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## Abstract

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JEL Classification: G32, G34

Keywords: director supply, Board Of Directors, Match quality



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# Trainspotting: Board Appointments in Private Firms*

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January 2021

**Abstract**

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# 1 Introduction

Boards of directors are key to corporate decision-making (Adams and Ferreira, 2007). In turn, who gets "on board" is important for a firm's success: prior research on board composition highlights the role of directors' independence (e.g., Knyazeva et al., 2013), experience or diversity (e.g., Bernile et al., 2018; Chen et al. 2020). Naturally, board appointments are determined by a firm's demand for directors and vary with such factors as firm's size, age (Boone et al., 2007) or firm's advising and monitoring needs (Becher et al., 2019). Board appointments may also reflect supply-side factors (e.g., Cai et al., 2017; Ferreira et al., 2020). As argued in Knyazeva et al. (2013, p.1562), "*the ability of most firms to recruit qualified independent directors is significantly affected by the local supply of prospective directors.*" The past literature on director appointments has mostly focused on listed companies, while little is known about the private ones, constituting the core of the economic system.

We study how an exogenous shock in potential director supply affects the director-firm match quality in private firms. More specifically, to overcome the endogenous board selection – e.g., worse firms may fail to recognize the importance of competent directors – we exploit a gradual introduction of the high-speed and high-comfort train service in Italy. The underlying logic is that the reduction in personal travel costs (e.g., time or discomfort) expands the supply of potential directors willing to accept a distant board appointment, *ceteris paribus*, thus facilitating the match between firms and directors. This approach is similar to the idea that the personal costs of performing a task at a distant location decrease with the ease of traveling between two locations (similar to Bernile et al., 2018; Bernard et al., 2019; Giroud, 2013).

The duration and the quality of the journey are important criteria for the potential candidates' decision to accept a board appointment. First, firms may prefer in-person to online board meetings. Online gatherings forced by the COVID-19 pandemic are perceived as less effective since only "in a room full of people you can take the pulse of the crowd" and "allow for a proper grilling of bosses" (The Economist, 2020). Second, board meetings may be relatively frequent, increasing directors' preference for within-a-day trips.[1] Third,

[1] Although scientific evidence on board functioning in private firms is virtually nonexistent, practitioners do suggest that, in the U.S., boards of private firms meet from once per month (in young companies) to four

these meetings may be intense and lengthy, typically lasting for at least three to four hours (Hadzima, 2005), making the directors consider comfort costs.

Our empirical analysis builds on a rich novel dataset on the universe of Italian limited liability companies for the period 2005-2017. It combines administrative data on board members' identities and demographics with firm-level information on its age, location, industry, and balance sheet indicators. Our sample of non-micro firms comprises over 295 thousand firm-year observations, information on over 31 thousand firms, and over 162 thousand unique individuals who have held positions on their boards.[2]

We propose a novel measure of board appointments' quality based on how well board quality fits firm quality. To that aim, we use firm and director fixed effects estimated in a two-way fixed effects model (Bertrand and Schoar, 2003; Baltrunaite et al., 2020) in total factor productivity regressions. We define director quality and firm quality as their relative positions in the corresponding fixed effects distributions each year.[3] Under the assumption that director and firm quality are complements in the production process, the optimal allocation implies the positive assortative matching, under which best (worst) directors lead best (worst) firms (similarly to Dauth et al., 2019).[4] The improvement in firm-director matching would be consistent with high-quality firms attracting more talented leaders at the expense of low-quality firms. We examine how the firm's access to potential non-local directors in the destinations connected to the firm's headquarters by a high-speed train affects the directors' quality, depending on the firm quality.

We demonstrate that a shock in the supply of potential non-local directors improves firm-director match quality. For example, approximately 157,000 directors serve on boards in Milan and 31,000 in Bologna. These numbers are arguably a good proxy for the overall

to six times per year (in more established ones) (Hadzima, 2005). There is no systematic evidence on the actual meeting frequency in Italy.

[2]Following European Commission, we define micro firms as firms that do not reach a 2-million EUR revenue and a 10-employee threshold over our sample period (https://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en).

[3]Director fixed effects may be interpreted as an individual contribution in boosting the firm's productivity. It comprises, among other factors, unobservable time-invariant and portable personal characteristics, such as ability, charisma, or skills.

[4]Our definition of the quality of the match takes a stance of the overall economic efficiency and considers not only the firm utility, but also the talent allocation within the economy and, in particular, within a highly qualified labor force segment comprising the corporate directors' labor market.

number of individuals whom companies consider for their board appointments. We show that after such cities as Milan and Bologna are connected via a high-speed train line, in high-quality firms located close to the high-speed train station in a city like Bologna, the board percentile rank increases by 1.3 percentage points. In contrast, non-local director supply diminishes the board quality in low-quality firms – they lose directors and experience difficulties substituting them. Overall, the shock in the potential directors' supply improves the director-firm fit by increasing the extent of the positive assortative matching, whereby higher (lower) talent directors sit on boards of higher (lower) quality firms.

We argue that our director supply shock is exogenous to the board-firm quality match. By construction it is not mechanically correlated with the mere presence of a high-speed train to the headquarters from other cities in Italy, as it exploits i) the timing of the high-speed line opening and ii) the intensive margin in terms of the pool size of non-local directors in the destination city.[5] Therefore, our results have a causal interpretation under the assumption that there are no relevant omitted variables that determine board selection, the (time-varying) existence of high-speed trains between firm headquarters and other cities in Italy, as well as the size of the director pool at these locations. First, a high-speed train line connecting cities of similar sizes in different years and cities of different sizes in the same year supports the validity of this assumption.[6] Second, we further address threats to identification by holding constant several potentially confounding factors. More specifically, our result is robust to stringent regression specifications that include firm fixed effects, and region-specific and sector-specific non-parametric time trends. Furthermore, the result is not sensitive to alternative definitions of the shock in the director pool. Also, by excluding firms located around the supply-shock affected stations one at a time, we show that no single connection drives the result.

We provide evidence that the improved train service is unlikely to explain heterogeneous effects on the board quality through a number of alternative channels. First, the introduction

[5]The origin-destination pairs are labeled from the firm's perspective throughout the paper: the origin, thus, is the firms' location and the destinations are the locations connected via the high-speed rail to the origin location.

[6]To illustrate our measure, Verona was connected to a relatively smaller director pool in Venice in 2008 and almost twice larger director pool in Bologna in 2009; both Milan and Bologna (with the five-fold director pool difference) were connected to Reggio Emilia in 2013. Also, see Table 1.

of the high-speed train service may improve the connection between investors and their potential target firms, leading to more equity acquisitions and, in turn, affecting firm demand for directors. Second, improved access to distant firms may facilitate outside investment and lead to more dispersed ownership. If firms' demand for board monitoring is a function of the incentives' alignment between ownership and governance, this improved access might lead to changes in board appointments. Third, an improved train connection may increase tourist flows, in turn leading to more business activity and, possibly, changes in director demand. Our robustness analysis supports the notion that these alternative channels do not drive the heterogeneous director supply-board quality effect.

