GLOBALIZATION, RECRUITMENTS, AND JOB MOBILITY

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Abstract: Previous research indicates that firms pay a premium to poach workers from exporting firms if experience working for an internationally engaged firm reduces trade costs. Since international experience is less valuable to non-exporters, we would expect to see differences in recruitments between firms that are internationally engaged and those that serve only the domestic market. Moreover, increased openness might lead to higher job-to-job mobility if more globalization raises both the share of exporters and the number of workers with skills that make them attractive for other exporters. Using linked Swedish employer-employee data for the period 1997-2013, we do find systematic differences between the way exporters and non-exporters recruit workers: exporters have a relatively high share of recruitments from other exporters as hypothesized. We also find some suggestive evidence that increased openness correlates positively with upward mobility for occupations that play a major role in international commerce, such as professionals and managers.

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1. Introduction

It is well-documented that globalization increases the firm-level demand for skilled workers (Hummels et al. 2014), and that the skill intensity of a firm's workforce is positively related to that firm's level of international engagement (Davidson et al. 2017). In contrast, less is known about the ways firms go about building their workforces and the role that globalization plays in shaping their recruiting strategies. These issues are important, since many workers gain skills on the job that allow them to move on to better, higher paying jobs. Thus, if globalization influences the hiring practices of firms, there may be implications for the economic mobility of workers as they transition across jobs and build their careers.

Recent research, empirical and theoretical, suggests that these forces may be present and important. Examining job flows across firms offering different wages on the jobs ladder, Haltiwanger et al. (2018) show that firms with different levels of productivity tend to use different strategies to fill their vacancies. This suggests that firms with different levels of international engagement are likely to use different recruiting strategies, since it is well known that firm productivity is positively related to firm-level export activity (Bernard et al. 2007). One goal of this paper is to document the link between a firm's level of export activity and the types of recruiting strategies that they employ. On the theoretical side, our recent research (Davidson et al. 2020) shows that since globalization affects the distribution of firms and the opportunities to gain skills that they offer workers, globalization can have implications for the rate at which workers acquire skills and move up the jobs ladder. This potential impact on economic mobility depends on the idea that different firm types recruit workers from different labor pools and that working for an internationally engaged firm allows workers to acquire skills that reduce trade costs. In such a framework, economic mobility increases with globalization since increased export activity

allows workers to gain international experience at a faster rate. Neither the differences in recruitment patterns between firms with different engagement in export, nor the effect of globalization on economic mobility has been empirically documented; a task that this paper sets out to do.

We examine recruitment patterns and job mobility using a large Swedish matched employer-employee data set with detailed information on both workers and firms covering the period 1997-2013. In the spirit of Davidson et al. (2020), we separate firms into three groups based on exports as a share of total sales: (*i*) firms that do not export (non-exporters), (*ii*) firms that have export shares below the industry median of exporting firms (low-export firms), and (*iii*) firms that have export shares above the industry median of exporting firms (high-export firms).[1] We first look at the conditional mean difference between firms in their share of hires (in terms of total hires by a firm) from those three firm groups. We find that after controlling for firm characteristics, industry fixed effects and year fixed effects, both high- and low-export firms have a larger share of their recruitments from other exporting firms. For example, for low-export firms, the share of recruits from other low-export firms is 1.9 percentage points higher and the share from high-export firms is 3.9 percentage points higher, as compared to non-exporters. These estimates imply that out of 100 new hires, low-export firms recruit about 6 more workers with international experience (those from other exporting firms). Similarly, the estimates for high-export firms suggest that out of 100 new hires, high exporters recruit about 8 more workers with international experience, as compared to non-exporters.

[1] In Davidson et al. (2020), we model firm heterogeneity in a Melitz-style model. We derive two critical cutoff productivities. The lowest productivity (below the lower of the two cutoffs) firms do not export. Those with medium productivity (between the two cutoff values) export a small share of their output, and those with the highest productivity (above the higher of the two cutoffs) export a large share of their output.

The key mechanism in the Davidson et al. model is that large, highly productive exporters reduce their trade costs by poaching experienced workers from smaller, less productive exporters.[2] It is easy to imagine that international experience in some occupations plays a larger role in lowering trade costs relative to others (e.g., supply chain or business development managers, business tax or global trade lawyers, experts in international finance vs. clerical support). To investigate further, we therefore divide our sample of workers into different occupational categories. We find that compared to non-exporters, the share of recruitments from low export firms by high export firms is relatively high for managers and professionals, but not for clerks or operators.

We then study the robustness of this hiring pattern by using alternative measures of recruiting firms and workers' international experience. We characterize recruiting firms by their exports as a share of total sales (a continuous measure) and construct an index to capture the amount of international experience that workers may gain from working at exporting firms. To address the potential endogeneity problem with the OLS estimates, e.g. unobserved firm-level productivity shocks may be correlated with firm export shares and hiring patterns, we also take an instrumental variable approach. Following Hummels et al. (2014) and Davidson et al. (2017), we instrument for firm export shares using a weighted average of world import demand. Shocks to foreign import demand for a particular product by a particular partner country are external to Swedish firms and unlikely to be correlated with firm-level productivity shocks that may affect the firm-level hiring decisions. In addition, because Swedish firms are specialized in different

[2] Throughout the paper we refer to the worker's new employer as the "poaching" firm and its former employer as the "poached" firm. We note that we are using the term "poach" somewhat loosely, since we have no direct evidence that these workers are being poached. A more accurate (although clumsier) nomenclature would be to refer to the new employer as the "hiring" firm, while using "former employer" to refer to the firm that lost their employee.

products and export to different foreign markets, a given shock to foreign demand for a specific product by a specific destination country can have vastly different impacts across firms even within the same industry. Using lagged firm-level trade shares as weights, our instrument aggregates shocks to world import demand up to the firm level and it has significant variation across firms. Here, treatment is an export shock caused by changes of foreign demand for a firm's export product. Both OLS and IV estimates provide strong evidence that firms with higher export intensities tend to hire more workers with international experience. Thus, our analysis reveals that recruitment patterns differ significantly between firms with different degree of global engagement and firms with higher export intensities tend to have a higher demand for workers with international experience.

We continue our analysis by examining how worker mobility is affected by increased openness within industries. We construct measures of upward/downward mobility based on worker movement between firms within an industry. We measure the extent of trade openness using industry export shares to capture the impact of trade shocks on the distribution of firms (i.e., entries of new exporters and export expansion by established exporters) within the industry. Consistent with the conceptual framework outlined in Section 2 below, our OLS estimates suggest a positive relationship between increased openness to trade and upward mobility for professionals and managers. A 10 percentage point increase in industry export shares is associated with a 4 percentage point increase in the share of managers (relative to all employees) who move up to firms that have a higher export share, and with a 0.76 percentage point increase in the share of managers and professionals who move upward to firms with an export share at a higher quartile. In contrast, there is no link between increased openness and upward mobility for clerks and operators. Thus, we find a stronger relationship between economic mobility and increased trade

openness for occupations that play a major role in international commerce, such as professionals and managers.[3]

Moreover, it is well documented that high exporting firms pay relatively high wages relative to firms that do not export even after controlling for worker characteristics (e.g. Schank et al. 2007; Munch and Skaksen 2008; Baumgarten 2013). Thus, the mobility from firms that export less to those that export more would imply higher average wages. In accordance with this argument, we find that workers who previously worked at high-export firms are relatively more likely to end up in high wage firms.

Our paper relates to several different strands of empirical papers. For instance, Haltiwanger et al. (2018) provide evidence for pro-cyclical worker mobility from low-wage to high-wage firms. However, differing from Haltiwanger et al., we are interested in worker mobility from firms that export less to those that export more, and whether economic mobility is related to increased trade openness. Our focus on recruitment strategies and exporting relates to Labanca et al. (2014), which finds that as firms prepare to export, they poach workers from other exporters. This leads to deeper market penetration by the poacher and reduced market penetration by the firm that loses the worker. In addition, Mion et al. (2017) provides evidence that export experience gained by a manager at a previous firm leads to better export performance by the worker's current employer and a large wage premium for the manager.[4] Note that these two studies focus primarily on the impact of hiring workers with international experience on firms' export performance, without

[3] We also use a similar IV approach as above to account for possible endogeneity due to omitted procyclical factors that may increase with industry export shares and worker mobility. The estimated coefficients are similar to their OLS counterparts, but with larger standard errors.

[4] See also Patault and Lenior (2021) who examine buyer-seller relationships using matched worker-firm data from France. They find that hiring a sales manager significantly increases the probability that a firm will start exporting to the sales manager's previous buyers.

consideration of the impact on job mobility. We add to this literature by examining flows of workers between different types of firms and how these flows are linked to increased openness.

Finally, our paper relates to a literature that tries to capture long term labor market effects of globalization. Autor et al. (2014) find that US workers in regions experiencing increased Chinese import competition are relatively likely to change jobs, often at reduced pay. Keller and Utar (2016) and Utar (2018) find that Chinese import competition in Denmark forces workers out of manufacturing into service sector jobs, some to higher wage jobs, others to less skilled lower paying jobs. Accordingly, Munch (2010) finds that offshoring by Danish firms increases the probability that low skilled workers become unemployed, and that high skilled workers change jobs. Our paper differs from these studies by examining job mobility between different firm types in response to export expansions; that is, we do not focus on workers who are pushed out of their jobs as a consequence of import competition and offshoring.

The rest of the paper is organized as follows. Section 2 discusses the theoretical link between export intensity, recruiting strategies, and economic mobility. Section 3 describes the data and our empirical specifications. Our empirical results are provided in Section 4, with concluding remarks in Section 5.

2. Conceptual Framework

In this section we provide an overview of the model in Davidson et al. (2020) that connects globalization, firm recruiting strategies, export activity and economic mobility. The model's foundation is identical to Melitz (2003) in that ex ante identical firms are randomly assigned productivity measures after paying the sunk cost of entry but before committing to production. The novel features of the model are the way that firms build their workforces and the way that worker experience influences the cost of production and the costs associated with exporting.

The Blanchard model of perpetual youth is used in which a cohort of ex ante identical workers are born each instant and then die at a constant rate regardless of age. Workers gain experience on the job and the type of experience that they have plays a role in determining firms' costs. Once a worker takes a job, they randomly gain "basic experience" via a Poisson process. The randomness captures the notion that some workers catch on quickly while others learn slowly. Each firm's marginal cost of production is decreasing in the fraction of its workforce that has basic experience. Workers can gain international experience by working for an exporter. As with basic experience, international experience is gained randomly via a Poisson process. Each exporter's iceberg trade costs are decreasing in the fraction of its workforce that has international experience.

Experience is not directly observable, but firms can detect it with costly screening. Firms then face a trade-off. They can choose not to screen, but are likely to end up with a workforce that has little or no experience; or, they can pay the cost of screening to ensure that their workers have the appropriate type of experience.

