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## Globalization, Recruitments, and Job Mobility

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IFN Working Paper No. 1354, 2020

## **Globalization, Recruitments, and Job Mobility**

Carl Davidson, Fredrik Heyman, Steven Matusz,  
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# GLOBALIZATION, RECRUITMENTS, AND JOB MOBILITY

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**Abstract:** Previous research indicates that exporting firms are willing to pay a premium to poach workers from other 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 their domestic market. Moreover, as emphasized in Davidson et al. (2020), increased openness might lead to higher job-to-job mobility if increased globalization increases both the share of exporters as well as 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 that increased openness correlates positively (negatively) with upward (downward) mobility. The effects are strongest for professionals and managers. Hence, our findings provide empirical support for Davidson et al. (2020).

**Keywords:** Globalization; Export; Job-Mobility; Recruitments

**JEL codes:** F16; F66; J60

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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 that 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 that offer 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 established 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 assumptions that different types of firms recruit their workers from different labor pools and that working for an internationally engaged firm allows workers to acquire skills that enable their employers to reduce their 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 between firms in their recruitment patterns, 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).<sup>1</sup> We find that both high- and low-export firms have a relatively high share of their recruitments from other exporting firms, while non-exporters have a large share of hires from other non-exporters and from unemployment. More specifically, after controlling for firm characteristics, industry fixed effects and year fixed effects, the share of hires from other exporters is 9.4 percentage points higher by high-export firms, and 6.6 percentage points higher by low export firms, as compared to non-exporters. Thus, our analysis reveals that recruitment patterns differ significantly between globally engaged firms and those that serve domestic market only. The key mechanism in the Davidson et al. model is that large, highly productive exporters poach workers from smaller, less productive exporters in order to lower their trade costs. 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

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<sup>1</sup> 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.

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 upward mobility, from a low exporter to a high exporter, is common among managers and professionals. In contrast, we find no such upward mobility for clerks or operators. We continue our analysis by examining how worker mobility is affected by increased openness. Consistent with the conceptual framework outlined in Section 2 below, we find a statistically significant positive relationship between openness to trade and upward mobility for professionals and managers. A 10 percentage point increase in openness is associated with an 8 percentage point increase in the share of these workers who move up to firms that have a higher export share. In addition, increased export intensity is associated with less downward mobility for professionals and managers. There is no link between openness and mobility for clerks and operators. Thus, we find a stronger link between economic mobility and trade openness for occupations that play a major role in international commerce, such as professionals and managers.

It is well documented that high exporting firms pay relatively high wages and firms that do not export pay relatively low wages 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 extend our analysis by examining how increased openness affects mobility to low- and high-wage firms. We find that workers who previously worked at high-export firms are relatively likely to end up in high wage firms.

Our paper relates to several different strands of empirical papers. For instance, Haltiwanger et al. (2018) provides 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 Mion et al. (2017) which shows that firms increase their level of exports when they hire managers with previous experience from exporting firms. Accordingly, Labanca et al. (2014) find that firms tend to poach workers from exporters as a way to increase their own export activity. Hence, these studies suggest that experience from working in exporting firms is valued and affects 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 to lower paid ones. 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 intensive and lower paying jobs. Accordingly, Munch (2010) finds that offshoring in Danish firms increases the probability that low skilled workers become unemployed, and that high-skill workers change jobs. Our paper differs from these studies by examining general job mobility between different firm types; 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 and results in Davidson et al. (2020) that connect globalization, firm recruiting strategies, export activity and economic mobility. The foundation of the model 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 they commit to production. The novel features of the model are the manner in which firms build their workforces and the manner in which worker experience influences the cost of production and the costs associated with exporting.

The Blanchard overlapping generations 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 gain "basic experience" randomly 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 engage in costly screening to determine it. 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. We show that active firms self-select into four different categories. Active firms with the lowest productivity measures do not screen, hire only



newborn, inexperienced workers and pay a low wage. As in the standard Melitz model, these firms do not earn enough revenue to justify paying the fixed cost of exporting, so they sell all of their output domestically. Active firms with medium productivity measures 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 revenue 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.

In this framework, newborn workers take jobs at low-wage firms 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.<sup>2</sup> Workers that accept job offers from medium-wage exporters can then start the process of obtaining international experience. If they manage to do so, they can then seek jobs at high-wage firms. Thus, as a worker's career unfolds they move up the jobs ladder and secure jobs that offer better compensation. The term "upward economic mobility" refers to the rate at which workers ascend the jobs ladder.

Globalization, which is modeled as a reduction in trade costs, alters the equilibrium distribution of firms, triggering changes in wage inequality and economic mobility.<sup>3</sup> First, lower trade costs lead some medium-wage non-exporters to start exporting, while all firms that were already engaged in international commerce expand their level of exporting. This increases the number of exporters, pushing up the demand for workers with international experience and hence,

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<sup>2</sup> 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.

<sup>3</sup> 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.

the wage paid at the top of the job ladder. In addition, high-wage workers die 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 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 employment by the group of medium-wage firms declining. Thus, wage inequality rises.