Consistent with the improved mobility across locations, we show that firms with access to non-local director pool raise the fraction of directors that were born or worked in the train destination at the expense of directors in other non-train-destination locations. The result suggests that firms respond to an increase in director supply by hiring directors located close to the fast-train-destination stations.

We further study whether firm access to non-local potential directors' pool changes observable directors' characteristics, such as their demographic composition or family ties. Both young people and women are disproportionally few among directors in Italian firms (Baltrunaite et al., 2019). We find that a positive shock in the supply of non-local directors encourages changes in generations on corporate boards by lowering the average board age, while there is no effect on the fraction of female directors. Our results are consistent with heterogeneous mobility preferences across demographic groups, with women (young individuals) having a lower (higher) propensity to move for long-distance work appointments (Farré et al., 2020), resulting in lower (higher) marginal effects of director supply.

A positive shock to directors' supply may affect director appointments based on family links, which likely signal a sub-optimal choice from a restricted pool of talent.[7] We use a proxy for relative-favoritism defined as a fraction of the same surname directors as the owning

[7]In theory, if feasible candidates' supply is limited, family members' appointments may be optimal in equilibrium (and not due to social preferences such as nepotism or inheritance norms). For example, related people may be more likely to embrace a longer-term perspective, overcome agency problems between owners and managers (especially when formal institutional or general social trust is weak) or accept a lower remuneration package due to their engagement in a family business.

family surname.[8] As firms likely face a trade-off between easy-to-hire family directors and scarce external directors, a positive supply shock in available directors is expected to reduce family appointments. We find that an increased supply of directors lowers the share of the family members on boards. Reassuringly, this result confirms the intuition that the presence of relatives in the board room is indicative of a limited firms' propensity to draw from a broader pool of talent (Burkart et al., 2007; Perez-Gonzalez, 2006; Bennedsen et al., 2007).

Firm's organizational features, such as managerial styles or structures, affect its performance (e.g., Bandiera et al., 2020, Caliendo et al., 2020). Relatedly, we provide evidence that the supply-driven director quality is associated with higher revenues and total factor productivity and lower the probability of default. This finding is in line with the notion that higher-quality directors render firm input utilization more effective. It is also consistent with the idea that the scarce supply of suitable directors hinders firm growth and performance. We also argue that alternative explanations are unlikely to drive the effects on firm productivity. Overall, the increase in high-quality firms' performance comes at the cost of low-quality firms, potentially raising the dispersion in firms' performance.

This paper contributes to several strands of research in economics and finance. First, it adds to the studies on the labor market for corporate directors (e.g., Becher et al., 2019; Cai et al., 2017; Ferreira et al., 2020). As this literature almost entirely focuses on publicly listed companies, our paper contributes by being among the first to examine board appointments in private firms.[9] Compared to the U.S. public firms, board turnover is lower in Italian limited liability companies (Denis and Sarin, 1999). Nevertheless, in line with Knyazeva et al. (2013) findings on listed firms, we establish that board selection in these smaller firms is significantly affected by access to non-local directors' pool. Our paper closely speaks to Sauvagnat and Schivardi (2020), who show how a thinner market of possible candidates for a CEO position in Italy reduces the chances of successfully replacing lost managers, leading to adverse effects on firm performance.

Second, our study contributes to literature on the relationship between board composition and firm outcomes (e.g., Adams et al., 2018; Bird et al., 2019; Eisenberg et al., 1998;

[8] In this respect, our paper builds on a vast literature on the effects of family ownership and management on firm performance. See, e.g., Bertrandt and Schoar (2006) for the literature review.

[9] Matveyev (2016) studies the role of compensation in corporate directors' labor market.

Field and Mkrtchyan, 2017; Yermack, 1996). We extend the analysis beyond evidence on publicly-traded companies and offer a new comprehensive measure of board appointment quality based on the closeness of the director-firm fit. In addition, our results on board diversity further highlight the role of supply-side factors, such as potential directors' mobility preferences, while the analysis on the presence of directors with family ties adds to the literature on board independence.[10]

Third, this paper is related to a rich literature on agglomeration economies. Building on the notion that the search quality is better in the large labor market (e.g., Wheeler, 2001; Dauth et al.; 2019, Rossitti, 2019), we demonstrate that the size of the labor market is relevant for board appointments in private firms. Interestingly, better director-firm matches may be one of the channels behind the observed higher manager compensation in large cities (Francis et al., 2016).

# 2 Institutional setting in Italy

## 2.1 Corporate governance of limited liability firms

Italian firms commonly choose to incorporate in one of the two legal forms: some larger firms select the joint-stock company form (*società per azioni*), whereas the vast majority of small and medium-sized companies are constituted as limited liability companies (*società a responsabilità limitata*).

The traditional corporate governance model is the predominant corporate governance structure in Italy.[11] It prescribes the firm's shareholders to appoint the governance body, constituted of one or more directors. Their roles are specified in corporate by-laws and may comprise a wide range of activities, such as appointing the firm's top management, steering

[10] See, e.g., Dahya et al. (2008), Knyazeva et al. (2013), Armstrong et al. (2014), Duchin et al. (2010).

[11] The 2003 Italian corporate law reform introduced the possibility for joint-stock companies to adopt corporate governance structures alternative to the traditional one, i.e., two-tiered model (following German tradition), and one-tiered model (following Anglo-Saxon tradition). Although the reform aimed to make the Italian system more flexible and easier to adapt to other legal systems, the adoption of new governance structures remained remarkably low. In the universe of Italian limited liability firms, less than one percent of firms are governed using one-tier or two-tier models. Similarly, they are nearly negligible in the sample used in our analysis, e.g., in 2017, there are only 21 joint-stock companies with the one-tier model and only eight companies with the two-tier model.

corporate strategic decisions, approving financial statements, or supervising chief executives.

Naturally, directors' duties vary across firms. Although publicly and privately-held Italian companies share the same formal governance structure, lending them with the "classic" – advising and monitoring – roles, in practice, private companies are smaller and more closely-held (for more detail, please see Section 3.2), implying a lower relevance of directors' monitoring. Similarly, while top executives managing the firm are frequently chosen from the outside labor market in large companies, in smaller-sized firms directors' themselves tend to retain executive powers.

## 2.2 High-speed train

High-speed rail in Italy consists of two major lines connecting most of the country's large cities. The first line runs from Turin to Salerno via Milan, Bologna, Florence, Rome, and Naples; the second - from Turin to Venice via Milan (the full high-speed service is under-construction on some segments still). Rail traveling is much faster than car-traveling – trains avoid traffic jams and are operated with a maximum speed of 300 kilometers per hour.[12] On top of a significant reduction in traveling time, the high-speed service offers an improvement in train travel quality. All trains are equipped with complimentary wi-fi and in-seat sockets for charging personal devices and offer a possibility to travel in business class with additional services – private cabins for business meetings, extra comfort, and quiet environments. Accordingly, the high-speed rail service is significantly more expensive than conventional rail travel.

