# EFIGE final report to the European Commission

## *From Genesis to Revelation: How firm-level data can change the way we think about economic policy*

Carlo Altomonte and Gianmarco Ottaviano

European Firms In a Global Economy

EFIGE

EFIGE IS A PROJECT DESIGNED TO HELP IDENTIFY THE INTERNAL POLICIES NEEDED TO IMPROVE EUROPE'S EXTERNAL COMPETITIVENESS

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The EFIGE project is coordinated by Bruegel and involves the following partner organisations: Universidad Carlos III de Madrid, Centre for Economic Policy Research (CEPR), Institute of Economics Hungarian Academy of Sciences (IEHAS), Institut für Angewandte Wirtschafts-forschung (IAW), Centro Studi Luca D'Agliano (Ld'A), Unitcredit Group, Centre d'Etudes Prospectives et d'Informations Internationales (CEPII).

The EFIGE partners also work together with the following associate partners: Banque de France, Banco de España, Banca d'Italia, Deutsche Bundesbank, National Bank of Belgium, OECD Economics Department.

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SEVENTH FRAMEWORK PROGRAMME
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# EFIGE
# European Firms In a Global Economy: Internal policies for external competitiveness

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# Deliverable 14. Final Report to the European Commission

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# European Firms in the Global Economy: Internal policies for external competitiveness

## EFIGE FINAL REPORT

*By Carlo Altomonte (Bocconi University and Bruegel) and Gianmarco Ottaviano (LSE, Bocconi University and Bruegel)*

**The EFIGE Project (www.efige.org)**

The EFIGE project (European Firms in a Global Economy) is aimed at exploring the patterns of internationalization of European firms. The EFIGE project is supported by the Directorate General Research of the European Union, through the Seventh Framework program (FP7). It is led by Bruegel, in collaboration with seven other European research institutions. A number of Central Banks and International Organizations acted as Associate Partners to the Consortium.

For the first time, a highly detailed firm-level survey has been carried out to collect both quantitative and qualitative data on European firms on a harmonized basis. Until this survey, researchers had to rely on data collected through country-specific methodologies, resulting in a very narrow room for cross-country studies at the EU level. The interviews were conducted by the German company GfK Eurisko in 2009-2010.

A sample of manufacturing firms over 10 employees located in seven EU member countries – Austria, France, Germany, Hungary, Italy, Spain and the United Kingdom – was asked to answer more than 150 questions. The final sample gathers 14,759 firms that returned valid questionnaires. The exact numbers of firms are 2973 firms for Germany, 2973 firms for France, 3021 firms for Italy, 2832 firms for Spain, 2142 firms for the UK, 482 firms for Austria and 488 firms for Hungary. Firm-specific weights were attached to each firm in order to compensate for the over or underrepresentation of certain categories. Using the weights thus allows researchers to obtain results that are representative for the country as a whole.

The firm-level data collected from the survey were then matched with data taken from firms' balance sheets (Amadeus dataset). The resulting dataset can be broken down into six major topics: general information (part A), workforce (part B), investment, information technologies and R&D (part C), internationalization (part D), market and pricing (part E) and finance (part F).

The EFIGE partners and associate partners are:

| Partners | Acronyms | Country |
|---|---|---|
| Bruegel (coordinator) | Bruegel | Belgium |
| Universidad Carlos III de Madrid | Carlos III | Spain |
| Centre for Economic Policy Researcher | CEPR | UK |
| The Institute of Economics of Hungarian Academy of Sciences | IEHAS | Hungary |
| Institute for Applied Economic Research | IAW | Germany |
| Centro Studi Luca d'Agliano | Ld'A | Italy |
| UniCredit | UniCredit | Italy |
| Centre d'Etudes Prospectives et d'Informations Internationales | CEPII | France |
| **Associate Partners** | | |
| Bank of Belgium | | Belgium |
| Bank of France | | France |
| Federal Bank of Germany | | Germany |
| Bank of Italy | | Italy |
| Bank of Spain | | Spain |
| OECD | | International |

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## Executive Summary

The chances of European countries to grow prosper and provide well being to their citizens rest on the ability of their firms to become successful traders and producers in foreign markets within and outside the EU. This project examines the pattern of internationalisation of European firms. With a clear focus on defining adequate and effective policy measures, it looks at the broad factors constraining or enhancing companies' foreign operations, like growth in size and productivity; type of ownership and corporate governance; access to financial markets; innovation; the macroeconomic environment. It does so by combining theoretical and empirical research at the frontier of the academic and policy debate with the gathering of new data through a cross country survey. The main questions addressed by the project are: What are the features of European firms that successfully compete in international markets? To what extent do they contribute to productivity and employment? Does access to foreign market enhance firm performance through a learning process? Why are some countries more successful in international trade and FDI? What are the policies that can improve a nation's foreign trade performance? Does integration within the Single Market foster productivity improvements? Has the euro led to a wider participation of firms in cross-border business? What policies can promote the participation of other European firms that are currently excluded from international markets? What are the gains and the adjustments involved in reducing barriers to trade and foreign direct investment (FDI)? What policies can best maximise gains and smooth adjustments?

Based on an original collection of new harmonised firm-level data across seven European countries (Austria, France, Germany, Hungary, Italy, Spain, UK) the projects highlights three broad sets of empirical findings. First, because of the existence of very heterogeneous firms within every industry and country (with a good deal of firms with below average performances operating together with some exceptionally outstanding firms), several European countries have been able to withstand global competition even in traditional labour-intensive industries where the EU, on average, seems to have no comparative advantage vis-à-vis labour-abundant emerging economies. Second, the characteristics of these firms that successfully operate in the international market are remarkably similar across industries and countries. Third, global competition is increasingly taking place through the international fragmentation of production. All these

findings point to the fact that the traditional association between industries and comparative advantages is becoming increasingly blurred.

Some of these facts had indeed been previously assessed in the economic literature, but only for a limited number of countries due to the lack of comparable cross-country data. The newly collected harmonised dataset of the project, and the associated output in terms of working paper and reports, have instead established solid evidence on these findings, on which it is possible to build innovative fact-based policy intervention. In particular, in terms of policy, the overarching finding that firms, rather than sectors, are the key drivers of competitiveness requires a change of perspective. In all sectors a relatively small number of companies ('the happy few') account for a very large share of exports and foreign production. This is a very restricted elite of high-performance fast-growing firms that compete successfully in the global arena.

Strengthening the competitiveness of the European economy thus involves widening the 'happy few club', focusing on the factors that may encourage or discourage firms' entry into the international market as sellers and producers, rather than on the reallocation of economic resources towards 'competitive' industries. This impinges on a wide set of policy dimensions, not just those strictly related to the international dimension of the economy. Most of them actually involve domestic policy measures that affect the working of internal product, labour and financial markets. Such policies directly or indirectly affect several facets of the costs and benefits of internationalisation by fostering firms' entry into foreign markets. The reports of the project detail the actual policies that should be implemented.

# 1. Introduction

Nations do not trade, nor do sectors. It is firms that trade. This simple truth makes it clear that understanding the firm-level facts is essential to good policy-making in Europe. What are the features of European firms that successfully compete in international markets? To what extent do they contribute to productivity and employment? Does access to foreign markets enhance firm performance through a learning process? Why are some countries more successful in international trade and FDI? What are the policies that can improve a nation's foreign trade performance? Does integration within the Single Market foster productivity improvements? Has the Euro led to a wider participation of firms in cross-border business? What policies can promote the participation of other European firms that are currently excluded from international markets? What are the gains and the adjustments involved in reducing barriers to trade and foreign direct investment (FDI)? What policies can best maximise gains and smooth adjustments?

Until recently, economists and practitioners had very different views on these issues. Economists tended to assume that trade and FDI opening affected sectors differently but firms similarly. Practitioners viewed them as a selection process in which some firms thrived and others went bankrupt. There was a disconnect between trade models and the fact that, firms being heterogeneous, they fared differently under the pressure of foreign competition. Recent developments in trade theory have bridged this gap by introducing firm heterogeneity. In this new framework, trade and FDI opening do not only affect sectors but also firm-level employment and productivity within sectors.

The growing consensus that the foregoing questions are best treated using firm-level trade and (FDI) data is currently finding it hard to break new ground in terms of both scientific research and policy-making due to various constraints on firm-level data availability in Europe. First, general information on firms is not always available. Second, the available data do not display the same information across countries. Third, important differences in coverage and method reduce the comparability of the available data. Fourth, when available, firm-level data collected homogeneously across Europe are not oriented toward exports and FDI.

The aim of the project is to address the above questions by generating new data through matching existing firm-level datasets and by supplementing their limitations through original coordinated data collection. A

key obstacle that the project removes is the absence in the existing datasets of detailed information on the modes of internationalisation that involve cross-border production networks.

The present project builds on the achievements of the network on 'European Firms and the International Market' (EFIM), coordinated by Bruegel and the Centre for Economic Policy Research (CEPR). This network brought together research teams from institutions based in the EU and involved, either jointly or individually, in a wide range of highly successful research projects based on firm-level data. Its aim was to use national firm-level data to carry out comparative cross-European analysis of internationalisation. The outcome was the well-cited report 'The Happy Few: The internationalisation of European firms' (Mayer and Ottaviano, 2007), which showed the policy relevance of tackling this issue at the firm level. Besides EFIM, many of the researchers involved in this project built and strengthened their contacts through several successful experiences within FP5 and FP6 projects or RTNs. For example, MICRODYN (which tackled the issue of growth, employment and competitiveness in the knowledge-based European economy through a micro-founded firm-based approach), LABFDI (which studied the labour market effects of European FDI on the basis of firm-level data), TID (an RTN looking at the link between industrialisation and development). National-level research funding also played a role. The Italian Ministry of Research funded a large strategic project coordinated by Centro Studi Luca d'Agliano looking at the effects of the geographic dispersion of production on employment and competitiveness at the firm level. Several of the researchers involved in the present project were actively involved. Finally, EFIGE also includes the expertise of institutions that enter as Associate Partners and have a long experience in building national (Central Banks of Belgium, France, Germany, Italy and Spain) or comparative (OECD) firm- level surveys.

This project pushes forward these earlier research efforts and combines them within a coherent framework. The construction of a consistent cross-country specific dataset provides an invaluable research tool for scholars and policy-makers, far beyond our research network. Research both builds on these new survey data and exploit existing data sets. It combines in-depth country analyses as well as policy reports with an overarching cross-country analysis. Comparing how similar sets of factors affect internationalisation choices in different countries provides an invaluable opportunity to understand how different institutional and regulatory frameworks at the national level may enhance or hinder competitiveness at the firm level.

The rest of this report is organized in five sections. Section 2 presents the research strategy carried out within the project. Section 3 describes how the implementation of that strategy helps to gain new insights

through the analysis of the original dataset assembled by the project as well as of already existing firm-level data. Section 4 focuses on the issue of competitiveness both from a country and cross-country perspectives. Section 5 draws some key policy lessons from the findings of the projects. A methodological Appendix completes the report.

## 2. Research Strategy

The research strategy adopts an integrated approach to internationalisation by investigating the interactions between the strategic decisions of European firms and the various facets of Europe's economic environment. In terms of the former, the project studies the feedbacks between the ability of firms to compete in foreign markets and their reliance on local as well as global production networks. It shows evidence of a strong complementarity between different sets of international activities. Successful exporters often also carry out a large part of their production activities abroad, either through FDI or some form of subcontracting. Moreover, successful firms manage wide ranges of products but they do not sell all of them on all markets. In terms of the latter, the project identifies the bottlenecks to internationalisation stemming from firm size, innovation, access to financial markets, governance and organisational modes, the skill composition of the labour force, regional characteristics. Finally, particular attention is devoted to the impact of European integration and the Crisis on the external competitiveness of European firms, also with a special focus on the effects of the single currency on firms' trade and production decisions.

The work program is organised in ten work packages (WPs). Two work packages concern horizontal activities that support the whole project. In particular, WP1 is devoted to the overall coordination of the project and WP2 to policy outreach and dissemination. The remaining work packages represent the core of the scientific project.

The objective of WP3 is to provide a detailed assessment of the internationalisation patterns of European firms. This is contained in seven country reports and one cross-country report including descriptive information. Given the detailed information required, the focus is on seven representative EU countries (Austria, France, Germany, Hungary, Italy, Spain and the UK) whose non-harmonised and sometimes incomplete firm-level data are available to the various teams. This broadens and deepens previous analysis reported in the EFIM report. Typically, however, the overlap among the different national datasets in terms of sampled variables is far from complete at the targeted level of disaggregation (firm-level data). In the

EFIM report different countries were therefore selected depending on the specific issues addressed. This is a first crucial constraint as it prevents one from learning and drawing policy implications from cross-country comparisons. Moreover, some key variables are simply unavailable in the existing datasets outside EFIGE. Among those variables, the most important are the ones that capture the reliance on local and global production networks based on offshoring (i.e. location abroad), outsourcing and other forms of contracting out. This is a second crucial constraint as it prevents the investigation of the recent tendency of internationalised firms increasingly to rely on more flexible modes of internationalisation. For these reasons, an important contribution of WP3 is the creation of an original cross-country dataset based on harmonised surveys run in seven selected countries (Austria, Germany, France, Hungary, Italy, Spain and UK). This makes our project a pioneering endeavour in systematic cross-country firm-level data collection in Europe. There are signals that it is becoming a turning point in applied research and policy-making on internationalisation issues at the European level. The idea is also to explore if in the future such data collection could be taken over by coordinated national statistical agencies and EU institutions. In this sense our endeavour should be seen as contributing to the ongoing effort at the EU level to provide enhanced policy support and anticipate scientific and technological needs in the wake of FP6 initiatives such as EU KLEMS. Most naturally, the public-good aspect of our project is reflected in free access to our original firm-level dataset after its construction in the wake of the successful experience of EU KLEMS.

By adopting, adapting and extending the cutting-edge tools of related frontier research in theoretical and empirical economics, the other six work packages build on the data gathered and the patterns highlighted in WP3 to investigate major issues for research and policy in six interrelated areas:

WP4 – Size, productivity and internationalisation;
WP5 – Firm organisation and internationalisation;
WP6 – The geographical scope of internationalisation;
WP7 – Skills, tasks and internationalisation;
WP8 – Innovation and internationalisation;
WP9 – Financial constraints to internationalisation;
WP10 – Internationalisation and the Euro.

Interrelatedness makes integration among the seven work packages unavoidable and reinforces the research network interactions. In particular, the work packages share the same methodological framework

based on the new perspective on international trade and FDI that stresses the importance of firms rather than sectors to understand the challenges and the opportunities countries face in the age of globalisation.