The impact of globalization on upward economic mobility at the bottom of the job ladder (the rate at which workers move from low-wage jobs to medium-wage jobs) is a bit more complicated. 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 1. Firms with productivity  $\phi$  between  $\phi_\ell$  and  $\phi_h$  find it profitable to offer a medium-level wage, with those with  $\phi \geq \phi_x$  exporting a proportion of their output. Low-wage firms are those with productivity below  $\phi_\ell$ , while high-wage firms have productivity above  $\phi_h$ . As noted above, a reduction in trade costs reduces what firms earn from domestic sales, harming non-exporters. This causes  $\phi_\ell$  to rise, with low-productivity medium-wage firms switching to low-wage firms. The lower trade costs make it easier to export, so that high-productivity medium-wage firms switch and become high-wage firms – that is,  $\phi_h$  falls. Since the distance between  $\phi_\ell$  and  $\phi_h$  shrinks, there are fewer medium-wage firms. The impact on the availability of jobs with medium-wage exporters, which depends on the distance between  $\phi_x$  and  $\phi_h$ , is not as clear. This is because non-exporters with

productivity just below  $\phi_x$  become exporters, causing  $\phi_x$  to fall, which implies that the impact on  $\phi_h - \phi_x$  is ambiguous. When we calibrate our model using US data, we find that for all relevant values of the model's parameters this value rises, 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.

--Figure 1--

To summarize, globalization results in an increase in the proportion of firms offering the extreme wages (high and low) and it also leads to a relative increase in the high wage, triggering an increase in wage inequality. But, globalization also leads to an increase in upward economic mobility, with workers making their way up the jobs ladder at a faster rate. This is an important result, since it implies that a narrow focus on wage inequality overstates the overall impact of globalization on inequality across workers. Workers in entry-level jobs may be harmed by the initial impact of 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 model described above only allows for movements up the jobs ladder. However, 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.”<sup>4</sup> Such movements back down the ladder can devastate workers, resulting in large

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<sup>4</sup> For evidence of downward mobility using Danish data, see Groes, Kirchner and Manovskii (2013) and Frederiksen, Halliday and Koch (2016).

losses in lifetime earnings and hampering the development of their careers.<sup>5</sup> Thus, another goal of this paper is to explore 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.<sup>6</sup> 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 and 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.

In the light of the above conceptual framework, we now turn to an examination of the hiring practices by different firm types, and how worker mobility is related to globalization.

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<sup>5</sup> The classic references on the losses from job displacement are Jacobson, LaLonde and Sullivan (1993) and Kletzer (1998). For more recent evidence, see Davis and von Wachter (2011) or Krolikowski (2017).

<sup>6</sup> 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.

### 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 originate 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 covers goods but not services, therefore our empirical analysis is for manufacturing only.

Our firm data is matched with detailed information on all Swedish individuals who are at least 16 years old. The information on the individuals' employment status includes their employment 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.

#### *3.2.Hiring Practices in Different Firm Types*

We start out by examining hiring practices at the firm level. Based on the theoretical framework described in Section 2, we classify our sample of firm types by export participation: high, low, and non-exporting. The separation of firms by export participation is done yearly. For purposes of classification, 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  $\phi_x$  in Figure 1). 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-productivity firms in Davidson et al. (2020) (i.e., those with productivity between  $\phi_x$  and  $\phi_h$  in Figure 1). 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  $\phi_h$  in Figure 1).<sup>7</sup> Jobs in exporting firms can also provide an opportunity for workers to gain “international experience.”

One goal of our empirical analysis is to reveal the differences between firms in the way that they build their workforce (a novel feature of Davidson et al. (2020)). In addition to hiring an unemployed worker, a firm may poach 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 group, and non-exporting firms, and where  $g = U$  represents the unemployment pool. 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:

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

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

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<sup>7</sup> 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 but an export share of output below 0.5, and firms belonging to the high-export group have positive export and 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 capital stock);  $D_s$  represents industry fixed effects used to control for industry specific demand shocks that may affect labor demand, and  $D_t$  represents year fixed effects used to control for macroeconomic shocks that may affect the overall labor market; and  $\varepsilon_{ft}$  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.

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 (export as a share of total sales) of firm  $i$  at time  $t$ . Unlike hiring shares defined above, this index captures the variation of export intensities within the 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.

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 or his own status (employed/unemployed) in year  $t-1$ .

Note that hires can come from workers in different firm types or from the pool of unemployed. Defining unemployment is not straightforward since the information on firm

affiliation refers to one specific month. It is possible that an individual goes from unemployment in year  $t-1$  (November) to employment in, for instance, January in year  $t$  and then to a new firm in November year  $t$ . We would then count it as recruitment from unemployment if we only look at the information in November year  $t-1$  and November year  $t$ . A similar problem arises for individuals changing employer several times in one year, where we might misclassify the recruitment by only having information on employment in November. While it is not possible to completely control for such occurrences in the data at hand, we will take several measures to minimize any potential bias. For instance, several different definitions of unemployment have been calculated. The results reported below are based on having more than one week of unemployment in year  $t$ . Several other varieties of this definition have been used, e.g. including more than 0 or 30 days of unemployment in year  $t$  (with or without using a specific variable for unemployment status in November). We note that using alternative definitions of unemployment has little impacts on our results.<sup>8</sup>

### *3.3.Trade Openness and Worker Mobility*

An important prediction of the Davidson et al. (2020) model is that under certain conditions, globalization increases upward mobility and reduces downward mobility. Thus, the second part of our analysis examines how trade openness relates to worker mobility across firms at the industry level. To this end, we use the following specification:

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

where  $Y_{st}$  is our variable of interest – worker mobility (its measurement is described below);  $TradeOpenness_{st}$  is measured by industry export shares (defined as an industry's total exports as

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<sup>8</sup> The results are available upon request.



a share of total sales);<sup>9</sup> 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  $\epsilon_{st}$  is the error term. The above specification assumes that firms within an industry face common trade shocks. The coefficient  $\gamma$  is identified by within-industry over-time variation in export shares. The theoretical framework outlined in Section 2 suggests that  $\gamma > 0$  for upward mobility and  $\gamma < 0$  for downward mobility.

