Economics Bulletin

Volume 35, Issue 1

# Firm age and the margins of international trade: Comparable evidence from five European countries

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## Abstract

This note uses comparable representative data for manufacturing firms from five European countries (Germany, France, Italy, Spain, and the United Kingdom) to investigate the links between firm age and the participation of the firms in export, the share of exports in total sales, the number of countries exported to, and the participation in import. The big picture revealed is in line with the theoretical considerations. Older firms tend to be more often exporters and importers, they export to more different destination countries, and they export a higher share of their total sales in three out of five countries.

I thank two anonymous referees for suggestions that helped to improve the paper considerably. The firm-level data used in this study are available from the web; see www.efige.org and section 2 of this paper for details. To facilitate replications the Stata do-files used are available from the author on request.

**Citation:** Joachim Wagner, (2015) "Firm age and the margins of international trade: Comparable evidence from five European countries", *Economics Bulletin*, Volume 35, Issue 1, pages 145-158
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**Submitted:** September 23, 2014. **Published:** March 11, 2015.

## 1. Motivation

Reliable empirical evidence on the links between firms' success on international markets and the characteristics of firms is important to inform the design of economic policies that aim to promote international trade, and to guide trade theorists in their attempts to build theoretical models of trading firms that are not at odds with reality. Over the past 20 years a huge literature emerged that uses micro data to investigate econometrically the links between exports or (to a lesser extent) imports and various dimensions of firm performance. The literature started with two seminal papers by Bernard and Jensen (1995, 1999) that used firm level data from the US to document differences between exporting and non-exporting firms even within narrowly defined industries and controlling for firm size. Further empirical research looked at the determinants of firms' entry into export markets (e.g., Bernard and Jensen 2004). In a next step transaction-level data on firms and trade were used to investigate the margins of exports and imports, i.e. the number of goods traded and the number of countries traded with (see Bernard et al. 2007). Furthermore, links between other forms of international firm activities besides trade and various dimensions of firm performance were investigated. For recent surveys of this empirical literature see Bernard et al. (2012) and Wagner (2012).

From this literature we have empirical evidence for many countries for the links between foreign trade and some important firm characteristics like firm size, human capital intensity, R&D intensity, product and process innovations, capital intensity, foreign ownership, industry affiliation, and productivity. Such comprehensive evidence, however, is lacking on one other firm characteristic, namely firm age. While firm age (or plant age) is mentioned in some of the papers from this literature, studies that investigate the links between age and international trade activities at the level of the firm are rare. This apparent neglect of the role of firm age in empirical models of firms' exports comes as a surprise because we can expect that firm age and export tend to be closely related. David Audretsch (1998, p. 137) points out that "firms are typically created as an experiment to pursue a new idea. If that idea succeeds the firm will tend to grow and create jobs. If that idea is not viable the firm will tend to stagnate and ultimately exit." Although some of these new firms are "born global" firms that head for international markets from the start, typically it takes years before firms eventually export to one foreign market, and then enter other markets progressively. Firms gain expertise in entering new foreign markets from experience and this lowers the fixed costs of entry to any further new market over the next years (see Sheard 2014, p. 536). A similar argument can be made with regard to the number of products exported. If a firm successfully exported one good and learned how to adopt it to the wants of customers or the legal regulations in a foreign market, how to prepare a user manual in a foreign language, how to set up a distribution network etc., this lowers the fixed costs of exporting any other goods, and the firm will start to export more goods in the years to come. Often firms will start to export to a foreign country that is close to their home country and that has low distance costs (including language barriers, differences in legal systems, or cultural differences), and export to more and more distant destinations after several years of experience only.