The traditional concepts of 'comparative advantage' and 'comparative disadvantage' are used to identify industries in which a country is stronger than its competitors and those in which it is weaker, meaning industries in which its relative costs of production are respectively low and high. In the global arena industries of comparative advantage are expected to expand while those of comparative disadvantage are expected to shrink. In recent years this 'sectoral view' has been increasingly challenged by the analysis of large firm-level datasets that have unveiled a large heterogeneity in the competitiveness of firms. Within the very same industry, while some firms are not able to cope with international competition, others thrive. The resulting intra-industry reallocations of market shares and productive resources are much more pronounced than inter-industry reallocations driven by comparative advantage.

The reallocation of resources from less to more competitive firms fosters the emergence of successfully internationalised firms. Such reallocation allows for a more efficient use of productive resources and is beneficial for the economy as a whole. What are the common characteristics of these successfully internationalised firms?: (i) Are they bigger than other firms? (ii) Do they adopt more complex organisational forms in terms of ownership structure? (iii) Do they distribute geographically their activities in a more complex way? (iv) Are they more innovative? (v) Are they more skill intensive?; (vi) Do they have better access to capital markets? (vii) Do they find it easier to withstand the transaction costs associated with international activities?

If these common characteristics imply overall that firms must achieve a higher level of complexity in the way they run their operations, then this is possible thanks to higher efficiency, empirically captured in terms of higher productivity. Accordingly, only firms that are productive enough are able to thrive in the global arena. At the same time, it could happen that firms sharing the same productivity level become successfully internationalised in some countries and struggle to withstand international competition in others. This reveals the existence of a variety of bottlenecks that differ from country to country and prevent firms from breaking into international markets. Work packages WP4 to WP10 deal with the different bottlenecks crippling the above-mentioned seven key characteristics of successfully internationalised firms.

WP4 starts by highlighting the role of firm productivity and size as a constraint to internationalisation with a special emphasis on SMEs. It will study how internationalisation interacts with the dynamics of firm growth. WP5 investigates how the organisational complexity of foreign operations affects the internationalisation of differently sized firms. WP6 focuses on the challenges differently sized firms face in selling to and sourcing from distant markets. The constraints on internationalisation due to labour market frictions and skill mismatch are addressed in WP 7. This work package also analyses the feedback from internationalisation to labour demand and employment across different skill groups. WP8 deepens the analysis of the interactions between firm growth and internationalisation by studying the obstacles to the creation of competitive firms at the innovation stage. WP9 deals with the financial constraints to firm creation, growth and internationalisation. WP10 studies the constraints that are delaying the envisaged effects of European integration, and in particular of the Euro, on the competitiveness of European firms.

## 3. New Insights from Old and New Data

Within the framework of the project research has been carried out at the frontier of academic and policy analysis, building on the fact that several researchers in the participant institutions and members of the Scientific Advisory Board are among the leaders in the field. Specifically, the project has produced 62 working papers (31 already published in scientific reviews and journals) and 12 reports (4 policy reports, 7 country reports and 1 cross-country report), from which coherent pictures have emerged on all the seven areas of research of the project concerning: firm size, productivity and internationalisation; firm organisation and internationalisation; the geographical scope of internationalisation; skills, tasks and internationalisation; innovation and internationalisation; financial constraints to internationalisation; internationalisation and the euro. New insights have been gained based on the newly collected data (EU-EFIGE/Bruegel-UniCredit Survey) as well as existing data as long as these allow for the in-depth analysis of specific issues for specific countries.

Methodologically the research has developed along two parallel action lines, whose main insights from a policy-making point of view are summarized in the reports of the project. These also build on the EFIGE working papers, whose content is targeted to an academic audience. Working papers can be found on the website of the project and are not detailed in this report for parsimony.

### *The Effects of the euro on European firms (1st EFIGE Policy Report)*

Along the first action line, new insights have been developed based on existing data as long as these allow for an in-depth analysis of specific issues for specific countries. The outcome has been a rich series of working papers distributed among the seven areas of research detailed above as well as the 1st Policy Report titled 'Of markets, products and prices: The effects of the euro on European firms'.

Even exploiting only existing data, the outputs of the project have cut new ground within the policy-relevant literature. They stressed the importance of firms' heterogeneity for understanding countries' aggregate performance in international markets. In particular, the 1st Policy Report confirms the consensus that emerges from a growing body of literature: contrary to expectations trade flows have not increased meaningfully since the introduction of the euro. They may have grown by a couple of percentage points at most, but not a sufficient order of magnitude to yield a noticeable welfare gain. This comes as a disappointment for all those who justified the macroeconomic pains of forming a currency area in the name of integration and the efficiency gains it would yield.

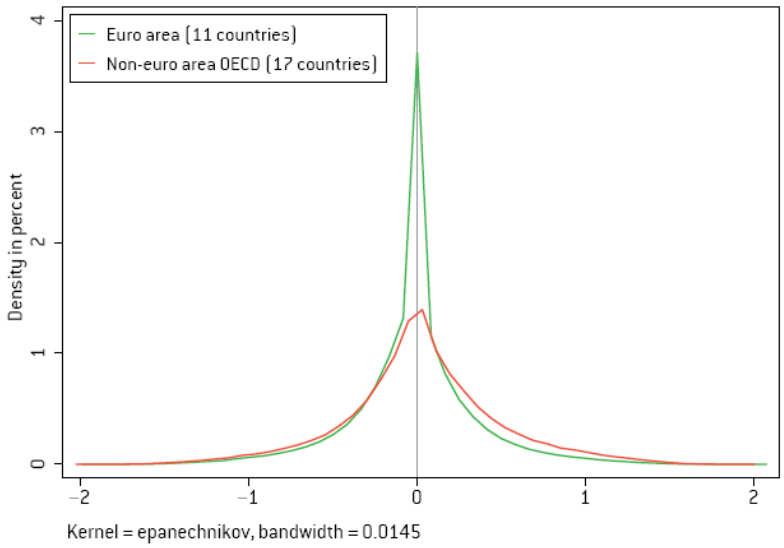
The report, however, also argues that trade effects cannot be measured by trade volumes alone. More trade does not necessarily mean more efficient organisation of production. It is indeed easy to construct examples where efficient organisation (say, the location of all production in the country where costs are lowest) results in less trade than the organisation adopted to protect a firm's profits from the possible effects of exchange rate fluctuations (say, the distribution across several countries of the stages of production). So trade volume can be a misleading yardstick. As important, if not more so, is *who* is trading and at *what price*. For allowing more producers to access foreign markets and lowering the price paid by consumers, unambiguously result in welfare gains. Here is where this report makes a difference.

As regards the 'who ' issue, the latter builds on the firm-level approach of the project in order to determine if the euro has resulted in an increase in the number of exporting firms (the 'extensive margin' of trade, according to the customary jargon) or not. Results actually show that the increase in the number of exporting firms has remained small. For the typical euro-area SME, life has not changed with the single currency and the market remains primarily national. In other words, other obstacles – be it differences in regulation, legal framework, taxes or language – are significant enough to continue to act as binding

constraints on internationalisation. This is a strongly disappointing message that deserves to be put before policymakers, especially at a time of crisis when signs of renewed fragmentation of the European market are emerging. The question is, what are the missing flanking policies that would have allowed small firms to benefit from a larger market and grow? The following EFIGE Policy Report try, among others, to answer to this issue.

Fortunately there is better news about the '*what price'* issue. Here, the euro has resulted in less volatile and lower prices, especially within the euro area as shown in Figure 1. This is a clear plus for consumers. They may have not noticed (at least, this is what they are telling opinion surveys such as *Eurobarometer*, where they complain about the inflationary effect of the euro) but thanks to lower trading costs and increased competition, they have gained additional purchasing power. This is in turn likely to have resulted in aggregate welfare gains, as the exporting firms' profits are likely to have increased as a consequence of reduced trading costs.

**Figure 1 - Distribution of export price differentials with respect to the OECD mean: French exporters, 2000**




Distribution of the log of the price gap calculated as the log of a price (country, product and firm specific) divided by the average price of this good across OECD countries. Source: EFIGE.

(Source: Fontagné L., Mayer,T. and Ottaviano, G. (2009) "Of markets,products and prices",*Bruegel Blue Print Series*, Vol.8, 48)

### *The EU-EFIGE/Bruegel-Unicredit Dataset*

While the 1st Policy Report shows how interesting aspects can be fruitfully investigated using existing datasets, the latter constrain the analysis of insights, however valuable, to specific issues and/or specific countries. Hence, some of the most enticing research outcomes of the project are generated from its second line of action, in which new data have been collected through harmonised cross-country firm-level surveys, leading to the creation of the EU-EFIGE/Bruegel-Unicredit Dataset. This has provided the consortium (and will provide the entire academic and policy community henceforth) with an invaluable mine of information to address research questions that are simply impossible to tackle with previously existing datasets.

In terms of operational steps, this second action line of research saw the design of the survey questionnaire. Here, the main challenge was to produce a technically feasible as well as economically sound harmonised questionnaire able to tackle crucial cross-country institutional specificities. The second step involved a public tender to assign the data collection exercise to a professional contractor, based on the questionnaire. The tender was awarded to a professional multinational firm specialised in this business, GFK EURISKO (the third largest European player in this field). The third step involved the collection of the data and the creation of a user-friendly database together with its draft instruction manual. In particular, the project has gathered both qualitative and quantitative information at the firm level through a detailed questionnaire containing more than 150 items related to the operations of international firms, collected via CATI (Computer Assisted Telephone Interview) and CAWI (Computer Assisted Web Interview) approaches. In order to ensure standard statistical representativeness of the collected data, a target had been set at around 3,000 firms for large countries (Germany, France, Italy, Spain), 2000 for the UK (given the smaller manufacturing sector in this country) and 500 firms for smaller countries (Austria and Hungary), i.e. a total of some 15,000 valid questionnaires.

The data collection effort was completed in May 2010. The exact numbers of firms, collected through appropriate sampling procedures, was 2973 firms for Germany, 2973 firms for France, 3021 firms for Italy, 2832 firms for Spain, 2142 firms for the UK, 482 firms for Austria and 488 firms for Hungary. After completion of the survey, the fourth step began: the organisation and the analysis of the data. In terms of organisation, the data were validated by official statistics, and then matched to balance sheet data using

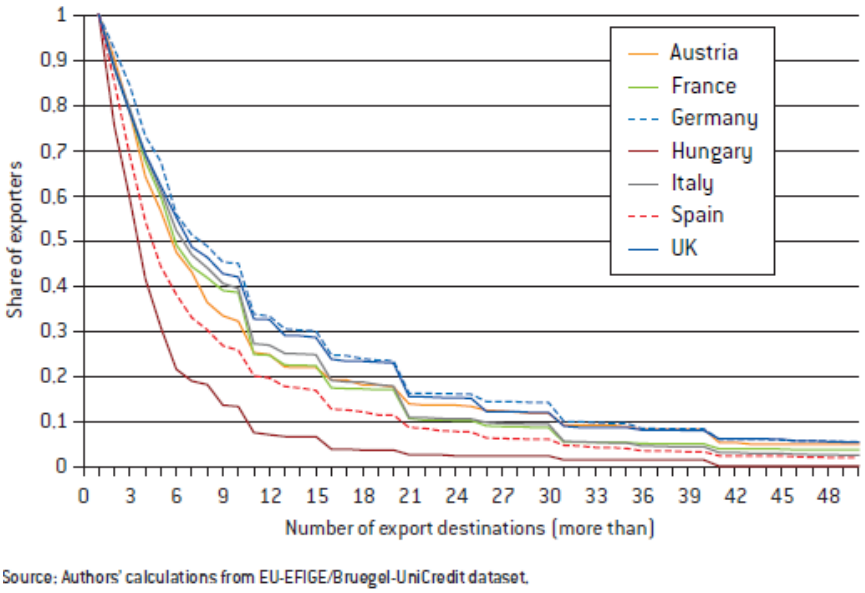
the commercially available AMADEUS database of company information supplied by Bureau Van Dijk. In this way the project was able to construct a representative micro-based cross-country dataset encompassing known characteristics of firms observed over time (balance sheet data for 2001-2009), which could then be matched to previously unobserved characteristics on the various dimensions of firms' activities (the EFIGE dataset). The integrated dataset was distributed to partners in the course of 2011, after the signature of the relevant Intellectual Property agreements needed to protect the highly sensitive firm-level data. Lastly, the dataset together with its user manual was made public on the EFIGE website in October 2012. We hope that the availability of a large and comprehensive dataset of this kind, with more than 7 million data points measuring different characteristic of firms across European countries, will stimulate the scientific and policy debate in Europe and beyond.

By finally making it possible to carry out consistent cross-country analyses, the new data have generated a quantum leap in research output given the previous lack of comparable statistical information for European countries in the project's seven research areas. See the methodological Annex I for additional details.

### *The Global Operations of European firms (2nd EFIGE Policy Report)*

To start with, previous data did not even allow researchers to obtain a comparable cross-country mapping of the overall international activities of European firms, something now possible thanks to EFIGE. The 2nd Policy Report on 'The global operations of European firms' fills this gap. Its findings are reassuring for researchers who had previously fathomed the characteristics of successfully internationalised firms using non-harmonized and often patchy cross-country data: the hypotheses they had formed on the basis of theory and partial evidence are by and large confirmed. For example, as shown in Figure 2, only a few numbers of firms (the 'happy few') export to a large number of countries while a large number of firms export in a few countries. This is true in all countries.

**Figure 2 - Number of Export Destinations for Exporters, by Country**




Source: Authors' calculations from EU-EFIGE/Bruegel-UniCredit dataset.

(Source: Horgos, D., Maggioni,D., Schivardi, F., Navaretti, G., Bugamelli, M. and Altomonte, C. (2011) " The global operations of European firms – The second EFIGE policy report", *Bruegel Blue Print Series*, Vol.12, 21)

As the policy report stresses, the most compelling fact that emerges from systematic comparisons is that firms in different countries behave in a strikingly similar way. To put it in simple words, there is no special gene that explains why Germany exports much more than Italy or Spain. In fact, German firms do not differ markedly from similar firms elsewhere in Europe. Rather, the structure of German industry and especially the density of medium-sized firms (the famous *Mittelstand*) go a long way towards explaining macroeconomic differences with neighbouring countries. It is therefore on the basis of strong evidence that research can deliver messages about policy. The main message is that, at a time when most governments have put competitiveness at the top of their agenda, they should first and foremost focus on firm-level development. The key questions for policymakers looking for ways to increase exports are how they can foster growth in the size of existing small and medium-sized firms, and how they can promote the entry of new firms. In turn, actions to this end will help improve productivity, foster innovation and enrich skills.

In detail, the report starts from a key question around which a large part of the current economic policy debate revolves in Europe: Why is there so much variation between European Union countries in trade performance? Germany is by far the most export oriented, with a share of exports to GDP of 39.9 percent, followed by Italy (23.4 percent), France (21.3 percent), the United Kingdom (17.2 percent) and Spain (16.7

percent). Why are there similar, if not greater, differences in terms of foreign direct investment and other forms of production internationalisation?

