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# Ethnic Diversity and Firms' Export Behavior \*

Pierpaolo Parrotta,<sup>†</sup> Dario Pozzoli,<sup>‡</sup> and Davide Sala<sup>§</sup>

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## Abstract

Media are reporting of companies that are increasing the diversity of their workforce to expand their business internationally. This paper investigates whether these examples constitute pieces of evidence that diversity promotes firms' internationalization. Indeed, diverse companies are like a cosmopolitan world in small scale, in which their employees learn to relate to other cultures. This improves firms' *relational capital* and ability to market products internationally. To address endogeneity issues, we rely on several empirical strategies, one of which is centered on the well established "shift share" method. Our results are robust across all empirical models, confirming the hypothesis that ethnic diversity favors firms' engagement on international markets.

**JEL Classification:** J15, F14, F15, F16, D22.

**Keywords:** Ethnic diversity, export, instrumental variable, shift share.

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# 1 Introduction

A number of recent studies have made the strong case that cultural diversity is strongly linked to a range of economic outcomes (Guiso et al., 2009 and Fernandez, 2011).<sup>1</sup> Clearly, the “diversity dividend” described in this literature can also mature within the firm boundary. When diversity increases at the workplace, firms become like a cosmopolitan world in small scale, and their employees learn to operate in a multicultural environment. *Relational capital* grows, and firms’ ability to cater products on international markets improves. This seems confirmed by the practice of some international companies (i.e., Toshiba, Lawson, Arla Food) that are deliberately expanding the base of foreign employees in their headquarters with the aim of sustaining or developing globalized operations.<sup>2</sup>

The focus of this paper is to investigate whether these prominent business examples also constitute pieces of evidence in favor of the hypothesis that diversity promotes firms’ internationalization. Albeit interesting, workforce diversity as a driver for firms’ internationalization remains untested in international economics, presumably because of the inadequacy of available data.<sup>3</sup>

The linked employer-employee nature of Danish registry data allows not only to gauge workforce diversity at the firm level, but also to relate it to different measures of firm internationalization, namely *market reach* (i.e., export status, number of destinations and exported products) and *market penetration* (i.e., export sales). The measure of diversity adopted is the same as the one used to describe the diversity of a city in

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<sup>1</sup>See Alesina and La Ferrara (2005) for a review of macro studies.

<sup>2</sup>Examples include the Japanese companies Lawson and Toshiba (see “Japanese companies throw doors open to foreign staff” by Michiyo Nakamoto, Financial Times, December 7th, 2010), and the largest Danish dairy firm, “Arla Foods” (see the speech by its CEO Peder Tuborgh at the “More International Export Talent” event organized in Copenhagen at the Foreign Trade Ministry, on the 19th of November 2013).

<sup>3</sup>Ottaviano et al. (2015) have recently investigated the impact of immigrant diversity, measured at the local labor market, on imports, exports and productivity of service-producing firms in the UK. Our study considers the effect of an ethnically diversified workforce measured at the firm level, but it uses a similar methodology to tease out causality. See below for more details.

Ottaviano and Peri (2006), and considers the main language spoken in workers' country of origin as a proxy for employees' cultural background.

The major empirical challenge is that diversity is endogenous to the internationalization process of a firm. A critical aspect is that diversity responds also to labor demand.<sup>4</sup> In absence of quasi experiments to worker mix at the firm-level, we rely on an IV strategy to sort out the causal effect of interest. In this context, our IV strategy should identify variation in diversity off changes in the local labor supply and neutralize at best variation in diversity induced by shifts of the local labor demand.

We pursue two approaches. The main approach implements the well established "shift share" method, as recently proposed by Foged and Peri (2013). This identifies supply-driven diversity from changes to the local labor supply which are ascribable to migration shocks due to exogenous push factors. The alternative approach exploits drivers of migrants' settlements, that shape the diversity of the local labor supply without directly affecting firms' exports. Specifically we use rental opportunities and historical attitudes towards immigrants as instruments and make use of a difference-in-difference design to filter out changes in diversity stemming from the demand channel.

Our results prove to be robust across different instruments and empirical models (OLS, fixed effects, IV), providing pieces of convincing evidence in favor of the hypothesis that ethnic diversity promotes trade.

The international business literature has already provided theoretical arguments on the importance of diversity for the internationalization process of a firm. Mohr and Shoobridge (2011) have theorized that firms that successfully manage a diverse workforce have an advantage to engage with individuals with different values, norms, and tastes (better *relational capital*). The form of knowledge described has *global scope* and is therefore applicable to multiple markets simultaneously. Its implication

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<sup>4</sup>Methodological difficulties are multiple: companies self-select into different levels of workforce diversity (Osborne, 2000) and there are no obvious simple omitted variables, because ethnic diversity is measured as an index.

is similar to the learning mechanism underlying the theory of *sequential exporting* (Albornoz et al., 2012). According to this theory, fledgling exporters use their first international market access as a “testing ground” to learn about their own profitability and export potential. Because this process builds the necessary confidence for operating internationally, it generates knowledge that has a global scope and becomes useful during all subsequent expansions abroad.<sup>5</sup> Likewise, in our context diversity gives firms the experience required to operate in a multicultural environment and to respond more promptly to new opportunities arising on several international markets.<sup>6</sup> The key difference compared to the sequential exporting theory is that this experience does not form on the first penetrated international market, but rather on the domestic market, and internally within the firm.

This highlights also an important difference between the diversity channel described here and the channel described in the network literature. In both cases, firms are using a form of *relational capital*, but with a different scope. *Relational capital* built with diversity management is applicable to multiple markets, whereas with networking, firms capitalize on employees’ specific competences about their country of origin to overcome local informational or entry barriers (Rauch, 2001; Andrews et al., 2011; Hiller, 2013; Ottaviano et al., 2015 ). Therefore, networking is expected to impact exporting positively. However, the relation between diversity and trading is ambiguous, because its positive direct effect may be offset by other indirect effects. A large amount of macro and micro evidence points to a similar trade-off: The advantages of multiculturalism may be lost to the increased communication difficulties and distrust arising from the clash of cultures.<sup>7</sup> Moreover, both Grossman and Maggi (2000) and

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<sup>5</sup>See Albornoz et al. (2012), p. 18.

<sup>6</sup>For example, a better *relational capital* means that diverse firms may *i*) market their products in a way that resonate with an international customer base; *ii*) understand and target specific customers’ needs and niche markets; and *iii*) timely adjust its products to distinct customer and regulatory requirements in several markets.

<sup>7</sup>See Becker (1957), Lang (1986), Lazear, (1998, 1999) for a negative impact of diversity. See Hong and Page (2001, 2004), Berliant and Fujita (2008), Glaeser et al. (2000), Casella and Rauch (2003)

Bombardini, Gallipoli and Pupato (2014) show that the relation between diversity and trading is theoretically ambiguous because technology acts as a mediating factor.

Our work intersects two strands of the literature: one investigating the economic effects of (cultural) diversity, the other analyzing the determinants of firms' internationalization. While it is consolidated that productivity determines firms' selection into exporting, recent hypotheses have started to investigate more closely the deliberate efforts undertaken by firms to become exporters (*conscious self-selection*). Some studies have explored technological investments or quality upgrading (Alvarez and Lopez, 2005; Iacovone and Javorcik, 2012), while other studies have focused on human capital investments with firms building up the right expertise in preparation for exporting (Molina and Muendler, 2013; Sala and Yalcin, 2015). Our paper identifies the diversity of the workforce as a driver of internationalization, and adds to the recent literature that has recognized how labor force characteristics are also important for export performance. Mion and Opromolla (2014) and Choquette and Meinen (2014) emphasize the role of managers' and workers' market specific export knowledge. Likewise, Melitz and Toubal (2014) suggest that employees' foreign language proficiency can favor communications with customers abroad and improve firms' exports.

The paper proceeds with a description of the theoretical foundation of our work in Section 2, and of our empirical strategy in Section 3. Section 4 describes the data, and Section 5 presents our results. Section 6 concludes.