We consider only direct (i.e., the shortest) city-to-city connections throughout the paper. We disregard indirect connections to minimize assumptions regarding passenger mobility patterns, e.g., the number of stops or travel time they are willing to travel. Table 1 lists the pairs of cities connected by a high-speed train line and the year of their connection.

[Table 1 here]

[12]Table 1 shows that the passengers save time when choosing high-speed train instead of driving a car even in non-peak car-traffic hours.

## 2.3 Stylized facts on long-distance commuting

Throughout the paper, we build on a notion that corporate board directors, similar to other high-skill workers, use high-speed train service to commute long distance. Compared to the other occupational segments, they are more likely to afford such journeys and to hold positions with more flexible work hours and locations. To corroborate this argument, we investigate if the high-speed train line's introduction increased long-distance commuting among the high-skill occupations using the Italian Labor Force Survey. For the period 2005-2017, this survey covers a repeated cross-section of a representative sample of Italian households and gathers information on workers' demographic characteristics, occupation status, segment, residence, and work locations.

We evaluate the train introduction effect on the long-distance commuting of Italian workers, distinguishing them by occupational segment (Table 2). The dependent variables *Commute long distance* and *Commute to destination* indicate individuals who work outside the region of their residence and who work in the train destination province (and outside the region of their residence), respectively. The variable $High\ speed\ train$ indicates firms located in a province in the years following the opening of the high-speed line. $Professional$ is an indicator for workers employed in high-skill/high-wage professions in the private sector, such as managers, entrepreneurs, lawyers, or other specialists, except for medical staff and high-school teachers. Our regression specifications control for non-parametric province-level time shocks. On top, regressions reported in Columns 2 and 4 include individual controls such as gender, age, education, and broad occupational segment.

First, we show that high-speed train service does not affect long-distance commuting patterns on average, i.e., to any region in Italy regardless of its high-speed connection status. The estimate on the $High\ speed\ train$ indicator is statistically and economically insignificant, equal to zero (Table 2, Columns 1 and 2). There is no differential effect for high-skill professional workers either, as the interaction term $High\ speed\ train \times Professional$ is not significant either.

Next, we focus on long-distance commuting via the high-speed train-lines. We show that high-speed train connections among cities result in more intense worker's commuting across

these locations. Interestingly, the effect is double for professional workers (Table 2, Columns 3 and 4). Overall, the results suggest that the introduction of high-speed train service disproportionally increases long-distance commuting among the high-skill occupations, supporting the use of the train-induced identifying variation in our analysis.

[Table 2 here]

# 3 Data

## 3.1 Data and variable definitions

The analysis relies on two main datasets. The first one, *Infocamere*, is based on administrative data on the Italian limited liability companies gathered by the provincial Chambers of Commerce. It contains information on the registration data of the universe of Italian private non-financial sector firms. Most importantly, this dataset includes personal information on firms' stockholders and directors, i.e., their names, surnames, and personal identification codes. We use this information to derive their age, gender, and place of birth.

The second data source is the database managed by the *Cerved Group*, which gathers balance sheet information of the universe of the Italian limited liability firms. Our sample comprises all private non-micro non-financial non-agricultural firms included in the intersection of the *Infocamere* and *Cerved* databases for the years from 2005 to 2017, covering over 295 thousand firm-year observations.[13,14] We follow more than 31 thousand firms and 162 thousand unique individuals who have held positions on their boards.

To measure director and firm quality, in a matched firm-director panel dataset over the period 2005-2017, tracking directors across different firms over time, we use a high-dimensional two-way fixed effects model as in Baltrunaite et al. (2020). To estimate how much of the unexplained variation in firms' total factor productivity can be attributed to an

[13]We exclude firms in agriculture, finance, insurance, public administration, education, health, care, social activity, household activities, extra-territorial activity. We also drop firms for which information on industry or municipality or other data needed to calculate the main variables used in the analysis is missing. We drop firms located on islands.

[14]Given the low potential of very small firms to invest a non-negligible amount of resources in board selection and remuneration, we exclude all micro-firms from our analysis. More specifically, we drop firms that do not reach a 2-million EUR revenue and a 10-employee threshold over our sample period.

individual board member, two sources of variation are exploited: cross-sectional variation due to the fact that the same person can sit on the boards of several firms and longitudinal variation due to the fact that the same person can switch from one firm to another over time.[15] The estimated director fixed effects, conditionally on firm fixed effects, and time-varying firm characteristics can be interpreted as a measure of directors' talent (i.e., the individual contribution to the variation of the firms' TFP).

Formally, the analysis uses the largest connected set of firms, which consists of $N$ firms, linked to each other via director mobility, and each firm $i$ is observed over $T_i$ years. We have therefore an unbalanced panel of $T = \sum_{i=1}^{i=N} T_i$ firm-year observations. In each year $t$ a firm $i$ is run by one or several among $J$ directors, whose identities are known to us. We estimate the following high-dimensional two-way fixed effect model:

$$y = F\alpha + D\psi + X\beta + \varepsilon \tag{1}$$

$y$ is a $T \times 1$ vector whose $j$-th element is the total factor productivity of firm $i$ in period $t$;[16] $F$ is a $T \times N$ matrix that collects firm dummies; $D$ is a $T \times J$ matrix that collects directors dummies; $X$ is a $T \times K$ matrix of year dummies (with $K = 13$ in our setting); $\varepsilon$ is the $T \times 1$ vector containing the error terms.

The OLS estimation of equation (1) provides a meaningful estimate of the coefficients $\psi$ of interest as long as directors do not systematically sort into firms based on factors that are not observed by the econometricians and are thus included into the error term. As specification (1) features firm fixed effects, sorting based on companies' time-invariant characteristics would not constitute a threat to the identification. The extensive validity checks are presented in Baltrunaite et al. (2020).

The average of the estimated directors' fixed effects at the firm level is used to measure its board quality. Similarly, the firm fixed effect can be interpreted as a measure of a firm's quality. In our analysis, we use the variable *PcBoard*, defined as the annual percentile rank

[15] The presence of "movers", i.e., individuals with multiple board appointments, allows the identification of fixed effects for both "mover" and "non-mover" directors within the connected set of firms.

[16] We use a measure of TFP computed using balance sheet information with the Levinsohn and Petrin (2003) estimator with the Ackerberg et al. (2015) correction, and that has been purged of sector-year and province-year fixed effects. The TFP measure is computed within 2-digit sectors to account for sectoral differences in the productivity function.

of the average director fixed effect, and $PcFirm$, defined as the annual percentile rank of the firm fixed effect. In other words, every year we divide the board quality measure $PcBoard$ and firm quality measure $PcFirm$ in the percentile rank from 1 to 100.