The report argues that some of the variation results, of course, from country-specific features, such as macroeconomic policies, market size or infrastructure. Nonetheless, it is firms that are at the heart of competitiveness. Firms carry out global operations, exporting to, importing from and producing in foreign countries. A crucial issue for policymakers is thus to understand to what extent the global reach and the international performance of European economies are determined by the characteristics of their firms, independent of other features of national economies. This is especially important because the characteristics of key firms and their within-country distributions are very different in different European nations.

The report finds that the international performance of European firms is indeed largely independent of the country in which they are located. Companies that internationalise successfully their sales or their production have similar features in all European countries. Size, productivity, the skill intensity of the workforce and the ability to innovate are positively related to firms' export performance in all countries, in terms of both exporter status and export value as a share of firm turnover. The same firm characteristics support more complex internationalisation strategies, such as exporting to a larger number of markets, or to more difficult and distant countries, or producing abroad, either through foreign direct investment (FDI) or international outsourcing (IO), i.e. production carried out by a foreign third firm under some sort of arms-length contract. Multi-country strategies of international production are essential for fostering exports, particularly to fast-growing emerging economies. In those economies entry is harder and more costly than in the European export market. Whereas more than 90 percent of European exporters sell their products within the EU, a much smaller proportion sell to distant emerging markets. Even more importantly, in all countries the smaller the firms, the more difficult it is to overcome the rising fixed costs of global operations. The emphasis on firm size, consolidation and growth does not imply that firms should be very large to be successful exporters. Size must be sufficient to undertake complex global operations, including global production, which is also undertaken by many medium-sized firms.

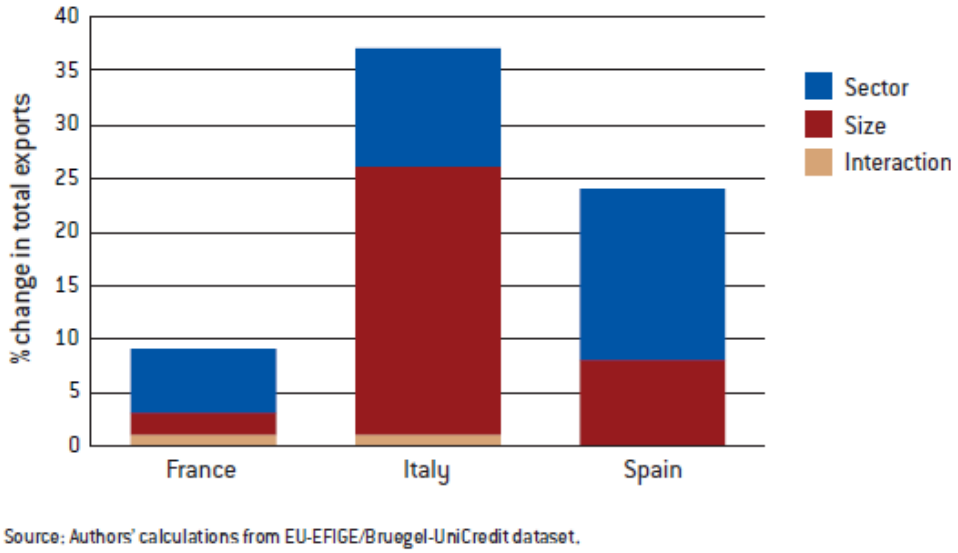
The report also finds that, considering international firms, those with comprehensive global operations were relatively more resilient in the face of the 2008-09 crisis vs. firms with a relatively 'simple' international exposure. The highly developed patterns of internationalisation of German firms, for example,

partly explain their ability to withstand the crisis better than Italian companies. Aggregate data on trends in exports hides much churning at the firm level. In our sample half of the firms reduced their exports and half of them either increased or stabilised foreign sales.

How can the finding that internationalisation patterns are predominantly driven by firm characteristics be reconciled with the evidence that, overall, countries perform very differently in terms of their exports and global production strategies? The main reason is that the within-country distribution of these characteristics is very heterogeneous: industrial structures differ significantly across European countries, in terms of size and sectoral distribution, and in terms of innovative capacity and productivity. Moreover, this has little to do with the sectoral distribution of industrial production. Even within narrowly defined industries, differences in size persist, with clear national patterns: for example, German firms tend to be larger and Italian firms smaller than the EU average in all sectors.

The fact that firm characteristics are of central importance raises new challenges for policy. Should policy making aim to foster those firm-specific drivers of internationalisation? For example, we find that, if the industrial structure (in terms of firm size and sectors) of countries such as Italy and Spain were to converge to the structure of Germany, the value of Italian and Spanish total exports would rise considerably – by 37 percent and 24 percent respectively – mainly due to the firm size effect (see Figure 3). Needless to say, this suggestive counterfactual exercise must be interpreted with caution, particularly when deriving policy recommendations. Nonetheless, it aptly illustrates the far reaching implications that firm-based insights may have on policy making.

**Figure 3 - Percentage Change in the Value of Export using the German size-sector Employment Distribution (total employment constant)**




Source: Authors' calculations from EU-EFIGE/Bruegel-UniCredit dataset.

(Source: Horgos, D., Maggioni,D., Schivardi, F., Navaretti, G., Bugamelli, M. and Altomonte, C. (2011) " The global operations of European firms – The second EFIGE policy report", Bruegel Blue Print Series, Vol.12, 42)

The importance of firms' characteristics supports the view that policies focused on improving the general business environment, on reforming institutional, regulatory, infrastructural or other factors that hinder long term investments, innovation capabilities and firms' growth, are likely to be more effective in strengthening international competitiveness than targeted intervention, such as measures for export promotion. Yet, observed industrial structures are the endogenous outcome of macro policies and several other country features, and not necessarily of market imperfections. The 'right sort of industrial features' for internationalisation cannot therefore be enforced. In our view there is little scope for policies aimed at changing the sectoral composition of industry. Policies of that sort are not necessarily likely to improve global competitiveness.

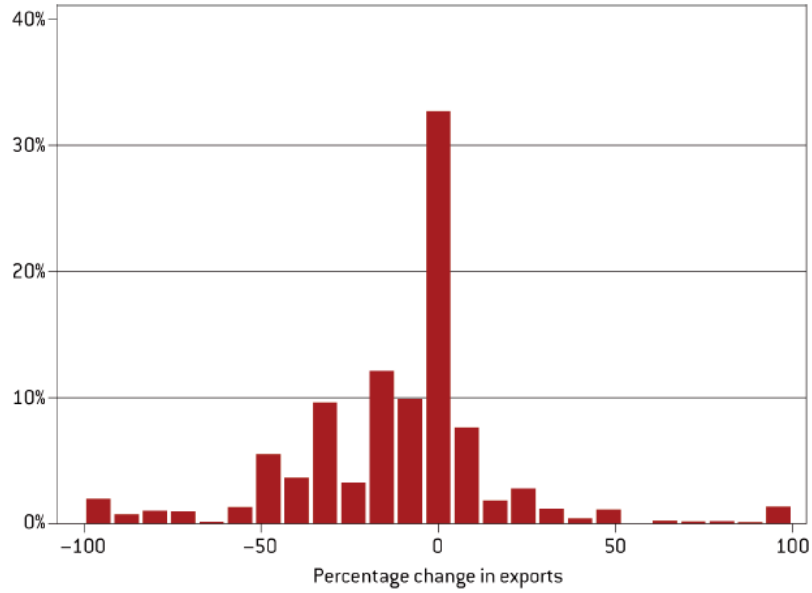
A deeper investigation of the sources of competitiveness is indeed the common denominator of the policy relevant research output of EFIGE, as testified both by the rich series of working papers and the reports distributed among the project's seven research areas. These have cut new ground within both the academic and policy debate, reinforcing the idea that firms' heterogeneity is of paramount importance for understanding countries' aggregate performance in international markets.

### *Still Standing: How European Firms Weathered the Crisis (3rd EFIGE Policy Report)*

The 3rd Policy Report 'Still standing: how European firms weathered the crisis' zooms on the effect of firms' internationalisation on their resilience to the economic downturn. Exploiting the unique features of the project's dataset, among which some specific questions addressed to firms on how they have reacted to the financial crisis across the years 2008 and 2009, this report provides more, and more precise, evidence of what makes firms successful and therefore also what makes countries successful in the context of globalisation. The Report indeed finds that while the ability of firms to grow more productive over time is associated to their external competitiveness, internationalisation, however, also makes them vulnerable to large shocks affecting international trade, and may transform them into agents of propagation of global downturns. In this respect, the 3rd Policy Report enriches some of the finding of the 2nd Policy Report.

At the time of the Great Recession of 2009, there was intense speculation about the reasons why trade collapsed much more than output. It was sometimes claimed that global supply chains were not only propagators, but also multipliers of international fluctuations. This policy report sheds new light on the issue, exploiting the fact that the project's survey was – by chance – elaborated in the course of 2009 and thus – by design – included questions about the firms' response to the global crisis. To that extent, it provides a detailed account of what happened to them in an especially turbulent environment, showing for example that a minority of firms managed to fare very well in spite of headwinds, and that their individual characteristics and their position in global supply chains both played major roles in determining their performance and their employment behaviour. This finding, illustrated in Figure 4 for exports, is reminiscent of a familiar insight from the analysis of labour markets: even in the worst possible macroeconomic conditions, some firms increase their payrolls and some individuals succeed in getting access to better jobs.

**Figure 4 - Distribution of change in imports**




Source: EFIGE. Note: The spike at zero comes from the survey question: *did your exports stayed unchanged, rise or decline – and if changed, by how much?*

(Source: Békés, G., Halpern, L., Koren, M. and Muraközy, B. (2011) "Still standing: how European firms weathered the crisis – The third EFIGE policy report ", *Bruegel Blue Print Series*, Vol.15, 13)

The stylised facts presented in the 3rd Policy Report are important to bear in mind at a time when Europe is running the risk of another severe downturn and when many firms, especially the smaller ones, are facing increasing difficulties in getting access to credit. Throughout Europe and beyond its borders, governments are putting increased emphasis on competitiveness and growth. But effective policies require a proper understanding of what determines international performance. This especially applies to southern European countries, where the traded-goods sectors has shrunk in relative terms as a consequence of domestic credit booms and must now attract resources and expand. For sure, policies that increase the stock of knowledge, foster human capital formation, improve labour-market institutions and make capital markets more efficient are called for. But the analysis of heterogeneous firms suggests that measures that would help firms just below the threshold of internationalisation to pass it, and firms already active in international markets to expand their reach, would do more for competitiveness than across-the-board, indiscriminate measures.

***Breaking Down the Barriers to Firms Growth in Europe (4th EFIGE Policy Report)***

That the foregoing should not be an argument for 'picking the winners', rather to find ways to help 'fatten the tail' of globally competitive firms is one of the key messages of the 3rd Policy Report. How to achieve this goal in a non-discretionary, non-distortive way is the further issue addressed by the 4th Policy Report, which is also the last of the series, titled 'Breaking down the barriers to firm growth in Europe'.

The ability to 'grow out' of the crisis is now widely recognised as the only long-term viable option for the sustainability of the European Union and its social market economy model. Enhanced 'competitiveness' at the EU level is required, which would allow the EU to capture growth currently taking place mainly in emerging markets. While the consensus on the need to foster competitiveness is almost unanimous, the debate on how to define and measure it is still open, especially when the focus is kept at the country level. Different (often complementary) approaches are available and their relative advantages depend on several factors, in particular the level of detail at which data is available (e.g. country, industry or firm/product level).

The 4th Policy Report starts from the observation that large firms contribute disproportionately to the economic performance of countries: they are more productive, pay higher wages, enjoy higher profits and are more successful in international markets. The differences between European countries in terms of the size of their firms are stark. Firms in Italy and Spain, for example, are on average 40 percent smaller than firms in Germany. The low average firm size translates into a chronic lack of large firms. In Italy and Spain, a mere 5 percent of manufacturing firms have more than 250 employees, compared to a much higher 11 percent in Germany. Understanding the roots of these differences is key to improving the economic performance of Europe's lagging economies.

So why is there so much variation in firm size in different European countries? What are the barriers that keep firms in some countries from growing? And which policies are likely to be most effective in breaking down those barriers? This policy report aims to answer these questions by developing a quantitative model of the seven European countries covered by the project's survey.

The fact that larger firms export more and innovate more suggests that barriers to research and development and to trade are the main culprits in slowing down firm growth. Countries that face higher

trade costs provide fewer opportunities for businesses to become large. And a relative absence of R&D spending puts a break on firm growth, leading to a size distribution skewed towards smaller firms. Trade and innovation are not independent; they interact in significant ways. A reduction in trade costs, for example, tends to stimulate innovation, because it allows firms to become larger, thus making it easier for them to bear the fixed costs of R&D.

The framework developed in this policy report emphasises this complex interaction between a firm's decision to export and its decision to innovate. Different barriers – trade costs, innovation costs and tax distortions – affect these decisions, and ultimately determine a country's firm size distribution. The model put forward is able to identify which barriers explain the relative absence of large firms in some European countries. The framework is then used to quantitatively estimate the returns from reducing the different barriers. It thus provides a useful tool for practitioners interested in understanding which policies are likely to be more beneficial in terms of stimulating firm growth.

An important conclusion is that in order to identify the barriers to firm growth, one needs to jointly analyse trade and innovation. For example, if trade were to be ignored, the analysis would predict that both Italy and Spain have high innovation costs. However, once trade is introduced, the analysis finds that the high proportion of small firms in Italy is mainly due to high innovation costs, whereas in Spain it is due to a combination of high trade and high innovation costs. In other words, if Italy wants to reduce barriers to firm growth, it should mainly focus on promoting innovation, whereas in Spain the emphasis should also be on reducing trade costs and improving access to international markets.

Although this gives some indication about which barriers to firm growth different countries face, it does not say anything about the expected magnitude of the effects of different policies. How does reducing trade costs compare in terms of effectiveness to reducing innovation costs or reducing labour taxes? To address this question, the policy report estimates the effect on firm growth and the firm size distribution of a one percent drop in the different barriers (innovation costs, trade costs and taxes). As shown in Table 1, in nearly all countries, reducing innovation costs has a much greater impact than reducing trade costs.

**Table 1 - Distribution of change in imports**

| Change in | Austria | France | Germany | Hungary | Italy | Spain | UK |
|---|---|---|---|---|---|---|---|
| Innovation costs | 1.16 | 1.19 | 1.19 | 1.22 | 1.16 | 1.17 | 1.24 |
| Variable trade costs | 1.24 | 0.62 | 0.42 | 0.21 | 0.69 | 0.68 | 0.49 |
| Profit taxes | 0.20 | 0.11 | 0.28 | 0.21 | 0.34 | 0.01 | 0.37 |
| Labour taxes | 0.13 | 0.11 | 0.11 | 0.10 | 0.14 | 0.09 | 0.16 |

(Source: Loris Rubini, L., Desmet, K., Piguillem, F. and Crespo, A. (2012) "Breaking down the barriers to firm growth in Europe: The fourth EFIGE policy report", *Bruegel Blue Print Series*, Vol.18, 28)

On average, a one percent reduction in innovation costs is predicted to lead to an approximately 1.2 percent increase in firm growth, whereas a one percent drop in trade costs would increase firm growth by around 0.6 percent. This implies that policymakers, who need to find a trade-off between the reduction of certain barriers and the potential returns from doing so, would achieve a much greater impact by focusing on reducing the barriers to innovation.