## 2 The Diversity Channel and the Diversity Index

The hypothesis, that we deem most interesting on how diversity impacts exporting, is the one advanced in Mohr and Shoobridge (2011): Firms that successfully manage a diverse workforce also develop those core capabilities that are required to conduct

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for a positive impact of diversity.

international transactions with people of different cultures. This, in turn, improves firms’ “relational capital” and, consequently, the ability to cater products to a foreign customer base. This type of knowledge is clearly *non-rival* and is applicable to all markets (i.e., *global scope*), but is *excludable* to other firms. Therefore, it becomes an *intangible asset* like patents or blue prints and, according to the OLI framework, enables firms to overcome the liability of conducting business abroad.<sup>8</sup>

Our aim is to capture two important features of firms’ workforce ethnic diversity: “Richness”, the number of ethnic groups in a workplace, and “evenness”, how balanced is the distribution of different ethnicities present in a workplace. Using the same index of *ethnic fragmentation* as in [Ottaviano and Peri \(2006\)](#), and letting  $p_{s_{wt}}$  be the share of foreigner employees with ethnic background  $s$  in workplace  $w$  among the total number of foreign employees (i.e.,  $p_{s_{wt}} \equiv \text{foreigners}_{s_{wt}} / \text{foreigners}_{wt}$ ), the workforce diversity index for firm  $i$  at time  $t$  is

$$d_{it} = \sum_{w=1}^W \frac{N_w}{N_i} \left( 1 - \sum_{s=1}^S p_{s_{wt}}^2 \right), \quad (1)$$

where  $W$  is the total number of workplaces belonging to firm  $i$ ,  $S$  is the total number of ethnic categories, and  $N_w$  and  $N_i$  are the number of full-time and part-time employees in workplace  $w$  and firm  $i$ , respectively.<sup>9</sup> We identify employees’ ethnic background with the major language spoken in their country of origin. Therefore  $s$  indicates a linguistic group and  $S$  is the collection of linguistic groups in a plant. This choice is grounded in the argument that linguistic distance serves as a good proxy for cultural distance

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<sup>8</sup>OLI is the acronym for ownership, location, internationalization. See [Dunning \(1977, 1981\)](#).

<sup>9</sup>See also [Parrotta et al. \(2014\)](#) for a similar definition. When the total number of employees,  $N$ , is lower than the number of linguistic groups  $S$ , we adjust the ethnic diversity to take firm size into account. Specifically, we standardize the index at a maximum value equal to  $(1 - 1/N)$ . Moreover, second-generation immigrants are treated as foreigners in the main analysis. However, excluding them in the computation of the index does not substantially change our main results.

(Guiso et al., 2009; Adsera and Pytlikova, 2012).<sup>10</sup> Linguistic groups corresponds to the third level of the linguistic family tree in the Ethnologue data with a total of  $S = 35$  linguistic groups (see the online appendix for more details).

We restrict  $p$  in one important way: we compute its numerator without counting among *foreigners* in group  $s$  those workers coming from countries in the European Union as of 1990.<sup>11</sup>

This restriction is necessary for our identification strategy (explained in the next section) and means that the empirical focus is on non-EU diversity. Because our aim is to test a “relational capital” hypothesis and not an hypothesis of ethnic networks, this is not a worrisome limitation in our context. If anything, it actually strengthens our story because  $d$  excludes, de facto, those workers with origins in some of the most important Danish export markets (both in terms of export volumes and of number of products exported).

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<sup>10</sup>Such an approach avoids the complication arising with a nationality-based index of weighting each nationality with some sort of “cultural” distance. Arguably, an Italian and a French employee are culturally closer than an Italian and a Mongolian. In our computation based on linguistic groups, an Italian would be closer to a Frenchman than to a Mongolian (because her language is in the same linguistic group as French, but not in the same group as Mongolian), whereas in a nationality-based index, she would appear equally distant to both the Frenchman and the Mongolian, unless a weighting scheme is introduced.

<sup>11</sup>Excluded EU countries are Belgium, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain and United Kingdom. Note that no linguistic group is eliminated altogether from the index: For example, Greece and Cyprus belong both to the “Attic” linguistic group, but only Greece belonged to the EU in 1990. Therefore workers from Cyprus are counted, while workers from Greece are excluded when computing the numerator of  $p$  for the “Attic” linguistic group. See the online appendix for a comprehensive list of countries belonging to each linguistic group.



### 3 Empirical strategy

We investigate the relation between workforce ethnic diversity ( $d_i$ ) and export performance ( $y_i$ ) of the firm using the following triangular system

$$y_{it} = \alpha + \gamma d_{it} + \mathbf{x}_{it}\beta + \eta_{jt} + \eta_{rt} + e_{it}, \quad (2)$$

$$d_{it} = \delta_0 + \delta_1 Z_{mt} + \mathbf{x}_{it}\delta_2 + \eta_{jt} + \eta_{rt} + v_{it}, \quad (3)$$

where  $i$  is the sub-index for a firm and  $t$  for time, and  $\mathbf{x}$  is a row vector of firm and workforce characteristics.  $y$  is the export outcome of the firm as variedly measured by export status, or export sales (in logarithm), or the number of markets and destinations. When the export status is our dependent variable, we estimate (2) with the linear probability model (LPM), which eases the comparability of the effects of diversity across all outcomes and is more suitable to 2SLS estimation (Miguel et al., 2004).<sup>12</sup>  $\eta_{jt}$ ,  $\eta_{rt}$  are industry-year and region-year fixed effects, respectively; their inclusion control for changes to the regional labor market demand that may affect workforce diversity.  $e_{it}$  and  $v_{it}$  are idiosyncratic error terms.

The *relational capital* channel suggested in Mohr and Shoobridge (2011) may take time to build. By focusing on the current level of diversity in equation (2), rather than its lagged value, we are, if anything, underestimating this effect. Moreover, a number of micro studies have uncovered how diversity can in some situations exacerbate emotional conflicts among employees and hinder their performance or communication, while, in other circumstances, can improve the problem-solving capacity and creativity of working teams (Barkema and Shvyrkov, 2007).<sup>13</sup> Therefore, the parameter  $\gamma$  captures the resulting net effect of diversity.

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<sup>12</sup> Angrist and Pischke (2010) deem the LPM as adequate as a probit or logit model, at least if the “right” non-linear model is unknown.

<sup>13</sup> Some of these effects operate through (lagged) productivity, which we always include in  $\mathbf{x}$ . See also Parrotta et al. (2014).

Furthermore, the effect of diversity can be confounded with network effects, as firms may be hiring people with specific backgrounds with the intention to start exporting to specific destinations. To discern the effects of hiring a mix of diverse workers ( $d$ ) from hiring a specific group of foreigners, we include in vector  $\mathbf{x}$  also the shares of foreign employees belonging to each linguistic group present in the firm.<sup>14</sup>

Finally, our specification accommodates that diversified firms are hardly a random selection of the population of firms:  $Z$  is our instrumental variable, which exploits changes in labor supply or in the composition of labor supply in municipality  $m$  that are triggered by arguably exogenous factors.<sup>15</sup> The three instruments proposed differ just for the type of factors considered. The main instrument is based on the well established “imputed share” method, which exploits the spatial distribution of early migrant enclaves; the other two instruments are based on other drivers of migrants’ settlements (e.g., rental opportunities and historical attitudes towards migrants). In what it follows we describe each approach in detail.

### 3.1 “Imputed share” based instrument

At the core of the “imputed share” method described in [Foged and Peri \(2013\)](#) is the identification of an increase in immigration at the municipality level ascribable to an immigration shock originating outside Danish borders.<sup>16</sup> This method can be adapted to come up with a municipal diversity measure whose variation is induced uniquely by the supply driven shock, and therefore it is unrelated to the firm’s idiosyncratic error in the outcome equation.

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<sup>14</sup>Given that we have a total of 35 linguistic groups, there are at most 35 of such shares. Note that we calculate these shares at the firm level as the ratio between the number of employees belonging to a specific linguistic group to the total number of non-native employees. Calculating these shares out of total employment gives nearly identical results.

<sup>15</sup>Municipalities classification is consistent throughout the period 1995-2007. We are thankful to the data manager at Aarhus University for providing it to us.

<sup>16</sup>The methodology in [Foged and Peri \(2013\)](#) refers in turn to the “shift share” approach introduced in [Altonji and Card \(1991\)](#).