Similar arguments can be made with regard to the link between imports and firm age. At any point in time, therefore, firm age and the margins of exports and imports can be expected to be closely linked. Empirical evidence on this link, however, is scarce. As regards exports, in a recent micro-econometric study that uses comprehensive data for manufacturing firms from Germany Wagner (2014a) finds that the probability of exporting, the share of exports in total sales, the number of destination countries and the number of goods exported are higher for older firms. A positive link between firm age and export revenue, number of destination countries, and number of products exported has also been found by Bastos and

Dias (2013) in an empirical investigation using Portuguese data. For imports, the only empirical study I am aware of finds that in Germany older firms are more often importers, import more different goods, and import from more different countries of origin (Wagner 2014b).

This note contributes to the literature by using comparable representative data for manufacturing firms from five European countries (Germany, France, Italy, Spain, and the United Kingdom) to investigate the links between firm age and the participation of the firms in export, the share of exports in total sales, the number of countries exported to, and the participation in import. This study keeps in mind that "the credibility of a new finding that is based on carefully analyzing two data sets is far more than twice that of a result based only on one" (Hamermesh, 2000, p. 376). To anticipate the most important finding, the big picture revealed is in line with the theoretical considerations and with findings reported for Germany before. Older firms tend to be more often exporters and importers, they export to more different destination countries, and they export a higher share of their total sales in three out of five countries.

The rest of the paper is organized as follows. Section 2 discusses the data and measurement issues. Section 3 presents the results of the empirical investigation. Section 4 reports results from robustness checks using augmented empirical models and pooled data. Section 5 concludes.

## 2. Data and measurement issues

The lack of empirical studies on the link between firm age and the margins of exports and imports is at least in part due to the fact that suitable data at the level of the firm that include information on firm age are rare. The empirical investigation in this paper uses the EU-EFIGE/Bruegel-UniCredit dataset (the EFIGE data from now on). This database has recently been collected within the project *European Firms in a Global Economy: internal policies for external competitiveness*. It combines measures of firms' international activities with information on firm characteristics (including firm age) for representative samples of manufacturing firms in seven European Economies (Germany, France, Italy, Spain, United Kingdom, Austria, and Hungary). The cross-section data were collected in 2010 and mainly refer to 2008. A detailed description of the EFIGE data is given in Altomonte and Aquilante (2012). An anonymized version of the EFIGE data is publicly available at www.efige.org.

Information on the age of a firm is not included as a continuous variable in the public use data set. Firm age is reported as either "More than 20 years", or "Between 20 and 6 years", or "Less than 6 years". Given the small number of firms that are classified as less than 6 years old firm age is measured by a dummy variable here that takes on the value of one if a firm is more than 20 years old.

The data includes information on three margins of exports of the firm. The firm is classified as an exporter if it sold abroad some or all of its own products/services directly from home country in 2008. The share of exports in total sales is the percentage of the firm's 2008 annual turnover represented by the export activities from its home country. The number of destination countries indicates to how many countries in total the firm exported its products in 2008 from its home country. Note that there is no information available on the number of different goods exported.

As regards imports the data set has information whether the firm was an importer of raw materials and intermediates in 2008 or not. Unfortunately, no information is available on

other margins of imports (imports over total sales, number of countries of origin, number of different products imported).[1]

The data include information on the industry affiliation of the firm. This industry is coded using the NACE-Clio classification, and it is anonymized by replacing this code using a randomly assigned code number that is identical for all firms from a NACE-Clio industry. Therefore, the sector identifier can be used to control for industry fixed effects in empirical models.

With these data it is possible to investigate the relationship between the age of a firm and margins of the firm's exports and imports for representative samples of manufacturing firms from five European countries[2] in a strictly comparable way.[3]

## 3. Results

The empirical investigation uses information on 13,827 enterprises from manufacturing industries in five European countries (Germany, France, Italy, Spain, and the UK) in 2008. Nearly 60 percent of these firms existed already more than 20 years ago; these enterprises are classified as old firms. Table I shows that the share of exporters is larger among old firms than among younger firms in each of the five countries. This difference in the first extensive margin of exports – export participation - can be considered to be large from an economic point of view in all countries with the exception of Germany.