Active firms self-select into four different categories. Active low-productivity firms do not screen, hire only newborn, inexperienced workers and pay a low wage. As in Melitz (2003), these firms do not earn enough revenue to cover the fixed cost of exporting, so they sell their output domestically. Active medium-productivity firms poach workers from low-wage firms, screen for basic experience and pay a medium level wage. Within this group of firms, those with relatively high productivity earn enough to cover the cost associated with accessing world markets and therefore, export a fraction of their output. It is these medium wage exporters that offer workers an opportunity to gain international experience. High-productivity firms poach workers from medium-wage exporters, pay a high wage and export a relatively high proportion of their output. Thus, our model's first prediction is that *firms with different levels of international engagement*

will use different recruiting strategies, with high-export firms hiring workers from low-export firms and non-exporters hiring from other non-exporters or from the pool of inexperienced.

Turning next to workers, new entrants take low-wage jobs and hope to gain basic experience. Once they do, they can move on to a medium-wage job if an offer comes along and the cost of moving is not too high.[5] Workers that accept job offers from medium-wage exporters can then try and gain international experience. If they do so, they can then seek high-wage jobs. Thus, as a worker's career unfolds, they move up the jobs ladder and secure jobs with better compensation. The term "upward economic mobility" refers to the rate at which workers ascend the jobs ladder.

Globalization (a reduction in trade costs) alters the distribution of firms, triggering changes in wage inequality and economic mobility.[6] First, lower trade costs lead some medium-wage non-exporters to start exporting, while all firms that were already exporting export more. This increases the number of exporters, pushing up the demand for workers with international experience and hence, the wage paid at the top of the job ladder. In addition, high-wage workers exit the labor force at a constant rate and must be replaced, implying that high-wage firms need to make more offers than before. This makes it easier for workers at medium-wage exporters to move up to better, high-wage jobs, increasing upward economic mobility at the top of the job ladder.

Falling trade costs also lead to an increased inflow of imports, lowering the revenue that firms earn from domestic sales. This reduction in revenue harms low-productivity firms and leads some medium-wage non-exporters to switch and start offering the low-wage. The end result is that globalization leads to increased employment by the groups of low-wage and high-wage firms, with

[5] The process of moving is modeled using an approach similar to Artuc et al. (2010). When a worker receives a job offer, they draw a random cost of moving and accept the job if the expected gain from moving exceeds that cost.
[6] As noted above, we assume that iceberg trade costs depend on level of international experience embodied in a given firm's workforce. We model globalization as a reduction in iceberg trade costs for a given mix of workers.

employment by the group of medium-wage firms declining. For reasons described in Appendix A, the measure of jobs offered by medium-wage exporters can rise or fall. However, in Davidson et al. (2020) we calibrate our model using US data and we find that for all relevant values of the model's parameters, more openness leads to more jobs at medium-wage exporters, which increases economic mobility at the low end of the jobs ladder as well (the rate at which workers move from low-wage jobs to medium-wage jobs). Thus, the second prediction of our model is that *increased openness leads to an increase in upward economic mobility.*

To summarize, globalization increases the proportion of firms offering the extreme wages and leads to a relative increase in the high wage, triggering an increase in wage inequality. But, globalization also increases the rate at which workers move up the jobs ladder. This is a potentially important result, since it implies that a narrow focus on wage inequality may miss the impact of globalization on inequality across workers. Workers in entry-level jobs may be initially harmed by globalization if their real wage falls, but they may make that up by moving up the jobs ladder at a faster rate and eventually landing a job that pays more than it would have without freer trade. The result's importance depends on how widely it applies. A key assumption of the model is that by hiring workers with international experience (e.g., organizing global supply chains, managing logistics, dealing with international taxes and finance, negotiating with people in different cultures), a firm can lower its trade costs. As noted in the introduction, this may be true for many high-skilled, white-collar workers, but it may not apply as broadly to production workers. And, this is exactly what our empirical evidence below will show. Thus, this result may not provide comfort to those concerned about globalization's impact on workers in low-paying occupations.

In addition to upward mobility, recent evidence indicates that a surprising number of workers are demoted each year while others are laid off and forced to accept new jobs at lower

pay. For example, using US data, Forsythe (2017) finds that "approximately 7% of employed individuals move down the occupational ladder each year."[7] Such movements back down the ladder can devastate workers, resulting in large losses in lifetime earnings and hampering the development of their careers.[8] Thus, we also explore in this paper the impact of globalization on downward economic mobility. In the conclusion of Davidson et al. (2020), we describe how our model can be extended to allow for downward mobility and provide a conjecture as to how it might be impacted by globalization. The extension involves assuming that once a worker becomes experienced and moves to a new, higher-paying job, they must then exert effort to keep their new skills from deteriorating. This effort would be costly and vary across workers.[9] As long as the worker puts forth effort, their new skills would not deteriorate; but, if the worker shirks, the skills would disappear and the worker's productivity would revert to its previous level. To prevent shirking, firms would monitor workers and fire those that have lost their skills. Shirking workers would therefore risk detection with the prospect of falling back down one level on the jobs ladder if caught. And, if caught, they would then need to re-acquire that type of experience if they wanted to move back up the ladder and earn a higher wage. In this framework, workers would make the choice between exerting effort or shirking by comparing the cost of effort with the expected loss from shirking. Since globalization increases wage inequality, the expected loss in earnings from shirking should rise as trade costs fall. This implies that globalization should lead to fewer workers shirking and, as a result, there should be fewer demotions and less downward mobility. It is important to note that the forces at work here are fundamentally different than those that link

[7] For evidence of downward mobility using Danish data, see Groes et al. (2015) and Frederiksen et al. (2016).
[8] The classic references on the losses from job displacement are Jacobson et al. (1993) and Kletzer (1998). For more recent evidence, see Davis and von Wachter (2011) or Krolikowski (2017).
[9] We envision modelling the cost of effort in a manner similar to moving costs – once experience is gained and the worker moves on to a new job, a random draw would determine the cost of effort for that worker.

openness to recruiting strategies and upward mobility. Since globalization increases inequality in all occupations, it should make shirking less attractive to all workers, regardless of occupation. Thus, the third prediction of our model is that *increased openness should decrease downward mobility for workers in all occupations.*

We are now ready to turn to our empirical examination of the hiring practices employed by different firm types (characterized by their export status or wages), and the link between worker mobility and globalization. The following empirical analysis focuses on the three predictions of our model.

3. Data and Empirical Specifications

3.1. Data

Our empirical analysis uses matched employer-employee data from Statistics Sweden covering the period 1997-2013. The Swedish firm database contains detailed information on all Swedish private sector firms. Firm-level information on exports originates from the Swedish Foreign Trade Statistics. Based on compulsory registration at Swedish Customs, the data cover all trade transactions outside the EU. Trade data for EU countries are available for all firms with a yearly import or export of around 1.5 million SEK and above. According to figures from Statistics Sweden, the data cover around 92% of total goods trade within the EU. The trade data cover goods but not services, and we therefore restrict our empirical analysis to the manufacturing sector.

Our firm data are matched with detailed information on all Swedish individuals who are at least 16 years old. The data on individuals originate from the LISA database provided by Statistics Sweden. The LISA database combines information from many different register databases, and include information such as age, gender, education, occupation, labor market participation, and

income. Since LISA covers the universe of individuals in Sweden, a person will exit our data only by emigration or dying.

The information on individuals' employment includes their work status in the month of November as well as some additional information, such as the number of days being unemployed during the rest of the year. Occupations are based on the *Swedish Standard Classification of Occupations* (*SSYK96*) which in turn is based on the *International Standard Classification of Occupations (ISCO-88).* Occupations in ISCO-88 and SSYK96 are grouped based on the similarity of skills required to fulfill the duties of the jobs. Appendix B provides details on the occupation classification. In the following analysis we consider four broad occupation categories: managers, professionals, operators, and clerks.[10]

3.2. Hiring Practices in Different Firm Types

We start by examining how hiring practices differ between firms with different export status. Based on the above theoretical framework, we classify firms by export participation: high, low, and non-exporting. The separation of firms by export participation is done yearly, and we compare the share of output exported by each firm with export shares of other firms within the same two-digit industry. Firms belong to the no export group if they have no exports. These firms are equivalent to the low-wage and medium-wage low-productivity firms in Davidson et al. (2020) (i.e., firms with productivity below ϕ_x in Appendix A Figure A1). Jobs in these firms provide workers with "basic experience" only. Firms with positive exports belong to the low export group if the share of output exported is below the industry median. These are the medium-wage, high-

[10] Based on ISCO-88, "managers" correspond to major group 1 (legislators, senior officials and managers), "professionals" correspond to major groups 2 (professionals) and 3 (technicians and associate professionals), "operators" correspond to major groups 7 (craft and related trades workers) and 8 (plant and machine operators and assemblers), and "clerks" correspond to major groups 4 (office clerks), 5 (service workers and shop and market sales workers), 6 (skilled agricultural and fishery workers), and 9 (elementary occupations).

productivity firms in Davidson et al. (2020) (i.e., those with productivity between ϕ_x and ϕ_h in Appendix A Figure A1). Firms belong to the high-export group if the share of output exported is above the industry median (the high-wage firms in Davidson et al. 2020, i.e., those with productivity above ϕ_h in Appendix A Figure A1).[11] Jobs in exporting firms provide an opportunity for workers to gain "international experience."

To test the first theoretical prediction regarding the differences between firms in the way that they build their workforce, we focus on how different firm types differ in their recruitment of workers from high-export firms, low-export firms, or non-exporting firms. Let h_{ft}^{g} be the number of hires by firm *f* in year *t* from group g, where $g = H, L, N$ represents the group of the high-export, low-export, and non-exporting firms, and where $g = U$ represents the pool of workers from all other sources, including the service sector, the public sector, newly graduated, unemployed, parental leave, immigration, etc. Let $TotalHire_{ft} = \sum_g h_{ft}^{g}$ be the total number of hires by firm *f* in year *t*. Since we are interested in the composition of hiring undertaken by different firm types, we use the share of hires from each group as the dependent variable. The regression equation for the hiring shares is as follows:

$$\frac{h_{ft}^{g}}{TotalHire_{ft}} = D_H + D_L + X_{ft}\beta + D_s + D_t + \varepsilon_{ft} \qquad (1)$$

where D_H and D_L are dummy variables indicating the type of firm *f* (for example, $D_H = 1$ if firm f belongs to the high-export group, and $D_H = 0$ otherwise), and non-exporting firms are the omitted category; X_{ft} is a vector of firm characteristics that may affect the labor demand by the

[11] We also experimented with alternative ways to group firms. For instance, we grouped firms according to their relative export intensities across rather than within industries. Moreover, we defined firms as the low export group if they have positive exports but an export share of output below 0.5, with firms belonging to the high-export group having positive exports and an export share above 0.5. The results are qualitatively similar and are available upon request.

specific firm, including firm age, labor productivity (value added per worker), and firm size (measured by total employment); D_s represents industry fixed effects used to control for industry specific demand shocks that may affect labor demand and industry specific comparative advantage that may lead to different distribution of firms within an industry; D_t represents year fixed effects used to control for macroeconomic shocks that may affect the overall labor market; and ε_{ft} is the error term that captures all the unobserved factors that may affect the hiring decisions by firm *f* in year *t*. To allow for within-firm correlation over time, standard errors are clustered at the firm level.[12] Our main interest is on D_H and D_L, which capture the conditional mean differences between firm types in their recruiting strategies.