Let  $F_{st}$  be the national stock of immigrants belonging to ethnic group  $s$  in period  $t$ , of which  $F_{mst}$  live in municipality  $m$ , corresponding to a share of  $s_{mst} = F_{mst}/F_{st}$ . It is worth noting that  $\tilde{F}_{mst} = s_{ms90}F_{st}$  can be interpreted as the counterfactual inflow of migrants into municipality  $m$  that would have prevailed, if the national stock of migrants in year  $t$  had settled on the Danish territory as the cohort arriving in 1990. The share  $s_{ms90}$  works as a “spatial assignment rule”, distributing the incoming stock of migrants of type  $s$  across Danish municipalities according to the ethnic spatial distribution of 1990. Based on a migration network argument, early migration settlements of the original enclave of migrants may be a good predictor for subsequent waves of migrations. Therefore  $\tilde{F}_{mst}$  is a good predictor for the actual inflow. Normalizing it by the whole foreign population residing in the same municipality in year 1990, one obtains  $\tilde{p}_{mst} = \tilde{F}_{mst}/F_{m90}$ , the imputed share of foreigners of type  $s$  at the municipality level. By analogy with equation (1), the following municipal diversity index

$$Z_{mt} \equiv \tilde{d}_{mt} = 1 - \sum_{s \in S} (\tilde{p}_{mst})^2 \quad (4)$$

can be used as an instrument whose validity hinges on  $F_{st}$  and  $s_{ms90}$  being exogenous regressors. In [Foged and Peri’s \(2013\)](#) argumentations, the arrival of  $F_{st}$  migrants in Denmark is mainly driven by political and economic crises in the country of origin (i.e., push factors), whereas  $s_{ms90}$  is retained to be exogenous for two reasons. First, it partially reflects a random dispersion policy of refugees implemented in Denmark since 1986. Second, Denmark was not historically a popular immigration host country, so the presence of immigrant before 1995 was rather confined and hardly related to future developments of labor demand.<sup>17</sup> These identification assumptions are strengthened by restricting the origin of migrants to non-EU countries: Like for  $p$ , the computation

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<sup>17</sup>See [Foged and Peri \(2013\)](#) for more details on Danish immigration history and on their methodology.

of  $\tilde{p}$  excludes workers coming from countries that were EU-member states in 1990.<sup>18</sup>

It becomes apparent that the definition of non-EU diversity used in equation (1) is dictated by our identification assumption. Extending our definition to include also European workers demands of our instrument to predict the European component of diversity. But push factors outside the European Union can poorly explain the presence of European migrants on the Danish territory. We therefore believe that adopting this definition of diversity helps the instrument power.

It is worth noticing that we are not using  $\tilde{p}$  directly as an instrument, but the mapping of it given in equation (4). Unlike in [Foged and Peri \(2013\)](#) and [Foged and Peri \(2015\)](#), this results into two limitations.<sup>19</sup> First, we cannot restrict the computation of our instrument exclusively to asylum seekers without ending up with a weak instrument. Second, the within variation of  $\tilde{d}$  in equation (4) is too modest for the inclusion of firm fixed effects.<sup>20</sup> To eliminate as much of cross-sectional variation as possible and present nevertheless the cleanest possible identification strategy, we further implement the following adjustments to the empirical analysis. First, we drop the municipality where the Danish truly cosmopolitan capital is located (i.e, the municipalities of Copenhagen and Frederiksberg), as it is the chosen location of many prominent and internationally oriented firms' headquarters as well as the host to many big immigrant communities. Second, we include in (2) a polynomial of third order to control for firm size (as measured by the number of employees), because larger firms are typically more diverse and export more. Third, we further augment the same equation with a second

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<sup>18</sup>Excluded EU-member states are Belgium, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain and United Kingdom. Among the non-EU countries, Iraq, Lebanon, Iran, Somalia, Vietnam, Sri-Lanka, Afghanistan, Slovenia, Croatia, Bosnia, Montenegro, Kosovo, Serbia, and Macedonia are the countries where refugees came from, representing between 22% and 28% of non-EU foreigners throughout our sample period.

<sup>19</sup>Another important difference is that we cannot exploit the year 1994, when the first immigration wave occurs, for a DiD based instrumental strategy, because firm characteristics are observed only from 1995 onwards.

<sup>20</sup> $\tilde{d}$  reveals a very modest within-variation of 0.09 as opposed to a between-variation of 0.18 across municipalities.

measure of firm size, namely the capital stock per employee. Fourth, to account for different business models, we interact the number of employees with a foreign ownership dummy.

Finally, the introduction of region-year fixed effects acts in this context as a sort of firm-area group fixed effect because of the limited firm mobility across regions throughout the sample.

### 3.2 Alternative instruments

In the robustness section of this study, we corroborate the results obtained from our main IV strategy with two further instruments. Their advantage is to extend our empirical estimation in the direction of a difference-in-difference strategy, which attenuates endogeneity issues due to possible shocks to the labor demand. Both instrumental variables exploit the argument that migrant settlements influence the diversity of the local labor supply, and therefore, factors affecting migrant settlements but not firms' export outcomes ought to be valid instruments.

The first IV candidate is related to the housing market: Danish legislation on search and transition costs constrain the ability of some groups of foreigners to purchase real estate. In these instances, one can expect that migrants are more likely to rent an apartment than to purchase one upon arrival in Denmark. Therefore, where migrants take up residence will depend on the availability of rental opportunities. Since high-rises are more likely to serve as rental housing ([Harmon, 2013](#)), the share of housing stock in 1990 made of high-rises works as an instrument of workforce diversity. Since the composition of the housing stock is persistent over time, it can also be a good predictor of current migrant settlements and ultimately of the diversity level of the workforce.

A second instrument candidate is the historical attitude toward migrants in the municipality where the firm is located. This is a good candidate because migrants

prefer to settle in areas where locals' attitudes toward them are historically less negative (Waisman and Larsen, 2008). Therefore, if areas with a tradition of being ideologically more open are attracting more migrants, firms located in these areas can draw from a more diverse pool of workers.

To argue in favor of the validity of both instruments, we implement the following DiD design:

$$Z_{mt} = \delta_0 V_{m90} + \delta_1 I(t \geq 2004) + \delta_2 V_{m90} * I(t \geq 2004) + I(V = H_{m90})[\delta_3 N_{m90} + \delta_4 (N/Area)_{m90}], \quad V = H_{m90}, A_{m90}; \quad t = 2001, \dots, 2007. \quad (5)$$

where  $H_{m90}$  and  $A_{m90}$  respectively denote the share of housing stock made of high-rises and the historical attitudes towards migrants, both measured at the municipality level in 1990.<sup>21</sup> The function  $I$  is an indicator function taking value 1 when the expression in parenthesis is true. Therefore, the specification with  $H_{m90}$  controls additionally for total population ( $N$ ) and population density ( $N/Area$ ) of the municipality because rural and urban municipalities may exhibit different trends along these characteristics.  $\delta_2$  measures the differential shift in diversity developed after year 2004 in areas that, because of rental opportunities or open attitudes, are more favorable to migrant settlements.

This approach exploits the different degree of exposure of distinct municipalities to international migration. Its advantage is best appreciated thinking of  $m$  as an index for two types of municipalities: one characterized by a low exposure, and the other by a high exposure, to migration inflows.<sup>22</sup> In this set-up, changes to the instrumental variable that stem from national unobservable pull factors are netted out, as they are expected to be common across the two types of municipalities. However, idiosyncratic

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<sup>21</sup>Note that the standard errors are also clustered at municipality level.

<sup>22</sup>De facto, our specification is finer: instead of a binary classification of municipalities, each municipality differs for the degree of exposure to migration along a continuum defined by  $\tilde{p}$ , but the interpretation of our specification remains unchanged.

shocks to the municipal labor demand persist in this formulation and invalidate our identification assumptions if they affect both our instrumental variable and firms' export outcomes. In this case, we would expect  $d$ , as predicted by  $Z$  using (5), to covary with firms' export outcomes in the same municipality. As discussed below in section 5.3, Table A.2 in the appendix shows that there is no evidence of such correlation in the years before 2004. This finding strengthens the validity of our instruments and it's supportive of the common trend assumption implicit in our identification strategy for the period preceding 2004.<sup>23</sup>

Finally the proposed DiD formulation in equation (5) mitigates also other concerns of instrument invalidity arising when firms receive unsolicited export requests (greater  $\epsilon_{it}$ ). Higher orders means that firms' employees become more exposed to foreign contacts and may develop a better attitude towards foreigners. If some of these workers also live in the municipality where the firm is located, the attitude toward migrants will also improve. This implies that the local attitude towards foreigners is potentially correlated with the error term in equation (2).<sup>24</sup> By focusing on historical attitudes,  $A_{m,90}$ , which are measured at least one decade before our estimation sample, we are able to attenuate these issues of reverse causality.

The choice of 2004 as the time divider in our DiD strategy is partly data driven: Figure 1 indicates that (non-EU) ethnic diversity zoomed distinctively in two moments: in 1994, which we cannot exploit because of the lack of firm data, and, a second time, in the EU enlargement year of 2004.<sup>25</sup>

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<sup>23</sup>This assumption ensures that municipalities with low exposure to migration are legitimate counterfactuals for the way the instrumental variable is affected by national demand shocks in municipalities with a high degree of exposure to migration.

<sup>24</sup>Likewise, the presence of a young generation of entrepreneur-inventors in 1990 in search of affordable rental opportunities to test and develop their ideas, as in the dawning of the "Silicon-Valley" experience, would invalidate the high-rise share as an instrument, because past rental opportunities translate into future exporting outcomes in the case of successful start-ups. As long as this entrepreneurial vitality is conceivable as an economy-wide time factor or as a municipality time-invariant factor, a difference-in-difference specification of this instrument is robust to this type of critique.