The use of the model developed in this policy report, however, goes beyond identifying what drives differences in the firm size distribution across European countries. It is also able to analyse some of Europe's pressing economic issues, such as the impact of a possible breakup of the euro area. Europe is in the midst of the most severe economic crisis since the Great Depression. Fiscal austerity programmes are biting hard. To some observers, the breakup of the euro area, once considered a far-off doomsday scenario, is becoming a real possibility. Unfortunately, few models are able to shed light on the economic impact of these shocks. The framework developed in this policy report is well equipped to analyse these questions.

In a first application, the report estimates the effect of a 20 percent drop in government expenditure ('austerity') on R&D in Spain. Although this drop only amounts to 0.1 percent of GDP, the model predicts it will lead to a welfare drop in consumption of 2.7 percent. In a second application, the prospect of a return to national currencies ('break up of the euro') is considered. The existing literature has estimated that this would lead to a drop in trade of 10 percent. Taking this number, as detailed in Table 2, the model predicts that abandoning the common currency would result in a welfare drop in consumption of between 7 percent and 15 percent. Larger countries, such as Germany, have larger domestic markets, and would lose

less (around 7 percent), compared to smaller countries, such as Austria, which rely more on international trade, and would thus lose more (around 15 percent). This estimate, already large, should be viewed as a lower bound, since it only captures the negative effect euro-area breakup would have on trade flows, thus ignoring many other potential impacts.

**Table 2 - Breakup of the euro area**

| | Percentage change in | | |
|---|---|---|---|
| Country | Transport costs | Welfare | Value added |
| Austria | 9.87% | -15.22% | -11.76% |
| France | 8.71% | -10.48% | -8.24% |
| Germany | 4.29% | -7.30% | -5.75% |
| Hungary | 6.79% | -11.06% | -8.42% |
| Italy | 6.33% | -7.84% | -5.91% |
| Spain | 3.27% | -7.30% | -5.74% |
| UK | 6.09% | -7.35% | -5.63% |

(Source: Loris Rubini, L., Desmet, K., Piguillem, F. and Crespo, A. (2012) "Breaking down the barriers to firm growth in Europe: The fourth EFIGE policy report", *Bruegel Blue Print Series*, Vol.18, 33)

## 4. A New Approach to Competitiveness and Its Policy Impact

All in all, the overarching message emerging from the original body of knowledge created by EFIGE is that, in assessing country international competitiveness, it is crucial to complement the traditional set of macro indicators with new indicators based on firm-level evidence. This is all the more important now that the debate on how to define, measure and assess 'competitiveness' has taken an unexpected turn, which is easily understandable but rather unwarranted. On the one hand, in line with the approach of the project, the recent literature on trade has increasingly underlined and shown empirically that aggregate industrial performance depends strongly on firm level factors, such as size, organization, technological capacity, as well as on other financial and institutional conditions firms are confronted with in the specific environment they operate. On the other hand, the policy debate in Europe has increasingly singled out macro factors, (such as labour costs or current account dynamics), which are seen as the preponderant determinants of aggregate economic performance, while leaving other factors, if any, to the domain of structural/non-price competitiveness matters, possibly to be tackled within the proposals of the 'Europe 2020' reforms agenda.

The prominent attention to macro factors lies squarely on the fact that – in the midst of a major fiscal crisis in the euro area – when referring to 'competitiveness', the emphasis is on macro and financial stability considerations. As a result, the indicators one refers to most often are the ones which: i) are easy to communicate, most notably unit labour cost differentials, and ii) are generally identified as a/the culprit of macro imbalances to be quickly corrected. Against this background, however, there is a risk that sustainable growth considerations may be neglected or actually contradicted. The consortium has shown that there is room to usefully complement the (much debated) commonly used definition of 'competitiveness', mostly driven by considerations related to macro stability, with considerations more strictly related to the idea of sustainable growth. The two views are actually often complementary as regards for instance 'competitiveness' rankings across countries, but firm level considerations turn out to be essential when actual policies are set in place to address 'competitiveness' issues. To do so, we have suggested a definition of 'competitiveness' together with a number of firm level based indicators that could be usefully and systematically added to the set of macro indicators commonly used. In advocating the broadening of the scope of the firm level analysis – from the present and almost exclusive purpose of producing research papers, to a more systematic use for policy advice – we also paved the way towards richer and more complete data collection.

This view peddled by the consortium has been sympathetically received by the policy community. In this respect, the best example is probably the creation by the European Central Bank of the 'Competitiveness Research Network' (CompNet) to which EFIGE researchers have been providing key expertise based on the successful experience of the project. The fact that some of the associate partners of EFIGE also rank among the founding members of CompNet further testifies the existence of fruitful cross-fertilization between the project and the policy community. As implied by the findings of the project, CompNet starts from the observation that, from a policy perspective, competitiveness issues have been identified as root causes of the ongoing crisis and have therefore been deliberately included in the surveillance processes being established at EU/euro area and G20 level. Yet, there is still a lack of a commonly agreed unified framework that connects determinants of competitiveness with outcomes. Moreover, there are various views on and definitions of competitiveness, which tend to remain rather polarised and are rarely cross-checked.

In order to fill this research gap, CompNet was established at the end of 2011. The network has participants from all ESCB national central banks, as well as from international organisations interested in

competitiveness issues and the academic community. The network's objective is to develop a more consistent analytical framework for assessing competitiveness, one which allows for a better correspondence between determinants and outcomes. To do so, the network functions as a unique forum in which different approaches and measures of competitiveness can be discussed, researched and developed, and eventually reconciled. Developing a framework which includes a complementary use of micro and macro data can lead to improved analyses of competitiveness issues. The framework aims to factor in the advantages and to harmonise the disadvantages of the differing views on competitiveness. See: http://www.ecb.int/home/html/researcher_compnet.en.html.

### *The Triggers of Competitiveness (EFIGE Cross-Country Report)*

'The triggers of competitiveness' is the title of the EFIGE Cross-Country Report, which is dedicated to European cross-cutting issues that go beyond the specificities of the countries covered by the project.

What are the factors that trigger the competitiveness of European firms? In line with CompNet, the cross-country report notes that the debate on competitiveness has shifted significantly in recent years because of the massive crisis in the euro area. In fact competitiveness is now considered a key factor for the adjustment in the euro area. Macroeconomic data indeed show that in the run-up to the crisis, huge capital flows fundamentally altered the structure of our economies with a significantly increased tradable sector in some countries and an overblown non-tradable sector in others. The sudden stop of these capital flows has left countries severely exposed and adjustment to a new growth model has been slow and fraught, with major increases in unemployment and relatively limited price and wage adjustment visible in the national account data. On the other hand, in some cases, export performance has been spectacular during the crisis years. For example, Spanish export performance has been one of the euro area's strongest. Yet, high unemployment testifies to the unfinished adjustment agenda in Spain.

Against this background, the cross-country report takes a fresh look by inquiring into the determinants of firm-level international performance, that is external competitiveness. In fact, in the competitiveness debate, it is of crucial importance to understand not only the macroeconomic challenge but also to search for the right policy response that will generate growth and exports. This can be found at the firm level. A number of new results emerge. Firm-level total factor productivity is clearly identified as a crucial

determinant of growth and exports. Human capital, R&D, equity finance and performance-based incentives for employees also underpin the success of firms. Moreover, size matters and large firms typically are much better exporters than their smaller counterparts.

A number of important policy conclusions are drawn from the analysis. Central for the promotion of export growth is setting the right conditions for firms to grow and export. It is crucial to remove incentives for firms to stay small. Important factors hampering firm growth are taxes and social and labour regulation. But lack of access to finance also often limits growth. And indeed, one of the most dangerous side-effects of the current sovereign debt crisis is that the financial system in Europe is fragmenting, putting a break on credit as well as equity finance, in particular in crisis countries. Equity finance has always been weak in Europe compared to the United States and this may explain the less dynamic European corporate sector. Finally, all the standard recommendations about R&D and education are confirmed by the report. Adjustment in the euro area will require very comprehensive relative price changes. In the absence of nominal exchange rates, wage and product price inflation need to adjust to create conditions for jobs and growth. Yet, the report reminds us that lasting external competitiveness needs to be underpinned by the right policies for corporations. In this respect, microeconomic data sets and research of the kind employed in this and other EFIGE reports are crucial to define the right policy set. All too often, policy makers ignore the rich potential that microeconomic research offers them.

More specifically, the cross-country report goes further than the existing set of competitiveness indicators, recognising from the outset that it is not really countries that exchange goods and services, but rather firms located in each country. The report therefore looks at the issue through the lens of firm performance and, driven by the policy debate, focusses on a specific dimension of competitiveness, that is external or international competitiveness, defined as the ability to exchange the goods (and services) in which a country is abundant for the goods and services that in the same country are scarce. Consistently with other results throughout the project, the report finds that the external competitiveness of a country is indeed determined by the aggregate ability of individual firms to operate successfully in international markets: in other words, assessing the external competitiveness of the EU amounts to identifying what drives the ability of European firms to compete successfully in international markets. As suggested by recent economic literature, the working hypothesis is that external competitiveness is an expression of high firm-level productivity. A growing body of evidence points to the fact that the aggregate performance of a country or an industry strongly depends on firm-level factors (size, organisation, technological capacity and

their ability to successfully operate in international markets), which are ultimately related to firm-level productivity. The report thus takes a 'bottom up' approach and discusses the ways in which international exposure and productivity interact at the firm level, eventually determining the external competitiveness of European countries.

In so doing, as other reports, also in the cross-country report we capitalise on the unique harmonised cross-country dataset created by the project to link the international activities of European firms to the same firms' balance-sheet data as retrieved from the Bureau Van Dijk's AMADEUS dataset. Thus we can correlate measurements of productivity with firms' international exposure. In particular, we compare a number of firm-level productivity measures, namely total factor productivity (TFP), labour productivity (LP) and unit labour costs (ULC), with the latter being the measure typically used as the basis for the analysis of competitiveness at the country level. After controlling for country and industry characteristics, we find that international exposure is indeed positively correlated with our measurements of productivity at the firm level. Moreover, when measured by labour productivity or TFP (as economic theory would suggest), productivity is also positively correlated with the complexity of firms' internationalisation strategies, with complex activities (FDI) more associated with higher productivity than simpler activities (imports or exports). Outsourcing, which typically involves an intermediate level of complexity, is associated with the middle of the productivity range. Such a correlation, however, holds to a lesser extent when productivity is measured in terms of (the inverse of) ULC. The reason is that LP exhibits a strong positive correlation with TFP, whereas the correlation between the inverse of ULC and TFP, though positive, is much weaker, mainly due (at least in our data) to the different structure of labour costs in innovating firms, thus underlining the importance of quality and other non-price determinants for competitiveness. This finding suggests that while ULC measurements can be appropriately informative for an initial macro-policy assessment of a country's competitiveness, an in-depth study of the sources of competitiveness, and the resulting recommendations on how policy can tap those sources, requires an analysis of firm-level TFP dynamics similar to the one we put forward in this report. See Table 3.

**Table 3 - International categories of firms – descriptive statistics (restricted sample, 2008)**

| | No. of firms | Avg. turnover (in €1,000s) | Avg. no. of employees | Avg. capital stock per employee (in €1,000s) | Total Factor Productivity | Unit labour cost (in € per unit of added value) | Labour productivity (added value per employee in €1,000s) |
|---|---|---|---|---|---|---|---|
| Non active abroad | 1,514 | 5,298.51 | 31.67 | 156.14 | 0.872 | 0.77 | 50.71 |
| Active abroad | 5,921 | 24,623.51 | 152 | 200.01 | 1.024 | 0.78 | 57.55 |
| *of which* | | | | | | | |
| Exporter | 5,201 | 26,104.12 | 164.41 | 203.19 | 1.033 | 0.77 | 58.09 |
| Importer of services | 1,900 | 50,004.76 | 372.81 | 230.61 | 1.159 | 0.84 | 61.81 |
| Importer of materials | 3,939 | 31,647.82 | 208.25 | 203.31 | 1.058 | 0.79 | 58.43 |
| Global exporter | 2,211 | 28,345.27 | 104.42 | 224.77 | 1.094 | 0.79 | 62.56 |
| Passive outsourcer | 2,965 | 20,763.66 | 84.31 | 208.06 | 1.06 | 0.79 | 59.86 |
| Active outsourcer | 306 | 32,991.62 | 127.39 | 224.94 | 1.066 | 0.76 | 56.03 |
| FDI | 387 | 98,554.23 | 359.7 | 238.08 | 1.293 | 1.05 | 63.35 |
| Whole sample | 7,435 | 20,303.82 | 125.6 | 190.39 | 0.991 | 0.78 | 56.05 |

Source : EFIGE dataset. Note: Numbers are weighted sample averages. TFP is the Solow residual of the production function.

(Source: Altomonte, C., Aquilante, T. and Ottaviano, G. (2012) "The triggers of competitiveness: The EFIGE cross-country report", *Bruegel Blue Print Series*, Vol.17, 21)

In particular, starting from the finding that more complex internationalisation strategies generate higher costs, and thus require greater productivity for profits to be maintained, the cross-country report identifies the characteristics of those firms that are able, over time, to move from below to above the minimum performance threshold (or 'productivity cut-off') required to become active in the international environment. In other words, we identify which firm-level factors matter more in driving the growth in the productivity of European firms in order to trigger their international activities.

The wealth of EFIGE data allows us to show that, even in different European countries, the ability of firms to grow above the productivity cut-off is triggered by similar 'growth-friendly' characteristics at the firm-level related to innovation (human capital and R&D intensity), finance (adequate capital in the form of equity), human resources and management (the use of performance-based salaries and a reduced presence of managers belonging to the family, if the firm is family owned), and ownership structures (affiliation to a foreign group). Firms with the right balance of these characteristics are able to grow and become successful internationally. In doing so, they become larger than the average domestic firm (140 versus 31 employees in our sample). Firms that do not strike that balance remain small and domestic, thus

not contributing to their country's external competitiveness. These findings are consistent in different countries and industries. They also hold for different productivity levels: all firms that become more productive share similar characteristics, irrespective of their starting point.

