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Average wage, qualification of the workforce and export performance in German enterprises: Evidence from *KombiFiD* data*

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Abstract

Empirical investigations with enterprise level data from official statistics often use the average wage as a proxy variable for the qualification of the workforce, mostly due to the lack of detailed information on the qualification of the employees. This paper uses unique newly available data for German enterprises from the *KombiFiD* project that for the first time combine information from the statistics of employees covered by social security and information from surveys performed by the Statistical Offices to look at the quality of this proxy variable by investigating the link between the average wage in a firm and the qualification of the workforce. Furthermore, it demonstrates that detailed information on the qualification of the workforce sheds new light on the role of highly qualified employees for success on export markets that is not revealed by the average wage as a proxy variable. Based on the results of this paper it is argued that combined firm level data that stem from different data producers should be widely accessible for research.

JEL classification: C81, F14, J31

Keywords: Qualification of workforce, average wage, export, firm level data

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1. Motivation

Empirical investigations with firm level data from official statistics often use the average wage paid in a firm, computed as the total wage bill over the number of employees, as a proxy variable for human capital intensity of production. The information on the number of employees and on the wage bill is widely available in surveys of firms conducted by the statistical offices all over the world. More detailed information on the qualification of the workforce (like the share of employees with a certain level of education attained or vocational training concluded), however, is only rarely available at the firm level in this type of data[1] (see Syverson (2011), p. 340).

As a case in point, and to motivate this study by pointing to a potential pitfall caused by using the average wage as a proxy variable for human capital intensity, consider a recent study on the links between firm characteristics and exports in enterprises from German manufacturing industries (Wagner 2011a). Germany is one of the leading actors on the world market for manufactured goods but not every firm from a manufacturing industry in Germany is an exporter. In 2006 the share of exporters in all enterprises was 69 percent in West Germany and 52 percent in East Germany. Reliable information on the characteristics of exporting and non-exporting firms and on the links between firm characteristics and the share of exports in total sales is important to guide theorists and policy makers in an evidence based way. In Wagner (2011a) recently released rich high quality data for a large representative panel of enterprises from German manufacturing industries are used to investigate

[1] Note that establishment surveys with voluntary participation of the firms (and linked employer-employee data that use information from these surveys) usually collect information on the qualification of the workforce at a detailed level; for Germany, see the IAB Establishment Panel (Fischer et al. 2009) and the linked employer-employee data from the LIAB (Alda et al. 2005).

the links between firm characteristics and export activities, and a decisive role of human capital intensity for exporting is found.

Unfortunately, in the enterprise level data used in this study there is no better proxy for human capital intensity than the average wage per employee in a firm. For example, the data has no information on the share of employees with a university degree or the share of employees that successfully passed the exams following apprenticeship.[2] To justify the use of the average wage in a firm as a proxy variable for human capital intensity in the absence of more direct measures it is argued that although qualification of the work force is not the only determinant of the average wage in a firm it can be expected to be highly positively correlated with it. Furthermore, it is pointed out that in the empirical models that link wage per employee to exporting both firm size and industry affiliation are included and, therefore, both firm-size wage differentials and inter-industry wage differentials are controlled for.

While due to the lack of detailed information on the qualification of the employees this approach is widely used in the literature it is not without problems especially when it comes to the analysis of the links between exports and human capital intensity. It is a stylized fact found in many micro-econometric studies from a number of countries that exporters pay higher wages (see Schank, Schnabel and

[2] The distinction between blue collar workers and white collar workers that is often used in the literature (for Germany, see e.g. Bernard and Wagner (2011)) is no way to proxy human capital intensity for two reasons. First, often blue collar workers are high qualified skilled employees with apprenticeship (so-called *Facharbeiter*) while white collar workers include many unskilled employees. Second, the distinction between blue collar workers (*Arbeiter*) and white collar workers (*Angestellte*) is no longer used in Germany after a reform of the pension system; in the data from official statistics, for example, there is no separate information on wages (for blue collar workers) and salaries (for white collar employees) from the reporting year 2006 onwards.

Wagner (2007) for a survey). Recent studies using linked employer-employee panel data show that wage differences between exporters and non-exporters become smaller but do not completely vanish once observable and unobservable characteristics of the employees and of the workplace are controlled for.[3] Therefore, any empirical model that uses the average wage in a firm as a proxy variable for human capital intensity of production to investigate the link between firm characteristics and the propensity to export suffers from an endogeneity problem – the higher the wage per employee the higher is the probability that the firm is an exporter not only because more human capital intensive firms have a higher probability to export but also because a firm that exports has a higher wage per employee irrespective of the (observed and unobserved) qualification of the work force!

