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by

Thorsten Schank, Claus Schnabel and Joachim Wagner

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Do exporters really pay higher wages?
First evidence from German linked employer-employee data

Thorsten Schank[a], Claus Schnabel[b] and Joachim Wagner[c]

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Abstract: Many plant-level studies find that average wages in exporting firms are higher than in non-exporting firms from the same industry and region. This paper uses a large set of linked employer-employee data from Germany to analyze this exporter wage premium. We show that the wage differential becomes smaller but does not completely vanish when observable and unobservable characteristics of the employees and of the work place are controlled for. For example, blue-collar (white-collar) employees working in a plant with an export-sales ratio of 60 percent earn about 1.8 (0.9) percent more than similar employees in otherwise identical non-exporting plants.

Keywords: Exports, wages, exporter wage premium, linked employer-employee data, Germany

JEL-Classification: F10, D21, L60

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[a] Thorsten Schank, Friedrich-Alexander-Universität Erlangen-Nürnberg, Lehrstuhl für Arbeitsmarkt- und Regionalpolitik, Lange Gasse 20, D-90403 Nürnberg, thorsten.schank@wiso.uni-erlangen.de.

[b] Claus Schnabel, Friedrich-Alexander-Universität Erlangen-Nürnberg, Lehrstuhl für Arbeitsmarkt- und Regionalpolitik, Lange Gasse 20, D-90403 Nürnberg, claus.schnabel@wiso.uni-erlangen.de.

[c] Joachim Wagner, Universität Lüneburg, Institut für Volkswirtschaftslehre, Campus 4.210, D-21332 Lueneburg, wagner@uni-lueneburg.de.

1. Motivation

About ten years ago Bernard and Jensen (1995) published a Brookings paper on “Exporters, Jobs, and Wages in U.S. Manufacturing” that used hundreds of thousands of plant level data to provide facts and figures on exporting plants compared to their non-exporting counter-parts. One of the new and exciting findings documented in this paper is that exporters tend to pay higher wages and benefits: Average wages and benefits (per worker, per production worker, and per non-production worker) are higher in exporting plants than in non-exporting plants of all size classes. Exporter wage premia are statistically significant for all categories of wages and benefits after controlling for capital per worker, size of plant, multi-plant dummy, industry, year, plant age, and region. Coefficients of exporter status dummies are statistically significant in fixed effects regressions controlling for capital per worker, hours per worker, size of plant, and year.

The Bernard and Jensen (1995) paper started a literature. A synopsis of 21 studies covering 22 different countries from highly developed economies like the U.S., Germany, and Sweden, and emerging economies like Taiwan, Korea, and Mexico, to transition countries (Estonia, Slovenia) and least developed Sub-Saharan African economies like Burundi or Ethiopia is provided in an Appendix Table. The empirical strategies used in these papers replicate (sometimes only partly) the approach introduced by Bernard and Jensen, and the results regarding the exporter wage premia are broadly consistent with the findings from the pioneering study.

An open question not dealt with in this literature is whether these exporter wage premia do indeed indicate that exporting plants pay higher wages in the sense that comparable workers are better paid when working on a comparable work place for an exporter, i.e. *ceteris paribus*. Given that all the empirical studies listed in Appendix 1 use average data at the plant or firm level, individual characteristics of the workers that might influence their productivity (and, therefore, their wages) cannot be taken into account, and certain characteristics of the work place that might call for compensating wage differentials are not represented adequately. This shortcoming has been recognized from the outset: Commenting on the presentation of the paper by Bernard and Jensen, Robert Z. Lawrence argued that "the impact of exports, while positive and statistically significant, is considerably reduced once the effects of capital intensity, industry, plant scale, and location are controlled for. One suspects, moreover, that the premiums would be even further reduced if the authors were able to control for worker characteristics.

Thus the wage benefits that are attributable solely to exporting appear to be rather small." (Bernard and Jensen 1995, p. 113f.)

Besides providing a synopsis of the literature on exporter wage premia this paper contributes to the literature by testing for the existence of these premia when observable and unobservable individual characteristics of the employees and the work place are controlled for using a rich German linked employer-employee panel data set. The rest of the paper is organized as follows: Section 2 introduces the data set while section 3 replicates the now standard approach using plant-level data. Section 4 provides results for exporter wage premia based on linked employer-employee data using information for both individual workers and the plants they are working in. Section 5 concludes.

2. The linked employer-employee data set

The use of matched employer-employee data has recently become popular as it allows a more detailed analysis of economic relationships. In particular, various analyses of the labor market can benefit from the availability of employer-employee data.[1] In this paper, we use the LIAB, which combines the employment statistics of the German Federal Labor Services with plant level data from the IAB Establishment Panel.

The employment statistics (cf. Bender, Haas and Klose 2000) cover all employees and trainees subject to social security. They exclude, among others, the self-employed, family workers, a subgroup of civil servants (“Beamte”), students enrolled in higher education and those in marginal employment. The employment statistics cover nearly 80 percent of all employed persons in western Germany and about 85 percent in eastern Germany. They are collected by the social insurance institutions for their purposes according to a procedure introduced in 1973 and are made available to the Federal Employment Services. Notifications are prescribed at the beginning and at the end of a person's employment in a plant. In addition an annual report for each employee is compulsory at the end of a year. Misreporting is legally sanctioned. The employment statistics contain information on an employee's occupation, the occupational status, and gross earnings up to the contribution assessment ceiling, and on individual characteristics like sex, age,

[1] A survey of analyses using matched employer-employee data sets can be found in Abowd and Kramarz (1999).

nationality, marital status, and qualification. Each personnel record also contains the establishment identifier, the industry, and the size of the plant.

Starting in 1993, the IAB Establishment Panel (cf. Kölling 2000) is drawn from a stratified sample of the plants included in the employment statistics, where the strata are defined over industries and plant sizes (large plants are oversampled), but the sampling within each cell is random. In 1993, the sample started with 4,265 plants, covering 0.27 percent of all plants in western Germany (2 million) and 11 percent of total employment (29 million). In 1996, the eastern German establishment panel started with 4,313 establishments representing 1.10 percent of all plants (391,000) and 11 percent of total employment (6 million). The IAB Establishment Panel has been set up for the needs of the Federal Labor Services to provide further information about the demand side of the labor market. Therefore, detailed information on the composition of the workforce and its development through time constitutes a major part of the questionnaire. Further questions include information on training and further education, wages, working time, business activities, establishment policies, and general information about the plant. Other topics, for instance, questions on innovations or the flexibility of labor, are asked biannually or triannually.

The LIAB is created by linking the employment statistics and the IAB Establishment Panel through a plant identifier which is available in both data sets.[2] This matched employer-employee data set is unique for Germany. The version we use comprises the years 1993 to 1997. Since precise information on the collective bargaining regime of plants (needed for the imputation of wage data) is not available before 1995 and since we employ lags of investment, we can only make use of the waves 1995 to 1997. We exclude establishments that are located in the eastern part of Germany since the economic situation (and the level of wages) in post-communist eastern Germany still differs considerably from that in western Germany. Also, we focus on the manufacturing sector since exports are only of minor importance in the service sector. Therefore, in the regressions we end up with a sample of 1,855,034 observations of 918,149 employees in 1,262 establishments. This is composed of 1,189,469 observations of 585,692 blue-collar workers and 601,250 observations of 306,229 white-collar employees.

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[2] The LIAB data are confidential but not exclusive. They are available for non-commercial research by visiting the data access center of the German Federal Labor Services at the IAB in Nuernberg, Germany. Researchers interested in replications or extensions of our work may contact the first author (e-mail: Thorsten.Schank@wiso.uni-erlangen.de) for a copy of the Stata do-files used to produce the results reported here.

The dependent variable in our investigation is the log of wages, taken from the IAB Establishment Panel and, alternatively, from the employment statistics. Whereas the IAB panel data just provide information on the total wage bill of an establishment, the information on individual earnings in the employment statistics is more detailed, but it refers only to the income subject to social security contributions (i.e. up to the contribution assessment ceiling of the social security system).

For blue-collar workers, this problem is of minor importance since only 1.7 percent of the observations are reported to be at the ceiling. For white-collar workers, however, one third of the wage-observations are censored. As is well-known, not taking account of the censoring and applying OLS (or standard fixed effects techniques) to either all observations or to the reduced sample without the values on the ceiling yields biased estimates. We treat the data problem as a missing data problem and multiply impute the censored wages of white-collar workers by draws of a random variable from a truncated distribution.[3] Details of the applied Markov chain Monte Carlo technique can be found in Appendix 2. To obtain more precise imputed values, we have performed the procedure separately for each of the fourteen manufacturing industries in our sample. We should also point out that the imputation takes account of plant-fixed effects, which seems important since the variable under examination in this paper (a plant's export behavior) is a plant-level variable.[4]

Provided that certain regularity conditions are satisfied, the stationary distribution of the Markov chain approaches the conditional distribution of the unobserved wages above the ceiling, given the observed uncensored wages (see Schafer 1997). Making use of only a single imputation and then applying OLS would – in our context – yield parameter estimates equivalent to a Tobit regression with unimputed data. However, in subsequent analyses we want to control for person or plant heterogeneity, which is less straightforward with a Tobit model. In addition, without special corrective measures, single-imputation inference tends to overstate

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[3] Multiple imputation has been developed by Rubin (1978) and is explained in Rubin (1996), Schafer (1997) and Rässler, Rubin and Schenker (2004). The theoretical motivation for multiple imputations is Bayesian, although the resulting multiple imputation inference is usually also valid from a frequentist point of view. In the context of censored wages multiple imputation has been proposed and applied by Gartner and Rässler (2005).