Our regression sample includes all firms and workers in the entire manufacturing sector for firms with at least 10 employees. A recruitment is defined as a worker who is employed in a firm in year *t* (November) but not in year *t-1* (November). Hence, a worker who is recruited in year *t* is linked to the characteristics of the previous employer in year *t-1*.

3.3. Trade Openness and Worker Mobility

As outlined above, the Davidson et al. (2020) model predicts that under certain conditions, increased trade openness raises upward mobility for certain occupations and reduces downward mobility, regardless of occupation. Thus, the second part of our analysis tests these predictions by examining how worker mobility across firms relates to increased trade openness at the industry level. To this end, we use the following specification:

$$Y_{st} = \gamma * TradeOpeness_{st} + D_s + D_t + \epsilon_{st} \qquad (2)$$

[12] If exporting at a firm in a given industry is correlated with exporting by other firms in that same industry, export status (i.e., non-exporters, low-exporters, or high-exporters) will be correlated by construction for all firms within industry. To account for the possible correlation of export status within industry, we have also clustered standard errors at the industry level. Our main results remain statistically significant. Those results are available upon request.

where Y_{st} is our variable of interest – worker mobility (its measurement is described below); $TradeOpeness_{st}$ is measured by industry export shares (defined as an industry's total exports as a share of total sales);[13] industry fixed effects D_s are included to capture industry-specific factors that may affect worker mobility; year fixed effects D_t are included to capture the effects of business cycles that are common to all the industries; and ϵ_{st} is the error term. This specification assumes that firms within an industry face common trade shocks. Positive trade shocks (e.g., a reduction in trade costs) can raise industry export shares by generating new entries into the export market and export expansion by established exporters. Thus, industry export shares help capture the impact of trade shocks on the distribution of firms within the industry.[14] The coefficient γ is identified by within-industry over-time variation in export shares and worker mobility.[15] It can be interpreted as to what extent changes in worker mobility are associated with changes of export shares within industries. The second theoretical prediction suggests $\gamma > 0$ for upward mobility and the third prediction suggests $\gamma < 0$ for downward mobility. To allow for within-industry correlation over time, standard errors are clustered at the industry level.

To capture upward job mobility, we first divide firms in each industry into groups based on export intensity. Our base case again divides firms into non-exporters, low export firms, and

[13] We have also used industry tariffs on Swedish exports to capture trade openness. The results are qualitatively similar to those when industry export shares are used. However, since around 70 percent of Swedish exports are to other EU countries and the variation in industry tariffs is relatively small, the estimates are less precise. These results are available upon request.

[14] As noted in Section 2, while lower trade costs lead to greater access to export markets, they also trigger more import competition. The expanded export opportunities make it easier for workers to gain international experience and this facilitates upward mobility. In contrast, import competition does not directly affect firms' hiring practices and has only a minor impact on worker mobility. The reason for this is that import competition only affects profits from domestic sales, which are most important for non-exporting firms. As a result, greater import competition affects the measure of active firms and the share of non-exporting firms that offer the low wage (as opposed to the medium wage) with only a small impact on the measure of firms that export. We therefore restrict our attention to the relationship between exporting and economic mobility in our empirical work.

[15] One would expect that a shock that lowers trade costs would move the economy towards a new steady state with greater economic mobility, and that the new higher level of mobility would be present all along the transition path to the new steady state. Our empirical analysis that relates the increase in mobility to the increase in openness over time potentially captures the changes occurring along the transition path toward a new steady state.

high export firms as defined above. We then refine the analysis by dividing firms into five or ten groups to better capture worker mobility across firms. Let i (and j) = 1, 2, …, k indicate the k different firm groups and number groups such that higher values correspond to higher export shares. Let M_{ijt} be the number of workers who move from a firm in the i group to firm in the j group as a share of all employees between $t-1$ and t.[16] We define the upward mobility index as $\sum_{ij} M_{ijt} \cdot (j-i)/(k-1)$ for $i < j$ where k is the number of firm groups and $j-i$ can be interpreted as the number of "rungs" by which workers ascend the job ladder.[17] This measure is bounded by 0 and 1. If no workers move upward during the period, the index equals zero. If all workers start at non-exporting firms in $t-1$ and move to high export firms in t, the index equals one. Thus, the index is larger when there is more upward mobility.

The downward mobility index is defined in a similar manner: $\sum_{ij} M_{ijt} \cdot (i-j)/(k-1)$ for $i > j$ where k is the number of firm groups and $i-j$ can be interpreted as the number of rungs by which workers descend the job ladder. Note that since many workers stay in the same firm group, the indices of upward and downward mobility do not sum up to one, and it is possible that both upward and downward mobility indexes may move in the same direction even within the same industry.

Firms are complex organizations with a large number of tasks that need to be carried out both for production and distribution. Firms employ workers in a wide variety of occupations to carry out these tasks and the wage distributions for different occupations are largely distinct. Thus, the most appropriate way to address the issues at hand might be to focus on workers in a particular occupation. Moreover, we expect international experience to be more valuable to exporters in

[16] For workers who moved across industries, industry affiliation is based on the industry where the workers ended up.
[17] This is a variant of the measure proposed by Bartholomew (1982).

occupations that play a major role in international commerce, such as professionals and managers. Therefore, in what follows for each industry we compute the upward/downward mobility index separately for professionals, managers, clerks and operators.

4. Empirical Results

As previously mentioned, our empirical investigations have two objectives. First, we want to examine how hiring patterns differ between firms with different export intensities or wages, and whether the hiring patterns also differ across occupations. Second, we want to study how worker mobility is associated with increased trade openness within industries.

4.1. Hiring Practices in Different Firm Types

4.1.1.Baseline Results

We examine hiring practices by estimating equation (1). The regression results are displayed in Table 1. Since non-exporters are the omitted group, the estimated coefficients reflect the mean difference in hiring shares between high- or low-export firms and non-exporters, after controlling for various firm characteristics, industry fixed effects, and year fixed effects. The constant terms reflect the baseline hiring shares by non-exporters in the Wood and Wood Product Manufacturing industry and in year 1998.[18]

Panel A reveals significant differences in hiring patterns across firms of different export intensities. Compared to non-exporters, both low- and high export firms have higher shares of recruitments from other exporters, and lower shares from non-exporters. As seen in columns 1-2, for low export firms, the share of recruits from low-export firms is 0.019 higher and the share from high-export firms is 0.039 higher, as compared to non-exporters. These estimates imply that out

[18] Recall that our data on workers and firms cover 1997-2013. When we look at firms' hiring patterns and worker mobility across firms, the first window for workers' transition between jobs is between 1997 and 1998, implying that 1998 is the first year for our measure of hiring shares and that 1998 is the omitted year.

of 100 new hires, low-export firms recruit about 6 more workers with international experience (those from other exporting firms). [19] The estimates for high-export firms suggest that out of 100 new hires, high exporters recruit about 8 more workers with international experience, as compared to non-exporters. Since high export firms are larger in size on average, the results imply that high-export firms recruit the largest number of workers with international experience. The results further imply that international experience is valued more by exporters than by non-exporters, and that the demand for international experience is even higher by high export firms.

--Table 1--

In the conceptual framework in Davidson et al. (2020) summarized in Section 2, firm-specific wages and export status are related: all high-wage firms and some of the medium-wage firms are engaged in export activities, while none of the low-wage firms export. Thus, we use an alternative firm classification based on average firm wages. We define low-, medium-, and high-wage firms as corresponding to whether they are in the lowest, middle, or highest third of the wage distribution in an industry.

In panel B we examine how the hiring patterns differ between firms that pay different wages. It shows that poaching from exporters is highest for high wage firms, and lowest for low wage firms (the omitted category). As an example, in comparison to low wage firms, high- and medium wage firms have 6 and 2.3 percentage points higher shares of recruitments from high export firms (see panel B column 1). Given the positive correlation between firm wages and export status, these hiring patterns align well with those reported in panel A. On the other hand, differing from panel A, column 3 in panel B shows that high- and medium wage firms have higher share of

[19] Recall that the hiring share is defined as the number of hires by a firm from a specific firm group as a share of the total number of new hires by that firm. Given the estimates in columns 1-2, out of 100 new hires, low-export firms would recruit (0.019+0.039)*100=5.8 more workers from low- or high-export firms, as compared to non-exporters.

recruits from non-exporters, as compared to low wage firms. This pattern may reflect the fact that the correlation between firm wages and export status is not perfect. In reality, some of the high- or medium-wage firms do not export, and thus international experience is not a key factor in hiring decisions at those firms. This result further implies that the demand for international experience is closely related to export intensity rather than wages.

Overall, the hiring patterns displayed in Table 1 suggest that the hiring strategies differ significantly across firm types by export participation and by firm wages. Compared to non-exporters, exporting firms have a higher share of recruitments from other exporters. In contrast, non-exporters have a higher share of recruitments from other non-exporting firms.

4.1.2.Results by Occupations

The key mechanism of the Davidson et al. model is that jobs in low export firms offer an opportunity for workers to gain international experience and experienced workers at low export firms are poached by high exporters to reduce their trade costs. Since international experience is likely to be more important for some worker categories than for others, in Table 2 we study hiring practices separately for four broad occupation categories: managers, professionals, clerks, and operators. Let h_{fto}^{g} be the number of hires in occupation category *o* by firm *f* in year *t* from group g, where $g = H, L, N$ represents the group of the high-export, low-export, and non-exporting firms. We replace the dependent variable in equation (1) with $h_{fto}^{g} / TotalHire_{ft}$. Given that $\sum_o h_{fto}^{g} = h_{ft}^{g}$, we can interpret the estimated difference in hiring shares reported in Table 2 as a decomposition of the corresponding estimate for all occupations in Table 1 into the four occupation categories.[20]

[20] Since the information on occupations is available for 2001-2013, the number of observations in Table 2 is smaller than that in Table 1 where the sample is for 1997-2013.