To capture plausibly exogenous variation in board appointments, we exploit the high-speed train line's introduction to construct a non-local directors' supply shock for firms located in cities connected by a high-speed train line. We assume that a director's travel costs determine the likelihood of a firm-director match, which is in line with Bernile et al. (2018) or Giroud (2013), suggesting that the personal costs of performing a task at a distant location decrease with the availability of non-stop flights between the agent performing the task and its location. In our case, we argue that a substantial reduction in travel time and an increase in travel comfort would make the access to directors in train-connected locations easier, reducing the board reliance on a smaller local pool of directors.[17] With more available candidates, firms would face a broader set of choices, enabling them to find more suitable directors.

Our proxy for the non-local pool of directors to which a firm is exposed considers the firm's location and the number of directors working in a location (or locations) accessible to this firm via the high-speed train.[18,19] More precisely, we measure the non-local pool of directors based on the number of directors in location(s) $b \in B$ accessible to firms in a location $A$, in the years after a location $A$ and a location $b$ become connected via the high-speed train. Formally, the variable $NonLocalPOOL$ is an interaction between the indicator variable for firms located within a 10 kilometers distance from a station with a high-speed train connection and the non-local director pool the destination location(s) (in logarithms).[20]

[17]Although it may seem that a higher salary may easily compensate for directors' travel time, we argue that the opportunity cost of time for candidate directors may be substantially higher than the monetary value of time saved on the journey. In other words, some job attributes may simply be non-exchangeable for money, as the time endowment is limited to 24 hours per day for everybody and candidate directors may not be budget-constrained when considering potential board appointments.

[18]The most common occupation of a director is an executive in another firm (Guner et al., 2008; Linck et al., 2008). As comprehensive data on executives in Italian private companies do not exit, we use directorship in other firms to proxy for being a potential candidate for board appointments.

[19]A firm's geographical location in our data is at the municipality level, which is the most granular administrative unit in Italy. There are 20 regions, approximately 110 provinces and more than 8,000 municipalities in Italy in the period we consider. We also note that one local labor market (which is a statistical, but not an administrative unit) typically comprises several municipalities.

[20]In case the same city gets connected to different destinations in different years, we consider separate

We define the variables as:

$$NonLocalPOOL_{ilt} = log(1 + \sum_{b=1}^{B} \mathbf{1}\{d(\text{HST station to b}; l) < 10km\} * \#\text{Directors in b}) \quad (2)$$

where $l$ is the location of the firm, $HST$ is the acronym for the high-speed train, and $B$ is the set of high-speed train service destinations available to firms in municipality $l$ located fewer than 10km from the closest train station served by $HST$.

In terms of geographical boundaries, the overall pool of potential directors in that location is proxied by a pool of individuals that currently work as firm directors in the local labor market (LLM) of that location. Furthermore, the increased supply of directors affects only firms located within 10-kilometer distance from the station in location A: the variable $NonLocalPOOL$ takes the value of zero for firms that are further than 10km from a station connected by a high-speed train.[21] Figure 2 illustrates the relationship between a firm and its non-local director supply in the simplest case with B consisting of one element only.

[Figure 2 here]

To better examine directors' mobility along the train line, we define three variables at a firm-year level, expressed as the percentage of the total number of directors ($BoardSize$). $DestBorn$ considers directors who were born in the high-speed train connected province, while other measures take into account directors who in the previous year served on a board of a firm in the high-speed connected LLM ($DestExp$) or in any other LLM ($NonDestExp$).[22]

To describe the changes in the board's quality and diversity, we construct several measures at a firm-year level. $DirAge$ is the average age of directors sitting on a firm's board. $Female$

years for each location.

[21] The definition of the "catchment area" in the origin and destination locations is asymmetric in the baseline specification. We motivate this measure by the fact that individuals are very likely to move for work *locally* within the local labor market. Yet, if they have to travel via the high-speed train line to a further destination outside their local labor market, their willingness to cover the entire local labor market at that destination may be lower. For this reason, we only consider firms relatively close (i.e., within 10km distance) to the train station as the ones able to attract directors from further away. We relax this assumption and check if the results are robust to using a symmetric definition of $NonLocalPOOL$ variable in Section 5.1.

[22] Our data is based on administrative records, and does not include the place of residence for individuals in the sample. Therefore, we rely on their place of birth and the place of work to proxy for the location they reside in.

is a percentage of women directors. $SameName$ measure fractions of the firm's directors with the same last name as the firm's largest shareholder.

To study firm performance, we use a logarithmic value of revenues ($logRev$), the total factor productivity ($TFP$), calculated using Levinsohn and Petrin (2003) semi-parametric estimator with the Ackerberg et al. (2015) correction, and an indicator variable taking a value of one if the firm does not appear in our sample the following year ($Default$), which we use as a proxy for firm's default.

## 3.2 Descriptive statistics

Over the 2005-2017-year period, our director supply shock measure uses 14 direct high-speed train connections between 15 stations (Table 1). 27% of sample firms in 18% firm-year observations have access to directors from other labor markets, accessible by such train service.[23,24] Their average trip is 127-km-long. It takes 0.9 hour and saves at least 0.8 hour for a passenger that chooses taking a train instead of a car ride in non-rush hours.

The median sample firm is 24-year-old. Using its 2.2 million EUR assets it produces 12.4 million EUR annual revenues (Table 3). On average, four directors sit on its board. 0.8% of these directors were born at the other end of the high-speed train line. 1.6% of them have experience at another firm located in an LLM connected with a high-speed train, and 2.2% – at another firm in some other LLM.

[Tables 3 and 4 here]

As previously explained in section 3.1, we build firm and board quality measures as annual percentiles of firm and director fixed effects. These fixed effects are calculated within the largest set of companies connected via director mobility, limiting our sample to such connected firms. The size of this sample corresponds to 30% of the universe of Italian

[23]The variable $Train$ is a dummy variable, taking a value of one if firm's the municipality is located within 10km from a station, connected by a high-speed train in the years $t$ following the opening of the first high-speed train connection.

[24]These calculations are based on data cut at a local labor market (LLM) level in the last year of our sample. We observe that an LLM has 3,296 directors on average. The train-connected LLMs are, on average, larger (15,879 directors) than the not connected LLMs (1,834 directors). Even for these LLMs, an opening of a train line is important as it adds 73,065 directors on average to their local director labor market.

companies. We compare the firms in and out of our sample (Table 4) to understand the external validity of our results. Our sample firms appear statistically and economically different from the remaining population of Italian firms in several dimensions. They are:

- by five percentage points more likely to have access to a high-speed train;
- more likely to have larger boards;
- 1 year older;
- larger, in terms of a number of employees, assets, and revenues;
- more likely to have directors with experience away from the firm's location;
- less productive.

Our paper shows that only the more productive firms benefit from an increased supply of directors. As our sample covers less productive firms on average, the effect for the out-of-sample Italian firms may be even stronger.