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 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 movers between  $t - 1$  and  $t$ .<sup>10</sup> 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 “steps” by which workers move upward.<sup>11</sup> 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 “steps”

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<sup>9</sup> 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.

<sup>10</sup> For workers who moved across industries, industry affiliation is based on the industry where the workers ended up.

<sup>11</sup> This is a variant of the measure proposed by Bartholomew (1982).

by which workers move downward. Note that since many workers stay in the same firm group, the indices of upward and downward mobility do not sum up to one.

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 that international experience will be more valuable to exports in occupations that play a major role in international commerce, such as professionals and managers. Thus, in what follows for each industry we compute the upward/downward mobility index separately for professionals, managers, clerks and operators.<sup>12</sup>

## **4. Empirical Results**

### *4.1. Hiring Practices in Different Firm Types*

We start by examining recruitment patterns in firms with different levels of export. As seen from Figure 2, compared to other firm groups, non-exporters are more likely to hire workers from firms that also do not export. In contrast, out of the total recruitment by both high- and low-export firms, substantially more recruits come from other exporting firms (about 90% on average over the sample period).

--Figure 2--

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<sup>12</sup> Based on the *Swedish Standard Classification of Occupations (SSYK96)*, managers are occupations with SSYK96 = 1, professionals include occupations with SSYK96 = 2 and 3, clerks are occupations with SSYK96 = 4, 5, and 6 and operators are occupations with SSYK96 = 7 and 9.

Figure 2 also reveals that there is substantial amount of worker mobility across firm groups. For example, 20 percent of new hires by high export firms came from low export firms (upward mobility), while 60 percent of new hires by non-exporters came from firms that exported (downward mobility).

#### *4.1.1. Main Results*

In the following, we examine hiring practices by different firms in more detail. The regression results of equation (1) are displayed in Table 1. In panel A we look at how hiring patterns differ across firms of different export intensities. Non-exporters are the omitted group. Both low- and high export firms have relatively high shares of recruitments from other exporters. High export firms have the highest share of recruitments from other high export firms. This type of recruitment is 8.6 percentage points higher, as compared to non-exporters (column 1). On the other hand, column 3 shows that in comparison to non-exporters, low export firms have 4.2 percentage points fewer recruitments from non-exporters, and high-export firms have 6.4 percentage points fewer. A similar pattern is seen in column 4 that exporters, especially high export firms, recruit less from unemployed.

The estimates in panel A also reveal worker mobility across firm types. For example, compared to non-exporters, the share of hires from low export firms by high export firms is 0.8 percentage points higher (upward mobility), while column 3 shows that the share of hires from high export firms by low export firms is 4.4 percentage points higher (downward mobility). Thus, the overall patterns displayed in Figure 2 hold after controlling for industry and year fixed effects and firm characteristics.

--Table 1--

In the conceptual framework in Davidson et al. (2020) and 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. These results are consistent with the empirical literature finding that exporters tend to pay higher wages. Thus, in Panel B we examine how the hiring patterns differ between firms that pay different wages. Calculating the average wage for each firm, we define low-wage, medium-wage, and high-wage firms as corresponding to whether they are in the lowest, middle, or highest third of the wage distribution in an industry.

It can be seen in Panel B that poaching 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 7 and 2.8 percentage points higher shares of recruitments from high export firms (see panel B column 1). Accordingly, the shares of recruitments from unemployment by these two types of firms are 13.8 and 5.6 percentage points lower respectively (column 4). Given the positive correlation between firm wages and export status, these hiring patterns are consistent 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 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 wage firms do not export while some of the low wage firms might export.

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. Workers with experiences in exporting firms tend to move to other exporting firms that pay high or medium wages.

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 help them move up the job ladder and secure jobs in high export firms that pay higher wages. 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. In Panels A and B, we look at the difference between firms of different export intensity.

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. This pattern is consistent with the results in Table 1. Furthermore, panel A shows that in comparison to non-exporters, high export firms recruit more professionals and managers from low export firms, indicating that there is more upward mobility for professionals and managers. In contrast, panel B suggests no evidence for such upward mobility among clerks or operators. One explanation 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 results 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, suggesting the existence of upward mobility. In contrast, we do not find such a pattern for clerks or operators (see panel D).

In sum, Table 2 suggests that hiring patterns differ substantially across occupations. We see strong evidence for upward mobility from low-export firms to high-export firms and high wage firms for managers and professionals, but not 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 (mainly managers and professionals) with opportunities to obtain international experience, enabling them to move upward to high export firms that pay more.

Further, these hiring patterns could shed light on the mechanism behind the assortative matching between firms and workers studied in Davidson et al. (2014). As firms systematically hire workers according to their export and wage status, high export and high wage firms are matched to more skilled workers with international experience. Our analysis may be viewed as an alternative approach to capture labor market sorting, which is based on hiring patterns instead of using the wage approach as in Abowd et al. (1999).