In panels A and B, we look at the difference between firms of different export intensity. Consistent with those seen from Table 1, both high- and low-export firms have a lower share of recruits from non-exporters for all occupation categories except for managers. Moreover, columns 1 and 4 show that for all occupation categories, high export firms recruit more from other high exporters, compared to low export firms and non-exporters.

However, we also note the difference between managers/professionals and clerks/operators in the hiring by high exporting firms from low export ones. Panel A shows that the hiring share of managers and professionals from low-export firms by high-export firms is about 0.30 percentage points higher, as compared to non-exporters. In contrast, panel B suggests no significant difference between high export firms and non-exporters in their recruitment of clerks from low exporters, and high export firms have a lower hiring share of operators from low exporters, as compared to non-exporters. One explanation for the different recruiting patterns for professionals/managers versus clerks/operators is that international experience is more important for professionals and managers whose skills are more essential for the operation of international businesses.

--Table 2--

Panels C and D report the corresponding results for firms of different average wages. The estimates in panel C suggest that in comparison with low wage firms, high wage firms tend to recruit managers and professionals from high export firms. However, differing from the panel A results, high-wage firms have relatively high recruitment shares of managers and professionals from both low-export firms and non-exporters. In contrast, we do not find such a pattern for clerks

or operators (see panel D). Again, we observe that international experience is more relevant for managers and professionals.

In sum, Table 2 suggests that hiring patterns differ across occupations. We find suggestive evidence for a higher hiring share of managers and professionals by high export firms from low export firms, but no such evidence for clerks or operators. Since international experience is more important for managers and professionals than for clerks or operators in the operation of international businesses, our result provides support for the key mechanism of the Davidson et al. model that jobs in low-export firms provide workers in occupations that are important for international commerce (mainly managers and professionals) with opportunities to obtain international experience, and high exporters reduce their trade costs by recruiting experienced workers from low export firms.

These hiring patterns might shed light on the mechanism behind the result in Davidson et al. (2014) that the degree of positive assortative matching between firms and workers increases with openness. As workers move up the jobs ladder, they gain more skills and become more valuable to their employer. Since openness increases the rate at which workers move up the jobs ladder, the rate at which high productivity firms (exporters) match with high quality workers (those with international experience) rises. Thus, our results are consistent with our 2014 paper and our analysis may be viewed as an alternative explanation of increased labor market sorting driven by globalization.

Our results also imply that international experiences and skills are embodied in workers and may not be immediately transmitted to the firm. Thus, exporters need to continuously hire workers with international experience in order to serve their export market. This perpetual demand by exporters for international experience can offer opportunities for skilled workers to move

upward to firms that export more and pay more. On the other hand, our results do not seem to support the alternative hypothesis that a firm needs workers with international experience to start exporting and will not need to hire such workers once it has started to export since at that stage the firm has accumulated the knowledge of its previously hired workers. If this hypothesis were true, one would expect that compared to other firms, high exporters might have less incentives to hire workers with international experience. Apparently, this is inconsistent with the results seen in Tables 1-2.

4.1.3.Robustness

Next, we examine whether the above results for hiring patterns are robust to alternative measures of recruiting firms and of workers' international experience. In Table 3 recruiting firms are characterized by firm export as a share of total sales (a continuous measure). Panel A, columns 1-3 show that as firm export shares increase, the share of recruits from high export firms rises while the share of recruits from low export firms and non-exporters falls, indicating that firms with a higher export intensity tend to poach workers with more international experience. Panels B-E compare the four broad occupation categories. The results in columns 1-3 suggest that firms with higher export intensities have a significantly higher share of recruits of managers and professionals from high export firms. On the contrary, there is no effect of export intensities on recruitments of clerks and operators.

In addition to hiring shares, we construct an index to capture the recruitment profile at the firm level. Our index for firm *f* at time *t* is constructed as:

$$Recruitment\ Index_{ft} = \sum_{i=1}^{n} \left(\frac{h_{fti}}{Total\ Hire_{ft}} \right) X_{it}$$

where h_{fti} is the number of hires by firm *f* from firm *i* at time *t* and X_{it} is the export intensity (exports as a share of total sales) of firm *i* at time *t*. Unlike hiring shares, this index captures the variation of export intensities within the same group of poached firms. If workers obtain more international experience by working for firms with a higher export intensity, this recruitment index can be interpreted as an average of international experience embodied in new hires.

In column 4 the dependent variable is replaced with this recruitment index. The positive coefficients suggest that firms with a higher export share tends to poach workers with more international experience. The estimated coefficients for managers and professionals are two to six times of those for operators and clerks. Overall, the results in columns 1-4 are consistent with the hiring patterns presented in Tables 1-2.

--Table 3--

Although our specification has controlled for a rich set of firm characteristics that may affect demand for workers with different skills, there are still concerns about unobserved firm characteristics (e.g., firm-level productivity shocks) that may be correlated with firm export shares and hiring patterns. To address the potential endogeneity problem with the OLS estimates shown in columns 1-4, we construct instruments that are positively correlated with firm export shares, but do not directly affect hiring. Following Hummels et al. (2014) and Davidson et al. (2017), we instrument for firm export shares using the weighted averages of world import demand (WID). Specifically, for firm *f* in year *t*, it is computed as:

$$WID_{ft} = \sum_{cg} ts_{fcg,t-1} * WID_{cgt},$$

where WID_{cgt} is country c's total purchases of product *g* (at the 6-digit HS level) from the world market (less purchases from Sweden) in year *t* and $ts_{fcg,t-1}$ is the share of firm *f*'s export of

product g to country c in firm f's total export in year $t-1$.[21] There is rich variation in WID_{cgt} across partner countries and across products. Changes in WID_{cgt} may stem from changes to trade costs or shifts of demand for product g by country c. These shocks to world import demand are external to Swedish firms and unlikely to be correlated with unobserved firm characteristics (e.g., productivity shocks) that may affect the firm-level hiring decisions. At the same time, because Swedish firms are specialized in different products and export to different destinations, a given demand shock to foreign buyers can have substantially different impacts across Swedish firms, even within the same industry. Using trade shares $ts_{fcg,t-1}$, the instrument WID_{ft} aggregates shocks to world demand conditions up to the firm level and it has significant variation across firms. Thus, in our IV estimation, treatment is shocks to foreign demand for a firm's export product. In addition, with lagged trade shares as weights, our instrument is unaffected by contemporaneous shocks to technology that can affect both the types of exports and hiring decisions at the firm level. Using lagged trade shares slightly reduces the number of observations.

The first stage regression reveals a strong partial correlation of WID_{ft} and firm export shares. The estimated coefficient on WID_{ft} is 0.0396 (t = 25.12). The first stage F-statistic for testing the hypothesis that WID_{ft} is uncorrelated to firm export shares is 630.8, which is well above the critical value of 16.38 for the weak instrument test at a 5% significance level when the maximum TSLS size distortion is no more than 10% (Stock and Yogo 2005, Table 2).

The second stage estimates reported in columns 5-8 confirm the hiring patterns shown above. For example, the estimated coefficients on firm export shares in column 5 remain significantly positive for managers and professionals. Furthermore, the positive coefficient on firm export shares is about twice as large as that of OLS estimates. This suggests that the observed

[21] World import demand (WID) is constructed using COMTRADE bilateral trade data.

positive association between export shares and shares of recruits from high-export firms is not driven by reverse causality (or simultaneity) since the OLS estimates would be biased upward if a higher share of workers with international experience makes it easier for firms to export more. The larger IV estimates also suggest that the observed positive correlation between exports and recruitments from high exporters is not due to some omitted variables (e.g., firm productivity shocks) that are positively correlated with both exports and recruits with international experience because such a positive shock would imply an upward bias of the OLS estimates. On the other hand, the OLS estimates could be biased downward toward zero due to measurement errors in export shares. One possible source of measurement errors in export shares could arise from the fact that small trade flows to the EU are not included. The IV approach can solve the problem of attenuation bias, leading to larger estimates. Furthermore, it is important to note that the IV estimates capture the average effect of export shares on the recruitment of workers with international experience for the subsample of firms that exported more because of the positive world import demand shocks but would not have exported more otherwise (e.g., see Imbens and Angrist 1994 for discussions about the local average treatment effect). It is possible that the effect of export shares is stronger for this subsample of firms ("compliers") than for other firms.

There are concerns that exporters may cluster in certain regions, making it easier to poach from other exporters due to proximity and local networks. The hiring pattern seen in our tables may reflect the fact that workers move through the geographically concentrated network of exporting firms. To address this concern, we include region dummies for the poaching firms to absorb the effect of geographical clustering of exporters on firm hiring. The results are shown in Appendix C Table A1, where regions are classified by Swedish municipalities. Compared to Table 3, adding region dummies makes no change to the result, suggesting that the hiring pattern revealed

in Tables 1-2 is unlikely driven by the effect of export clusters in certain regions. We also obtain similar results when regions are grouped at more aggregate levels, such as by Swedish counties.

We also run regressions with firm fixed effects to control for constant unobserved firm characteristics. The identification relies on within-firm over time variation in hiring shares and export shares. Thus, the estimates with firm fixed effects can tell us how hiring strategies may change over time within a firm when its export share rises. The results are reported in Appendix C Table A2. The estimated coefficients on firm export shares become smaller and less significant than those reported in Table 3. Note that since both our dependent variable and export shares are normalized, they do not change much over time. As a result, compared to the overall variation in hiring shares and export shares, the within-firm variation is relatively small, potentially leading to larger standard errors and smaller coefficients for the model with firm fixed effects. With firm fixed effects, measurement errors can also amplify and reduce estimation precision.

On the other hand, the larger and more significant estimates seen in Table 3 suggest that the results without firm fixed effects are primarily driven by the cross-firm variation in hiring shares and export shares, rather than by the within-firm over-time variation. Those estimates should be interpreted as to what extent hiring strategies differ across firms with different export shares. This interpretation is consistent with the theoretical framework in which the key mechanism works through worker sorting between different firms that adopt different hiring strategies based on their level of export activities.

In sum, we find that the main results reported in Tables 1-2 are robust to alternative measures of recruiting firms and workers' international experience. Firms with higher export intensities tend to hire more workers with international experience. These results provide further supporting evidence for the key mechanism of the Davidson et al. model (2020) that international

experience gained by working at exporting firms can help workers (mainly managers and professionals) climb up the job ladder to firms that export more and pay more.[22]

Below we investigate the issue of economic mobility from the perspective of workers and examine to what extent worker mobility between different firms is shaped by increased trade openness within industries.

4.2. Trade Openness and Worker Mobility

As described in the theoretical framework above, globalization leads to a shift of the distribution of firms toward more export activities, thus raising the demand for workers with international experience, and promoting upward mobility to firms that export more and pay more. In the following we continue by looking in more detail at worker mobility, and in particular how mobility is affected by increased openness.

