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Managers' Mobility, Trade Status, and Wages

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ABSTRACT:

The transmission of knowledge across firms is typically difficult to measure. By matching employer-employee data with trade data at the firm level, we are able to identify the transmission of export experience, i.e. experience acquired through participation in the export activity of previous employers, and to quantify the impact of this valuable knowledge on workers' wages and firms' trade status. We find that export experience corresponds to a 5% wage premium for managers but not for other workers. Most of the premium arises at the time of employer change and it is robust to controlling for a wealth of workers' and firms' characteristics including worker-trade status fixed effects, past employer size and productivity, and broad employer change patterns. On the employing firm side, we find that export experience positively affects entry into the export activity and matters more than firm size and productivity. A one standard deviation increase of the share of currently employed managers with export experience more than doubles the probability to start exporting. On the contrary, export experience acquired by managers from previous employers does not affect the capacity to keep exporting while firm size and productivity do. We address endogeneity issues by using an IV strategy that mimics a random matching between managers with export experience and firms. The IV strategy relies on information on the spatial variation in the supply of displaced managers with export experience and on firms' internal hierarchical structure as a proxy for future recruiting intentions.

Keywords: Managers, worker mobility, trade status, wage premia, displacement, export experience

JEL classification: F10, L25, J31, J60, M50

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1. Introduction

Understanding the determinants of firms' export status and export performance is key to a number of policy-relevant issues like the nature of the gains from trade, the design of schemes to support firms' export participation, and the reaction of trade volumes and prices to macro-economic shocks. The current heterogeneous firms framework in international trade is dominated by the productivity paradigm. Firms self-select themselves into the export activity based on their productivity. By fostering competition among firms, trade integration spurs a Darwinian process leading to the survival of the most productive firms only. This ultimately increases average industry productivity giving rise to both a new source of gains from trade and to new margins of adjustments of total trade volumes and prices.

The goal of our paper is to go beyond the productivity paradigm by both identifying and quantifying the contribution of another key determinant of firms' trade status: workers' export experience. We are interested in understanding whether export experience, broadly defined as having previously worked for an exporting firm, matters for successfully starting and/or continuing to export. An alternative way of reframing our research question is whether workers acquire some valuable export-related knowledge by working in exporting firms and are then able to successfully transfer some of this knowledge to new employing firms. Our analysis consists of two steps. In the first step, we investigate whether export experience is reflected in workers' wages. To the extent that valuable knowledge is actually transferred to the new employer, we expect export experience to correspond to a wage premium. In the second part of our analysis, we tackle our research question more directly and model a firm's trade status and its evolution over time as a function of the share of workers in the firm that have export experience. This exercise is prone to a number of endogeneity issues that we address by using an IV approach.

In order to answer our research question, we start by constructing a unique dataset for Portugal by merging two sources. The first one is *Quadros de Pessoal*, a matched employer-employee dataset covering the entire population of workers and widely used in the labor literature. The second is the universe of transaction-level firm-trade data coming from customs returns forms (extra-EU trade) and Intrastat forms (intra-EU trade). The two datasets provide us the means to draw a sharp portrait of workers' export experience and its flow across firms with different trade status. This is possible thanks to two quite unique features of our data: an exhaustive coverage and a high degree of reliability.

In the first part of our analysis we estimate a Mincerian wage equation and test both whether there is evidence of an export experience premium and whether such premium

is characterized by a level and/or trend component. A related question that we also address is whether export experience is valuable only when the worker is a manager or rather if a premium exists also for non-managers. Overall, we find that the (for us) observable export experience corresponds to a 5% premium for managers' wages only. Such premium is larger than the premium of being a manager with respect to a non-managerial white collar worker and has both a level and a trend component that jointly lead to a whopping 15% premium over a 7 year interval. Our estimations are robust to controlling for a wealth of workers' and firms' characteristics including worker-trade status fixed effects, past employer size and productivity, and broad employer change patterns.

Once established that a wage premium exists and that it involves only managers, we go one step further and model a firm's trade status and its evolution over time as a function of the share of current managers in the firm that have export experience. We consider a large battery of time-varying controls including firm size and productivity as well as measures of the observable and unobservable ability of managers, i.e. average and standard deviation of managers' age and education as well as average and standard deviation of managers' fixed effects coming from the Mincerian wage regression. Moreover, following Roberts and Tybout (1997), we condition for the firm past trade status, the latter reflecting the option value of sunk entry costs, and consider separately the impact of export experience on export entry and exit.

We start by providing OLS results while subsequently turning to an IV strategy that mimics a random matching between managers with export experience and firms. In particular, we draw on some exogenous variation in local managers' demand and supply. On the demand side, we use the firm-level ratio of managers to workers 3 years prior to the year t of analysis as a predictor of subsequent hiring of managers by a given firm. Being a substantial part of managers with export experience employed in t arrived within the last two years, this instrument is ultimately correlated with the share of experienced managers and, following Roberts and Tybout (1997), 3 years can be considered a sufficiently long time span for the past not to matter for export status. On the manager supply side, we consider the local availability (within a NUTS 3 region) of managers that change firm because of job displacement and we focus in particular on firms' closure.¹ As outlined in Dustmann and Meghir (2005), a firm closure can be thought to be an exogenous shock to a worker's career, since it results in a separation of all plant's workers and it is not related to the worker's own job performance. Furthermore, for a variety of reasons that can be considered as exogenous in our analysis, workers tend to search and

¹Displacement is usually defined as the permanent and involuntary separation of workers from their jobs without cause (i.e. for economic reasons). Displacement occurs when a firm shuts down or substantially downsizes.

accept more easily new jobs in the same location of the past job. Combining these two arguments, the local availability of displaced managers with export experience can be considered as an exogenous labor supply for local firms.

IV estimations indicate that the share of managers with export experience is more important than firm size and productivity for the export entry process with a one standard deviation increase leading to more than double the probability to start exporting. IV results further indicate that export experience is more valuable for large firms while suggesting that the key year for managers' arrival to matter is the year the firm starts exporting. On the other hand, export experience acquired by managers from previous employers has no effect on the likelihood to successfully continue international business while firm size and productivity do. Indeed, exporting firms have managers that have developed export experience within the firm with its past export activity and our findings suggest that internal and external experience do not complement each other.

Our paper is related to the recent literature of heterogenous firms and trade. Starting with the seminal paper by Melitz (2003), many trade models have been building around a Darwinian selection mechanism of the most productive firms into export activity. The recent availability of firm-level trade data has allowed to heavily improve our understanding of the determinants of export status with data suggesting that exporting firms are larger, have a more skilled workforce, do more R&D, and pay higher wages. However, even considering all these different dimensions, these models are still far from matching the degree of cross-sectional heterogeneity across firms in their export participation and intensity. There are indeed many very productive firms that do not export at all and quite a few very unproductive firms that do sell abroad. Export experience might thus be one of the missing elements of the story.

Two natural questions that arise at this stage are what kind of valuable knowledge corresponds to export experience and why managers are so special. One possibility is that the export experience of managers adds to the productivity of a firm in a way that is not fully captured with standard firm productivity estimations based on production and inputs use measures. In this respect, Blinder (2006) and Grossman and Rossi-Hansberg (2008) suggest that the complexity of the tasks involved in the different stages of the production process is key to understand recent trends in international trade. At the same time, Antràs, Garicano and Rossi-Hansberg (2006) explicitly focus on teams of workers and their formation in a globalized economy and highlight the key distinction between managers and non-managers based on tasks complexity. However, there is at least another option to be considered. Managers are also different from other workers because they are in charge of marketing and commercialization activities (which are not necessarily more complex) like, for example, setting-up distribution channels, finding and establishing relationships with foreign suppliers, setting up marketing activities

directed at finding and informing new buyers, and building a customer base. Arkolakis (2007) and Eaton, Eslava, Kugler and Tybout (2009) stress the role of search and marketing costs in international trade and provide evidence of the importance of the continuous “search and learning about foreign demand” problem that firms face when selling abroad.

Our findings are related to both Muendler and Molina (2009) and Balsvik (2010). On the relationship between firms’ trade performances and hiring from exporters, Muendler and Molina (2009) show that anticipated export status, predicted with destination-country trade instruments, leads firms to prepare their workforce by hiring workers from other exporters, and that hiring former exporter workers is correlated with both a wider reach of destinations and a deeper penetration of destinations. Though very rich in scope, Muendler and Molina (2009) do not provide evidence of a wage premium for former exporter workers nor analyze the causal impact of workers, and in particular managers, on firms’ trade performances. On the evidence of the transmission of some valuable knowledge that is capitalized into wages, Balsvik (2010) finds that movers from multinational enterprises (henceforth, MNEs) to non-MNEs receive a 5% wage premium compared to stayers in non-MNEs and that there is a positive correlation between the share of workers with MNE experience in non-MNEs plants and the productivity of these plants. Besides focusing on MNE and spill-overs, Balsvik (2010) does not explore the distinction between managers and non-managers nor try to establish a causal relationship between workers’ experience and firms’ performances. Finally, our focus on managers is shared with a large body of literature at the intersection of different fields. Among the wide range of topics covered, and of particular relevance for our analysis, some of this literature is devoted to explaining the determinants of their pay (Gabaix and Landier (2008) and Guadalupe and Wulf (2008)), while other frameworks focus on the impact of managers on corporate decisions and firm performance (Bertrand and Schoar (2003), Bloom and Van-Reenen (2010), and Bloom, Eifert, Mahajan, McKenzie and Roberts (2010)).

The rest of the paper is organized in five additional Sections. Section 2 describes the construction of the dataset used in estimations. In Section 3 we expand on the scope of our research and provide definitions of our key variables and a first glance to the data. Section 4 develops a Mincerian wage analysis to test both whether there is evidence of an export experience premium and whether such premium is related to the type of worker (managers vs. non-managers). In Section 5 we explicitly model a firm’s trade status and its evolution over time as a function of, among other, the share of current managers in the firm that have export experience. In order to deal with endogeneity we use an IV strategy that mimics a random matching between managers with export experience and firms. Section 6 concludes and provides directions for further research. Additional

details about the data and complementary Tables are provided in the Data and Tables Appendix respectively.

2. Data

Our analysis relies on information resulting from the merge of two major datasets: a panel dataset on trade at the firm-country-product level and a matched employer-employee panel dataset. Trade data come from Statistics Portugal (INE - *Instituto Nacional de Estatística*) while employer-employee data come from *Quadros de Pessoal* (henceforth, QP), a dataset made available by the Ministry of Labor and Social Security. In the following, we provide details of the two datasets and the sample resulting from the merge.

2.1 Trade Data

Statistics Portugal collects data on export and import transactions by firms that are located in Portugal on a monthly basis. These data comes from customs return forms in the case of extra-EU trade and from a special form supplied to the Portuguese statistics agency in the case of intra-EU trade (Intrastat). The same information is used for official statistics and, besides small adjustments, the merchandise trade transactions in our dataset aggregate to the official total exports and imports of Portugal. Each transaction record includes, among others, the firm's tax identifier, an eight-digit Combined Nomenclature product code, the destination/origin country, the value of the transaction in euros, the quantity (in kilos and, in some case, additional product-specific measuring units) of transacted goods, and the relevant international commercial term (FOB, CIF, FAS,...etc.).² We were able to gain access to data from 1995 to 2005 for the purpose of this research. We use data on export transactions only, aggregated at the firm-year level.

²In the case of intra-EU trade, firms have the option of "adding up" multiple transactions only when they refer to the same month, product, destination/origin country, Portuguese region and port/airport where the transaction originates/starts, international commercial term, type of transaction (sale, resale,...etc.), and transportation mode. In the case of intra-EU trade, firms are required to provide information on their trade transactions if the volume of exports or imports in the current year or in the previous year or two years before was higher than 60,000 euros and 85,000 euros respectively. More information can be found at: <http://webinq.ine.pt/public/files/inqueritos/pubintrastat.aspx?Id=168>.

2.2 Matched Employer-employee Data

The second main data source, *Quadros de Pessoal*, is a longitudinal dataset matching all firms and workers based in Portugal.³ As for the trade data, we were able to gain access to information from 1995 to 2005. Information for the year 2001 is only partly available due to issues arisen in the collection of the data. In the next Section we provide details on how we deal with this missing data problem for some key variables of our analysis.

The data are made available by the Ministry of Labor and Social Security, drawing on a compulsory annual census of all firms in Portugal that employ at least one worker. Each year every firm with wage earners is legally obliged to fill in a standardized questionnaire. Reported data cover the firm itself, each of its plants, and each of its workers. The variables available in the dataset include the firm's location, industry, total employment, sales, ownership structure (equity breakdown among domestic private, public or foreign), and legal setting. The worker-level data cover information on all personnel working for the reporting firms in a reference month (October). They include information on gender, age, occupation, schooling, hiring date, earnings, hours worked (normal and overtime), etc. The information on earnings is very detailed. It includes the base wage (gross pay for normal hours of work), seniority payments, regular benefits, irregular benefits and overtime pay.

Each firm entering the database is assigned a unique, time-invariant identifying number which we use to follow firms over time. The Ministry of Labor and Social Security implements several checks to ensure that a firm that has already reported to the database is not assigned a different identification number. Similarly, each worker also has a unique identifier, based on the worker's social security number, which allows us to follow individuals over time. The administrative nature of the data and their public availability at the workplace - as required by the law - imply a high degree of coverage and reliability. The public availability requirement facilitates the work of the services of the Ministry of Employment that monitor the compliance of firms with the law (e.g., illegal work).

³*Quadros de Pessoal* has been used by, amongst others, Cabral and Mata (2003) to study the evolution of the firm size distribution; by Blanchard and Portugal (2001) to compare the U.S. and Portuguese labor markets in terms of unemployment duration and worker flows; by Cardoso and Portugal (2005) to study the determinants of both the contractual wage and the wage cushion (difference between contractual and actual wages); by Martins (2009) to study the effect of employment protection on worker flows and firm performance. See these papers also for a description of the peculiar features of the Portuguese labor market.

2.3 Combined dataset

The two datasets are merged by means of the firm identifier. As in Cardoso and Portugal (2005), we account for sectoral and geographical specificities of Portugal by restricting the sample to include only firms based in continental Portugal while excluding Nace rev.1 2-digit industries 1, 2, and 5 (agriculture and fishery) as well as 95, 96, 97, and 99 (minor service activities and extra-territorial activities). Turning to workers, we consider only single-job full-time workers aged between 16 and 65 and working a minimum of 25 and a maximum of 80 hours (base plus overtime) per week. The hourly wage in euros is based on the total number of hours worked (normal plus overtime) and is constructed as the sum of the base wage plus overtime wages and regular benefits. In order to control for outliers, we apply a trimming based on the hourly wage and eliminate 0.5% of the observations on both extremes of the distribution.

In what follows we focus on manufacturing firms only (Nace codes 15 to 37) because of the closer relationship between the export of goods (that is key in our analysis) and the production activity of the firm.⁴ Furthermore, being "managers" the job category we are particularly interested in, we focus our analysis on the subset of firms with at least one employed manager. The majority of firms in our data do not have an (employed) manager (64.2%). Indeed, to identify managers we need the person(s) running the firm to be paid a wage. For example, a firm owner running a firm as a self-employed will be picked up in our data because a wage, along with an individual identifier, is reported in the QP. This is also the case whenever the person running the firm is a third person employed by the owners(s). However, if there is no third person(s) and none of the owners is self-employed we won't be able to attribute managers to the firm. Our analysis is thus representative of larger and more organizationally structured firms that are indeed those accounting for the bulk of trade in Portugal. Indeed, firms with at least one manager represent (in 2004) 73.3% of exporting firms and account for 99.9% of Portuguese exports in the manufacturing industry and for 98.8% of employment.

Insert Table 1 about here.