This pattern of a more pronounced export orientation among old firms compared to younger firms does not show up in the extensive margin – the share of exports in total sales – among exporting firms. Table II reports the average share of exports in total sales for both age groups in the five countries. These shares are about the same in Germany, France and the UK and only slightly larger in older firms in Italy and Spain. However, as stated in the discussion of the data in section 2 already, figures on the percentage share of exports in total sales might be fuzzy. This share is directly asked in the questionnaire and not computed from reported values of exports and turnover. This leads to a large share of answers that seem to be estimates (or, maybe, guesstimates) because nearly 50 percent of all reported shares of exports in total sales are "round" figures (10, 20, 30, …, 90, 100).

The link between firm age and exports is again in line with theoretical considerations for the second extensive margins of exports investigated here, namely the number of destination countries of exports. Table III shows that old firms export on average to a considerably higher number of countries than younger firms in all five countries.

Turning to the link between firm age and imports, Table IV documents that old firms have a larger propensity to import than younger firms in all five countries. While this

[1] There is separate information available whether the firm imported services or not in 2008, but this information is not used here due to the small number of firms that were importer of services. Furthermore, there is information about the percentage of all intermediate goods purchased that were purchased from abroad, but this figure does not include raw materials and is, therefore, not used here.

[2] Firms from Austria and Hungary are not included here due to the small sample size for these countries.

[3] While firm age is included as a control variable (that is not discussed in any detail) in empirical models for international firm activities in some papers that use the EFIGE data (see Barba Navarett et al. (2011); Altomonte et al. (2012), p. 43ff.; Licio and Pinna (2013), p. 20ff.) the link between firm age and the margins of trade has not been analyzed systematically with these data. See Barba Navaretti et al. (2014) for an analysis of firm age and firm growth based on the EFIGE data.

difference is rather small in France, it can be considered to be large from an economic point of view in the other four countries considered here.

The bottom line up to now, then, is that old firms export and import more often, and export to a larger number of countries, while this positive link between firm age and international trade is only found for Italy and Spain when it comes to the share of exports in total sales.

The descriptive evidence discussed so far ignores the fact that firms come from different industries that might differ in the mix of old and young firms due to the history of the industries – there might be more younger firms in industries like the manufacture of computer equipment than in the clothing industry – and due to differences in the "openness" to trade between industries caused by transport costs or legal barriers. The next step, therefore, consists of the estimation of empirical models that test for differences in the intensive and extensive margins of exports and imports between old and younger firms from the five countries after controlling for industry affiliation by the inclusion of industry fixed effects. Results are reported in Table V. Note that these models are not used to empirically explain the margins, they are just vehicles to estimate the margin premium of old firms.

The results for model 1 clearly indicate that the probability of participation in exports (the first extensive margin) is statistically significantly higher for old firms in all five countries. The estimated average marginal effects for being an old firm lies between 4.6 and 11.5 percentage points and it can be considered to be large form an economic point of view.

Results for model 2 support in large parts the conclusions drawn from the unconditional comparison of the average share of exports in total sales reported in Table 2. Old and younger firms from France and the UK do not differ in their intensive margins of exports, while this difference is statistically significant and large from an economic point of view for firms from Italy and Spain. The case of Germany is especially interesting here. While the average share of exports in total sales reported in Table II is (marginally) smaller for old firms compared to younger firms, controlling for industry affiliation leads to a statistically significant and large positive premium for old firms of 13 percent.

According to the results for model 3 there is a statistically significant and large premium for old firms in the second extensive margin of exports, the number of destination countries. After controlling for industry affiliation the old firms export to 35 to 48 percent more destination countries than the younger firms.[4]

Results for all countries but France for model 4 show a positive and quite large premium for old firms with regard to the participation in imports. The estimated average marginal effect for being an old firm is between 5 and 10 percentage points after controlling for industry affiliation in Germany, Italy, Spain, and the UK.