# 4 Empirical design

For several reasons, board quality may correlate with the firm's important characteristics, either observable or unobservable. Using OLS to evaluate the directors' supply-quality relationship may yield biased estimates, with little information on the causal question of interest. To address this matter, we propose a novel identification strategy based on a director supply shock induced by the introduction of the high-speed train line, as explained more in detail in subsection 3.1.

We run the following reduced-form panel regressions to study the effects on board appointment quality:

$$PcBoard_{it} = \gamma^{N} NonLocalPOOL_{ilt} + \gamma^{L} LocalPOOL_{ilt} + X_{it}^{'}\beta_x + \sigma_i + \mu_{tr} + \nu_{ts} + \varepsilon_{it} \quad (3)$$

where $PcBoard_{it}$, $NonLocalPOOL_{ilt}$ and $LocalPOOL_{ilt}$ are measures of board quality, non local and local supply of directors, respectively as defined in subsection 3.1, for each firm $i$, in location $l$ and year $t$. $X_{it}$ is a vector of firm-level controls measured in their logarithmic values: age in years, value of assets in the first year a firm appears in *Cerved* database. $\sigma_i$

is the vector of firm fixed effects. $\mu_{tr}$ is a vector of year-region fixed effects, while $\nu_{ts}$ is the vector of sector-year fixed effects. Firm fixed effects, $\sigma_i$, account for time-constant firm unobservables, while $\mu_{tr}$ and $\nu_{ts}$ absorb non-parametric region-specific and sector-specific time trends.

The *NonLocalPOOL* variable isolates arguably exogenous variation in the directors' supply stemming from three sources of variation: i) cross-sectional variation across provinces which received or did not receive the high-speed train line; ii) time-series variation due to the staggered timing of the high-speed train line opening, iii) the intensive margin proxied by the pool size of potential non-local directors at the destination location(s).

The identifying assumption of this analysis is that there are no omitted variables that co-vary with board appointments, the timing of high-speed train service opening, and the size of directors' labor market at the destination, conditional on covariates. Although this assumption is not directly testable in the data, we motivate in detail the role of the control variables and make explicit the remaining threats to the identification.

The timing of the high-speed train line's opening is not correlated with the country-level economic cycle by construction since different provinces experienced the opening of a high-speed train line in different years. Moreover, the identifying variation does not disproportionately rely on provinces in specific geographic areas in the country or economic and demographic changes in certain provinces, which may be systematically correlated with the presence or the timing of the introduction of the high-speed train, due to the inclusion of region fixed effects and province-level controls. One may argue that development of a train connection to a firm's location may affect its operations – for example, improve the transportation of firm's manufactured goods – and then lead to a trickle-down effect on director appointments.[25] If the train-line opening affects the demand *at* the province level (including any effect on province population), we tackle this concern in the main regression specifica-

[25]We, however, argue that high-speed train connection did not substantially alter the market conditions in which firms operate, as it improved passenger travel comfort only (Beria et al., 2018; Desmaris, 2016), but left transportation costs of goods unchanged. The first cargo service was planned to run on the line only in 2019 (Beria et al., 2018), which is after our sample period. Moreover, the high-speed transportation is mostly used among upper-middle-class, business and tourist passengers, representing a moderate share of the overall passenger transportation within Italy, making it unlikely that the better train connection would create additional demand for firms' output.

tion by controlling for the economic output per capita in each province. If the train-line opening affects the demand *within* the province, for example, by heterogeneously affecting different firms, our estimates rely on an implicit assumption that firm demand for director appointments is unaffected.[26] To support this claim, we implement several robustness checks showing that the supply, rather than demand of directors, explains the director supply-board quality link.

One may worry about the forward-looking bias in the estimation of directors' quality, whereby the effect mechanically arises because a director is defined as *ex-ante* high-quality if in the future she joins a high-quality firm. To tackle this issue director fixed effects could be estimated using only the period before the introduction of the high-speed train service. Yet, given that our panel only spans the period 2005-2017 and the fact that the first high-speed train connections were launched as early as in 2007, we do not consider this a reasonable strategy in our case: coefficient inconsistency related to the small time dimension may aggravate the analysis more than the gains associated with the removal of the remaining biases due to the forward-looking nature of the fixed effects. Nevertheless, we point out that director fixed effects are estimated controlling for province-year shocks. This allows to capture all observed and unobserved time-varying factors affecting firms in different provinces (see also Section 3.1). Therefore, the remaining confounding variation may only pertain to time changes within a province, conditional on the extensive battery of controls included in the regression equation 3.

Last, to investigate the relationship between directors' supply and firm performance, we run a number of reduced-form regressions as in equation (1) and also show a set of scaled results, in which effects of $NonLocalPOOL$ on firm performance are scaled-up by their impact on $PcBoard$ (Section 5.4).

[26]This assumption is corroborated by well-established studies such as Knyazeva et al., (2013), Bernile et al. (2018).

# 5 Results

## 5.1 Director supply and quality of the boards

We report the estimated relationship between the directors' supply and the quality of the board in Table 5. On average, the supply of potential non-local directors ($NonLocalPOOL$) does not affect the quality of the firm's board of directors. The result is unchanged using parsimonious (with year, sector, and region fixed effects) and stringent (with the firm, year-sector and year-region fixed effects) regression specifications (Table 5, Columns 1 and 2). The latter specification only exploits the time variation within the firm due to the inclusion of firm fixed effects. Therefore, it limits concerns of a systematic unobservables-based selection of firms founded in the city center, hence, close to the station, having systematically different patterns in their boards' selection.

Board appointments are an equilibrium outcome of a matching process between firms and potential directors. Thus, not all firms are likely to gain equally from a larger pool of potential directors. For example, the best firms are more likely to benefit from the increased director supply as directors previously "constrained" to work in worse-quality firms now may be more willing to move for board appointments in high-quality firms. To evaluate this conjecture, we examine how the director supply-board quality effect varies with firm quality.

The results suggest that this supply-quality relationship is indeed heterogeneous across firms: only better firms benefit from the increased supply of directors, at the expense of the worse quality firms. To be precise, worse quality firms face a significant impairment in their director-firm match (Table 5, Column 3). The coefficient on $NonLocalPOOL$ is negative and insignificant. In contrast, a higher number of potential non-local directors improves the quality of board appointments at higher quality firms (Table 5, Columns 3 and 4). This relationship is robust to measuring firm's quality using a percentile of its fixed-effect or an indicator for firms with quality higher than the annual median quality ($Good$). The coefficient for the better quality firms, $NonLocalPOOL\_Good$, is positive and significant, leading to a positive value of the combination of the two coefficients, 0.035, which is also significant at 1% level.

The results are not only statistically but also economically significant. For example, over

157 thousand directors serve on boards of firms registered with the municipality within 10 kilometers from Milan train station. For higher quality firms in a location, to which high-speed train to Milan is opened, the firm-board quality percentile increases by 1.3 percentage points, controlling for the firm, year-region, and year-sector fixed effects. This effect is substantial, explaining 23% of the over time variation in board quality of a median sample firm.

