arguments, we put forward our fourth hypothesis:

HP4 *Internationalized firms investing in intangible assets were more resilient to the 2008 crisis*

Finally, the financial crisis transformed into sovereign debt crises particularly in those countries with a higher level of public debt and/or a weaker economy. This resulted in rising spreads on sovereign bond yields and further tensions in the finance and banking market, mainly in the peripheral euro area countries. As a consequence, we expect an increasing role of financial constraints in affecting the behaviour of internationalized firms during the crisis. In the case of Italy, Landini et al. (2015) find that intangible assets significantly reduced the probability of firm exit during the initial phase of the crisis but that financial constraints became more relevant than intangibles in explaining firm exit at later stages of the crisis. We, therefore, test our fifth hypothesis:

HP5 *The role of financial constraints and intangible assets in mediating the impact of internationalization on firms' resilience to the crisis changed over time. Intangible assets were more important for immediate growth while financial constraints were more important for medium-term exit*

We test these hypotheses on firm level data from the EFIGE database for a sample of European countries (Germany, France, Italy and Spain)[4]. In particular, we estimate both the determinants of the change in firms' sales after the crisis and the probability of exit in the five years after the crisis.

In order to estimate the determinants of firms' growth, we start from Gibrat's law where the rate of growth of sales is related to the initial level of sales (in logs). To this basic specification, we add internationalization strategies (exports, active outsourcer, passive outsourcer, foreign direct investment, belonging to a foreign group), price competitiveness (competition based on low cost, cost of labour), technological competitiveness (competing on quality, human capital, innovation, labour productivity), variables capturing firms' strategy and organization (family firms, decentralized management, bonuses to managers based on performance),

[4] Despite huge heterogeneities between the analysed companies, the four analysed countries were characterized by a similar foreign and domestic value added in exports, which means general comparability in terms of internationalization. A foreign value added in exports accounted for about 24% in 2008 in all cases and almost 26% in Spain and 25% in France with similar results for Germany and Italy (24%) in 2011 (Crespo and Jansen, 2014).

variables capturing liquidity constraints (liquidity ratio and firms answering that financial constraints prevented their growth), investment in tangible and intangible assets and firms' age[5]. We, therefore, come up with the following estimated equation:

$$lnS_{it}-lnS_{it-1}=\alpha_1 lnS_{it-1}+ \alpha_2 I_{it-1}+ \alpha_3 Q_{it-1}+ \alpha_4 C_{it-1}+ \alpha_5 F_{it-1}+ \gamma \boldsymbol{X}_{it-1} + \alpha_{0jt} + \varepsilon_{it} \quad (1)$$

where lnS_{it} is the log of sales in 2009, I is a vector of variables capturing internationalization strategies, Q is the variable capturing competition based on quality, C is the variable capturing competition based on costs, F is the variable capturing financial constraints and X is a vector of other control variables. On the basis of our first hypothesis, we expect exporting firms to have experienced a larger drop is sales compared to non exporting firms ($\alpha2<0$ when the internationalization strategy is equal to exporting). Hypothesis two assumes that active exporters and firms producing abroad experienced a smaller drop in sales while passive exporters experienced a larger drop ($\alpha2>0$ when the internationalization strategy is equal to an active exporter or foreign direct investment and $\alpha2<0$ when internationalization strategy is equal to a passive exporter). In order to test for the third hypothesis, we interact firms' internationalization (being active abroad) with financial constraints. A confirmation of the hypothesis requires the interaction term to have a negative sign (internationalized firms with financial constraints experienced a larger drop in sales compared to other internationalized firms). Finally, in order to test for the fourth hypothesis, we interact internationalization (being active abroad) with intangible assets. A confirmation of the hypothesis requires the interaction term to have a positive sign.

We also estimate an equation for the probability of firms' exit. In order to measure firms' exit, we exploit information contained in the AIDA-BVD database, which allows us to detect firms that were active in 2007 and changed their status before 2015. Differently from the previous literature (see Agarwal and Audretsch, 2001; Cefis and Marsili, 2005) and following Landini et al. (2015), we can distinguish between exit due to the death of the firm and exit occurred through merger and

[5] For a precise definition of the variables see the Appendix.

acquisition. In the present paper, we focus only on the former, while the firms subject to merger and acquisition are taken out of the sample. Exit is just a dummy variable that takes value 1 if a firm exited the market before 2015, and zero otherwise. The use of this variable in the empirical analysis is meant to look at firms' medium- to long-term resilience. As we already stated (and as it will be shown in the descriptive statistics), the 2008 crisis resulted in a strong drop in sales in the year immediately after. The analysis of firms' growth between 2008 and 2009 looks at what factors increased/decreased the impact of the shock on firms' growth. However, the crisis continued also after 2008, leading to the sovereign debt crisis, especially in European peripheral countries. The study of the factors affecting firms exit over a longer time span (until 2015) allows assessing what factors affect firms' resilience to a prolonged downturn.

At the firm level, size and age have traditionally been considered key determinants of firms' survival (Evans, 1987; Hall, 1987; Audretsch, 1995). Several studies have examined the effects of innovation on the probability to survive, mostly finding that innovative firms enjoy a premium in terms of survival (Cefis and Marsili, 2005 and 2012; Hall, 1987; Buddelmeyer et al., 2010). With reference to the recent economic crisis, a small but growing literature has stressed the importance of factors directly associated with macroeconomic shocks such as financial constraints and firms' sensitivity to changes in aggregate demand and trade. In this respect, Cleassens et al. (2012) argue that the 2008–2009 crisis impacted on firm performance through a combination of two main channels: a financial one that affected firms' ability to access credit, and a real one that operated mainly through a contraction of internal demand and trade. Their estimates reveal that, in economic terms, the real channel was more important than the financial one, particularly in 2009.

Following the mentioned literature and adding variables on internationalization strategy, we estimate the following equation for the probability of exit:

$$\text{Prob (EXIT = 1)}_{i,,\, t,t+s} = \Phi(\beta_{0\text{jt}} + \beta_1 I_{it} + \beta_2 Q_{it} + \beta_3 C_{it} + \beta_4 F_{it} + \delta \mathbf{X}_{it} + \varepsilon_{it}) \quad (2)$$

where EXIT is equal to one if firm *i* exited the market between t=2007 and t+s=2015, and zero otherwise, and Φ denotes the normal cumulative distribution function.