Results reported so far are based on empirical models that were estimated for data from firms from one country at a time. Table VI reports results from an empirical model that uses pooled data for firms from all five countries and that includes country fixed effects. Results for firm age are fully in line with the results reported in Table V. Older firms are more often exporters and importers, they export to more different destination countries, and they export a higher share of their total sales.

In a final step results for empirical models that are augmented by a number of control variables that measure firm characteristics which can be expected to be related to both firm age and international trade activities are presented.

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[4] Results from Kolmogorov-Smirnov tests for differences in the distribution of the share of exports in total sales and for the number of destination countries (that are based on industry-demeaned values) reveal exactly the same patterns. To economize on space, these results are not reported here but are available on request.

Results reported in Table V and Table VI are based on empirical models that measure firm age by a dummy variable that takes on the value of one if a firm is older than 20 years, and that do not include any further control variables besides a set of industry fixed effects. Table VIII reports results from regression models with a more detailed classification of firms by age, and with control variables that measure firm characteristics which can be expected to be related to both firm age and international trade activities, namely firm size and financial constraints. Details regarding the specification of the variables are discussed next, followed by a discussion of the results from the augmented empirical models.

As said in section 2, information on the age of a firm is not included as a continuous variable in the public use data set. Firm age is reported as either "More than 20 years", or "Between 20 and 6 years", or "Less than 6 years". Table VII reports the shares of firms from the three age classes in the samples of firms from the five countries. With the exception of the UK firms younger than 6 years are rather rare. Therefore, in the empirical investigation in section 3 firm age is measured by a dummy variable that takes on the value of one if a firm is more than 20 years old. Obviously, information is being lost by grouping firms with less than 6 years of age with firms between 6 and 20 years of age. As a robustness check, therefore, empirical models were estimated with two dummy variables for firms 20 to 6 years old and firms less than 6 years old, using the oldest firms as the reference group.

It is a stylized fact that firm size is positively related to international trade activities (see Wagner (2001)). As is argued in section 1, usually firms start as small ventures and grow over time, so firm size and firm age are related. If international trade is related to firm size, and firm size to firm age, the evidence for a positive link between international trade and firm age might be attributable to firm size. To see whether there is an effect of firm age independent of firm size, the empirical models are augmented by two dummy variables for medium sized firms (with 50 to 249 employees) and large firms (with 250 and more employees), using small firms (with less than 50 employees) as the reference group.[5]

There is evidence from a number of recent empirical studies for several countries that credit constraints can hamper export and import activities of firms (see Wagner (2014c) for a comprehensive survey of this literature). It might be the case that older firms, by having built a good reputation, have easier access to credit, and this allows older firms to export and import more. To control for the possible role of credit constraints in the link between firm age and international trade activities the empirical models should be augmented by an indicator for credit constraints faced by the firms. The problem here is that the EFIGE data at hand do not contain any direct information on the degree of credit constraints faced by the firm (like a credit rating score by a rating agency). Therefore, a proxy variable is used that considers a firm as credit constraint if it did recur to external financing in the period 2008-2009, was willing to increase its borrowing at the same interest rate of its current credit line, did apply for more credit but was not successful. A firm is considered not to be credit constraint if it either did not recur to external financing in the period 2008-2009, or was not willing to increase its borrowing at the same interest rate of its current credit line, or did either not apply for more credit or did apply for it and was successful. Evidently, this is a rather crude proxy variable, but it is the best one can do without access to further information.[6] Hopefully, it at least works as a control variable, even if it does not reveal any convincing evidence on the links between credit constraints, trade activities, and firm age.

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[5] Note that information on the number of employees is not available as a continuous variable in the public use data set of the EFIGE data.

[6] See Altomonte et al. (2012, 2014) for alternative measures of (potential) credit constraints with the EFIGE data that use information not included in the public use data set.