This paper makes two contributions to the literature. First, it presents empirical evidence on the quality of the average wage in a firm as a proxy variable for the qualification of the employees. Second, it demonstrates that detailed information on the qualification of the workforce sheds new light on the role of highly qualified employees for success on export markets that is not revealed by the average wage as a proxy variable. In the empirical investigations it uses unique newly available data for German enterprises from the *KombiFiD* project (discussed in detail below) that for the first time combine information from the statistics of employees covered by social security and information from surveys performed by the Statistical Offices. Based on

[3] See Schank, Schnabel and Wagner (2007) for Germany; other studies using linked employer-employee panel data to investigate the link between individual wages of the employees and export activities of the employer are surveyed in Wagner (2011c). Note that Schank, Schnabel and Wagner (2010) find that higher wages in exporting firms are due to self-selection of more productive, better paying firms into export markets; they are not caused by export activities.

the results of this paper it is argued that combined firm level data that stem from different data producers should be widely accessible for research.

The rest of the paper is organized as follows. Section 2 describes the data used and the definition of variables. Section 3 looks at the link between the average wage in a firm and the qualification of the workforce. Section 4 compares results from empirical models for export participation and for the share of exports in total sales that use either the average wage of a firm or information on the qualification of the workforce to measure the human capital intensity of the production. Section 5 concludes.

2. Data and definition of variables

The empirical investigation uses data for enterprises[4] from manufacturing industries that come from two sources. The first source is the so-called *AFiD-Panel Industrial Enterprises* that combines information about firms from manufacturing industries that stem from various surveys conducted by the German statistical offices (see Malchin and Voshage (2009) for details). These data are the source for the following variables:

- *Average wage in a firm,* defined as the annual sum of wages paid (without social security contributions paid by the firm) over the number of persons working in the firm, and measured in Euro.

- *R&D intensity*, measured by expenditures on research and development over total turnover (in percent).

- *Share of exports in total sales*, measured as exports over total turnover (in percent).

[4] Data are for legal units (enterprises, or *Unternehmen*), not for local production units (establishments, or *Betriebe*). In this paper we use the term firm as a synonym for enterprise.

- *Capital intensity*, measured as value of physical capital per person working in the firm.[5]

- *Firm size*, measured by the number of persons working in the firm.

- *Industry affiliation* of a firm, recorded at the four-digit level.

The second source of data is the Establishment History Panel (*Betriebs-Historik-Panel*).[6] Details aside, this data set is built from individual level information for employees covered by social security.[7] In a first step for each year from 1975 onwards information for all employees working in a local production unit (establishment) was aggregated, and this is the standard version of the Establishment History Panel. In this study a different version of the Establishment History Panel is used. Here for multi-establishment enterprises information from all establishments of the enterprise was aggregated in a second step. The result is a data set with detailed information about the characteristics of the employees (covered by social security) in each enterprise in a year.

[5] Note that information on physical capital used in the firm is not available in the data. Annual data for investments are available. A careful inspection of these investment data revealed that they should not be used to construct estimates of the capital stock of the firm by using the perpetual inventory method. The crucial problem here lies in the fact that investment at the firm level tends to be highly volatile. Often very high values in some year and very low values (or no investments at all) in some other year are reported, and this leads to rather different values for the capital stock proxy variable depending on the year(s) used. A proxy for the physical capital used in a firm can be constructed using information based on the amount of depreciation reported in the cost structure survey (see Wagner (2010) for details). This proxy variable is used here.

[6] For an introduction to the Establishment History Panel see Spengler (2008); a detailed description of the current version is Hethey-Maier and Seth (2010).

[7] "All employees who are subject to at least one of the following compulsory insurances are liable to social security: health insurance, long-term care insurance, pension insurance, unemployment and accident insurance. However, not liable to social security and thus not included in the data are civil servants, conscripts, those doing alternative civilian service, self-employed, judges, scholars, students, pensioners, clergy and others." (Spengler 2008, p. 502)

Information reported to the social security system includes, among others, the qualification (educational level attained and vocational training concluded). The following variables based on this information are used:

- *Share of medium qualified employees* is defined as the total number of employees (covered by social security) with either the high-school diploma (*Abitur*) as the highest educational level attained or with vocational training concluded over the total number of employees (covered by social security) in an enterprise; the share is measured as a percentage.
- *Share of highly qualified employees* is defined as the total number of employees with a polytech or university degree over the total number of employees (covered by social security) in an enterprise; the share is measured as a percentage.