4 Due to technical constraints, the imputation does not deal with person effects. However, we believe that this is of a lesser problem in our context. The results reported in Section 4 indicate that the unobserved individual heterogeneity correlated with exports (and wages) is more or less collinear with the unobserved plant heterogeneity correlated with exports (and wages).

precision because it omits the between-imputation component of variability (Schafer, 1997). For this reason, we apply multiple imputation.

All individual-level wage regressions reported in Section 4 are carried out separately for blue-collar and for white-collar workers. As mentioned above, the censoring problem is neglectable for the former group, such that we can use the unimputed data. For white-collar workers, we report both, results based on unimputed data (including the censored values) as well as on the data-sets which also include imputed values. In the case of imputed data, we estimate a wage regression for a given specification for each of the five (imputed) data sets and obtain five parameter estimates. The average of these five estimates yields the Multiple Imputation (MI) point estimate. The standard error of the MI point estimate is composed of a between component (the standard deviation of the five estimates) and a within component (the average of the five standard errors).[5]

The main focus of our analysis is on the influence of exports on wages. We can make use of two alternative indicators of exports: First, a dummy variable indicating whether or not a plant has any exports, and second the proportion of exports within total sales. Table 1 reports descriptive statistics for these variables in our sample. From the results using weighted data it follows that one in five manufacturing plants was an exporter in the years covered. This is in line with results from official statistics reporting a share of exporters in all manufacturing plants of 23 percent for 1996 (Günterberg and Wolter 2002, p. 250). It is well known that both the propensity to export and the share of exports in total sales tend to increase with firm size in Germany (see e.g. Wagner 2001). Therefore, the share of employees working in exporting firms is much larger – about two thirds in our sample (weighted data). Due to the oversampling of larger firms in the IAB panel (mentioned above) the unweighted figures are much higher for both the share of exporters in all plants (70 percent) and the share of employees in exporting plants (more than 90 percent). Furthermore, the positive relationship between firm size and the share of exports in total sales, and the oversampling of larger firms in the IAB panel, leads to a proportion of exports in total sales of all exporting firms that is 34 percent in the unweighted data compared to 19 percent in the weighted data.

[Table 1 near here]

[5] The formulas are presented in Schafer (1997).

On average, exporting firms pay higher wages than non-exporters. According to the sample of establishments from the IAB panel used in our empirical investigation the difference between the average monthly wage per employee working in a firm that does or does not export is 36.6 percent. This raw exporter wage premium is both statistically significant and large from an economic point of view. Descriptive information on the other variables employed in our analysis is reported in Appendix 3.

3. Traditional Approach

We start our econometric investigations with a specification which is very similar to that adopted by Bernard and Jensen (1995) in their seminal article. This should constitute a reasonable basis for comparison. Using aggregate plant data from the IAB establishment panel, we estimate the impact of exports on the monthly wage bill per employee, where we make use of two alternative indicators of exports: first, a dummy variable indicating whether or not a plant has any exports, and second the proportion of exports within total sales. We include as control variables the logarithm of the number of employees and its square, the logarithm of capital per worker[6], average weekly standard hours and year dummies. Finally, a dummy variable for the existence of paid overtime work takes account of the fact that additional (paid) hours are typically compensated with an overtime premium.[7] The parameter estimates from an OLS regression are reported in the first (export dummy) and fourth (export proportion) column of Table 2. Ceteris paribus exporting plants do not pay higher wages than non-exporters. The statistically significant and economically large differential between the average wage paid by exporters and non-exporters mentioned above, therefore, is due to differences in the plant observables included in the empirical model. The export share, however, is positively related with wages. If the proportion of exports in total sales rises by ten percentage points, say, the wage per employee will increase by 1.4 percent. We should also note that the parameters of the control variables show the expected sign and are statistically significant at the 1 percent level.

[Table 2 near here]

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[6] The capital stock in year *t* is approximated by the average of a plant's investment in the years *t*, *t-1* and *t-2*. If for the years *t*, *t-1* and *t-2* there was only investment information available for one year (and two missing values), the respective (plant-year) observation was dropped from the analysis.

[7] We cannot control for the actual number of overtime hours since a considerable part of the plants in the sample provided no information on this variable.

Columns two and five of Table 2 report the estimates of wage regressions which additionally include 13 industry and 9 federal state dummies. While the coefficient on the export dummy remains zero, the impact of the export proportion halves in size, but is still significant. Therefore, the positive relationship between the export share and wages is partly due to between-industry differences.[8] Next, we control for unobserved plant heterogeneity and include plant fixed effects in the regression.[9] As can be seen from columns three and six of Table 2, both the coefficients on the export dummy and the export share are now totally insignificant, from which one might conclude that (omitted) plant heterogeneity had been responsible for the positive impact of the export share on wages reported above. However, the fixed effects estimates contain much more noise. The standard error for the coefficient on the export share is three times as large as the respective figure obtained by OLS, and all the control variables are also insignificant.

These results differ considerably from those reported by Bernard and Wagner (1997) in the only other study using German data and a comparable approach: Bernard and Wagner found that exporting or not does make a difference, while the share of exports in total sales does not matter. The coefficient of the exporter dummy variable is statistically significant whether fixed plant effects are controlled for or not. One reason for the different findings of Bernard and Wagner (1997) could be that they relied on census-type data from official statistics (where firms are obliged to report true data) over a longer and different time period (1978-1992) and, therefore, with considerable variation of export status and export share within plants.

4. Individual Level Wage Regressions

Plant-level estimations may suffer from aggregation bias since we cannot control for observable and unobservable individual heterogeneity which influence wages. Furthermore, the wage information obtained from plant surveys is *per se* less detailed and any adjustments for part-time employment and apprentices, for example, can only be approximative. In this section, we present individual level

[8] Separate regressions which (are available upon request and) either include industry or federal state dummies show that the industry dummies are responsible for the reduction in the coefficient on the export share.

[9] The industry and federal state dummies are dropped again since plants do generally neither change industry nor location and it is impossible to distinguish between misreporting and genuine switchers for those (few) who report different affiliations.

wage regressions based on the linked employer-employee data described in section 2. Throughout, the analysis will be carried out separately for blue-collar and white-collar workers. Besides the different degree of wage-censoring for both groups, there may also be varying exporter wage premia. Bernard and Wagner (1997) report in their study using plant level data that the positive exporter wage differential is almost exclusively driven by higher wages of white-collar workers.

We first apply OLS to a model without establishment level variables (except the information on exports), but with individual characteristics which are typically included in the empirical literature on wages. These comprise the following variables, all of which are available from the employment statistics: the age of the employee (and its square), a gender dummy, education dummies (without A-levels and apprenticeship (base category), with apprenticeship but without A-levels, without apprenticeship but with A-levels, with apprenticeship and A-levels, technical college degree, university degree, unknown education), a dummy variable indicating that the professional status is a master craftsman or a foreman and a dummy variable for non-German nationality. Note that both the data for the individual characteristics and the information on earnings are from official statistics, and, therefore, can be considered to be highly reliable.

As can be seen from the first column of Table 3, exporting plants do ceteris paribus pay higher wages of around 2 percent, but the difference is not statistically significant at conventional levels.[10] In contrast, we find again a significant positive relationship between the export share and wages. Raising the proportion of exports in total sales by ten percentage points increases the wage by 1.3 percent for blue-collar workers and by 0.6 percent for white-collar workers. Based on the export-share variable, there are two results emerging from this first column which recur throughout. First, the export wage premia is (about two times) larger for blue-collar workers than for white-collar employees. Second (and as expected), for white-collar employees the parameter estimate on the export share rises somewhat when using the wage-data including the imputed values instead of the original censored observations. Since the latter yields biased estimates, in what follows we will always refer to the coefficients from the imputed data.

As in the plant-level estimations, including industry and federal state dummies reduces the coefficient on the export variables (column two of Table 3), but (again)

[10] The parameter estimates of the control variables from this and the subsequent regressions are provided in Appendix 4-10.

the impact of the export share on wages can only partly be attributed to differences between industries.

[Table 3 near here]

Next, we control for individual level heterogeneity by including person fixed effects. The parameter on the export share is now identified either (i) if a plant changes its export share or (ii) if an employee moves to a plant with a different export share than its previous employer (and analogously for the parameter on the export dummy). Note that 827 (or 64.3 percent) of the firms included in our sample exported in each year and 370 (or 28.7 percent) did not export at all, while 80 firms (6.2 percent) changed their exporter status once and 10 firms (0.8 percent) did so twice. 2,271 persons (0.2 percent) changed once between employers included in our sample, 20 persons (0.002 percent) did so twice. While the shares of exporter status or employer changers in all firms or persons are rather small, the absolute numbers of cases are large enough to identify the parameters of the export variables included in our empirical models.

Column three of Table 3 reports the person fixed effects regression estimates of the export variables. For both blue- and white-collar workers, the wage difference between exporting and non-exporting plants is effectively zero. Compared with column two, the impact of the export share on wages reduces further, but is still (weakly) significant. The reduction of the coefficients (both for the exporting dummy as well as for the export share) when controlling for unobserved individual heterogeneity implies that unobserved worker characteristics are positively correlated with export behavior.

The coefficients on the export variables might still be biased because of the omission of observed and unobserved plant characteristics. As a next step, we therefore add the same variables which have been used in the plant-level regressions discussed in the previous section. We also include industry and federal state dummies. The OLS estimates which do not take account of unobserved heterogeneity are reported in the first column of Table 4. These are best compared to the second column of Table 3. It can be observed that the inclusion of the plant characteristics reduces the parameters on the export variables. As before, the effect of the export dummy is zero. While the export share has still a positive and significant impact on the wages of blue-collar workers, its estimate is now insignificant for white-collar employees. As above, we control next for unobserved personnel heterogeneity (column two of Table 4).

