Globalization: A Woman's Best Friend? Exporters and the Gender Wage Gap*

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Abstract

This study explores the relationship between the gender wage gap and the firm's export status using matched employer-employee data from the Norwegian manufacturing sector between 1996 and 2010. We estimate a standard Mincerian wage regression and find evidence of a substantial gender wage gap. More interestingly, the gender wage gap appears to be smaller in exporting firms. This effect is both statistically significant and economically meaningful. Working for an exporting firm is associated with a 5.7 percentage point lower gender differential, which amounts to closing the gender wage gap by about a fifth. This finding is robust to controlling for unobservable worker ability using the sibling's wage or the parents' education as proxies. The effect is present when blue and white collar workers, or workers in various occupational categories, are considered separately. Exporters exhibit their distinctive behaviour prior to entry into foreign markets. They are also found to hire a larger share of female workers and female managers.

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1 Introduction

It is a well-documented fact that women earn less than men, even in relatively equal societies, such as the Northern European countries. This appears to be true even after controlling for observable worker characteristics, hours worked and occupation, and especially so in the private sector.[1] There is, moreover, abundant empirical evidence that exporting firms are different from other firms along a set of dimensions. They are larger, more productive, more profitable and, in general, pay higher wages.[2] In this paper, we set out to explore whether exporters also differ from other firms when it comes to gender. In particular, we are interested in the link between exporting and the gender wage gap.

Is there any reason to expect the gender wage gap to be correlated with the firm's export status? One possible explanation is that due to greater competition, exporters discriminate less. According to Becker (1957), some employers may have a taste for discrimination and may be willing to incur additional costs to indulge it. On the one hand, Becker's theory predicts that increased product market competition will erode firms' profits and thus force out costly discrimination practices. Exporting firms are typically assumed to operate under greater competitive pressures than firms not exposed to international competition. Hence, they should be less prone to engage in discriminatory practices. One could even go further and argue that not engaging in discrimination may be a source of competitive advantage. On the other hand, the productivity advantage that allows firms to export and enjoy higher profits could, in accordance with Becker's theory, allow them to sustain costly discrimination practices to a larger extent than it is possible for other firms.

Alternatively, it may be that exporters hire different women than non-exporters. These women may have different observable or/and unobservable characteristics which make them more productive, and firms may moreover value these characteristics differently. Recent theoretical contributions to literature on trade, heterogeneous firms and wages have proposed different mechanism for why exporters may end up employing more able workers and pay their labor force higher wages than non-exporters. Helpman et al. (2010) present a model where exporters invest more in screeening and as a consequence hire more able workers who are paid accordingly higher wages. Eckel and Yeaple (2014) consider an environment in which workers are heterogeneous in their ability, and where exporting multiproduct firms are able to use internal labor markets in a setting of information frictions to better compensate more able workers, and end up paying higher average wages. Based on Norwegian data, Irarrazabal et al. (2013) investigate the link between firms' productivity and the labor force

[1] See Blau and Kahn (2000)and Barth et al. (2013) for overviews.

[2] See e.g. Bernard et al. (1995) and Schank et al. (2007).

composition empirically, and find that based on observable characteristics, exporters do seem to hire more able workers.

At present, theory does not provide any clear prediction with respect to the relationship between exporting and gender wage gap. Hence, this remains an empirical question. To investigate the link between the gender wage gap and exporting, we exploit a matched employer-employee data set covering all firms in the Norwegian manufacturing sector and their full-time employees between 1996 and 2010. The data set covers about 90% of manufacturing output in Norway in 2004. It includes detailed information on employees, such as number of years and type of education, labor market experience, gender and various demographics including number of children. To examine the effect of the export status on the gender wage gap, we estimate a Mincerian wage regression controlling for a host of worker and firm characteristics. We find evidence of a substantial gender wage gap of around 24%. More interestingly, the gender wage gap appears to be smaller in exporting firms. This effect is both statistically significant and economically meaningful. Working for an exporting firm is associated with a 5.7 percentage point lower gender differential, which amounts to closing almost a quarter of the gender wage gap.

This finding is robust to allowing for industry-year specific gender differentials. It is also robust to allowing for a differential gender wage gap in large firms, more profitable firms and Norwegian multinationals, all of which exhibit a lower gender wage differential. The effect is present when we consider separately college educated workers and workers without college education. It can also be detected when we focus on subsamples of occupational categories. Finally, the effect can be found when we control for the worker's ability using standard proxies such as the sibling's wage, father's or mother's education. We also find that exporting firms have a larger share of female employees. It is true when we consider the female share in the total labor force, college educated workers, workers without college education and managers.

A natural follow-up question is whether firms behave differently after they enter foreign markets or whether their distinctive management practices resulting in a lower gender wage gap make it easier for them to start exporting. To examine this question, we narrow our attention to non-exporters and to firms observed both before and after entry into export markets. We then trace the development in the gender wage gap in future exporters one, two or three years prior to their entry into foreign markets. We find that future exporters have a lower gender wage gap prior to entry into foreign markets, which is consistent with the view that their distinctive management practices may be a source of competitive advantage.

This paper is structured as follows. The next section reviews the existing literature. The following section describes the data and presents some summary statistics. Section

4 discusses the empirical strategy and the baseline results, while Section 5 focuses on the gender composition of the workforce in exporting and non-exporting firms. The last section concludes.

2 Related Literature

This paper speaks to two strands of the existing literature. The first strand is the large literature on exporters and the exporter wage premium. Bernard et al. (1995) show that exporters pay higher wages than non-exporters in the US, and that this wage premium goes to both production and non-production workers. Several paperrs confirm that this pattern holds in a host of other countries.[3] More recently, the availability of matched employer-employee data has allowed researchers to examine whether the exporter wage premium is robust to controlling for various worker and firm characteristics. Schank et al. (2007), among others, show that this is indeed the case. According to Klein et al. (2013), however, the picture is more nuanced. The matched employer-employee data for the German manufacturing sector show that exporters pay a wage premium to high-skilled workers while giving a wage discount to low-skilled workers.

Other studies aim to explain the reasons behind the exporter wage premium.

Helpman et al. (2010) introduce search and matching frictions into a Melitz (2003) model and allow for ex post match-specific heterogeneity in a worker's ability. Because a worker's ability is not directly observable by employers, firms screen workers to improve the composition of their workforce. As larger firms have higher returns to screening (due to complementarities between workers' abilities and firm productivity), and the screening technology is the same for all firms, more productive firms screen more intensively and have employees with a higher average ability than less productive firms. Since higher-ability employees are more costly to replace, more productive firms pay higher wages. When the economy is opened to trade, the selection of more productive firms into exporting increases their revenue relative to less productive firms, which further enhances their incentive to screen workers to exclude those of lower ability. As a result, exporters employ workers with a higher average ability than nonexporters and hence pay higher wages.

A different mechanism leading to similar outcomes is proposed by Eckel and Yeaple's (2014) who consider an environment in which workers are heterogeneous in their ability. Prior to employment, a worker's ability is private information. Subsequent to employment by a firm, a worker's ability is observed by the employer but cannot be verified in a court of law so that an initial employment contract cannot specify a wage as a function of a worker's

[3]See Schank et al. (2007) for an overview.

skill. The advantage of large (multi-product) firms relative to smaller (single-product) firms lies in the fact that the large firm has an internal labor market in which different product divisions compete for workers. The existence of this internal labor market allows large firms to attract the most able workers because they have in place a mechanism for compensating highly skilled workers, while smaller firms can only commit to paying a worker a wage that reflects the average skill of its employees. As only large firms become exporters, it follows that only non-exporters engage in statistical discrimination. And if women are perceived to be less productive, the gender wage gap may be lower in exporting firms.