The *AFiD-Panel Industrial Enterprises* is prepared by the German statistical offices. The data can be accessed for scientific research via the Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Federal States (see Malchin and Voshage 2009). The Establishment History Panel is build from administrative data by the Research Data Centre of the Federal Employment Agency at the Institute for Employment Research. The data can be accessed via this Research Data Centre for scientific research (see Spengler 2008).

Linking these confidential firm level data across the borders of the data producers, however, is difficult. Details aside, it is technically not easy (but not impossible either) and it is legal only if the firm agreed in written form. The basic idea of the project *KombiFiD* (an acronym that stands for *Kombi*nierte *Fi*rmendaten für *D*eutschland, or combined firm level data for Germany) that is in detail described on the web (see www.kombifid.de) is to ask a large sample of firms from all parts of the German economy to agree to match confidential micro data for these firms that are

kept separately by three data producers (the Statistical Offices, the Federal Employment Agency, and the German Central Bank) in one data set. These matched data are made available for scientific research while strictly obeying the data protection law, i.e. without revealing micro level information to researchers outside the data producing agencies. In *KombiFiD* 54,960 firms were asked to agree in written form to merge firm level data from various surveys and administrative data for the reporting years 2003 to 2006. 30,944 firms replied and 16,571 agreed. These 16,571 firms are in the *KombiFiD Agreement Sample*.

The sample of enterprises used in the empirical investigation performed here consists of all firms from manufacturing industries in West Germany[8] in the *KombiFiD Agreement Sample* for which information from both data sources[9] – the AFiD-Panel Industrial Enterprises and the Establishment History Panel - could be linked in the *KombiFiD* project for 2006.[10] Enterprises that do not have complete information for all variables were dropped from the computations. This leads to a data set with 4,588 observations.

[8] The sample is limited to firms from West Germany. There are large differences between enterprises from West Germany and the former communist East Germany even many years after the unification in 1990. Therefore, an empirical study should be performed separately for both parts of Germany. The *KombiFiD Agreement Sample* for East German manufacturing firms, however, contains only a small number of firms, and this sample turned out to be not representative for the population of firms in a replication study that compares results based on the complete cost structure survey data and data from the *KombiFiD Agreement Sample* (see Wagner 2011b).

[9] Data on foreign direct investments and balance sheet data from the German Central Bank are not used in this study. The KombiFiD sample including data from this source is small and consists mostly of large exporting firms; therefore, these data are not suited for an empirical investigation of export participation and export performance.

[10] All variables are extremely highly positively correlated over the four years covered by the KombiFiD sample. Therefore, the study uses data for one year only.

3. Average wage and qualification of the workforce in the firm

In the first step of the empirical investigation of the quality of the average wage in a firm as a proxy variable for the qualification of the employees we will look at the link between the average wage and the shares of medium qualified employees (which either have a high-school diploma (*Abitur*) as the highest educational level attained or which successfully concluded vocational training) and highly qualified employees (with a polytech or university degree). Descriptive statistics for firms from West Germany in 2006[11] in Table 1 show that the share of highly qualified employees tends to be rather small – it is less than four percent in the median firm – while a large fraction of employees is classified as medium qualified (two thirds of all employees in the median firm are from this group). As expected, the correlation of the share of employees from both of these groups with the average wage in a firm is positive, and it is much higher for the share of highly qualified employees. Note that both shares of employees are uncorrelated in the firms in the sample.

[Table 1 near here]

A simple OLS regression of the average wage in a firm on the share of highly qualified employees and the share of medium qualified employees (plus a constant) points to a statistically highly significant positive link between the qualification level of the workforce and the wage level (see results for model 1 reported in Table 2). As expected, the estimated regression coefficient is considerable larger (by a factor five) for the share of highly qualified employees compared to the estimated coefficient for

[11] The shares of employees from various groups are highly stable over time; therefore, results are reported for the latest year covered by the KombiFiD sample only.

the share of medium qualified employees. The same results are found when firm size (measured by the number of employees and its squared value) and industry (measured by dummy-variables at the 4digit industry level) are controlled for to take care of firm-size wage effects and industry wage effect (see results for model 2).