We expect $\beta_1=0$ when the internationalization mode is "exporting" (hypothesis 1). Moreover, we expect the interaction term between financial constraints and internationalization to be negative (internationalized firms experiencing financial constraints had a higher probability to exit compared to other internationalized firms) (hypothesis 3). Finally, we expect the interaction term between intangible assets and internationalization to be positive if flexibility of assets is more important than financial constraints in affecting resilience (hypothesis 4). On the contrary, if the importance of financial constraints and tangibility of assets has increased over time (hypothesis 5), the interaction term can be null or negative. This last result is more likely to occur in peripheral European countries (Italy and Spain in our sample).

4. Data and descriptive statistics

The data source is the EFIGE Bruegel-Unicredit dataset. It is based on questionnaire data for representative samples of manufacturing firms (above 10 employees) across seven European countries (Altomonte and Aquilante, 2012). The survey was conducted in late 2009 and early 2010 and collected cross-section information for the year 2008, even though certain questions relate to the 2007–2009 period and/or the companies' decisions during the crisis. The sample covers five large (Germany, France, Italy, Spain and the UK) and two small countries (Austria and Hungary). Questionnaire data were combined with balance sheet data. Moreover, in order to measure firms' exit, we exploit information contained in the AIDA-BVD database, which allows us to detect firms that were active in 2007 and changed their status before 2015. In order to have a homogeneous sample, we focus on four countries: Germany, France, Italy and Spain.

Table 1 reports descriptive statistics for firms' growth during the crisis by country.

Table 1 Firms growth between 2008 and 2009 by country

Country	Median	Mean	Min	Max	90%	St. Dev	Nobs
France	-0.141	-0.166	-5.787	2.168	0.094	0.289	2390
Germany	-0.030	-0.095	-3.387	2.313	0.109	0.287	1188
Italy	-0.197	-0.250	-8.308	1.574	0.072	0.402	2677
Spain	-0.216	-0.249	-2.240	3.587	0.075	0.323	2185

Source: Elaborations based on EFIGE Bruegel-Unicredit dataset

Looking at both median and mean firms' growth rate, the impact of the crisis appears very severe in all countries. However, differences across countries are also striking: while German firms decline by less than 10% on average, in Italy and Spain the decrease in sales is more than twice as large (25%). The mean growth rate, due to the large variance across firms, may not be representative of the average behaviour. Looking at the median, the decline is somewhat smaller, but, again, differences across

countries are even larger[6]. Finally, it is worth pointing out that firms behaved differently during the crisis. In all countries, there was a minority of firms (the top 10%) experiencing high growth also during the downturn.

Interesting differences across countries emerge when looking at exit rates. Over the 2007–2015 period, 18% of French firms left the market. The percentage was 17% in Spain, 15% in Italy and 10% in Germany. It is worth noting that, although Germany appeared the most virtuous country also when looking at exit rates, Italy behaved much better in terms of exit rates than when considering firms' decline is sales. This evidence can suggest the presence of weaker selection mechanisms in Italy. Table 2 looks at firms' performance according to internationalization mode.

Table 2 Firms' growth and exit by internationalization strategy.

	Sales growth		Exit rate	
	No	Yes	No	Yes
Exporting	-0.197	-0.249	0.156	0.127
Active outsourcer	-0.207	-0.155	0.150	0.198
Passive outsourcer	-0.191	-0.225	0.155	0.146
Global exporter	-0.201	-0.214	0.159	0.132
FDI	-0.206	-0.166	0.153	0.126
Foreign Group	-0.206	-0.190	0.156	0.l02
Active abroad	-0.194	-0.207	0.157	0.150

Source: Elaborations based on EFIGE Bruegel-Unicredit dataset

Two interesting broad facts emerge from the table: i) the relationship between internationalization and firms' growth and exit varies substantially across internationalization modes; ii) the same internationalization mode can be differently associated with firms' growth and exit. Looking at sales growth, while exporters and passive outsourcers were more strongly hit by the crisis, the opposite happened for active outsourcers, firms with foreign direct investment and (partially) firms belonging to foreign groups. Looking at exit rates, on the other hand, exporters

[6] To some extent, distribution of firms in the sample among active and passive outsourcers could explain these differences. While France accounted for the highest share of active outsourcers in the sampled population of countries (5.2%), Spain represented the lowest share (2%), and Germany and Italy 4%. When it comes to the passive outsourcers, Italy accounted for the highest level (44%) and Spain for the lowest (27.3%), while France and Germany were similar, around 40%.

behaved better than non-exporters. This evidence seems to confirm *prima facie* that the impact of the crisis was particularly severe on the intensive margin (firms reduced their level of exports but did not stop exporting and did not exit the market). Firms with foreign direct investment and firms belonging to a foreign groups appear the most resilient (in terms of death rates) to the crisis. This might simply be the effect of a larger size of these firms and should be better investigated in the regression analysis. Finally, and most surprisingly, passive outsourcers behaved better than active outsourcer when judged on the basis of exit rates. This suggests that better performance of firms operating abroad through contracts and arm's length agreements compared to firms selling produced-to-order goods abroad might only have been the consequence of a higher degree of short-term rigidity of the former group compared to the latter. Higher exit rates among active outsourcers might also be the result of a global trade slowdown in the recent years due to lower investment (including FDI), slower GDP growth and murky protectionism (ECB, 2016). While Ferratino and Taglioni (2014) indicate that during the second crisis (2011–2013) the reaction of GVCs was more moderate than in 2008/09, the production organized within GVCs became also more sensitive to the global downturn.

The relationship between internationalization mode and performance during the crisis may hide the impact of other variables affecting simultaneously internationalization and growth/exit (such as firms' size and productivity). Therefore, to better investigate possible causal relationships, we have to turn to the regression analysis.

5. Econometric results

Tables 3 and 4 and Tables 5 and 6 report, respectively, the results for the rate of growth of sales and for the probability of exit.