Results for the augmented regression models are reported in Table VIII. The most important result is that the big picture on the link between firm age and international trade activities revealed by the augmented models is quite similar to the one seen in section 3 on the basis of the parsimonious empirical models. Compared to firms that are older than 20 years, firms that are 20 to 6 years old have a significantly smaller propensity to export and export to a smaller number of countries in all five countries. The propensity to import is smaller among these younger firms in four out of five countries (with an insignificant regression coefficient for France) and the share of exports in total sales is smaller is smaller in three countries (with insignificant coefficients for Germany and France). Results for firms from the youngest age class are often in line with these results for firms from the second age class, the estimated regression coefficients, however, are not statistically significantly different from zero at a conventional level in some cases (which might well be due to the small number of very young firms reported in Table VII).

If the augmented model is estimated with pooled data, results reveal a positive link between firm age and all the margins of international trade considered here even after controlling for size. With age, a firm learns whether to expand and whether to export. In some theories, firms grow, and after reaching a certain size, they start exporting (see e. g. Piguillem and Rubini (2013) or Impullitti et al. (2013)). So exporting is related to size, and size to age. While age and exports often go hand in hand, results presented in Table VIII show that they not always do. A firm may choose to grow, and eventually export, or export without growing. These empirical results might guide trade theorists in their attempts in future attempts to build models of trading firms.

## 4. Concluding remarks

This note uses comparable representative data for manufacturing firms from five European countries (Germany, France, Italy, Spain, and the United Kingdom) to investigate the links between firm age and the participation of the firms in export, the share of exports in total sales, the number of countries exported to, and the participation in import. The big picture revealed is in line with the theoretical considerations. Older firms tend to be more often exporters and importers, they export to more different destination countries, and they tend to export a higher share of their total sales. Future empirical research on the determinants of the margins of exports and imports, therefore, should investigate further the role of firm age, ideally using longitudinal data that cover a large time span (and that are not yet available, unfortunately).

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Table I: Firm age and participation in exports: Descriptive statistics

| | Firms older than 20 years | | Firms 20 years old or younger | |
|---|---|---|---|---|
| | Number of firms in the sample | Share of exporters (percent) | Number of firms in the sample | Share of exporters (percent) |
| Country | | | | |
| Germany | 1,812 | 45.92 | 1,123 | 42.74 |
| France | 1,915 | 52.27 | 1,058 | 41.21 |
| Italy | 1,829 | 69.87 | 1,191 | 58.52 |
| Spain | 1,454 | 56.53 | 1,378 | 43.76 |
| UK | 1,183 | 62.21 | 884 | 54.19 |

Source: Own calculations based on the EFIGE data; all figures are for reporting year 2008.

Table II: Firm age and share of exports in total sales: Descriptive statistics

| | Firms older than 20 years | | Firms 20 years old or younger | |
|---|---|---|---|---|
| | Number of firms in the sample | Average share of exports in total sales (percent) | Number of firms in the sample | Average share of exports in total sales (percent) |
| Country | | | | |
| Germany | 882 | 31.06 | 480 | 31.59 |
| France | 1,000 | 29.56 | 435 | 29.74 |
| Italy | 1,278 | 36.81 | 697 | 34.22 |
| Spain | 882 | 28.04 | 603 | 25.19 |
| UK | 763 | 30.89 | 479 | 29.23 |

Source: Own calculations based on the EFIGE data; all figures are for reporting year 2008. Only firms that exported in 2008 are included in the sample.

Table III: Firm age and number of destination countries in export: Descriptive statistics

| | Firms older than 20 years | | Firms 20 years old or younger | |
|---|---|---|---|---|
| | Number of firms in the sample | Average number of destination countries in export | Number of firms in the sample | Average number of destination countries in export |
| Country | | | | |
| Germany | 823 | 16.72 | 470 | 11.41 |
| France | 1,001 | 12.83 | 436 | 8.55 |
| Italy | 1,277 | 13.12 | 697 | 9.72 |
| Spain | 816 | 10.47 | 600 | 7.19 |
| UK | 710 | 15.65 | 461 | 10.82 |

Source: Own calculations based on the EFIGE data; all figures are for reporting year 2008. Only firms that exported in 2008 are included in the sample.