The second strand is the large literature on the gender wage gap, recently reviewed by Blau and Kahn (2000) and OECD (2012). The reviews provide a set of facts on the gender wage gap and an overview of recent empirical analyses. They also describe a variety of mechanisms that can explain the gender wage gap, such as females working in different occupations than males, investing less in human capital or being discriminated against on taste-based or statistical grounds.

Most closely related to our paper are studies on the impact of globalization on the gender wage gap. There are several papers investigating this question empirically, most of them focusing on developing countries. Oostendorp (2009) conducts a cross-country study on the effect of increasing trade on the gender wage gap using an IV approach and finds that the occupational gender wage gap appears to decrease with increasing economic development, at least for richer countries. Black and Brainerd (2004) test Becker's model of discrimination by comparing the difference in residual wage gaps between concentrated relative to competitive industries that were exposed to comparable icreases in trade. They find that the gender wage gap narrowed more quickly in concentrated industries where the import share grew, relative to competitive industries with a comparable import growth, and interpret this result as supporting the theory.

In a theoretical contribution, Ben Yahmed (2013) shows in a Melitz-type model that trade integration widens the gender wage gap among skilled workers and decreases it among unskilled workers. In her setting, men and women have the same distribution of ability but differ in their commitment levels. Firms engage in statistical discrimination which creates the gender wage gap. Firm may choose to invest in a high technology by incurring an additional cost. Complementarities between commitment/abilty and technology induce exporters (which are the ones choosing to adopt the high technology) to hire more able workers and have a higher gender wage gap among skilled workers. The narrowing of the gap for the unskilled workers is due to general equilibrium effects, where unskilled workers reallocate to firms with low gender wage gaps, and not due to exporting firms paying higher wages to the unskilled workers.

Juhn et al. (2013) study how trade liberalization affects gender inequality using Mexican firm-level data. Trade liberalization induces the most productive firms to start exporting and adopt a new technology that is more modern and requires less physical strength. This improves women's labor market outcomes in the blue-collar tasks, while leaving them unchanged in the white-collar tasks. The authors use the introduction of NAFTA to test the model. They find that liberalization is associated with entry of new firms and adoption of a more modern technology. In addition, firms hire relatively more blue-collar females and increase their share of the wage bill. Unlike our study, Juhn et al. (2013) do not have worker level data, so they are not able control for any worker characteristics except their blue- or white-collar status.

3 Stylized Facts on Women and Exporters

3.1 Data

We employ a set of different data collected by Statistics Norway. We match data on firms, trade, foreign direct investment and employees for the period 1996-2010. To start with, we use firm-level data from Statistics Norway's *Capital database*, which contains balance sheet information on variables such as value added, output, and employment for an unbalanced panel of all mainland joint-stock companies in the Norwegian manufacturing sector.[4] The data set covers around 90% of manufacturing output in Norway. The industry classification used is the NACE Rev. 2.[5] This Capital database is merged with firm-level data on export and import values based on customs declarations, using a unique firm identifier. These data make up an unbalanced panel of all yearly export and import values by firm.[6] Finally, we match this merged data set with firm-level data on outward foreign direct investment (FDI). This leaves us with a comprehensive panel data set on Norwegian manufacturing firms' performance and internationalization which we merge with employer-employee data..

The main source of employment and wage data for the period 1996 to 2010 is the employee register (AT) which holds annual records of worked hours and earned wages on the individual level. Statistics Norway links this register to the tax office database (LTO) to create a correspondence between the wage reported by the employer and those reported to the tax

[4]Mainland Norway refers of all domestic production activity except from the exploration of crude oil and natural gas, services activities incidental to oil and gas, transport via pipelines and ocean transport.
Statistics Norway's *Capital database* is described in Raknerud et al. (2004).

[5]A list of the manufacturing industries can be found in the Appendix.

[6]In line with findings of studies from other countries, the majority of Norwegian manufacturing firms does not export. In 1996, only 34.9% were exporting, while in 2005, this number had risen to 38.1%. See Figure 1 in the Appendix for the share of exporting firms across Norwegian manucaturing industries.

authorities by the individual. This joint file (ATmLTO) is a much cleaner data set and is therefore used instead of the AT register. In addition to wages at the person-firm-year level, the database includes the first and the last date of the employment spell within a given year, the total number of days worked, the municipalities in which the individual lives and works, and an indicator for full-time and part-time employment. The ATmLTO data are then merged with time-varying individual specific information about years and type of education, gender and number children, also from Statistics Norway. The employee data also allows us also to match family members. We exploit this in our analysis as we use information on both parents education and siblings' wage.

From 2003 onwards, the employment register also contains an occupational classification, based on the International Standard Classification of Occupations, ISCO-88 (COM). This is a four-digit code describing the type of job the individual has, ranging from senior officials and managers to elementary occupations that require no formal education. The codes are grouped into ten categories.[7]

3.2 Construction of Sample and Variables

The comprehensive data set for firms and employees leaves us with a panel covering the population of all mainland joint-stock manufacturing firms along with their trade, FDI and employees. For each worker-year, we assign to the worker the wage and the firm of the longest employment spell during the year. We restrict our sample to individuals who have worked for at least three months during a year. We keep only full time employees in the data set. This is done to avoid measurement error in number of hours worked as well as biases related to possible part time wage penalties.[8] We also restrict our sample to individuals who are between 19 and 67 years old, and to workers with at least one year of potential labor market experience. We measure daily wages as the wage earned in that spell, divided by the number of days worked in that spell.

To remove outliers, we predict wages based on a simple Mincer regression of log wages on education, experience and experience squared.[9] We then remove observations that lie

[7]These ten categories are: 1. Managers, 2. Professionals, 3. Technicians and associate professionals, 4. Clerks, 5. Service workers and shop and market sales workers, 6. Skilled agricultural and fishery workers, 7. Craft and related trades workers, 8. Plant and machine operators and assemblers, 9. Elementary occupations, 0. Armed forces and unspecified. For a more detailed description of the occupational classification, see NOS C 521 Standard Classification of Occupations, http://www.ssb.no/a/publikasjoner/pdf/nos_c521/nos_c521.pdf.

[8]It is well known in the literature on the gender wage gap that part time workers have lower hourly earnings and that women are overrepresented among part time workers, see e.g. Manning and Petrongolo (2008).

[9]See below for how the experience and education variables are constructed.

outside five times the standard error of the residual.

We are left with a sample of 2,713,623 worker-firm-year observations, based on roughly 6,000 firms each year, spread across 24 industries.

We construct a set of variables to account for observable labor characteristics. The variable *Education* is an individual's total number of years of schooling. *Experience* is a measure of actual experience calculated based on the pension register and gives the actual number of years a person has been active in the labor market.[10] An alternative, and often used, measure of labor market experience is a person's potential experience, given by the age of the worker minus the number of years of education. However, given our focus on gender differences, we choose actual experience to be our preferrred measure of labor market experience since women typically have noncontinuous labor market histories and thus potential experience may be a poor proxy for their actual experience.

To account for geographical aspects of the localization of firms and workers, we employ a centrality measure constructed by the Norwegian Institute for Urban and Regional Research (NIBR). All Norwegian municipalities are grouped into residential and labor market regions. These regions are then split into five categories along the centre-periphery axis, based on the size of the population, availability of amenities, number of jobs and distance to nearest place categorized as central. The categories are: major cities, medium-sized towns, small towns, rural centres and periphery. We define an individual as working in a central location if he or she works in a municipality that belongs to one of the first two categories.

Further details on how the sample was selected and how variables were constructed are provided in the Appendix.

3.3 Some Basic Facts on Exporters and Women

We start out considering the gender wage gap (GWG). We estimate the gender wage gap in the Norwegian manufacturing sector by using worker-level data and regressing the log of wages on a female dummy. We find that the gender wage gap is sizable, and higher in manufacturing than in the rest of the Norwegian economy.[11] Female workers in Norwegian manufacturing on average earn roughly 22 percent less than men, see Table 1.[12] Compared to what Blau and Kahn (2000) report for the US in 1999 (23.5 %), the gender wage gap in Norway is – even in the manufacturing sector – slightly smaller.