In a policymaking perspective, the findings from the cross-country report have several implications:

- If the objective of policy is to foster a country's competitiveness, the ultimately firm-driven nature of this process is such that aggregate measures of competitiveness are subject to a number of biases that have to be appropriately taken into account when interpreting aggregate statistics: there is no useful 'average firm' concept, rather, firms are very heterogeneous within countries and industries. As a result, rather than formulating policies in an effort to increase the competitiveness of the average firm, it is much more efficient to stimulate competitiveness by fostering the reallocation of economic activities from less to more efficient firms.
- Among the comparable firm-level measures currently available thanks to EFIGE, the single best predictor of a firm's ability to successfully operate in international markets is its total factor productivity (TFP).
- Successful international companies invest in human capital and R&D, rely on equity finance, motivate their human resources through performance-based incentives, do not necessarily loathe family ownership but do draw a line between the family owner and the firm's management, and do not see foreign capital as an intrusion but rather thrive on the synergies it creates and the international opportunities it opens up, via both imports and exports, and in general the participation in global value chains.
- Small is not beautiful per se. It is true that a significant part of employment and productivity growth comes from small firms. However, these are not any small firms. They are, instead, firms that start small and, in the process of getting bigger, become more productive and start to hire more employees. In this respect, the key question for policy aimed at small and medium-sized companies should not be how to help small firms to survive as they are, but should rather be how to help small firms adopt the right attributes that promote not only survival but also growth.
- In particular, specific incentives (both market- and government-based) should be created in the areas of innovation (e.g. tax credit schemes for R&D expenditures), finance (e.g. via the liberalisation and simplification of a cross-border pan European market for private equity and venture capital), human resources (e.g. promoting lifelong training programmes and securing an improvement in national

education systems), management (e.g. via a better link between wages and productivity), and ownership (fostering the attraction of foreign investment and the participation of domestic firms in global value chains).

- More in general, the promotion of productivity growth and competitiveness can and should go beyond the traditional exercise of educated guesswork, targeting instead the specific structural aspects that make firms inclined to acquire the 'right' set of characteristics, beyond the worn-out generic mantra of 'flexibilities versus rigidities'. Such an approach, still popular in policy circles, is hardly justifiable in the era of firm-level data.

### *Competitiveness and Countries' Specificities (EFIGE Country Reports)*

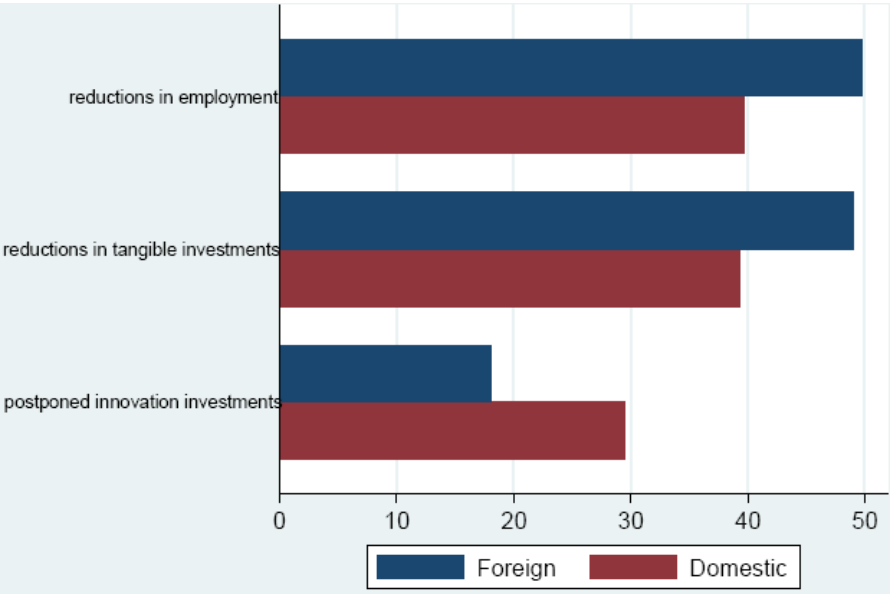
While cross-cutting issues are the topic of the cross-country report under the common heading of competitiveness, the seven Country Reports shed additional light on country specificities that the policy reports still highlight as important. In this respect, the country reports offer a unique overview of the opportunities and the challenges faced by the seven countries covered by the project. In so doing, they further reveal the great potential of the project's new perspective on competitiveness - based on micro evidence - as a precious complement to the traditional perspective - based on macro evidence.

In its country report Austria is depicted as a small, open economy characterised by ambitious innovation policies. In the 2000s, the country stimulated its research, technology and innovation policies as a matter of economic policy priority. To foster research and innovation activity, a variety of policies were used, including measures aimed at attracting foreign investment in R&D; it is not a coincidence that Austria is now characterised by a concentration of medium foreign enterprises. In the period 2000-2007, Austria was able to demonstrate the highest rate of change of its R&D intensity in the world (+0.63 percentage points); the corporate sector, including foreign owned enterprises, has contributed significantly to this increase. The results of these striking policies were tested for their resilience in a crisis for the first time in 2008-2009.

The analysis presented in this report is based on a wide range of information on the characteristics of firms and their specific innovation strategy provided by the EU-EFIGE/Bruegel-UniCredit Survey. While the crisis had a considerable impact on exports as prospects were gloomier than expected, the data show that Austrian firms suffered less than other countries surveyed, suggesting that a successful 'system of innovation', which includes the presence of foreign-owned businesses characterised by a high propensity

for R&D and innovation, is not neutral. As shown in Figure 5, over the crisis period, Austrian-owned firms, regardless of their size, showed greater resilience than foreign-owned firms. Also small businesses (10-49 employees) have been more able to weather the crisis when compared with other small European companies, and their success is strictly connected to their capability to invest, innovate and compete on quality.

**Figure 5 - Share of firms experiencing reductions in 2009: Austrian vs. foreign owned (over 50 employees)**



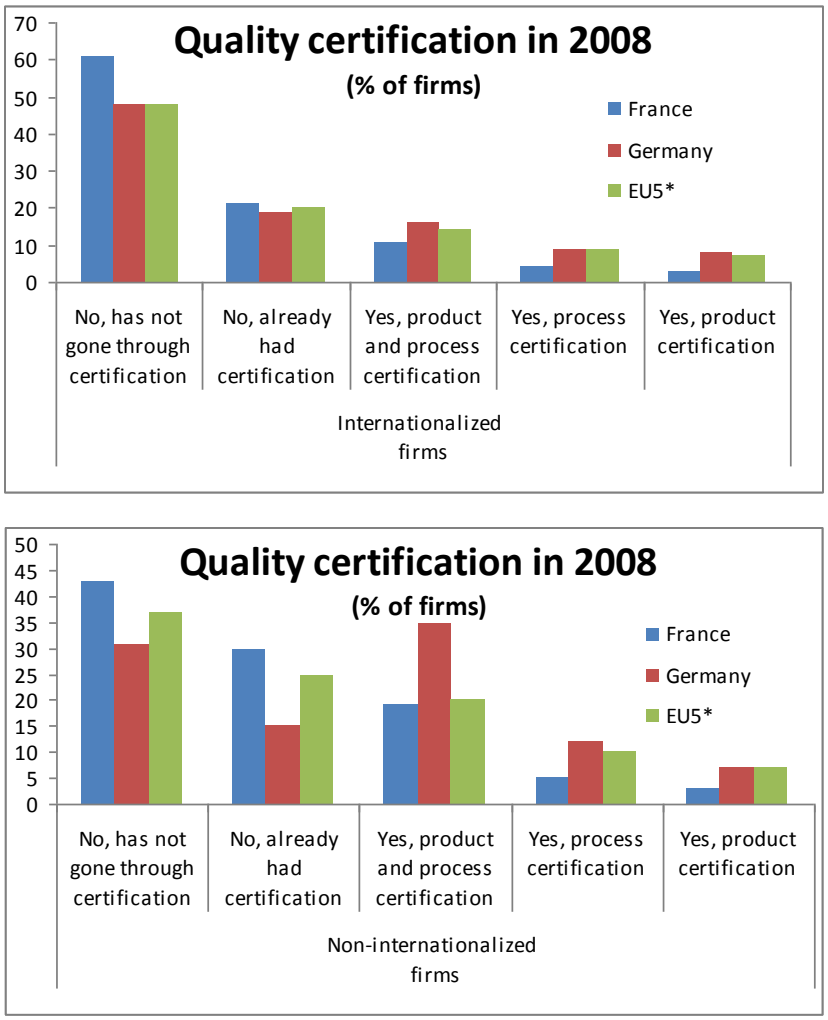

(Source: Campagna, L., Pasetto, A. and Riti, A. (2012) "Austria Felix: The impact of the crisis on a small open economy ", *EFIGE Country Report*, 11 )

The main policy indication that emerges from this report is the centrality of research, technology and innovation policies. For Austria, as a small country with a number of large firms, including foreign multinationals and many small- and medium-sized firms, it is important to foster innovation diffusion, whether created domestically or abroad, and to make choices that contribute to continuous technological upgrading of the economy, facilitating interaction between all the players in the innovation system.

For France, the corresponding country report also underlines the crucial importance of innovation in building a competitive manufacturing sector. Exporters are more innovative, have a greater tendency to invest in research and development, and are more likely to be certificated over the quality of their products

and their production processes (see Figure 6). Hence, success in foreign markets is, before all, related to the overall performance of firms. The report also highlights the crucial role of innovation financing.

**Figure 6 - Quality certification by French firms (2008): Internationalized vs. non-internationalized**




(Source: Berthou, A. and Hugot, J. (2012) "How does innovation affect the internationalisation pattern of firms? ", *EFIGE Country Report*, 13 )

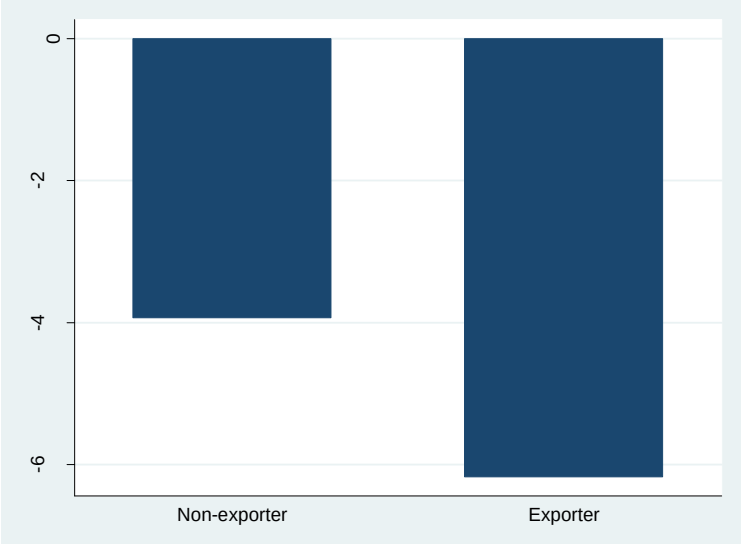
Several policy implications emerge. First, as highlighted also in the policy reports, firms' innovation over products and production processes is an important determinant of the success of domestic firms on home and foreign markets. Promoting firms' innovation propensity therefore has the potential of raising the competitiveness of the domestic production structure, as it increases the quality of goods offered by firms. Second, the establishment of vertical relations with other firms, research centres and universities is a

critical determinant of domestic firms' innovation propensity. Buying an innovation can help a firm upgrade its technology within a short period of time. Third, investing in R&D is costly and requires external financial resources. When failures in credit markets occur, a public policy may be required so as to allow firms to innovate.

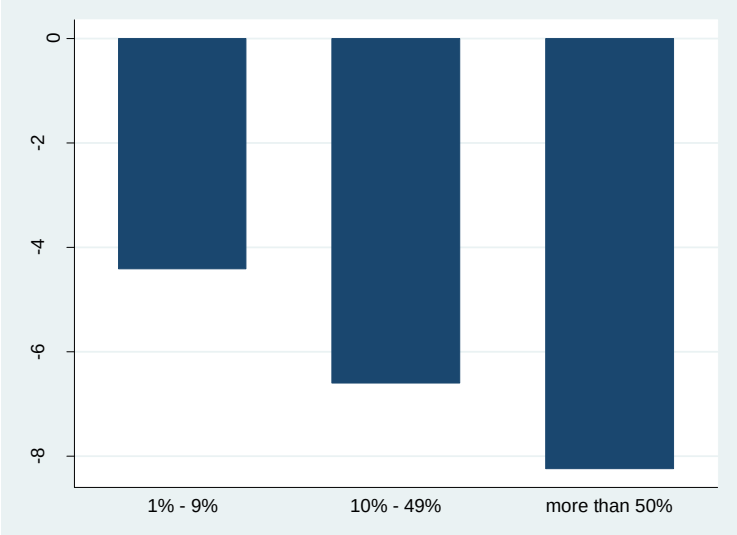
In Germany the export industry has traditionally been the growth engine of the economy. Relative to GDP, Germany is the largest exporter in the world. In absolute terms, it is second only to China. Shortly after the outbreak of the financial crisis in 2007, exports plummeted worldwide. Due to its high export share, Germany was severely affected by the turmoil on world markets. One group that plays a special role among German exporters is the *Mittelstand*, the small- and medium-sized firms that make up 40 percent of all manufactured exports. Few years later, it seems that the German economy is back to normal. Exports are soaring, and unemployment has declined to levels not known since the beginning of the 1990s. But how did this turnaround happen? Was the effect of the crisis on German exporters not so big after all? Or did Germany apply the right remedies for coping with the effects of the crisis?

The country report gives some answers to these questions. In particular, it analyses the effects of the crisis, especially on German exporters. First, exporters in Germany were affected more often by a drop in turnover than non-exporters, and the drop was much more pronounced. Second, exporters were particularly hit by an increase in debt costs during the crisis. Third, while in the climax of the crisis, all German firms underwent a substantial net reduction in personnel, this effect was more pronounced for exporting firms. Fourth, within exporters, the higher the export share, the more pronounced their net change in personnel during the crisis. This is shown in Figure 7.

**Figure 7 - Employment change in German firms (2008-2009)**




Average percentage change in personnel according to exporter status




Average percentage change in personnel according to export share

(Source: Neugebauer, K. and Spies, J. (2012) "How did exporting firms cope with the crisis? ", *EFIGE Country Report*, 11-12)

The report goes on to identify the factors that most hampered German exporters and then looks at the means employed by firms to cope with the effects of the crisis. The main policy implication of this report is that the implemented measures of the German government to dampen the effects of the crisis worked well

overall, but have failed to reach some types of firms. Exporters that were strongly affected by the crisis, for example, faced severe problems in obtaining credit. Policy instruments have to be more aptly designed in order to make them accessible to a wide range of firms in the event of a crisis.

Turning to Hungary, the corresponding country report documents the internationalisation patterns of Hungarian firms. There are two key features of Hungary that were found important to investigate. First, Hungary is a small, open economy – much more open than any other country in the sample. This materializes also in the export intensity of its firms (see Table 4).