Table IV: Firm age and participation in imports: Descriptive statistics

| | Firms older than 20 years | | Firms 20 years old or younger | |
|---|---|---|---|---|
| | Number of firms in the sample | Share of importers (percent) | Number of firms in the sample | Share of importers (percent) |
| Country | | | | |
| Germany | 1,812 | 29.03 | 1,123 | 24.76 |
| France | 1,915 | 54.83 | 1,058 | 52.84 |
| Italy | 1,829 | 36.69 | 1,191 | 30.73 |
| Spain | 1,454 | 43.74 | 1,378 | 35.05 |
| UK | 1,183 | 52.92 | 884 | 43.78 |

Source: Own calculations based on the EFIGE data; all figures are for reporting year 2008.

Table V: Firm age and margins of international trade: Regression results

| Model | | | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| Dependent variable | | | Exporter (Dummy; 1 = yes) | Log of share of exports in total sales | Log of number of destination countries of exports | Importer (Dummy; 1 = yes) |
| Method | | | Probit | OLS | OLS | Probit |
| Country | | | | | | |
| Germany | | | | | | |
| | Old firms | ß | 0.046 | 13.04 | 47.93 | 0.051 |
| | (Dummy) | p | 0.014 | 0.042 | 0.000 | 0.002 |
| France | | | | | | |
| | Old firms | ß | 0.107 | 5.86 | 37.49 | 0.017 |
| | (Dummy) | p | 0.000 | 0.416 | 0.000 | 0.363 |
| Italy | | | | | | |
| | Old firms | ß | 0.108 | 10.10 | 35.27 | 0.058 |
| | (Dummy) | p | 0.000 | 0.005 | 0.000 | 0.001 |
| Spain | | | | | | |
| | Old firms | ß | 0.115 | 25.71 | 38.32 | 0.081 |
| | (Dummy) | p | 0.000 | 0.001 | 0.000 | 0.000 |
| UK | | | | | | |
| | Old firms | ß | 0.086 | 12.31 | 43.50 | 0.100 |
| | (Dummy) | p | 0.000 | 0.146 | 0.000 | 0.000 |

Note: Own calculations based on the EFIGE data; all estimates are for reporting year 2008. The reference category is made of firms that are 20 years old or younger. The reported results for model 1 and model 4 are the estimated average marginal effects. For model 2 and model 3 the reported results are based on the estimated regression coefficients that were transposed by calculating (exp(ß) – 1 * 100) to calculate the average percentage difference between old and younger firms. All p-values are based on heteroscedasticity-robust standard errors. All models include a set of industry controls and a constant. Note that model 2 and model 4 are estimated for exporting firms only.

Table VI: Firm age and margins of international trade: Regression results for pooled data

| Model | | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Dependent variable | | Exporter (Dummy; 1 = yes) | Log of share of exports in total sales | Log of number of destination countries of exports | Importer (Dummy; 1 = yes) |
| Method | | Probit | OLS | OLS | Probit |
| Old firms | ß | 0.094 | 15.07 | 39.40 | 0.060 |
| (Dummy) | p | 0.000 | 0.000 | 0.000 | 0.000 |
| France | ß | 0.049 | -18.67 | -23.16 | 0.270 |
| (Dummy) | p | 0.000 | 0.000 | 0.000 | 0.000 |
| Italy | ß | 0.212 | 2.85 | -17.59 | 0.075 |
| (Dummy) | p | 0.000 | 0.470 | 0.000 | 0.000 |
| Spain | ß | 0.083 | -27.40 | -37.89 | 0.140 |
| (Dummy) | p | 0.000 | 0.000 | 0.000 | 0.000 |
| UK | ß | 0.145 | -27.28 | -13.95 | 0.211 |
| (Dummy) | p | 0.000 | 0.000 | 0.001 | 0.000 |

Note: Own calculations based on the EFIGE data; all estimates are for reporting year 2008. The reference categories are firms that are 20 years old or younger, and firms from Germany. The reported results for model 1 and model 4 are the estimated average marginal effects. For model 2 and model 3 the reported results are based on the estimated regression coefficients that were transposed by calculating (exp(ß) – 1 * 100) to calculate the average percentage difference between old and younger firms, and between firms from Germany and the other countries. All p-values are based on heteroscedasticity-robust standard errors. All models include a set of industry controls and a constant. Note that model 2 and model 4 are estimated for exporting firms only.