In our study we perform two complementary analyses. In section 4 we estimate a wage equation in order to identify the existence of a premium for workers' export experience whose definition, along with those of firm trade status, occupational categories and displaced workers, is provided in Section 3.1. In Section 5 we investigate the link between managers, export experience, and firm trade status by performing both simple and IV estimations. Because of the requirements imposed by our definitions, both analyses have

⁴As explained below, even though our analysis focuses on manufacturing firms we use data both on manufacturing and non-manufacturing firms to build some of our key variables. Moreover, we also carried out a complete analysis for non-manufacturing firms. Results are available upon request.

been performed over the period 1997-2004. The top (bottom) panel of Table 1 reports summary statistics – for the year 2004 – of worker-level (firm-level) variables used in our estimations and referring to observations for which all covariates – except in the IV case – are jointly available. The top panel of Table 1 indicates, among other, that in 2004 there are 386,062 workers in our sample with an average (log) hourly wage of 1.373 euros, an average age of 38.4 years, an average education of 7.4 years, and an average firm tenure of 10.6 years.⁵ The bottom panel of Table 1 tells us, among other information, that these workers are employed by 12,342 firms and reports the trade status, average (log) size and apparent labor productivity across firms, as well as their (log) age, the share of foreign-owned firms (4.9%), and the mean and standard deviation of managers’ age and education within the firm.⁶ Finally, the variable “Exports PT”, obtained aggregating HS6 codes export data from the BACI dataset provided by CEPII (Centre d’Etude Prospectives et d’Informations Internationales), represents (log) aggregate exports of Portugal of products belonging to Nace rev.1 2-digit industries.

We provide in the next Section the definition of the key variables of our analysis while expanding on the scope of our research. We further give a first glance on the existence of a wage premium for managers with export experience, the impact of managers with export experience on firms’ trade status, and statistics on the distributions of experienced managers across firms.

3. Managers, export experience, trade status, and displacement

3.1 Key definitions and scope of the research question

Managers

Throughout our analysis we distinguish between managers and non-managers. Conceptually, we want to identify a group of workers (managers) that is responsible for the main strategic decisions taken within the firm. Managers are responsible for high-level tasks including the organization of the firm, strategic planning, the shaping of technical, scientific and administrative methods or processes and the orientation of teams.⁷ In

⁵Worker tenure, wage and the identification of the hiring date are defined and described at length in the Data Appendix. We thank Anabela Carneiro for providing the conversion table between education categories (as defined in QP) and number of years of schooling for every year of the data.

⁶Firm age, size, apparent labor productivity and foreign-ownership are defined and described at length in the Data Appendix.

⁷Bertrand and Schoar (2003) investigate whether individual managers affect corporate behavior. Even though they cannot claim causality, they do find systematic behavioral differences in corporate decision-making across managers. Bloom and Van-Reenen (2010) claim that differences in productivity across countries and firms largely reflect variations in management practices.

practical terms, we refer to a classification of workers according to eight hierarchical levels defined by the Portuguese law.⁸ The classification is made according to the task performed and skill requirements and each level can be considered as a layer in a hierarchy defined in terms of increasing responsibility and task complexity. Each firm is required to classify workers according to these grade levels. Table 8 in the Tables Appendix supplies a full description of the hierarchical levels. We define a manager as a worker belonging to one of the top three hierarchical levels: "Top management", "Middle management" or "Supervisors, and team leaders". Moreover, we define as white collar a worker belonging to the fourth hierarchical level ("Higher-skilled professionals"), as blue collar a worker belonging to the fifth ("Skilled professionals"), sixth ("Semi-skilled professionals") or seventh ("Non-skilled professionals") hierarchical level and as other collar apprentices and other workers.

The reasons why we focus on the distinction between managers and non-managers are twofold. First, there is a growing literature looking at the relationship between trade and tasks. Blinder (2006) and Grossman and Rossi-Hansberg (2008) suggest that the complexity of the tasks involved in the different stages of the whole production process (design, manufacturing of parts, assembly, R&D, marketing, commercialization, etc.) is key to understand recent trends in international trade and in particular outsourcing. At the same time, Antràs et al. (2006) explicitly focus on teams of workers and their formation in a globalized economy and highlight the key distinction between managers and non-managers based on tasks complexity. Managers are different from other workers and likely to be particularly important for trade activity because they are responsible for the most complex tasks within a firm.

Second, managers are also different from other workers because they are in charge of marketing and commercialization activities (which are not necessarily more complex) like, for example, setting-up distribution channels, finding and establishing relationships with foreign suppliers, setting up marketing activities directed at finding and informing new buyers, and building a customer base. Arkolakis (2007) and Eaton et al. (2009) stress the role of search and marketing costs in international trade and provide evidence of the importance of the continuous "search and learning about foreign demand" problem that firms face when selling abroad. At the same time, Araujo, Mion and Ornelas (2010) show the importance of trust-building in repeated interactions between sellers and buyers in an international market.

It is certainly difficult to draw a straight line between these two dimensions under which managers are different from other workers. Indeed, researching the foreign regulatory environment and adapting the product to make sure that it conforms to

⁸See the Decreto Lei 121/78 of July 2nd.

foreign standards (which includes testing, packaging, and labeling requirements) is a commercialization activity that involves complex tasks. In a similar vein, making sure the product meets the right quality standards for the targeted foreign demand which is, as showed in Verhoogen (2008) and Iacovone and Javorcik (2009), a key element of international success is an example of an activity characterized by both a strong commercial nature and tasks complexity. It is beyond the scope of our research to disentangle these two facets and in what follows we will have both of them in the background.

In the second and fifth columns of Table 2 we report the number of, respectively, workers and managers for each year of the estimation sample (1997 to 2004). The ratio of managers to workers increases over time as a consequence of the decline of production jobs and, based on our classification, managers roughly represent in-between 10 and 15% of workers in manufacturing firms. Such share is larger than the one reported in other studies on managers like, for example, Iranzo, Schivardi and Tosetti (2008) with the key reason being that we use a looser definition of managers. Like any dividing line, our definition is certainly prone to questioning. Nevertheless, we believe that the boundaries we set are more appropriate to the issues we focus in this study and that, in the end, what is a good definition is (often) an empirical question. In this respect, we will show later on that our loose definition of managers will indeed be empirically successful in drawing a strong dividing line with respect to other workers. Furthermore if, for example, only top management matters our results can still be interpreted as providing a lower bound of the effect of managers.

Insert Table 2 about here.

Export experience

Having good reasons to believe that managers are special when it comes to trading on foreign markets does not mean that managers are all alike. Arguably, the knowledge and skills of a manager (and workers in general) cannot be considered as purely fixed but evolve over time depending on the different situations faced along a career. In particular, some managers have had the chance to be involved in export activities in the past. Likely, experience acquired yesterday improves the capacity of a manager to deal with the complex tasks required in exporting and develop business networks today. Therefore, all other things being equal, managers with export experience will be more valuable than others for trading activities. To the extent that such knowledge is transferable from one firm to the other, it thus represents a valuable asset for the manager (when changing employer and/or renegotiating the wage) and will affect the export performances of the current employer. In our analysis, we are particularly interested in capturing the flow of such export experience across firms via the mobility of managers and, more precisely, we want to identify the significance and magnitude of this channel on managers' wages

and firms' trade status change. Firms' trading status, managers, wages, and mobility are therefore, for our purposes, four crucial interconnected aspects of the data.

Exploiting the matched employer-employee feature of our dataset, we are able to track workers over time. This allows us to identify, for each firm-year pair, the subset of currently employed workers that have previously worked in a different firm. Moreover, exploiting the trade dataset, we can single-out those workers that were employed in the past by an exporting firm. We define the latter group as "workers with export experience acquired outside the firm". In the remaining of the paper, we will refer to them simply as "workers with export experience" and, since we are able to track all workers, we consider both managers and non-managers with export experience and assess whether export experience matters for managers only or both. Columns 3 and 6 of Table 2 report the number of, respectively, workers and managers with export experience for each year of the estimation sample. As one can see, numbers are increasing over time due to the fact that: (i) we cannot identify the export status of previous employers before 1995; (ii) as workers move across firms during the 1997-2004 estimation period, more and more workers acquire export experience. On the one hand, this feature of the data exposes us to measurement error meaning that we fail to identify, especially in early years, some worker as having export experience. However, this should not be much of a concern in our analysis as the type of measurement error we face should provide us with a lower bound of the value of export experience for the worker (Section 4) and should not systematically affect our comparison of firms with different trade status (Section 5). On the other hand, the value of export experience is likely to be characterized by a time decay. The fact that we only consider export experience related to export activity carried in between 1995 and 2005 avoid us to classify a worker as having export experience because of a very distant job in the past.

Parallel to the case of managers, our definition of export experience can be debated. Pushing the time decay argument further, one can think of refining our definition by imposing that the previous job in an exporting firm must be recent enough. In the same vein, one can argue that experience acquired in a firm exporting a lot (for example at least 500,000 euros) can be more valuable. Last but not least, the number of years a worker spent in a previous exporting employer can be relevant as well. In unreported estimations, we actually experimented with all three refinements finding very similar results with respect to our basic definition of export experience. Though surprising at first sight, we did not find strong evidence that, for example, export experience acquired in a large exporter matters more. At second sight, however, this can be quite easily rationalized. A large exporting firm has typically several managers meaning that each of them is actually exposed only to a "fraction" of the tasks and network activities involved in the trade business. Indeed, we only find that refining export experience by imposing a

constraint on the number of years a worker spent in a previous exporting firm provides stronger results. However, the magnitude of the difference is quite small. All in all, these findings make us believe that our loose definition of export experience is enough to get the big picture of a phenomenon that, if more tightly measured, would provide even stronger results.

Finally, it is important to stress that we focus here on one out of many possible channels of export-related knowledge transmission and that a distinction should be made between internal and external export experience. From the perspective of a firm wanting to enter the export market for the first time, export-related knowledge can only be acquired from sources outside the firm as there is no in-house experience. In this light, our analysis looks at the effect of export experience brought into a firm by newly hired workers on the likelihood to become an exporter. Though arguably important, other channels are certainly at work. For example, export-related knowledge can also be developed via training programs aimed at increasing managers' knowledge and links to foreign markets. Other information sources, like partnership and/or business projects between exporting and non exporting firms, can also drastically impact the capacity of a firm to engage in international trade.⁹ On the other hand, from the perspective of a firm which is already exporting, there is already some available export experience within the firm. In this perspective, our analysis can also shed light on the substitutability/complementarity between external and internal sources of export experience.

Trade status

In order to distinguish among firms that start and quit exporting we consider several firm trade status categories. Partly following Eaton, Eslava, Kugler and Tybout (2008), we divide firms into five categories on the basis of their (temporal) degree of involvement in export markets. Each firm is classified, at any point in time, as a "New exporter", "Continuing exporter", "Exiting exporter", "Never exporter" or "Other exporter". The classification is exhaustive and is based upon the behavior of the firm in a time span of four years. Specifically, a firm in year t is classified as a (i) "New exporter" if the firm exports both in t and in $t + 1$ but was not exporting in the two preceding years ($t - 1$ and $t - 2$); (ii) "Continuing exporter" if the firm exports continuously from $t - 2$ to $t + 1$; (iii) "Exiting exporter" if the firm was exporting in $t - 2$ and $t - 1$ but does not export in the following two years (t and $t + 1$); (iv) "Never exporter" if the firm never exports from $t - 2$ to $t + 1$; (v) "Other exporter" if the firm does not belong to any of the previous categories. The top panel of Table 3 reports the number of firms classified by trade status for each year in the sample. In Section 5, we study the relationship

⁹However, the evidence provided in Bernard and Jensen (2004) suggests that the impact of export promotions programs and industry/geographical informational spillovers among exporters is rather weak.

between managers with export experience and firms' trade status change by focusing on two comparisons: New exporters vs. Never exporters and Exiting exporters vs. Continuing exporters. The idea behind this strategy is to compare, at each point in time t , firms with the same (two years-long) exporting history but that "suddenly" take divergent paths. Considering those firms that were not exporting both in $t - 2$ and in $t - 1$, we are interested in understanding if and how much experienced managers affect entry into the export activity. On the other hand, when comparing firms that were exporting both in $t - 2$ and in $t - 1$, we are interested in understanding if and how much experienced managers affect the capacity of the firm to keep exporting. In both cases, we are interested in an "informed/successful/structured" decision to export as opposed to a "random/occasional" presence in export markets and this is the reason why we use two year continuous (non-)export intervals to construct our trade status categories.¹⁰ Our key variable is the (within firm) share of managers employed in t who have export experience. The bottom panel of Table 3 reports the average value (across firms) of this share by trade status-year.

Insert Table 3 about here.

Displacement

In the last part of Section 5 we refine the trade status analysis by using an IV strategy. In order to mimic a random matching of managers and firms, we draw on some exogenous variation in managers' demand and supply and instrument the share of managers with export experience. On the demand side, we use the ratio of managers to workers within the firm in year $t - 3$ as a predictor of subsequent hiring by a given firm. Indeed, there is a positive correlation in the data between this ratio and firm hiring in-between $t - 2$ and t . Being a substantial part of managers with export experience in t arrived within the last two years (about 42%, see Table 1), this instrument is ultimately correlated with the share of experienced managers and, following Roberts and Tybout (1997), 3 years can be considered a sufficiently long time span for the past not to matter for export status.

On the manager supply side, we consider the local availability (within a NUTS 3 region) of managers that change firm because of displacement and we focus in particular on firm closure.¹¹ As outlined in Dustmann and Meghir (2005), a firm closure can be

¹⁰A number of recent papers (e.g. Eaton et al. (2008) for Colombian firms, Amador and Opromolla (2008) for Portuguese firms, and Albornoz, Calvo-Pardo, Corcos and Ornelas (2010) for Argentinean firms) has unveiled quite a few randomness showing that (i) many exporters are single-year, i.e. they export only for a year (or less), (ii) their average export sales are extremely below average, and (iii) their average export sales grow rapidly, conditional on survival. In our data single-year exporters are classified as "Other exporters".

¹¹Displacement is usually defined as the permanent and involuntary separation of workers from their jobs without cause (i.e. for economic reasons). Displacement occurs when a firm shuts down or substantially downsizes.

thought to be an exogenous shock to a worker's career, since it results in a separation of all plant's workers and it is not related to the worker's own job performance. Furthermore, for a variety of reasons that can be considered as exogenous in our analysis, workers tend to search and accept more easily new jobs in the same location of the past job. Combining these two arguments, the local availability of displaced managers with export experience can be considered as an exogenous labor supply for local firms.

In order to classify workers as "displaced" we partly follow Carneiro and Portugal (2006) and proceed in three steps. First we identify firms' closures between 1995 and 2003. We define a firm as shutting down in year t when the firm is observed in the QP data in year t but is not observed in the dataset in any of the three subsequent years.¹² Second, we identify those workers that used to be employed in the past by a firm shutting down in t and that stayed in the closing firm till either t or $t - 1$. In order to distinguish workers' mobility due to firms' closures from mobility due to mergers & acquisitions we use the hiring date of the worker in the current firm. In particular, we require the worker hiring year in the current firm not to be smaller than the closure year of the previous firm.¹³ Finally, to make our argument stronger, we consider for this set of workers only those observations pertaining to their first job after displacement because subsequent employer changes are likely to be endogenous to both worker and employer characteristics. Columns 4 and 8 of Table 2 report (respectively) the number of displaced workers and managers with export experience for each year of the sample. Due to our firm closure definition, in 2004 there are no displaced workers/managers.

Key features of our data

All in all, the QP and trade datasets provide us the means to draw a sharp portrait of the workers' (and especially managers') export experience and its flow across firms with different trade status. This is possible thanks to two quite unique features of our data: an exhaustive coverage and a high degree of reliability. These two key characteristics allow us to follow workers and firms over time while being able to record workers' accumulation of export experience and changes in firms' export activity. Furthermore, the richness of the data allow us to control for a wealth of both worker and firm characteristics like (among others) job location, workers' education and skills, and firms' size, productivity and foreign ownership. Last but not least, the capacity to precisely identify

¹²This time span should be sufficiently long to avoid measurement errors due to "temporary exits", with the most likely reason for such exits being that the survey form was not received by the Ministry of Employment before the date when the recording operations were closed. See Carneiro and Portugal (2006) for further details.

¹³The reason is that, in the case of mergers & acquisitions, the hiring year of workers who stayed in the new firm is likely to be the hiring year corresponding to the pre-merger/pre-acquisition situation.

firms' closures and job displacement enriches our investigation with a key element to assess a causal relationship.

3.2 *A first glance at the data*

Wages and export experience premium

There is a large body of literature concerned with the existence and the explanation of a wage premium for workers of exporting (as opposed to non-exporting) firms.¹⁴ As shown in Martins and Opromolla (2009), Portugal is not an exception to this robust empirical finding. What Figures 1 and 2 add to this debate is that the wage premium seems to come essentially from managers. Figure 1 shows the kernel density of the log hourly wage distribution in our 2004 sample for non-managers broken down by firm export status.¹⁵ The densities of export-involved firms (New, Exiting, and Continuing exporters), when compared to the density of Never exporters, indicate somewhat higher wages but magnitudes look pretty small. Differences become much clearer in Figure 2 when the same descriptive exercise is applied to managers' wage densities. Export-involved firms seem to consistently pay managers more. The evidence is particularly strong for Exiting exporters in the middle-top of the distribution, while for Continuing and New exporters the difference is more pronounced when considering top wages.