<sup>25</sup>The expansion on May 1st, 2004, meant that ten new states joined the European Union: Eight were Central or Eastern European countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania,

[Insert Fig. 1 about here]

When we look at Figure 2, we can notice how both times the rise of ethnic diversity can be associated to the rise of non-EU immigration. On the contrary, EU immigration, which includes only workers from the pre-2004 member-countries, exhibits a nearly flat trend throughout both periods. A significant part of the acceleration of non-EU immigration after 2004 can be attributed to migrants from the new EU member-countries, with the average share of non-EU workers from the new EU members increasing from 0.26% in 2003 to 0.75% in 2007.<sup>26</sup>

[Insert Fig. 2 about here]

Because the variation in the degree of exposure to migration around year 2004 is essential to the success of this alternative approach, we restrict our sample to a time window comprised within 2001-2007. Of course, such an approach is valid only if we can convincingly argue that the eastward EU enlargement of 2004: *i*) had no direct effect on firms' exports, and *ii*) could be reasonably conceived as exogenous to firms.

The first condition is apparently the hardest to defend because of the contextual trade liberalization that the eastern enlargement process has entailed, and that one expects to impact directly firms' export performances. This criticism would be problematic only if the timing of trade liberalization and of free circulation of people were to coincide. But actually trade liberalization was completed already on January 1, 2002 by means of a number of bilateral agreements between EU and the Central and Eastern European countries, known as European Associations.<sup>27</sup> Therefore, trade ef-

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Poland, the Slovak Republic and Slovenia), and two were Mediterranean countries (Cyprus and Malta). See [Kahanec \(2010\)](#) and [Zaiceva and Zimmermann \(2008\)](#) for detailed evidence on migration from new to old member states.

<sup>26</sup>Note that the ten new accessing countries map into seven different language groups (Czech Republic, Poland, and Slovakia to *Slavic West*; Cyprus to *Attic*; Estonia to *Finnic-Permian*; Hungary to *Ugric*; Latvia and Lithuania to *Baltic East*; Malta to *Semitic Central*; Slovenia to *Slavic South*). Therefore, it is plausible that the inflow of workers from these areas translate into a greater "richness" of our index, resulting into an overall increase of our ethnic diversity index.

<sup>27</sup>See [Baldwin \(1995\)](#), [De Benedictis et al. \(2005\)](#), and [Baas and Bruecker \(2011\)](#).



fects associated with the eastward EU enlargement were gradually realized before 2004, “pre-empting” the full trade potential of the EU extension. To the extent that the post-accession dummy as well as industry-year fixed effects effectively capture some of the trade effects, the identification assumption should not be violated.<sup>28</sup> In the robustness check section of the paper, we additionally show that our results continue to hold if all export measures used in outcome equation (2) will be netted out of exports directed to the new EU member states.

With regard to the second condition, we think of the eastern enlargement process of 2004 as an exogenous labor supply shock from the perspective of a single enterprise, because Danish firms had limited influence on the reduction of labor mobility barriers within Europe decided in transnational negotiations.<sup>29</sup> Even so, we should reasonably rule out some sort of location sorting of firms around the enlargement year. Looking at our sample, the great majority of firms (over 75%) did not relocate at all in-between 2004 and 2007, indicating that location sorting because of the enlargement event was unlikely to happen.<sup>30</sup>

## 4 Data

### 4.1 Data sources

Our data has five pillars: data on firms and their employees from Danish registries, ethnic and language data from “Ethnologue: Language of the World”, data on high-rise stock at the municipality level from “Statistikbanken”, political ideology data from the

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<sup>28</sup>Recall also that focusing on non-EU diversity already excludes a direct relation of the index  $d$  with some of Denmark’s most important export markets.

<sup>29</sup>At best Danish firms could have hoped for lobbying at the national level for introducing (or avoiding) the optional temporary migration restrictions that each member state could have resorted to for a maximum period of eight years. However, these restrictions were anyway subject to the approval of the European Commission.

<sup>30</sup>The percentage of firms that reallocate across municipalities oscillates only slightly throughout the sample and is about 20% in the biennium before 2004, which is in line with that of other years.

“Manifesto Research Group/Comparative Manifestos Project”, and finally electoral outcome data from the Danish parliamentary elections.<sup>31</sup> The Ethnologue data is necessary for our measure of workforce diversity, while data from the Comparative Manifestos Project and Danish elections is combined together to construct our measure of historical attitudes towards migrants, *A*. The online appendix details its construction based on the political ideology of the municipal median voter in year 1990.

Information about firms and workers is collected from several sources at the Danish official statistical institute (Denmark Statistics):<sup>32</sup> From the population of all firms, we sample privately owned firms in the manufacturing and service sectors with 10 or more employees and non-imputed accounting data.<sup>33</sup> We end up with approximately 14,000 firms over the period 1995-2007 (about 157,586 observations).

The smallest observed unit of a firm is the plant, and we have about twelve percent multi-plant firms. However, the municipality information is available only for firms’ headquarters.

The employer-employee matched data allows us to gather substantial information on both firms’ workforce characteristics and firms’ characteristics, which we summarize in Table 1. Firm productivity is calculated in the main analysis as value added per employee in logarithmic scale (i.e., labor productivity), but in the robustness checks, we also introduce a TFP measure based on [Amiti and Konings \(2007\)](#).<sup>34</sup> The available information is as good as it gets to control for both the composition and the quality of firms’ workforce as well as for firm heterogeneity.

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<sup>31</sup>But for Danish registry data, all sources are freely available on the web. More details about “Ethnologue” can be found at “<http://www.ethnologue.com>”. The Manifesto Research data and Danish Election data can be downloaded at “<https://manifestoproject.wzb.eu/>” and “<http://valgdata.ps.au.dk/Kontakt.aspx>”, respectively. Danish registry data is exclusively administered by the official Danish statistical institute, “Statistics Denmark”.

<sup>32</sup>See the online appendix for more detailed information.

<sup>33</sup>A similar sampling is implemented in other studies concerning labor diversity and using Danish register data. See [Parrotta et al. \(2014\)](#) and [Marino et al. \(2012\)](#). The size criteria reduces both self-employment and typical migrant businesses. Finally, the sectors “electricity, gas, and water supply”, and “public services” are excluded because they are largely dominated by public companies.

<sup>34</sup>We use accounting data available in the Firm Statistics Registers to construct this measure.

Customs data contains export sales and the number of exported products at the firm level, available at specific destinations and also aggregated over all destinations. Exports are recorded in Danish kroner (DKK) according to the 8-digit Combined Nomenclature.<sup>35</sup> To make the classification of products consistent across time and to minimize potential measurement errors, we use the product classification at the 3-digit level. We depart from the typical approach in the literature measuring the firm's export experience by means of the lagged export status, and compute, in any given year, the (cumulative) number of years a firm has been exporting for (*export experience*).

## 4.2 Descriptive statistics

Table 1 groups the descriptive statistics for all our variables. Consistently with a large body of evidence on firm-level trade statistics, less than half of the firms in our sample engage in some export activities. Moreover, larger firms tend to export more, export more products, export to more destinations, have longer tenured employees, have a higher proportion of skilled workers, and are more productive.<sup>36</sup>

Turning to diversity, about a quarter of firms in our sample have a level of ethnic diversity above the sample average. Their average ethnic diversity for white- and blue-collar workers is also approximately four times larger than in the rest of the sample. These firms are relatively large enterprises, and about half of them export. They export a slightly larger number of products and to more destinations.

[Insert Table 1 about here]

Among this group of firms, diversity not only is high, but also its variance is small. This contrasts with the high variance of diversity registered among firms with more

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<sup>35</sup>Transactions must be worth at least 7500 DKK or involve goods whose weight is at least 1000 kg to be recorded. 7500 DKK are about 1000 euros at the time of writing. Since the introduction of the euro currency, the Danish Central Bank has adopted a fixed exchange rate policy vis-a-vis the euro.

<sup>36</sup>When tested, TFP and labor productivity mean differences are significantly different between exporters and non-exporters.

than 50 employees, implying that some of them are not that diverse.

Clearly, the variation of diversity in our sample reflects the variation of the shares  $p$  associated to each linguistic group.<sup>37</sup> Even if we exclude all countries in the European Union as of 1990 from our analysis, “Germanic West” and “Germanic North” are the most represented linguistic groups, corresponding to the area of Nordic Countries, Germany’s former African colonies, and Oceania. Among the other linguistic categories, the highest shares are registered among the “Gheg”, “Semitic Central”, “Indo-Aryan”, “Slavic South”, and “Iranian” groups, largely corresponding to the geographical areas of Middle East and former Yugoslavia. But for the “Iranian” group, these are also the groups most contributing to the time and cross-sectional variation of the diversity index. All other language groups exhibit very low variance, thus the limited time variation of our instrumental variable.