[10]The pension register contains data on incomes dating back to 1967.

[11]According to Barth et al. (2013) women in Norway have over the last decade earned between 12.5-15 percent less than men. Focsuing only on the private sector, the gap has averaged 15-17 percent. These gender wage gaps are estimated based on the entire workforce, including both part time and full time employees.

[12]The GWG is calculated using that $100(e^{-0.250} - 1) = -22.12$.

Table 1: Overall Gender Wage Gap

	OLS
Female	-0.250***
	(0.008)
Observations	2713623
Adjusted R^2	0.040

Notes: Estimates are based on the panel 1996-2010.
Dependent variable: log wage.
Standard errors in parenthesis are clustered on firm.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

It is well know that exporters are different. This fact has been documented for a number of countries, including Norway.[13]Here we procede by documenting some basic facts on the exporter wage premium and its variation across groups of workers with different educational levels and gender. To calculate the exporter premium, we follow the standard approach in the literature (see e.g. Bernard et al. (1995)) by regressing the firm's average wage on its exporting status and size:

$$\ln \overline{Wage}_{jt} = \alpha_{kt} + \beta Exporter_{jt} + \gamma \ln L_{jt} + \varepsilon_{jt}, \tag{1}$$

where $\ln \overline{Wage}_{jt}$ is the log of the average wage paid by firm j in year t, $Exporter_{jt}$ equals one if firm j exports in year t, and zero otherwise, and $\ln L_{jt}$ is log firm size, measured in terms of the number of employees. α_{kt} denotes industry-year fixed effects.[14]

The results, presented in Table 2, show that the estimated coefficient on the exporter status is positive and statistically significant (see Column (1)). When using the full sample, we find an exporter premium of 5.3% on average.

International trade has been cited as a source of increasing wage inequality, so it is interesting to examine how the exporter wage premium is distributed across different groups of workers. In Columns (2) and (3) of Table 2 we split the sample into male and female workers and find that the exporters on average pay higher wages to both sexes, but the exporter premium is slightly higher for males than females. Education is another worker characteristic regarded to be important for the extent to which workers gain from gloablization. Hence, we split the sample according to level of education into non-college and college educated. We find that the exporter premium is substantially higher for the college educated workers.

[13]Irarrazabal et al. (2013) find that exporters in the Norwegian manufacturing sector pay higher wages, have higher productivity, profitability and capital intensity.

[14]A firm is defined as an exporter if sales abroad exceed NOK 10,000.

Table 2: Exporter premia

	(1) All	(2) M	(3) F	(4) Non	(5) Coll	(6) Non-coll M	(7) Non-coll F	(8) Coll M	(9) Coll F
Exporter	0.052***	0.052***	0.043***	0.035***	0.093***	0.033***	0.037***	0.101***	0.060***
	(0.005)	(0.005)	(0.006)	(0.004)	(0.008)	(0.004)	(0.007)	(0.008)	(0.013)
Size	0.032***	0.036***	0.050***	0.032***	0.053***	0.035***	0.048***	0.056***	0.054***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.004)
Industry*year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	89779	87386	54551	86830	45091	83907	50885	41151	18903
Adjusted R^2	0.322	0.309	0.304	0.314	0.243	0.301	0.289	0.251	0.240

Notes: Estimates are based on the panel 1996-2010. Dependent variable: log wage.
Standard errors in parenthesis are clustered on firm. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Finally, we consider both gender and education variation in exporter premium, and split the sample into four groups based on gender and education level. The exporter wage premium is positive and significant for all groups of workers, but there are substantial differences in the magnitudes. Low educated males benefit the least from working at an exporter. The exporter wage premium is higher for college than for non-college educated for both genders. College educated males are paid a substiantially higher exporter premium than college educated females.

With this decriptive evidence on gender wage gap and exporter premia as a background we set out to examine whether working for an exporter matters for women – and if so, whether women are relatively better or worse off by working for an exporting firm. In other words, is globalization good or bad news for women?

4 Empirical Strategy and Results

We set out to investigate empirically the relationship between exporting and gender inequality. First, we do so by analyzing the link between the employer's export status and the gender wage gap exploiting observable labor and firm characteristics. Then, we augment our analysis with proxies for unobservables, such as a worker's ability and ambition.

4.1 Analyzing Exporters and the Gender Wage Gap Controlling for Observables

4.1.1 Export Status and the Gender Wage Gap

We start by posing the question of how large the gender wage gap is when we account for observable worker and firm characteristics. We adopt the most common way of identifying the gender wage gap by estimating a wage regression of the Mincer (1974) type adding a female dummy. A statistically significant dummy captures the gender wage gap, provided that the included controls account for the relevant measures of worker productivity. Our model takes the following form:

$$\ln w_{ijst} = \delta fem_i + X_{it}\beta + Z_{jt}\theta + \alpha_{st} + \varepsilon_{ijst}, \tag{2}$$

where w_{ijst} is the daily wage of worker i employed by firm j operating in industry s at time t, fem_i is a dummy for being female, X_{it} is a vector of observable characteristics of worker i including education, experience and experience squared, and a dummy for having children, Z_{jt} is a vector of observable characteristics of firm j, which for now includes a dummy indicating whether the firm is located in a central area. δ_{st} is a industry-year fixed effect allowing us to account for systematic variations in wages across industries, and ε_{ijst} is an error term. In all our estimations, standard errors are clustered on firm to account for group correlation across workers within firms.

The results, given in Column (1) of Table 3, show that after conrolling education, experience and children, women earn 20% less than men. This gender wage gap is just about two percentage points lower than the overall gender wage gap we found in the manufacturing sector without controlling for worker or firm characteristics (see Section 3.3) . However, it is important to bear in mind that we are limiting our analysis to one sector of the economy and that a substantial part of the gender wage gap in Norway is known to be explained by women primarily working in other sectors than men. Our estimates also tell us that only around 10 percent of the still present gender wage gap in the Norwegian manufacturing can be explained by observable worker characteristics that are viewed as important determinants of workers' productivity.

To see whether the result on the gender wage gap is mainly driven by between-firm or within-firm variation, we estimate a the model above adding firm fixed effects. The results from this regression, presented in Column (2) of Table 3, show that the within-firm gender gap is only slightly lower than the overall gender gap. This tells us that the aggregate gender wage gap stems mostly from female and male workers being paid different wages within a

firm rather than being due to differences across firms.

Table 3: Gender Wage Gap

	(1) OLS	(2) FE	(3) OLS	(4) FE
Female	-0.223***	-0.222***	-0.274***	-0.268***
	(0.005)	(0.005)	(0.005)	(0.004)
Exporter			0.082***	-0.010***
			(0.006)	(0.004)
Female*Exporter			0.059***	0.055***
			(0.007)	(0.006)
Experience	0.033***	0.031***	0.032***	0.030***
	(0.000)	(0.000)	(0.000)	(0.000)
Experience^2	-0.056***	-0.051***	-0.055***	-0.051***
	(0.001)	(0.001)	(0.001)	(0.001)
Education	0.060***	0.051***	0.059***	0.051***
	(0.002)	(0.001)	(0.002)	(0.001)
Children	0.052***	0.052***	0.053***	0.052***
	(0.002)	(0.002)	(0.002)	(0.002)
Centrality	0.066***	0.068***	0.063***	0.067***
	(0.008)	(0.013)	(0.007)	(0.013)
Constant	5.180***	5.400***	5.148***	5.408***
	(0.028)	(0.023)	(0.026)	(0.023)
Industry*year	Yes	No	Yes	No
Year	No	Yes	No	Yes
Observations	2713623	2713623	2713623	2713623
Adjusted R^2	0.401	0.470	0.405	0.470

Notes: Estimates are based on the panel 1996-2010.