Table VII: Distribution of firms over age classes

| Country | Share of firms (percentage) | | |
|---|---|---|---|
| | Older than 20 years | 20 to 6 years old | Younger than 6 years |
| Germany | 61.74 | 31.24 | 7.02 |
| France | 64.41 | 29.47 | 6.12 |
| Italy | 60.54 | 32.94 | 6.52 |
| Spain | 51.34 | 42.55 | 6.11 |
| UK | 57.23 | 32.95 | 9.82 |

Source: Own calculations based on the EFIGE data; all figures are for reporting year 2008.

Table VIII: Firm age and margins of international trade: Regression results

| Model | | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Dependent variable | | Exporter (Dummy; 1 = yes) | Log of share of exports in total sales | Log of number of destination countries of exports | Importer (Dummy; 1 = yes) |
| Method | | Probit | OLS | OLS | Probit |
| <u>Germany</u> | | | | | |
| Firms 20 – 6 years old (Dummy) | ß | -0.037 | -5.16 | -23.23 | -0.037 |
| | p | 0.064 | 0.424 | 0.000 | 0.042 |
| Firms < 6 years old (Dummy) | ß | 0.043 | -5.68 | -30.60 | -0.019 |
| | p | 0.224 | 0.603 | 0.000 | 0.565 |
| 50 – 249 employees (Dummy) | ß | 0.154 | 33.50 | 58.11 | 0.117 |
| | p | 0.000 | 0.000 | 0.000 | 0.000 |
| 250 and more employ. (Dummy) | ß | 0.171 | 62.17 | 115.0 | 0.133 |
| | p | 0.000 | 0.000 | 0.000 | 0.000 |
| Credit constraints (Dummy) | ß | 0.106 | -13.76 | 14.41 | 0.117 |
| | p | 0.159 | 0.413 | 0.550 | 0.059 |
| <u>France</u> | | | | | |
| Firms 20 – 6 years old (Dummy) | ß | -0.076 | 3.55 | -18.04 | 0.015 |
| | p | 0.000 | 0.648 | 0.001 | 0.434 |
| Firms < 6 years old (Dummy) | ß | -0.104 | -5.77 | -28.39 | -0.029 |
| | p | 0.004 | 0.678 | 0.007 | 0.432 |
| 50 – 249 employees (Dummy) | ß | 0.201 | 52.35 | 76.95 | 0.199 |
| | p | 0.000 | 0.000 | 0.000 | 0.000 |
| 250 and more employ. (Dummy) | ß | 0.336 | 116.3 | 162.0 | 0.348 |
| | p | 0.000 | 0.000 | 0.000 | 0.000 |
| Credit constraints (Dummy) | ß | 0.026 | -12.23 | -13.13 | -0.016 |
| | p | 0.723 | 0.616 | 0.490 | 0.822 |

Italy

| | | | | | |
|---|---|---|---|---|---|
| Firms 20 – 6 years old | ß | -0.092 | -13.99 | -20.16 | -0.040 |
| (Dummy) | p | 0.000 | 0.018 | 0.000 | 0.028 |
| Firms < 6 years old | ß | -0.085 | 3.84 | -19.64 | -0.007 |
| (Dummy) | p | 0.011 | 0.724 | 0.028 | 0.832 |
| 50 – 249 employees | ß | 0.179 | 47.91 | 95.81 | 0.184 |
| (Dummy) | p | 0.000 | 0.000 | 0.000 | 0.000 |
| 250 and more employ. | ß | 0.263 | 107.9 | 185.7 | 0.356 |
| (Dummy) | p | 0.000 | 0.000 | 0.000 | 0.000 |
| Credit constraints | ß | 0.010 | 8.00 | 8.20 | 0.022 |
| (Dummy) | p | 0.743 | 0.468 | 0.353 | 0.470 |