We begin by noting that a relatively small amount of mobility could be an artifact of the coarse tripart classification of firm types. We therefore expand the analysis by re-classifying firms into five or ten groups based on their export intensities. We also use a continuous measure of worker mobility that compares the export intensities between the poaching firm and the poached firm. Furthermore, considering above results, we anticipate that the relationship between trade openness and worker mobility should be stronger for professionals and managers. Thus, below we present regression results for equation (2) separately by broad occupational categories.

Table 4 presents the industry-level evidence for the link between trade openness and upward mobility – worker movement from firms that do not export (or export less) to the firms that export (or export more). The estimates in panels A-C in column 1 (based on three firm groups)

[22] The theoretical framework also suggests that firms with higher export intensities may pay a larger wage premium to workers with international experience. Since our focus is on hiring practices and job mobility, we are not exploring this interesting implication in the paper.

suggest a statistically significant positive correlation between increased industry export shares and upward mobility for professionals and managers. In contrast, the results in panels D-E column 1 do not suggest any significant link between increased openness and upward mobility for clerks or operators. Column 2 displays a similar pattern when firms are divided into five groups in which the first group still consists of non-exporters, and the other four groups are based on quartiles of the distribution for firm export shares. Finally, allowing for ten firm groups does not alter our results (column 3).

One way to gauge the magnitude of our estimates is to translate the effect on upward mobility in terms of predicted changes in the share of workers that would climb up the job ladder by one rung in response to increased trade openness. Recall that the upward mobility index is defined as $\sum_{ij} M_{ijt} \cdot (j-i)/(k-1)$ for $i < j$, where M_{ijt} is the number of workers who move from a firm in the i group to a firm in the j group as a share of all employees in a specific occupation, k is the number of firm groups, and $j - i$ is the number of rungs by which workers move up the job ladder. To facilitate the interpretation of the results, we suppose all upward movers climb up the job ladder by one rung, i.e., $j - i = 1$. In the case of three firm groups (k = 3), this entails movement from non-exporters to low-export firms, or from low-export to high-export firms. Given the estimate of 0.0154 in panel C, column 1, a 10 percentage points increase in industry export shares is associated with 0.154*(3–1) = 0.31 percentage points increase in the share of managers and professionals who move from non-exporters to low-export firms or from low- to high-export firms.

Turning to a finer classification of firm types, we expect to detect more upward mobility. For example, the estimates in panel C, column 2 suggests that a 10 percentage points increase in

industry export shares is associated with 0.191*(5−1) = 0.76 percentage points increase in the share of managers and professionals who move upward to firms with an export share at a higher quartile.

--Table 4--

An alternative way to capture upward mobility is to use the share of workers (relative to all employees) who move up to firms that have a larger export share compared to the worker's previous employer. As shown in panel A columns 4-5, for managers a 10-percentage point increase in industry export shares is associated with a 4 percentage point increase in the share of workers who move up to firms that have a higher export share compared to the worker's previous employer. In contrast, in panels D and E columns 4-5 we again find no evidence for a link between industry export expansion and upward mobility for clerks or operators.

There are concerns about omitted procyclical factors that may increase both industry export shares and worker mobility. To deal with the potential endogeneity problem, we construct an instrument for industry export shares by aggregating the world import demand up to the industry level.[23] Here, treatment is an export shock caused by an increase in foreign demand for the products in a specific industry. This instrument is not as strong as the above firm-level instrument because of fewer observations and less variation.[24] The second stage IV estimates are reported in columns 6-7. To save space, we only report the results when the upward mobility index is computed based on three firm groups or when the extent of upward mobility is measured by the

[23] Specifically, we compute the world import demand faced by industry *s* in year *t* as $WID_{st} = \sum_{cg} ts_{scg} * WID_{cgt}$, where WID_{cgt} is country c's total purchases of product *g* (at the 6-digit HS level) from the world market (less purchases from Sweden) in year *t* and ts_{scg} is the share of export of product *g* by industry *s* to country *c* in total export by industry *s*. Thus, the instrument WID_{st} captures the fluctuations in world demand conditions that are time varying and specific to industry *s*. Trade shares for the pre-sample year (1997) are used to aggregate trade shocks at the industry level.

[24] In the first stage regression the estimated coefficient on WID_{st} is 0.0823 (*t* = 4.14). The first stage *F*-statistic for testing the hypothesis that WID_{st} is unrelated to industry export shares is 17.18.

share of workers who move to firms that have a larger export share compared to the worker's previous employer. Unlike the firm-level IV results shown in Table 3, the IV estimates displayed in columns 6-7 are largely statistically insignificant. However, it is also clear that the IV coefficients are similar to their OLS counterparts, but with larger standard errors.

As described in Davidson et al. (2020), downward mobility can happen if workers shirk, leading to deterioration of skills. Globalization increases the expected loss in earnings from shirking and thus reduces the incentive to shirk. As a result, we expect a negative relationship between openness and downward mobility. Moreover, since globalization increases inequality for all occupations, we would expect this link to be present in all occupational categories. In Table 5 we find some suggestive evidence for such a negative relationship between industry export shares and downward mobility: most estimated coefficients have negative signs.

--Table 5--

To examine the robustness of our results, we use the number of all movers rather than the number of all employees as the denominator when constructing measures of worker mobility. Table 6 displays the estimates that use these alternative measures. Consistent with Table 4, the relationship between upward mobility and industry export share remains significantly positive for professionals and managers. The results for downward mobility confirm the pattern revealed in Table 5. In particular, the estimates in panel C columns 9-10 for professionals and managers suggest that a 10 percentage point increase in industry export shares is associated with a 10.5 percentage point decrease in the share of workers (relative to all movers) who move downward to firms that export less compared to the worker's previous employer, and a 12.9 percentage point decrease in the share of workers who move down to firms that export 10 percentage points less

than the worker's previous employer. We also find a negative relationship between trade openness and downward mobility for clerks and operators. The estimates in panels D-E, column 10 are of a similar magnitude to those for professionals and managers, although they are less statistically significant.

Overall, we find strong suggestive evidence for a link between increased trade openness and upward worker mobility for professionals and managers. On the other hand, there is little evidence for such a link for clerks or operators. In contrast, we find some suggestive evidence for a link between increased trade openness and downward mobility for *all* workers. These results are consistent with Davidson et al. (2017) who find that increased trade increases the demand for high skilled workers, mainly professionals and managers. These results also provide support for the main prediction of Davidson et al. (2020) that increased openness increases upward mobility for workers in occupations that play an essential role in the operation of international businesses. As the distribution of firms changes with increased globalization, the fraction of firms that demand more professionals and managers rises, providing more opportunities for professionals and managers to gain international experience and move up the jobs ladder. Finally, these results also provide support for the Davidson et al. (2020) conjecture that increased openness should decrease downward mobility for all workers.

5. Concluding Remarks

Globalization affects firms in many different ways. One consequence of falling trade costs is that more firms will export and those that were already exporting will export even more. This in turn has consequences for workers: more workers will learn about international business practices, gaining skills that are valuable for other exporters. Our recent research (Davidson et al. 2020) builds a theoretical model that connects globalization, firm recruiting strategies, and worker

mobility. The model predicts that (1) firms with different levels of export activities will use different recruiting strategies, with high-export firms hiring workers from low-export firms and non-exporters hiring from other non-exporters or from the pool of inexperienced; (2) increased trade openness raises upward mobility for workers in occupations that play a major role in international commerce, such as professionals and managers; and (3) increased trade openness reduces downward mobility for workers in all occupations.

In this paper we tested these theoretical predictions by using matched Swedish employer-employee data for the period 1997-2013. When we examine the recruiting strategies of firms, we find that firms with high export intensity largely recruit workers from other exporting firms. In contrast, firms that do not export tend to recruit workers from other non-exporting firms. We also find that compared to non-exporters, the share of recruitments from low-export firms by high-export firms is relatively high for managers and professionals, but not for clerks or operators.

We continued our analyses by examining how worker mobility is affected by increased trade openness within industries. We find suggestive evidence that upward mobility (e.g., from low-export firms to high-export firms) is positively related to increased trade openness for professionals and managers, with no such a link for clerks and operators. We also find some weak evidence that downward mobility is negatively associated with increased trade openness, with this link holding for all workers, regardless of occupation.

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Appendix A: Falling trade costs and upward mobility

To see how falling trade costs impacts upward economic mobility at the bottom of the job ladder, we begin by noting that to make it to the top of the jobs ladder, a worker needs to secure a job with a medium-wage exporter in order to gain international experience. The impact of globalization on the group of medium-wage firms can be explained using Figure A1. Firms with $\phi \in [\phi_\ell, \phi_h]$ offer a medium-level wage, with those with $\phi \geq \phi_x$ exporting a proportion of their output. Low-wage firms are those with $\phi < \phi_\ell$, while high-wage firms have $\phi > \phi_h$. As noted in Section 2, a reduction in trade costs increases import competition and reduces what firms earn from domestic sales, harming non-exporters. This causes ϕ_ℓ to rise, with low-productivity medium-wage firms switching status to low-wage firms. The lower trade costs also make it easier to export, so that high-productivity medium-wage firms switch and become high-wage firms – that is, ϕ_h falls. Since the distance between ϕ_ℓ and ϕ_h shrinks, there are fewer medium-wage firms. The impact on the availability of jobs with medium-wage exporters, which depends on the distance between ϕ_x and ϕ_h, is not as clear. This is because non-exporters with productivity just below ϕ_x become exporters, causing ϕ_x to fall, which implies that the impact on $\phi_h - \phi_x$ is ambiguous. As we note in the text, in Davidson et al. (2020) we calibrate our model using US data and we find that for all relevant values of the model's parameters this value increases, so that more jobs at medium-wage exporters are available and upward economic mobility at the low end of the jobs ladder rises as well.

--Appendix A Figure A1--

Appendix B: Occupation classification

Occupations in our data are based on the *Swedish Standard Classification of Occupations* (*SSYK96*) which in turn is based on the *International Standard Classification of Occupations (ISCO-88).* SSYK96 and ISCO-88 are more or less identical at the 3-digit level with only a few exceptions. A conversion key between SSYK96 and ISCO88 are available at Statistics Sweden: http://www.scb.se/Grupp/Hitta_statistik/Forsta_Statistik/Klassifikationer/_Dokument/oversattningsnyckel.pdf.

In the context of ISCO-88 and SSYK96 a "job" is defined as "a set of tasks and duties which are (or can be assigned to be) carried out by one person." Occupations are grouped and aggregated on the basis of the similarity of skills required to fulfill the tasks and duties of the jobs (Hoffmann, 2004). Detailed descriptions of occupations can be seen from the *International Labor Organization* website: http://www.ilo.org/public/english/bureau/stat/isco/isco88/major.htm. As shown in Table 1 in Hoffmann (2004), Managers, Professionals, and Technicians require higher skill levels, and Clerks, Sales and service workers, Craft, Operators, and Laborers require lower skill levels.