Compared to conditioning on individual as well as on plant observables, the export share coefficient for wages of blue-collar workers falls from 4.0 to 2.7 percent, while the export dummy remains insignificant for this group. Both export-variables are now significant for white-collar workers, which was not the case without controlling for unobserved personnel heterogeneity. The coefficient on the export share implies that a rise in the proportion of exports in total sales by ten percentage points increases the wage for white-collar workers by 0.15 percent.

In the next step, we control for unobserved plant characteristics, but not for unobserved personnel heterogeneity. The estimates of these plant fixed effects regressions, which are identified through variations of the variables within a plant, are reported in column three of Table 4. Interestingly, the coefficients on the export variables are almost identical for person and plant fixed effects.

[Table 4]

However, the coefficients for both person and plant fixed effects might still be biased – in this particular application by the same amount – because in each case we have controlled only for one side of the labor market. To investigate this, the two types of heterogeneity have to be taken account of at the same time in the regression. Unfortunately, because of movement between plants, there is no transformation which sweeps out both sets of fixed effects simultaneously. This means that person de-meaned (or differenced) firm dummies need to be created and estimated.[11] If one is not interested in the estimates of the heterogeneity themselves, consistent estimates of the coefficients on the observables can be obtained in a computationally far more straightforward way (see Andrews, Schank and Upward 2006). One simply defines unique worker-firm combinations (or 'spells'). By definition, neither the worker nor the firm unobserved (time-invariant) characteristics vary for a given spell. Therefore, we can sweep out both by applying spell fixed effects. Effectively, this uses only the differences between two consecutive observations if the worker does not change his employer between two periods.[12]

[11] Alternatively, one could also create and estimate firm de-meaned person dummies, but the dimension of persons is usually much larger than the dimension of firms.

[12] Note that this applies to nearly all persons in our regression sample because only 2,271 persons changed between employers included here once, and 20 did so twice. Since the proportion of plant-movers is tiny, any selection bias due to ignoring wage-changes of individuals moving between plants should be negligible. Moreover, it is often argued that mobility is not exogenous, which means that an individual's productivity may differ between firms because the quality of the match between an individual and a firm varies. To the extent that the (unobserved) quality of the match and a firm characteristic are correlated, the estimated firm coefficients will be biased (see Gibbons and Katz 1992 for a simple model in the context of industry wage differentials).

Spell fixed effects thus are our preferred specification, the results of which are reported in the last column of Table 4. It appears that the parameter estimates on the export variables are more or less identical to person or plant fixed effects. Therefore, we can safely conclude that exporting *per se* does hardly matter, but that the export share has a statistically significant impact on wages. An increase in the proportion of exports by 10 percentage points increases the wage of a blue-collar (white-collar) worker by 0.30 (0.15) percent. This means that a blue-collar employee working in a plant that exports 40 / 60 / 80 percent of its production earns about 1.2 / 1.8 / 2.4 percent more than an employee in a non-exporting plant, ceteris paribus, i.e. after controlling for observable and unobservable individual and plant characteristics. For white-collar workers, the exporter wage premium is lower and amounts to exactly half of the respective values. As the synopsis in Appendix 1 demonstrates, similar results have been obtained in studies for other countries (see, e.g., Bernard and Jensen 1995, 1999, 2004, and Isgut 2001), although the majority of studies find higher wage premia for white-collar workers.

5. Conclusions

The bottom line of our empirical study on the relationship between exporting and wages in West German manufacturing plants is an affirmative answer to the question in the title – exporters really do pay higher wages. Using linked employer-employee data to control for observable and unobservable individual and plant characteristics in the most comprehensive way possible we observe that wages increase with the share of production firms sell on foreign markets. This ceteris paribus exporter wage premium is neither (unplausibly) large nor negligible – working in a plant with, e.g., an export/sales ratio of 60 percent means for a blue-collar (white-collar) employee earning about 1.8 (0.9) percent more compared to working in an otherwise identical plant that does not export at all.

The positive relationship between wages and the share of exports in total sales is in line with previous findings reported in the literature. Three of the studies for other countries using aggregate firm level data (listed in the synopsis in Appendix 1) look at the role of export shares. Both Liu, Tsou and Hammitt (1999) for Taiwan and Isgut (2001) for Columbia report a positive impact of the export share on wages after controlling for unobservable plant heterogeneity, as do Hansson and Lundin (2004) for Sweden based on plant observables only. None of these studies, however, uses linked employer-employee data, so the results may be biased because neither observed nor unobserved individual characteristics are controlled for.[13]

An open question to be considered next is why according to our preferred specification with spell fixed effects (reported in the last column of Table 4) wages tend to increase with the proportion of exports in total sales, ceteris paribus. By construction neither observed nor (time-invariant) unobserved characteristics of the workers or the workplace can matter here. Given that the exporter wage premia are paid voluntarily and that the higher wages paid by more export-intensive plants lead to higher costs, the answer must lie in a positive relationship between wage premia over and above the going wage paid in other firms on the one hand, and success on exports markets that leads to a higher surplus on the other hand.

This said, efficiency wage theories form a natural pool of candidates to answer the question under consideration here. Among the various variants of models (Yellen 1984) the “higher-wages-reduce-turnover” variant seems to be most relevant in the context of German firms and exporting. To see why, remember that Germany is a high-wage country. Labor costs per unit of output are higher in Germany than in other competing highly industrialized countries including the U.S., UK, and Japan (Institut der deutschen Wirtschaft Köln 2004, p.7). High unit labor costs and a strong currency mean that German exporters cannot base their success in international market on low-priced products. Instead, they have to rely on complex high-quality products. To successfully produce this kind of products the tacit knowledge of the experienced workforce is a limiting factor of production. Managers often point to the non-transferable know-how incorporated in the firm’s workforce when asked why they still produce in high-cost Germany instead of, say, China or India.[14] Labor turnover is rather costly in these cases, so firms will be interested to reduce quits. One way to achieve this is to pay a premium above the going wage that a worker could earn in another plant. The higher the export/sales

[13] To the best of our knowledge there is only one contemporaneous study on exports and wages based on linked employer-employee data: Milner and Tandrayen (2004) use data for 1993 to 1995 from six African countries (Cameroon, Ghana, Kenya, Tanzania, Zambia and Zimbabwe). They find a positive and significant wage premium for workers in exporting firms, even after controlling for firm and individual characteristics. The positive effect is larger for skilled workers, but positive only for firms that sell inside Africa. The relation between the share of exports in total sales and wages is not investigated in this study, however. Two papers by Gustavsson, Heyman and Sjöholm (2004) and by Martins (2004) use linked employer-employee data to look at the related issue of wage differentials between local and foreign owned firms in Sweden and Portugal, respectively.

[14] For a recent example, see Bernhard Schreier of Heidelberger Druckmaschinen, the world market leader in the production of printing equipment, quoted in Handelsblatt, June 30, 2004, p. 13.

ratio and the share of profits earned on the world market, the more important will an experienced workforce be to secure high quality of products and competitiveness of the firm as a whole, and the higher will be the wage premium paid.[15]

An alternative interpretation of our finding that wages tend to increase with the proportion of exports in total sales would be that firms with high export shares might have experienced relatively favorable foreign demand shocks, and have raised wages to attract a relatively large work force in response. Such an explanation for cross-firm wage heterogeneity when workers are homogeneous can be found in some search-theoretic models which assume that individuals work at different wages, so that the labor supply curve is upward-sloping from the point of view of an employer (see, e.g., Bontemps et al. 2000). While in equilibrium all firms have the same level of profits, this can be attained by paying a low wage (thus attracting few workers) as well as by paying a high wage (thus attracting many workers). Furthermore, if firms employ different production technologies so that workers are more productive in one firm than in another, more productive firms may offer higher wages. Since there is some theoretical support (see Helpman, Melitz and Yeaple 2004) and empirical evidence (for Germany, see Wagner 2006) for exporting firms being more productive, this could also explain the exporter wage premium. Unfortunately, with our data we are not able to adequately test and empirically discriminate between the alternative explanations sketched above.

A question not discussed here is the direction of causality: Do exporters pay higher wages because they are exporters? Did they pay higher wages before they started to export? Do wages increase faster in firms that started to export than in comparable non-exporting firms? To investigate this important topic in a convincing way linked employer-employee data are needed for a panel that covers at least seven years, and that includes a large number of export starters which can be monitored (at least three years) before and (at least three years) after beginning to export, and which can be compared to (matched) firms that did not start to export (see Wagner 2002 for such a study using plant level panel data). The LIAB data used in our study are not (yet) suited for this kind of study, so the topic of causality is left for future research.

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[15] Unfortunately with the data used here it is not possible to test for a difference in labor turnover due to quits between firms with different export shares and different wage premia paid.

Table 1: Incidence and Coverage of Exporting Plants. Manufacturing, Western Germany (Percentages)

	Weighted	Unweighted[1]
Share of exporting plants	19.1	70.6
Employment share of exporting plants	64.8	92.7
Proportion of exports within total sales of exporting plants	18.9	33.8

Source: IAB Establishment Panel 1995-1997.
[1] Plant level regression sample.