**Table 4 - Export intensity: share of firms by export to sales ratio**

| | Share of firms in sample | | |
|---|---|---|---|
| Intensity brackets | HUN | AUS | EU |
| 0-10% | 20% | 23% | 26% |
| 50%-60% | 5% | 4.5% | 6% |
| 90%-100% | 23% | 15.5% | 5.5% |

(Source: Békés, G., Halpern, L., Koren, M. and Muraközy, B. (2012) "How did exporting firms cope with the crisis? ", *EFIGE Country Report*, 8)

Hungarian exports are heavily concentrated on few firms. These firms are mostly subsidiaries of large multinationals serving EU markets. The quality of Hungarian exports is competitive on the European markets, but this quality is mainly supported by the R&D and innovation of foreign parent firms. The success of this type of economy depends on how widely and deeply the supply chain is based on the domestic economy. In this respect there seems to be a great divide between firms that are able to be part of the suppliers and those which are excluded.

Second, Hungary is known for its political business cycle which has been the strongest of countries that joined the European Union in the 2000s. As a result its macroeconomic policies had to move in an opposite direction when the crisis hit; fiscal and monetary tightening was necessary when most countries could rely on massive temporary relief and easing in order to contain the dire consequences on output and

employment. These polices may have affected the performance of companies and represent an interesting angle on the relationship between macro policy and the response of firms.

Four policy conclusions can be drawn. First, it should be noted that firms in Hungary do not behave very differently from other EU countries in many respects. While Hungarian firms are smaller and less open to trade with countries outside Europe, export and innovation performance is not very different. Thus, Hungary may well use policy ideas from other economies such as labour market reforms in Germany. Second, Hungary serves as an export platform for some very large companies, which sell 90-100 percent of their output abroad. Making sure these companies can continue to operate is important for growth. Third, internationalisation is important for Hungarian firms and hence, policies should aim to increase the number of firms not only in exports, but imports, FDI and outsourcing as well. Hungary is lagging behind in terms of contacts with outside Europe; this should be addressed. Fourth, as a consequence of poor policy management before the crisis, fiscal policy was retracting just when it should have been there to cushion the fallout from the crisis. This caused domestic sales to fall more than in other countries and more firms suffered from the crisis. This shows that sound fiscal policy has also an option value – the potential for application in a crisis.

The country report on Italy starts from the observation that competing in a global environment requires an increasing level of 'sophistication' in firms' investment, innovation, internationalisation and organisation strategies. The report focuses on several questions on the Italian manufacturing structure. What is the comparative level of sophistication of Italian firms' strategies? The report looks at three areas of firm activity (internationalisation, innovation and human capital) by depicting firms' complexity, or their 'quality', through a wide spectrum of variables that capture their intangible assets endowment. The report singles out several indicators of a sophisticated firm and investigates how they are related among themselves and with firm size, comparing Italian firms' performance with respect to France, Germany and Spain. Do Italian firms behave like their European competitors? Along which dimensions do they differ? Do these differences disappear when comparing firms belonging to the same size class? Is the relationship between a firm's quality and size similar across countries? Answering these questions allows to show whether Italian firms suffer a gap in their degree of sophistication with respect to other European countries, and along which specific dimensions.

As a further step, the country report on Italy investigates a potentially relevant aspect that can be a driver of firms' strategic choices: their financial structure. More complex strategies imply more elaborated financial needs. Intangible assets do not always embed physical collateral to be held as a guarantee to external financiers.

Overall, as shown in Table 5, the Italian corporate sector shows a lack of sophistication with respect to France and Germany while is broadly in line with Spain. The gap with the other European countries is not only driven by the Italian firms' size distribution, but also by a lower performance with respect to the main European counterparts within each size class. Also, their analysis shows that large Italian firms are characterised by a less fragile financial structure than small- and medium-sized firms, and that firms with a less fragile financial structure are more sophisticated. The findings highlight the specific areas where Italian firms lag behind their European competitors and that should be targeted by policy intervention. At the same time, the report argues that, in order to be effective, policy intervention should pay attention to the financial and banking system's ability to assess the intangible assets of firms, which are required in the current global competition environment.

**Table 5 - International activities by country**

| Indicator | FRA | GER | ITA | SPA |
|---|---|---|---|---|
| Exporters (%) | 58.52 | 59.97 | 72.16 | 61.06 |
| No. of export destinations* | 11.08 | 13.36 | 10.71 | 8.39 |
| Exporters to emergent countries* | 22.23 | 27.3 | 17.71 | 10.76 |
| Prod. to order for foreign firms** | 48.13 | 42.70 | 47.27 | 25.23 |
| Purch. of customised goods abr. (%) | 30.46 | 11.70 | 7.75 | 7.46 |
| FDI-Makers (%) | 3.88 | 5.79 | 2.46 | 2.74 |

*Only for the population of exporters
** Only for the population of firms producing to order

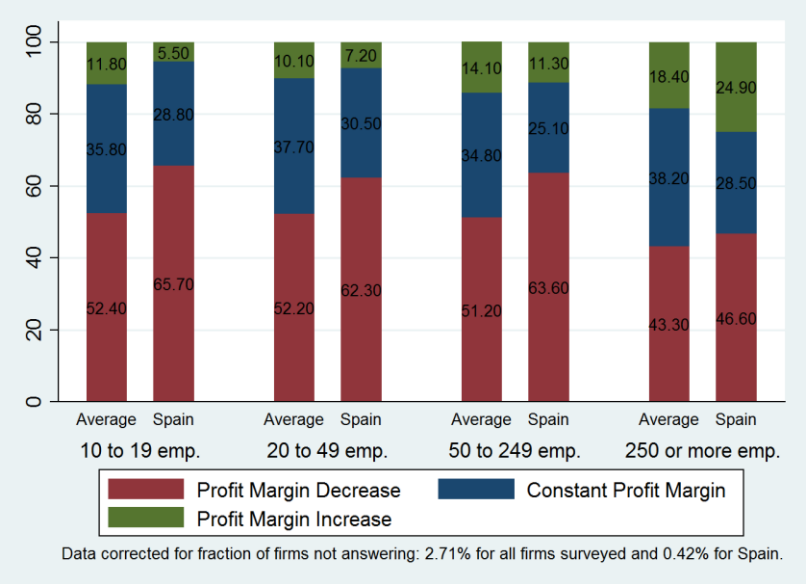
(Source: Cerisola, S., D'Alfonso, E. Felice, G. Giannangeli, S. and Maggioni, D. (2012) "Investment in intangible assets and level of sophistication: the role of Italian firms' financial structure", *EFIGE Country Report*, 10)

Of the large European countries, Spain has been arguably hit the hardest by the economic crisis. While the extent of the crisis is evident in many aggregate macroeconomic indicators, such as the sharp increase in unemployment and the slow recovery of GDP growth, these indicators mask systematic differences at the firm level. The country report analyses the heterogeneity of firm performance across countries, and singles out differences that set Spanish firms apart. Given the high degree of firm heterogeneity, understanding

the crisis at the firm level is key to the designing of targeted policies, and thus improving the effectiveness of economic policy.

The report finds that the poor performance of Spain appears to be mainly accounted for by the relative predominance of small firms. As shown in Figure 8, the Spanish firms that clearly fared worse than their European neighbours are the small firms: 65.7% of small Spanish firms (10-19 employees) report decreases in their profit margin while the survey average is 52.4%. For large firms, instead, although there is a larger share of firms reporting a decrease in profit margin in Spain than the survey average, 46.6% versus 43.3%, the share of firms reporting an increase is significantly larger, 24.9% versus 18.4%. These findings suggest that policies should focus on identifying and reducing firm-size distortions that negatively affect the growth of small firms.

**Figure 8 - Share of firms by change in profit margin for all firm sizes (number of employees): Spain and survey average (2008-2009)**




(Source: Crespo, A., Desmet, K. and Esteban, S. (2012) "Did Spanish firms perform worse in the wake of the 2008 crisis? ", *EFIGE Country Report*, 4)

Finally, for the United Kingdom, the country report focuses on the impact of the financial crisis. In particular, it studies the spatial dimension of the available information and provides a number of indicators of the degree of internationalisation of UK firms across regions. A key contribution of this report, which is

particularly relevant to policy makers, is to provide the first firm-level analysis of the response of UK firms to the 2008-09 financial crisis.

The analysis highlights small systematic differences across firms according to their ownership structure, size and internationalisation status. Nevertheless, as shown in Table 6, results further indicate that there are no systematic regional differences with respect to the drop in firms' turnover during the crisis. Indeed, the share of firms experiencing a drop in turnover is very similar across all firm-type/region combinations. In terms of the margins of the crisis, it is shown that the drop in turnover was not due to a reduction in the product portfolio of firms but rather to a decline in the value of product sold. Given the substantial amount of sunk-type investment costs involved in changing the product scope, the shadow of the crisis might thus be shorter than its scale initially suggested.

**Table 6 - Share of exporters that experienced a turnover drop during the crisis: By percentage turnover reduction and region**

| Turnover reduction | Far North | North | Centre | South |
|---|---|---|---|---|
| *<10%* | 18.90 | 19.90 | 16.20 | 19.20 |
| *10-30%* | 29.60 | 32.30 | 34.70 | 29.00 |
| *>30%* | 11.20 | 11.70 | 15.00 | 12.70 |
| *No reduction* | 39.40 | 34.70 | 33.80 | 38.60 |
| *Missing information* | 1.00 | 1.40 | 0.30 | 0.50 |

(Source: Mion, G and Ulltveit-Moe, K. (2012) "UK firms, space and the crisis", *EFIGE Country Report*, 12)

## 5. Conclusions

From the rich body of new knowledge created by EFIGE, we can draw some broader lessons for fact-based policy making in Europe and beyond its borders.

The first lesson is a methodological one: whereas ten years ago economists and policymakers routinely discussed competitiveness on the basis of aggregate trade and investment flows, nowadays it has become unimaginable to overlook the firm-level dimension of international economic performance. Nations do not trade, it is firms that trade. This simple truth has become obvious and to speak of competitiveness without speaking of firms is now as awkward as to speak of employment without speaking of job destruction and creation. We are proud to have contributed to this intellectual and policy revolution.

Second, there is a strong and robust correlation between firm internationalisation and firm performance. Simply put, and as documented again in this report, a firm that exports tends to be also more profitable, more productive and more innovative. Again this may seem evident – but if it were to everyone, would globalisation be so disputed?

Third, the evidence collected within the framework of the project has confirmed to a remarkable extent that in different countries, firms with the same characteristics tend to behave in the same way with respect to international competition. German entrepreneurs may have a stronger propensity to export and invest abroad, but this is not what explains Germany's strong presence on international markets. Rather, it is the density of medium-sized, skill-endowed and innovative firms that explains German export performance. In this respect this report brings new evidence to the fore, showing that in comparison, the less stellar trade performances of Italy and Spain are due to the much higher density of small firms. German firms do not trade better, but more German firms trade.

Fourth and consistent with the previous findings, to let domestic firms grow is one of the surest ways to improve export performance. But as demonstrated throughout the project, how to tear down barriers to growth is a country-specific question. Obstacles can be of different natures – they can originate in product,

labour, technology and financial markets – and the binding constraints may be different from one country to another. So there is no one-size-fits-all recipe for firm growth and exports, rather each government must do its homework and identify domestic roadblocks.

Fifth, the relationship between firm characteristics and internationalisation is highly non-linear. Exports and FDI involve fixed costs and this gives rise to threshold effects. For this reason, long-distance exports and, to an even greater extent, FDI rely on a tiny group of truly global firms. In comparison to those serving the domestic market, only a minority of firms are serving even the closest neighbouring market. From a policy perspective, this implies that the highest returns from public action are to be expected from initiatives that 'fatten the tail' of globally competitive firms. If this can be done without picking the winner is a question of major relevance for all governments looking for ways to improving competitiveness.

As a testimony of the project's socio-economic impact, the findings, the insight and the lessons from EFIGE have received considerable attention by the policy community. EFIGE partners have been invited to present them in high profile events at key policy institutions such the European Commission, the Bank of Italy, the Bank of Spain, the Banque de France, the OECD, the IMF, the World Bank, the WTO, the ILO, the United Nations Conference on Trade and Development (UNCTAD) and, last but not least, the European Central Bank within the CompNet framework. At the beginning of EFIGE there was a clear commitment by the partners to maintaining the momentum after the funding has finished. New far-reaching initiatives like CompNet testify the fulfilment of the initial commitment.

# Methodological Appendix

### *The EFIGE Dataset*

At the heart of the project lies the EU-EFIGE/Bruegel-UniCredit dataset, a unique firm-level dataset constructed in order to obtain representative samples of manufacturing firms (with a lower threshold of 10 employees) across European countries. In particular the dataset includes around 3,000 firms for Germany, France, Italy and Spain, more than 2,200 firms for the UK, and some 500 firms for Austria and Hungary, as reported in Table A.1 below (see additional Tables in Annex 1 for more details on the sample).

**Table A.1: The EFIGE dataset by country**

| Country | Number of firms |
|---|---|
| Austria | 443 |
| France | 2,973 |
| Germany | 2,935 |
| Hungary | 488 |
| Italy | 3,021 |
| Spain | 2,832 |
| UK | 2,067 |
| Total | 14,759 |

*Source*: EFIGE Survey dataset. Industry codes are not available for 316 firms.

Variables of interest have been collected for each firm through a survey questionnaire. In particular, the questionnaire contains both qualitative and quantitative data on firms' characteristics and activities, for a total of around 150 different variables split into six different sections: Proprietary structure of the firm; Structure of the workforce; Investment, technological innovation and R&D; Internationalization; Finance; Market and pricing. All questions mainly concern the year 2008, with some questions asking information for 2009 and the previous years in order to have a picture of the effects of the crisis as well as the dynamic evolution of firms' activities.

An interesting characteristic of the EFIGE dataset is that, on top of the unique and extensive cross-country firm information contained in the survey, data can be matched with balance sheet information. In particular, the EFIGE data have been integrated with balance sheet data drawn from the database

AMADEUS managed by Bureau van Dijk, retrieving nine years of usable balance sheet information for each surveyed firm, from 2001 to 2009. These data can be used to further improve on the characterization of firms included in the survey, in particular by enabling the calculation of firm-specific measures of productivity.

The merging with balance sheet data makes it possible the validation of the data along two different dimensions. First of all, it is possible to compute the correlation over time (2001-2009) between some measures of firm performance aggregated from the EFIGE representative samples (with proper weights, see *infra*) at the country level vs. official statistics provided by Eurostat (Structural Business Statistics for manufacturing firms >10 employees). For example, Eurostat reports the average wage paid in the manufacturing industry by firms with more than 10 employees for each country-year. It is thus possible to correlate the latter figures with the micro-based averages obtained, for the same country-year pairs, by the (weighted) aggregation of the 'cost of employees' item reported in the balance sheets of each firm in the sample.1

The correlations for the comparable measures are reported in table 4 below.