[Table 2 near here]

The R^2-value for model 1 shows that some 30 percent of the variation of the average wage between the firms in the sample can be explained by the variation of the qualification of the employees. If the empirical model is augmented by firm size and industry affiliation the proportion of the variation of the average wage explained by the variation of the variables included in the model raises to about half of the total variation.

These results indicate that the average wage in a firm can indeed be regarded as a proxy variable for the qualification level of the workforce – the higher the share of qualified employees, the higher is the average wage (controlling for firm-size and industry effects, too). The fit of the empirical model, however, is far from perfect. To state it differently, the average wage measures other characteristics of the firm and its environment besides the qualification of the workforce, too.[12]

[12] A discussion of the reasons for differences in the average wage of a workforce with identical qualification is beyond the scope of this paper. Possible reasons include a higher average wage in a firm that earns higher profit due to product market conditions and that shares part of the extra profits with its employees, and efficiency wages paid by a firm to motivate employees to work harder.

4. Application: On the role of human capital intensity for the export performance of manufacturing firms in West Germany

To shed more light on the usefulness of the average wage in a firm as a proxy variable for the qualification of the workforce this section compares results from empirical models for export participation and for the share of exports in total sales that use either the average wage of a firm or information on the shares of medium and highly qualified employees as a measure of the human capital intensity of production.

The empirical models used in this exercise take a clue from a recent empirical study on firm characteristics and exports (Wagner 2011a). A comprehensive theoretical model for the export decision of a firm that discriminates between exporters and non-exporters and that explains the share of exports in total sales is lacking. Therefore, the empirical models used in this study are based on elements of a theory of the exporting firm.[13]

A starting point is the stylized fact that firm size and exports are positively related. This positive link between exports and firm size is due to fixed costs of exporting and efficiency advantages of larger firms due to scale economies, advantages of specialization in management and better conditions on the markets for inputs. Large firms can be expected to have cost advantages on credit markets while small firms often face higher restrictions on the capital market leading to a higher risk of insolvency and illiquidity. Furthermore, there might be disadvantages of small firms in the competition for highly qualified employees. There are limits to the advantage of size, because coordination costs mount as the scale of operations increases, and at

[13] The theoretical arguments are standard in the literature on the micro-econometrics of exports. Therefore, the discussion can be brief here; see Wagner (1995) for a more complete statement.

some point any further expansion might cease to be profitable. Therefore, a positive relationship between firm size and exports, at least up to a point, is expected.

Further elements of an empirical model to explain the export performance of firms can be taken from the theory of international trade. Countries have a comparative advantage in the production of goods that use the relative abundant factors of production relatively intensively. Given that Germany is relatively rich in physical and human capital and one of the technologically leading countries, firms that use physical and human capital intensively and that are active in R&D can be expected to have a comparative advantage on the international market.

Here, human capital intensity is measured by either the average wage in a firm or by the shares of medium and highly qualified employees; physical capital intensity is measured as value of physical capital per person working in the firm; R&D intensity is measured by expenditures on research and development over total turnover; Firm size is measured by the number of persons working in the firm; the industry affiliation of a firm is recorded at the four-digit level and a set of dummy variables for the industries is included in the empirical models; the share of exports in total sales is measured as exports over total turnover.[14]

Table 3 shows that on average exporters are larger, use more physical capital per employee, have a higher value of human capital intensity (measured by either the average wage in the firm or the share of highly qualified employees) and are more R&D intensive. All these differences between exporters and non-exporters are highly statistically significant and large from an economic point of view. Furthermore, results of the Kolmogorov-Smirnov test indicate that these differences are not only observed at the mean; the distribution of these firm characteristics for the exporters first-order

[14] For details and the sources of variables see section 2.

stochastically dominates the distribution of the firm characteristics for the non-exporters.[15] These findings are in line with the theoretical considerations and with results reported for Germany for other samples of firms. Note that the share of medium qualified employees does not differ statistically and economically significantly between the two groups of firms.

[Table 3 near here]

Table 4 reports results for the estimation of empirical models that link firm characteristics[16] to the probability that a firm is an exporter and to the share of exports in total sales of a firm. The average wage in a firm and the share of highly qualified employees are both positively linked with the propensity to export – the estimated probit regression coefficients are positive and highly statistically significant. Note that this is not the case for the share of medium qualified employees. In line with the descriptive results discussed above the probit estimates show that the share of medium qualified employees in a firm and the propensity to export of the firm are unrelated.