Dependent variable: log wage.

Standard errors in parenthesis are clustered on firm.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

We now examine whether there is a difference in the gender wage gap between exporters and non-exporters. We do so by adding a dummy for exporting firms, as well as an interaction term between a firm's export status and the female dummy. The latter variable picks up any differential in the gender wage gap between exporting and non-exporting firms, controlling for the observable characteristics of the worker and the firm. Hence, the regression we estimate is given by:

$$\ln w_{ijst} = \eta fem_i + \zeta fem_i * Exporter_{jt} + X_{it}\beta + Z_{jt}\theta + \delta_{st} + \varepsilon_{ijst}, \tag{3}$$

where the vector of observable characteristics of firm j, Z_{jt}, now includes also the export

status of the firm. The results from OLS and firm fixed effects regressions are given in Columns (3) and (4) of Table 3, respectively. They confirm the existence of a statistically significant exporter wage premium of about 8.5 percent (see Column (3)). The coefficient in the fixed effects regression is very small and negative, and is harder to interpret as it is identified based on firms switching the exporting status.

The results further show that the gender wage gap is still statistically significant and economically large, when we account not only for observable worker and firm characteristics, but also for both the exporting status and firm fixed effects. Most interesting from our point of view, is the fact that the interaction term between being female and working for an exporting firm is positive and statistically significant. This indicates that there is an additional exporter wage premium for females. The coefficient is unchanged regardless of whether or not we include firm fixed effects. We find that in general females are paid 24 percent less, while women working at exporting firms are paid only around 19 percent less than their male peers. Thus working at an exporter closes the gender wage gap by around twenty percent.

This result is robust to allowing for differential returns to education and experience between males and females, exporting and non-exporting firms (see Table 14 in the Appendix). It is also robust to controlling for the number of children (rather than using just a dummy for having children). Not surprisingly, we find that men with children enjoy higher wages, while females with children tend to earn less. Exporting firms do not appear to treat women with children differently from other firms (see Table 15 in the Appendix).

4.1.2 Robustness Checks

So far we have documented that there is a persistent gender wage gap after controlling for observable worker and firm characteristics and that females gain relatively more from working for exporters than males do. Hence, exporting firms close part of the gender wage gap. There is, however, a chance that our results may driven by other industry or occupation characteristics that are correlated with the exporter status. For instance, it could be that exporters are clustered in industries that for some reason have different gender wage gaps. One may also argue that our findings may be explained by the fact that even if men and women have the same number of years of education and experience, they simply do not perform the same kind of jobs. If these differences are systematically related to the exporter status of the firm, this might explain our findings.

To be able to interpret our findings as exporter effects, rather than an industry, firm or occupation effects, we need to make sure that our gender gap results are not driven by any of these other characteristics. In what follows we estimate a set of amended specifications of

our baseline model.

Industry-specific Gender Wage Gaps Differences in the gender wage gaps between exporters and non-exporters may be due to exporters clustering in industries with smaller gender wage gaps. In our baseline regressions, we do control for industry-year fixed effects, but these will only pick up the average effects for all workers in that industry. Now we allow for industry-specific gender wage gaps by including an interaction between an industry dummy (defined at NACE digit 2 level) and the female dummy. The results from estimating this specification are given in Table 4, Column (1). The industry specific gender gaps (left out of the table for expositional clarity) show that there is substantial variation across industries in the magnitude of the gender wage gap. It ranges from around 36% in NACE 14 (Manufacture of clothing), to around 13.5% in NACE 24 (Manufacture of basic metals). Most importantly for our story, however, the differential gender wage gap in exporting firms relative to non-exporting firms remains positive and significant, although its magnitude is somewhat smaller than before.

To go one step further, we allow the industry specific wage gaps to vary by year. This ensures that any industry-wide differential trends or shocks are taken out of our gender wage gap estimate. The results are given in Column (2) of Table 4. Our main findings remain robust also to the inclusion of such effects.

Occupation-specific Gender Wage Gaps Exporters may for some reason be biased towards some occupations, in the sense that they pay some occupational groups relatively higher wages on average, i.e., there is an occupation-specific exporter premium. If that's the case, the differences in the gender wage gaps between exporters and non-exporters may be due to (i) exporters employing relatively more women in occupations in which they tend to pay more, or (ii) exporters being more likely to hire women in occupations with a lower gender wage gap in general.

Hence, we proceed by adding occupation fixed effects based on ten occupational categories (see Section 3.1), allowing for occupation-specific gender wage gaps by including an interaction between occupation fixed effects and the female dummy and by allowing for an occupation-specific exporter premium. The results are given in Table 5. The occupation effects, occupation-specific gender gaps and occupation-specific exporter premia, are left out of the table for expositional clarity. We find that occupation does indeed have an impact on wages, and for three occupations – Managers, Clerks and Service workers – there are significant occupational specific gender wage gaps. Importantly, however, the differential gender wage gap in exporting firms relative to non-exporting firms remains positive and significant,

Table 4: Industry-specific Gender Wage Gaps

	(1) OLS	(2) OLS
Exporter	0.086***	0.087***
	(0.006)	(0.006)
Female*Exporter	0.035***	0.034***
	(0.007)	(0.007)
Experience	0.032***	0.032***
	(0.000)	(0.000)
Experience^2	-0.055***	-0.055***
	(0.001)	(0.001)
Education	0.059***	0.059***
	(0.001)	(0.001)
Children	0.054***	0.054***
	(0.002)	(0.002)
Centrality	0.062***	0.062***
	(0.007)	(0.007)
Industry*female	Yes	No
Industry*female*year	No	Yes
Industry*year	Yes	Yes
Observations	2713623	2713623
Adjusted R^2	0.407	0.407

Notes: Estimates are based on the panel 1996-2010.
Dependent variable: log wage.
Standard errors in parenthesis are clustered on firm.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Occupational specific Gender Wage Gaps

	(1) OLS	(2) FE	(3) OLS	(4) FE	(5) OLS	(6) FE
Female	-0.269***	-0.244***	-0.285***	-0.257***	-0.281***	-0.262***
	(0.007)	(0.006)	(0.022)	(0.018)	(0.018)	(0.015)
Exporter	0.110***	-0.002	0.110***	-0.001	0.162***	0.064***
	(0.008)	(0.004)	(0.008)	(0.004)	(0.022)	(0.016)
Female*Exporter	0.065***	0.051***	0.060***	0.047***	0.061***	0.055***
	(0.009)	(0.007)	(0.009)	(0.007)	(0.009)	(0.007)
Occupation	Yes	Yes	Yes	Yes	Yes	Yes
Female*occupation	No	No	Yes	Yes	Yes	Yes
Exporter*occupation	No	No	No	No	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry*year	Yes	No	Yes	No	Yes	No
Year	No	Yes	No	Yes	No	Yes
Observations	1440219	1440219	1440219	1440219	1420527	1420527
Adjusted R^2	0.321	0.423	0.322	0.424	0.384	0.467

Notes: Estimates are based on the panel 2003-2010. Dependent variable: log wage.
Controls: experience, experience^2, education, children & centrality.
Standard errors in parenthesis are clustered on firm.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

and its magnitude is approximately the same as without occupational controls.

4.2 Exporters and the Gender Wage Gap: Controlling for Unobservables

Our analysis has so far revealed persistent differences in the gender wage gap between exporters and non-exporters when controlling for observable characteristics. What if this is because the females working for exporters are different in ways the econometrician cannot observe? Could it be that the lower gender wage gap we observe in exporting firms is simply an artifact that can be explained by exporters being better at screening and thus employing women with different abilities and ambition than non-exporters? And that these workers due their higher productivity thus are paid more.