Insert Figures 1 and 2 about here.

Such purely descriptive result certainly needs econometric testing and controls for both workers and firms characteristics. However, to the extent that the size of the premium conveys information about the value of a worker for a firm, Figures 1 and 2 indicate that managers are relatively more valuable for export-involved firms. This is consistent with our idea that those workers (managers) involved in high-level tasks (like organization, strategic planning, and team orientation) as well as in marketing and commercialization activities are of particular value when the dividing line across firms is the export activity.

Insert Figures 3 and 4 about here.

A further step, which is more closely related to our research question, is to ask whether managers' export experience pays, i.e. if there exists a premium for the export experience of a manager. Figures 3 provides a descriptive answer to such a question while Section 4 delivers a more solid econometric answer building on a Mincerian wage regression. The

¹⁴See Schank, Schnabel and Wagner (2007), Munch and Skaksen (2008), and Frias, Kaplanz and Verhoogen (2009) among others.

¹⁵The density referring to the group Other exporters is not reported in order to make the picture more readable.

top-left panel of Figure 3 shows the kernel density of the log hourly wage distribution, in our 2004 sample, for managers with and without export experience referring to the group of Never exporters. Interestingly enough, managers with export experience seem to gain higher wages than managers without such experience in Never exporting firms. This finding is consistent with either managers' export experience being correlated with some valuable (for both trading and non-trading firms) characteristics or with a compensating differential story. The remaining panels of Figure 3 display the same kernel distribution in the three other firm groups: New, Continuing, and Exiting exporters. It is pretty clear from the Figure that in all cases higher wages are paid to managers with export experience thus suggesting that also export-involved firms value export experience. What is not clear from Figure 3 is whether the export experience premium paid by trade-involved firms is higher than that paid by Never exporters. We leave the answer to this question for Section 4.

Another intriguing issue in our analysis is whether the export experience premium we observe confounds firm change patterns in managers' wage profiles. Indeed, in order to gain export experience, our definition requires a worker to change employer. Workers with export experience are thus a sub-sample of those workers changing employer at least once in our sample. In order to gain some preliminary insights on this issue, Figure 4 provides a graphical overview of a simple difference-in-difference exercise. For simplicity, we consider here (unlike in the wage regression analysis of Section 4) only those workers that change firm only once in the 1997-2004 period and are managers in the new firm. The treated group is represented by managers moving to another firm while contemporaneously gaining export experience in $t \in [1997, 2004]$. The control group is represented by managers moving to another firm in t but not gaining export experience because the former employer was not an exporter. Figure 4 provides the average log wage of both the treated and control group (left axis), as well as their difference (right axis), in between $t - 3$ and $t + 2$. This simple exercise reveals that managers acquiring export experience at some date t were, on average, previously gaining a higher wage than those that simply change employer. However, the difference between the wage of the treated and control group was steadily shrinking before t . Suddenly, at the time of the employer change t , there is a break in the pattern of the wage difference that continues also in $t + 1$, and slows down in $t + 2$. Besides showing that the acquisition of export experience is more than simply changing employer, Figure 4 suggests that the export experience premium has both a level and trend component. We will come back to this issue more in detail in Section 4.

Export experience and trade status

Insert Figures 5 and 6 about here.

In Section 5 we complement our wage analysis by looking at firms' trade performance and its link to the presence of managers with export experience. Among the different firm trade performance margins, we focus on trade status and consider as key variable the (within the firm) share of managers employed in t who have export experience. The bottom panel of Table 3 reports the average value of this share by trade status-year. In order to shed light on the impact of managers' export experience on the entry into export activity, we will be comparing in Section 5 two sets of firms that have in common the fact of not having exported in both $t - 1$ and $t - 2$ but that, suddenly, take diverging paths from t onwards: New exporters who exports in both t and $t + 1$ and Never exporters who keep selling only domestically. Table 3 reveals that, in each year of our sample, the share of managers with export experience is higher in New than in Never exporters with the ratio of the two shares being around three. Figure 5 provides further insights on this difference by looking at its evolution around the key date t with levels of the two shares being reported on the left axis and the difference being reported on the right axis. Considering our working window of 4 years, one can appreciate that the share of managers with export experience is higher in New as compared to Never exporters already in $t - 2$. However, the difference increases reaching its peak in t when New exporters start exporting.

Clearly, this represents only descriptive evidence and can simply be considered as a necessary (but not sufficient) condition on the data to be consistent with a causal impact of managers' export experience on starting to export. In particular, the fact that the share is higher in New exporters already in $t-2$ calls for the introduction of additional covariates to help conditioning for differences between New and Never exporters. Furthermore, the direction of causality between the increase in the share of managers between $t - 2$ and t and the entry into export activity by New exporters is certainly an issue and calls for some source of exogenous variation in the data to provide identification. We address both concerns in Section 5.

Parallel to the previous comparison, in Section 5 we will be contrasting firms that have in common the same successful export activity in the two previous years but that, starting from t , take diverging paths: Continuing exporters who keep exporting in both t and $t + 1$ and Exit exporters who do not to export in these two years. A quick look at Table 3 reveals that the share of managers with export experience might indeed play a role in the export exit process. In each year of our sample, the share of managers with export experience is higher in Continuing than in Exit exporters with the ratio of the two shares being around 1.3. However, Figure 6 shows that the situation is much less clear than in the previous case.

By looking at levels of the two shares (left axis) and their difference (right axis) one can appreciate that Exiting firms start with a lower share in $t - 2$. However, the difference

shrinks in $t - 1$ while increasing in the dividing year t and changing actually sign in $t + 1$. Econometric tools will be used in Section 5 to gain a better understanding of this comparison.

4. Wage analysis

A first step in the quest of a causal relationship between the export experience brought by managers into a firm and its trade performance is to assess whether such an experience is valued on the labor market. To the extent that valuable export-related knowledge is actually transferred to the new employer, we expect export experience to correspond to a wage premium.¹⁶

To achieve this goal, we estimate a Mincerian wage equation and test both whether there is evidence of an export experience premium and whether such premium arises in the first year a manager joins the new firm and/or accrues with time. Furthermore, we explore whether the export experience premium is related to the degree of involvement of a firm into the export activity. Arguably, the premium should reflect the expected increase in the stream of profits induced by the managers having export experience and therefore vary according to the degree of export participation and/or ambitions of a firm.

A related question that we also address is whether export experience is valuable only when the worker is a manager or rather if a premium exists also for non-managers. The existence of a premium for non-managers would be consistent with the presence of some sort of knowledge valuable to the exporting activity brought into the firm by blue and/or white collars. Arguably, given the nature of the jobs involved, such knowledge would be a dimension of firms' productivity which is, eventually, not fully captured by productivity estimations. The existence of a premium for managers *only* would instead have more ambiguous implications because managers can potentially affect both firms' productivity and accessibility to foreign demand.

4.1 Econometric model

We index workers by i , firms by f , and time by t . Each worker i is associated at time t to a unique firm. The baseline wage regression we estimate is given by:

¹⁶If externalities are at work and/or labor markets are not competitive, the value of the transferred knowledge needs not to be fully capitalized in a worker's wage. However, except for limiting cases, a wage premium should be observed.

$$\begin{aligned}
w_{it} = & \alpha + \beta_1 Age_{it} + \beta_2 Age_{it}^2 + \beta_3 Edu_{it} + \beta_4 Ten_{it} + \beta_5 Manag_{it} + \beta_6 Blue_c_{it} + \beta_7 Other_c_{it} \\
& + \beta_8 Epr_{it} + \beta_9 Epr_{it} \times Manag_{it} + TS_{ft} + Loc_{ft} + Ind_{ft} + Job_change_{it} + \gamma_1' \mathbf{C_fc}_{ft} + \gamma_2' \mathbf{P_fc}_{ft} \\
& + c_i + \delta_t + \varepsilon_{it}.
\end{aligned}
\tag{1}$$

w_{it} is the log hourly wage of worker i in year t , while Age_{it} and Age_{it}^2 denote, respectively, the age and age squared of a worker. Edu_{it} corresponds to the number of years of education and Ten_{it} is the number of years a worker has spent in the current firm since hiring (tenure). $Manag_{it}$, $Blue_c_{it}$, and $Other_c_{it}$ are dummies indicating the job qualification of a worker (respectively manager, blue collar, and other collar) with white collar being the excluded category. Epr_{it} is a dummy indicating whether worker i has export experience in t , as defined in Section 3.1, and is the key variable of interest. We consider both Epr_{it} and its interaction with the dummy $Manag_{it}$ to analyze whether export experience is valued differently between managers and non-managers.

As for other covariates, TS_{ft} is a set of dummies for firm f trade status category at time t , as defined in Section 3.1, with Never exporters being the excluded category. Loc_{ft} stands for a battery of 28 NUTS 3 region dummies corresponding to the location of firm f , while Ind_{ft} denotes a full set of dummies for the industry (Nace rev.1 2-digits) to which firm f belongs. Job_change_{it} is a rather important control corresponding to a series of dummies taking value one from the year t a worker changes employer for the 1st, 2nd, ..., n^{th} time. Indeed, as outlined in Section 3.2, we need these controls to be sure that the export experience premium does not confound job change patterns in workers' wage profiles. $\mathbf{C_fc}_{ft}$ is instead a vector of firm-time covariates referring to the *current* employing firm f that are likely to affect wages: (i) firm size (log of employment); (ii) firm apparent labor productivity (log of sales per employee); (iii) firm age (log); (iv) mean and standard deviation of both age and education of firm f managers;¹⁷ (v) a foreign ownership dummy;¹⁸ (vi) a proxy for firm f export demand given by Portuguese yearly aggregate (log) exports of products belonging to the Nace 2-digits industry of firm f . By contrast, $\mathbf{P_fc}_{ft}$ is a vector of controls referring to the *previous* employing firm f' . Export experience is in fact an attribute of the worker coming from his past job in an exporting firm. In order to isolate this effect from other characteristics of the previous employer we consider, in the spirit of Postel-Vinay and Robin (2002), both firm size and

¹⁷Inspired by Iranzo et al. (2008), these variables capture the age, and education structure of managers within the firm, which is likely to affect firm productivity and ultimately wages.

¹⁸Martins (2010) shows that foreign-owned Portuguese firms pay their workers more than other firms. This pay increase is consistent both with a 'wage policy effect' (greater 'generosity' in the remuneration practices of foreign firms vis-à-vis their domestic counterparts) and a 'selection effect' (foreign firms hire workers that are, on average, already better remunerated in their domestic firms than 'similar' workers).

apparent labor productivity of f' in the last year of employment of worker i .¹⁹ Finally, c_i are worker fixed effects, δ_t indicates time dummies, and ε_{it} is a wage shock that we assume to be uncorrelated with the covariates.

We use the standard within estimator to estimate the parameters of our baseline equation (1) while clustering standard errors at the worker level. As a robustness check, we also estimate a variant of (1) with “worker-firm trade status” fixed effects ($c_i \times TS_{ft}$) thereby allowing the value of the relationship to be match-specific and accounting for heterogeneity (across firm trade status) of the return on unobserved time-invariant worker characteristics. Fixed effects $c_i \times TS_{ft}$ are identified by workers changing firms with different trade status as well as by workers remaining into a firm that changes trade status.

In our estimations, we consider two additional specifications to (1). In the first one (time breakdown), we interact both Epr_{it} and $Epr_{it} \times Manag_{it}$ with time dummies to look at the time profile of the export experience premium for both managers and non-managers. In the second one (interactions), we consider all possible interactions between Epr_{it} , $Manag_{it}$ and TS_{ft} to investigate whether the export experience premium, for both managers and non-managers, varies depending on the trade status of a firm.

For our parameters to have a causal interpretation, i.e. being representative of the whole population of possible worker-firm matches, we are implicitly imposing the condition that matching is random conditional on covariates. Though restrictive, our hypothesis is made somewhat less strong by the fact that we make use of a large battery of firm and worker observables, as well as, either worker fixed effects (c_i) or match-specific worker-firm trade status fixed effects ($c_i \times TS_{ft}$).²⁰

4.2 Results

The coefficients of interest in (1) are β_8 and β_9 . By using worker fixed effects c_i and employer change dummies Job_change_{it} , the identifying variation comes from workers changing employer while acquiring export experience. Whenever we use worker-firm trade status fixed effects ($c_i \times TS_{ft}$), the identifying variation originates from workers changing for an employer with the same trade status while acquiring export experience.

¹⁹As shown in Postel-Vinay and Robin (2002), both past and current employer characteristics are key to determine a worker wage. In their search model with on-the-job-search, Postel-Vinay and Robin (2002) stress the importance of firm labor productivity for which our two covariates represent a reasonable proxy. In a few cases, the information about firm size and/or apparent labor productivity of f' is not available. In order to cope with this problem we set missing values to zero and make use of two categorical dummies taking value one whenever the information is not available.

²⁰Bandiera, Guiso, Prat and Sadun (2009) provide an example of how controlling for managerial ability is important. They find that more talented top executives are matched with larger firms and the level of managerial pay is increasing in firm size.

Table 4 reports the computed coefficients and standard deviations of β_8 and β_9 , along with a few summary statistics, coming from the estimation of our baseline specification (1) for the 1997-2004 manufacturing firms sample whose construction is described in Section 2.²¹ Columns 1 and 2 refer to the case of, respectively, worker and worker-firm trade status fixed effects. Columns 3 and 4 of Table 4 refer instead to the time breakdown specification and in particular contain the estimated coefficients and standard deviations of the interactions between Epr_{it} and $Epr_{it} \times Manag_{it}$ with time dummies. Estimates of all of the interaction coefficients between Epr_{it} , $Manag_{it}$ and TS_{ft} referring to the second alternative specifications (interactions) are instead reported in Table 9 in the Tables Appendix and summarized in a more readable way in Table 5. Finally, estimated coefficients (along with standard errors) of controls variables have the expected sign and magnitude and are reported, for all specifications, in Table 10 in the Tables Appendix. In all cases, standard errors have been clustered at the worker level.

Insert Tables 4, and 5 about here.

We are interested in answering the following five questions.

Question 1: Does export experience pay for a non-manager? The coefficient and significance of Epr_{it} in columns 1 and 2 of Table 4 indicate that the premium is actually small and negative, i.e. a non-manager earns about 2%-3% less upon having export experience.

Question 2: How does the export experience premium evolve over time for a non-manager? The coefficients and significance of interactions between Epr_{it} and time dummies in columns 3 and 4 of Table 4 indicate that the negative premium decreases over time and becomes basically not significant after 7 years.²²

Question 3: Does export experience pay for a manager? Contrary to the case of non-managers, columns 1 and 2 of Table 4 reveal that the sum of the coefficients of Epr_{it} and $Epr_{it} \times Manag_{it}$, i.e. the export experience premium for a manager, is positive, large, and (as indicated by the number of superscripts *) significant.²³ In estimations with worker fixed effects, the premium equals $0.054 = 0.073 - 0.019$ log wage points which is actually larger than the manager premium over a white collar (0.033) reported in column 1 of Table 10. Estimations with worker-trade status fixed effects convey the same message with the export experience premium ($0.045 = 0.073 - 0.028$) showing to be larger than

²¹Results for firms outside manufacturing are available upon request.

²²Within our estimation sample years (1997-2004), 7 years is the longest possible length of export experience. For those cases in which workers have, according to our definition, export experience already in 1997 we use the dummy "Other Year of Export Exp" which is also reported in Table 4 both alone and interacted with manager.

²³In columns 1 and 2, ***, **, and * correspond to the 1, 5, and 10% confidence level of the test that the sum of "Export Exp." and "Manag. X Export Exp." coefficients are different from zero.

the premium of being a manager with respect to a white collar (0.034).²⁴

Question 4: How does the export experience premium evolve over time for a manager? The coefficients value and the number of superscripts ^{*25} corresponding to the sum of interactions between Epr_{it} and $Epr_{it} \times Manag_{it}$ with time dummies in columns 3 and 4 of Table 4 indicate that the premium is significantly positive in all years and increases over time. In the case of worker fixed effects, the premium start at about 5% ($0.048 = 0.068 - 0.020$) on the first year of export experience and raises steadily to about 14% ($0.141 = 0.147 - 0.006$) in the 7th year of export experience.²⁶ Considering worker-trade status fixed effects the premium starts at 0.033 and reaches 0.154 at year 7.