Table 3 The determinants of sales growth over the crisis (2008–2009)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Sales in 2008 (log)	-0.0173***	-0.0194***	-0.0165***	-0.0203***	-0.0186***	-0.0190***
	(0.00490)	(0.00491)	(0.00489)	(0.00518)	(0.00491)	(0.00521)
Export	-0.0337**					-0.0306*
	(0.0145)					(0.0160)
Active outsourcer		0.0316*				0.0313*
		(0.0172)				(0.0173)
Passive outsourcer			-0.0416***			-0.0441***
			(0.0104)			(0.0103)
Foreign Direct Investment				0.0321		0.0322
				(0.0221)		(0.0221)
Global exporter					0.000236	0.0239*
					(0.0114)	(0.0129)
Foreign group	0.0193	0.0132	0.0167	0.0139	0.0134	0.0209
	(0.0170)	(0.0168)	(0.0168)	(0.0169)	(0.0168)	(0.0171)
Quality competition	0.0194**	0.0202**	0.0212**	0.0201**	0.0199**	0.0208**
	(0.00989)	(0.00989)	(0.00988)	(0.00990)	(0.00989)	(0.00987)
Innovation	0.0240**	0.0204**	0.0275**	0.0205**	0.0210**	0.0263**
	(0.0105)	(0.0104)	(0.0107)	(0.0104)	(0.0106)	(0.0108)
Human capital	0.0180*	0.0155	0.0193*	0.0161	0.0159	0.0190*
	(0.0101)	(0.0101)	(0.0102)	(0.0101)	(0.0103)	(0.0102)
Labour productivity (log)	0.0458**	0.0460**	0.0445**	0.0462**	0.0452**	0.0467**
	(0.0214)	(0.0212)	(0.0213)	(0.0214)	(0.0213)	(0.0215)
Cost competition	-0.0354***	-0.0352***	-0.0332***	-0.0351***	-0.0350***	-0.0331***
	(0.0107)	(0.0107)	(0.0106)	(0.0107)	(0.0107)	(0.0106)
Cost of labour (log)	-0.0637***	-0.0645***	-0.0628***	-0.0640***	-0.0644***	-0.0629***
	(0.0224)	(0.0223)	(0.0224)	(0.0224)	(0.0224)	(0.0224)
Family management	-0.0108	-0.0101	-0.0103	-0.0102	-0.0101	-0.00985
	(0.0117)	(0.0117)	(0.0116)	(0.0117)	(0.0117)	(0.0117)
Decentralized Management	0.0170	0.0171	0.0181	0.0165	0.0169	0.0175
	(0.0119)	(0.0118)	(0.0119)	(0.0119)	(0.0119)	(0.0120)
Bonus	0.0162	0.0148	0.0166	0.0149	0.0154	0.0150
	(0.0116)	(0.0115)	(0.0115)	(0.0115)	(0.0116)	(0.0116)
Financial constraints	-0.0190*	-0.0193*	-0.0172*	-0.0197*	-0.0188*	-0.0187*
	(0.0100)	(0.0100)	(0.0100)	(0.0100)	(0.0100)	(0.0100)
Liquidity ratio (log)	-0.0195**	-0.0185**	-0.0194**	-0.0186**	-0.0185**	-0.0203**
	(0.00933)	(0.00928)	(0.00930)	(0.00928)	(0.00929)	(0.00934)
Tangible assets (log)	-0.00762	-0.00632	-0.00786	-0.00654	-0.00695	-0.00641
	(0.00507)	(0.00516)	(0.00510)	(0.00509)	(0.00515)	(0.00515)
Intangible assets (log)	0.00812***	0.00801***	0.00811***	0.00797***	0.00808***	0.00776***

	(0.00250)	(0.00249)	(0.00250)	(0.00250)	(0.00249)	(0.00249)
Age (log)	0.0735	0.0758	0.0784	0.0754	0.0760	0.0770
	(0.0725)	(0.0717)	(0.0720)	(0.0717)	(0.0718)	(0.0725)
Age squared (log)	-0.0101	-0.0106	-0.0107	-0.0106	-0.0106	-0.0108
	(0.0109)	(0.0108)	(0.0108)	(0.0108)	(0.0108)	(0.0109)
Italy	-0.118***	-0.123***	-0.120***	-0.120***	-0.123***	-0.117***
	(0.0253)	(0.0248)	(0.0250)	(0.0243)	(0.0252)	(0.0251)
France	-0.0364	-0.0376	-0.0334	-0.0338	-0.0366	-0.0317
	(0.0233)	(0.0231)	(0.0234)	(0.0226)	(0.0232)	(0.0230)
Spain	-0.157***	-0.159***	-0.165***	-0.156***	-0.159***	-0.164***
	(0.0321)	(0.0320)	(0.0318)	(0.0316)	(0.0322)	(0.0318)
Constant	-0.0312	-0.0128	-0.0385	-0.00989	-0.0176	-0.0228
	(0.122)	(0.121)	(0.122)	(0.122)	(0.122)	(0.123)
Observations	4,553	4,560	4,560	4,560	4,560	4,553
R-squared	0.041	0.040	0.043	0.039	0.039	0.045

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Tables 3 and 5 look at the role of internationalization strategies, while Tables 4 and 6 look at the mediating role of financial constraints and intangible assets.

Looking at Table 3, columns 1 to 5 report results separately for each internationalization strategy: 1) exporting; 2) active outsourcer; 3) passive outsourcer; 4) foreign direct investment; 5) global exporter. Notice that these strategies are not mutually exclusive. Column 6 introduces all internationalization strategies simultaneously in the same equation.

The results support the hypothesis that exporting firms were more strongly hit by the crisis (hypothesis 1). In particular, also taking into account several characteristics (including their innovativeness and productivity), they experienced a decline in sales more than 3 percentage points higher than non-exporting firms. This means that, immediately after the 2008 downturn, the domestic market mitigated the impact of the crisis on the decline in firms' sales. Similar results are offered by Bruni et al. (2014) examining profitability performance of Italian manufacturing and services firms during the 2004–2012 period including the economic crisis. Their

observations indicate that companies more focused on the domestic market performed better than other firms[7].

However, not all forms of internationalization produced the same impact: firms producing abroad through contracts and arm's length agreements with local firms experienced a significantly smaller drop in sales compared to all other firms (their decline in sales was 3 percentage points smaller than the average one). The opposite occurred for firms selling produced-to-order goods abroad. This group of firms experienced larger losses (a decline in sales 4 percent higher than other firms). Overall, these results give support to our second hypothesis: firms' response to the crisis depends on their internationalization mode. Here, two observations are noteworthy: among exporting firms, global exporters were less strongly hit by the crisis. This suggests the benefits of export diversification. Internationalization of production (especially in the form of arm's length agreements with local firms, but partly also FDI) protected firms' sales just after the crisis.