[Table 5 here]

## 5.2 Robustness tests

We evaluate if the director supply-board quality effect is robust to alternative variable definitions, sample selection choices and regression specifications. First, we use an alternative definition of board quality. Instead of averaging the directors' fixed effect within a board and ranking this measure for each year, we rank the directors each year and measure board quality with the average of their percentile rank. The director supply effect remains negative for the worse firms, positive for the better firms, and the difference between the two effects is statistically significant (Table 5, Column 5).

Second, small firms may have less sophisticated director selection practices than larger ones and, therefore, may benefit less from expanding the non-local directors' supply. In other words, one would expect that the effect mostly comes from larger firms. To confirm if it is the case, we exclude the firms with fewer than 20 employees. Our results are not only confirmed qualitatively (Table 5, Column 6), but are also larger in the absolute value.

Third, our results may be affected by sample selection. Initially, we define firm- and director-quality measures over the whole sample period. Such a definition may potentially over-represent directors that accept board appointments in further-located firms, which can be accessed via a high-speed train. These directors may not have accepted the positions before the high-speed train line started its operations. To evaluate this concern, we keep only the firms and directors active in 2005-2006, before the first high-speed train connection. The estimates remain consistent with the initial findings (Table 5, Column 7).

Next, we study the sensitivity of our results to alternative definitions of the director

supply shock measure by varying the distance, which determines the reach of the high-speed-train induced director supply shock. Differently from the baseline definition, which considers firms within the 10-km distance from the station as "treated", we use several alternative cut-offs. First, we use a parsimonious variable that ignores the differences in the size of directors' pool in each destination and is defined as an indicator for firms within an LLM with a high-speed train connection (Table 6, Column 1). Moreover, we set the high-speed train reach for firms located in the same LLM, i.e., similar to a commuting zone (Table 6, Column 2) or located within 20km from the station (Table 6, Column 3), rather than within 10km from the station. These changes do not significantly affect the results: the coefficients on the interaction variable $NonLocalPOOL\_Good$ remain statistically significant.

To assure that oversampling of firms located close to the stations is not driving the results, we collapse our observations at an LLM-year level (Table 6, Column 4), distinguishing by the firm quality. Even though we now work with nearly 30-times smaller sample, the coefficients remain of the same sign and statistically significant. This finding illustrates that board quality effects are robust to considering the aggregate measure of economic activity, rather than that of a single firm.

[Table 6 here]

Next, to tackle the concern that some particular train connection drives the results, we exclude supply-shock-affected stations (and firms located close to these stations) one-by-one. The results remain robust to eliminating any of the train segments (Table 7).

[Table 7 here]

We examine the robustness of our results in firms with different ownership structure. The boards of directors usually have two main roles - they monitor and advise the firm. A shareholder with a larger fraction of shares may relatively well oversee the firm, reducing the firm demand for outside directors for monitoring purposes, *ceteris paribus* firm demand for directors' advising. If it is the case, firms with more influential main shareholders are expected to respond less to an increased director supply. We find that the effect of non-local director supply on boards' quality is not statistically different in the subsamples of firms

with the main shareholder having over half of the firm's shares (influential shareholder) and other firms (Table 8, Columns 1 and 2). This finding is consistent with firms responding to directors' supply to satisfy their demand for directors' advising expertise primarily (Table 8, Columns 1 and 2), shedding light on the role of directors in private firms.

We also provide evidence to exclude a couple of alternative explanations for our findings. First, directors' supply-board quality effect may arise not only from the train-induced supply, but also the train-induced changes in demand for directors. Opening a train line may improve the connection between investors and their potential target firms, lead to more acquisitions, a higher need for new directors and a stronger response to the increased director supply. To ensure that such events do not drive our results, we exclude firms with any ownership changes over the last year.[27] However, the positive effect of increased director supply on good firms remains even in this smaller sample (Table 8, Column 3). Second, one may argue that improving a train connection to a firm's location affects its operations. For example, an easier access to a city may increase tourist flows, leading to more business activity and trickle-down effects on director appointments. However, excluding locally operating firms – in accommodation, catering, health, artistic, entertainment and fun activities industries – preserves the results (Table 8, Column 4).

[Table 8 here]

## 5.3 Director appointments and the supply shock

### 5.3.1 New and leaving directors

Our results indicate that an increase in director supply negatively affects the board quality of the worse firms. We illustrate two channels leading to such an outcome. First, low-quality firms appear to lose directors. Second, as improved train connection eases directors' commuting, worse firms experience difficulties attracting high-quality directors who presumably choose better (and distant) appointments.

Regarding the first explanation, two relationships hold. The worse firms lose directors and, on average, the size of their boards decreases. We run regression 3 but replace the

[27] In our sample, 24% of firm-year observations exhibit changes in ownership compared to the previous year.

dependent variable with a number of directors on the firm's board. A negative and significant coefficient on *NonLocalPOOL* and a positive coefficient on *NonLocalPOOL_Good* suggest that the board size significantly decreases only for the bad-quality firms (Table 9, Column 1). The combination of $NonLocalPOOL$ and *NonLocalPOOL_Good* is not significant. The result is consistent not only at the firm-year but also at the director-firm-year level using firm-year variation when including director fixed effects (Table 9, Column 2).

Moreover, there is evidence that worse firms are more likely to lose directors. To perform this test, we examine the data at the director-firm-year level. We create four categorical variables - $NonLocalPOOL$ interacted with indicators taking a value of one if: 1) a firm is of a high quality and director's fixed effect is higher than that of the firm ($GoodFGoodD$); 2) a firm is of a high quality and director's fixed effect is lower than that of the firm ($GoodFBadD$); 3) a firm is of a low quality and director's fixed effect is higher than that of the firm ($BadFGoodD$); 4) a firm is of a low quality and director's fixed effect is lower than that of the firm ($BadFBadD$). Among director-firm observations with a positive director supply variable 18% (32%) arise from situations with a good firm and a better (worse) director; 34% (16%) arise from states with a lousy firm and a better (worse) director, respectively. We study how the probability of the director's exit changes in reaction to the supply shock depending on the firm-director combination type. We replace $NonLocalPOOL$ in our main regression specification with its interaction with a combination of these four variables and use the dependent variable defined as an indicator for a director leaving the firm in the current year.

The regression results suggest that worse firms are more likely to see their directors leave as director supply increases. The coefficients *NonLocalPOOL_BadFGoodD* and *NonLocalPOOL_BadFBadD* are both positive and significant, but the difference between the two is not statistically significant. In contrast, as the director supply rises, the good directors keep their positions in the good firms and good firms let the worse directors go. The coefficients on *NonLocalPOOL_GoodFGoodD* and *NonLocalPOOL_GoodFBadD* are negative and positive, respectively (Table 9, Column 3).