Question 5: Does export experience (for both managers and non-managers) pay differently in trade-involved firms? The question we are interested in cannot be directly answered by looking at estimates but needs testing some linear hypotheses involving the coefficients reported in Table 9. Table 5 directly displays the implied export experience premia, test statistics, and p-values for both managers and non-managers in the case of worker and worker-firm trade status fixed effects. The Table further provides information on whether the experience premium in trade involved firms (New, Continuing, Exiting, and Other) is significantly different from the equivalent premium for Never exporters. Table 5 reveals, by looking at the number of * superscripts,²⁷ that two clear patterns emerge. Considering non-managers, although the negative premium is always smaller for Never exporters while being not significantly different from zero in the case of worker-firm trade status fixed effects, there is no single case in which the premium for Never exporters is significantly different from the premium paid by trade involved firms. On the other hand, when considering managers, in virtually all cases the positive premium is larger in trade involved firms but the difference with respect to Never exporters is significant only for the most trade involved firms (Continuing exporters).

Overall, our findings are consistent with the idea that managers are special when it comes down to exporting and some valuable knowledge is transferred to the new employer when changing firm. The (for us) observable export experience of a manager

²⁴It is worth nothing, however, that the premium of being a manager with respect to a white collar is, for example, in the case of worker fixed effects identified by workers changing job qualification during the panel and this is known to deliver much smaller coefficients than in the simple OLS case with no fixed effects.

²⁵In columns 3 and 4, ***, **, and * correspond to the 1, 5, and 10% confidence level of the tests that verify, in each year of export experience, if the export experience premium for a manager is significantly different from zero.

²⁶Within our estimation sample years (1997-2004), 7 years is the longest possible length of export experience. Whenever positive, the average number of years a worker has export experience in our sample is, due to the relatively short length of the panel, rather small (2.9 years), which helps reconciling the overall figure on the export experience premium with its time breakdown.

²⁷***, **, and * mean, respectively, that the experience premia is significantly different from the one of Never exporters at the 1, 5, and 10% confidence level.

corresponds to a sizeable positive wage premium (about 5%) which is alive after controlling for a wealth of workers' and firms' characteristics including worker-trade status fixed effects, past employer size and productivity, and broad employer change patterns. The premium for managers arises already at the time of employer change and keeps increasing over time until the maximum time span allowed by our sample (7 years) reaching a peak of about 15%. On the other hand, non-managers do not seem to receive any positive premium for their export experience. On average the premium is actually negative though after 7 years it is virtually zero.

These results are related to those of Balsvik (2010). She finds that movers from MNEs to non-MNEs with more than three years' tenure from the MNE receive a wage premium of 5% compared to stayers in non-MNEs and that there is a positive correlation between the share of workers with MNE experience in non-MNEs plants and the productivity of these plants. Besides focusing on MNE and spill-overs, Balsvik (2010) does not explore the distinction between managers and non-managers nor try to establish a causal relationship between workers' experience and firm performances as we do in Section 5. Our findings are also related to Muendler and Molina (2009). Muendler and Molina (2009) show that anticipated export status, predicted with destination-country trade instruments, leads firms to prepare their workforce by hiring workers from other exporters, and that hiring former exporter workers is correlated both a wider reach of destinations and a deeper penetration of destinations. Though very rich in scope, Muendler and Molina (2009) do not provide evidence of a wage premium for former exporter workers nor analyze the causal impact of workers, and in particular managers, on firms' trade performances.

Furthermore, our findings point (in some cases) to the existence of a larger export experience premia for managers in trade-involved firms with respect to Never exporters, which suggests that such an experience is more valuable for the former. Point estimates are virtually all in the expected direction though significance is achieved, partially due to our precision-demanding specification with clustering and many controls, only for the group of firms that are more involved in trade activities (Continuing exporters). The statistically weak evidence for a smaller premium paid by Never exporters might be consistent with a compensating differential mechanisms. For example, a manager with export experience may, though less valuable for a Never exporter, bargain over a compensation for a work he/she considers less interesting because not involving trade. However, it might also indicate that managers with export experience are by some measure "better" in dimensions that go beyond the export activity. This reasoning call for caution in interpreting the export experience premium as evidence of a casual effect of export experience on firms' trade performance.

We deal in a more explicit way with the causal link between export experience brought

by managers and the trade performance of a firm (and in particular its export status) in the next Section.

5. Trade status analysis

Assessing that a sizeable wage premium is paid only to managers with export experience and that such a premium is somewhat higher in trade-involved firms is only indirect evidence of a causal impact of managerial experience on trade performance. The aim of this Section is therefore to provide more substantive evidence of such a causality.

There are many different export performance margins to which managers with export experience might contribute: entry, exit, number of exported products, number of reached destinations, export value, etc. For the purpose of this study we focus on the first two and model a firm's trade status and its change over time as a function of a large battery of time-varying control as well as of the share of current managers in the firm that have export experience. We describe the econometric model in Section 5.1 while presenting estimation results in Section 5.2. In particular, results in Section 5.2.1 have been obtained using OLS while results in Section 5.2.2 build on an IV identification strategy.

5.1 Econometric model

In what follows we focus on four (out of five) of the finely defined trade status categories described in Section 3.1, namely: Never exporters, New exporters, Continuing Exporters, and Exiting exporters. In terms of trade records, New and Never exporters share at time t the same history: no exports in both $t - 1$ and $t - 2$. However, at date t their paths suddenly diverge with New exporters starting to export, and keep exporting in $t+1$, while Never exporters remain purely domestic firms. At the other extreme lie Continuing and Exiting exporters. As in the previous case, both types of firm have the same trade history but their present and future ($t + 1$) participation to the export market follows different directions. While Continuing exporters keep their presence in foreign markets in (at least) the next two years, Exiting exporters stop selling abroad in t and maintain their stand in $t + 1$ as well.

We exploit these switches in order to identify the impact of export experience hold by managers on a firm likelihood to start or quit exporting. In particular we estimate, for comparability between standard and IV estimates, a linear probability model.²⁸ In the first part of the analysis, we focus on export entry and compare New and Never

²⁸For IV estimations, the linear probability model allows for a larger set of instruments' tests compared to the IV probit. Results of the alternative probit specification are qualitatively identical and are available upon request.

exporters. In the subsequent analysis we turn to export exit and compare Exiting and Continuing exporters. Our binary variable y_{ft} , indicating firm f trade status at time t , is equal to zero for Never (Continuing) exporters and equal to one for New (Exiting) exporters. Our approach follows the logic developed in the dynamic model of exporting behavior of Roberts and Tybout (1997), and further applied in Bernard and Jensen (2004), that sunk costs of entry into the export activity create path-dependency. Therefore, any attempt to establish a causal impact on trade status must condition for the firm past trade status; the latter reflecting the option value of sunk costs.²⁹ Our specification is slightly more general as we allow managerial experience (as well as other covariates) to have a differential impact on entry and exit from the export activity. Furthermore, as we are interested in an "informed/successful/structured" decision to export, as opposed to a "random/occasional" presence in export markets, our trade status categories are based on the 2+2 years time frame described in Section 3.1.³⁰

The baseline linear probability model that we estimate is given by:

$$y_{ft} = \alpha + \beta_1 Share_{ft} + \beta_2 Size_{ft} + \beta_3 Prod_{ft} + \beta_4 Exports_PT_{ft} + \gamma' \mathbf{fc}_{ft} + \delta_t + \varepsilon_{ft} \quad (2)$$

where the error component ε_{ft} captures idiosyncratic shocks affecting firms' trade status and whose properties will be further discussed below. The set of covariates includes time dummies δ_t as well as:

1. Our key variable $Share_{ft}$ which is the number of managers with export experience (acquired outside the firm) in firm f at time t divided by the total number of managers. If a firm has no manager with export experience $Share_{ft}$ is equal to zero.
2. $Size_{ft}$ and $Prod_{ft}$ denote firm f size (log of employment) and apparent labor productivity (log of sales per employee) at time t . As shown in Bernard and Jensen (1999) and Melitz (2003) firm size, and especially productivity, has a causal impact on export participation and should certainly be taken into account in our analysis.

²⁹See Irarrazabal and Oromolla (2008) for a general equilibrium model of trade with heterogeneous firms that shows how firm idiosyncratic productivity shocks and export sunk costs imply hysteresis in export status.

³⁰We believe that controlling for export status in the preceding two years, besides allowing for a sufficiently large sample, is enough for accounting for the firm trade history. In Bernard and Jensen (2004) main specifications only two lags are considered. The magnitude of the coefficient of "Last exported two years ago" is significant though being between 30 and 40 percent the magnitude of the coefficient "Exported last year". Moreover, Roberts and Tybout (1997) find that "...last year's exporting status $Y_{i,t-1}$ has a strong positive effect on the probability of exporting this year. But plants that last exported two or three years ago enjoy only small lingering effects from their previous investments in foreign-market access." and further add that "...we cannot reject the hypothesis that both coefficients are jointly equal to zero."

3. $Exports_PT_{ft}$ denotes a proxy for firm f export demand and is given by Portuguese yearly aggregate (log) exports of products belonging to the Nace 2-digits industry of firm f in year t . Indeed, a favorable (adverse) foreign demand shock can induce firms to enter (quit) exporting and needs to be accounted for.
4. fc_{ft} indicates a battery of firm-time controls: (i) the firm-level mean and standard deviation of managers' age and education as well as the firm-level mean and standard deviation of managers' (with and without experience) fixed effects, as a measure of skill, coming from the estimation of (1). Inspired by Iranzo et al. (2008), these variables capture the age, education, and skill structure of managers within the firm, which is likely to affect firm productivity and ultimately export status;³¹ (ii) a foreign ownership dummy. This is an important control as it is well known that multinationals are more involved into trade; (iii) firm age, which broadly accounts for the firm past success; (iv) a full set of Nace rev.1 2-digits dummies; (v) a full battery of NUTS 3 region dummies corresponding to the location of firm f .

We further consider two additional refinements of (2). In the first one, we investigate whether the share of managers with export experience is more or less valuable for trade status depending on firm size and productivity. This is a relevant theory and policy issue in the debate on firm heterogeneity and trade. To this end, we estimate an augmented version of (2) by adding two interaction terms: $Share_{ft} \times Size_{ft}$ and $Share_{ft} \times Prod_{ft}$. We then consider a second variant of (2) in which we look at the time profile of the arrival of managers with export experience. In particular we consider managers arriving in t , $t - 1$, $t - 2$, or before³² and replace $Share_{ft}$ with four variables like, for example, $Share_{ft}^{t-1}$ which corresponds to the number of managers with export experience in firm f at time t that have been hired in $t - 1$ divided by the total number of managers in t .

We cluster standard errors at the firm-level in all specifications. All right hand side variables (except dummies) have been divided by their respective standard deviation in order to provide a comparable metric. Given the rough equivalence between coefficients of a linear probability model and marginal effects of a probit (evaluated at the sample mean), a coefficient of, for example, $Size_{ft}$ of 0.0x indicates that a one standard deviation

³¹Milgrom and Roberts (1990) and Kremer (1993) have emphasized that in some activities, like complicated manufacturing processes, workers performing different tasks are highly complementary (supermodular production functions); in the "O-Ring production function", failure at any task destroys the entire value of the project. On the contrary, in activities requiring creativity or problem solving, superior performance of one task might mitigate the need for superior performance in the others (submodular production functions). Grossman and Maggi (2000) propose a model of trade where aggregate trade patterns reflect differences in the distribution of talent across the labor forces of two different countries.

³²In some cases we are not able to precisely identify the year of entry of a manager observed in t . In this situation we classify the managers as having arrived before $t-2$.

increase in firm size roughly increases the probability of being a New exporter by $x\%$. Marginal effects are thus comparable, in term of how much variation in probability is induced, across covariates and specifications within a given comparison pair (e.g. Exiting vs Continuing) and, by means of the unconditional probability, also between the two comparison pairs.

5.2 Results

In the next Section we provide results from the estimation of the linear probability model (2) obtained using OLS, while in the subsequent one we use an IV strategy to account for the potential endogeneity of $Share_{ft}$ due to simultaneity and omitted variables.

5.2.1 OLS estimations

Under the assumption that ε_{ft} in (2) is uncorrelated with explanatory variable, and in particular with $Share_{ft}$, our linear probability model can be estimated with OLS. Table 6 shows estimation results for the key covariates of the three different specifications we consider for both the New vs Never Exporters and Exiting vs Continuing exporters comparison. Table 11 in the Tables Appendix provides information on the other regressors.

New vs Never exporters

Column 1 of Table 6 reports the results of our baseline New vs Never exporters specification. The sign, magnitude, and significance of the share of managers with export experience variable indicate, when considering that the unconditional probability of being a New exporter ($y_{ft} = 1$) equals 0.051, that the effect we are capturing is rather sizeable. A one standard deviation increase in $Share_{ft}$ increases the likelihood of start exporting by 0.018 probability units corresponding to about 35% more chances to be a New exporter. Such magnitude is equal to the one of firm productivity while firm size is almost twice as important. However export demand, which due to time dummies is essentially identified by its time variation,³³ is the most important covariate with yearly Portuguese Nace 2-digit exports getting a coefficient of 0.045. Size and productivity have been widely shown to have a sizeable (and causal) impact on export status and our results confirm previous findings. What our results add to the existing literature on trade and heterogeneous firms is that the transmission of export experience via the mobility of managers is as important as firm productivity in explaining entry into the export activity.

Insert Table 6 about here.

³³Some additional identifying variation is provided by firms changing Nace code.

Column 2 of Table 6, where we interact the share of experienced managers with size and productivity, further indicates that export experience is more valuable in larger firms. This result is important in the policy debate on export promotion because, to the extent that the presence of managers with export experience allows firms to reduce trade and information costs related to doing business overseas, it suggests that larger firms can disproportionately gain from support received along these dimensions. Finally column 3, where we consider the time profile of the arrival of managers with export experience, points to a very stable time pattern. The value of export experience for becoming an exporter does not seem to depend much upon the date when the manager has joined the firm.

Exiting vs Continuing exporters

Column 4 of Table 6 displays key covariates estimates of our baseline Exiting vs Continuing specification. The unconditional probability to quit exporting ($y_{ft} = 1$) equals 0.035 meaning that 3.5% of firms with a past record of two years of continuous exports exit from foreign markets in both the current and subsequent year.

Firm size and productivity play (as in the case of entry into the export activity) a major role also in understanding the failure of firms to keep exporting. Big and more productive firms are more likely to have a successful path with the magnitude of productivity (size) implying that a one standard deviation increase in productivity (size) reduces the probability of exiting by 37% (74%). On the other hand, export demand has the expected sign but it is now smaller and largely not significant.

As for export experience results are rather different from the entry case. The coefficient of $Share_{ft}$ is negative, which would suggest that export experience has a positive impact on the probability to keep exporting, but it is rather small and not significant. Indeed, both Exiting and Continuing firms have managers that have developed export experience within the firm with its past export activity and our findings would suggest that internal and external experience do not complement each other. Nevertheless, the interactions specification in column 5 portrays a more complex picture. The coefficient of $Share_{ft}$ is negative and significant while the interaction with size is positive and significant. This means that, for small firms, export experience acquired by managers from previous employers has a large positive effect on the likelihood to successfully continue international business. However, this effect gets smaller as firm size increases. Finally, as far as the time profile of experienced managers' arrival is concerned, column 6 indicates that there is some significant pattern at time $t - 1$ and $t - 2$. Though the magnitude is small, the negative sign of $Share_{ft}^{t-1}$ and $Share_{ft}^{t-2}$ suggests that not having enough managers with export experience entering in $t - 1$ and $t - 2$ makes it more likely for a firm to quit exporting in t .

5.2.2 IV estimations

In the previous Section we dealt with endogeneity, and in particular with the issue of omitted variables, by making use of a large battery of both firm and firm-level aggregated managers' characteristics. However, we acknowledge that there are still issues that are likely to bias our results.