To investigate the role played by unobservable productivity determinants for the general wage gap as well as the for a exporters' compensation of females we include proxies for ability/ambition that we presume are correlated with workers' productivities. Our first set of proxies is inspired by labor literature, e.g., by the work of Altonji and Pierret (2001), and includes the (deflated) wage of older sibling and the parents' education. Our second proxy is

Table 6: Gender Wage Gap – Unobservables and culture

	(1) OLS	(2) OLS	(3) OLS
Female	-0.248***	-0.262***	-0.184***
	(0.012)	(0.013)	(0.021)
Exporter	0.083***	0.083***	0.083***
	(0.006)	(0.006)	(0.006)
Female*Exporter	0.059***	0.059***	0.059***
	(0.007)	(0.007)	(0.007)
Conservative	0.139***	0.134***	0.126***
	(0.030)	(0.030)	(0.030)
Conservative*Female	-0.222***	-0.220***	-0.222***
	(0.036)	(0.036)	(0.035)
Dad's education	0.007***		
	(0.000)		
Dad's education*Female	-0.000		
	(0.001)		
Mom's education		0.005***	
		(0.001)	
Mom's education*Female		0.001	
		(0.001)	
Sibling's wage			0.041***
			(0.002)
Sibling's wage*Female			-0.011***
			(0.003)
Controls	Yes	Yes	Yes
Industry*year	Yes	Yes	Yes
Observations	2713623	2713623	2713623
Adjusted R^2	0.407	0.406	0.407

Notes: Estimates are based on the panel 1996-2010.
Dependent variable: log wage. Controls include experience, experience squared, education and dummies for missing ability measure or conservative, female sibling, children and centrality.
Standard errors in parenthesis are clustered on firm.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

motivated by the existing work (Haaland et al., 2013) showing that female labor participation in Norway at the regional level is negatively correlated with the conservative political outlook and, more specifically, with the support for the Christian Democratic Party. Women who grew up in more conservative areas may be more inclined to seek out less ambitious jobs because they may perceive the family life as their top priority. In contrast, men who grew up in such regions may view themselves as the primary bread winners and thus may be very ambitious when it comes to career choices. For each worker, we identify the municipality in which the worker's mother lived when the worker was 15 (or the closest year after). We then calculate the share of the votes obtained by Christian Democrats in that municipality in the elections in the closest year to the year in which the worker turned 15. This variable, called *Conservative,* is then entered into the regression model. Following Altonji and Pierret (2001), we include dummies for cases when the ability or the ambition proxy is missing.[15] We allow for a different effect of the proxies on female workers by interacting them with the female dummy.

The results, reported in Table 6, confirm our earlier findings. As before, we find that females earn less than males, exporters pay a premium and the exporter premium is larger for women. As for the proxies themselves, the father's education, mother's education and the sibling's wage all appear to have a positive and statistically significant impact on the worker's wages. The effect of the sibling's wage is somewhat smaller for females. Our proxy for the worker's ambition *(Conservative)* and its interaction with the female dummy are statistically significant in all specifications. They also follow the expected patterns. Male workers who grew up in more conservative regions tend to have higher wages (controlling for observables, such as education and experience), while female workers coming from conservative regions seem to earn less than other females with comparable education and experience.

In the Appendix Table 16, we additionally allow for interactions between our ability/ambition proxies and the exporter dummy. Doing so does not affect our main conclusions.

Subsample analysis Is the finding of a smaller gender wage gap is in exporting firms robust across education levels and occupations? We begin by splitting the sample into workers with and without college education. The results are reported in Table 7. We find that the gender wage gap is in most cases similar for non college and college educated workers, while the exporter premium is higher for the more educated workers. Exporting firms have a lower gender wage gap in both subsamples. Interestingly, the difference in gender wage gap between exporters and non-exporters is greater for non-college educated

[15]We also include dummies in all relevant interaction terms for cases where these dummies are missing. For more details on the construction of the ability proxies, see the Appendix.

Table 7: Gender Wage Gap – Accounting for unobservables – Education split

	(1)	(2)	(3)	(4)	(5)	(6)
	Non-coll	Coll	Non-coll	Coll	Non-coll	Coll
Female	-0.254***	-0.258***	-0.270***	-0.271***	-0.202***	-0.139***
	(0.014)	(0.019)	(0.015)	(0.020)	(0.023)	(0.051)
Exporter	0.063***	0.205***	0.059***	0.180***	0.113***	0.214***
	(0.013)	(0.032)	(0.015)	(0.036)	(0.024)	(0.081)
Female*Exporter	0.069***	0.022*	0.069***	0.023*	0.069***	0.024**
	(0.007)	(0.012)	(0.007)	(0.012)	(0.007)	(0.012)
Conservative	0.292***	0.008	0.292***	-0.019	0.287***	-0.053
	(0.030)	(0.097)	(0.030)	(0.098)	(0.030)	(0.109)
Conservative*Female	-0.244***	-0.153***	-0.242***	-0.161***	-0.240***	-0.186***
	(0.039)	(0.048)	(0.039)	(0.048)	(0.039)	(0.047)
Conservative*Exporter	-0.140***	-0.014	-0.140***	-0.002	-0.143***	0.026
	(0.044)	(0.097)	(0.044)	(0.098)	(0.044)	(0.108)
Dad's education	0.002***	0.012***				
	(0.001)	(0.003)				
Dad's education*Female	0.000	0.004***				
	(0.001)	(0.001)				
Dad's education*Exporter	0.003***	-0.007**				
	(0.001)	(0.003)				
Mom's education			0.000	0.008**		
			(0.001)	(0.004)		
Mom's education*Female			0.001	0.005***		
			(0.001)	(0.001)		
Mom's education*Exporter			0.004***	-0.005		
			(0.001)	(0.004)		
Sibling's wage					0.040***	0.073***
					(0.003)	(0.014)
Sibling's wage*Female					-0.009***	-0.010
					(0.003)	(0.007)
Sibling's wage*Exporter					-0.003	-0.017
					(0.003)	(0.014)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry*year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2160012	440659	2160012	440659	2160012	440659
Adjusted R^2	0.322	0.398	0.322	0.397	0.323	0.398

Notes: Estimates are based on the panel 1996-2010. Dependent variable: log wage.
Controls include experience, experience squared, education and dummies for missing
ability or culture measure (also interacted with female and exporter), female sibling, children and centrality.
Standard errors in parenthesis are clustered on firm. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Gender Wage Gap – Unobservables and occupation split

	(1) Mng OLS	(2) Prof OLS	(3) Tech OLS	(4) Clerk OLS	(5) Service OLS	(6) Craft OLS	(7) Mchn OLS	(8) Elem OLS
Female	-0.216***	-0.161***	-0.254***	-0.183***	-0.403***	-0.259***	-0.278***	-0.244***
	(0.033)	(0.035)	(0.025)	(0.028)	(0.052)	(0.031)	(0.026)	(0.068)
Exporter	0.223***	0.147*	0.145***	0.027	-0.024	0.097***	0.065***	0.077
	(0.047)	(0.083)	(0.041)	(0.042)	(0.056)	(0.023)	(0.024)	(0.061)
Female*Exporter	0.065***	-0.072***	-0.009	0.075***	0.061***	0.065***	0.097***	0.014
	(0.017)	(0.024)	(0.017)	(0.013)	(0.023)	(0.014)	(0.015)	(0.024)
Dad's education	0.017***	0.011	0.004	0.003	-0.009**	0.002	-0.003*	-0.011***
	(0.004)	(0.007)	(0.004)	(0.003)	(0.004)	(0.001)	(0.002)	(0.004)
Dad's education*Female	-0.001	0.005***	0.006***	-0.001	0.007*	-0.001	0.001	-0.003
	(0.002)	(0.002)	(0.001)	(0.002)	(0.004)	(0.002)	(0.002)	(0.006)
Dad's education*Exporter	-0.008*	-0.008	-0.001	0.000	0.010**	-0.000	0.004*	0.000
	(0.004)	(0.008)	(0.004)	(0.003)	(0.004)	(0.002)	(0.002)	(0.005)
Conservative	0.144	-0.110	0.292***	0.208**	0.103	0.312***	0.295***	0.240*
	(0.088)	(0.166)	(0.090)	(0.096)	(0.149)	(0.048)	(0.053)	(0.132)
Conservative*Female	-0.195**	-0.227**	-0.257***	-0.180***	-0.264*	-0.126	-0.285***	0.077
	(0.083)	(0.113)	(0.077)	(0.054)	(0.135)	(0.083)	(0.069)	(0.105)
Conservative*Exporter	-0.006	0.094	-0.195**	-0.041	0.124	-0.052	-0.104	-0.028
	(0.093)	(0.164)	(0.094)	(0.095)	(0.158)	(0.062)	(0.073)	(0.144)
Industry*year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	133908	75494	188774	93251	36272	291776	511977	51637
Adjusted R^2	0.318	0.308	0.338	0.201	0.338	0.204	0.232	0.186