[15] The non-parametric Kolmogorov-Smirnov test for first order stochastic dominance of one distribution over another was introduced into the empirical literature on exports by Delgado, Farinas and Ruano (2002). Let F and G denote the cumulative distribution functions of a variable for two groups of firms, exporters and non-exporters. First order stochastic dominance of F relative to G is given if F(z) – G(z) is less or equal zero for all z with strict inequality for some z. Given two independent random samples of firms from each group, the hypothesis that F is to the right of G can be tested by the Kolmogorov-Smirnov test based on the empirical distribution functions for F and G in the samples (for details, see Conover 1999, p. 456ff.).

[16] Given the focus of this paper the discussion of the estimation results is limited to the human capital variables; for a broader discussion of the results see Wagner (2011a).

Results from empirical models for the share of exports in total sales point to a positive link between export activity and human capital intensity, too. The estimated regression coefficients for the average wage in a firm are positive and highly statistically significant irrespective of the estimation method[17] used. The same holds for the estimated regression coefficients for the share of highly qualified employees, while the significance level of the positive coefficients for the share of medium qualified employees is lower (although still higher than the usual critical error level of five percent). Note that the regression coefficient of the share of medium skilled employees is much smaller than the regression coefficient of the share of highly skilled employees. These results point to a much more decisive role of highly qualified employees for success on export markets.

[Table 4 near here]

That said, the results indicate that irrespective of the way human capital intensity is measured a higher level of human capital intensity is positively related to exports. In line with the conclusions drawn in section 3, therefore, the average wage rate can be regarded as a useful proxy variable for human capital input in a firm. The detailed information on the qualification of the employees, however, reveals that the highly qualified employees with a polytech or university degree do matter much more

[17] Ordinary least squares (OLS) ignores the fact that the dependent variable of the empirical model is a proportion that is by definition limited between zero and one (or zero and one hundred percent) and that has a probability mass at zero (because 16.75 percent of all firms in the sample are non-exporters with a share of exports in total sales that is zero). The fractional logit estimator takes care of this; see Papke and Wooldridge (1997) for details and Wagner (2001) for the first application of this estimator to the share of exports in total sales.

than the employees with a medium qualification. This important insight is only available from the new kind of data used here.

5. Concluding remarks

This paper demonstrates that the average wage in a firm is a useful proxy variable for the qualification of the employees. This is good news for researchers working with firm level data because information on the wage bill and the number of employees is usually available from surveys performed by statistical offices while detailed information on the qualification level of the workforce is not.[18]

However, this paper also shows that this detailed information on the qualification of the workforce sheds new light on the role of highly qualified employees for success on export markets that is not revealed by the average wage as a proxy variable. These results are important because reliable information on the characteristics of exporting and non-exporting firms and on the links between firm characteristics and the share of exports in total sales is crucial to understand a central dimension of firm performance. Furthermore, it can help to inform policy debates in Germany on the removal of barriers to immigration for highly qualified employees from countries outside the European Union.[19]

The bottom line, then, is that data for German enterprises that combine information from the statistics of employees covered by social security and

[18] Similar evidence is reported in empirical studies on the productivity of firms where including the wage bill alone as a measure of labor inputs does almost as well as including the full array of human capital measures; see Syverson (2011), p. 340.

[19] A case in point is the debate about the suggested introduction of a so-called „Blue Card“ that shall enable employees from countries outside the EU to work in Germany provided that they hold a university degree and have a job contract that fixes an annual wage of at least 44,000 Euro (see Frankfurter Allgemeine Zeitung, December 8, 2011, p. 11).

information from surveys performed by the Statistical Offices, and firm level data that stem from different data producers in general, should be widely accessible to foster research and to support evidence-based policy advice.

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Table 1: Descriptive statistics for the sample of enterprises: West Germany, manufacturing industries, 2006

	Mean	Std.dev.	p1	p50	p99
Average wage (Euro)	33,583	11,566	5,978	33,454	63,965
Share of highly qualified employees (Percent)	6.42	8.41	0.00	3.85	39.68
Share of medium qualified employees (Percent)	61.72	20.29	5.26	65.69	94.73

Correlation matrix

	Average wage (Euro)	Share of highly qualified employees (Percent)
Share of highly qualified employees (Percent)	0.499	
Share of medium qualified employees (Percent)	0.217	0.015

Note: For a definition of the variables see text. p1, p50 and p99 refer to the 1st , 50th and 99th percentile. The number of observations is 4,588.