It means that companies with one of the most sophisticated internationalization modes (being global exporters is more demanding) were, on average, less strongly hit by the crisis than exporting firms. Notice that the result applies also when controlling for innovation and productivity, indicating that it is not the consequence of self-selection of more productive and innovative companies being also able to operate on global high distance markets (Navaretti et al., 2012).

Looking at control variables, first we can observe that Gibrat's law does not hold: small firms grow more (decline less) than large firms after the crisis. What emerges clearly from regression results is the superiority of competition based on quality compared to cost competitiveness in mitigating the impact of the crisis on firms' growth. Quality competition, innovation, and labour productivity are positive and significant in all specifications. The significance of product quality should increase a company's resilience because it could mean more sophisticated products and reveal technological advantages, which is in line with positive influence of

[7] They also confirm that companies that were relatively young enjoyed relatively better current liquidity. Firms from high-tech and highly concentrated sectors enjoyed better performance during the slowdown.

innovations and labour productivity. A similar result on the superiority of adopting strategies to increase quality over strategies aimed at reducing costs was found in Evangelista et al. (2015) before the crisis. Human capital has also a positive impact on growth, although the effect is smaller and not robust in all specifications. It may be a result of the fact that, as indicated in the literature, human capital is a means of assets intangibility and contributes crucially to innovations (Lieponen, 2005). Accetturo and Giunta (2013) showed that, among intermediaries, companies which invested more in human capital and product innovation went through the crisis more smoothly. Békés et al. (2011) confirmed that companies which were able to protect white collars during the crisis performed better.

At the same time, firms competing on costs (declaring that the main competitive factor which will determine the success of the firm in the next years is lowering production costs) exhibit lower growth, although growth decreases for firms with higher labour costs. In the case of cost competition, it may be related to the fact that products are more homogenous and less sophisticated as well as offered by companies which compete with other suppliers based on prices. Agostino et al. (2014) postulate such an effect in the case of the *Captive* position within a GVC. It describes subcontractors delivering intermediate products, which were mostly affected by the crisis. Higher labour costs could decrease sales because they could reflect the inability to cut costs and prices and and rapidly adjust to the market. In the face of a crisis, this feature can be critical for all companies operating on homogenous and heterogeneous product markets. Macroeconomists call it "internal devaluation", which becomes a crucial part of adjustment during crises, especially in countries without possibility to devalue nominal exchange rate.

Factors linked to firms' management do not appear to matter, while the results on financial constraints are difficult to interpret. On the one hand, firms stating that financial constraints hampered their growth, as expected, exhibit significantly lower growth rates (almost 2 percentage points less than other firms) but firms with more liquid assets grow less. A possible explanation is that during an unprecedented trade and GDP collapse, companies with a more liquidity buffer have more incentive to "wait and see" how economic and market conditions will evolve and do not feel high

pressure to sell at any cost. A complementary argument is that this reflected the "flight to liquidity" phenomenon usually seen during turbulent and uncertain times accompanied by high assets volatility. More liquid assets could dampen the first phase of the crisis in terms of financial constraints. We will come back to this result when discussing the determinants of firms' exit. Finally, firms investing in intangible assets proved more resilient to the crisis. But did investment in intangible assets and financial constraints mediate the impact of firms' internationalization on growth?

Table 4 reports the results on the mediating impact of intangible assets and financial constraints. Internationalized firms include all firms active abroad through exports, imports or international production.

Table 4 The mediating impact of financial constraints and intangible assets on the relationship between internationalization and growth

VARIABLES	(1)	(2)	(3)	(4)
Sales in 2008 (log)	-0.0166***	-0.0166***	-0.0167***	-0.0168***
	(0.00474)	(0.00474)	(0.00473)	(0.00473)
Active abroad	-0.0161	-0.00901	0.0310	0.0399
	(0.0120)	(0.0152)	(0.0270)	(0.0290)
Intangible assets (log)	0.00804***	0.00805***	0.000309	0.000162
	(0.00249)	(0.00249)	(0.00450)	(0.00450)
Intangible assets * active abroad			0.00975*	0.00996**
			(0.00505)	(0.00506)
Financial constraints	-0.0193*	-0.00492	-0.0198**	-0.00384
	(0.0100)	(0.0195)	(0.0100)	(0.0195)
Financial constraints * active abroad		-0.0178		-0.0197
		(0.0221)		(0.0221)
Quality competition	0.0202**	0.0201**	0.0204**	0.0203**
	(0.00989)	(0.00990)	(0.00989)	(0.00990)
Innovation	0.0230**	0.0230**	0.0228**	0.0228**
	(0.0107)	(0.0107)	(0.0107)	(0.0107)
Human capital	0.0173*	0.0174*	0.0168	0.0170*
	(0.0102)	(0.0102)	(0.0102)	(0.0102)
Labour productivity (log)	0.0439**	0.0434**	0.0444**	0.0439**
	(0.0213)	(0.0213)	(0.0213)	(0.0213)
Cost competition	-0.0350***	-0.0350***	-0.0350***	-0.0350***
	(0.0107)	(0.0107)	(0.0107)	(0.0107)
Cost of labour (log)	-0.0634***	-0.0629***	-0.0637***	-0.0632***
	(0.0223)	(0.0222)	(0.0223)	(0.0222)
Family management	-0.00998	-0.0100	-0.00994	-0.0100
	(0.0117)	(0.0117)	(0.0117)	(0.0117)
Decentralized Management	0.0177	0.0176	0.0177	0.0176