#### *4.1.2. Robustness*

Next, we examine whether the above results for hiring patterns are robust to alternative measures of workers' international experience and recruiting firms. In Table 3 the dependent variable is replaced with the recruitment index as defined above. This index is a weighted average export share of poached firms where the weights are the share of new hires from the poached firm. In panel A, we study the hiring patterns by firms of different export intensity. Column 1 pools all occupations. Again, non-exporters are the omitted group. The estimated coefficient on high-export (or low-export) firms indicates the difference in the recruitment index between high-export (or low-export) firms and non-exporters after controlling for firm characteristics, industry fixed

effects, and year fixed effects. The estimates suggest that the index is the highest for high export firms, suggesting that hires by high export firms are on average from firms with higher export shares (i.e., workers with more international experiences). In contrast, non-exporters have the smallest recruitment index. In column 2, firm export shares (a continuous measure) is used to characterize recruiting firms. The positive coefficient indicates that firms with a higher export share tends to poach workers with more international experience. These results are consistent with the hiring patterns presented in Table 1.

--Table 3--

In columns 3-10 we then look at hiring patterns separately by occupations. It is seen that high export firms have the largest index for all groups of occupations, suggesting that high export firms tend to recruit from firms with higher export intensities, as compared to non-exporters. The difference is stronger for managers and professionals. Moreover, the coefficient for low export firms is also positive and statistically significant, albeit smaller than the coefficients for high-export firms, showing that this group of firms tend to recruit from more export intensive firms than non-exporters do, and less than what high-export firms do. When recruiting firms are characterized by export shares, we also find a larger positive coefficient for managers and professionals (columns 4 and 6) as compared to that for clerks and operators (columns 8 and 10). These results are in line with those reported in Table 2.

In panel B, we study hiring patterns by firms of different average wages. Low-wage firms are the omitted group. We find that the coefficients are significantly positive for both high- and medium-wage firms, indicating that those firms tend to poach workers with more international

experience as compared to low-wage firms. Again, the difference is stronger for managers and professionals.

Furthermore, we obtain marginally significant results when the recruiting firms are characterized by mean firm wage (a continuous measure). This contrasts with the significant results in panel A that firms with higher export shares are shown to recruit workers with more international experience. This difference reflects the fact that some high wage firms are non-exporters and may not value international experience as much as exporters. This also validates our use of export shares of poached firms to capture the amount of international experience that workers may gain from working at exporting firms.

In columns 11-12, the dependent variable is an alternative recruitment index that is based on the mean wage of poached firms:  $\sum_{i=1}^n \left( \frac{h_{f ti}}{\text{Total Hire}_{ft}} \right) w_{it}$  where  $h_{f ti}$  is the number of hires by firm  $f$  from firm  $i$  at time  $t$  and  $w_{it}$  is the mean wage of firm  $i$  at time  $t$ . This index is higher when a larger fraction of workers is recruited from higher wage firms. It is seen in panel A, column 11 that high export firms tend to recruit from higher wage firms as compared to low export firms and non-exporters. Unlike the results in columns 1-10, we find no significant difference between low export firms and non-exporters, suggesting that export shares rather than mean wages of poached firms can better proxy for international experience that is embodied in new recruits.

In sum, we find that the main results reported in Tables 1-2 are robust to alternative measures of workers' international experience and recruiting firms. 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 and move upward to firms that export more and pay more.



Below we investigate the issue of economic mobility from the perspective of workers and examine to what extent worker mobility is shaped by trade openness.

#### *4.2. Trade Openness and Worker Mobility*

Slightly more than 20 percent of Swedish workers leave their job each year. Some become unemployed or decide to leave the labor force, others are on parental- or extended sick leave, and yet another group changes employers. Figure 3 shows the share of employed workers who move to another firm in each year between 1998 and 2013. The share varies over the years from a minimum of around 11 percent in 2004 to a maximum of around 16 percent in 2000. This movement between firms is what we next set out to examine.

--Figure 3--

We continue by looking in more detail at this 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) suggests 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).

--Table 4--

An alternative way to capture upward mobility is to use the share of workers who move up to firms that have a larger export share compared to the worker's previous employee. As shown in Panel C columns 4-5, for professionals and managers a 10 percentage point increase in industry export shares is associated with a 8 percentage point increase in the share of workers who move up to firms that have a higher export share, and most of upward mobility is to firms that have a larger export share by more than 10 percentage points compared to the worker's previous employee. 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.

We continue by examining the effect of increased openness on downward mobility. In Table 5 we find some evidence for a negative relationship between industry export shares and downward mobility. In particular, the estimates in Panels C columns 4-5 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 who move downward to firms that export less compared to the worker's previous employee, 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 employee.

--Table 5--

Overall, the results in Tables 4 and 5 provide strong suggestive evidence for a link between trade openness and worker mobility for professionals and managers. On the other hand, we find little evidence for such a link for clerks or operators. 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 by Davidson et al. (2020) that globalization 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 upward.

## **5. Concluding Remarks**

Globalization affects firms in many different ways. One consequence of falling trade costs is that more firms will export. This in turn has consequences for workers: more workers will learn about international business practices, gaining skills that are valuable for many other exporters. We find that firms with high export intensity largely recruit workers from other exporting firms.

Accordingly, firms that do not export tend to recruit workers from other non-exporting firms or from the pool of unemployed.