Appendix C: Additional robustness results

Below we present two additional robustness checks of the results reported in Table 3. See Section 4.1.3 for more details.

--Appendix C Table A1--

--Appendix C Table A2--

TABLE 1 Hiring practice by different firm types

	Hire from high-export firms	Hire from low-export firms	Hire from non-exporters
	(1)	(2)	(3)
Panel A: Hiring by firms of different export intensity			
High export firms	0.0736***	0.0008	-0.0639***
	(23.70)	(0.36)	(-20.23)
Low export firms	0.0386***	0.0187***	-0.0414***
	(14.41)	(8.26)	(-13.76)
Constant term	0.0345***	0.0455***	0.171***
	(5.83)	(10.11)	(27.94)
R-squared	0.049	0.015	0.043
Panel B: Hiring by firms of different average wages			
High wage firms	0.0600***	0.0380***	0.0341***
	(23.03)	(18.39)	(12.75)
Medium wage firms	0.0234***	0.0159***	0.0136***
	(10.53)	(8.74)	(5.62)
Constant term	0.0338***	0.0490***	0.158***
	(5.75)	(11.10)	(26.03)
R-squared	0.048	0.018	0.039

NOTES: This table examines hiring patterns by different firm types. In panel A, firms are classified into three groups based on export-to-sales ratios. High export firms are those with an export-to-sales ratio above the industry median of exporting firms and low export firms are those with an export-to-sales ratio below the industry median. Non-exporters are the omitted category. The constant term reflects the baseline hiring shares by non-exporters in the Wood and Wood Product Manufacturing industry and in year 1998. In panel B, firms are separated into three groups based on the average wage for each firm. High-, medium-, and low-wage firms are defined as corresponding to whether they are in the highest, middle, or lowest third of the wage distribution in an industry. Low wage firms are the omitted category. The constant term reflects the baseline hiring shares by low wage firms in the Wood and Wood Product Manufacturing industry and in year 1998. In columns 1-3, the dependent variable is the share of hires (in terms of total hirings) from high-export firms, low-export firms, and non-exporters, respectively. All regressions include controls for firm characteristics that may affect the labor demand by the specific firm, including firm age, labor productivity (value added per worker), firm size (measured by total number of employment). Both industry fixed effects and year fixed effects are also included. See Section 3.2 for more details about the specification. The number of observations in all regressions is 94,152. Standard errors are clustered at the firm level. In the parenthesis are *t*-ratios. (*), (**), and (***) denote statistical significance at the 10%, 5% and 1% level, respectively.

TABLE 2 Hiring practice by firm types and by occupations

	Hire from high-export firms	Hire from low-export firms	Hire from non-exporters	Hire from high-export firms	Hire from low-export firms	Hire from non-exporters
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Hiring of managers or professionals by firms of different export intensity						
	Managers			Professionals		
High export firms	0.0127***	0.0030***	0.0006	0.0314***	0.0031**	-0.0124***
	(13.21)	(4.75)	(0.67)	(18.61)	(2.35)	(-6.60)
Low export firms	0.0053***	0.0042***	0.0007	0.0146***	0.0038***	-0.0095***
	(6.33)	(6.80)	(0.87)	(10.53)	(3.01)	(-5.59)
Panel B: Hiring of clerks or operators by firms of different export intensity						
	Clerks			Operators		
High export firms	0.0115***	0.0016	-0.0077***	0.0230***	-0.0080***	-0.0497***
	(10.21)	(1.50)	(-4.75)	(10.18)	(-4.54)	(-18.59)
Low export firms	0.0080***	0.0043***	-0.0061***	0.0194***	0.0047***	-0.0303***
	(7.80)	(4.18)	(-3.93)	(9.27)	(2.60)	(-11.49)
Panel C: Hiring of managers or professionals by firms of different average wages						
	Managers			Professionals		
High wage firms	0.0104***	0.0053***	0.0068***	0.0316***	0.0224***	0.0273***
	(11.67)	(8.29)	(8.34)	(21.35)	(18.70)	(18.25)
Medium wage firms	0.0034***	0.0027***	0.0018***	0.0115***	0.0076***	0.0087***
	(4.72)	(4.86)	(2.71)	(9.71)	(7.82)	(6.89)
Panel D: Hiring of clerks or operators by firms of different average wages						
	Clerks			Operators		
High wage firms	0.0005	-0.0016*	-0.0080***	-0.0132***	-0.0107***	-0.0181***
	(0.48)	(-1.73)	(-5.64)	(-6.95)	(-7.08)	(-8.05)
Medium wage firms	-0.0007	-0.0017*	-0.0059***	0.0009	-0.0010	-0.0020
	(-0.78)	(-1.88)	(-4.25)	(0.49)	(-0.63)	(-0.94)

NOTES: This table examines hiring patterns by firm types and worker occupations. In panels A and B, firms are classified into three groups based on export-to-sales ratios. High export firms are those with an export-to-sales ratio above the industry median of exporting firms and low export firms are those with an export-to-sales ratio below the industry median. Non-exporters are the omitted category. In panels C and D, firms are separated into three groups based on the average wage for each firm. High-, medium-, and low-wage firms are defined as corresponding to whether they are in the highest, middle, or lowest third of the wage distribution in an industry. Low wage firms are the omitted category. In columns 1-3 (or columns 4-6), the dependent variable is the share of hires (in terms of total hirings) from high-export firms, low-export firms, and non-exporters, respectively. All regressions include controls for firm characteristics that may affect the labor demand by the specific firm, including firm age, labor productivity (value added per worker), firm size (measured by total number of employment). Both industry fixed effects and year fixed effects are also included. See Section 3.2 for more details about the specification. The number of observations in all regressions is 67,990. Standard errors are clustered at the firm level. In the parenthesis are *t*-ratios. (*), (**), and (***) denote statistical significance at the 10%, 5% and 1% level, respectively.

TABLE 3 Hiring practice: Robustness

	OLS				IV			
	Hire from high-export firms	Hire from low-export firms	Hire from non-exporters	Recruit. Index	Hire from high-export firms	Hire from low-export firms	Hire from non-exporters	Recruit. Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All occupations								
Firm export share	0.0478***	-0.0339***	-0.0375***	0.0616***	0.1101***	-0.0389**	-0.0700***	0.0943***
	(8.06)	(-7.95)	(-7.10)	(14.84)	(5.18)	(-2.37)	(-3.42)	(6.47)
R-squared	0.024	0.013	0.027	0.051	0.020	0.013	0.025	0.049
Panel B: Managers								
Firm export share	0.0130***	-0.0030**	0.0001	0.0346***	0.0266***	-0.0014	0.0018	0.0475***
	(7.30)	(-2.56)	(0.06)	(9.20)	(4.64)	(-0.31)	(0.38)	(3.78)
R-squared	0.015	0.005	0.006	0.089	0.013	0.005	0.006	0.089
Panel C: Professionals								
Firm export share	0.0285***	-0.0006	0.0025	0.0499***	0.0457***	0.0010	0.0050	0.0721***
	(9.12)	(-0.28)	(1.01)	(12.55)	(4.34)	(0.12)	(0.55)	(5.41)
R-squared	0.056	0.030	0.042	0.093	0.055	0.030	0.042	0.091
Panel D: Clerks								
Firm export share	-0.0006	-0.0050***	-0.0064***	0.0083***	-0.0031	-0.0120*	-0.0104	-0.0058
	(-0.35)	(-3.12)	(-2.87)	(2.95)	(-0.44)	(-1.92)	(-1.17)	(-0.57)
R-squared	0.009	0.008	0.022	0.026	0.009	0.007	0.022	0.025
Panel E: Operators								
Firm export share	-0.0048	-0.0207***	-0.0305***	0.0211***	-0.0022	-0.0256***	-0.0692***	0.0237*
	(-1.40)	(-8.94)	(-8.80)	(5.32)	(-0.18)	(-2.59)	(-5.10)	(1.74)
R-squared	0.032	0.018	0.052	0.029	0.032	0.018	0.048	0.029

NOTES: This table examines hiring patterns across firms with different export shares (i.e., firm export as a share of total sales). In columns 1-3 and 5-7, the poached firms are classified into three groups based on export-to-sales ratios. High export firms are those with an export-to-sales ratio above the industry median of exporting firms and low export firms are those with an export-to-sales ratio below the industry median. The dependent variable is the share of hires (in terms of total hirings) from high-export firms, low-export firms, and non-exporters, respectively, in columns 1-3 and 5-7. In columns 4 and 8, the dependent variable is a recruitment index defined as a weighted average export share of poached firms where the weights are the share of new hires from the poached firm. This recruitment index is higher if a larger share of workers is recruited from firms that export more. It is used to capture international experience embodied in new hires. All regressions include controls for firm characteristics that may affect the labor demand by the specific firm, including firm age, labor productivity (value added per worker), firm size (measured by total number of employment). Both industry fixed effects and year fixed effects are also included. Columns 5-8 report the second stage of IV estimates where firm export share is instrumented by the firm-specific world import demand shock (WID). In the first stage regression, the estimated coefficient on WID is 0.0396 (t=25.12). The first stage F-statistic for testing the hypothesis that WID is uncorrelated with firm export share is 630.8. See Section 3.2 for more details about the specification. The number of observations in all regressions is 41,810. Standard errors are clustered at the firm level. In the parenthesis are t-ratios. (*), (**), and (***) denote statistical significance at the 10%, 5% and 1% level, respectively.