	(0.0118)	(0.0118)	(0.0118)	(0.0118)
Bonus	0.0160	0.0161	0.0164	0.0165
	(0.0115)	(0.0115)	(0.0114)	(0.0115)
Liquidity ratio (log)	-0.0190**	-0.0190**	-0.0194**	-0.0193**
	(0.00930)	(0.00930)	(0.00929)	(0.00928)
Tangible assets (log)	-0.00736	-0.00739	-0.00722	-0.00725
	(0.00511)	(0.00511)	(0.00510)	(0.00510)
Age (log)	0.0766	0.0766	0.0753	0.0751
	(0.0718)	(0.0718)	(0.0718)	(0.0717)
Age squared (log)	-0.0106	-0.0106	-0.0104	-0.0104
	(0.0108)	(0.0108)	(0.0108)	(0.0108)
Italy	-0.122***	-0.121***	-0.121***	-0.121***
	(0.0247)	(0.0247)	(0.0246)	(0.0246)
France	-0.0346	-0.0347	-0.0333	-0.0334
	(0.0228)	(0.0228)	(0.0228)	(0.0228)
Spain	-0.158***	-0.158***	-0.158***	-0.158***
	(0.0319)	(0.0319)	(0.0318)	(0.0318)
Constant	-0.0258	-0.0308	-0.0609	-0.0672
	(0.122)	(0.123)	(0.124)	(0.125)
Observations	4,560	4,560	4,560	4,560
R-squared	0.039	0.039	0.040	0.040

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

We can observe that firms active abroad did not experience a performance significantly different from that of other firms. This is the result of different internationalization strategies having opposite effects on firms' resilience to the crisis (as we saw above). More interestingly, while financially constrained firms experienced a larger drop in sales on average, there is no significant difference in the impact of financial constraints between internationalized and non-internationalized firms. This might suggest that, immediately after the crisis (its first phase), the lack of trade credit was not a major determinant of the great trade collapse.

Moreover, the results show a strong role of intangible assets in containing the decline in sales of internationalized firms. In fact, we find a positive and robust impact of the mediating effect of intangible assets on the relationship between firms' internationalization and the change in firms' sales: the higher firms' investment in intangible assets, the smaller the drop in firms' sales for firms active abroad. Overall, these results confirm our fourth but not our third hypothesis.

Focusing on firms' exit over a longer time span (between 2007 and 2014) allows looking at the long-run impact of the crisis, including not only the initial drop in firms' sales but also the impact of the following sovereign debt crisis.

Table 5 looks at the impact of internationalization modes while Table 6 looks at the mediating impact of financial constraints and intangible assets.

Table 5 The determinants of firms' probability of exit (marginal effects)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Export	-0.00113					0.0147
	(0.0132)					(0.0154)
Active outsourcer		0.0300				0.0411*
		(0.0226)				(0.0239)
Passive outsourcer			-0.0165*			-0.0138
			(0.00975)			(0.0105)
Foreign Direct Investment				-0.0425**		-0.0441**
				(0.0190)		(0.0189)
Global exporter					-0.0202*	-0.0207*
					(0.0105)	(0.0119)
Foreign group	-0.0534***	-0.0544***	-0.0540***	-0.0546***	-0.0533***	-0.0527***
	(0.0158)	(0.0156)	(0.0156)	(0.0156)	(0.0157)	(0.0159)
Quality competition	-0.0238**	-0.0235**	-0.0232**	-0.0238**	-0.0237**	-0.0233**
	(0.00998)	(0.00995)	(0.00995)	(0.00995)	(0.00995)	(0.00995)
Innovation	-0.0170*	-0.0180*	-0.0149	-0.0166	-0.0145	-0.0131
	(0.0103)	(0.0103)	(0.0103)	(0.0102)	(0.0103)	(0.0103)
Human capital	-0.0126	-0.0134	-0.0118	-0.0130	-0.0113	-0.0116
	(0.0101)	(0.0101)	(0.0101)	(0.0101)	(0.0101)	(0.0102)
Labour productivity (log)	-0.111***	-0.109***	-0.109***	-0.109***	-0.109***	-0.110***
	(0.0138)	(0.0138)	(0.0138)	(0.0137)	(0.0138)	(0.0138)
Cost competition	0.0153	0.0152	0.0159	0.0156	0.0150	0.0149
	(0.0102)	(0.0102)	(0.0102)	(0.0102)	(0.0102)	(0.0102)
Cost of labour (log)	0.0627***	0.0620***	0.0619***	0.0599***	0.0621***	0.0616***
	(0.0142)	(0.0142)	(0.0142)	(0.0142)	(0.0142)	(0.0142)
Family management	-0.0309***	-0.0311***	-0.0310***	-0.0310***	-0.0315***	-0.0309***
	(0.0105)	(0.0105)	(0.0105)	(0.0105)	(0.0105)	(0.0105)
Decentralized Management	0.0187	0.0192	0.0195	0.0194	0.0196	0.0210*
	(0.0123)	(0.0123)	(0.0123)	(0.0123)	(0.0123)	(0.0124)
Bonus	-0.0271**	-0.0273**	-0.0261**	-0.0262**	-0.0259**	-0.0253**
	(0.0108)	(0.0108)	(0.0108)	(0.0108)	(0.0108)	(0.0108)
Financial constraints	0.0669***	0.0661***	0.0679***	0.0679***	0.0671***	0.0688***
	(0.0105)	(0.0105)	(0.0105)	(0.0105)	(0.0105)	(0.0106)
Liquidity ratio (log)	-0.0965***	-0.0961***	-0.0967***	-0.0961***	-0.0964***	-0.0961***
	(0.00822)	(0.00819)	(0.00820)	(0.00819)	(0.00819)	(0.00820)

Tangible assets (log)	-0.0256***	-0.0249***	-0.0259***	-0.0260***	-0.0265***	-0.0264***
	(0.00459)	(0.00458)	(0.00456)	(0.00457)	(0.00459)	(0.00461)
Intangible assets (log)	0.00536**	0.00525**	0.00535**	0.00537**	0.00546**	0.00541**
	(0.00251)	(0.00250)	(0.00250)	(0.00250)	(0.00250)	(0.00250)
Age (log)	-0.0546*	-0.0521*	-0.0510*	-0.0509*	-0.0534*	-0.0538*
	(0.0282)	(0.0282)	(0.0281)	(0.0281)	(0.0281)	(0.0282)
Age squared (log)	0.00668	0.00624	0.00616	0.00613	0.00664	0.00696
	(0.00461)	(0.00459)	(0.00459)	(0.00459)	(0.00459)	(0.00460)
Sales in 2008 (log)	-0.0108**	-0.0114**	-0.00957**	-0.00860*	-0.00937*	-0.00802
	(0.00483)	(0.00481)	(0.00481)	(0.00490)	(0.00483)	(0.00497)
Italy	0.0247	0.0240	0.0267	0.0204	0.0274	0.0235
	(0.0233)	(0.0232)	(0.0233)	(0.0233)	(0.0233)	(0.0234)
France	0.0248	0.0234	0.0263	0.0207	0.0243	0.0226
	(0.0240)	(0.0239)	(0.0241)	(0.0239)	(0.0240)	(0.0240)
Spain	0.0505	0.0504	0.0489	0.0449	0.0536	0.0465
	(0.0373)	(0.0372)	(0.0370)	(0.0366)	(0.0377)	(0.0369)
Observations	4,970	4,979	4,979	4,979	4,979	4,970