Table 2: Plant Level Wage Regressions. Manufacturing, Western Germany
(Endogenous Variable: Logarithm of Monthly Wage Bill per Employee)

Estimation Method	OLS	OLS	Plant Fixed Effects	OLS	OLS	Plant Fixed Effects
Variables						
Exporting plant (1 = yes)	0.017 [0.75]	0.005 [0.23]	0.024 [0.69]			
Exports (proportion of total sales)				0.140 [4.50]***	0.067 [2.14]**	0.026 [0.28]
Logarithm of establishment size (number of employees)	0.213 [8.44]***	0.239 [9.35]***	-0.236 [1.13]	0.211 [8.84]***	0.238 [9.77]***	-0.235 [1.13]
Squared logarithm of establishment size	-0.014 [6.21]***	-0.017 [7.46]***	0.010 [0.55]	-0.015 [6.66]***	-0.017 [7.80]***	0.010 [0.55]
Logarithm of capital per worker	0.035 [4.74]***	0.037 [5.16]***	0.012 [0.83]	0.035 [4.69]***	0.037 [5.11]***	0.012 [0.82]
Weekly standard hours	-0.027 [4.83]***	-0.012 [1.90]*	-0.008 [0.80]	-0.025 [4.67]***	-0.012 [1.88]*	-0.008 [0.81]
Paid overtime work in establishment (1 = yes)	0.098 [5.17]***	0.076 [4.24]***	0.019 [0.88]	0.097 [5.13]***	0.076 [4.25]***	0.019 [0.87]
13 industry dummies	no	yes***	no	no	yes***	no
9 federal state dummies	no	yes***	no	no	yes***	no
Constant	8.264 [36.42]***	7.868 [28.45]***	9.434 [13.31]***	8.232 [36.49]***	7.867 [28.30]***	9.445 [13.30]***
R^2	0.337	0.414	0.025	0.343	0.415	0.025

Source: IAB Establishment Panel 1995-1997. 2,797 observations from 1,287 plants. Regressions include year dummies. Absolute values of t-statistics in brackets. Residuals within plants are allowed to be not independent. ***/ **/ * denote significance at the 1 / 5 / 10 percent level, respectively.

Table 3: Estimates of Exporter Wage Premium
Individual Level Regressions of Manufacturing, Western Germany
(Endogenous Variable: Logarithm of Daily Wage; Separate Regression for each Cell)

	Estimation Method	OLS	OLS	Person Fixed Effects
Group of Employees	Export Variable			
Blue-Collar, unimputed data	Exporting plant (1 = yes)	0.022 [1.24]	0.014 [1.23]	0.008 [1.47]
	Exports (proportion of total sales)	0.128 [4.20]***	0.079 [4.40]***	0.028 [2.63]***
White-Collar, unimputed data	Exporting plant (1 = yes)	0.018 [1.63]	0.013 [1.54]	0.004 [1.45]
	Exports (proportion of total sales)	0.046 [2.70]***	0.024 [2.36]**	0.011 [2.50]**
White-Collar, imputed data	Exporting plant (1 = yes)	0.022 [1.45]	0.011 [0.96]	0.006 [1.59]
	Exports (proportion of total sales)	0.059 [2.47]**	0.036 [2.37]**	0.013 [1.86]*

Source: LIAB 1995-1997. 1,189,469 observations of 585,692 blue-collar workers; 601,250 observations of 306,229 white-collar workers. Absolute values of t-statistics in brackets. Residuals within plants are allowed to be not independent. ***/ **/ * denote significance at the 1 / 5 / 10 percent level, respectively. Regressions include as further independent variables: age of employee, age squared of employee, gender, 6 education dummies, a dummy variable for the professional status being a master craftsman or a foreman (blue-collar workers only), a dummy variable for Non-German nationality, 2 year dummies and (only in the second OLS and Person Fixed Effects estimations) 13 industry and 9 federal state dummies.

Table 4: Estimates of Exporter Wage Premium
Individual Level Wage Regressions including Plant Characteristics. Manufacturing, Western Germany
(Endogenous Variable: Logarithm of Daily Wage; Separate Regression for each Cell)

	Estimation Method	OLS	Fixed Effects (FE)		
			Person FE	Plant FE	Spell FE
Group of Employees	Export Variable				
Blue-Collar, unimputed data	Exporting plant (1 = yes)	-0.011 [1.11]	0.009 [1.51]	0.005 [0.73]	0.009 [1.49]
	Exports (proportion of total sales)	0.040 [2.05]**	0.028 [3.13]***	0.027 [2.87]***	0.030 [3.26]***
White-Collar, unimputed data	Exporting plant (1 = yes)	-0.001 [0.07]	0.005 [2.17]**	0.004 [1.53]	0.005 [2.17]**
	Exports (proportion of total sales)	0.006 [0.61]	0.012 [3.18]***	0.011 [2.79]***	0.012 [3.31]***
White-Collar, imputed data	Exporting plant (1 = yes)	-0.004 [0.42]	0.008 [2.27]**	0.008 [1.74]*	0.008 [2.16]**
	Exports (proportion of total sales)	0.012 [0.86]	0.015 [2.51]***	0.014 [2.04]**	0.015 [2.44]**

Source: LIAB 1995-1997. 1,189,469 observations of 585,692 blue-collar workers working belonging to 1,262 plants (586,816 spells); 601,250 observations of 306,229 white-collar workers belonging to 1,204 plants (307,314 spells). Absolute values of t-statistics in brackets. Residuals within plants are allowed to be not independent. ***/ **/ * denote significance at the 1 / 5 / 10 percent level, respectively. In addition to the regressions reported in Table 3, the following plant-level variables are included: logarithm of the number of employees, squared logarithm of the number of employees, logarithm of capital per worker, weekly standard hours, a dummy variable indicating that the plant works overtime.

Appendix 1: Synopsis of studies on exporter wage differentials

Author(s) (year of publication)	Country (period covered)	Sample	Wage variable(s)	Important results
Meller (1995)	Chile (1986 – 1989)	Sample of 138 export firms and 436 non-export firms from five industries (food, wine, wood products, chemicals, basic metal)	Median value of average annual wage	The null hypothesis of equal means for wage levels among export and non- export firms (for small and large firms separately) is rejected at the 1 per cent level of significance. Workers of export firms have consistently higher wages than those from non-export firms in all industries. (Note that a firm was considered an exporter if at least 30 per cent of its production was destined for foreign markets; non-exporters sell only on the domestic market. Firms with less than 100 workers were classified as small firms.)
Alvarez and López (2004)	Chile (1990 – 1996)	7,132 manufacturing plants (unbalanced panel)	Average wage, average wage for production workers and for non-production workers	Controlling for plant size, foreign ownership, 3-digit sector, and year, exporter premia are 21 percent for average wages, 15 percent for production wages, and 28 percent for non-production wages.
Isgut (2001)	Colombia (1981 – 1991)	5,956 to 6,909 manufacturing plants (unbalanced panel)	Average annual wages for all workers, blue collar workers, white collar workers, technicians, and managers	Average annual wages are much higher in exporting plants than in non-exporting plants by all five measures of wages in all plants and in plants from three different size classes (less than 30, 30 to 100, more than 100 workers). Exporter wage premia are statistically significant for all wage measures after controlling for plant size, industry, region, year, export/sales ratio, and capital per worker. Fixed effects regressions including the exports/sales ratio, plant size, capital per worker, and year estimate exporter wage premia between 1.5 percent (for white collar workers) and 3.3 percent (for blue collar workers).
Sinani (2003)	Estonia (1994 – 1999)	2,335 observations on manufacturing firms (unbalanced panel) with 420 firms in 1994 and 303 firms in 1999.	Average labor costs	Average labor costs for exporters equal about four times (1994) and three times (1999) the average labor costs for non-exporters.
Bernard and Wagner (1997)	Germany [Federal State of Lower Saxony] (1978 – 1992)	4,263 manufacturing plants in 1978; 4,270 manufacturing plants in 1992	Average annual wage; average annual production wage; average annual non-production wage	Average annual wage, production wage and non-production wage is higher in all plants and in plants with less than 250 employees in 1978 and 1992, but not for plants with more than 250 or more than 500 employees. Wage differences are much more pronounced for white-collar workers. Exporter wage premia are in part statistically significant after controlling for plant size, capital per worker, production hours per worker, a multi-plant dummy, and industry: the average wage premium in exporting plants is 2.6 percent, while blue-collar workers receive no premium and white-collar workers are paid 3.3 percent more. Results including export intensity are similar. In a fixed effects specification both the premia for average wages and for white-collar wages remain significant.
Arnold and Hussinger (2004)	Germany (1992 – 2000)	Unbalanced panel of 2,149 observations on the firm level taken from the Mannheim Innovation Panel covering the manufacturing sector	Wage per employee (exact definition not given)	The wage per employee for the 1,260 exporters is 24.7 percent higher than the wage paid by the 889 non-exporters. Note that firms are considered to be exporters only if they sell at least five percent of their turnover abroad.