Notes: Estimates are based on the panel 2003-2010. Dependent variable: log wage. Controls include experience, experience squared, education, and dummies for missing ability measure or conservative, female sibling, children and centrality.
Standard errors in parenthesis are clustered on firm. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

than for college educated. Another striking pattern is related to the conservative background of workers. It seems to have a large positive effect on earnings of less educated males and no statistically significant effect for college educated males. In the case of females, a conservative background is negatively correlated with earnings of both groups, but its effect is stronger on less educated females.

Next we proceed by splitting the sample according into eight occupational categories: Managers (Mng), Professionals (Prof), Technicians and associate professionals (Tech), Clerks, Service workers and shop and market sales workers (Service), Craft and related trades workers (Craft), Plant and machine operators and assemblers (Mchn), and Elementary occupations (Elem), leaving out two categories that are not relevant for manufacturings firms, namely Armed forces and unspecified and Skilled agricultural and fishery workers. The results are reported in Table 8.

We see that across all occupations, there is a statistically significant gender wage gap. This gap is smallest for Professionals and Technichians, and largest for the Service workers and Plant and machine operators. Exporters on average pay a wage premium to all occupations, except for Technicians, Service workers and Elementary occupations. For the majority of the occupations, exporters pay an extra premium to females. The only statistically significant negative exporter effect on the gender wage gap is found for the group of Professionals.

4.3 Is It Really about Exporting?

It is well known that exporting firms are more profitable and larger than other firms, and also more likely to undertake foreign direct investment. Any difference in wages between exporters and non-exporters may be driven by these factors rather than exporting as such. Hence, we need to control for them. We do so by including controls for size, profitability and FDI in our baseline line regression, while also allowing the gender wage gap to vary according to these. To limit the size of the table we present the results for only one ability proxy (Father's education). Using the alternative proxies would not change our conclusions.

We start by adding a dummy for large firms, defined as firms with more than 250 employees, and an interaction term for a large firm and a female worker. The results are given in Column (1) of Table 9. While the large firm dummy and the interaction term are both significant and positive, the differential exporter gender wage gap is still present. We also experimented with controlling for firm size using the continuous variable number of employees, and it has not affected our main results. Large firms do pay higher wages – and even higher to females – but the impact of exporting on the gender wage gap is still statistically

and economically significant.

Second, we calculate a firm's profit margin by dividing operating profits by operating income. We include this measure of profitability as well as its interaction with the female dummy in our baseline regression. The results are reported in Column (2) show that the smaller exporter gender wage gap is not driven by the fact that exporters tend to be more profitable. Just as in the case with large firms, the more profitable firms do pay higher wages – and even higher to females – but working at an exporter reduces the gender wage gap even more.

Finally, a well documented characteristic of exporting firms is that they are more likely to engage in other international activities. Maybe this is a story of multinational firms (MNCs) which learn from foreign affiliates or simply have other management practices. If so, this may lead to a smaller gender wage gap in firms engaging in FDI. To account for this, we introduce a dummy for MNCs and its interaction with the female dummy. The results are reported in Column (3). It appears that females working for MNCs also receive a premium over and above the male MNC premium. The gender wage gap is even lower in these firms as compared to other firms, but the exporter effect is still positive and significant.

In sum, there is something different about the exporting firms.

4.4 Are Exporters Inherently Different?

Our results persistently suggest that gender wage gaps at exporters are smaller than at non-exporting firms. An important question is whether this is because firms with smaller gender wage wage start exporting or because exporting leads to smaller gender wage gaps. To investigate this question, we examine developments in the gender wage gap in the years prior to entry into export markets. We focus on non-exporters and firms that start exporting, so any effect we find here is due to new exporters having a differential gender wage gap compared to non-exporters.

We further restrict the sample by requiring that new exporters must be observed at least one to three years prior to exporting, depending on the time frame we consider. We restimate our baseline specification adding dummies for firms that will become exporters in the following one to three years, as well as interactions between these dummies and the female dummy:

$$\ln w_{ijst} = \eta fem_i + \zeta fem_i * exporter_{jt} + \sum_{k=1}^{3} \vartheta_{t+k} entry_{j,t+k} + \sum_{k=1}^{3} \xi_{t+k} fem_i * entry_{j,t+k} + X_{it}\beta + Z_{jt}\theta + \delta_{st} + \varepsilon_{ijst} \tag{4}$$

The results are reported in Table 10. They suggest that firms that become exporters in

Table 9: Gender Wage Gap – Unobservables and firm characteristics

	(1) OLS	(2) OLS	(3) OLS
Female	-0.244***	-0.230***	-0.243***
	(0.011)	(0.015)	(0.012)
Exporter	0.030*	0.025*	0.047***
	(0.017)	(0.013)	(0.017)
Female*Exporter	0.041***	0.054***	0.052***
	(0.006)	(0.007)	(0.006)
Large	0.075***		
	(0.009)		
Female*Large	0.035***		
	(0.009)		
Profitability		0.019***	
		(0.002)	
Female*Profitability		0.006**	
		(0.003)	
MNC			0.059***
			(0.011)
Female*MNC			0.033***
			(0.011)
Dad's education	0.003***	0.000	0.003***
	(0.001)	(0.001)	(0.001)
Dad's education*Female	-0.001	-0.000	-0.001
	(0.001)	(0.001)	(0.001)
Dad's education*Exporter	0.004***	0.007***	0.004***
	(0.001)	(0.001)	(0.001)
Conservative	0.248***	0.266***	0.242***
	(0.030)	(0.032)	(0.030)
Conservative*Female	-0.226***	-0.213***	-0.225***
	(0.034)	(0.036)	(0.035)
Conservative*Exporter	-0.139***	-0.143***	-0.129***
	(0.040)	(0.043)	(0.040)
Controls	Yes	Yes	Yes
Industry*year	Yes	Yes	Yes
Observations	2713623	2114139	2713623
Adjusted R^2	0.412	0.406	0.408

Notes: Estimates are based on the panel 1996-2010.
Dependent variable: log wage. Controls include experience, experience squared, education and dummies for missing ability measure or conservative, female sibling, children and centrality.
Standard errors in parenthesis are clustered on firm.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

the future are already different today. They already pay a wage premium to all workers *and* have a smaller gender wage gap, one and two years before entry into exports. While their tendency towards smaller gender wage gaps is there already three years prior to entry, their general exporter wage premium is not.

It might be the case that future exporters are preparing to enter into exports by hiring new workers that have some unobservable (to the econometrician) quality that is beneficial for the firm as it start to export, like e.g. foreign experience. This may explain why we see a wage premium in the years prior to exporting, and could suggest that there is something special about these workers. If this is disproportionally true with respect to the new female hires, it could explain the lower gender wage gap we find in exporting firms. To test for whether this is the case, we split the sample into workers with at least one year of tenure in the firm and new hires, defined as workers with less than one year of tenure in the firm, and run the same specification as described above.