**Table A.2**

**Correlations between AMADEUS and Eurostat variables**

| | |
|---|---|
| Number of Employees | 0.61*** |
| Revenues/Production value | 0.52*** |
| Cost of Employees/Wages | 0.71*** |
| Labour Productivity | 0.84*** |

NOTE: Observations are country-year-specific averages (weighted in AMADEUS sample). Eurostat data are derived from Structural Business Statistics, Manifacturing, over 10 employees.

Note also that correlations for countries with particularly good quality in balance sheet data (France, Italy, Spain) are always above 90 per cent (in Germany, Austria, Hungary and UK the EFIGE sample of firms has a number of missing observations in the balance sheet data reported by Amadeus).

It is also possible to calculate the nominal and real productivity dynamics of the EFIGE sample firms over time, and compare them to similar aggregate statistics (in this case retrieved from the STAN dataset of the OECD). The latter is reported in table A.3 below.

[1] Note that the EFIGE sample is built in order to be representative for the year 2008, while in this exercise we use the balance sheet data of the same balanced sample of firms to compute averages over time. To the extent that representativeness might vary over time due to entry/exit, our correlations with official statistics might degrade.

**Table A.3 – Labour productivity growth**
**Comparison between EFIGE (merged with Amadeus) and OECD- STAN**

| Country | Year | STAN not deflated | Amadeus-Efige not deflated | STAN manufacturing deflator | Amadeus-Efige, manufacturing deflator | Amadeus-Efige, 2-digit deflator |
|---|---|---|---|---|---|---|
| France | Δ(2008-2001) | 9.80 | 10.24 | 12.63 | 12.62 | 14.14 |
| Spain | Δ(2008-2001) | 9.57 | 9.66 | 1.55 | 1.13 | -0.11 |
| Italy | Δ(2008-2001) | 6.38 | 7.95 | -2.00 | -0.51 | -1.51 |

Note: France and Spain do not have information on employees for 2008 in the OECD-STAN database: the aggregate values refer to 2007

Finally, using data directly from the EFIGE Survey it is technically possible to compare the extent to which the exercise is able to replicate the extensive margin of export activities (number of exporters over total firms) reported by other national sources in different countries. A number of caveats apply in this case: first, due to the granularity of the export variable, while the propensity to export tends to increase with a firm's size, the relation has a certain variance, and thus, in a survey like EFIGE, it is not granted ex-ante that by analyzing individual firms, even stratified by size, one is able to pick actual exporters. Second, given the characteristics of the sample (manufacturing firms with more than 10 employees), it is also difficult to match the retrieved extensive margin with a comparable figure in other national sources in a specific year, as information with a similar level of detail on exporters is often not publicly available. For this reason, we have used a number of different, not necessarily official, national sources to compare extensive margins. With these caveats, table A.4 below builds a tentative match between the extensive margin reported in the EFIGE survey and the most similar statistics available at the national level, by size class of firms.

**Table A.4: Extensive margin of export (% of exporting firms)**

| | Firm size class | | | | | |
|---|---|---|---|---|---|---|
| | *Between 10 and 49* | | *Between 50 and 249* | | *More than 249* | |
| Country | EFIGE | National source | EFIGE | National source | EFIGE | National source |
| France * | 59.9 | 66.7 | 75.0 | 83.9 | 87.9 | 93.5 |
| Germany * | 59.4 | 60.6 | 77.8 | 78.6 | 80.0 | 90.6 |
| Hungary | 61.7 | 61.6 | 79.3 | 85.1 | 97.4 | 96.0 |
| Italy | 69.9 | 65.4 | 86.6 | 86.5 | 92.6 | 96.7 |
| Spain | 57.9 | 45.2 | 76.2 | 80.8 | 88.0 | 92.2 |
| UK | 59.6 | 39.5 | 77.1 | 66.2 | 81.1 | 77.6 |

* > 20 employees to match national sources

National sources (data for Austria not available)

FRANCE EAE survey > 20 employees, year 2007.
GERMANY Statistisches Bundesamt: AFiD Panel Industrieunternehmen, YEAR 2006.

| | |
|---|---|
| HUNGARY | APEH, 2008 |
| ITALY | ICE/ISTAT + EUROSTAT, YEAR 2007 |
| SPAIN | Central de Balances (Annual Survey of Firms) and Balanza de Pagos (Balance of Payments), |
| UK | "Firm level empirical study of the contribution of exporting to UK productivity growth - (2007)", R. Harris & Q. Cher Li, 21 May 2010 UKTI; |

### *The EFIGE Survey*

The data collection has been performed through a survey carried out by a professional Contractor (GFK, the fourth largest market research company in the world), with the aim of gathering both qualitative and quantitative information at the firm level. The questionnaire submitted to the firms (attached in Annex 2) covers different topics:

- general information, such as company ownership and control
- business groups
- workforce employed in the firm
- investment, technological information and related financing
- research and development, innovation and training activities
- export and internationalisation processes
- market structure and competition
- financial structure and bank-firm relationship

These topics are organized around six different sections in the questionnaire for a total of some 150 items.

In order to ensure standard statistical representativeness of the collected data, the dataset has been built so as to fulfil three criteria:

1 – The availability of an adequately large target sample of firms, initially set at around 3000 firms for large countries (Germany, France, Italy, Spain and the UK), and some 500 firms for smaller countries (Austria and Hungary), i.e. a foreseen total of 16,000 operable questionnaires (the exact numbers by country have been defined in accordance with country-specific sampling procedures)[2]
2- A minimum response rate of 85-90% for 5 to 10 key questions previously agreed; a minimum response rate for 10/15 important questions not below 70%; an overall average of response rates not below 60% for the remaining part of the questionnaire.
3- A proper stratification of the sample in order to ensure representativeness of the collected data ex-ante and ex-post for each country; in particular three dimensions have been used for the stratification of the sample: industries (at the NACE-2 digit level of aggregation), regions (at the NUTS-1 level of aggregation)

[2] It was found, for example, that the number of manufacturing firms in the UK does not allow to build a 'random' sample larger than 2,000 firms. Similar considerations led to the figure of 500 firms for Hungary and Austria, as increasing the number of observations in those cases would have de facto implied a census of all existing firms in given cells of the underlying stratification. Annex I reports the precise number of firms by country, industry and class size.

and size class (10-19; 20-49; 50-250; more than 250 employees). Given their relevance in aggregate competitiveness dynamics, but a relative 'thin' weight in a standard stratification of the population of firms, large firms have been oversampled (doubling their weight as per the original stratification criteria).

In order to achieve these targets in terms of representativeness, ensuring at the same time an appropriate randomization of each cell in the stratification, the typical response rates in these type of surveys are such that at least 25,000 firms should be contacted, on average, in each large country and some 5,000 in the smaller countries, for a total of a minimum of 135,000 firms to contact for all 7 countries.

Another request in carrying out the survey was the ability to match the information retrieved through the questionnaire for each surveyed firm with balance sheet information of the same firm. The latter left the AMADEUS dataset managed by Bureau van Dijk as the only feasible databank from which extracting the initial list of companies to contact.[3]

In terms of organization of activities and timing, the survey set up around three sequential phases. First, the research teams, together with the Contractor, have jointly worked for around two months to lay down the preparatory ground work:

- initial draft version of the questionnaire and its translation in the different national languages;
- definition of a minimum response rate for some key questions;
- sampling and stratification criteria, with a specific proposal on the oversampling of large companies;
- definition of the survey methodology (CATI, CAWI and a mixed method) for the different classes of firm;
- structure of the Field Reports to be regularly provided by the Contractor in order to constantly monitor the quality of the survey collection
- specific training for the responsible personnel working on the survey, given the technical nature of some of the questions.

A second phase of the survey activities, lasting around four months, has been dedicated to validating the survey strategy, through a pilot exercise in which some 100 firms from large countries and some 50 firms from small countries (trying to achieve a more or less stratified sample) have been interviewed. The validation exercise in particularly was carried out to explore four different dimensions: modalities of contact with the surveyed company (to enhance the likelihood of initial acceptance of the interview); clarity vs. ambiguity of the questionnaire, including quality of the translation into local language, and thus average

[3] The AMADEUS dataset contains balance sheet data over time for more than 20 million companies in the European Union. The initial list extracted from AMADEUS included for every country name, fiscal id, address and telephone numbers of firms, together with basic balance sheet data. According to the specification required by the project, the list was composed of firms having at least 10 employees in the manufacturing and related industries.

response rate; ease of answer and thus total time of the interview (which had to be contained in any case to around 45' at the max); smoothness of automatic built-in filters in the questionnaire.

Based on these results, the questionnaire, and the survey strategy in general, have been fine tuned by the research teams together with the Contractor, in order to maximise the outcome of the actual field work for the entirety of the sample, thus leading to the third and final phase of the survey.

The latter has seen the actual administration of the questionnaire to the sample, until the targets in terms of numerosity as well as representativeness where achieved in each country, with regular meetings in order to ensure the smoothness of the exercise throughout. This phase lasted from January to end of May 2010. [4]

Once the survey was finalised and the rough data transferred from the Contractor to the research teams, these data have been reorganised in a STATA compatible format. A data map has been provided to allow each researcher to link variable labels with the questionnaire, as well as take into account (when relevant) possible filters in the questionnaire (according to which not each company replies to each question). Appropriate weighting procedures to reproduce representative statistics from the sample (where large firms have been over weighted) have also been designed. Finally, based on the company name, EFIGE data have been merged with AMADEUS balance sheet data for a relevant number of variables, and then, once stripped out of reference to any specific firm identifier, distributed to researchers.

### *Assessing Competitiveness from EFIGE Data*

Given their characteristics, EFIGE data can be uniquely used to identify and compare firms across countries in terms of their different modes of internationalization, which can be considered a proxy for the external competitiveness of countries, as the latter is strongly associated to the overall productivity of firms.

In particular, using the EFIGE survey is possible to classify firms along seven, non mutually exclusive, internationalization categories. Firms are considered exporters if they reply "yes, directly from the home country" to a question asking whether the firm has sold abroad some or all of its own products / services in 2008.[5] Concerning imports, we follow the same procedure, distinguishing materials and service imports. With respect to Foreign Direct Investment (FDI) and International Outsourcing (IO), we have exploited a question asking whether firms were running at least part of their production activity in another country: firms replying "yes, through direct investment (*i.e.* foreign affiliates/controlled firms)" are considered as

[4] To ensure a certain degree of homogeneity in response rates, it is important that the actual survey is concluded within a specific period of time, not exceeding six months.

[5] In order to encompass the phenomenon of temporary traders, we have considered as exporter also a firm replying "regularly/always" or "sometimes" to the question "Before 2008, has the firm exported any of its products?". For importing firms, we combine the following questions: firms replying "yes, from abroad" to "In 2008 has the firm purchased any materials (services) for its domestic production?" and firms replying "regularly/always" or "sometimes" to "Before 2008, did the firm purchase any materials (services) from abroad?".

undertaking FDI, while firms replying "yes, through contracts and arm's length agreements with local firms" are considered as pursuing an active international outsourcing strategy.[6] We have then looked at firms involved in international value chains, although not actively pursuing an internationalization strategy, through a question asking whether part of the firm's turnover was made up by sales produced according to a specific order coming from a customer (produced-to-order goods): firms replying positively, and indicating that their main customers for the production-to-order activity are other firms located abroad, are considered as pursuing a passive outsourcing strategy. Hence, a passive outsourcer is the counterpart of an active outsourcer in an arm's length transaction. Finally, thanks to a question that allows identifying the main geographical areas of the exporting activity, we have identified "global exporters", *i.e.* firms that export to countries outside the EU.

Table A.5 provides some descriptive statistics for our seven categories of international firms, as well as the residual category of local firms not active abroad. The questions associated to each international category used here all included in Section D of the survey questionnaire.

As it can be seen, we can identify already at this stage a clear ranking of firm characteristics with respect to the degree of involvement in international activities, in line with the idea that international firms are more 'competitive' than domestic firms. In particular, Table A.5 shows that internationally active firms tend to be larger, have higher sales and are more capital intensive. The position along the turnover ranking tends to increase with the degree of complexity of international activities, from exporter, to importer of material / active outsourcing, to importer of services and FDI. Local firms involved in international value chains ('passive outsourcers') are somewhat smaller than the average of all internationally active firms, but larger than purely local firms.

**Table A.5: International categories of firms – Descriptive statistics (full sample), 2008**

| | N. of firms | Avg. turnover per firm (in 1,000 EUR) | Avg. n. of employees | Avg. Capital stock per employee (in 1,000 EUR) |
|---|---|---|---|---|
| Non Active abroad | 3,402 | 4,443.33 | 31.44 | 152.16 |
| Active abroad | 11,357 | 19,273.46 | 139.85 | 196.4 |
| *of which* | | | | |
| Exporter | 9,849 | 20,494.21 | 151.42 | 199.03 |
| Importer of services | 3,449 | 38,659.98 | 332.12 | 223.57 |
| Importer of materials | 7,298 | 24,976.44 | 191.17 | 200.36 |
| FDI | 719 | 77,637.20 | 334.13 | 239.55 |
| Passive outsourcer | 5,799 | 17,052.42 | 83.96 | 204.98 |
| Active outsourcer | 590 | 24,657.11 | 119.55 | 225.28 |
| Global exporter | 4,016 | 24,777.71 | 103.43 | 222.93 |
| Whole sample | 14,759 | 15,589.29 | 114.52 | 186.59 |

[6] Note that these firms are attributed to the country in which they are located and thus surveyed, although the 'nationality' of the group they possibly belong to may be different.

Source: EFIGE dataset.

Using the merge between EFIGE and AMADEUS it is also possible to go one step further in the assessment between the degree of involvement in international activities and firm 'competitiveness'. From a theoretical point of view, firm competitiveness is best captured by the concept of Total Factor Productivity (TFP). This measures productive efficiency: how much output a firm can produce for any given amounts of inputs. In other words, a firm has higher TFP than a competitor if it is able to produce more output with the same amounts of inputs.

In the merged data it is possible to calculate Total Factor Productivity (TFP) for around 50% of the firms present in the dataset. To that end, we first assign our observational units to industries, and then we run for each industry the Levinsohn and Petrin (2003) semi-parametric production function estimation algorithm. This allows solving the simultaneity bias affecting standard estimates of firm-level productivity, as well as to derive TFP estimates from heterogeneous, industry-specific production functions.[7] More specifically, following standard practice in the literature, output is proxied in the estimations by value-added, deflated using industry-specific price indices retrieved from Eurostat. The labour input is measured by the number of employees, while capital is proxied by the value of tangible fixed assets deflated using the GDP deflator.

Table A.6 reports the average TFP of firms in the different international activities alongside the other firm characteristics already shown in Table A.5, with the sample now limited to those firms for which it is possible to retrieve TFP. As can be seen, the resulting restricted sample does not show any particular bias in terms of representation by category of firms, nor in terms of overall ranking.