## 5 Results

### 5.1 OLS and FE results

Table 2 presents OLS estimates of equation (2) for all outcomes of interest including the most comprehensive set of control variables. Examining the results for export status (Column 1), the coefficient of ethnic diversity is positive and significant. Consistently with a large body of the empirical trade literature, firms that are more productive or draw on a longer export experience, are also more likely to export.

[Insert Table 2 about here]

Interestingly, controlling for unobserved heterogeneity does not practically alter neither the point estimate nor the standard error of the coefficient associated with the

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<sup>37</sup>In the online appendix, we provide a detailed description of each linguistic group along with the average share of foreign workers belonging to it. We also supply information on the within and between standard deviation of these shares.

diversity index. This is suggestive of the fact that our comprehensive list of controls successfully account for firms' cross-sectional variation. This is an important feature for our IV results below, where we are unable to employ firm fixed effects.

Quantitatively, our regression with firm fixed effects suggests that a (within-firm) standard deviation increase in ethnic diversity (0.139) is associated with a 0.2 percent increase in the export probability.<sup>38</sup> We deem this effect sizeable as it is about a fourth of the effect resulting from one standard deviation increase in labor productivity.<sup>39</sup> To put these numbers into a real perspective, firms in the full sample (exporters and non-exporters) with an average ethnic diversity employ about 12 foreign ethnic groups; as a comparison, firms characterized by an ethnic diversity equal to the "average plus a (within-firm) standard deviation increase" employ about 16 ethnicities, so 4 more categories.<sup>40</sup>

In the remaining columns of Table 2, we look at the other export activities of firms, namely export sales, number of destinations, and number of products (3-digits classification). Since each of these outcomes is only observable for exporters, we focus only on the relevant population of exporting firms, and all results have to be interpreted as conditional on exporting.

Overall, we learn that ethnic diversity positively correlates with all outcomes. The results are again robust across all specifications, although the discrepancy between OLS and FE is slightly larger than it was for export status.<sup>41</sup>

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<sup>38</sup>This figure is calculated as  $(0.139 \cdot 0.007 / 0.39) \cdot 100 = 0.25$ , where 39% is the average probability of exporting from Table 1.

<sup>39</sup>Specifically a within standard deviation increase in productivity (0.254) is associated with a 0.8 percent increase in the export probability.

<sup>40</sup>In the sample of exporters only, firms with average ethnic diversity employ foreigners belonging to 19 different language categories and firms with a standard deviation above the average diversity employ 24 ethnicities (i.e., 5 additional language groups).

<sup>41</sup>All OLS and FE results are amply confirmed when region-year fixed effects are replaced by municipality-year fixed effects. This means that results are robust to local labor market defined at either the municipality level or the regional level. This is important in view of the fact that municipality-year fixed effects cannot be used together with our instrument. In light of this result, controlling only for regional shocks to the labor market in IV regressions does not seem to be critical in our analysis.

## 5.2 IV results

In this section, we present IV estimates that address issues of reverse causality and self-selection that arise in our context. Table 3 summarizes the main IV results obtained with the “shift share” approach using the richest set of control variables.

[Insert Table 3 about here]

The first stage panel shows that our “imputed share” based instrument  $\tilde{d}$  in equation (4) can explain the variation of firm level workforce diversity. This means the economic channel on which we have based our instrumental strategy finds empirical support. The early enclaves of migrants are indeed a good predictor of subsequent waves of migrations and of the diversity of local labor supply.

In the second stage panel, we find that ethnic diversity improves all firms’ export performances, but the coefficient remains statistically significant at the conventional levels only for export status, number of destinations and number of products, the so-called *market reach* measures of export performance. This is in line with [Mohr and Shoobridge’s \(2011\)](#) argument that skills developed along with diversity management are facilitating the engagement into international activities. If we regard export status, number of destinations and products as more closely related to the extensive margins of firm’s internationalization, our results suggest that diversity reduces the export fixed costs, but not the variable costs.<sup>42</sup> Therefore, more diverse firms are more likely to engage on foreign markets at different levels (i.e, entry, new products, new markets) but do not necessarily exhibit higher export volumes. Since the employee network effect is already controlled for by the inclusion of the shares of foreigner employees belonging to each linguistic group, we can conclude that diversity helps companies to overcome

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<sup>42</sup>In our text we avoid to refer to the “number of products exported” as the proper extensive margin of the firm because we do not measure it dynamically as the result of product creation and destruction, as in [Iacovone and Javorcik \(2010\)](#). In our case it is a yearly stock measure that clearly correlates with the proper extensive margin.

those entry barriers that are not market specific. Thus, diversity has a global scope and its benefits extend to several foreign markets.

The quantitative implications of our conservative estimates based on non-EU diversity indicate that on average one standard deviation increase in ethnic diversity enhances the probability to export by 9% whereas the effect on the number of exported products and destinations is in the order of less than one additional product or market.<sup>43</sup>

The tests for *weak instruments* are all well within the comforting range suggested by [Stock and Yogo, 2005](#), further confirming the good fit of our first stage and indicating that the estimates of our coefficients are not possibly inflated by a weak instrument.<sup>44</sup>

For IV estimates being larger than the OLS point estimates, we offer two plausible interpretations. First, besides ethnic diversity, other forms of investment, such as technological investments ([Alvarez and Lopez, 2005](#), [Atkeson and Burstein, 2010](#)), quality upgrading ([Iacovone and Javorcik, 2012](#)), and human capital investments ([Molina and Muendler, 2013](#), [Sala and Yalcin, 2015](#), and [Mion and Opromolla, 2014](#)), affect exporting and the traded product mix. If these activities are substitutes to ethnic diversity, but unobservable to the econometrician, the substitutability can induce a negative bias in the estimates of the parameter of our diversity index. Second, a LATE interpretation of our instrument could be at play ([Imbens and Angrist, 1994](#); [Card, 2001](#); [Angrist and Krueger, 2001](#); [Imbens and Wooldridge, 2009](#)). Indeed, the firms that are more likely

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<sup>43</sup>The way productivity is measured hardly matters for our conclusions. In the online appendix, we also present results where labor productivity is replaced by the TFP measure proposed in [Amiti and Konings \(2007\)](#), which explicitly models the dependence of firm's capital stock and import-export activities on (unobservable) productivity shocks.

<sup>44</sup>The shares of foreign employees belonging to each linguistic group included among the control variables are also likely to be endogenous and should be instrumented. As we are not interested in quantifying the effect of networking, just controlling for its effect, the properties of the LPM come in handy. Because of linearity, the coefficient of our interest will not be affected by other potentially endogenous regressors (see [Wooldridge \(2002\)](#)). It is indeed reassuring that we do not observe any worrying jumps of our point estimates when we compare the results from our most comprehensive specification with those obtained by excluding the shares of foreigners from the same regression (not reported).

to respond to the labor supply shock with investments in diversity are arguably the least diverse. If our estimated marginal effect reflects the “return” of increasing diversity for these firms, it is likely to exceed the average return for the whole population. This is because the highly diversified firms over the sample period are plausibly sizing a smaller marginal gain than the subgroup of firms most affected by the variation of our instrument.

### 5.3 Results from alternative instruments

We corroborate our main IV findings by introducing the two alternative DiD-based instruments, which, by construction, are unaffected by national labor demand shocks. The IV results are based on the DiD specification in equation (5) and are reported in the first and the third panel of Table 4, whereas the corresponding first stage regressions are presented in Table A.1 of the appendix. The estimates largely confirm the sign, the magnitude and the statistical significance of the coefficients obtained with the main IV regression in Table 3.<sup>45</sup>

[Insert Table 4 about here]

However, a common drawback of both our alternative instruments is that they are possibly affected by local labor demand shocks. If these changes are idiosyncratic to municipalities, they are not eliminated with our DiD strategy and invalidate our identification assumptions if they also affect firms’ export outcomes. In this case, we would expect firms’ outcomes and the diversity index, as predicted by our instruments, to be correlated at the municipality level already before 2004. To assess the presence of pre-trends which at the same time affect outcomes and are correlated with our instruments, we perform the following tests similarly to [Foged and Peri \(2013\)](#) and

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<sup>45</sup>Note that the time window in these regressions is restricted around the timing of the EU enlargement year (i.e., 2001-2007); thus, the smaller sample size compared to those in the main analysis.



Foged and Peri (2015). Specifically we first aggregate firms' export outcomes and characteristics at the municipality level, taking the arithmetic mean of  $y_{it}$  (and other firm characteristics) across all firms located in the same municipality.<sup>46</sup> The difference between the aggregated value of  $y$  in 2003 and in 2000 constitutes the pre-2004 trend in firms' outcomes at the municipality level. By means of a regression line, we relate this trend to the trend in predicted ethnic diversity, calculated as the difference between the predicted value of  $d$  in 2007 and in 2003 obtained from regression (5) reported in Table A.1. This difference mimics the source of exogenous variation used in our IV strategy. As shown in Tables A.2, we find no evidence that the two trends are related. This means that the common trend assumption required prior to 2004 is likely to hold. Moreover, the strength of our instruments is confirmed in the last column within each panel of Table A.2, which shows a strong correlation between the change in the instruments and the actual change in the diversity index.