We continued our analyses by examining workers that do not switch jobs between similar types of firms but moved, for instance, from low export firms to high export firms. We find that such mobility is positively affected by increased openness to international trade: upward mobility from low exporting firms to high exporting firms increases substantially when trade increases. However, the positive effect on upward job-mobility is restricted to managers and professionals with no statistically significant effect on clerks and operators. Downward mobility is also affected by increased openness. As expected, downward mobility for professionals and managers decreases substantially with globalization. The effect for clerks and operators is barely significant.

To sum up, our results provide empirical support for the theoretical links between globalization, recruitment strategies and economic mobility highlighted in Davidson et al. (2020).

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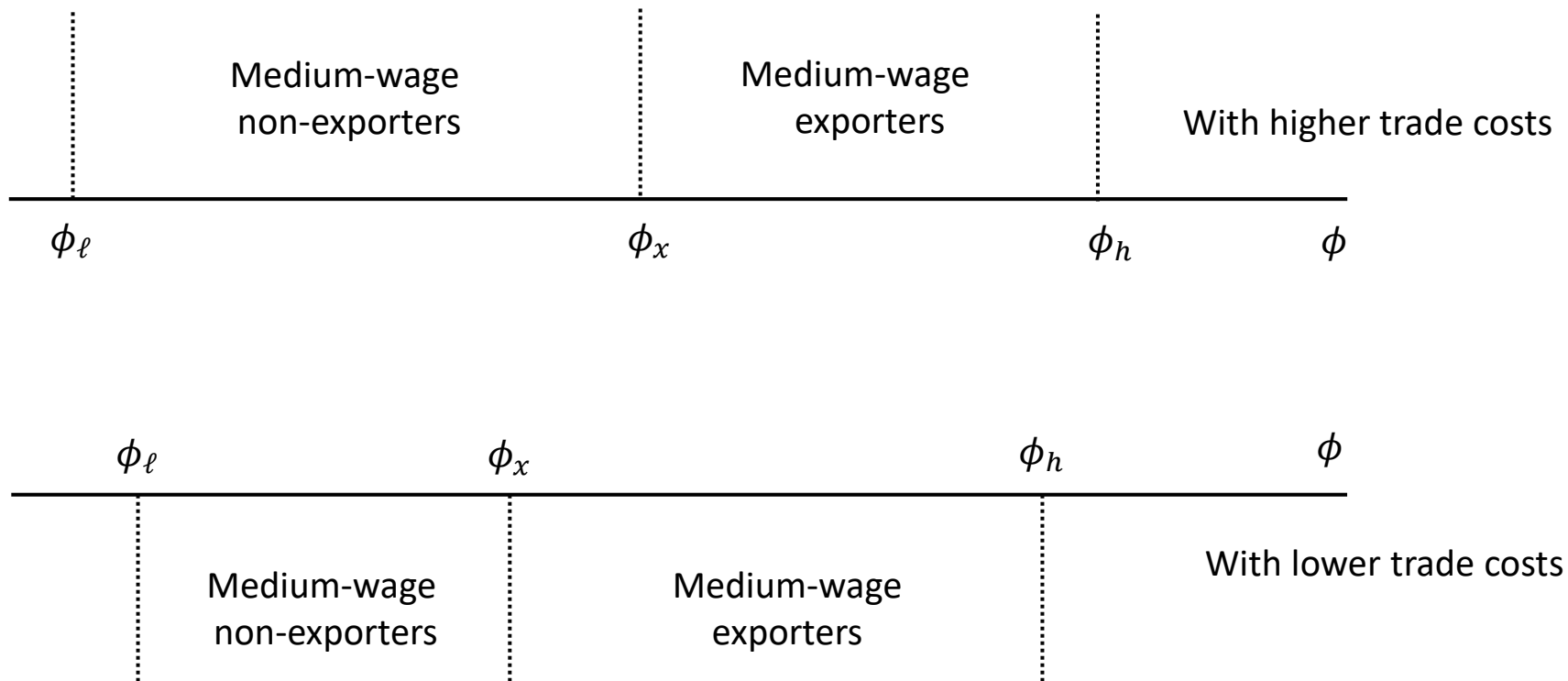
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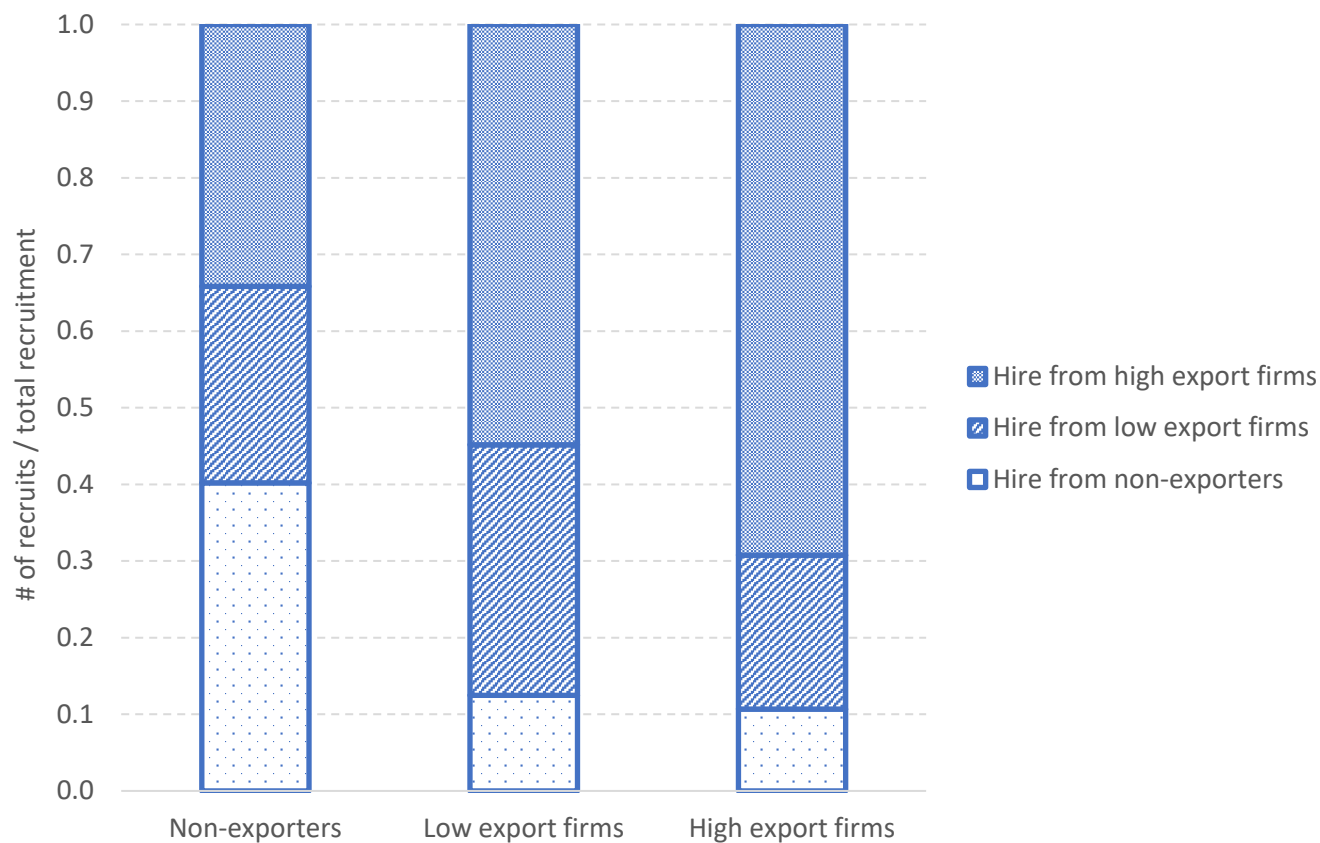
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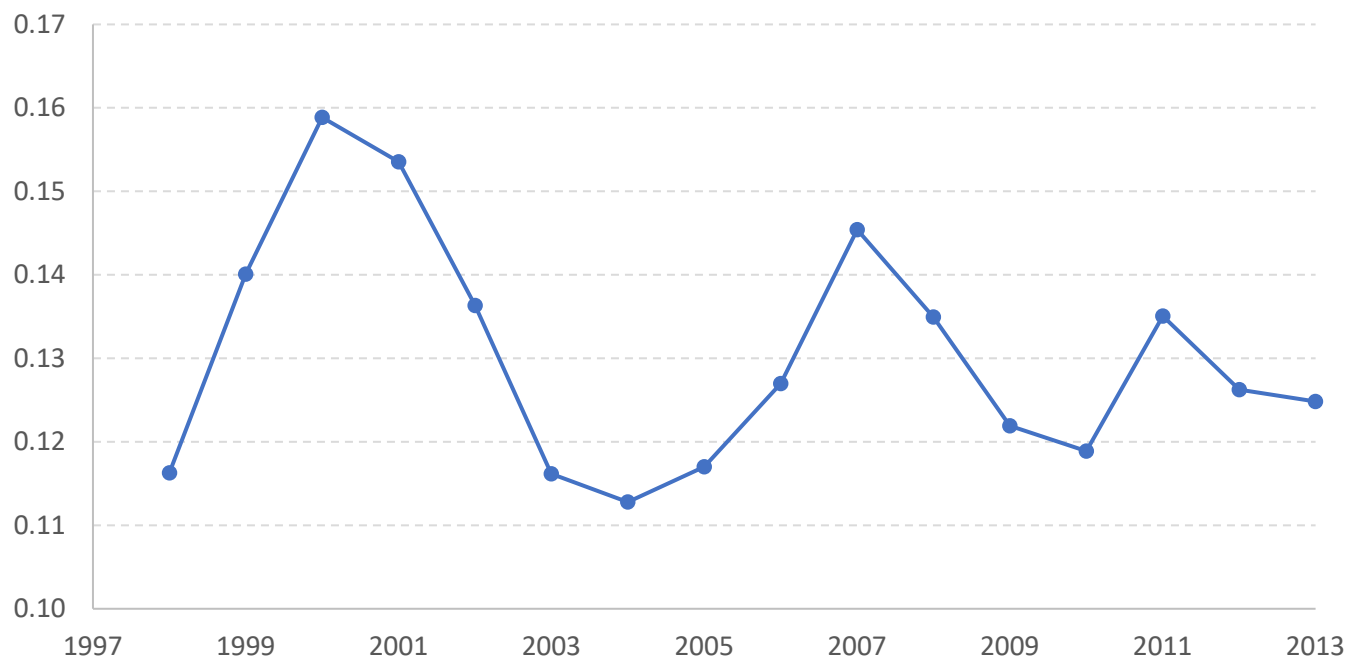
**Figure 1. Medium-wage firms**





*Notes :* This figure displays the pattern of recruitment by three firm groups: (i) firms that do not export ("non-exporters"); (ii) firms that have export-to-sales ratios below the industry median of exporting firms ("low export firms"); and (iii) firms that have export-to-sales ratios above the industry median of exporting firms ("high export firms"). The number of recruits as a share of total recruitment is an average of annual recruitment shares over the period 1997-2013. For example, out of the total recruitment by high export firms, about 11% came from non-exporters, 20% from low export firms, and 69% from other high export firms.