The first endogeneity issue we face is that there could be some (for us) unobservable firm characteristics that affect trade status and are correlated with the entry of managers with export experience. Considering, for example, the comparison of New and Never we do not have an observable measure of variables like R&D expenditure, product, process and IT innovation that are likely to affect the export participation of a firm.³⁴ Although we do control for the two key variables that are believed to have a causal impact on trade participation (size and productivity), the fact that we cannot control for other dimensions of the competitiveness of the firms and/or for the amount of effort put in place by a firm to become an exporter might induce a spurious correlation with export experience. Although the evidence coming from the wage analysis does indicate that trade involved firms pay for managers' export experience, this might be ultimately just due to such managers having some unobservable time-variant characteristics which are not valuable to the firm for her export activity conditional on *all* those firms' fundamentals that truly cause export participation. For example, managers with export experience might be very good in dealing with product and/or process innovation with innovation having a causal impact on export status while being not observable to us.

The second endogeneity problem is related to the timing of events. Considering again the comparison of New and Never, it seems at first glance crucial to define when the "preparation for exporting" begins, i.e. when the decision to try to become an exporter takes place. The extreme case is the one of a firm that puts in place a wide range of policies at some date $t - x$ to become an exporter in t while sticking to this decision no matter what happens between $t - x$ and t . The firm could then hire managers with export experience between $t - x$ and t only to make this process somehow smoother. In such a model a causal effect of managers' experience could be eventually identified only when the managers joined the firm before or in the meantime the decision to export in $t - x$ took place. We do not necessarily believe that this extreme model is a good description of a choice like exporting under such a high degree of uncertainty and continuously available new information, but we have to contemplate this possibility.

Finally, both in the previous extreme case and in a situation in which a firm continuously revises her decision to export based on the new available information we still

³⁴Bustos (2010) and Lileeva and Trefler (2010) provide evidence of the relationship between innovation, productivity, trade liberalization, and trade status.

face a problem of simultaneity. Both the entry of managers with export experience and other investments put in place by a firm can have a causal impact on export status but, being the outcome of a joint maximization process, it is hard to properly disentangle their respective contribution as a shock affecting the profitability of one margin has an impact on the optimal choice of all the others.

Insert Figures 7 and 8 about here.

The three endogeneity issues discussed so far are equivalent to say that managers with export experience are not randomly assigned to firms. In an ideal experimental setting, managers would indeed be randomly assigned to firms providing the basis for a clear cut causal analysis on firms' trade status. The IV strategy we implement draws on some exogenous variation in managers' demand and supply in order to mimic a random matching between managers with export experience and firms. On the demand side, we use the ratio of managers to workers in year $t - 3$ ($Ratio_{ft-3}$) as a predictor of subsequent managers' hiring by a given firm. Indeed, as shown in Figure 7, there is a small (-0.057) but significant negative correlation between $Ratio_{ft-3}$ and firm hiring in between $t - 2$ and t . Being a substantial part of managers with export experience in t arrived within the last two years (about 42%, see Table 1), this instrument is ultimately correlated with the share of experience managers at time t and, following Roberts and Tybout (1997), 3 years can be considered a sufficiently long time span for the past not to matter for export status.

On the managers' supply side, we consider the local availability (within a NUTS 3 region) of managers that change firm because of displacement, as defined in Section 3.1, and we focus in particular on firm closure. As outlined in Dustmann and Meghir (2005), a firm closure can be thought to be an exogenous shock to a worker's career, since it results in a separation of all plant's workers and it is not related to the worker's own job performance. Furthermore, for a variety of reasons that can be considered as exogenous in our analysis (like housing property, family ties, etc.), workers tend to search and accept more easily new jobs in the same location of the past job.³⁵ Combining these two arguments, the local availability of displaced managers with export experience can be considered as an exogenous labor supply for local firms. More precisely, we construct a variable ($PAME_{ft}$) which equals the ratio of the number of displaced managers with export experience in the NUTS 3 region of firm f in year t to the number of managers with export experience in the same location-year.

The instrument $PAME_{ft}$ is, due to time dummies, essentially identified by its time variation.³⁶ As shown by Figure 8, $PAME_{ft}$ displays a substantial time (as well as

³⁵In our sample, 78.2% of the workers and 67.1% of the managers that change employer do remain in the same NUTS 3 region.

³⁶Some additional identifying variation is provided by firms changing region.

spatial) variation which is needed in order to provide identification.

We consider $Ratio_{ft-3}$, $PAME_{ft}$, $PAME_{ft-1}$, and $PAME_{ft-2}$ and use them both alone, as well as interacted up to the third power, as instruments for $Share_{ft}$.³⁷ Table 7 shows IV estimation results for the key covariates, as well as tests on instruments, of the three different specifications we consider for both the New vs Never Exporters and Exiting vs Continuing exporters comparison. Table 12 in the Tables Appendix provides information on the other regressors.

Two further comments are in order. First, one can to some extent argue that firm closure is related to the ability of the managers running the firm. However, to the extent that the ability of the “bad” displaced manager is reflected by its wage, our two controls for the mean and standard deviation of firm f managers’ fixed effects should account for that. Second, firm closure might be related to industry-specific shocks that also affect entry and exit into the export activity. Besides industry fixed effects, our control $Exports_{PT}_{ft}$ should broadly account for demand shocks affecting the trade status of firms within a Nace 2-digit industry. As for supply shocks, the fact that we rely on the availability of displaced managers within a location (as opposed to location-industry) for the construction of $PAME_{ft}$ and that (at this level of industry disaggregation) NUTS 3 regions are quite diversified, should make this issue less problematic.

New vs Never exporters

Key IV estimates of the comparison between New and Never exporters are contained in columns 1, 2, and 3 of Table 7. The unconditional probability of being a New exporter is slightly different from the OLS case and now equals 0.046.³⁸

Insert Table 7 about here.

Column 1 of Table 7 reveals that, after instrumenting, the share of managers with export experience is still significant and matters even more. With a point estimate of 0.064, $Share_{ft}$ is now the most important determinant (in term of probability increase per unit of standard deviation) of the export entry process with a one standard deviation increase leading to more than double the probability to start exporting. Both the Kleibergen-Paap rk LM statistic (under-identification test) and the Hansen J statistic (over-identifying restrictions tests) works fine. However, the value of the Kleibergen-Paap rk Wald F statistic (weak instruments test) suggests that, even if critical values are not available,³⁹

³⁷When considering in our third specification the time profile of managers’ arrival, we use the same set of variables to instrument $Share_{ft}^t$, $Share_{ft}^{t-1}$, and $Share_{ft}^{t-2}$.

³⁸The number of observation is reduced with respect to OLS estimations due to the fact that $Ratio_{ft-3}$ is sometimes missing. The same issue arises for the comparison between Exiting and Continuing exporters.

³⁹The critical values provided in Stock and Yogo (2005) refer to the case of homoskedastic errors only.

we might have a problem of weak instruments meaning that the point estimate of 0.064 should, though quite different from the OLS estimate,⁴⁰ be taken with some caution.

Concerning column 2, we still find after instrumenting that there is a positive interaction between $Share_{ft}$ and size. However, the Hansen J statistic points to the presence of some residual endogeneity in this specification and so further caution is needed. Finally, the time breakdown of managers' arrival analysis in column 3 indicates, contrary to the OLS case, that year t is the key one. All of the effect of $Share_{ft}$ seems to be due to the arrival of managers at t with arrivals in $t - 1$ and $t - 2$ being not significant.⁴¹ Though, the under-identification test statistic suggests this might partly be due to some lack of precision of our estimates.

Exiting vs Continuing exporters

IV estimates of core covariates for the comparison between Exiting and Continuing exporters are showed in columns 4, 5, and 6 of Table 7 and the unconditional probability of being an Exiting exporter is still 0.035.

The Kleibergen-Paap rk Wald F statistic indicates that the first two specifications of this second set of IV estimates suffer much less from weak instrumenting. However, none of the instrumented variables is significant. We thus conclude that, after controlling for endogeneity, export experience acquired by managers from previous employers has no effect on the likelihood to successfully continue international business, i.e. internal and external export experience are substitutes. Note that this results does not necessarily contradict the evidence provided in Section 4 on the export experience premium. The fact that continuing exporters seems to particularly value this experience might be due to trade performance margins other than the capacity to keep exporting like, for example, the number of exported products and/or the number of reached destinations. Finally, column 6 seems to suggest (as in the previous case) that t is the key date with the lack of a sufficient inflow of managers with (external) export experience playing an important role in the exit process. However, both the under-identification and weak instruments tests statistics warn about estimates and/or standard errors bias.

⁴⁰As shown in Stock and Yogo (2005), in the case of weak instruments the IV estimator is biased towards the probability limit of the OLS estimator and, in the extreme case of irrelevant instruments, the expectation of the IV estimator corresponds to the OLS limit. The fact that IV and OLS estimates are rather different in our case is thus reassuring about the weakness of instruments.

⁴¹Note that the share of managers arrived before $t-2$ is, for obvious reasons, not instrumented and so we refrain from comment on it.

6. Conclusions

Our findings enrich the state of the knowledge of what determines firms' export participation by both identifying and quantifying the contribution of workers' previous export experience. On the workers' side we find, in line with previous studies on MNEs, that knowledge gained from experience in previous employers can be transferred across firms and is reflected in a sizeable wage premium. However, we show that only managers reap a premium for export experience, suggesting that managers are the principal channel through which the transfer of valuable export-related knowledge occurs. On the firms' side, having managers with export experience has a bigger impact than firm size and productivity on the likelihood to start exporting. Finally, the presence of managers with export experience does not significantly affect the likelihood that a current exporter continues to export, i.e. knowledge about exporting gained inside or outside the current firm appear to be substitutes.

These results have important implications for policy. First, by creating a wage divide between manager and non-managers, as well as within the group of managers, export experience represents another channel via which trade fosters wage disparities. This is an important finding in the debate about the pains from trade and the observed increase in wages' dispersion both across and within occupations. Second, to the extent that the presence of managers with export experience allows firms to reduce trade and information costs related to doing business overseas, our findings suggest that larger firms can disproportionately gain from support received along these dimensions. This is an important piece of information for the design of more efficient export promotion policies. Third, the result that export-related knowledge acquired inside or outside the current firm appear to be substitutes is, again, important for a better allocation of public expenditure on export schemes as well as for the debate on super-modularity across inputs and productivity.

There are several directions deserving further research and in what follows we propose some. First, in our framework we consider the impact of export experience on entry and exit into the export activity. However, there are other export performance margins that can be fruitfully explored like the number of exported products, the number of reached destinations, and the volume of exports by country-product. On a more dynamic basis, also exports growth and its volatility could possibly be part of future research on this topic. A somewhat related second avenue of research is to determine what the nature of the knowledge transferred by managers is. Does the presence of managers with export experience increases the likelihood of entry because it improves a firm competitiveness beyond what can be captured by firm size and productivity? Alternatively, do these managers help reducing trade costs and/or uncertainty? Or maybe they simply increase

firms' demand by bringing valuable clients' contacts? We are unable to answer these questions here but, certainly, the analysis of the different margins of export performance will provide precious elements for this debate. In the same vein, a finer classification of the different functional categories of managers (sales, finance, advertising, CEO, etc.) can turn out to be very useful to shed further light on the nature of the information flow we have identified. All of the above are the subject of ongoing research.

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Table 1: Summary Statistics, Wage and Trade Status Regressions, 2004 (from 1997-2004 Sample)

Variable	Mean	Std. Dev.	Median	Min.	Max.	N
<i>Worker-level</i>						
Hourly Wage (log)	1.373	0.521	1.244	0.731	3.415	386,062
Export Experience (0/1)	0.176	0.381	0	0	1	386,062
Manager w/ Export Exp. (0/1)	0.028	0.164	0	0	1	386,062
Age (Years)	38.421	10.651	38	16	65	386,062
Education (Years)	7.445	3.66	6	0	16	386,062
Tenure (Years)	10.582	9.509	8	0	52	386,062
Manager (0/1)	0.151	0.358	0	0	1	386,062
Blue Collar (0/1)	0.738	0.44	1	0	1	386,062
White Collar (0/1)	0.061	0.24	0	0	1	386,062
Other Collar (0/1)	0.05	0.218	0	0	1	386,062
<i>Firm-level</i>						
Manag. w/Export Exp. (Share)	0.129	0.279	0	0	1	12,342
– Hired in t (Share)	0.017	0.100	0	0	1	12,342
– Hired in t-1 (Share)	0.019	0.112	0	0	1	12,342
– Hired in t-2 (Share)	0.019	0.112	0	0	1	12,342
– Hired bef. t-2 (Share)	0.074	0.213	0	0	1	12,342
New Exporter (0/1)	0.029	0.168	0	0	1	12,342
Continuing Exporter (0/1)	0.205	0.404	0	0	1	12,342
Exiting Exporter (0/1)	0.008	0.089	0	0	1	12,342
Other Exporter (0/1)	0.253	0.435	0	0	1	12,342
Never Exporter (0/1)	0.505	0.5	1	0	1	12,342
Firm Size (log)	2.919	1.235	2.89	0	8.266	12,342
Apparent Labor Productivity (log)	10.6	0.983	10.567	6.11	16.341	12,342
Firm Age (log)	2.575	0.845	2.708	0	5.517	12,342
Foreign Ownership (0/1)	0.049	0.216	0	0	1	12,342
Managers' Age (Average)	42.268	8.486	42	19	65	12,342
Managers' Age (Std. Dev.)	4.327	5.137	2.121	0	31.82	12,342
Managers' Education (Average)	8.757	3.613	9	0	16	12,342
Managers' Education (Std. Dev.)	1.664	2.182	0	0	11.314	12,342
Exports PT (log)	14.232	0.836	14.38	11.326	15.44	12,342

Notes: This table shows summary statistics of worker-level and firm-level variables used in our regressions for the 2004 sample year. Variable names followed by "(0/1)" refer to dummy variables. In the last column, "N" refers to the number of workers for worker-level variables, and to the number of firms for firm-level variables. See Section 3.1 for definitions of firms' trade status, managers, and export experience. Statistics refers to observations for which all covariates, except in the IV case, are jointly available.

Table 2: Number of Workers and Managers, by Export Experience, Displacement Status, and Year, 1997-2004

Year	Workers			Managers		
	<i>All</i>	<i>With Export Experience</i>	<i>Displaced with Export Exp.</i>	<i>All</i>	<i>With Export Experience</i>	<i>Displaced with Export Exp.</i>
1997	452,550	14,675	1,749	48,366	2,075	219
1998	446,496	24,219	853	50,990	3,404	122
1999	449,453	36,444	1,717	50,413	4,767	211
2000	438,023	48,722	4,341	51,339	6,501	555
2002	350,522	53,425	3,130	48,601	8,344	649
2003	372,782	61,100	2,207	54,788	9,716	399
2004	386,062	68,123	0	58,140	10,704	0

Notes: This table shows summary statistics of worker-level variables from the sample used in the wage regressions of Section 4. See Section 3.1 for definitions of managers, export experience, and displacement status.

Table 3: Number of Firms and Share of Managers with Export Experience, by Trade Status and Year, 1997-2004

Year	All Firms	New Exporter	Continuing Exporter	Exiting Exporter	Other Exporter	Never Exporter
Number of Firms						
1997	8,032	186	2,158	69	2,424	3,195
1998	8,133	181	2,258	60	2,084	3,550
1999	8,467	165	2,279	93	2,332	3,598
2000	8,871	224	2,306	73	2,428	3,840
2002	8,748	201	2,167	89	2,697	3,594
2003	11,020	262	2,409	96	3,081	5,172
2004	12,342	358	2,529	99	3,119	6,237
Share of Managers with Export Experience						
1997	0.030	0.064	0.027	0.018	0.046	0.018
1998	0.047	0.126	0.047	0.040	0.077	0.026
1999	0.069	0.112	0.076	0.042	0.095	0.046
2000	0.094	0.141	0.102	0.090	0.126	0.066
2002	0.127	0.211	0.138	0.119	0.156	0.093
2003	0.122	0.248	0.150	0.112	0.154	0.084
2004	0.129	0.242	0.164	0.157	0.156	0.095

Notes: This table shows summary statistics of firm-level variables from the sample used in the OLS trade status regressions of Section 5. See Section 3.1 for definitions of firms' trade status, managers, and export experience.