Finally, we deal with the argument that the EU enlargement may have indeed promoted trade flows among new and historic members of the European Union, in spite of the fact that trade liberalization had already started almost a decade before. In this instance, all of our DiD strategies are invalid because the EU enlargement cannot possibly be thought of as an exogenous source of variation for firms' workforce diversity. To obviate this critical aspect of the EU enlargement, we redefine each export outcome net of the trade flows toward new EU members. Therefore, the export status is defined to be one whenever a firm exports at least to one foreign market other than a new EU state. Likewise, the turnover becomes the total turnover realized over all destinations but in the new EU members. Similarly, the number of products is the total of exported products to all destinations except to new EU members, and the number of markets are all destinations to which a firm exports excluding the new EU states. The results are reported in the second and fourth panel of Table 4 and are very

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<sup>46</sup>The aggregation of export status results in the share of exporting firms in the municipality.

similar to the results with all trade flows, confirming that our empirical strategy based upon the EU enlargement can withstand this legitimate critique.

## 5.4 Additional robustness checks

Using the main instrument  $\tilde{d}$  given in equation (4), Table 5 presents further robustness checks for our main IV results.

First, we introduce a diversity index that distinguishes workers not only by linguistic group, but also by occupation. As white-collar workers are typically more influential on firms' business plans and export strategies, ethnic diversity in executive professions may promote firms' export activities more effectively. Table 5 reports evidence supporting this conjecture for all the export dimensions: The estimated coefficients of diversity referring to white-collar workers are generally larger and more precisely estimated than those for blue-collar workers.

[Insert Table 5 about here]

Next, we investigate if the aggregation of our Herfindhal index across all workplaces used to obtain the firm level diversity has an influence on our results. For mono-establishment firms, the plant and the firm unit coincide, so no aggregation is necessary, and yet our results do not change substantially, if the effects of diversity are estimated only with mono-establishment firms in our sample.<sup>47</sup>

Finally, the available evidence on firm level trade is mostly confined to the manufacturing sector, whereas our analysis has focused on the whole Danish firm population. In Table 5, we present our estimates separately for the manufacturing and service sectors. No obvious difference emerges in terms of the statistical significance of the coefficient of interest.<sup>48</sup>

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<sup>47</sup>As noted by one referee, these firms are also the best fit for our instrument. This is because the municipality of the firm is only observed at firms' headquarter location. Therefore, the approximation is exact only for these types of firms.

<sup>48</sup>In the online appendix, we also assess whether the effects of diversity differ with the size of firms.

## 6 Conclusions

Motivated by [Mohr and Shoobridge's \(2011\)](#) hypothesis that more diverse firms increase their “relational capital” and, therefore, improve their exporting performances, we have investigated the causal effect of increasing labor force (ethnic) diversity on different exporting outcomes at the firm level, namely export status, export sales, number of destinations, and number of exported products.

Using employer-employee matched data for the whole Danish population of firms (and workers) between 1995 and 2007, we find that on average more ethnically diversified firms perform better on the international market along all measures of *market reach*. This suggests that diversity facilitates overcoming international entry barriers of foreign markets, without necessarily increasing export volumes. It also propounds the idea that productivity is not the only driver of firms' selection into international markets. Other characteristics of the workforce, in this case diversity, are just as important and deserve closer attention by (trade) economists. Indeed, they act as proper intangible assets and determine firms' success. Since a large body of literature has pointed out how technology mediates the effects of workforce diversity ([Grossman and Maggi, 2000](#), [Ottaviano and Peri, 2012](#), [Bombardini, Gallipoli and Pupato, 2014](#), and [Yeaple, 2005](#)), it is not surprising that selection on productivity is ultimately conjunct with the selection on workforce characteristics. More theoretical and empirical future research is necessary to deepen our understanding of how these channels interact and shape the internationalization process of firms.

In the absence of randomized experiments, to investigate the causal impact of diversity, we adapt [Foged and Peri's \(2013\)](#) strategy and rely on the increase in immigration at the municipality level ascribable to a shift of the local labor supply curve caused by

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This is investigated splitting the sample between firms above and below 50 employees and between firms with shares of non-native workers above and below the industry average. We learn that the effect of diversity does not seem to vary with the size of firms.

an immigration shock originating outside Danish borders in the 90s. Moreover, as robustness checks to the main identification strategy, we corroborate our results with two alternative DiD approaches, which exploit municipalities' varying degree of exposure to migration around the 2004 EU enlargement.

We are also careful to disentangle the effects of workforce diversity from those induced by networking. Even accounting for firms' share of workers belonging to each linguistic group as a means of capturing plausible network effects, our findings on the effects of diversity are confirmed.

From the perspective of firms, the challenges and costs associated with managing a diverse workforce may constitute investments in "relational capital", which reward with an increased ability to initiate, manage, and expand international business. These findings open new ways to policy makers about designing export promotion policies. If they are confirmed also for other countries, these results indicate that diversity of the workforce plays a role in the international success of traditional immigration countries (e.g., USA, France, Germany, Sweden, and the UK). Moreover, the international fragmentation of production chains and migration flows continue to put strain on societies worldwide, increasing diversity of their workforce. Our results show that these events provide untapped opportunities for firms. However for these benefits to be realized, integration policies must encourage migrants' assimilation into the labor market.

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Figure 1: (Non-EU) Ethnic Diversity, 1991-2007