[7] Using ordinary least squares when estimating productivity implies treating labour and other inputs as exogenous variables. However, profit-maximizing firms adjust their inputs each time they observe a productivity shock, which makes input levels correlated with the same shocks. Since the latter are unobserved to the econometrician, inputs turn out to be correlated with the error, biasing the OLS estimates of production functions. Olley and Pakes (1996) and Levinsohn and Petrin (2003) have developed two similar semi-parametric estimation procedures to overcome this problem, using investment and material costs, respectively, as proxies for these unobservable shocks.

**Table A.6: International categories of firms – Descriptive statistics (restricted sample), 2008**

| | N. of firms | Avg. turnover (in 1,000 EUR) | Avg. n. of employees | Avg. capital stock per employee (in 1,000 EUR) | Total Factor Productivity | Unit labour cost (in EUR per unit of value added) | Labour productivity (value added per employee in 1,000 EUR) |
|---|---|---|---|---|---|---|---|
| Non Active abroad | 1,514 | 5,298.51 | 31.67 | 156.14 | 0.872 | 0.77 | 50.71 |
| Active abroad | 5,921 | 24,623.51 | 152 | 200.01 | 1.024 | 0.78 | 57.55 |
| *of which* | | | | | | | |
| Exporter | 5,201 | 26,104.12 | 164.41 | 203.19 | 1.033 | 0.77 | 58.09 |
| Importer of services | 1,900 | 50,004.76 | 372.81 | 230.61 | 1.159 | 0.84 | 61.81 |
| Importer of materials | 3,939 | 31,647.82 | 208.25 | 203.31 | 1.058 | 0.79 | 58.43 |
| FDI | 387 | 98,554.23 | 359.7 | 238.08 | 1.293 | 1.05 | 63.35 |
| Passive outsourcer | 2,965 | 20,763.66 | 84.31 | 208.06 | 1.06 | 0.79 | 59.86 |
| Active outsourcer | 306 | 32,991.62 | 127.39 | 224.94 | 1.066 | 0.76 | 56.03 |
| Global exporter | 2,211 | 28,345.27 | 104.42 | 224.77 | 1.094 | 0.79 | 62.56 |
| Whole sample | 7,435 | 20,303.82 | 125.6 | 190.39 | 0.991 | 0.78 | 56.05 |

Source: EFIGE dataset. Notes: Numbers are weighted sample averages. TFP is the Solow residual of the production function.

Table A.6 also reports two additional measures of firm level 'competitiveness', namely labour productivity (value added per employee) and unit labour costs (total wage bill per unit of output, ULC). These are commonly used measures of competitiveness. In particular, unit labour costs at the firm-level constitute the building block of aggregate measures of competitiveness such as the real exchange rate, and as such are interesting to compare with our estimated TFP.

The relative correlations between the retrieved measures of TFP, labour productivity and ULC are reported in Table A.7. As can be seen, TFP and labour productivity are positively and significantly correlated at 70 per cent, in line with the findings of the literature. More surprising, however, are the relatively small (albeit correctly signed and significant) correlation coefficients between the two productivity measures and unit labour costs, which are below 30 per cent. Such a low correlation casts some doubt on the actual meaning of aggregate measures of competitiveness based on ULC.

**Table A.7: Correlations between measures of firm competitiveness**

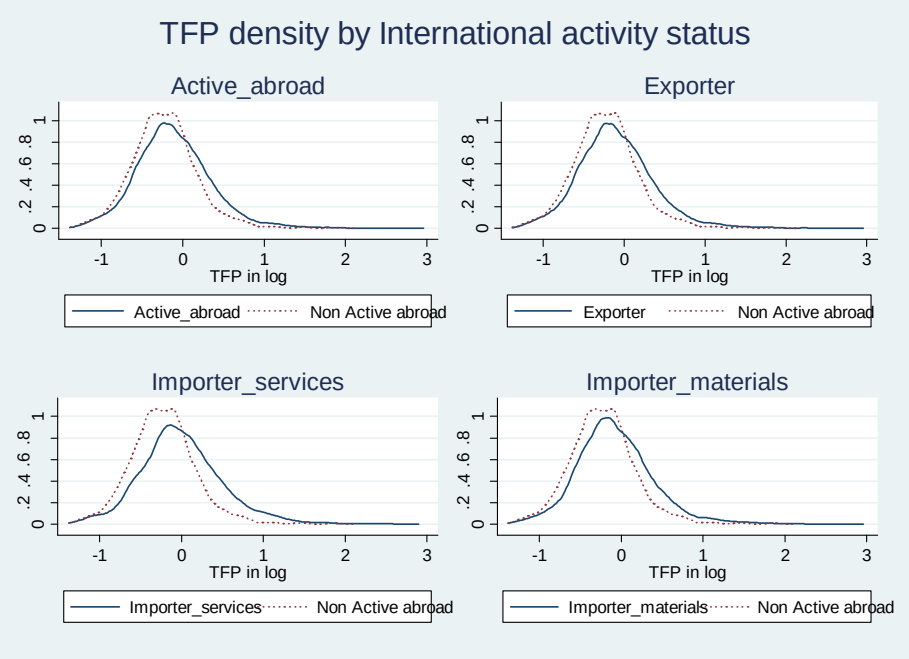
| | TFP | Labour productivity |
|---|---|---|
| Labour productivity | 0.695*** | |
| Unit labour cost | -0.277*** | -0.267*** |

Source: Authors' calculations based on EFIGE and Amadeus datasets.
***denotes statistical significance at the 1-percent level.

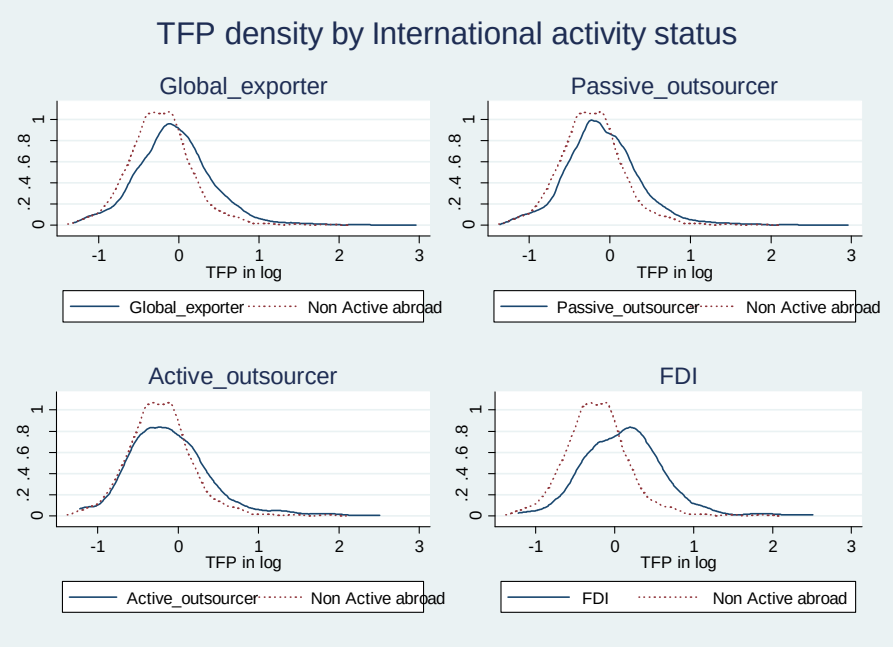
Based on these correlations, and the validation of productivity dynamics previously reported, we stick to productivity as our 'preferred' measure of firm-level competitiveness (vs. ULC).

A standard way of showing selection into different internationalization activities is to draw the kernel density estimates of the productivity distribution for firms involved in each of these activities, and compare it with those of firms that are inactive at the international level. A kernel density shows the shares of firms ('density') that attain each productivity level, that is, the probability of picking a firm with a certain productivity level when the firm is randomly drawn from each category of activities. The comparisons are depicted in Figure A.1 (panels (a) and (b)), where it has to be kept in mind that internationalization categories are not mutually exclusive as firms can be engaged in more than one international activity at a time. Thus, the sample sizes might vary and overlap (see Table A.5 for details).

**Figure A.1: TFP and internationalization**



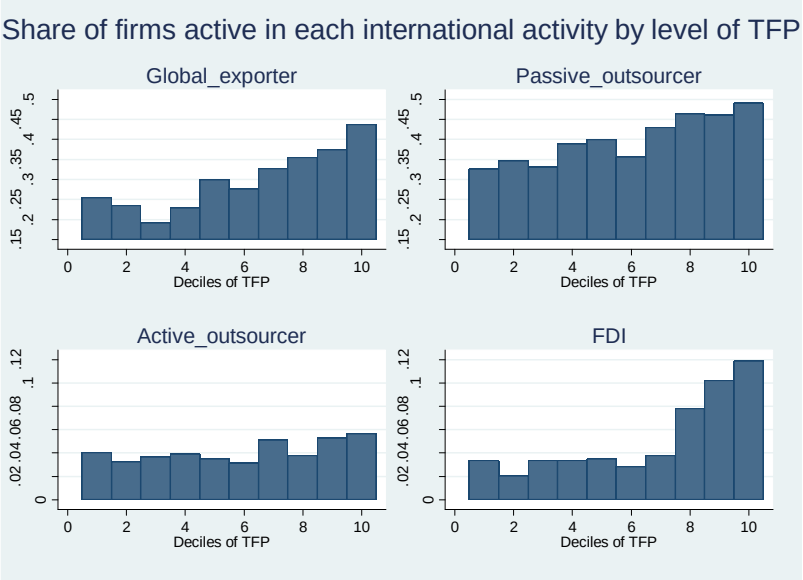

(a) All internationalizers and traders




(b) Offshorers and outsourcers

**Figure A.2: TFP and internationalization**


(a) All internationalizers and traders




(b) Offshorers and outsourcers

Both panels of Figure A.1 send the same message: a randomly drawn firm that is active internationally is likely to be more productive than a randomly drawn firm that is inactive internationally. The fact that the productivity densities vary across internationalization categories suggests that the costs associated with international operations might vary across the different activities. To deepen the investigation of this point, we analyze next how the probability that a firm is active in each international activity is associated with the observed level of productivity.

In particular, Figure A.2 shows the 'extensive margin' (number of active firms over total number of firms) of each internationalization activity by decile of productivity. The first thing to notice is the overall upward slope of the histograms when moving from left to right, that is from low to high productivity deciles. In line with the literature, this points out that the higher the productivity decile, the more likely it is for firms to be involved in some international activity. In other words, more productive firms self-select into internationalization status. However, the richness of information in our dataset allows us to go further than that, distinguishing the various internationalization activities in terms of selectivity.

To see this, let us focus on the top decile (10), *i.e.*. on the most productive 10 per cent of all firms. The top right graph in panel (a) of Figure 3 reveals that among the firms in that decile slightly more that 90 per cent are internationally active one way or another. Nonetheless, the categories of internationalization activities differ a lot in terms of popularity: slightly less than 85 per cent of firms are exporters; two thirds of them are importers of materials; almost 50 per cent of firms are importers of services or passive outsourcers; just below 45 per cent of firms are global exporters; less than 15 per cent are involved in FDI; and just above 5 per cent are active outsourcers.

These findings reveal a clear ranking of internationalization activities from low selectivity (exporting) to high selectivity (active outsourcing) that hint at a growing degree of complexity when moving from exporting to FDI and active outsourcing. Thus, firms with stronger competitiveness have access to a larger number of more complex options when it comes to designing their international operations. Stronger competitiveness implies having the possibility of exploiting a richer toolbox to deal with the challenges and seize the opportunities of globalization.

These finding are also confirmed by econometric evidence taking into account country and industry characteristics (not reported here): the 'productivity premium' increases with the complexity of internationalization activities. FDI and the import of services are associated with the largest TFP premia, followed by outsourcing activities and finally simple import and export strategies. Not surprisingly, however, 'complex' export strategies as proxied by the ability of firms to export beyond the EU are associated with higher premia, comparable to the ones derived from outsourcing activities.

# Annex I – The EFIGE Sample

**Table Annex 1: Distribution of firms by country and size class**

| Class size | AUT | FRA | GER | HUN | ITA | SPA | UK | Total |
|---|---|---|---|---|---|---|---|---|
| Employees (10-19) | 132 | 1,001 | 701 | 149 | 1,040 | 1,036 | 635 | 4,694 |
| Employees (20-49) | 168 | 1,150 | 1,135 | 176 | 1,407 | 1,244 | 805 | 6,085 |
| Employees (50-249) | 97 | 608 | 793 | 118 | 429 | 406 | 519 | 2,970 |
| Employees(over250) | 46 | 214 | 306 | 45 | 145 | 146 | 108 | 1,010 |
| Total | 443 | 2,973 | 2,935 | 488 | 3,021 | 2,832 | 2,067 | 14,759 |

**Table Annex 2: Distribution of firms by country and sector**

| *Sector* | AUT | FRA | GER | HUN | ITA | SPA | UK | Total |
|---|---|---|---|---|---|---|---|---|
| *15* | 32 | 212 | 350 | 62 | 238 | 463 | 147 | 1,504 |
| *17* | 8 | 118 | 77 | 7 | 196 | 46 | 52 | 504 |
| *18* | 5 | 55 | 17 | 17 | 109 | 50 | 42 | 295 |
| *19* | 0 | 32 | 13 | 4 | 115 | 47 | 10 | 221 |
| *20* | 21 | 93 | 103 | 17 | 88 | 212 | 89 | 623 |
| *21* | 10 | 83 | 62 | 16 | 71 | 27 | 47 | 316 |
| *22* | 34 | 148 | 215 | 27 | 105 | 100 | 208 | 837 |
| *24* | 5 | 102 | 95 | 20 | 108 | 121 | 104 | 555 |
| *25* | 22 | 226 | 192 | 40 | 169 | 148 | 122 | 919 |
| *26* | 18 | 153 | 94 | 30 | 167 | 163 | 56 | 681 |
| *27* | 13 | 68 | 58 | 7 | 76 | 68 | 54 | 344 |
| *28* | 70 | 839 | 510 | 101 | 611 | 580 | 301 | 3,012 |
| *29* | 48 | 249 | 503 | 68 | 381 | 305 | 208 | 1,762 |
| *31* | 20 | 121 | 134 | 19 | 152 | 66 | 124 | 636 |
| *32* | 5 | 94 | 56 | 9 | 49 | 25 | 101 | 339 |
| *33* | 15 | 58 | 192 | 6 | 71 | 25 | 80 | 447 |
| *34* | 6 | 73 | 41 | 11 | 47 | 64 | 33 | 275 |
| *35* | 2 | 16 | 20 | 3 | 33 | 42 | 21 | 137 |
| *36* | 5 | 16 | 172 | 18 | 211 | 258 | 258 | 938 |
| *Total* | 339 | 2,756 | 2,904 | 482 | 2,997 | 2,810 | 2,057 | 14,345 |

Note: Sector 15 is merged with sector 16 and sector 31 is merged with sector 30.