In the second explanation, we suggest that directors are less likely to take new positions in low-quality firms after opening a high-speed train line. We run the same regression

but replace the dependent variable with an indicator taking the value of one if, in a given year, a director takes a position in a new firm ($New$). We demonstrate that in response to an increased director supply, bad firms hire fewer directors. The coefficients on *NonLocalPOOL_BadFGoodD* and *NonLocalPOOL_BadFBadD* are negative (Table 9, Column 4). The good firms instead manage to differentiate across the director types in their hiring decisions. With the increase in director supply, the good firms are more likely to hire better directors and less likely to hire worse directors, as shown by, respectively, positive and negative coefficients on *NonLocalPOOL_GoodFGoodD* and *NonLocalPOOL_GoodFBadD* (Table 9, Column 4).

[Table 9 here]

### 5.3.2 Directors along the train line

Any board selection effect arising due to the supply shock in the availability of non-local directors should happen "via the high-speed train line". We show that consistent with the improved mobility across locations, firms with access to non-local director pool raise the fraction of directors that were born or worked in the train destination at the expense of directors with experience in other non-train-destination areas (Table 10, Columns 1, 3, 5).

For example, opening a high-speed train line between Bologna and Milan increases the potential non-local pool of directors by 157 thousand for firms in Bologna. This shock in supply raises the fraction of directors in Bologna, who were born in Milan and who had director-experience in Milan last year by 1.9 and 6.5 percentage points. It also decreases the fraction of directors who worked in other LLM in the previous year (not Milan, not Bologna) by 0.5 percentage point.

These results align with the firms responding to an increase in director supply by hiring directors located close to the fast-train-destination stations. Interestingly, a larger pool of potential directors facilitates search in corporate directors' labor market and alters board appointments along the high-speed train uniformly for all firms (Columns 2, 4, and 6). The more productive firms do not respond to the shocks in director supply by hiring more directors with links to the destination station than the less productive firms. The estimate on the variable *NonLocalPOOL_Good* is not significant.

[Table 10 here]

### 5.3.3 Quality and diversity of the boards

A larger pool of potential directors may result in changes in boards' demographic composition. We show that increasing the supply of potential directors leads to younger boards. The average age of a director ($DirAge$) decreases (Table 11, Column 1). The coefficient is negative and significant on average, and more than twice stronger for the good firms (Table 11, Column 2). Gaining high-speed train access to Milan decreases a board director's average age by 0.28 and 0.6 for worse and better firms.

Increasing a pool of potential directors, however, does not significantly improve diversity based on gender (Table 11, Column 3-4). Although women are disproportionally few among directors in Italian firms (Baltrunaite et al., 2019), these results are consistent with heterogeneous mobility preferences across demographic groups, with women having a lower propensity to move for long-distance work appointments (Farré et al., 2020).

The practice of appointing relatives and friends to direct a company may hinder a firm's access to a broader pool of talent (Burkart et al., 2007; Perez-Gonzalez, 2006; Bennedsen et al., 2007). Such favoritism may be particularly exacerbated in family firms, for which we examine whether "nepotistic" board appointment practices decrease as the potential directors' supply expands.[28] To proxy for directors' presence with family links on firm boards, we use a fraction of the same surname directors as the owning family surname, $SameName$. Interestingly, we show that an increase in director supply decreases the relative favoritism. The fraction of directors having the same last name as the owning family decreases with the pool of directors (Table 11, Column 5). Consistently with the results on director appointments from high-speed train connected locations, the effect does not differ significantly for better and for worse firms (Table 11, Column 6) - firms of both types reduce the share of family members on their boards.

[Table 11 here]

[28]The share of Italian family-owned businesses is similar to that of other European countries, yet, the incidence of family management is remarkably higher in Italy (EFIGE, 2013). In the selection of managers, family background, social and political connections often appear to hold more weight than competence, managerial skills and education.

## 5.4 Director supply and firm outcomes

We study if better board quality is associated with higher firm performance. In particular, we focus on firm growth, which we proxy by firm revenues, total factor productivity (TFP), and default probability. The results show that for better firms, at the expense of worse firms, a high-speed-train-induced shock to the director supply increases firm's revenues (Table 12, Column 1), TFP (Table 12, Column 2), and decreases the probability of default (Table 12, Column 3).

[Table 12 here]

We then examine directly how the director quality affects the firm's performance, under a stronger assumption that opening a train line only affects the firm's performance via hiring better directors (and, hence, these results should be interpreted with additional caution). Namely, in regressions in Table 12, Columns 4-6 we instrument for the board quality with a supply shock interacted with firm quality measure.[29] These "scaled" estimates are consistent with board quality raising firm's revenues, total factor productivity, and lowering the probability of default. In other words, more capable directors may bring a positive contribution to firms' outcomes, for instance, due to their ability to advise or lead the firm better.

Under the exclusion restriction, we assume that better train service to a firm's location improves its performance by attracting better-fit directors to serve on its board. Yet, a better connection between the two cities can benefit a firm via alternative mechanisms. Past studies suggest that when investors reach the firm easier, they monitor it closer and improve its productivity. Due to proximity, venture capitalists get involved with the local firms more than with the other firms (Lerner, 1995). Similarly, the mutual fund managers tend to purchase local firms and reap higher returns from them, potentially due to better monitoring capabilities (Coval and Moskowitz, 1999 and 2001). More intensive monitoring also may explain why plants with quicker access from the headquarters are more productive than other plants (Giroud, 2013). However, we argue that this train-induced more active monitoring by the owners is unlikely to explain the entire link between the firm's productivity and the quality of its board. This relationship is not significantly different for firms with

[29] In other words, the first-stage regression is essentially the one in Table 5, Column 4.

changing ownership (a proxy for new owners and new firm monitoring practices) and for the remaining firms (Table 13, Columns 1 and 2).

We perform an alternative test to support the assumption that the firm's productivity increases not only because of investors' improved monitoring capabilities. We assume that when directors have higher ownership of a firm, their incentives are better aligned and they need less monitoring from the other directors or shareholders. In such firms, new directors are likely to perform more advisory and fewer monitoring tasks. If board quality-firm productivity result rises solely from further-apart investors' needs to hire a director for monitoring purposes, then the effect will persist only in the subsample of firms with higher demand for monitoring, i.e., in firms with low director ownership. However, our findings suggest that board quality improvement due to the train connection leads to higher productivity of firms with both, high and low, director ownership (Table 13, Columns 3 and 4). These results are in line with higher quality boards engaging more actively in firm advising and less so - in monitoring, with favorable effects on the firm's productivity.

Finally, opening a high-speed train line may affect firm's revenues and productivity via higher sales arising from a train-related flow of tourists. Yet, excluding the firms operating locally – in accommodation, catering, health, artistic, entertainment and fun activities industries – preserves the results. We demonstrate that director quality in a subsample of firms providing products and services not locally only leads to higher sales and productivity (Table 13, Columns 5 and 6). These results support the notion that productivity increases not solely due to increased demand for the firm's goods.