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

We can notice that, differently from the decline in sales growth, the probability of exit is not higher for exporting firms: the great trade collapse mainly affected the amount of sales in the foreign market (intensive margin) but did not drive exporting firms out of the market more than domestic firms (the results confirm hypothesis one). Better performance of exporters in terms of (no) exit might be also a result of profits related to diversification of sales between national and foreign markets (Wagner and Gelübcke, 2012). While we investigate four largest euro area countries severely affected by the crisis, the possibility to sell outside the local market could be decisive for companies to be alive. Overall, some of the results on the impact of internationalization mode on the probability of exit differ from the results on the decline in exports: firms with foreign direct investment, global exporters and firms belonging to foreign groups have a lower probability of exiting the market[8]. These results show that firms with more sophisticated internationalization strategies are more resilient to economic crises. Foreign ownership and membership of a group are usually seen in the literature as factors increasing firms' resilience (Álvarez and Görg,

[8] Bricongne et al. (2010), based on French companies sample, documented that exit rates were slightly higher in the case of less diversified exporters.

2009; Wagner and Gelübcke, 2012) with some conditions and exceptions[9]. The main justification is that foreign companies are bigger, more productive and, what is crucial during crises, able to more smoothly switch between markets where they are present by relocating resources. Moreover, they have easier access to international financing.

Less clear are the results on active and passive outsourcers, which, in some specifications, show a weak positive (the former) and negative (the latter) effect on the probability to exit. These results go in the opposite direction when contrasted with those on firms' growth. This might suggest that a smaller decline in sales of active outsourcers and a larger decline in sales of passive outsourcers might be due to a higher degree of rigidity of the first group of firms (having contracts with foreign local firms) compared to the second group (selling produced-to-order goods) and not to a more efficient mode of internationalization.

Also in the case of firms' exit, competing on quality proved a successful strategy for firms' resilience. The exit probability was significantly lower for firms competing on quality (about 2% lower), for innovative firms (about 2% lower), while a 1% higher level of labour productivity resulted in a 10% lower probability of exit. At the same time, a 1% higher cost of labour resulted in a 5% higher probability of exit. It may reflect some advantages of assets intangibility despite its general negative influence on firms exit (further below). Differently from the case of firms' growth, variables linked to management significantly impacted on firms' resilience. In particular, family managed firms and firms rewarding managers with bonuses had a lower probability of exit. Family companies, due to their specific features, are able to deal better with some problems (e.g. the principal-agent) because they are more long-term oriented and committed to their goals and accumulate tacit knowledge (Sirmon and Hitt, 2003). According to the resource-based view, family firms may overcome shortage problems of knowledge and financial capital (see more Wąsowska, 2017).

[9] While foreign presence and integration within a GVC may play an important role in increasing firms' resilience, some research based on Italian companies does not fully confirm this pattern. Surprisingly at the same time, companies with the multinational status experienced lower performance. Ferraginaa (2012), based on Italian companies research in the period 2004–2008 (so before the crisis), confirmed that foreign multinationals are more likely to exit the market than national firms in the manufacturing and services sectors. The presence of foreign firms has a positive impact on firms' survival mainly in the services sector.

However, the main difference between estimates of firms' growth and those of firms' exit is the role of financial constraints. In fact, firms indicating that financial constraints prevented growth had a higher probability of exit (7% more) and a 1% point more of liquid assets reduced firms' probability of exit by about 8.5%. Moreover, firms belonging to foreign groups (having access to intra-group finance) had a lower probability to exit. The considerable importance of financial constraints for firms' exit may also explain the positive role of tangible assets and the negative role of intangible assets for firms' resilience. All these results suggest that financial constraints became gradually more important over the crisis.

When looking at the mediating impact of financial constraints and intangible assets on the impact of internationalization on firms' exit (Table 6), we find that both factors increase this probability.

Table 6 The mediating impact of intangible assets and financial constraints on the relationship between internationalization and exit (marginal effects)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Active abroad	-0.0133	-0.0366**	0.0361	0.0158	0.0272	-0.00266
	(0.0128)	(0.0181)	(0.0245)	(0.0287)	(0.0375)	(0.0448)
Intangible assets (log)	0.00558**	0.00556**	-0.00286	-0.00251	-0.000182	-0.00424
	(0.00251)	(0.00251)	(0.00482)	(0.00479)	(0.00641)	(0.00730)
Intangible assets * active abroad			0.0112**	0.0107**	0.0166**	0.00210
			(0.00549)	(0.00547)	(0.00738)	(0.00827)
Financial constraints	0.0695***	0.0305	0.0691***	0.0317	0.0252	0.0338
	(0.0105)	(0.0215)	(0.0105)	(0.0215)	(0.0293)	(0.0318)
Financial constraints * active abroad		0.0482*		0.0462*	0.0628*	0.0259
		(0.0253)		(0.0251)	(0.0363)	(0.0360)
Quality competition	-0.0239**	-0.0236**	-0.0237**	-0.0235**	-0.0192	-0.0268*
	(0.0100)	(0.00999)	(0.00999)	(0.00997)	(0.0129)	(0.0154)
Innovation	-0.0160	-0.0157	-0.0159	-0.0157	-0.0333**	-0.00238
	(0.0104)	(0.0104)	(0.0104)	(0.0104)	(0.0150)	(0.0146)
Human capital	-0.0125	-0.0130	-0.0128	-0.0132	-0.00831	-0.0195
	(0.0102)	(0.0101)	(0.0101)	(0.0101)	(0.0137)	(0.0148)
Labour productivity (log)	-0.106***	-0.105***	-0.106***	-0.104***	-0.0913***	-0.144***
	(0.0137)	(0.0137)	(0.0137)	(0.0137)	(0.0192)	(0.0215)
Cost competition	0.0143	0.0139	0.0140	0.0137	0.0146	0.0131
	(0.0103)	(0.0103)	(0.0103)	(0.0103)	(0.0133)	(0.0159)
Cost of labour (log)	0.0585***	0.0576***	0.0579***	0.0571***	0.0242	0.115***
	(0.0142)	(0.0142)	(0.0142)	(0.0141)	(0.0178)	(0.0244)
Family management	-0.0311***	-0.0311***	-0.0310***	-0.0310***	-0.0258*	-0.0379**