Table 4: Wage Regression - Baseline and Time Breakdown - Core Covariates

Covariates	Baseline	Baseline	Time Breakdown	Time Breakdown
	<i>Worker FE</i>	<i>Worker-Trade Status FE</i>	<i>Worker FE</i>	<i>Worker-Trade Status FE</i>
Export Exp. (0/1)	-0.019 ^a (0.002)	-0.028 ^a (0.003)		
Manag. X Export Exp. (0/1)	0.073 ^{a***} (0.003)	0.073 ^{a***} (0.004)		
1st Year of Export Exp.			-0.020 ^a (0.002)	-0.031 ^a (0.003)
2nd Year of Export Exp.			-0.022 ^a (0.003)	-0.028 ^a (0.004)
3rd Year of Export Exp.			-0.015 ^a (0.003)	-0.019 ^a (0.004)
4th Year of Export Exp.			-0.006 ^b (0.003)	-0.008 ^b (0.004)
5th Year of Export Exp.			-0.016 ^a (0.003)	-0.023 ^a (0.004)
6th Year of Export Exp.			-0.004 (0.003)	-0.016 ^a (0.004)
7th Year of Export Exp.			-0.006 (0.004)	-0.010 ^c (0.006)
Other Year of Export Exp.			-0.007 ^a (0.002)	-0.011 ^a (0.002)
Manager X 1st Yr Export Exp.			0.068 ^{a***} (0.004)	0.064 ^{a***} (0.005)
Manager X 2nd Yr Export Exp.			0.068 ^{a***} (0.004)	0.066 ^{a***} (0.005)
Manager X 3rd Yr Export Exp.			0.089 ^{a***} (0.004)	0.080 ^{a***} (0.005)
Manager X 4th Yr Export Exp.			0.105 ^{a***} (0.006)	0.116 ^{a***} (0.007)
Manager X 5th Yr Export Exp.			0.118 ^{a***} (0.005)	0.129 ^{a***} (0.006)
Manager X 6th Yr Export Exp.			0.124 ^{a***} (0.007)	0.135 ^{a***} (0.008)
Manager X 7th Yr Export Exp.			0.147 ^{a***} (0.010)	0.164 ^{a***} (0.011)
Manager X Other Yr Export Exp.			-0.049 ^{a***} (0.006)	-0.044 ^{a***} (0.007)
Constant	-2.353 ^a (0.099)	-2.316 ^a (0.087)	-2.350 ^a (0.099)	-2.307 ^a (0.087)
Observations	2,895,888	2,895,888	2,895,888	2,895,888
R^2	0.366	0.352	0.367	0.353
Number of workers	1,050,252		1,050,252	
Number of workers-trade status		1,395,980		1,395,980

Notes: Key covariates results from the within estimation of the mincerian wage equation (1) for both the baseline and time breakdown specifications. Other covariates are listed in Table 10. The dependent variable is a worker log hourly wage in euros as defined in details in the Data Appendix. The specifications in columns 1 and 3 include worker fixed effects while the specifications in columns 2 and 4 include "worker-firm trade status" fixed effects. All specifications include a set of NUTS 3 region dummies, NACE 2-digits industry dummies and year dummies. In columns 1 and 2, the export experience premium for a non-manager is directly given by the "Export Exp." coefficient. The export experience premium for a manager is instead given by the sum of "Export Exp." and "Manag. X Export Exp." coefficients. The same procedure extends to columns 3 and 4. Standard errors clustered at the worker-level in parentheses: ^a $p < 0.01$, ^b $p < 0.05$, ^c $p < 0.1$. In columns 1 and 2, ***, **, and * correspond to the 1, 5, and 10% confidence level of the test that the sum of "Export Exp." and "Manag. X Export Exp." coefficients are different from zero. In columns 3 and 4, they are associated to a series of tests that verify, in each year of export experience, if the export experience premium for a manager is significantly different from zero. See Section 3.1 for definitions of managers and export experience.

Table 5: Wage Regression - Interactions - Hypotheses Testing

	Never Exporter	New Exporter	Continuing Exporter	Exiting Exporter	Other Exporter	
<i>Worker FE</i>						
Non-managers	Experience premia	-0.011 ^a	-0.037 ^a	-0.020 ^a	-0.032 ^a	-0.018 ^a
	F-Test Statistic value	14.13	138.36	74.94	41.17	56.65
	P-value	0.0002	0.0000	0.0000	0.0000	0.0000
<i>Worker-Trade Status FE</i>						
Non-managers	Experience premia	-0.015	0.007	-0.024 ^a	-0.076	-0.033 ^a
	F-Test Statistic value	1.09	0.09	47.35	0.31	89.75
	P-value	0.2974	0.7594	0.0000	0.5807	0.0000
<i>Worker FE</i>						
Managers	Experience premia	0.044 ^a	0.045 ^a	0.061 ^{a**}	0.050 ^a	0.052 ^a
	F-Test Statistic value	31.00	43.30	213.36	13.10	157.59
	P-value	0.0000	0.0000	0.0000	0.0003	0.0000
<i>Worker-Trade Status FE</i>						
Managers	Experience premia	0.015	-0.008	0.059 ^{a**}	0.072	0.024 ^a
	F-Test Statistic value	0.50	0.01	110.21	0.80	14.88
	P-value	0.4778	0.9171	0.0000	0.3716	0.0001

Notes: This table includes results from linear hypotheses tests based on the within estimation of mincerian wage equation (1) with interactions between experience, manager, and trade status. Covariates' estimates and standard deviations are reported in Tables 9 and 10. The dependent variable is a worker log hourly wage in euros as defined in details in the Data Appendix. Both results based on worker fixed effects and "worker-firm trade status" fixed effects are provided. Both specifications include a set of NUTS 3 region dummies, NACE 2-digits industry dummies and year dummies. ^a, ^b, and ^c mean, respectively, that the experience premium is significantly different from zero at the 1, 5, and 10% confidence level. ^{***}, ^{**}, and ^{*} mean, respectively, that the experience premia is significantly different from the one of Never exporters at the 1, 5, and 10% confidence level. Test statistics and p-value are corrected for worker-level clustering. See Section 3.1 for definitions of firms' trade status, managers, and export experience.

Table 6: Trade Status Regressions Core Covariates - OLS

Covariates	New vs. Never		Exiting vs. Continuing			
	Baseline	Size & Productivity	Time Breakdown	Baseline	Size & Productivity	Time Breakdown
Manag. w/Export Exp. (Share)	0.018 ^a (0.002)	-0.035 (0.022)		-0.001 (0.002)	-0.040 ^c (0.022)	
Export Exp. X Size		0.029 ^a (0.007)			0.011 ^b (0.005)	
Export Exp. X Productivity		0.027 (0.020)			0.029 (0.021)	
Manag. w/Export Exp. Hired in t (Share)			0.008 ^a (0.002)			-0.001 (0.002)
Manag. w/Export Exp. Hired in t-1 (Share)			0.010 ^a (0.002)			-0.002 ^b (0.001)
Manag. w/Export Exp. Hired in t-2 (Share)			0.008 ^a (0.002)			-0.002 ^c (0.001)
Manag. w/Export Exp. Hired bef. t-2 (Share)			0.011 ^a (0.002)			0.002 (0.002)
Firm Size (log)	0.031 ^a (0.002)	0.027 ^a (0.002)	0.031 ^a (0.002)	-0.026 ^a (0.002)	-0.027 ^a (0.002)	-0.026 ^a (0.002)
App. Labor Productivity (log)	0.018 ^a (0.002)	0.017 ^a (0.002)	0.018 ^a (0.002)	-0.013 ^a (0.002)	-0.014 ^a (0.002)	-0.013 ^a (0.002)
Exports PT (log)	0.045 ^a (0.000)	0.045 ^a (0.000)	0.045 ^a (0.000)	-0.005 (0.468)	-0.006 (0.409)	-0.005 (0.489)
Constant	-0.973 ^a (0.178)	-0.953 ^a (0.178)	-0.973 ^a (0.178)	0.381 ^b (0.160)	0.414 ^b (0.161)	0.377 ^b (0.160)
Observations	30,763	30,763	30,763	16,685	16,685	16,685
R ²	0.053	0.055	0.053	0.032	0.033	0.033

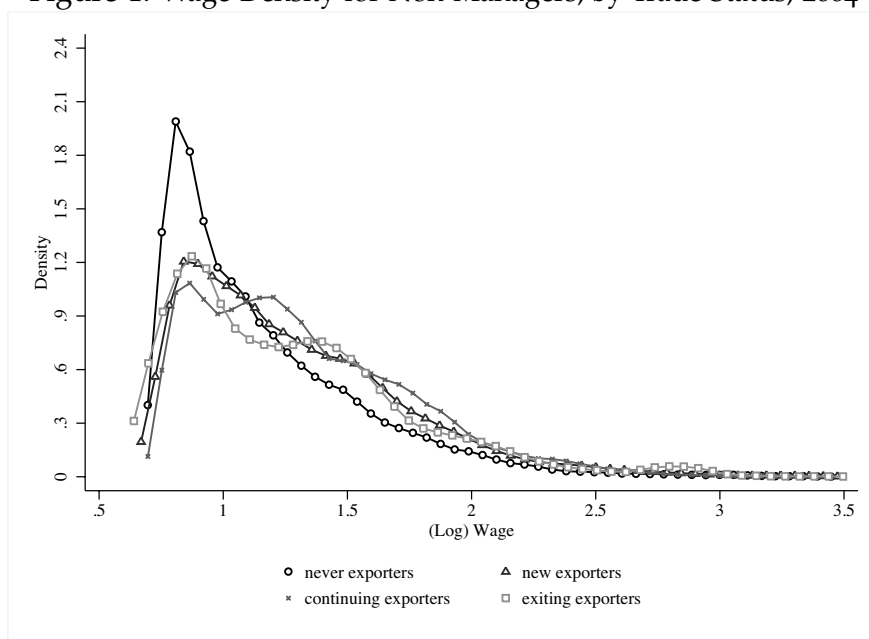
Notes: Results for the key covariates of OLS estimations of the trade status equation (2). Results of other covariates are reported in Table 11. The first three columns display estimations referring to the comparison of New vs Never exporters, while the last three columns refer to the comparison of Exiting vs Continuing exporters. The dependent variable is a binary indicator taking value one whenever a firm is a New (Exiting) exporter and zero otherwise. The unconditional probability of being a New (Exiting) exporter is 0.051 (0.035). The key variable in our analysis is the share of managers with export experience currently employed by the firm: Manag. w/Export Exp. (Share). In columns 1 and 4 we consider this variable alone, while in columns 2 and 5 (3 and 6) we consider it interaction with firm size and productivity (its time breakdown). All covariates, except dummies, have been divided by their respective standard deviation in order to deliver a comparable metric in terms of the variation of the dependent variable which is explained by a one standard deviation change in the dependent variable. All specifications include a set of NACE 2-digits industry dummies, NUTS 3-digit region dummies, and year dummies. Standard errors clustered at the firm-level in parentheses: ^a $p < 0.01$, ^b $p < 0.05$, ^c $p < 0.1$. See Section 3.1 for definitions of firms' trade status, managers, and export experience.

Table 7: Trade Status Regressions Core Covariates - Instrumental Variables

Covariates	New vs. Never		Exiting vs. Continuing	
	Baseline	Size & Productivity	Time Breakdown	Size & Productivity
Manag. w/Export Exp. (Share)	0.064 ^b (0.026)	-0.229 (0.144)	0.021 (0.049)	0.182 (0.186)
Export Exp. X Size		0.095 ^b (0.042)		-0.045 (0.031)
Export Exp. X Productivity		0.160 (0.116)		-0.139 (0.149)
Manag. w/Export Exp. Hired in t (Share)			0.067 ^c (0.039)	-0.122 ^b (0.054)
Manag. w/Export Exp. Hired in t-1 (Share)			0.014 (0.043)	0.034 (0.053)
Manag. w/Export Exp. Hired in t-2 (Share)			-0.058 (0.046)	-0.064 (0.052)
Manag. w/Export Exp. Hired bef. t-2 (Share)			0.011 ^a (0.002)	-0.001 (0.002)
Firm Size (log)	0.023 ^a (0.003)	0.018 ^a (0.005)	-0.028 ^a (0.005)	-0.026 ^a (0.003)
App. Labor Productivity (log)	0.019 ^a (0.002)	0.014 ^a (0.005)	-0.014 ^a (0.003)	-0.014 ^a (0.003)
Exports PT (log)	0.045 ^a (0.013)	0.041 ^a (0.014)	-0.002 (0.010)	-0.007 (0.010)
Observations	24,785	24,785	24,785	15,956
Kleibergen-Paap rk LM statistic	57.607	127.345	40.898	20.918
(Under-identification)	(0.0005)	(0.0005)	(0.0235)	(0.0006)
Kleibergen-Paap rk Wald F statistic	2.167	1.954	1.404	10.480
(Weak-identification)				0.613
Hansen J statistic	22.791	116.678	21.104	82.078
(Over-identifying restrictions)	(0.6447)	(0.0030)	(0.6326)	(0.3541)

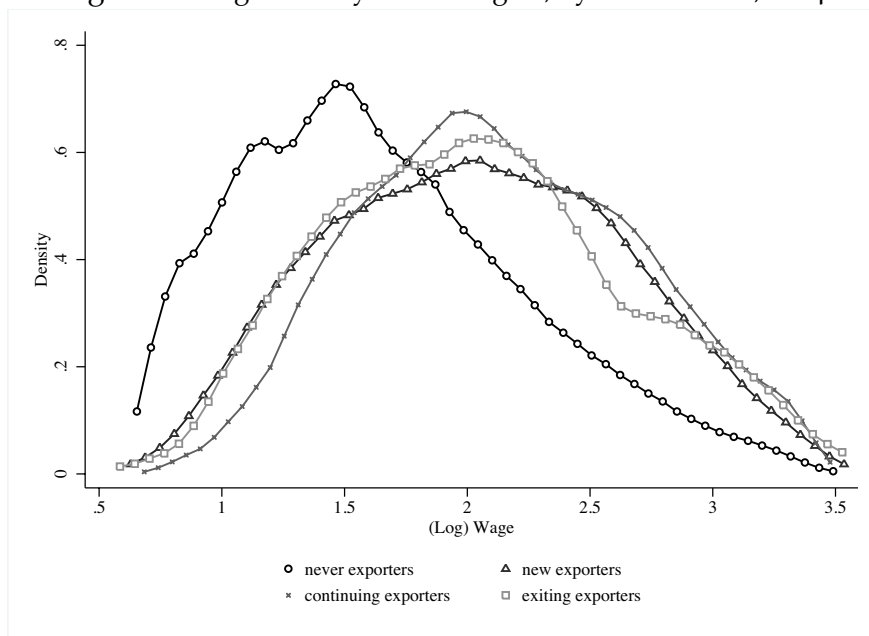
Notes: Results for the key covariates of IV estimations of the trade status equation (2). Results of other covariates are reported in Table 12. The first three columns display estimations referring to the comparison of New vs Never exporters, while the last three columns refer to the comparison of Exiting vs Continuing exporters. The dependent variable is a binary indicator taking value one whenever a firm is a New (Exiting) exporter and zero otherwise. The unconditional probability of being a New (Exiting) exporter is 0.046 (0.035). The key variable in our analysis is the share of managers with export experience currently employed by the firm: Manag. w/Export Exp. (Share). In columns 1 and 4 we consider this variable alone, while in columns 2 and 5 (3 and 6) we consider its interaction with firm size and productivity (its time breakdown). The two variables used to construct our instruments are the firm-level managers to employees ratio at time t-3 and a measure (PAME) of the local (NUTS 3 region of the firm) availability of displaced managers with export experience. Both these variables and their interactions up to the power three are used as core instruments. In the case of column 2 and 5 we also consider as instruments the interactions of the core instruments with firm size and productivity. Further details are provided in Section 5.2.2. All covariates, except dummies, have been divided by their respective standard deviation in order to deliver a comparable metric in terms of the variation of the dependent variable which is explained by a one standard deviation change in the dependent variable. All specifications include a set of NACE 2-digits industry dummies, NUTS 3-digit region dummies, and year dummies. Standard errors clustered at the firm-level in parentheses: ^a $p < 0.01$, ^b $p < 0.05$, ^c $p < 0.1$. See Section 3.1 for definitions of firms' trade status, managers, export experience, and displacement status.