Hahn (2004)	Korea (1990 – 1998)	ca. 69,000 to 97,000 manufacturing plants (unbalanced panel)	Average wage; average production worker wage; average non-production worker wage	Average wages are higher in exporting plants than in non-exporting plants by all three measures of wages in 1990, 1994 and 1998. Exporter wage premia are statistically significant and high controlling for industry, region and plant size (in 1998, 12.5 percent, 10.5 percent, and 12.0 percent for the three different measures of wages, respectively).
Bernard (1995)	Mexico (1986 – 1990)	2,370 manufacturing plants (balanced panel)	Average annual wage and benefits; average annual production wage; average annual non-production wage; average hourly production wage; average hourly non-production wage; average annual benefits	Exporting plants pay higher average amounts than non-exporting plants for all measures of wages and benefits in 1986 and 1992. Exporter premia are statistically significant after controlling for capital per worker, hours per worker, size of plant, foreign ownership, white collar/total employment, industry, state and year. In a fixed-effects model only the premia for benefits per employee is statistically significant. However, the number of plants changing from non-exporter to exporter or vice versa is rather small so the results from the fixed effects model rely on a very small sample.
Zhou (2003)	Mexico (1986 – 1990)	2,353 manufacturing plants	Average white-collar wages; average blue-collar wages; average earnings including non-wage benefits and social security contributions but excluding profit sharing; average earnings including everything	Average wages are much higher in exporting plants than in non-exporting plants by all four measures of wages. Exporter wage premia are statistically significant and high controlling for industry and state; and controlling for size of firm, capital-labor ratio, white-collar worker share in total employment, foreign equity participation dummy, imported machinery share, royalty payment share, total factor productivity growth, tariff rates on outputs and inputs, and license requirements on outputs and inputs. Exporter wage premia are statistically significant and high (between 7 and 9 percent) in fixed effects regressions.
Verhoogen (2003)	Mexico (1984 – 2001) (1993 – 2001)	3,003 manufacturing plants for 1993 – 2001 in a balanced panel; 3,605 manufacturing plants for 1993 – 2001 in an unbalanced panel; 706 plants for 1984 – 2001 in a balanced panel	Average white-collar hourly wage; average blue-collar hourly wage; ratio of white-collar / blue-collar wage	Average white-collar and blue-collar wages, and ratio of white-collar to blue- collar wage higher for exporters than for non-exporters in 1993, 1997, and 2001 (balanced panel 1993 - 2001); no results reported for the two other panels.
De Loecker (2004)	Slovenia (1994 – 2000)	7,915 manufacturing establishments (unbalanced panel); 20,580 observations	Average wage	Controlling for the number of employees, exporters pay 16.14 percent higher wages than non-exporters.
Farinas and Martin-Marcos (2003)	Spain (1990 – 1999)	10,145 observations on 1,403 manufacturing plants (unbalanced panel)	Average wage per hour	Average wages are higher in exporting firms than in non-exporting firms for all firms, small firms, and large firms in 1990 and 1999; note that differences are small in large firms (0.3 Euro and 0.5 Euro, respectively). Exporter wage premium is statistically significant and positive (6 percent) controlling for firm size, industry, year, foreign ownership, and firm age.
Hansson and Lundin (2004)	Sweden (1990 – 1999)	3,275 manufacturing firms (between 1,565 and 1,820 each year) in an unbalanced panel.	Average annual labor costs (including social security) per employee; average earning per employee; average earnings of skilled employees; average earnings of less-skilled employees	Average wages are significantly higher for all four wage measures in exporting firms than in non-exporting firms in 1990; in 1999, this holds only for skilled employees (while exporting firms had on average lower labor costs per employee). Using pooled data for 1990 to 1999 (15, 262 or 15,413 observations) exporter wage premia are computed controlling for export share, firm size, capital intensity, industry and year dummies; results are positive and statistically significant for average labor costs

				(wage premium: 1 percent), average earnings per employee (1.5 percent), and average earnings of skilled workers (7 percent), but not for average earnings of less- skilled workers.
Aw and Batra (1999)	Taiwan (1986)	80,584 firms in ten manufacturing industries from the 1986 census	Average annual wage of non-production labor and of production labor	For all ten industries exporters pay higher wages than non-exporters to both their non-production and production labor. The average cross-industry export wage premium (after controlling for firm size, foreign capital, firm age, multiplant status, and technology investment) is almost 30 percent for non-production workers and 14 percent for production workers.
Liu, Tsou and Hammitt (1999)	Taiwan (1989 – 1993)	875 plants from electronics industry (balanced panel) Information on exports only available for 1990 and 1992	Average annual wage	Average annual wage is much higher in exporting plants than in non-exporting plants in 1992. Exporter wage premium is statistically significant and positive (15.5 percent) in a random effects regression controlling for capital intensity, ratio of subcontracting revenues to total sales, and ratio of R&D expenditure to total sales.
Tsou, Liu and Hammitt (2002)	Taiwan (1986 – 1996)	Plant level data from the electrical machinery and electronics industry; 5,923 plants in 1986, 8,346 plants	Average annual wage	Average annual wages were significantly higher for exporters than for non-exporters; the differentials were 23.8 percent in 1991 and 18.6 percent in 1996.
Greenaway and Yu (2004)	UK (1989 – 1999)	461 firms (unbalanced panel) from the chemical industry; 2,883 observations. Some results for "other manufactures" are reported, too.	Average annual wage	Average annual wages are 1.5 percent higher for exporters from other manufacturing, and 7.6 percent higher for exporters from the chemical industry. Exporter premia (controlling for industry and time effects) are 4.5 percent and 6.4 percent, respectively.
Bernard and Jensen (1995)	U.S. (1976 – 1987)	193,463 manufacturing plants (1987 Census of Manufactures) ca. 400,000 manufacturing plants (pooled data for 1976 – 1987)	Average annual wage per worker; average annual wage per production worker; average annual wage per non-production worker; average annual benefits per worker	All average wages and benefits are higher in exporting plants than in non-exporting plants of all size classes, and with less than 250 employees or with 250 and more employees in 1987. Exporter wage premia are statistically significant for all categories of wages and benefits after controlling for capital per worker, hours per worker, size of plant, multi-plant dummy, industry, year, plant age, and region, amounting to 4.4 percent for wage per worker and 7.6 percent for benefits. Coefficients of exporter status dummies are statistically significant in fixed effects regressions controlling for capital per worker, hours per worker, size of plant, and year.
Bernard and Jensen (1999)	U.S. (1984 – 1992)	56,257 manufacturing plants in 1984; 199,258 manufacturing plants in 1987; 224,009 manufacturing plants in 1992	Annual average wage; annual average production wage; annual average non-production wage	Exporter wage premia are statistically significant after controlling for industry, state, and plant size. Estimates for 1992 are 9.3 percent for average wage, 6.6 percent for production wage, and 4.6 for non-production wage.
Bernard and Jensen (2004)	U.S. (1984 – 1992)	13,550 manufacturing plants (balanced panel)	Average annual wage; annual blue-collar wage; annual white-collar wage	Exporter wage premia are statistically significant after controlling for industry and state in 1984 and 1992; estimates for 1992 are 6.9 percent for average wage and blue-collar wage, and 3.7 percent for white-collar wage.

Van Biesebroeck (2003)	Sub-Saharan Africa: Burundi, Cameroon, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Tanzania, Zambia, Zimbabwe (1992 / 1996)	approx. 200 firms and three consecutive years in each country except Cote d'Ivoir (two years) and Burundi and Ethiopia (one year); unbalanced panels.	Average wage; production wage; non-production wage	Exporter wage premia is statistically significant and high (about 40 percent) for average wage after controlling for country, year, industry, location, and plant size. The premia is statistically significant and high (about 33 percent) for non-production wage in a sub-sample with information on it, but not statistically significant for production wage.

Note: The studies are listed in alphabetical order of the country considered; studies covering up to three countries are listed separately for each country, other multi-country studies are listed at the bottom of the table.

Appendix 2: The Imputation Procedure

In multiple imputation (MI), each value of the unknown missing data Y_{mis} is replaced by *m* simulated values Y_{mis}^1, $Y_{mis}^2, \ldots, Y_{mis}^m$. The *m* (as opposed to one) sets of imputations reflect uncertainty about the true values of the data. After the multiple imputations have been carried out, *m* completed data-sets (and plausible versions of the real data) exist, each of which can then be analyzed by standard complete-data methods.

We assume that the (logarithm of the) wage is given by

$$w^* = x'\beta + \varepsilon,$$

where $\varepsilon \sim N(0, \sigma^2)$. Observed wages are uncensored and equal to actual wages $(w^{obs} = w^{unc} = w^*)$ if the latter are on or below the ceiling. Otherwise observed wages are censored at the ceiling $(w^{obs} = w^{cen} = c)$. We will multiply impute the censored wages by estimates of the unobserved wages above the ceiling, which follow a normal distribution truncated at *c*. The multiple imputation is based on a Markov chain Monte Carlo (MCMC) technique, where the *m* simulated values are obtained through iterations of two steps:[16]

(1) In the first step, values for the missing information (i.e. for those observations where the wages are censored) are drawn from a truncated normal distribution:[17]

$$w^{imp} \sim N^c(x'\beta^{(t)}, \sigma^{2(t)}),$$

where the *c* indicates that the distribution is truncated at the ceiling *c* from above. Based on the uncensored and the imputed wage data (w^{unc}, w^{imp}), we then estimate a wage equation by OLS, where we include as *x*-variables the same covariates as in the individual-level wage regressions reported in Section 4. These comprise both individual and plant level information (see footnotes to Tables 3 and 4 for a complete list of variables in addition to the export share and the export dummy) and also include plant dummies, but no person effects.[18]

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[16] Multiple imputations based on Markov chain Monte Carlo techniques are discussed in Schafer (1997). We apply an algorithm of this technique proposed by Gartner and Rässler (2005) in the context of censored data. For a formal presentation, the reader is referred to Gartner and Rässler (2005).

[17] The starting values $(\beta^{(0)}, \sigma^{2(0)})$ for the truncated distribution are obtained from a tobit estimation.

[18] For ease of exposition, we have combined individual and plant level observables as well as plant dummies into the vector x. This could be done without harm, since plant dummies are not treated differently from any other variable.

(2) In the second step, the data posterior distributions can be specified, based on the estimates from the OLS regression, and new parameters are drawn according to the following:

$$\sigma^{2(t+1)} = RSS / g \ ,$$

where *RSS* is the residual sum of squares from the OLS regression and *g* is drawn from a χ^2-distribution (with degrees of freedom corresponding to those in the OLS regression).

$$\beta^{(t+1)} \sim N\left(\hat{\beta}, \sigma^{2(t+1)}(X'X)^{-1}\right),$$

where $\hat{\beta}$ is the estimated coefficient vector from the OLS regression.[19] With the new parameters $(\beta^{(t+1)}, \sigma^{2(t+1)})$, we can start again with step (1).