In Table 11 we consider incumbent workers in Columns (1)-(3), while in the remaining columns we report the results for new hires. The results for the incumbents are very similar to the results for the whole sample (see Table 10): exporters-to-be pay in general more and have smaller gender wage gaps. However, for new hires there is evidence of a wage premium prior to entry into exporting, but virtually no evidence of a smaller gender wage gap prior to exporting.

Hence, it seems as if the exporters-to-be pay their work force more – and their female workers in particularly so – than firms that do not export. We take this as further evidence in support of our hypothesis that exporting firms are in fact intrinsically different. We note that our findings is driven by behaviour towards incumbent workers rather than towards new hires.

Table 10: Entry into exports

	(1) OLS	(2) OLS	(3) OLS
Female	-0.281***	-0.291***	-0.307***
	(0.019)	(0.022)	(0.024)
Exporter	0.036*	0.027	0.008
	(0.019)	(0.021)	(0.024)
Female*Exporter	0.042***	0.032***	0.035**
	(0.010)	(0.011)	(0.015)
Dad's education	0.004***	0.004***	0.003***
	(0.001)	(0.001)	(0.001)
Dad's education*Female	0.001	0.002	0.003
	(0.001)	(0.002)	(0.002)
Dad's education*Exporter	0.003*	0.003	0.003
	(0.001)	(0.002)	(0.002)
Conservative	0.295***	0.302***	0.303***
	(0.031)	(0.034)	(0.035)
Conservative*Female	-0.235***	-0.273***	-0.265***
	(0.050)	(0.055)	(0.059)
Conservative*Exporter	-0.058	0.020	0.077
	(0.051)	(0.056)	(0.066)
Entry t+1	0.038***	0.038***	0.042***
	(0.006)	(0.006)	(0.007)
Female*Entry t+1	0.040***	0.049***	0.045***
	(0.008)	(0.010)	(0.013)
Entry t+2		0.023***	0.037***
		(0.008)	(0.007)
Female*Entry t+2		0.043***	0.031**
		(0.012)	(0.015)
Entry t+3			0.023
			(0.014)
Female*Entry t+3			0.040**
			(0.016)
Controls	Yes	Yes	Yes
Industry*year	Yes	Yes	Yes
Observations	684579	511920	437408
Adjusted R^2	0.307	0.296	0.288

Notes: Estimates are based on the panel 1996-2010.
Dependent variable: log wage. Controls include experience, experience squared, education and dummies for missing ability measure or conservative, female sibling, children and centrality.
Standard errors in parenthesis are clustered on firm.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 11: Entry into exports

	(1)	(2)	(3)	(4)	(5)	(6)
	Tenured workers			New hires		
	OLS	OLS	OLS	OLS	OLS	OLS
Female	-0.283***	-0.292***	-0.308***	-0.237***	-0.250***	-0.262***
	(0.019)	(0.023)	(0.025)	(0.048)	(0.058)	(0.064)
Exporter	0.032	0.022	0.002	0.087*	0.136**	0.202***
	(0.020)	(0.021)	(0.024)	(0.045)	(0.061)	(0.077)
Female*Exporter	0.043***	0.032***	0.035**	0.024	0.058**	0.060**
	(0.010)	(0.011)	(0.015)	(0.033)	(0.028)	(0.027)
Dad's education	0.003***	0.004***	0.003***	0.012***	0.013***	0.014***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Dad's education*Female	0.001	0.002	0.003	0.003	0.004	0.005
	(0.001)	(0.002)	(0.002)	(0.003)	(0.004)	(0.005)
Dad's education*Exporter	0.003**	0.003*	0.004*	-0.005	-0.008	-0.014**
	(0.002)	(0.002)	(0.002)	(0.004)	(0.005)	(0.006)
Conservative	0.295***	0.301***	0.301***	0.323***	0.328***	0.323***
	(0.032)	(0.034)	(0.036)	(0.064)	(0.071)	(0.074)
Conservative*Female	-0.236***	-0.272***	-0.263***	-0.286**	-0.357**	-0.356**
	(0.050)	(0.055)	(0.060)	(0.144)	(0.146)	(0.169)
Conservative*Exporter	-0.059	0.013	0.065	-0.075	0.068	0.123
	(0.051)	(0.056)	(0.067)	(0.135)	(0.115)	(0.132)
Entry t+1	0.037***	0.037***	0.042***	0.048***	0.058***	0.063***
	(0.006)	(0.006)	(0.007)	(0.018)	(0.019)	(0.022)
Female*Entry t+1	0.041***	0.049***	0.045***	0.004	0.042	0.040
	(0.009)	(0.011)	(0.013)	(0.026)	(0.034)	(0.047)
Entry t+2		0.021**	0.037***		0.061***	0.063**
		(0.009)	(0.008)		(0.023)	(0.032)
Female*Entry t+2		0.043***	0.030**		0.022	0.092*
		(0.012)	(0.015)		(0.039)	(0.048)
Entry t+3			0.035***			-0.077**
			(0.012)			(0.035)
Female*Entry t+3			0.033**			-0.044
			(0.015)			(0.056)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry*year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	654177	492044	420717	30402	19876	16691
Adjusted R^2	0.308	0.297	0.289	0.318	0.312	0.312

Notes: Estimates are based on the panel 1996-2010. Dependent variable: log wage. Controls include experience, experience squared, education and dummies for missing ability measure or conservative, female sibling, children and centrality. Standard errors in parenthesis are clustered on firm.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5 Exporters and recruiting

Our empirical evidence on the gender wage gap suggests that exporters are different already before they start exporting – also in terms of the gender wage gap. This is consistent with previous findings, by for instance Bernard and Bradford Jensen (1999), that firms that become exporter are larger, pay higher wages and are more productive several years before they enter the export market. In addition, Bernard and Bradford Jensen (1999) find that future exporters grow faster than those who will not enter into exports. We add an important characteristic to that list: future exporters seem to have distinct management practices leading to a lower gender wage gap prior to starting exporting.

Do exporters also employ more women? To test this, we regress the female labor share of each firm on an exporter dummy. We do this for the whole sample, as well as for college and non-college educated workers separately. We find that exporters do have a higher share of female workers in general (see Table 12). This is true if we just consider the female share of college educated employees or the female share of non-college educated workers. We take these findings as another piece of evidence supporting our hypothesis: distinct management practices affecting particuarly female workers seem to give exporters a competitive advantage.

Table 12: Female Share

	(1)	(2)	(3)	(4)	(5)	(6)
	All workers		College		Non-college	
	OLS	OLS	OLS	OLS	OLS	OLS
Exporter	0.029***	0.005***	0.020***	0.001	0.030***	0.009***
	(0.001)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
Size		0.017***		0.016***		0.015***
		(0.001)		(0.001)		(0.001)
Industry*year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	89779	89779	51700	51700	87427	87427
Adjusted R^2	0.292	0.299	0.127	0.131	0.280	0.284

Notes: Estimates are based on the panel 1996-2010.

Dependent variable: female share.

Standard errors in parenthesis are clustered on firm.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

6 Conclusions

We use a matched employer-employee data set covering all firms in the Norwegian manufacturing sector and their full-time employees between 1996 and 2009 to explore the link between the gender wage gap and the firm's export status. We find evidence of a substantial gender wage gap of more than 20 percent. Interestingly, the gender wage gap is smaller in exporting firms. More specifically, we find that females in general are paid a 24 percent wage discount, while women working at exporters are paid only 19 percent less than their male peers. Hence, working for an exporting firm closes the gender wage gap by about one fifth. This effect is both statistically significant and economically meaningful, and it is robust to allowing for industry-year specific gender differentials. While we also find that large, more profitable firms and Norwegian multinationals tend to have lower gender differentials, our main finding cannot be explained by these factors.