**Figure 2. Hiring practice by firm types**



**Figure 3. The share of workers who move to a new firm**

**Table 1. Hiring practice by different firm types**

	Hire from high- export firms	Hire from low- export firms	Hire from non- exporters	Hire from unemployment
	(1)	(2)	(3)	(4)
<i>Panel A: Hiring by firms of different export intensity</i>				
High export firms	0.0860*** (37.60)	0.00794*** (4.16)	-0.0640*** (-25.93)	-0.0299*** (-9.60)
Low export firms	0.0442*** (19.95)	0.0219*** (10.90)	-0.0415*** (-16.37)	-0.0245*** (-7.81)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	94143	94143	94143	94143
<i>Panel B: Hiring by firms of different average wages</i>				
High wage firms	0.0699*** (32.87)	0.0403*** (22.70)	0.0279*** (12.43)	-0.138*** (-49.55)
Medium wage firms	0.0284*** (13.87)	0.0172*** (9.80)	0.0107*** (4.71)	-0.0562*** (-19.81)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	94143	94143	94143	94143

*Note* : 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. 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. In columns 1-4, the dependent variable is the share of hires (in terms of total hirings) from high-export firms, low-export firms, non-exporters, and the pool of unemployed, 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 capital stock). See Section 3.2 for more details about the specification. 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)
<i>Panel A: Hiring of managers or professionals by firms of different export intensity</i>						
	<i>Managers</i>			<i>Professionals</i>		
High export firms	0.0102*** (18.64)	0.00249*** (6.40)	0.000178 (0.36)	0.0247*** (28.53)	0.00513*** (7.08)	-0.00473*** (-5.18)
Low export firms	0.00403*** (8.11)	0.00299*** (7.52)	0.000368 (0.76)	0.0108*** (13.53)	0.00364*** (5.01)	-0.00506*** (-5.51)
Observations	99839	99839	99839	99839	99839	99839
<i>Panel B: Hiring of clerks or operators by firms of different export intensity</i>						
	<i>Clerks</i>			<i>Operators</i>		
High export firms	0.00740*** (11.22)	0.000862 (1.40)	-0.00657*** (-7.06)	0.0155*** (12.10)	-0.00481*** (-4.66)	-0.0325*** (-22.06)
Low export firms	0.00511*** (7.95)	0.00287*** (4.51)	-0.00432*** (-4.50)	0.0127*** (10.09)	0.00359*** (3.23)	-0.0190*** (-12.33)
Observations	99839	99839	99839	99839	99839	99839
<i>Panel C: Hiring of managers or professionals by firms of different average wages</i>						
	<i>Managers</i>			<i>Professionals</i>		
High wage firms	0.00896*** (16.10)	0.00420*** (10.17)	0.00479*** (9.95)	0.0256*** (30.90)	0.0178*** (25.70)	0.0218*** (25.88)
Medium wage firms	0.00310*** (6.67)	0.00206*** (5.74)	0.00126*** (3.00)	0.00939*** (12.75)	0.00618*** (10.29)	0.00725*** (9.33)
Observations	99839	99839	99839	99839	99839	99839
<i>Panel D: Hiring of clerks or operators by firms of different average wages</i>						
	<i>Clerks</i>			<i>Operators</i>		
High wage firms	0.00158*** (2.59)	-0.000106 (-0.18)	-0.00426*** (-4.97)	-0.00472*** (-4.20)	-0.00487*** (-5.29)	-0.00930*** (-7.18)
Medium wage firms	0.000238 (0.39)	-0.000516 (-0.87)	-0.00301*** (-3.41)	0.00363*** (3.04)	0.00119 (1.21)	0.00124 (0.91)
Observations	99839	99839	99839	99839	99839	99839

*Note* : 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 capital stock). Both industry fixed effects and year fixed effects are also included. See Section 3.2 for more details about the specification. 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 by firm types and by occupations, robustness**

	Recruitment Index = Weighted Average Export Share of Poached Firms										Weighted Average Wage of poached firms	
	All		Managers		Professionals		Clerks		Operators		All	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Panel A: Hiring by firms of different export intensity</i>												
High export firms	0.0607***		0.0345***		0.0403***		0.0205***		0.0310***		11.82***	
	(37.14)		(35.74)		(40.29)		(24.26)		(26.97)		(4.37)	
Low export firms	0.0227***		0.00941***		0.0126***		0.00691***		0.0140***		0.499	
	(14.39)		(12.20)		(14.77)		(9.67)		(13.12)		(0.23)	
Export share		0.0903***		0.0604***		0.0696***		0.0296***		0.0428***		29.50***
		(34.52)		(29.42)		(34.66)		(19.01)		(21.37)		(8.72)
Observations	84745	84745	106931	106931	106931	106931	106931	106931	106931	106931	84745	84745
<i>Panel B: Hiring by firms of different average wages</i>												
High wage firms	0.0251***		0.0283***		0.0306***		0.0120***		0.00912***		50.14***	
	(16.30)		(29.95)		(32.02)		(15.22)		(8.48)		(21.59)	
Medium wage firms	0.0113***		0.00989***		0.0136***		0.00479***		0.00629***		14.76***	
	(7.35)		(12.27)		(15.30)		(6.56)		(5.96)		(6.26)	
Mean wage		0.0206		0.0323*		0.0282*		0.00863*		-0.00699**		0.0804*
		(1.57)		(1.93)		(1.92)		(1.86)		(-2.00)		(1.79)
Observations	84745	84745	106931	106931	106931	106931	106931	106931	106931	106931	84745	84745