	(0.0106)	(0.0105)	(0.0105)	(0.0105)	(0.0132)	(0.0174)
Decentralized Management	0.0168	0.0175	0.0165	0.0172	0.0201	0.0123
	(0.0122)	(0.0122)	(0.0122)	(0.0122)	(0.0181)	(0.0165)
Bonus	-0.0297***	-0.0298***	-0.0291***	-0.0291***	-0.0401***	-0.0229
	(0.0107)	(0.0107)	(0.0107)	(0.0107)	(0.0154)	(0.0146)
Liquidity ratio (log)	-0.0964***	-0.0965***	-0.0963***	-0.0965***	-0.105***	-0.0866***
	(0.00822)	(0.00821)	(0.00821)	(0.00819)	(0.0118)	(0.0113)
Tangible assets (log)	-0.0259***	-0.0259***	-0.0257***	-0.0257***	-0.0221***	-0.0305***
	(0.00459)	(0.00458)	(0.00458)	(0.00457)	(0.00607)	(0.00694)
Age (log)	-0.0496*	-0.0496*	-0.0513*	-0.0512*	-0.0453	-0.0530
	(0.0283)	(0.0282)	(0.0283)	(0.0282)	(0.0467)	(0.0362)
Age squared (log)	0.00597	0.00596	0.00622	0.00620	0.00579	0.00617
	(0.00461)	(0.00460)	(0.00461)	(0.00460)	(0.00788)	(0.00577)
Sales 2008 (log)	-0.0133***	-0.0133***	-0.0134***	-0.0133***	-0.00553	-0.0207***
	(0.00473)	(0.00473)	(0.00472)	(0.00472)	(0.00721)	(0.00649)
Italy	0.0230	0.0229	0.0236	0.0235		
	(0.0232)	(0.0232)	(0.0232)	(0.0232)		
France	0.0185	0.0189	0.0202	0.0205		0.0192
	(0.0237)	(0.0237)	(0.0237)	(0.0237)		(0.0239)
Spain	0.0484	0.0497	0.0486	0.0498	0.0275	
	(0.0370)	(0.0371)	(0.0370)	(0.0371)	(0.0248)	
Observations	4,979	4,979	4,979	4,979	2,633	2,346

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

While the result on financial constraints was expected (hypothesis 3), the result on intangible assets is unexpected (hypothesis 4). A possible explanation is the increasing importance of financial constraints as the crisis lasts in time (Landini et al., 2015). With simultaneous pressure on financial markets, negative selection, credit rationing and deleveraging, usefulness of intangible assets decreased accompanied by increased role of tangibility, which became more important. If this is the case, we should find the negative role of intangible assets especially in countries that were more severely hit by financial problems. Columns 5 and 6 of Table 6 report the estimates of the probability of exit separately for Spain and Italy and for Germany and France. The results show that the positive impact of intangible assets and financial constraints on the probability of exit for internationalized firms apply only to the former two countries. This result confirms our fifth hypothesis for Spain and Italy, where the financial crisis transformed into a foreign debt crisis.

6. Conclusions and policy implications

This paper has investigated the impact of the 2008 crisis on firms' growth and exit. Immediately after the crisis, global trade decreased sharply and more severely than domestic demand. According to some authors, Global Value Chains were responsible for the international transmission of the so-called "great trade collapse" and were even more affected than global trade during the crisis.

The evidence emerging from this empirical study based on the EFIGE survey and balance sheet data of companies involved in GVCs points to a more articulated explanation. In fact, while sales in the year after the crisis declined more for exporters than for non-exporters, not all modes of internationalization displayed the same effects. In particular, firms with diversified export markets (global exporters) and close to the decision-making processes (active outsourcer) experienced a less pronounced decline in sales compared to other firms. Moreover, when looking at the impact of the crisis in terms of firms' death probability, there is no evidence of a higher probability to exit the market for exporters while firms with foreign direct investment and firms belonging to a foreign group show a higher survival probability. These results reveal, overall, that internationalization was not a factor of weakness for European firms but rather it increased their resilience to the crisis. Despite the fact that during the first crisis exporters were affected more, the most sophisticated forms of internationalization secured companies in the short and medium term.

The second issue investigated in this paper is the role of intangible/tangible assets and liquidity constraints in mitigating/amplifying the impact of the crisis on internationalized firms.

First, it has been argued that, when coping with economic downturns, firms endowed with intangible assets have a larger portfolio of assets and possibilities (variety effects) as well as a better capacity of combining them (dynamic capabilities effect) to make strategic and operational responses. Moreover, benefits from participation in a GVC (in terms of value added creation) increase with investment in intangible assets in advanced economies (Jona et al., 2016). For these reasons, we tested whether internationalized firms investing in intangible assets were more resilient to the downturn. We found that intangible assets were very important for

preventing a drop in sales for internationalized firms immediately after 2008; however, they amplified the probability of firms' exit five years after the crisis in weaker European countries (Spain and Italy).

Second, the lack of trade credit and/or its higher cost after the crisis might have exacerbated the impact of the crisis on internationalized firms. We, therefore, tested whether financial constraints acted to mediate the impact of internationalization on firms' resilience. We found that, while financial constraints did not amplify the impact of the crisis on internationalized firms' growth between 2008 and 2009, they increased the probability of exit five years after. These results support the view that financial constraints became more severe in the second phase of the crisis, especially in countries with higher levels of private and public debt and/or a weaker banking sector. In such conditions, flexibility and adaptability potential of intangibility could expire over time. With simultaneous pressure on financial markets, negative selection, credit rationing and deleveraging, usefulness of intangible assets decreased, accompanied by an increased role of tangibility, which became more important.