Consistent with Becker's theory on taste-based discrimination, we observe that exporting firms have a large share of female employees. This is true for the female share of the total labor force, college educated workers, workers without college education and managers. In line with previous findings, suggesting that exporters are inherently different along a set of dimensions, we find that exporters act less discriminating already prior to entry into foreign markets, which is consistent with the view that lack of discrimination may be a source of competitive advantage.

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A Appendix

A.1 Data and Variables

A.1.1 Share of Exporters across Industries

A.1.2 List of Industries

A.1.3 Sample Selection

A.1.4 Construction of Variables

Parents' education: These variables are taken from the education statistics, and are simply the number of years of education for the mother and father of the worker.

Sibling's wage: This variable is constructed as the deflated logged wage of a worker's older sibling with at least five years of labor market experience. We choose the sibling's current wage if available, otherwise we choose the most recent one.

Conservative: For each worker, we identify the municipality in which the worker's mother lived when the worker was 15 (or the closest year after). We then calculate the share of the votes obtained by Christian Democrats in that municipality in the national elections in the closest year to the year in which the worker turned 15. The national elections are held every 4 years, which means that we observe the conservative measure no more than two years away from the year in which the worker turned 15. We have the share of Christian Democratic votes for every election since 1975, and for all the roughly 430 Norwegian municipalities.

A.1.5 Additional Tables

Table 13: NACE Rev. 2

NACE code	Industry name
10	Manufacture of food products
11	Manufacture of beverages
12	Manufacture of tobacco products
13	Manufacture of textiles
14	Manufacture of wearing apparel
15	Manufacture of leather and related products
16	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials, except furniture
17	Manufacture of paper and paper products
18	Printing and reproduction of recorded media
19	Manufacture of coke and refined petroleum products
20	Manufacture of chemicals and chemical products
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
22	Manufacture of rubber and plastic products
23	Manufacture of non-metallic mineral products
24	Manufacture of basic metals
25	Manufacture of fabricated metal products, except machinery and equipment
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment n.e.c.
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
31	Manufacture of furniture
32	Other manufacturing
33	Repair and installation of machinery and equipment

Table 14: Gender Wage Gap – Allowing for gender specific returns

	(1) OLS	(2) OLS	(3) OLS
Female	-0.090***	-0.280***	-0.146***
	(0.017)	(0.005)	(0.026)
Exporter	0.083***	-0.138***	-0.154***
	(0.006)	(0.034)	(0.032)
Female*Exporter	0.058***	0.067***	0.128***
	(0.007)	(0.007)	(0.031)
Experience	0.033***	0.033***	0.034***
	(0.000)	(0.001)	(0.001)
Experience*Female	-0.008***		-0.008***
	(0.001)		(0.001)
Experience*Exporter		-0.000	-0.000
		(0.001)	(0.001)
Experience*Female*Exporter			0.001
			(0.002)
Experience^2	-0.059***	-0.059***	-0.063***
	(0.001)	(0.001)	(0.001)
Experience^2*Female	0.022***		0.029***
	(0.002)		(0.003)
Experience^2*Exporter		0.005***	0.005***
		(0.002)	(0.002)
Experience^2*Female*Exporter			-0.008**
			(0.004)
Education	0.059***	0.044***	0.043***
	(0.001)	(0.002)	(0.002)
Education*Female	-0.003***		0.001
	(0.001)		(0.002)
Education*Exporter		0.018***	0.019***
		(0.002)	(0.002)
Education*Female*Exporter			-0.005***
			(0.002)
Children	0.078***	0.062***	0.091***
	(0.002)	(0.003)	(0.003)
Children*Female	-0.132***		-0.164***
	(0.004)		(0.007)
Children*Exporter		-0.010***	-0.017***
		(0.003)	(0.004)
Children*Female*Exporter			0.040***
			(0.008)
Centrality	0.056***	0.074***	0.067***
	(0.008)	(0.007)	(0.007)
Centrality*Female	0.029***		0.029***
	(0.007)		(0.009)
Centrality*Exporter		-0.015	-0.014
		(0.010)	(0.010)
Centrality*Female*Exporter			-0.000
			(0.011)
Industry*year	Yes	Yes	Yes
Observations	2713623	2713623	2713623
Adjusted R^2	0.408	0.406	0.409

Notes: Estimates are based on the panel 1996-2010. Dependent variable: log wage. Standard errors in parenthesis are clustered on firm. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 15: Gender Wage Gap – Accounting for number of children

	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Female	-0.274***	-0.159***	-0.274***	-0.148***
	(0.005)	(0.006)	(0.005)	(0.008)
Exporter	0.082***	0.083***	0.082***	0.084***
	(0.006)	(0.006)	(0.007)	(0.007)
Female*Exporter	0.059***	0.057***	0.059***	0.044***
	(0.007)	(0.007)	(0.007)	(0.009)
1-2 Children	0.053***	0.073***	0.053***	0.074***
	(0.002)	(0.002)	(0.003)	(0.004)
3-4 Children	0.055***	0.088***	0.054***	0.089***
	(0.002)	(0.002)	(0.004)	(0.004)
>4 Children	0.024***	0.054***	0.018**	0.051***
	(0.005)	(0.005)	(0.009)	(0.009)
1-2 Children*Female		-0.116***		-0.126***
		(0.004)		(0.007)
3-4 Children*Female		-0.182***		-0.202***
		(0.006)		(0.009)
>4 Children*Female		-0.187***		-0.195***
		(0.012)		(0.023)
1-2 Children*Exporter			0.000	-0.001
			(0.004)	(0.004)
3-4 Children*Exporter			0.002	-0.002
			(0.005)	(0.005)
>4 Children*Exporter			0.008	0.004
			(0.010)	(0.011)
1-2 Children*Female*Exporter				0.012
				(0.008)
3-4 Children*Female*Exporter				0.024**
				(0.010)
>4 Children*Female*Exporter				0.011
				(0.027)
Controls	Yes	Yes	Yes	
Industry*year	Yes	Yes	Yes	
Observations	2713623	2713623	2713623	2713623
Adjusted R^2	0.406	0.408	0.406	0.408

Notes: Estimates are based on the panel 1996-2010. Dependent variable: log wage. Controls include experience, experience squared, education and adummy for centrality. Standard errors in parenthesis are clustered on firm.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 16: Gender Wage Gap – Allowing for differential impact of unobservables and culture

	(1) OLS	(2) OLS	(3) OLS
Female	-0.247***	-0.261***	-0.184***
	(0.012)	(0.013)	(0.021)
Exporter	0.049***	0.046**	0.083***
	(0.017)	(0.018)	(0.025)
Female*Exporter	0.058***	0.058***	0.059***
	(0.007)	(0.007)	(0.007)
Conservative	0.243***	0.240***	0.238***
	(0.030)	(0.030)	(0.031)
Conservative*Female	-0.223***	-0.221***	-0.223***
	(0.036)	(0.036)	(0.035)
Conservative*Exporter	-0.127***	-0.130***	-0.138***
	(0.041)	(0.041)	(0.041)
Dad's education	0.003**		
	(0.001)		
Dad's education*Female	-0.000		
	(0.001)		
Dad's education*Exporter	0.004***		
	(0.001)		
Mom's education		0.000	
		(0.001)	
Mom's education*Female		0.001	
		(0.001)	
Mom's education*Exporter		0.005***	
		(0.002)	
Sibling's wage			0.040***
			(0.003)
Sibling's wage*Female			-0.011***
			(0.003)
Sibling's wage*Exporter			0.002
			(0.004)
Controls	Yes	Yes	Yes
Industry*year	Yes	Yes	Yes
Observations	2713623	2713623	2713623
Adjusted R^2	0.407	0.407	0.407

Notes: Estimates are based on the panel 1996-2010.
Dependent variable: log wage. Controls include experience, experience squared, education and dummies for missing ability measure or conservative, female sibling, children and centrality.
Standard errors in parenthesis are clustered on firm.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure 1: Share of exporters across industries