In general, we will not be able to use successive iterates of the imputed data because the parameters tend to be correlated (Schafer 1997). Therefore, we repeat steps (1) and (2) five thousand times and keep the data draws (step 1) of every one-thousandth iteration as a new-data set.[20] Hence, we end up with five complete data sets, each consisting of the same unimputed data below the ceiling (w^{obs}=w^{unc}) and different draws of imputed data if observed wages were censored (w^{imp}).

[19] Such random draws of $(\beta^{(t)},\sigma^{2(t)})$ are considered to be the Bayesian stochastic counterpart of maximizing the complete-data likelihood.

[20] For our data, autocorrelation functions of the parameters estimated from 5,000 iterations show that the chain converges and that – for the chosen lag of 1000 – autocorrelation does not cause problems.

Appendix 3: Descriptive Statistics; Regression Sample (Individual Level), Manufacturing, Western Germany

Variables	Blue-Collar Workers Mean	Blue-Collar Workers s.d.	White-Collar Workers Mean	White-Collar Workers s.d.
Logarithm of daily wage (in Pfennigen),				
Reported	9.692	0.223	9.993	0.235
imputed wages			10.056	0.300
Exporting plant (1 = yes)	0.931	0.254	0.915	0.278
Exports (proportion of total sales)	0.391	0.230	0.403	0.248
Age of employee (years)	39.296	10.374	41.574	10.121
Age of employee squared (divided by 100)	16.518	8.418	18.308	8.573
Gender (1 = female)	0.141	0.348	0.240	0.427
Educational dummies				
without apprenticeship, without A-levels (reference group)	0.306	0.461	0.041	0.197
with apprenticeship, without A- levels	0.652	0.476	0.586	0.493
without apprenticeship, with A-levels	0.003	0.052	0.012	0.109
with apprenticeship, with A-levels	0.004	0.065	0.064	0.244
Technical college degree	0.001	0.033	0.164	0.371
University degree	0.000	0.020	0.127	0.333
Unknown Education	0.034	0.181	0.006	0.078
Master craftsman, foreman (1= yes)	0.036	0.186	0.000	0.000
Foreign employee (1 = yes)	0.183	0.387	0.032	0.177
Logarithm of establishment size	7.489	1.294	7.499	1.262
Logarithm of establishment size squared	57.757	19.268	57.828	18.921
Logarithm of capital per worker	9.495	0.824	9.480	0.900
Weekly standard hours	36.005	1.479	36.151	1.397
Paid overtime in establishment (1 = yes)	0.905	0.293	0.914	0.280
Year dummies (reference: year = 1995)				
1996	0.301	0.459	0.316	0.465
1997	0.327	0.469	0.328	0.469
Number of observations:				
total	1,189,469		601,250	
censored	(20,378)		(203,850)	

Source: LIAB 1995-1997.

Appendix 4: Individual Level Wage Regressions; Manufacturing, Western Germany
(Endogenous Variable: Logarithm of Daily Wage)

Estimation Method	OLS					
	Blue-Collar Workers		White-Collar Workers			
	Unimputed Data		Unimputed Data		Imputed Data	
Variables						
Exporting plant (1 = yes)	0.022		0.018		0.022	
	[1.24]		[1.63]		[1.45]	
Exports (proportion of total sales)		0.128		0.046		0.059
		[4.20]***		[2.70]***		[2.45]**
Age of employee (years)	0.021	0.021	0.050	0.050	0.054	0.054
	[22.08]***	[22.85]***	[52.82]***	[52.89]***	[52.99]***	[52.59]***
Age of employee squared (divided by 100)	-0.022	-0.022	-0.050	-0.050	-0.051	-0.050
	[18.74]***	[19.31]***	[46.81]***	[46.81]***	[44.15]***	[43.73]***
Gender (1 = female)	-0.245	-0.242	-0.183	-0.183	-0.211	-0.210
	[29.49]***	[29.30]***	[22.90]***	[22.56]***	[25.20]***	[24.89]***
Educational dummies						
with apprenticeship,	0.092	0.088	0.089	0.089	0.109	0.109
without A- levels	[18.14]***	[17.33]***	[9.99]***	[10.04]***	[10.37]***	[10.43]***
without apprenticeship,	-0.018	-0.022	0.139	0.140	0.185	0.185
with A-levels	[1.54]	[1.96]*	[12.62]***	[12.55]***	[15.95]***	[15.78]***
with apprenticeship,	0.062	0.059	0.145	0.145	0.191	0.192
with A-levels	[5.04]***	[4.87]***	[13.19]***	[13.27]***	[14.41]***	[14.47]***
Technical college degree	0.080	0.071	0.210	0.210	0.318	0.317
	[4.44]***	[4.69]***	[24.65]***	[24.29]***	[41.39]***	[40.31]***
University degree	0.018	0.016	0.233	0.232	0.377	0.376
	[0.94]	[0.92]	[26.34]***	[25.78]***	[38.73]***	[38.45]***
Unknown Education	0.048	0.041	0.087	0.088	0.133	0.134
	[2.09]**	[2.18]**	[4.37]***	[4.48]***	[5.19]***	[5.30]***
Master craftsman, foreman	0.290	0.291				
(1= yes)	[20.83]***	[21.50]***				
Foreign employee (1 = yes)	0.012	0.011	-0.008	-0.009	-0.011	-0.013
	[2.04]**	[2.00]**	[2.21]**	[2.62]***	[1.89]*	[2.24]**
Constant	9.151	9.127	8.714	8.714	8.582	8.582
	[374.6]***	[430.4]***	[332.0]***	[340.6]***	[326.0]***	[334.1]***
R^2	0.349	0.366	0.482	0.484	0.5	0.51
No. of observations	1,189,469		601,250			
No. of employees	585,692		306,229			
No. of plants	1,262		1,204			
No. of spells	586,816		307,314			

Source: LIAB 1995-1997. Regressions include also year dummies, but no sectoral or regional dummies. Reference category of education dummies is without apprenticeship, without A-levels. Absolute values of t-statistics in brackets. Residuals within plants are allowed to be not independent. ***/ **/ * denote significance at the 1 / 5 / 10 percent level, respectively.

Appendix 5: Individual Level Wage Regressions; Manufacturing, Western Germany
(Endogenous Variable: Logarithm of Daily Wage)

Estimation Method	OLS					
	Blue-Collar Workers		White-Collar Workers			
	Unimputed Data		Unimputed Data		Imputed Data	
Variables						
Exporting plant (1 = yes)	0.014 [1.23]		0.013 [1.54]		0.011 [0.96]	
Exports (proportion of total sales)		0.079 [4.40]***		0.024 [2.36]**		0.036 [2.37]**
Age of employee (years)	0.019 [22.98]***	0.019 [22.90]***	0.048 [52.80]***	0.048 [52.83]***	0.052 [54.44]***	0.052 [54.48]***
Age of employee squared (divided by 100)	-0.020 [19.42]***	-0.020 [19.40]***	-0.048 [46.18]***	-0.048 [46.14]***	-0.049 [45.15]***	-0.049 [45.09]***
Gender (1 = female)	-0.208 [36.42]***	-0.207 [35.98]***	-0.182 [24.84]***	-0.182 [24.64]***	-0.209 [27.89]***	-0.208 [27.60]***
Educational dummies						
with apprenticeship, without A- levels	0.076 [23.04]***	0.075 [23.46]***	0.093 [12.12]***	0.093 [12.16]***	0.116 [13.72]***	0.116 [13.70]***
without apprenticeship, with A-levels	-0.036 [3.79]***	-0.037 [3.98]***	0.137 [14.50]***	0.137 [14.60]***	0.183 [19.44]***	0.184 [19.49]***
with apprenticeship, with A-levels	0.048 [6.17]***	0.047 [6.21]***	0.145 [15.84]***	0.145 [15.89]***	0.193 [17.48]***	0.194 [17.48]***
Technical college degree	0.069 [5.10]***	0.066 [5.15]***	0.209 [24.29]***	0.209 [24.13]***	0.318 [39.29]***	0.318 [38.47]***
University degree	0.022 [1.51]	0.021 [1.46]	0.227 [26.15]***	0.227 [26.05]***	0.372 [43.61]***	0.372 [42.87]***
Unknown Education	0.026 [2.14]**	0.021 [1.80]*	0.093 [5.67]***	0.093 [5.66]***	0.134 [6.85]***	0.135 [6.86]***
Master craftsman, foreman (1= yes)	0.294 [25.90]***	0.294 [26.02]***				
Foreign employee (1 = yes)	-0.003 [0.87]	-0.004 [1.06]	-0.012 [3.80]***	-0.012 [4.09]***	-0.016 [3.54]***	-0.016 [3.88]***
Constant						
R^2	0.479	0.484	0.517	0.517	0.54	0.54
No. of observations	1,189,469		601,250			
No. of employees	585,692		306,229			
No. of plants	1,262		1,204			
No. of spells	586,816		307,314			

Source: LIAB 1995-1997. Regressions include also year dummies as well as – in contrast to Appendix 4 – sectoral and regional dummies. Reference category of education dummies is without apprenticeship, without A-levels. Absolute values of t-statistics in brackets. Residuals within plants are allowed to be not independent. ***/ **/ * denote significance at the 1 / 5 / 10 percent level, respectively.