Table 2: Average wage and qualification of the workforce in a firm: West Germany, manufacturing industries, 2006

Estimation method: OLS Dependent variable: Average wage (Euro) Independent variable		Model 1	Model 2
Share of highly qualified employees (Percent)	ß	682.15	560.29
	p	0.000	0.000
Share of medium qualified employees (Percent)	ß	119.36	82.04
	p	0.000	0.000
Firm size (number of employees)	ß		0.621
	P		0.000
Firm size (squared)	ß		-4.17e-6
	p		0.003
4digit industry dummy variables		not included	included
Constant	ß	21,832.53	5,426.15
	P	0.000	0.281
Number of enterprises	4,588		4,588
R^2	0.293		0.468

Note: For a definition of the variables see text. ß is the estimated regression coefficient, p is the prob-value. A robust estimator of variance was used.

Table 3: Descriptive statistics for the sample of enterprises by exporter status: West Germany, manufacturing industries, 2006

	Exporter		Non-Exporter		t-Test	K-S-Test
	Mean	Std.dev.	Mean	Std.dev.	(p-value)	(p-value)
Average wage (Euro)	35,160	178.47	26,776	453.20	0.000	0.000
Share of highly qualified employees (Percent)	7.11	0.14	3.57	0.25	0.000	0.000
Share of medium qualified employees (Percent)	61.98	0.32	60.60	0.84	0.1243	*
Capital intensity (Euro)	90,908	1,956	79,373	4,552	0.020	0.000
R&D intensity (Percent)	1.28	0.05	0.19	0.05	0.000	0.000
Firm size (Number of persons)	477.35	63.93	163.58	10.32	0.000	0.000
Share of Exports in total sales (Percent)	34.82	25.42				

Note: For a definition of the variables see text. The number of observations is 4,431; 742 (or 16.75 %) of these enterprises were non-exporters. The p-value of the t-Test is for the null-hypothesis of no difference in mean values (assuming unequal variances in the two groups of firms); a p-value of the Kolmogorov-Smirnov Test (K-S-Test) that is 0.05 or smaller indicates that the distribution of the variable for the exporters first-order stochastically dominates the distribution of the variable for the non-exporters. A * indicates a case where the results of the K-S-Test gives inconclusive results – neither the null-hypothesis that the distribution of the variable for the exporters first-order stochastically dominates the distribution of the variable for the non-exporters nor the null-hypothesis that the distribution of the variable for the non-exporters first-order stochastically dominates the distribution of the variable for the exporters can be rejected at an error level of 5 percent or less.

Table 4: Exports and firm characteristics: West Germany, manufacturing industries, 2006

Dependent variable		Exporter (Dummy; 1 = yes)		Share of exports in total sales (Percent)			
Estimation method:		Probit		OLS		Fractional logit	
Average wage (Euro)	ß	5.55e-6		0.00057		0.000033	
	P	0.000		0.000		0.000	
Share of highly qualified employees (Percent)	ß		0.0064		0.595		0.032
	p		0.000		0.000		0.000
Share of medium qualified employees (Percent)	ß		-0.00014		0.035		0.002
	P		0.629		0.041		0.030
Capital intensity (Euro)	ß	-1.28e-7	-2.62e-9	9.91e-6	0.00002	5.14e-7	1.13e-6
	P	0.059	0.970	0.018	0.000	0.027	0.000
R&D intensity (Percent)	ß	0.016	0.013	1.138	0.944	0.047	0.035
	P	0.017	0.050	0.000	0.000	0.000	0.003
Firm size (Number of persons)	ß	0.00014	0.00015	0.0015	0.0016	0.000078	0.000087
	P	0.000	0.000	0.001	0.001	0.007	0.011
Firm size (squared)	ß	-8.82e-10	-9.57e-10	-9.54e-9	-9.96e-9	-4.96e-10	-5.56e-10
	P	0.000	0.000	0.001	0.002	0.010	0.015
Number of firms		3,609	3,609	4,431	4,431	4,431	4,431

Note: For a definition of the variables see text. All empirical models include 4digit industry dummy variables and a constant. ß is the estimated regression coefficient, p is the prob-value. Marginal effects at the mean are reported for the Probit estimates. The fractional logit model is estimated with glm using fam(bin) and link(logit). A robust estimator of variance was used for all estimates.

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