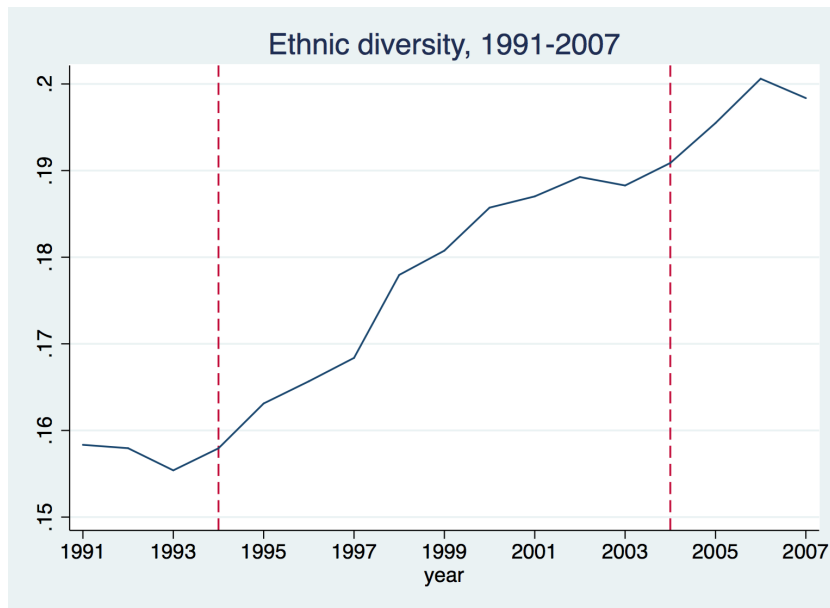


Figure 2: Share of Foreigners, by Area of Origin

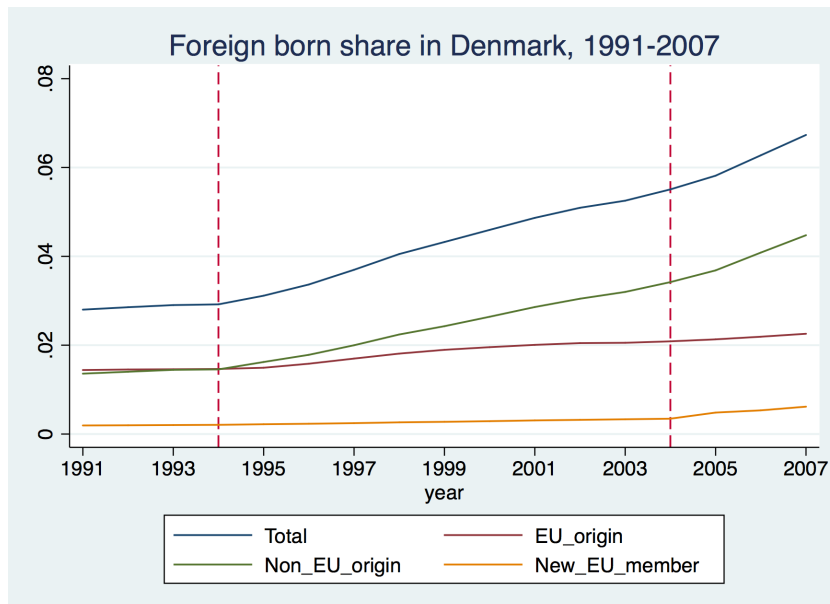


Table 1: Descriptive statistics

Variable	Definition	Full sample		Firms with above average ethnic diversity		< 50 Employees		≥ 50 Employees	
		Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
<b>Worker-level data</b>									
male workers	male workforce as a proportion of all employees	0.706	0.248	0.652	0.233	0.713	0.254	0.682	0.226
foreigners	non-Danish employees as a proportion of all employees	0.011	0.035	0.031	0.053	0.011	0.037	0.012	0.029
age_29-39	employees aged 29-39 as a proportion of all employees	0.205	0.116	0.214	0.102	0.202	0.123	0.213	0.088
age_40-48	employees aged 40-48 as a proportion of all employees	0.184	0.106	0.199	0.089	0.179	0.113	0.201	0.074
age_49-57	employees aged 49-57 as a proportion of all employees	0.211	0.117	0.218	0.101	0.207	0.125	0.227	0.087
age_58-65	employees aged 58-65 as a proportion of all employees	0.187	0.130	0.182	0.113	0.186	0.137	0.188	0.101
secondary education	employees with a secondary education as a proportion of all employees	0.604	0.175	0.562	0.148	0.610	0.184	0.583	0.140
tertiary education	employees with a post-secondary/ tertiary education as a proportion of all employees	0.079	0.133	0.115	0.145	0.070	0.130	0.109	0.136
tenure	average tenure	5.090	2.823	4.946	2.738	5.016	2.851	5.339	2.707
middle managers	middle managers as a proportion of all employees	0.156	0.206	0.194	0.220	0.141	0.201	0.209	0.215
managers	managers as a proportion of all employees	0.040	0.058	0.039	0.049	0.040	0.063	0.038	0.041
index ethnic diversity	diversity index based on non-EU employees' language	0.154	0.289	0.650	0.182	0.081	0.222	0.398	0.351
index ethnic diversity (white-collar)	diversity index based on white-collar workers' language	0.026	0.128	0.113	0.245	0.007	0.067	0.094	0.226
index ethnic diversity (blue-collar)	diversity index based on blue-collar workers' language	0.108	0.266	0.436	0.371	0.051	0.200	0.301	0.356
<b>Firm-level data</b>									
labor productivity	log of value added per employee	6.295	0.808	6.340	0.855	6.262	0.794	6.408	0.843
TFP	total factor productivity	6.259	1.010	6.524	1.076	6.174	0.926	6.492	1.180
number of employees	firm size in full time equivalents	64.137	344.062	173.772	692.018	21.760	9.756	207.532	701.422
capital per employee	log of capital stock per employee	4.441	1.422	4.511	1.536	4.373	1.398	4.671	1.479
export	1. if the firm exports	0.390	0.488	0.594	0.491	0.313	0.464	0.652	0.476
foreign ownership	1. if the firm is foreign owned	0.003	0.018	0.001	0.023	0.000	0.017	0.000	0.019
multi	1. if the firm is multi-establishment	0.180	0.385	0.311	0.463	0.095	0.294	0.468	0.499
N		152,081		35,533		117,389		34,692	
<b>Firms</b>		13,494		3,471		10,539		2,955	
<b>Customs data</b>									
log of export sales	log of aggregated value of a firm's export across all products and destinations	15.508	2.833	16.806	2.768	14.646	2.538	16.909	2.726
export markets	number of destination export markets	11.154	14.223	17.598	18.653	7.110	8.720	17.728	18.379
export products	number of products exported	2.542	2.193	3.279	2.750	2.048	1.578	3.346	2.745
export experience	number of years that a firm has been exporting in the sample period	5.635	3.377	6.169	3.497	5.392	3.280	6.029	3.493
N		59,351		21,119		36,746		22,605	
<b>Firms</b>		4,744		1,698		2,969		1,775	

*Notes:* All descriptive statistics are calculated over the period 1995-2007. The industrial sectors are the following: food, beverages and tobacco (4.05%); textiles (2%); wood products (6.19%); chemicals (3.95%); other non-metallic mineral products (1.94%); basic metals (18.95%); furniture (3.46%); construction (15.07%); sale and repair of motor vehicles (3.64%); wholesale trade (14.67%); retail trade (6.06%); hotels and restaurants (2.08%); transport (6.12%); post and telecommunications (0.40%); financial intermediation (1.17%); and business activities (10.25%). There are 96 municipalities and 6 regions.

Table 2: Ethnic diversity and export outcomes

	Probability of exporting		Log of export sales		Number of export markets		Number of exported products	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	FE	OLS	FE	OLS	FE	OLS	FE
index ethnic diversity	0.009** (0.004)	0.007* (0.004)	0.455*** (0.065)	0.230*** (0.036)	2.254*** (0.463)	1.385*** (0.147)	0.465*** (0.070)	0.230*** (0.036)
export experience	0.106*** (0.000)	0.082*** (0.001)	0.292*** (0.009)	0.112*** (0.031)	0.641*** (0.048)	0.494*** (0.051)	0.110*** (0.008)	0.131*** (0.011)
lagged labor productivity	0.012*** (0.002)	0.013*** (0.003)	0.976*** (0.039)	0.240*** (0.026)	2.075*** (0.233)	0.405*** (0.107)	0.275*** (0.037)	0.060*** (0.023)
secondary education	0.026*** (0.008)	-0.000 (0.013)	-1.088*** (0.164)	0.107 (0.142)	0.424 (0.868)	1.460*** (0.539)	0.462*** (0.140)	0.270*** (0.123)
tertiary education	-0.023 (0.015)	-0.098*** (0.029)	0.834*** (0.281)	0.565** (0.274)	8.901*** (1.836)	3.608** (1.461)	-0.268 (0.251)	0.644** (0.257)
male workforce	-0.005 (0.007)	-0.010 (0.016)	-1.071*** (0.118)	-0.294* (0.165)	-6.553*** (0.728)	-1.526* (0.787)	-1.940*** (0.146)	-0.165 (0.164)
middle managers	0.053*** (0.009)	-0.007 (0.012)	-0.078 (0.137)	0.066 (0.119)	4.251*** (0.828)	0.168 (0.535)	0.881*** (0.142)	0.222** (0.106)
managers	0.177*** (0.020)	0.032 (0.025)	1.038*** (0.282)	0.075 (0.183)	4.623*** (1.538)	0.272 (0.732)	0.834*** (0.245)	0.107 (0.164)
N	111,012	111,012	43,541	43,541	43,541	43,541	43,541	43,541
R2	0.784	0.261	0.487	0.136	0.396	0.170	0.314	0.147

*Notes:* Dependent variable in columns 1-2 is firms' export status. Results in columns 3-8 are based on the sample of only exporting firms, so that dependent variables are conditional on exporting. All regressions include whether the firm is foreign-owned, a multi-establishment dummy, the log of capital stock per employee, the shares of differently aged workers belonging to each of the employees' age distribution quintiles, firm's average tenure, the shares of foreign employees belonging to each linguistic group, a polynomial function of firm size (size, size<sup>2</sup>, size<sup>3</sup>), the interaction between firm employment and the foreign ownership dummy, year-industry and year-region fixed effects. Columns 2, 4, 6, 8 include firm fixed effects. Standard errors are clustered at the firm level. Significance levels: \*\*\*1%, \*\*5%, \*10%.

Table 3: Main IV approach with “shift share”

	<b>Probability of exporting</b>	<b>Log of export sales</b>
index ethnic diversity	0.122*** (0.049)	0.694 (0.465)
F test (excluded instruments); p-value	18.97; 0.000	16.05; 0.000
First stage coefficient	0.405*** (0.027)	0.379*** (0.035)
N	111,009	43,541
R2	0.769	0.457
	<b>Number of export markets</b>	<b>Number of exported products</b>
index ethnic diversity	2.665** (1.117)	0.797** (0.399)
F test (excluded instruments); p-value	16.05; 0.000	16.05; 0.000
First stage coefficient	0.379*** (0.035)	0.379*** (0.035)
N	43,541	43,541
R2	0.381	0.302

*Notes:* Results are from 2SLS estimates of equations (2) and (3), where the instrumental variable is  $\tilde{d}$  defined in equation (4). All regressions include export experience, lagged labor productivity, share of workers with secondary and tertiary education, share of male workers, share of managers and middle managers, whether the firm is foreign-owned, a multi-establishment dummy, the log of capital stock per employee, the shares of differently aged workers belonging to each of the employees’ age distribution quintiles, firm’s average tenure, the shares of foreign employees belonging to each linguistic group, a polynomial function of firm size (size, size<sup>2</sup>, size<sup>3</sup>), the interaction between firm employment and the foreign ownership dummy, year-industry and year-region fixed effects. Standard errors are clustered at the municipality level. Significance levels: \*\*\*1%, \*\*5%, \*10%.