Figure 1: Wage Density for Non-Managers, by Trade Status, 2004



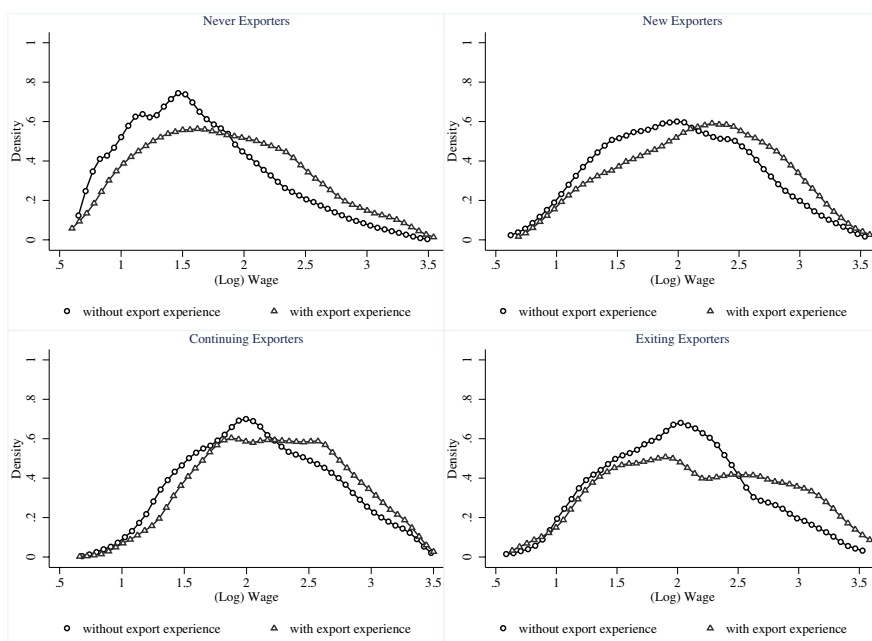
Notes: This Figure shows the kernel density of the log hourly wage distribution in the 2004 sample for non-managers, broken down by firm export status. The hourly wage is defined in the Data Appendix. The definitions of managers and firms' export status categories are provided in Section 3.1. The kernel is Epanechnikov and the kernel width is the Stata default one.

Figure 2: Wage Density for Managers, by Trade Status, 2004



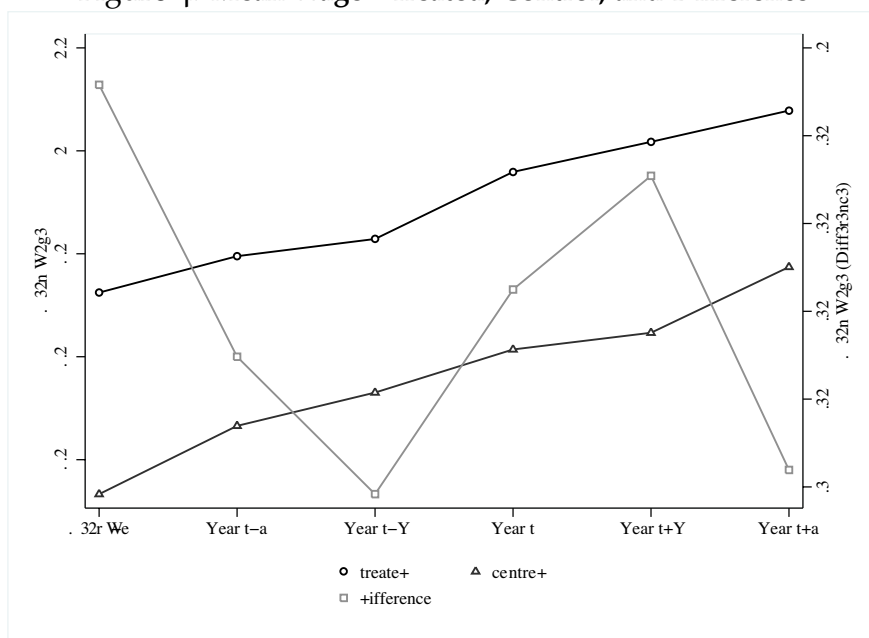
Notes: This Figure shows the kernel density of the log hourly wage distribution in the 2004 sample for managers, broken down by firm export status. The hourly wage is defined in the Data Appendix. The definitions of managers and firms' export status categories are provided in Section 3.1. The kernel is Epanechnikov and the kernel width is the Stata default one.

Figure 3: Wage Density for Managers with and without Export Experience, by Trade Status, 2004



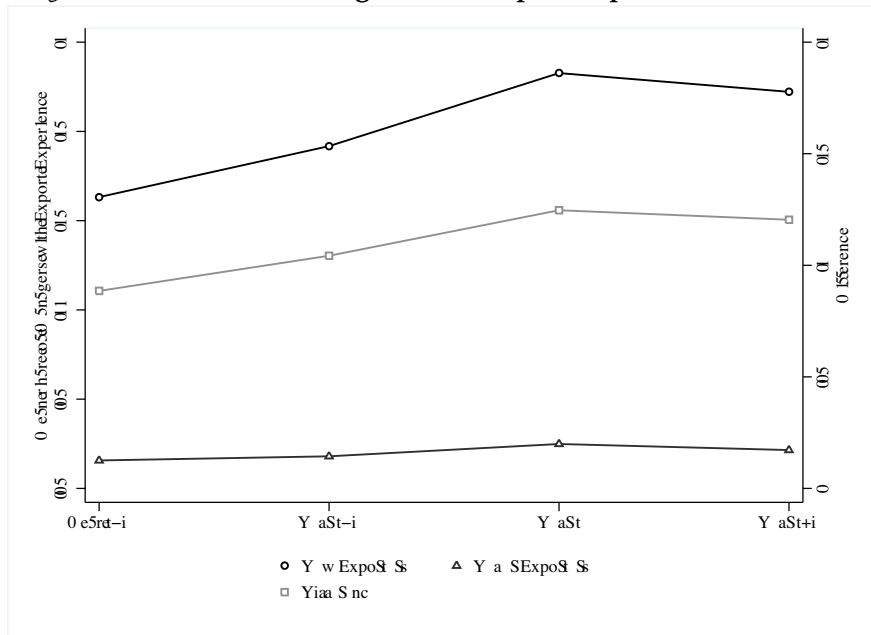
Notes: This Figure shows the kernel density of the log hourly wage distribution in the 2004 sample for managers, broken down by firm export status and manager export experience. The hourly wage is defined in the Data Appendix. The definitions of managers, export experience and firms' export status categories are provided in Section 3.1. The kernel is Epanechnikov and the kernel width is the Stata default one.

Figure 4: Mean Wage - Treated, Control, and Difference



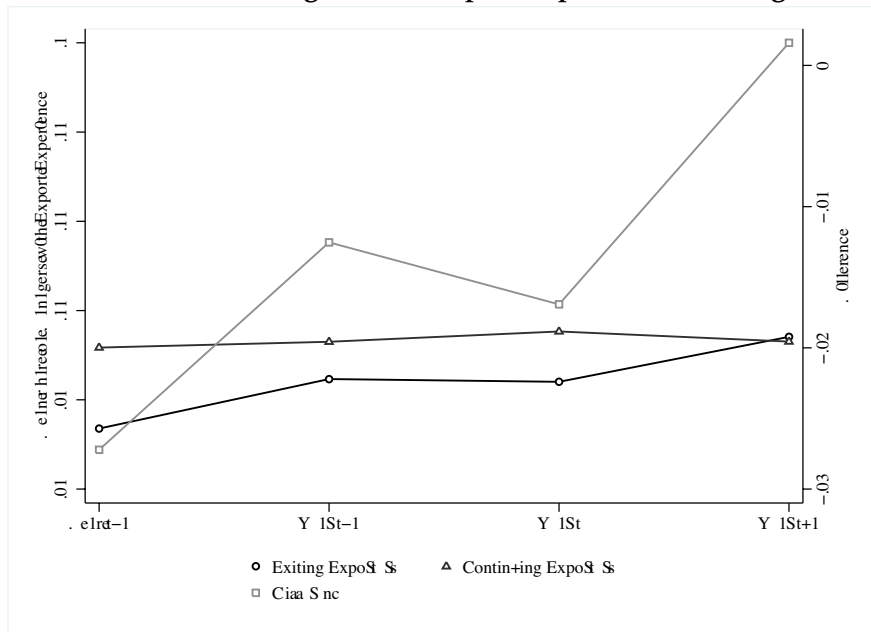
Notes: This Figure provides a graphical overview of a simple difference-in-difference exercise. We consider only those workers that change firm only once in the 1997-2004 period and are managers in the new firm. The treated group is represented by managers moving to another firm while contemporaneously gaining export experience in $t \in [1997, 2004]$. The control group is represented by managers moving to another firm in t but not gaining export experience because the former employer was not an exporter. The Figure provides the average log wage of both the treated and control group (left axis), as well as their difference (right axis), in between $t - 3$ and $t + 2$. The definitions of managers and export experience are provided in Section 3.1.

Figure 5: Mean Share of Managers with Export Experience - New vs. Never



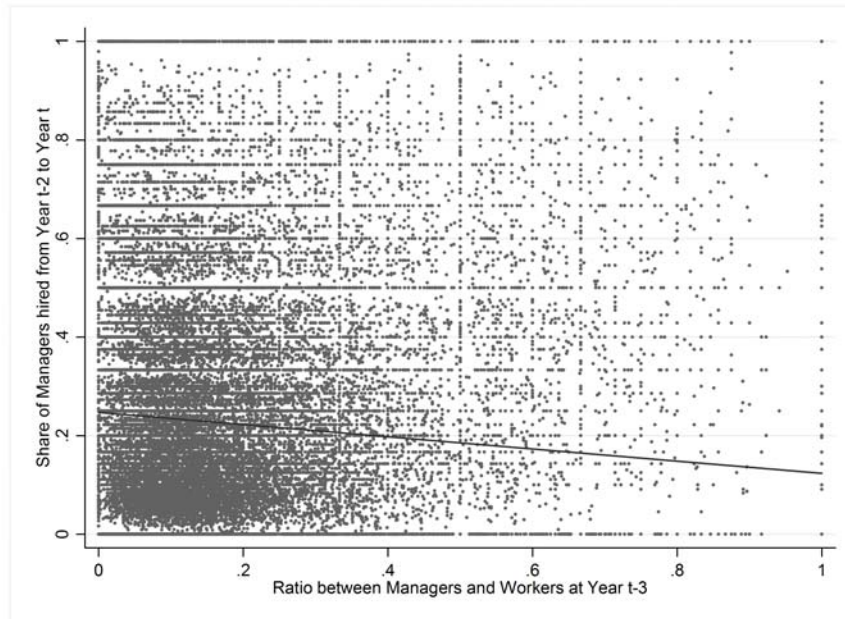
Notes: This Figure shows the level (left axis) and difference (right axis) of the share of managers with export experience in New and Never exporters over the 4 years window ($t - 2$ till $t + 1$) used in the construction of our trade status categories and centered around the year $t \in [1997, 2004]$, in which New exporter start exporting. The definitions of managers, export experience and firms' export status categories are provided in Section 3.1.

Figure 6: Mean Share of Managers with Export Experience - Exiting vs. Continuing



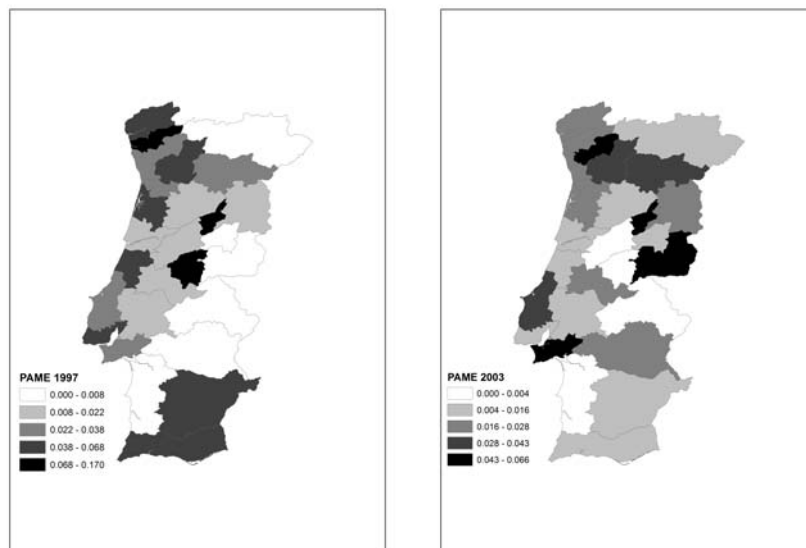
Notes: This Figure shows the level (left axis) and difference (right axis) of the share of managers with export experience in Exiting and Continuing exporters over the 4 years window ($t - 2$ till $t + 1$) used in the construction of our trade status categories and centered around the year $t \in [1997, 2004]$, in which Exiting exporter quit exporting. The definitions of managers, export experience and firms' export status categories are provided in Section 3.1.

Figure 7: Share of Managers Hired After $t-2$ vs. Ratio between Managers and Workers at $t-3$, Pooled Sample 1997-2004



Notes: This Figure shows the scatter plot and regression line of the firm-level ratio of managers to workers in year $t - 3$ (X axis) and the share of currently employed managers hired in between $t - 2$ and t (Y axis). The regression coefficient is -0.124 and, with a standard error of 0.005 , it is significant at the 1% confidence level. The R^2 of the regression is 0.003 . The definition of managers is provided in Section 3.1.

Figure 8: Share of Managers with Export Experience that are Displaced, by NUTS III, 1997 and 2003



Notes: This Figure shows the spatial distribution of the variable PAME across the 28 NUTS 3 regions forming continental Portugal for the two sample years 1997 and 2003. The variable PAME equals the ratio of the number of displaced managers with export experience in a NUTS 3 region in year t to the number of managers with export experience in the same location-year. The definitions of managers, export experience and displacement status are provided in Section 3.1.

Data Appendix

Each worker in *Quadros de Pessoal* (QP) has a unique identifier based on her social security number. In order to minimize the risk that the same identifier is assigned to two different workers, we create a new individual identifier based on the worker original identifier, her gender, year and month of birth.

All the information in QP is collected during the month of November of each year. Worker-level variables (not available in 2001) refer to October of the same year. Firm-level variables refer to the current calendar year (except firm total sales that refer to the previous calendar year).

The location of the firm is measured according to the NUTS 3 regional disaggregation. We keep only NACE rev.1 2-digits industries between 10 and 95 (excluding agriculture, fishery, other minor industries and extra-territorial activities). Results shown in the paper refer to the manufacturing sector only (NACE 15 to 37).

In the trade dataset, we restrict the sample to transactions registered as sales as opposed to returns, transfers of goods without transfer of ownership, and work done.

In the following, we report further details about the definitions of some key variables.

Hourly Wage Computed adding base and overtime wages plus regular benefits (at the month-level) and dividing by the number of regular and overtime hours worked in the reference week multiplied by 4.3. We apply a trimming of the top and bottom 0.5 per cent.

Hiring Date The year the worker was hired in the firm is a variable that is directly registered in QP. Since there are few instances when the hiring date changes from year to year for the same worker-firm spell, we create a robust version of the hiring date computed using the mode for each firm-worker spell. If there is a tie, we take the minimum year in the spell.

Tenure This variable is measured as the difference between the current year and the hiring date.

Foreign Ownership A firm is defined as foreign-owned if 50 percent or more of its equity is owned by a non-resident.

Firm Age Firm age at time t is equal to the difference between t and the year (minus one) the firm was created. The year the firm was created is replaced to missing whenever it is earlier than 1600.

Firm Size Firm size at time t is equal to the (log) number of all workers employed by the firm as resulting from the firm record.

Firm Apparent Labor Productivity Firm apparent labor productivity at time t is equal to the (log) ratio between total sales (sales in the domestic market plus exports) and the

number of all workers employed by the firm as resulting from the firm record.

Firm Trade Status Firm's trade status at time t is determined using the trade dataset and according to the definitions provide in Section 3.1.

Export Experience A worker in year t has "export experience" if she worked, in the past, in a different firm that had a positive amount of exports. Note that (i) experience can be acquired in a non-manufacturing firm as we focus on manufacturing only when performing estimations; (ii) since worker-level variables are not available for 2001 and, in few instances, workers are included in QP with a lag, we use the hiring date data variable in order to retrieve the firm affiliation of the worker in the past whenever this is missing.

Firm Closure and Displaced Workers A firm is defined as closing in year t when the firm is included in QP in year t but not in any of the three subsequent years. In order to distinguish firms' closures from mergers & acquisitions we follow Carneiro and Portugal (2006) by imposing the worker hiring year in the new firm not to be smaller than the year of closure of the previous employer. As far as the firm closure variable is concerned we assume that no firm is in QP in 2001. More precisely, a worker whose firm closes in 2000 and that appears in QP in 2002 in a (different) firm is classified as displaced even if we do not observe workers in 2001.