TABLE 4 Upward mobility and trade openness

	OLS					IV	
	3 firm groups	5 firm groups	10 firm groups	Up >0%	Up >10%	3 firm groups	Up >0%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Managers							
Industry export share	0.0148	0.0187**	0.0177**	0.0424**	0.0459***	0.0114	0.0541
	(1.70)	(2.70)	(2.74)	(2.19)	(3.23)	(0.77)	(1.17)
R-squared	0.23	0.20	0.21	0.28	0.32	0.23	0.28
Panel B: Professionals							
Industry export share	0.0134*	0.0173**	0.0125	-0.0016	0.0022	0.0295	-0.0117
	(1.88)	(2.21)	(1.24)	(-0.05)	(0.07)	(1.32)	(-0.17)
R-squared	0.27	0.22	0.22	0.23	0.28	0.26	0.23
Panel C: Professionals and managers							
Industry export share	0.0154**	0.0191**	0.0151*	0.0121	0.0179	0.0208	0.0030
	(2.36)	(2.91)	(1.89)	(0.54)	(0.79)	(1.26)	(0.05)
R-squared	0.27	0.22	0.22	0.22	0.28	0.27	0.22
Panel D: Clerks							
Industry export share	-0.0132	-0.0022	-0.0037	-0.0487	-0.0406	0.0060	0.0259
	(-0.80)	(-0.29)	(-0.55)	(-0.91)	(-0.84)	(0.43)	(0.44)
R-squared	0.20	0.21	0.20	0.18	0.19	0.19	0.17
Panel E: Operators							
Industry export share	0.0134	0.0122	0.0109	0.0112	0.0176	0.0149	0.0662
	(1.62)	(1.40)	(1.37)	(0.38)	(0.69)	(0.72)	(1.40)
R-squared	0.38	0.34	0.36	0.26	0.35	0.38	0.24

NOTES: This table examines the link between upward mobility and trade openness at the industry level. Industry export share is computed as an industry's total exports as a share of total sales. In columns 1 and 6, upward mobility is defined as $\Sigma_{ij} M_{ijt}(j-i)/(k-1)$ for $i < j$ where i (and j) = 1, 2, 3 indicate, respectively, the group of non-exporters, low export firms (those with export-to-sales ratios below the industry median), and high export firms (those with export-to-sales ratios above the industry median); M_{ijt} is the number of workers who move from a firm in the i group to another firm in the j group as a share of all employees in a specific occupation category between t and t-1; and k is the number of firm groups. In column 2, firms are divided into 5 groups in which the first group consists of non-exporters, and the other four groups are based on quartiles of the distribution for firm export-to-sales ratios. In column 3, firms are separated into 10 groups. In columns 4 and 7, upward mobility is computed as the share of workers who move up to firms that have a larger export-to-sales ratio compared to the worker's previous employee. In column 5, upward mobility is computed as the share of workers who move up to firms that have a larger export-to-sales ratio by more than 10 percentage points compared to the worker's previous employee. All regression control for both industry fixed effects and year fixed effects. Columns 6-7 report the second stage of IV estimates where industry export share is instrumented by the industry-specific world import demand shock (WID). In the first stage regression, the estimated coefficient on the industry-specific world import demand shock is 0.0823 (t=4.14). The first-stage F-statistic for testing the hypothesis that WID is unrelated to industry export shares is 17.18. See Section 3.3 for more details about the specification. The number of observations in all regressions is 192. Standard errors are clustered at the industry level. In the parenthesis are t-ratios. ***, **, * show significance at the 1%, 5%, and 10% level, respectively.

TABLE 5 Downward mobility and trade openness

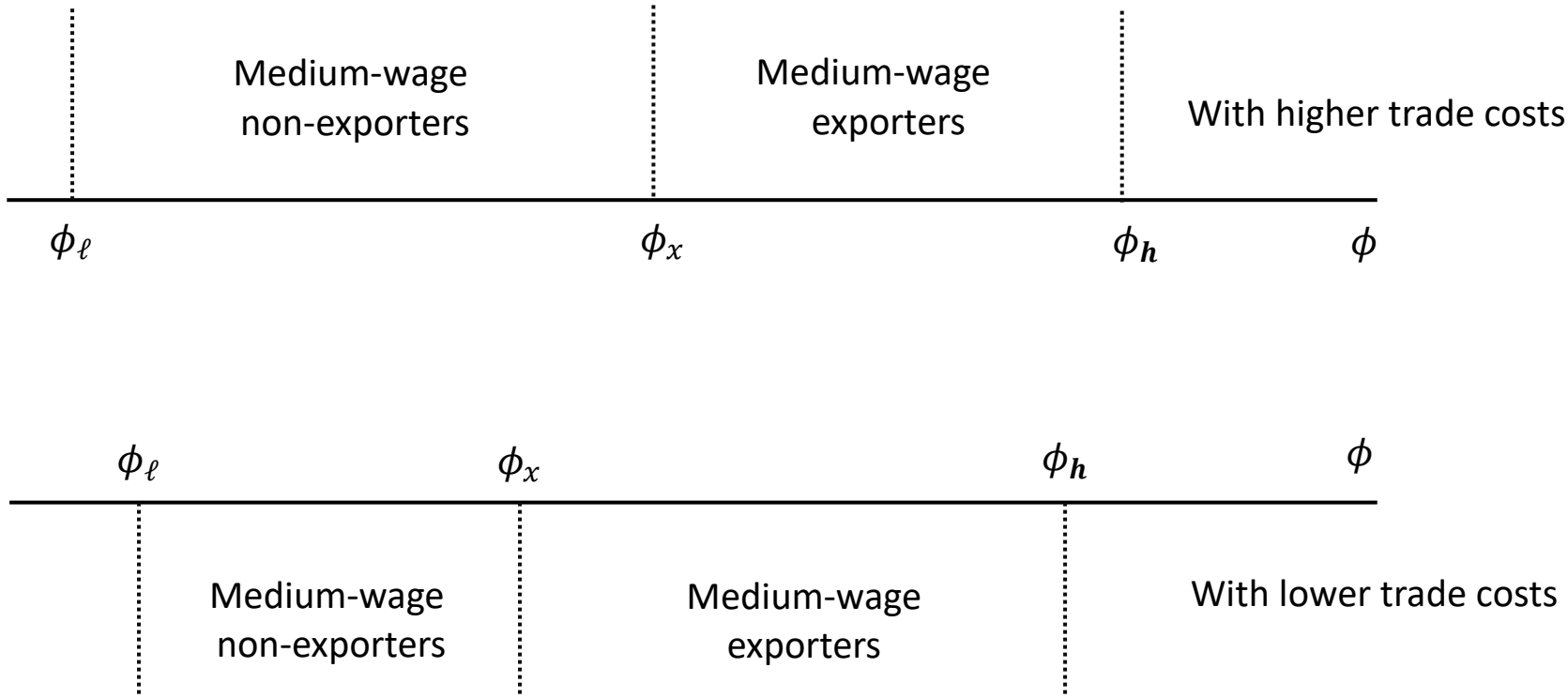
	OLS					IV	
	3 firm groups	5 firm groups	10 firm groups	Down > 0%	Down > 10%	3 firm groups	Down >0%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Managers							
Industry export share	0.0118	-0.0552	-0.0507	-0.2864	-0.3113	0.0238	0.0544
	(0.96)	(-0.94)	(-0.97)	(-1.19)	(-1.32)	(0.90)	(0.58)
R-squared	0.18	0.18	0.18	0.24	0.27	0.18	0.14
Panel B: Professionals							
Industry export share	-0.0045	-0.0990	-0.0917	-0.4604	-0.4691	0.0073	-0.0471
	(-0.28)	(-1.33)	(-1.38)	(-1.59)	(-1.67)	(0.19)	(-0.32)
R-squared	0.24	0.22	0.23	0.28	0.29	0.24	0.19
Panel C: Professionals and managers							
Industry export share	-0.0001	-0.0885	-0.0812	-0.4185	-0.4324	0.0139	-0.0188
	(-0.01)	(-1.24)	(-1.28)	(-1.49)	(-1.58)	(0.40)	(-0.14)
R-squared	0.23	0.21	0.22	0.27	0.29	0.23	0.17
Panel D: Clerks							
Industry export share	-0.0058	-0.0464	-0.0465	-0.1873	-0.1951	0.0082	-0.0222
	(-0.49)	(-1.39)	(-1.53)	(-1.26)	(-1.31)	(0.28)	(-0.30)
R-squared	0.16	0.18	0.20	0.21	0.21	0.15	0.16
Panel E: Operators							
Industry export share	-0.0095	-0.0598	-0.0582	-0.2361	-0.2409	0.0070	0.0471
	(-0.85)	(-1.43)	(-1.50)	(-1.22)	(-1.25)	(0.19)	(0.59)
R-squared	0.25	0.24	0.23	0.28	0.27	0.25	0.17

NOTES: This table examines the link between downward mobility and trade openness at the industry level. Industry export share is computed as an industry's total exports as a share of total sales. In columns 1 and 6, downward mobility is defined as $\Sigma_{ij}M_{ijt}(i-j)/(k-1)$ for $i > j$ where i (and j) = 1, 2, 3 indicate, respectively, the group of non-exporters, low export firms (those with export-to-sales ratios below the industry median), and high export firms (those with export-to-sales ratios above the industry median); M_{ijt} is the number of workers who move from a firm in the i group to another firm in the j group as a share of all employees in a specific occupation category between t and t-1; and k is the number of firm groups. In column 2, firms are divided into 5 groups in which the first group consists of non-exporters, and the other four groups are based on quartiles of the distribution for firm export-to-sales ratios. In column 3, firms are separated into 10 groups. In columns 4 and 7, downward mobility is computed as the share of workers who move downward to firms that have a smaller export-to-sales ratio compared to the worker's previous employee. In column 5, downward mobility is computed as the share of workers who move downward to firms that have a smaller export-to-sales ratio by more than 10 percentage points compared to the worker's previous employee. All regressions control for both industry fixed effects and year fixed effects. Columns 6-7 report the second stage of IV estimates where industry export share is instrumented by the industry-specific world import demand shock (WID). In the first stage regression, the estimated coefficient on the industry-specific world import demand shock is 0.0823 (t=4.14). The first-stage F-statistic for testing the hypothesis that WID is unrelated to industry export shares is 17.18. See Section 3.3 for more details about the specification. The number of observations in all regressions is 192. Standard errors are clustered at the industry level. In the parenthesis are t-ratios.