Appendix 6: Individual Level Wage Regressions; Manufacturing, Western Germany
(Endogenous Variable: Logarithm of Daily Wage)

Estimation Method	Person Fixed Effects					
	Blue-Collar Workers		White-Collar Workers			
	Unimputed Data		Unimputed Data		Imputed Data	
Variables						
Exporting plant (1 = yes)	0.008 [1.47]		0.004 [1.45]		0.006 [1.59]	
Exports (proportion of total sales)	1.11 [1.11]	0.028 [2.63]***		0.011 [2.50]**		0.013 [1.86]*
Age of employee (years)	0.039 [8.76]***	0.039 [8.75]***	0.078 [36.31]***	0.078 [35.86]***	0.091 [37.96]***	0.091 [37.37]***
Age of employee squared (divided by 100)	-0.031 [9.16]***	-0.031 [9.26]***	-0.056 [27.26]***	-0.056 [27.31]***	-0.071 [30.25]***	-0.071 [30.34]***
Gender (1 = female)						
Educational dummies						
with apprenticeship, without A- levels	0.002 [0.28]	0.003 [0.34]	0.009 [1.44]	0.009 [1.45]	0.016 [1.66]*	0.016 [1.67]*
without apprenticeship, with A-levels	0.000 [0.02]	0.000 [0.01]	-0.052 [2.29]**	-0.052 [2.29]**	-0.026 [1.07]	-0.026 [1.07]
with apprenticeship, with A-levels	0.013 [0.67]	0.014 [0.74]	0.004 [0.36]	0.004 [0.38]	0.018 [1.27]	0.019 [1.30]
Technical college degree	0.042 [1.86]*	0.042 [1.87]*	0.018 [2.32]**	0.019 [2.35]**	0.066 [4.76]***	0.067 [4.78]***
University degree	0.039 [1.46]	0.039 [1.47]	0.023 [2.79]***	0.023 [2.77]***	0.088 [6.62]***	0.088 [6.62]***
Unknown Education	-0.028 [1.80]*	-0.029 [1.90]*	0.008 [1.55]	0.008 [1.46]	0.015 [1.22]	0.014 [1.20]
Master craftsman, foreman (1= yes)	0.041 [1.33]	0.041 [1.36]				
Foreign employee (1 = yes)						
Constant	8.682 [63.29]***	8.693 [63.31]***	7.761 [142.3]***	7.769 [140.4]***	7.533 [105.0]***	7.542 [103.6]***
R^2	0.968	0.968	0.984	0.984	0.95	0.95
No. of observations	1,189,469		601,250			
No. of employees	585,692		306,229			
No. of plants	1,262		1,204			
No. of spells	586,816		307,314			

Source: LIAB 1995-1997. Regressions include also year dummies as well as sectoral and regional dummies. Reference category of education dummies is without apprenticeship, without A-levels. Absolute values of t-statistics in brackets. Residuals within plants are allowed to be not independent. ***/ **/ * denote significance at the 1 / 5 / 10 percent level, respectively.

Appendix 7: Individual Level Wage Regressions; Manufacturing, Western Germany
(Endogenous Variable: Logarithm of Daily Wage)

Estimation Method	OLS					
	Blue-Collar Workers		White-Collar Workers			
	Unimputed Data		Unimputed Data		Imputed Data	
Variables						
Exporting plant (1 = yes)	-0.011 [1.11]		-0.001 [0.07]		-0.004 [0.42]	
Exports (proportion of total sales)		0.040 [2.05]**		0.006 [0.61]		0.012 [0.86]
Age of employee (years)	0.019 [20.50]***	0.019 [20.87]***	0.048 [52.13]***	0.048 [52.11]***	0.052 [53.15]***	0.052 [53.15]***
Age of employee squared (divided by 100)	-0.019 [17.16]***	-0.019 [17.50]***	-0.048 [45.66]***	-0.048 [45.60]***	-0.048 [43.92]***	-0.048 [43.88]***
Gender (1 = female)	-0.202 [37.10]***	-0.202 [36.80]***	-0.180 [24.66]***	-0.180 [24.63]***	-0.206 [27.44]***	-0.206 [27.41]***
Educational dummies						
with apprenticeship, without A- levels	0.073 [22.45]***	0.073 [22.74]***	0.097 [12.86]***	0.097 [12.79]***	0.121 [14.82]***	0.120 [14.66]***
without apprenticeship, with A-levels	-0.040 [3.97]***	-0.040 [4.07]***	0.134 [15.67]***	0.134 [15.69]***	0.180 [19.91]***	0.181 [20.06]***
with apprenticeship, with A-levels	0.043 [4.54]***	0.043 [4.65]***	0.144 [15.64]***	0.145 [15.64]***	0.193 [17.28]***	0.193 [17.27]***
Technical college degree	0.072 [5.21]***	0.070 [5.31]***	0.209 [24.52]***	0.209 [24.36]***	0.318 [39.65]***	0.318 [38.98]***
University degree	0.028 [1.98]**	0.027 [1.93]*	0.225 [26.30]***	0.225 [26.17]***	0.370 [42.70]***	0.370 [42.18]***
Unknown Education	0.023 [1.76]*	0.022 [1.66]*	0.106 [7.08]***	0.106 [7.10]***	0.148 [8.33]***	0.149 [8.37]***
Master craftsman, foreman (1= yes)	0.295 [23.35]***	0.295 [23.62]***				
Foreign employee (1 = yes)	-0.007 [1.86]*	-0.007 [1.89]*	-0.012 [4.14]***	-0.013 [4.24]***	-0.017 [3.94]***	-0.017 [4.09]***
Logarithm of establishment size (number of employees)	0.051 [1.85]*	0.047 [1.75]*	0.089 [5.28]***	0.089 [5.28]***	0.077 [3.33]***	0.076 [3.33]***
Squared logarithm of establishment size	-0.002 [0.78]	-0.002 [0.74]	-0.005 [3.92]***	-0.005 [3.95]***	-0.004 [2.23]**	-0.004 [2.26]**
Logarithm of capital per worker	0.014 [3.07]***	0.013 [2.84]***	0.009 [3.53]***	0.009 [3.54]***	0.011 [2.94]***	0.011 [3.00]***
Weekly standard hours	-0.002 [0.57]	-0.002 [0.67]	-0.004 [1.57]	-0.004 [1.55]	-0.003 [0.94]	-0.003 [0.89]
Paid overtime work in establishment (1 = yes)	0.028 [3.06]***	0.028 [3.16]***	0.015 [2.70]***	0.015 [2.72]***	0.019 [2.23]**	0.019 [2.27]**
Constant	8.981 [51.43]***	9.005 [51.14]***	8.450 [77.87]***	8.449 [77.87]***	8.280 [57.77]***	8.275 [57.11]***
R^2	0.501	0.502	0.528	0.528	0.55	0.55
No. of observations	1,189,469		601,250			
No. of employees	585,692		306,229			
No. of plants	1,262		1,204			
No. of spells	586,816		307,314			

Source: LIAB 1995-1997. Regressions include also year dummies as well as sectoral and regional dummies. Reference category of education dummies is without apprenticeship, without A-levels. Absolute values of t-statistics in brackets. Residuals within plants are allowed to be not independent. ***/ **/ * denote significance at the 1 / 5 / 10 percent level, respectively.

Appendix 8: Individual Level Wage Regressions; Manufacturing, Western Germany
(Endogenous Variable: Logarithm of Daily Wage)

Estimation Method	Person Fixed Efffects					
	Blue-Collar Workers		White-Collar Workers			
	Unimputed Data		Unimputed Data		Imputed Data	
Variables						
Exporting plant (1 = yes)	0.009 [1.51]		0.005 [2.17]**		0.008 [2.27]**	
Exports (proportion of total sales)		0.028 [3.13]***		0.012 [3.18]***		0.015 [2.51]**
Age of employee (years)	0.042 [10.91]***	0.042 [10.90]***	0.079 [35.86]***	0.079 [35.43]***	0.092 [37.63]***	0.092 [37.06]***
Age of employee squared (divided by 100)	-0.030 [10.37]***	-0.030 [10.45]***	-0.056 [27.83]***	-0.056 [27.90]***	-0.071 [31.02]***	-0.071 [31.13]***
Gender (1 = female)						
Educational dummies						
with apprenticeship, without A- levels	-0.002 [0.21]	-0.001 [0.16]	0.009 [1.43]	0.010 [1.45]	0.016 [1.66]*	0.016 [1.68]*
without apprenticeship, with A-levels	-0.001 [0.05]	-0.001 [0.04]	-0.053 [2.32]**	-0.053 [2.32]**	-0.027 [1.11]	-0.027 [1.11]
with apprenticeship, with A-levels	0.007 [0.37]	0.008 [0.46]	0.002 [0.20]	0.003 [0.23]	0.016 [1.12]	0.017 [1.15]
Technical college degree	0.018 [0.80]	0.019 [0.82]	0.017 [2.15]**	0.018 [2.18]**	0.065 [4.65]***	0.066 [4.67]***
University degree	0.034 [1.26]	0.035 [1.27]	0.022 [2.57]**	0.022 [2.56]**	0.087 [6.39]***	0.087 [6.40]***
Unknown Education	-0.033 [2.22]**	-0.034 [2.33]**	0.008 [1.26]	0.007 [1.18]	0.016 [1.25]	0.016 [1.22]
Master craftsman, foreman (1= yes)	0.049 [2.08]**	0.049 [2.11]**				
Foreign employee (1 = yes)						
Logarithm of establishment size (number of employees)	-0.141 [1.52]	-0.138 [1.52]	-0.048 [1.48]	-0.046 [1.47]	-0.106 [1.98]**	-0.104 [1.96]**
Squared logarithm of establishment size	0.013 [1.85]*	0.013 [1.86]*	0.004 [1.56]	0.004 [1.55]	0.008 [1.98]**	0.008 [1.96]*
Logarithm of capital per worker	0.005 [2.01]**	0.006 [2.23]**	0.004 [3.61]***	0.003 [3.72]***	0.005 [3.04]***	0.004 [3.02]***
Weekly standard hours	0.003 [1.45]	0.004 [1.60]	0.002 [1.66]*	0.002 [1.91]*	0.003 [2.36]**	0.003 [2.47]**
Paid overtime work in establishment (1 = yes)	0.011 [2.31]**	0.011 [2.36]**	0.007 [4.19]***	0.006 [4.28]***	0.010 [4.66]***	0.009 [4.73]***
Constant	8.673 [22.73]***	8.658 [23.27]***	7.753 [55.63]***	7.750 [56.63]***	7.648 [36.40]***	7.646 [36.69]***
R^2	0.968	0.969	0.984	0.984	0.95	0.95
No. of observations	1,189,469		601,250			
No. of employees	585,692		306,229			
No. of plants	1,262		1,204			
No. of spells	586,816		307,314			

Source: LIAB 1995-1997. Regressions include also year dummies as well as sectoral and regional dummies. Reference category of education dummies is without apprenticeship, without A-levels. Absolute values of t-statistics in brackets. Residuals within plants are allowed to be not independent. ***/ **/ * denote significance at the 1 / 5 / 10 percent level, respectively.