Tables Appendix

Table 8: Classification of Workers According to Hierarchical Levels

Level	Tasks	Skills
1. Top executives (top management)	Definition of the firm general policy or consulting on the organization of the firm; strategic planning; creation or adaptation of technical, scientific and administrative methods or processes	Knowledge of management and coordination of firms' fundamental activities; knowledge of management and coordination of the fundamental activities in the field to which the individual is assigned and that requires the study and research of high responsibility and technical level problems
2. Intermediary executives (middle management)	Organization and adaptation of the guidelines established by the superiors and directly linked with the executive work	Technical and professional qualifications directed to executive, research, and management work
3. Supervisors, team leaders	Orientation of teams, as directed by the superiors, but requiring the knowledge of action processes	Complete professional qualification with a specialization
4. Higher-skilled professionals	Tasks requiring a high technical value and defined in general terms by the superiors	Complete professional qualification with a specialization adding to theoretical and applied knowledge
5. Skilled professionals	Complex or delicate tasks, usually not repetitive, and defined by the superiors	Complete professional qualification implying theoretical and applied knowledge
6. Semi-skilled professionals	Well defined tasks, mainly manual or mechanical (no intellectual work) with low complexity, usually routine and sometimes repetitive	Professional qualification in a limited field or practical and elementary professional knowledge
7. Non-skilled professionals	Simple tasks and totally determined	Practical knowledge and easily acquired in a short time
8. Apprentices, interns, trainees	Apprenticeship	

Notes: Hierarchical levels defined according to Decreto Lei 121/78 of July 2nd (Lima and Pereira (2003)).

Table 9: Wage Regression - Interactions - Core Covariates

Covariates	Interactions Worker FE	Interactions Worker-Trade Status FE
Export Exp. (0/1)	-0.011 ^a (0.003)	-0.015 (0.015)
Manag. X Export Exp. (0/1)	0.055 ^a (0.008)	0.031 ^c (0.017)
Export Exp. X New (0/1)	-0.025 ^a (0.003)	0.022 (0.026)
Export Exp. X Cont. Exporter (0/1)	-0.009 ^a (0.003)	-0.009 (0.015)
Export Exp. X Exit. Exporter (0/1)	-0.021 ^a (0.005)	-0.061 (0.139)
Export Exp. X Other Exporter (0/1)	-0.006 ^a (0.002)	-0.018 (0.015)
Manag. X Export Exp. X New (0/1)	0.026 ^a (0.010)	-0.046 (0.085)
Manag. X Export Exp. X Cont. (0/1)	0.026 ^a (0.008)	0.053 ^a (0.018)
Manag. X Export Exp. X Exit. (0/1)	0.026 ^c (0.016)	0.118 (0.091)
Manag. X Export Exp. X Other (0/1)	0.014 ^c (0.008)	0.026 (0.018)
Manag. X New (0/1)	-0.002 (0.004)	0.044 (0.075)
Manag. X Cont. Exporter (0/1)	0.013 ^a (0.003)	-0.011 ^b (0.005)
Manag. X Exit. Exporter (0/1)	-0.002 (0.005)	-0.061 (0.042)
Manag. X Other Exporter (0/1)	0.007 ^a (0.002)	0.005 (0.005)
Constant	-2.349 ^a (0.098)	-2.311 ^a (0.087)
Observations	2,895,888	2,895,888
R^2	0.366	0.352
Number of nss	1,050,252	
Number of nss_ts		1,395,980

Notes: This Table contains the coefficients value and standard deviation of the interactions between experience, manager, and trade status coming from the within estimation of the mincerian wage equation (1). Other covariates' estimates and standard deviations are reported in Table 10. The dependent variable is a worker log hourly wage in euros as defined in details in the Data Appendix. Both results based on worker fixed effects and "worker-firm trade status" fixed effects are provided. Both specifications include a set of NUTS 3 region dummies, NACE 2-digits industry dummies and year dummies. ^a, ^b, and ^c mean, respectively, that a coefficient is significantly different from zero at the 1, 5, and 10% confidence level. Standard errors are obtained with worker-level clustering.

Table 10: Wage Regression - All - Controls

Covariates	Baseline	Baseline	Time Breakdown	Time Breakdown	Interactions	Interactions
	<i>Worker FE</i>	<i>Worker- Trade Status FE</i>	<i>Worker FE</i>	<i>Worker- Trade Status FE</i>	<i>Worker FE</i>	<i>Worker- Trade Status FE</i>
Age (Years)	0.070 ^a (0.000)	0.071 ^a (0.000)	0.070 ^a (0.000)	0.071 ^a (0.000)	0.070 ^a (0.000)	0.071 ^a (0.000)
Age Squared (Years)	-0.000 ^a (0.000)	-0.000 ^a (0.000)	-0.000 ^a (0.000)	-0.000 ^a (0.000)	-0.000 ^a (0.000)	-0.000 ^a (0.000)
Education (Years)	0.003 ^a (0.000)	0.003 ^a (0.000)	0.003 ^a (0.000)	0.003 ^a (0.000)	0.003 ^a (0.000)	0.003 ^a (0.000)
Tenure (Years)	0.001 ^a (0.000)	0.000 ^c (0.000)	0.001 ^a (0.000)	0.000 ^c (0.000)	0.001 ^a (0.000)	0.000 ^b (0.000)
Manager (0/1)	0.033 ^a (0.002)	0.034 ^a (0.002)	0.035 ^a (0.002)	0.036 ^a (0.002)	0.024 ^a (0.003)	0.040 ^a (0.004)
Blue Collar (0/1)	-0.045 ^a (0.001)	-0.038 ^a (0.002)	-0.045 ^a (0.001)	-0.038 ^a (0.002)	-0.045 ^a (0.001)	-0.038 ^a (0.002)
Other Collar (0/1)	-0.107 ^a (0.002)	-0.098 ^a (0.002)	-0.107 ^a (0.002)	-0.098 ^a (0.002)	-0.107 ^a (0.002)	-0.098 ^a (0.002)
2nd Firm (or later)	0.005 ^b (0.002)	0.007 ^b (0.003)	0.004 (0.003)	0.004 (0.003)	0.005 ^b (0.002)	0.007 ^b (0.003)
3rd Firm (or later)	0.020 ^a (0.002)	0.026 ^a (0.003)	0.015 ^a (0.002)	0.019 ^a (0.003)	0.020 ^a (0.002)	0.026 ^a (0.003)
4th Firm (or later)	0.008 (0.007)	-0.003 (0.010)	0.002 (0.007)	-0.012 (0.010)	0.009 (0.007)	-0.003 (0.010)
5th Firm (or later)	0.028 (0.026)	-0.011 (0.035)	0.025 (0.026)	-0.014 (0.035)	0.028 (0.026)	-0.011 (0.035)
6th Firm (or later)	-0.125 (0.090)	-0.269 ^c (0.155)	-0.13 (0.091)	-0.270 ^c (0.155)	-0.126 (0.091)	-0.269 ^c (0.155)
Firm Size (log)	0.029 ^a (0.001)	0.029 ^a (0.001)	0.029 ^a (0.001)	0.029 ^a (0.001)	0.029 ^a (0.001)	0.029 ^a (0.001)
Apparent Labor Productivity (log)	0.004 ^a (0.000)	0.001 ^a (0.000)	0.004 ^a (0.000)	0.001 ^a (0.000)	0.004 ^a (0.000)	0.001 ^a (0.000)
Exports PT (log)	0.107 ^a (0.001)	0.107 ^a (0.001)	0.107 ^a (0.001)	0.107 ^a (0.001)	0.107 ^a (0.001)	0.107 ^a (0.001)
Firm Age (log)	0.003 ^a (0.001)	0.005 ^a (0.001)	0.003 ^a (0.001)	0.005 ^a (0.001)	0.003 ^a (0.001)	0.005 ^a (0.001)
Foreign Ownership (0/1)	0.018 ^a (0.001)	0.011 ^a (0.001)	0.018 ^a (0.001)	0.011 ^a (0.001)	0.018 ^a (0.001)	0.012 ^a (0.001)
New Exporter (0/1)	0.006 ^a (0.001)		0.007 ^a (0.001)		0.010 ^a (0.001)	
Continuing Exporter (0/1)	-0.001 (0.001)		-0.001 (0.001)		-0.002 ^c (0.001)	
Exiting Exporter (0/1)	-0.002 ^c (0.001)		-0.002 (0.001)		0.000 (0.002)	
Other Exporter (0/1)	0.004 ^a (0.001)		0.004 ^a (0.001)		0.004 ^a (0.001)	
Size of Prev. Firm (0/1)	0.012 ^b (0.005)	0.002 (0.007)	0.015 ^a (0.005)	0.003 (0.007)	0.011 ^b (0.005)	0.002 (0.007)
App. Prod. of Prev. Firm (0/1)	-0.035 ^a (0.010)	-0.022 (0.013)	-0.034 ^a (0.010)	-0.017 (0.013)	-0.035 ^a (0.010)	-0.015 (0.013)
Size of Previous Firm (log)	0.001 ^b (0.001)	0.004 ^a (0.001)	0.001 ^c (0.001)	0.004 ^a (0.001)	0.001 ^b (0.001)	0.004 ^a (0.001)
App. Prod. of Previous Firm (log)	0.003 ^a (0.001)	0.001 (0.001)	0.002 ^a (0.001)	0.001 (0.001)	0.003 ^a (0.001)	0.001 (0.001)
Avg. Managers' Age	-0.001 ^a (0.000)	-0.001 ^a (0.000)	-0.001 ^a (0.000)	-0.001 ^a (0.000)	-0.001 ^a (0.000)	-0.001 ^a (0.000)
Std. Dev. Managers' Age	0.000 (0.000)	-0.000 ^c (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 ^c (0.000)
Avg. Managers' Education	-0.000 ^a (0.000)	-0.001 ^a (0.000)	-0.000 ^a (0.000)	-0.001 ^a (0.000)	-0.000 ^a (0.000)	-0.001 ^a (0.000)
Std. Dev. Managers' Education	0.001 ^a (0.000)	0.001 ^a (0.000)	0.001 ^a (0.000)	0.001 ^a (0.000)	0.001 ^a (0.000)	0.001 ^a (0.000)
Constant	-2.353 ^a (0.099)	-2.316 ^a (0.087)	-2.350 ^a (0.099)	-2.307 ^a (0.087)	-2.349 ^a (0.098)	-2.311 ^a (0.087)
Observations	2,895,888	2,895,888	2,895,888	2,895,888	2,895,888	2,895,888
R ²	0.366	0.352	0.367	0.353	0.366	0.352
Number of nss	1,050,252		1,050,252		1,050,252	
Number of nss_ts		1,395,980		1,395,980		1,395,980

Notes: This Table contains the coefficients value and standard deviation of the controls used in the within estimation of the mincerian wage equation (1). The dependent variable is a worker log hourly wage in euros as defined in details in the Data Appendix. Both results based on worker fixed effects and "worker-firm trade status" fixed effects are provided for each of the three specifications considered: baseline, time-breakdown, and interactions. All specifications include a set of NUTS 3 region dummies, NACE 2-digits industry dummies and year dummies. ^a, ^b, and ^c mean, respectively, that a coefficient is significantly different from zero at the 1, 5, and 10% confidence level. Standard errors are obtained with worker-level clustering.

Table 11: Trade Status Regressions Controls - OLS

Covariates	New vs. Never			Exiting vs. Continuing		
	Baseline	Size & Productivity	Time Breakdown	Baseline	Size & Productivity	Time Breakdown
Firm Age (log)	-0.004 ^b (0.002)	-0.003 ^b (0.002)	-0.004 ^b (0.002)	0.002 (0.002)	0.003 (0.002)	0.003 (0.002)
Foreign Ownership (0/1)	0.083 ^a (0.019)	0.082 ^a (0.019)	0.083 ^a (0.019)	0.001 (0.004)	0.001 (0.004)	0.001 (0.004)
Avg. Managers' Age	-0.000 (0.002)	-0.001 (0.002)	-0.000 (0.002)	0.003 (0.002)	0.003 (0.002)	0.003 (0.002)
Std. Dev. Managers' Age	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	-0.003 (0.002)	-0.003 (0.002)	-0.003 (0.002)
Avg. Managers' Education	0.008 ^a (0.002)	0.007 ^a (0.002)	0.008 ^a (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)
Std. Dev. Managers' Education	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.004 (0.002)	0.004 ^c (0.002)	0.004 (0.002)
Avg. FE Managers	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)
Std. Dev. FE Managers	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)	-0.002 (0.003)	-0.002 (0.003)	-0.002 (0.003)

Notes: This Table contains the coefficients value and standard deviation of the controls used in the OLS estimations of the trade status equation (2). The first three columns display estimations referring to the comparison of New vs Never exporters, while the last three columns refer to the comparison of Exiting vs Continuing exporters. The dependent variable is a binary indicator taking value one whenever a firm is a New (Exiting) exporter and zero otherwise. The unconditional probability of being a New (Exiting) exporter is 0.051 (0.035). The key variable in our analysis is the share of managers with export experience currently employed by the firm : $\text{Manag. w/Export Exp. (Share)}$. In columns 1 and 4 we consider this variable alone, while in columns 2 and 5 (3 and 6) we consider it interaction with firm size and productivity (its time breakdown). All covariates, except dummies, have been divided by their respective standard deviation in order to deliver a comparable metric in terms of the variation of the dependent variable which is explained by a one standard deviation change in the dependent variable. All specifications include a set of NACE 2-digits industry dummies, NUTS 3-digit region dummies, and year dummies. Standard errors clustered at the firm-level in parentheses: ^a $p < 0.01$, ^b $p < 0.05$, ^c $p < 0.1$.

Table 12: Trade Status Regressions Controls - Instrumental Variables

Covariates	New vs. Never			Exiting vs. Continuing		
	Baseline	Size & Productivity	Time Breakdown	Baseline	Size & Productivity	Time Breakdown
Firm Age (log)	0.007 ^b (0.004)	0.003 (0.004)	0.001 (0.002)	0.007 (0.011)	0.001 (0.006)	-0.004 (0.004)
Foreign Ownership (0/1)	0.052 ^a (0.020)	0.056 ^a (0.020)	0.061 ^a (0.020)	0.004 (0.006)	0.003 (0.006)	-0.009 (0.006)
Avg. Managers' Age	-0.003 (0.002)	-0.002 (0.002)	-0.003 (0.002)	0.004 (0.002)	0.004 (0.002)	-0.003 (0.004)
Std. Dev. Managers' Age	0.005 ^c (0.003)	0.004 (0.003)	0.005 (0.003)	-0.003 (0.004)	-0.003 (0.003)	0.002 (0.004)
Avg. Managers' Education	0.001 (0.003)	0.004 (0.003)	0.002 (0.003)	-0.003 (0.004)	-0.001 (0.003)	0.005 (0.004)
Std. Dev. Managers' Education	0.003 (0.002)	0.002 (0.002)	0.002 (0.002)	0.004 ^c (0.003)	0.003 (0.002)	0.002 (0.003)
Avg. FE Managers	-0.006 ^b (0.003)	-0.002 (0.003)	-0.006 ^c (0.003)	0.003 (0.003)	0.003 (0.003)	0.005 (0.004)
Std. Dev. FE Managers	-0.004 (0.003)	-0.002 (0.003)	-0.002 (0.003)	-0.003 (0.003)	-0.002 (0.003)	-0.000 (0.004)

Notes: This Table contains the coefficients value and standard deviation of the controls used in the IV estimations of the trade status equation (2). The first three columns display estimations referring to the comparison of New vs Never exporters, while the last three columns refer to the comparison of Exiting vs Continuing exporters. The dependent variable is a binary indicator taking value one whenever a firm is a New (Exiting) exporter and zero otherwise. The unconditional probability of being a New (Exiting) exporter is 0.046 (0.035). The key variable in our analysis is the share of managers with export experience currently employed by the firm : $\text{Manag. w/Export Exp. (Share)}$. In columns 1 and 4 we consider this variable alone, while in columns 2 and 5 (3 and 6) we consider it interaction with firm size and productivity (its time breakdown). All covariates, except dummies, have been divided by their respective standard deviation in order to deliver a comparable metric in terms of the variation of the dependent variable which is explained by a one standard deviation change in the dependent variable. All specifications include a set of NACE 2-digits industry dummies, NUTS 3-digit region dummies, and year dummies. Standard errors clustered at the firm-level in parentheses: ^a $p < 0.01$, ^b $p < 0.05$, ^c $p < 0.1$.