*Note:* This table examines hiring patterns by firm types and worker occupations. In columns 1-10, 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. In columns 11-12, the dependent variable is an alternative recruitment index defined as a weighted average wage of poached firms. This index is higher if a larger share of workers is recruited from higher wage firms. In panel A, columns 1, 3, 5, 7, 9 and 11, recruiting 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 columns 2, 4, 6, 8, 10, and 12, recruiting firms are characterized by their export as a share of total sales. In panel B, columns 1, 3, 5, 7, 9, and 11, recruiting 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 2, 4, 6, 8, 10, and 12, recruiting firms are characterized by firm mean wage. 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 capital stock). Both industry fixed effects and year fixed effects are also included. See Section 3.2 for more details about the specification. 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**

	3 firm groups (1)	5 firm groups (2)	10 firm groups (3)	Up >0% (4)	Up >10% (5)
<i>Panel A: Managers</i>					
Industry export share	0.0148 (1.70)	0.0187** (2.70)	0.0177** (2.74)	0.781 (1.72)	0.786* (1.84)
Adjusted R2	0.107	0.073	0.082	0.099	0.031
<i>Panel B: Professionals</i>					
Industry export share	0.0134* (1.88)	0.0173** (2.21)	0.0125 (1.24)	0.809 (1.75)	0.749 (1.48)
Adjusted R2	0.145	0.095	0.091	0.178	0.118
<i>Panel C: Professionals and managers</i>					
Industry export share	0.0154** (2.36)	0.0191** (2.91)	0.0151* (1.89)	0.853* (2.07)	0.837* (1.90)
Adjusted R2	0.146	0.092	0.087	0.188	0.120
<i>Panel D: Clerks</i>					
Industry export share	-0.0132 (-0.80)	-0.00223 (-0.29)	-0.00367 (-0.55)	0.626 (1.22)	0.626 (1.16)
Adjusted R2	0.066	0.077	0.070	0.121	0.074
<i>Panel E: Operators</i>					
Industry export share	0.0134 (1.62)	0.0122 (1.40)	0.0109 (1.36)	0.758 (1.67)	0.673 (1.43)
Adjusted R2	0.276	0.229	0.249	0.197	0.057

*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 column 1, upward mobility is defined as  $\sum_{ij} M_{ijt}(j-i)/(k-1)$  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 between year  $t-1$  to year  $t$ ; 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 column 4, 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 and year fixed effects. The number of observations in all regressions is 192. In the parenthesis are t-ratios. \*\*\*, \*\*, \* show significance at the 1%, 5%, and 10% level, respectively.

**Table 5. Downward mobility by occupations**

	3 firm groups (1)	5 firm groups (2)	10 firm groups (3)	Down > 0% (4)	Down > 10% (5)
<i>Panel A: Managers</i>					
Industry export share	0.0118 (0.96)	-0.0552 (-0.94)	-0.0507 (-0.97)	-0.863* (-1.98)	-1.162** (-2.71)
Adjusted R2	0.048	0.043	0.040	0.037	0.149
<i>Panel B: Professionals</i>					
Industry export share	-0.00451 (-0.28)	-0.0990 (-1.33)	-0.0917 (-1.38)	-1.107** (-2.75)	-1.499*** (-3.09)
Adjusted R2	0.120	0.095	0.108	0.162	0.227
<i>Panel C: Professionals and managers</i>					
Industry export share	-0.000104 (-0.01)	-0.0885 (-1.24)	-0.0812 (-1.28)	-1.047** (-2.87)	-1.288*** (-3.21)
Adjusted R2	0.108	0.081	0.088	0.169	0.229
<i>Panel D: Clerks</i>					
Industry export share	-0.00584 (-0.49)	-0.0464 (-1.39)	-0.0465 (-1.53)	-0.754 (-1.57)	-1.034* (-1.85)
Adjusted R2	0.021	0.041	0.064	0.081	0.099
<i>Panel E: Operators</i>					
Industry export share	-0.00948 (-0.85)	-0.0598 (-1.43)	-0.0582 (-1.50)	-0.758 (-1.63)	-0.914* (-1.77)
Adjusted R2	0.129	0.111	0.098	0.099	0.076

*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 column 1, downward mobility is defined as  $\sum_{ij} M_{ijt}(i-j)/(k-1)$  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 movers between year  $t-1$  to year  $t$ ; 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 column 4, 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 and year fixed effects. The number of observations in all regressions is 192. In the parenthesis are t-ratios. \*\*\*, \*\*, \* show significance at the 1%, 5%, and 10% level, respectively.