Appendix 9: Individual Level Wage Regressions; Manufacturing, Western Germany
(Endogenous Variable: Logarithm of Daily Wage)

Estimation Method	Plant Fixed Effects					
	Blue-Collar Workers		White-Collar Workers			
	Unimputed Data		Unimputed Data		Imputed Data	
Variables						
Exporting plant (1 = yes)	0.005		0.004		0.008	
	[0.73]		[1.53]		[1.74]*	
Exports (proportion of total	1.110	0.027		0.011		0.014
sales)	[1.11]	[2.87]***		[2.79]***		[2.04]**
Age of employee (years)	0.019	0.019	0.046	0.046	0.050	0.050
	[27.69]***	[27.70]***	[53.54]***	[53.55]***	[59.58]***	[59.59]***
Age of employee squared	-0.020	-0.020	-0.046	-0.046	-0.047	-0.047
(divided by 100)	[25.71]***	[25.72]***	[46.83]***	[46.83]***	[50.28]***	[50.29]***
Gender (1 = female)	-0.171	-0.171	-0.176	-0.176	-0.201	-0.201
	[44.55]***	[44.54]***	[24.24]***	[24.24]***	[27.34]***	[27.34]***
Educational dummies						
with apprenticeship,	0.062	0.062	0.102	0.102	0.130	0.130
without A- levels	[32.05]***	[32.05]***	[16.58]***	[16.58]***	[23.13]***	[23.12]***
without apprenticeship,	-0.059	-0.059	0.126	0.126	0.173	0.173
with A-levels	[8.11]***	[8.11]***	[15.53]***	[15.53]***	[20.32]***	[20.32]***
with apprenticeship,	0.028	0.028	0.148	0.148	0.202	0.202
with A-levels	[5.61]***	[5.61]***	[20.17]***	[20.17]***	[26.50]***	[26.50]***
Technical college degree	0.047	0.047	0.209	0.209	0.318	0.318
	[3.84]***	[3.84]***	[27.42]***	[27.42]***	[49.09]***	[49.09]***
University degree	0.011	0.011	0.224	0.224	0.369	0.369
	[0.99]	[0.99]	[29.34]***	[29.34]***	[46.67]***	[46.67]***
Unknown Education	-0.012	-0.012	0.116	0.116	0.153	0.153
	[1.04]	[1.04]	[10.40]***	[10.40]***	[11.21]***	[11.21]***
Master craftsman, foreman	0.305	0.305				
(1= yes)	[38.84]***	[38.85]***				
Foreign employee (1 = yes)	-0.007	-0.007	-0.017	-0.017	-0.024	-0.024
	[3.87]***	[3.87]***	[7.05]***	[7.05]***	[8.06]***	[8.06]***
Logarithm of establishment	-0.283	-0.280	-0.064	-0.063	-0.145	-0.143
size (number of employees)	[2.89]***	[2.95]***	[2.25]**	[2.27]**	[2.70]***	[2.70]***
Squared logarithm of	0.023	0.023	0.004	0.004	0.009	0.009
establishment size	[2.99]***	[3.05]***	[1.65]*	[1.66]*	[2.23]**	[2.22]**
Logarithm of capital per	0.004	0.004	0.003	0.003	0.004	0.004
worker	[1.13]	[1.29]	[2.62]***	[2.70]***	[2.23]**	[2.18]**
Weekly standard hours	0.004	0.005	0.002	0.002	0.004	0.004
	[1.95]*	[2.13]**	[1.64]	[1.78]*	[2.69]***	[2.73]***
Paid overtime work in	0.007	0.007	0.006	0.006	0.008	0.008
establishment (1 = yes)	[1.55]	[1.61]	[3.42]***	[3.53]***	[3.87]***	[3.91]***
Constant	9.819	9.792	8.950	8.942	9.040	9.034
	[30.47]***	[31.40]***	[90.67]***	[92.73]***	[48.35]***	[48.89]***
R^2	0.348	0.348	0.49	0.51	0.49	0.51
No. of observations	1,189,469		601,250			
No. of employees	585,692		306,229			
No. of plants	1,262		1,204			
No. of spells	586,816		307,314			

Source: LIAB 1995-1997. Regressions include also year dummies. Reference category of education dummies is without apprenticeship, without A-levels. Absolute values of t-statistics in brackets. Residuals within plants are allowed to be not independent. ***/ **/ * denote significance at the 1 / 5 / 10 percent level, respectively.

Appendix 10: Individual Level Wage Regressions; Manufacturing, Western Germany
(Endogenous Variable: Logarithm of Daily Wage)

Estimation Method	Spell Fixed Effects					
	Blue-Collar Workers		White-Collar Workers			
	Unimputed Data		Unimputed Data		Imputed Data	
Variables						
Exporting plant (1 = yes)	0.009 [1.49]		0.005 [2.17]**		0.008 [2.16]**	
Exports(proportion of total sales)		0.030 [3.26]***		0.012 [3.31]***		0.015 [2.44]**
Age of employee (years)	0.043 [11.72]***	0.043 [11.71]***	0.078 [35.69]***	0.078 [35.33]***	0.092 [37.35]***	0.091 [36.88]***
Age of employee squared (divided by 100)	-0.030 [11.00]***	-0.030 [11.08]***	-0.055 [27.48]***	-0.055 [27.57]***	-0.070 [30.68]***	-0.070 [30.81]***
Gender (1 = female)						
Educational dummies						
with apprenticeship, without A- levels	-0.003 [0.33]	-0.002 [0.28]	0.013 [1.83]*	0.013 [1.83]*	0.022 [2.07]**	0.022 [2.08]**
without apprenticeship, with A-levels	0.009 [0.49]	0.010 [0.53]	-0.042 [1.75]*	-0.042 [1.74]*	-0.018 [0.68]	-0.018 [0.68]
with apprenticeship, with A-levels	0.012 [0.60]	0.014 [0.70]	0.008 [0.57]	0.008 [0.59]	0.025 [1.47]	0.026 [1.49]
Technical college degree	0.047 [1.94]*	0.048 [1.96]*	0.023 [2.43]**	0.023 [2.46]**	0.074 [4.30]***	0.074 [4.30]***
University degree	0.034 [1.24]	0.035 [1.26]	0.036 [3.29]***	0.036 [3.28]***	0.106 [6.47]***	0.106 [6.47]***
Unknown Education	-0.034 [2.18]**	-0.035 [2.28]**	0.010 [1.63]	0.010 [1.51]	0.017 [1.26]	0.017 [1.22]
Master craftsman, foreman (1= yes)	0.051 [2.34]**	0.051 [2.37]**				
Foreign employee (1 = yes)						
Logarithm of establishment size (number of employees)	-0.208 [2.13]**	-0.204 [2.16]**	-0.058 [1.49]	-0.057 [1.49]	-0.127 [2.01]**	-0.125 [2.01]**
Squared logarithm of establishment size	0.019 [2.48]**	0.019 [2.52]**	0.005 [1.55]	0.005 [1.56]	0.010 [1.99]**	0.010 [1.99]**
Logarithm of capital per worker	0.005 [1.77]*	0.005 [1.98]**	0.004 [3.77]***	0.004 [3.83]***	0.004 [2.86]***	0.004 [2.77]***
Weekly standard hours	0.004 [1.78]*	0.004 [1.94]*	0.002 [1.73]*	0.002 [1.97]**	0.003 [2.48]**	0.003 [2.59]***
Paid overtime work in establishment (1 = yes)	0.010 [2.28]**	0.010 [2.35]**	0.006 [4.14]***	0.006 [4.24]***	0.009 [4.56]***	0.009 [4.63]***
Constant	8.737 [25.38]***	8.718 [26.06]***	7.770 [54.35]***	7.767 [55.30]***	7.709 [35.07]***	7.706 [35.37]***
R^2	0.969	0.969	0.984	0.984	0.95	0.95
No. of observations	1,189,469		601,250			
No. of employees	585,692		306,229			
No. of plants	1,262		1,204			
No. of spells	586,816		307,314			

Source: LIAB 1995-1997. Regressions include also year dummies. Reference category of education dummies is without apprenticeship, without A-levels. Absolute values of t-statistics in brackets. Residuals within plants are allowed to be not independent. ***/ **/ * denote significance at the 1 / 5 / 10 percent level, respectively.

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Postfach 2440
D-21314 Lüneburg
Tel: ++49 4131 677 2321
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