Table 4: Alternative IV approach with DiD approach

Probability of exporting		Log of export sales	Number of export markets	Number of exported products
		DID approach with highrise shares in 1990 - $H^{DiD}$ -		
index ethnic diversity	0.107** (0.048)	0.233 (0.167)	2.562*** (0.759)	1.288** (0.634)
N	73,646	30,144	30,144	30,144
R2	0.805	0.488	0.395	0.279
<b>DID approach with highrise shares in 1990, no trade flows to new EU members</b>				
index ethnic diversity	0.076** (0.037)	0.487 (0.372)	1.631** (0.811)	1.049* (0.549)
N	73,646	29,789	29,789	29,788
R2	0.799	0.481	0.379	0.289
<b>DID approach with average attitudes towards immigrants in 1990 - <math>A^{DiD}</math> -</b>				
index ethnic diversity	0.012*** (0.004)	0.378 (0.260)	2.912*** (1.026)	2.058** (0.760)
N	73,646	30,144	30,144	30,144
R2	0.816	0.501	0.397	0.302
<b>DID approach with average attitudes towards immigrants in 1990, no trade flows to new EU members</b>				
index ethnic diversity	0.098** (0.037)	0.456 (0.317)	1.621** (0.527)	1.449** (0.721)
N	73,646	29,789	29,789	29,788
R2	0.811	0.496	0.394	0.296

*Notes:* Panel 1 to 4 report 2SLS estimates of equations (2) and (3), using the *alternative instruments* defined in equation (5). All regressions include export experience, lagged labor productivity, share of workers with secondary and tertiary education, share of male workers, share of managers and middle managers, whether the firm is foreign-owned, a multi-establishment dummy, the log of capital stock per employee, the shares of differently aged workers belonging to each of the employees' age distribution quintiles, firm's average tenure, the shares of foreign employees belonging to each linguistic group, a polynomial function of firm size (size, size<sup>2</sup>, size<sup>3</sup>), the interaction between firm employment and the foreign ownership dummy, year-industry and year-region fixed effects. In Panels 2 and 4, the export outcome is netted out of trade flows between Danish firms and new EU members as of 2004. Standard errors are clustered at the municipality level. Significance levels: \*\*\*1%, \*\*5%, \*10%.

Table 5: Robustness checks: estimates by job position, firm type and industry sector

	Probability of exporting	Log of export sales	Number of export markets	Number of exported products
			<b>White-collar</b>	
index ethnic diversity	0.112** (0.052)	0.416 (0.281)	4.058*** (0.995)	1.014*** (0.333)
N	111,009	43,541	43,541	43,541
R2	0.767	0.229	0.098	0.203
			<b>Blue-collar</b>	
index ethnic diversity	0.075* (0.041)	0.308 (0.336)	2.351* (1.268)	0.732** (0.285)
N	111,009	43,541	43,541	43,541
R2	0.778	0.355	0.206	0.221
			<b>Mono-establishment companies</b>	
index ethnic diversity	0.091** (0.040)	0.637 (0.445)	1.726** (0.788)	0.806** (0.384)
N	88,501	34,490	34,490	34,490
R2	0.782	0.400	0.289	0.234
			<b>Manufacturing industries</b>	
index ethnic diversity	0.086*** (0.043)	0.513 (0.326)	1.934** (0.683)	0.926*** (0.372)
N	28,609	20,482	20,482	20,482
R2	0.701	0.448	0.362	0.294
			<b>Service industries</b>	
index ethnic diversity	0.101** (0.051)	0.387 (0.492)	2.312*** (0.746)	0.571** (0.284)
N	81,972	26,979	26,979	26,979
R2	0.778	0.345	0.230	0.212

*Notes:* All regressions instrument for ethnic diversity with the main instrument  $\tilde{d}$  defined in equation (4). All regressions include export experience, lagged labor productivity, share of workers with secondary and tertiary education, share of male workers, share of managers and middle managers, whether the firm is foreign-owned, a multi-establishment dummy, the log of capital stock per employee, the shares of differently aged workers belonging to each of the employees' age distribution quintiles, firm's average tenure, the shares of foreign employees belonging to each linguistic group, a polynomial function of firm size (size, size<sup>2</sup>, size<sup>3</sup>), the interaction between firm employment and the foreign ownership dummy, year-industry and year-region fixed effects. Standard errors are clustered at the municipality level. Significance levels: \*\*\*1%, \*\*5%, \*10%.

# Appendix

## A Additional results

Table A.1: Alternative IV approach with DiD approach, first stage results

DID approach with average highrise shares in 1990		
	Full sample	Exporting firms
d(year>=2004)	0.400*** (0.026)	0.374*** (0.057)
highrise90	0.423*** (0.037)	0.388*** (0.057)
d(year>=2004)*highrise90	0.059** (0.026)	0.044** (0.021)
N	73,646	30,144
R2	0.488	0.491
DID approach with average attitudes towards immigrants in 1990		
	Full sample	Exporting firms
d(year>=2004)	0.125* (0.067)	0.131* (0.068)
attitudes90	0.576*** (0.052)	0.565*** (0.066)
d(year>=2004)*attitudes90	0.081*** (0.028)	0.086* (0.044)
N	73,646	30,144
R2	0.499	0.504

*Notes:* The dependent variable is ethnic diversity  $d$  from the outcome equation (2) and defined in equation (1). First stage results are based on regression (3) where the alternative instruments given in equation (5) are used one at the time (exactly identified system). All regressions include export experience, lagged labor productivity, share of workers with secondary and tertiary education, share of male workers, share of managers and middle managers, whether the firm is foreign-owned, a multi-establishment dummy, the log of capital stock per employee, the shares of differently aged workers belonging to each of the employees' age distribution quintiles, firm's average tenure, the shares of foreign employees belonging to each linguistic group, a polynomial function of firm size (size, size<sup>2</sup>, size<sup>3</sup>), the interaction between firm employment and the foreign ownership dummy, year-industry and year-region fixed effects. Regressions using "average highrise shares in 1990" as an instrument additionally include total population and population density of the municipality. Standard errors are clustered at the municipality level. Significance levels: \*\*\*1%, \*\*5%, \*10%.

Table A.2: Instrument power and correlation with pre-trends in export outcomes, DiD specification with the share of high-rises

Panel A: DID approach with average highrise shares in 1990			
	probability of exporting (2000-2003)	log of export sales (2000-2003)	number of export markets (2000-2003)
2003-2007 difference in predicted diversity	0.059 (0.170)	0.920 (2.529)	2.958 (8.790)
N	96	96	96
R2	0.619	0.647	0.585
	number of exported products (2000-2003)	actual non-EU ethnic diversity (2003-2007)	
2003-2007 difference in pre. non-EU diversity	1.897 (1.385)	0.689*** (0.062)	
N	96	96	
R2	0.486	0.926	
Panel B: DID approach with average attitudes towards immigrants in 1990			
	probability of exporting (2000-2003)	log of export sales (2000-2003)	number of export markets (2000-2003)
2003-2007 difference in predicted non-EU diversity	0.073 (0.189)	1.670 (2.756)	9.176 (9.090)
N	96	96	96
R2	0.660	0.687	0.629
	number of exported products (2000-2003)	actual non-EU ethnic diversity (2003-2007)	
2003-2007 difference in pre. non-EU diversity	0.624 (1.276)	0.705*** (0.053)	
N	96	96	
R2	0.531	0.940	

*Notes:* The dependent variable is the trend in the export outcome aggregated at the municipality level and calculated as the difference between its aggregated value in year 2003 and in year 2000. The main regressor in Panel A is the difference between the predicted value of  $d$  in 2007 and 2003 from regression (3), where the share of high-rises  $H$  is used for the DiD equation (5). The main regressor in Panel B is the difference between the predicted value of  $d$  in 2007 and 2003 from regression (3), where the historical attitude index  $A$  is used for the DiD equation (5). All regressions additionally include all other firm control variables (*export experience, lagged labor productivity, share of workers with secondary and tertiary education, share of male workers, share of managers and middle managers, whether the firm is foreign-owned, a multi-establishment dummy, the log of capital stock per employee, the shares of differently aged workers belonging to each of the employees' age distribution quintiles, firm's average tenure, the shares of foreign employees belonging to each linguistic group, a third-order polynomial function of firm size, the interaction between firm employment and the foreign ownership dummy*) averaged across all firms in the same municipality in year 2003. Regressions are weighted by the local labor force as of 2003. Significance levels: \*\*\*1%, \*\*5%, \*10%.