Spain

| | | | | | |
|---|---|---|---|---|---|
| Firms 20 – 6 years old | ß | -0.078 | -15.32 | -19.39 | -0.052 |
| (Dummy) | p | 0.000 | 0.021 | 0.000 | 0.005 |
| Firms < 6 years old | ß | -0.183 | -15.35 | -28.09 | -0.084 |
| (Dummy) | p | 0.000 | 0.363 | 0.012 | 0.030 |
| 50 – 249 employees | ß | 0.211 | 52.73 | 87.33 | 0.185 |
| (Dummy) | p | 0.000 | 0.000 | 0.000 | 0.000 |
| 250 and more employ. | ß | 0.374 | 115.5 | 231.1 | 0.352 |
| (Dummy) | p | 0.000 | 0.000 | 0.000 | 0.000 |
| Credit constraints | ß | 0.065 | 17.72 | 7.83 | 0.038 |
| (Dummy) | p | 0.040 | 0.157 | 0.423 | 0.234 |

UK

| | | | | | |
|---|---|---|---|---|---|
| Firms 20 – 6 years old | ß | -0.077 | -14.39 | -25.85 | -0.062 |
| (Dummy) | p | 0.001 | 0.089 | 0.000 | 0.008 |
| Firms < 6 years old | ß | -0.039 | 8.07 | -24.66 | -0.090 |
| (Dummy) | p | 0.279 | 0.558 | 0.010 | 0.016 |
| 50 – 249 employees | ß | 0.163 | 17.02 | 40.99 | 0.180 |
| (Dummy) | p | 0.000 | 0.082 | 0.000 | 0.000 |
| 250 and more employ. | ß | 0.156 | 60.96 | 144.39 | 0.344 |
| (Dummy) | p | 0.002 | 0.002 | 0.000 | 0.000 |
| Credit constraints | ß | 0.130 | -4.66 | -3.15 | 0.153 |
| (Dummy) | p | 0.409 | 0.925 | 0.932 | 0.311 |

Pooled data for five countries

| | | | | | |
|---|---|---|---|---|---|
| Firms 20 – 6 years old | ß | -0.073 | -9.61 | -20.58 | -0.033 |
| (Dummy) | p | 0.000 | 0.000 | 0.000 | 0.000 |
| Firms < 6 years old | ß | -0.068 | -0.70 | -25.00 | -0.042 |
| (Dummy) | p | 0.000 | 0.905 | 0.000 | 0.000 |
| 50 – 249 employees | ß | 0.179 | 39.68 | 71.62 | 0.173 |
| (Dummy) | p | 0.000 | 0.000 | 0.000 | 0.000 |
| 250 and more employ. | ß | 0.244 | 90.60 | 163.2 | 0.273 |
| (Dummy) | p | 0.000 | 0.000 | 0.000 | 0.000 |
| Credit constraints | ß | 0.038 | 6.28 | 5.85 | 0.036 |
| (Dummy) | p | 0.065 | 0.383 | 0.328 | 0.076 |

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Note: Own calculations based on the EFIGE data; all estimates are for reporting year 2008. The reference categories are firms older than twenty years, firms with less than 50 employees, and firms without credit constraints. The reported results for model 1 and model 4 are the estimated average marginal effects. For model 2 and model 3 the reported results are based on the estimated regression coefficients that were transposed by calculating (exp(ß) – 1 * 100) to calculate the average percentage difference between old and younger firms. All p-values are based on heteroscedasticity-robust standard errors. All models include a set of industry controls and a constant; the model with pooled data includes country fixed effects, too. Note that model 2 and model 4 are estimated for exporting firms only.