TABLE 6 Worker mobility and trade openness: Robustness

	Upward Mobility						Downward Mobility					
	OLS				IV		OLS				IV	
	3 firm groups	5 firm groups	Up >0%	Up >10%	3 firm groups	Up >0%	3 firm groups	5 firm groups	Down >0%	Down >10%	3 firm groups	Down >0%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Managers												
Industry export share	0.1884	0.4102**	0.7813	0.7863*	0.4998	0.9839	-0.1198	-0.0620	-0.8632*	-1.1620**	-0.2643	-0.2897
	(0.81)	(2.35)	(1.72)	(1.84)	(1.12)	(1.47)	(-0.50)	(-0.31)	(-1.98)	(-2.71)	(-0.54)	(-0.42)
R-squared	0.15	0.12	0.23	0.17	0.14	0.22	0.20	0.15	0.17	0.27	0.19	0.16
Panel B: Professionals												
Industry export share	0.5509**	0.7220***	0.8087	0.7493	0.7083	0.6729	-0.2610	-0.1143	-1.1069**	-1.4994***	-0.3605	-0.7023
	(2.46)	(3.48)	(1.75)	(1.48)	(1.41)	(1.12)	(-0.75)	(-0.35)	(-2.75)	(-3.09)	(-0.63)	(-1.12)
R-squared	0.21	0.17	0.29	0.24	0.21	0.29	0.20	0.15	0.28	0.34	0.20	0.28
Panel C: Professionals and managers												
Industry export share	0.4779**	0.6705***	0.8531*	0.8371*	0.6935	0.8388	-0.2991	-0.1916	-1.0469**	-1.2879***	-0.3726	-0.6198
	(2.29)	(3.49)	(2.07)	(1.90)	(1.52)	(1.48)	(-1.18)	(-0.98)	(-2.87)	(-3.21)	(-0.82)	(-0.98)
R-squared	0.20	0.17	0.30	0.24	0.19	0.30	0.21	0.16	0.29	0.34	0.21	0.28
Panel D: Clerks												
Industry export share	-0.0429	0.3507**	0.6256	0.6264	-0.1744	0.5280	0.1500	-0.1506	-0.7539	-1.0339*	0.4831	-0.6438
	(-0.17)	(2.25)	(1.22)	(1.16)	(-0.26)	(1.01)	(0.56)	(-0.86)	(-1.57)	(-1.85)	(0.90)	(-1.07)
R-squared	0.14	0.14	0.24	0.21	0.14	0.24	0.13	0.11	0.21	0.23	0.13	0.21
Panel E: Operators												
Industry export share	0.3063	0.3773	0.7582	0.6733	-0.1184	0.5913	-0.4677*	-0.2655	-0.7582	-0.9136*	-0.4027	-0.2349
	(1.44)	(1.68)	(1.67)	(1.43)	(-0.19)	(0.83)	(-1.99)	(-1.20)	(-1.63)	(-1.77)	(-0.67)	(-0.22)
R-squared	0.20	0.15	0.31	0.19	0.19	0.31	0.21	0.14	0.23	0.21	0.21	0.22

NOTES: This table examines the link between worker mobility and trade openness at the industry level. Unlike Tables 4 and 5, measures of worker mobility use the number of all movers rather than the number of all employees as the denominator. Industry export share is computed as an industry's total exports as a share of total sales. In columns 1 and 5, upward mobility is defined as $\Sigma_{ij} M_{ijt}(j-i)/(k-1)$ for $i < j$ where i (and j) = 1, 2, 3 indicate, respectively, the group of non-exporters, low export firms (those with export-to-sales ratios below the industry median), and high export firms (those with export-to-sales ratios above the industry median); M_{ijt} is the number of workers who move from a firm in the i group to another firm in the j group as a share of all movers in a specific occupation category between t and t-1; and k is the number of firm groups. In column 2, firms are divided into 5 groups in which the first group consists of non-exporters, and the other four groups are based on quartiles of the distribution for firm export-to-sales ratios. In columns 3 and 6, upward mobility is computed as the share of workers who move up to firms that have a larger export-to-sales ratio compared to the worker's previous employee. In column 4, upward mobility is computed as the share of workers who move up to firms that have a larger export-to-sales ratio by more than 10 percentage points compared to the worker's previous employee. The measures of downward mobility are defined in a similar manner. See the notes to Table 5 for more details. All regressions control for both industry fixed effects and year fixed effects. Columns 5-6 and 11-12 report the second stage of IV estimates where industry export share is instrumented by the industry-specific world import demand shock (WID). In the first stage regression, the estimated coefficient on the industry-specific world import demand shock is 0.0823 (t=4.14). The first-stage F-statistic for testing the hypothesis that WID is unrelated to industry export shares is 17.18. See Section 3.3 for more details about the specification. The number of observations in all regressions is 192. Standard errors are clustered at the industry level. In the parenthesis are t-ratios. ***, **, * show significance at the 1%, 5%, and 10% level, respectively.



APPENDIX A FIGURE A1 Medium-wage firms

APPENDIX C TABLE A1 Hiring practice: Robustness to region controls (Swedish municipalities)

	OLS				IV			
	Hire from high-export firms	Hire from low-export firms	Hire from non-exporters	Recruit. Index	Hire from high-export firms	Hire from low-export firms	Hire from non-exporters	Recruit. Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All occupations								
Firm export share	0.0460***	-0.0301***	-0.0314***	0.0548***	0.0894***	-0.0473***	-0.0648***	0.0836***
	(8.01)	(-7.09)	(-5.97)	(13.51)	(4.41)	(-2.96)	(-3.22)	(5.96)
R-squared	0.050	0.028	0.043	0.075	0.049	0.027	0.042	0.073
Panel B: Managers								
Firm export share	0.0121***	-0.0029**	-0.0004	0.0324***	0.0217***	-0.0018	0.0024	0.0398***
	(6.65)	(-2.39)	(-0.30)	(8.64)	(3.80)	(-0.40)	(0.52)	(3.24)
R-squared	0.025	0.014	0.015	0.099	0.024	0.014	0.015	0.099
Panel C: Professionals								
Firm export share	0.0297***	-0.0011	0.0034	0.0497***	0.0415***	-0.0009	0.0046	0.0665***
	(9.44)	(-0.49)	(1.38)	(12.48)	(4.05)	(-0.11)	(0.51)	(5.12)
R-squared	0.069	0.046	0.056	0.103	0.068	0.046	0.056	0.102
Panel D: Clerks								
Firm export share	-0.0017	-0.0050***	-0.0051**	0.0049*	-0.0065	-0.0127**	-0.0066	-0.0114
	(-0.90)	(-2.97)	(-2.21)	(1.72)	(-0.94)	(-2.07)	(-0.74)	(-1.16)
R-squared	0.020	0.017	0.032	0.040	0.020	0.016	0.032	0.039
Panel E: Operators								
Firm export share	-0.0066**	-0.0190***	-0.0291***	0.0161***	-0.0041	-0.0238**	-0.0594***	0.0212
	(-1.96)	(-8.11)	(-8.28)	(4.14)	(-0.34)	(-2.42)	(-4.50)	(1.60)
R-squared	0.053	0.029	0.066	0.048	0.053	0.029	0.064	0.048

NOTES: This table examines hiring patterns across firms with different export shares (i.e., firm export as a share of total sales). In columns 1-3 and 5-7, the poached firms are classified into three groups based on export-to-sales ratios. High export firms are those with an export-to-sales ratio above the industry median of exporting firms and low export firms are those with an export-to-sales ratio below the industry median. The dependent variable is the share of hires (in terms of total hirings) from high-export firms, low-export firms, and non-exporters, respectively, in columns 1-3 and 5-7. In columns 4 and 8, the dependent variable is a recruitment index defined as a weighted average export share of poached firms where the weights are the share of new hires from the poached firm. This recruitment index is higher if a larger share of workers is recruited from firms that export more. It is used to capture international experience embodied in new hires. All regressions include controls for firm characteristics that may affect the labor demand by the specific firm, including firm age, labor productivity (value added per worker), firm size (measured by total employment); and controls for the Swedish municipalities where the recruiting firms are located. Both industry fixed effects and year fixed effects are also included. Columns 5-8 report the second stage of IV estimates where firm export share is instrumented by the firm-specific world import demand shock (WID). In the first stage regression, the estimated coefficient on WID is 0.0403 (t=26.44). The first stage F-statistic for testing the hypothesis that WID is uncorrelated with firm export share is 699. See Section 3.2 for more details about the specification. The number of observations in all regressions is 41,810. Standard errors are clustered at the firm level. In the parenthesis are t-ratios. (*), (**), and (***) denote statistical significance at the 10%, 5% and 1% level, respectively.

APPENDIX C TABLE A2 Hiring practice: Controlling for firm fixed effects

	OLS				IV			
	Hire from high-export firms	Hire from low-export firms	Hire from non-exporters	Recruit. Index	Hire from high-export firms	Hire from low-export firms	Hire from non-exporters	Recruit. Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All occupations								
Firm export share	0.0153	-0.0224**	-0.0040	0.0179*	0.0576	-0.0300	0.0234	0.0053
	(1.14)	(-2.21)	(-0.34)	(1.92)	(0.60)	(-0.36)	(0.23)	(0.08)
R-squared	0.009	0.005	0.019	0.006	0.009	0.005	0.019	0.006
Panel B: Managers								
Firm export share	0.0070*	-0.0029	-0.0055	0.0204**	0.0464	0.0075	-0.0192	0.0499
	(1.68)	(-0.84)	(-1.42)	(2.21)	(1.59)	(0.29)	(-0.74)	(0.82)
R-squared	0.012	0.004	0.007	0.015	0.010	0.004	0.006	0.015
Panel C: Professionals								
Firm export share	0.0109	-0.0061	-0.0109*	0.0238**	0.0170	0.0000	0.0462	-0.0040
	(1.46)	(-1.13)	(-1.82)	(2.44)	(0.38)	(0.00)	(1.01)	(-0.06)
R-squared	0.032	0.017	0.025	0.025	0.032	0.017	0.022	0.025
Panel D: Clerks								
Firm export share	-0.0041	-0.0025	0.0024	-0.0035	-0.0261	0.0078	0.0633	-0.1174**
	(-0.99)	(-0.64)	(0.44)	(-0.46)	(-0.74)	(0.24)	(1.43)	(-2.31)
R-squared	0.003	0.003	0.009	0.004	0.003	0.003	0.006	-0.005
Panel E: Operators								
Firm export share	0.0025	-0.0138**	0.0022	0.0200**	0.0355	-0.0024	-0.0201	-0.0129
	(0.32)	(-2.33)	(0.29)	(2.11)	(0.59)	(-0.05)	(-0.30)	(-0.19)
R-squared	0.015	0.005	0.027	0.010	0.014	0.005	0.027	0.010

NOTES: This table examines hiring patterns across firms with different export shares (i.e., firm export as a share of total sales). Unlike Table 3, this table controls for firm fixed effects. In columns 1-3 and 5-7, the poached firms are classified into three groups based on export-to-sales ratios. High export firms are those with an export-to-sales ratio above the industry median of exporting firms and low export firms are those with an export-to-sales ratio below the industry median. The dependent variable is the share of hires (in terms of total hirings) from high-export firms, low-export firms, and non-exporters, respectively, in columns 1-3 and 5-7. In columns 4 and 8, the dependent variable is a recruitment index defined as a weighted average export share of poached firms where the weights are the share of new hires from the poached firm. This recruitment index is higher if a larger share of workers is recruited from firms that export more. It is used to capture international experience embodied in new hires. All regressions include controls for firm characteristics that may affect the labor demand by the specific firm, including firm age, labor productivity (value added per worker), firm size (measured by total number of employment). Both firm fixed effects and year fixed effects are also included. Columns 5-8 report the second stage of IV estimates where firm export share is instrumented by the firm-specific world import demand shock (WID). In the first stage regression, the estimated coefficient on WID is 0.0136 (t=14.63). The first stage F-statistic for testing the hypothesis that WID is uncorrelated with firm export share is 213.9. See Section 3.2 for more details about the specification. The number of observations is 41,810 in columns 1-4 and 40,387 in columns 5-8. Standard errors are clustered at the firm level. In the parenthesis are t-ratios. (*), (**), and (***) denote statistical significance at the 10%, 5% and 1% level, respectively.