Although it is difficult to draw policy conclusions from a single empirical analysis, the first message that emerges from the results of this contribution is the positive role of internationalization also in facing economic downturns. Although exporting firms were more strongly hit immediately after the crisis, they did not exhibit a higher probability to exit the market. Moreover, more sophisticated forms of internationalization (in particular foreign production) increased firms' resilience. This suggests that protectionist policies, even though they may act to protect countries from the transmission of shocks in the short run, are not an effective tool for firms' growth and survival in the long run. A trade regime with murky protectionism might systematically decrease cross-border trade and curb incentives to competition, innovation and efficiency. Internationalization of companies is closely interrelated with all of them and together they should be an engine for growth.

The second recommendation which we can put forward for managers and policy makers is that relying on the simplest internationalization modes (exporting, passive outsourcer) without building own, difficult-to-imitate advantages makes companies more vulnerable to external shocks. Investing in human capital, quality of selling

goods and services and innovations gives more ability to cope with short- and medium-term turbulences. It also seems justified to pay more attention to adaptation capabilities of family companies which have unique features such as long-term orientation and may overcome some financial and resource constraints.

An important message is that firms in advanced European countries do not benefit from strategies and/or policies aimed at making them more competitive on the basis of costs since their main factor of competitiveness and resilience lies in their capability of improving the quality of their products, innovating and increasing labour productivity. At the policy level, this means that all horizontal policies devoted to increasing firms' incentives to innovate and to invest in new technologies, if successful, are the best reaction to negative shocks in demand. It is, therefore, important that these policies are implemented especially in periods of downturns. Finally, the specific features of the 2008 crisis and its further developments and their consequences for firms' growth and survival should be fully understood to devise appropriate mechanisms to prevent good quality firms exiting the market. The fact that internationalized firms investing in intangible assets in Spain and Italy were more likely to exit the market between 2007 and 2015 suggests that financial constrains became particularly harmful as the crisis prolonged over time. This might prevent firms from investing in assets that are strategic in the long run but are difficult to use as collateral. It is, therefore, important for governments to devise appropriate policies for mitigating financial constraints, especially for firms that cannot use tangible fixed assets as collateral, in order to prevent a decrease in investments that are potentially able to sustain firms' (and countries') growth in the long run. Diversification of financial sources and financing forms as well as closer relations with well capitalized banks could partly help to overcome these problems.

Annex

Table A1: Variable descriptions and summary statistics

Variable	Definition When not differently specified variables refer to 2008	Source	Mean	St.Dev.	Min.	Max.
Growth	Log difference of sales in thousands euros between 2008 and 2009	Amadeus-Bureau van Dick	-0.2019	0.3614	-8.3084	6.6971
Exit	Dummy variable for firms active in 2007 and Active (default of payment), Active (insolvency proc.), Bankruptcy, Dissolved or in Liquidation in 2015	Orbis-Bureau van Dick	0.1519	0.3590	0	1
Export	Dummy for exporter- wide definition: firm is direct exporter in 2008 or has been actively exporting in years before 2008	EFIGE Cross-Country Report (Altomonte et al., 2012)	0.6673	0.4711	0	1
Active outsourcer	Dummy for the firm that has production activity contracts and agreements abroad	EFIGE Cross-Country Report (Altomonte et al., 2012)	0.0400	0.1959	0	1
Passive outsourcer	Dummy for the firm that has sold some produced to-order goods to foreign clients	EFIGE Cross-Country Report (Altomonte et al., 2012)	0.3929	0.4884	0	1
Foreign Direct Investment	Dummy for firm running at least part of its production activity in another country via direct investments.	EFIGE Cross-Country Report (Altomonte et al., 2012)	0.0487	0.2153	0	1
Global exporter	Dummy for firm exporting to China or India or Other Asian countries or USA or Canada or Central or South America	EFIGE Cross-Country Report (Altomonte et al., 2012)	0.2721	0.4451	0	1
Active abroad	At least one of the above variables takes value 1 or the firm is importer	EFIGE Cross-Country Report (Altomonte et al., 2012)	0.7695	0.4212	0	1
Foreign group	Dummy for Foreign group: firm belongs to a foreign group	EFIGE Cross-Country Report (Altomonte et al., 2012)	0.0881	0.2835	0	1
Quality competition	Dummy for firms indicating that the main competitive factors which will determine the success of the firm in the next years is improving product quality	EFIGE Survey	0.4918	0.4999	0	1
Innovation	Dummy for innovation: the firm on average in the last three years (2007–2009) carried out product or process innovation	EFIGE Survey	0.6491	0.4773	0	1
Human capital	Dummy for Human capital: firm has a higher share of graduate employees compared to the national average share of graduates	EFIGE Cross-Country Report (Altomonte et al., 2012)	0.2771	0.4476	0	1
Labour productivity (log)	Value added per employee	Amadeus-Bureau van Dick	3.7562	0.6274	-2.5770	6.3552
Cost competition	Dummy for firms indicating that the main competitive factors which will determine the success of the firm in the next years is lowering production costs	EFIGE Survey	0.5156	0.4998	0	1
Cost of labour (log)	Costs of employees thousands euro/employees	Amadeus-Bureau van Dick	3.4138	0.6283	-6.7060	7.6964

Family management	Dummy for family managed: firm share of managers related to the controlling family is higher than the national average	EFIGE Cross-Country Report (Altomonte et al., 2012)	0.2483	0.4321	0	1
Decentralized Management	Dummy for decentralized management: managers can take autonomous decisions in some business areas	EFIGE Cross-Country Report (Altomonte et al., 2012)	0.2807	0.4494	0	1
Bonus	Dummy for bonus: the managers are rewarded also with bonus	EFIGE Cross-Country Report (Altomonte et al., 2012)	0.3666	0.4819	0	1
Financial constraints	Dummy for firms indicating financial constraints as factors preventing growth	EFIGE Survey	0.3410	0.4741	0	1
Liquidity ratio (log)	Liquidity ratio	Amadeus-Bureau van Dick	0.0512	0.8379	-4.6052	4.5565
Tangible assets (log)	Tangible fixed assets/total assets	Amadeus-Bureau van Dick	-1.7799	1.1633	-14.6663	0.0000
Intangible assets (log)	Intangible fixed assets/total assets	Amadeus-Bureau van Dick	-5.2584	2.4130	-15.6474	-0.1361
Age (log)	Age of the firm	EFIGE Survey	3.1995	0.8675	0	5.9081
Sales (log)	Sales in thousands euros	Amadeus-Bureau van Dick	8.3495	1.3570	-1.3903	15.9621

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