[Table 13 here]

# 6 Conclusions

This paper exploits a novel rich dataset on Italian private firms to study how the size of corporate directors' labor market affects board appointments. To establish causality, we rely on a shock in potential non-local directors' supply induced by the reduction in their travel time and the increased comfort via the high-speed train service. There is evidence that, once the market for corporate director appointments expands, firms improve their

director matches by raising the closeness of the director-firm quality fit. Our study shows that higher-quality companies attract talented directors at the expense of low-quality firms, thus increasing the system's overall efficiency. This finding emerges in the Italian context, which is often criticized to lack meritocracy, suggesting that the effect size likely represents a lower bound.

We argue that our evidence on the effects of the potential directors' supply on board appointments is likely to apply also in other contexts. Italy is the fourth largest European economy and eighth-largest country by nominal GDP in the world. The regional disparities – the ratio of GDP per capita in the 20% richest over 20% poorest regions – are at the average OECD level (OECD, 2018), and is similar, e.g., to Belgium or France. Moreover, similar to the U.S. and Spain, Italy's most productive city is not its capital, suggesting that connecting centers of economic activity may be of similar importance in other countries. Overall, the Italian context appears rather comparable with that of many other large economies worldwide. Moreover, given that our identification in part comes from the comparison of firms located in urban areas with access to high-speed train and firms located in less urbanized places without such service, we expect our findings may apply well in places with relatively extensive urban development, and less so where the economic activity is more sparse.

Our results shed light on the positive indirect effects of infrastructure investments in high-speed rail - it serves to connect otherwise fragmented local labor markets for high-skill workers, such as corporate directors. They also suggest that policy-maker may improve mobility or, e.g., increase flexibility in board attendance or invest in human capital, to raise the quality of the local pool of talent. Our results, consistent with the board quality improving firm performance, may indicate that such changes would benefit both private firms and the productive system's overall efficiency.

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# Tables

Table 1: Opening of a high-speed train line

The table lists provinces, connected by a high-speed train during the 2005-2017-year period, a number of directors active in the connected LLM in the year of the train line connection, the distance and the travel time between the two stations. The last column shows how much time a passenger saves when choosing high-speed train instead of a driving a car in non-peak hours.

| Location A | | Location B | | Opening | Distance | Time | |
|---|---|---|---|---|---|---|---|
| City | Directors | City | Directors | | (km) | (hours) | saved (hours) |
| Padova | 20,151 | Venezia | 14,929 | 2007 March | 42 | 0.5 | 0.25 |
| Venice | 14,929 | Verona | 16,147 | 2007 March | 115 | 1 | 0.5 |
| Salerno | 7,379 | Naples | 43,427 | 2008 June | 55 | 0.75 | 0 |
| Milan | 156,840 | Bologna | 31,305 | 2008 December | 215 | 1 | 1.5 |
| Florence | 22,128 | Bologna | 31,307 | 2009 July | 105 | 0.5 | 1 |
| Verona | 16,839 | Bologna | 31,307 | 2009 July | 145 | 1 | 0.75 |
| Rome | 125,205 | Naples | 45,320 | 2009 November | 225 | 1.25 | 1.25 |
| Milan | 158,453 | Turin | 40,877 | 2009 December | 145 | 1 | 1 |
| Ancona | 5,379 | Rimini | 6,485 | 2013 April | 119 | 0.75 | 0.5 |
| Rimini | 6,485 | Bologna | 31,349 | 2013 April | 115 | 1 | 0.5 |
| Reggio Emilia | 13,283 | Bologna | 31,349 | 2013 June | 70 | 0.5 | 0.5 |
| Reggio Emilia | 13,283 | Milan | 163,842 | 2013 June | 155 | 1 | 1 |
| Trieste | 5,283 | Venezia | 16,238 | 2016 September | 148 | 1.5 | 0.5 |
| Brescia | 18,941 | Milano | 165,585 | 2016 December | 100 | 0.5 | 1.5 |

Table 2: Stylized facts on commuting

The table shows the results from OLS regressions using the Italian Labor Force Survey data. The dependent variable in Columns 1 and 2 is an indicator for individuals who work outside the region of their residence, while in Columns 3 and 4 - an indicator for individuals who work in the province accessible via the high-speed train. All regressions include year and province fixed effects. Regressions in Columns 2 and 4 also control for individual's gender, age, education, and broad occupational segment. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| Dependent variable: | Commute | | | |
|---|---|---|---|---|
| | long distance | | to destination | |
| | (1) | (2) | (3) | (4) |
| High-speed train | -0.000 | -0.000 | 0.005** | 0.005** |
| | (0.001) | (0.001) | (0.002) | (0.002) |
| Professional | 0.015*** | 0.007*** | 0.000* | -0.000** |
| | (0.002) | (0.002) | (0.000) | (0.000) |
| High-speed train × Professional | -0.000 | -0.002 | 0.005*** | 0.005*** |
| | (0.003) | (0.003) | (0.002) | (0.002) |
| Observations | 2,620,905 | 2,614,486 | 2,620,905 | 2,614,486 |
| Year and Province FE | Yes | Yes | Yes | Yes |
| Individual controls | | Yes | | Yes |
| R-squared | 0.02 | 0.03 | 0.02 | 0.02 |

Table 3: Summary statistics

This table presents summary statistics for variables used in the study. $Train$ is a dummy variable, taking a value of one if firm's municipality is located within 10km from a station, connected by a high-speed train. $NonLocalPOOL$ is a logarithmic value of a number of directors active in firms whose municipalities are within 10km from the station connected (via fast train line during the 2005-2017-year period) with the station closest to the affected firms. $LocalPOOL$ is the logarithmic value of a number of directors active in firms of the LLM. *Age* is the logarithmic value of a number of years since the firm was founded. *Employees* is the number of employees working at a firm. *Assets* and *Revenues* are firm's annual levels of assets and revenues, respectively, in million EUR, winsorized at 1 percent and 99 percent levels. $TFP$ is a measure of total factor productivity, calculated using Levinsohn and Petrin (2003) semiparametric estimator. *PcBoard* measures an annual percentile ranking of the average directors' quality in their firms. The following variables measure the fractions of directors (%), who were born in the connected LLM ($DestBorn$), last year served on a board of a firm in the connected LLM ($ExpDest$) or any other LLM ($ExpNonDest$).

| | count | mean | sd | min | p50 | max |
|---|---|---|---|---|---|---|
| *Connection* | | | | | | |
| Train | 295,194 | 0.20 | 0.40 | 0.00 | 0.00 | 1.00 |
| NonLocalPOOL_th | 295,194 | 11.95 | 29.88 | 0.00 | 0.00 | 166.97 |
| LocalPOOL_th | 295,194 | 42.87 | 60.04 | 0.05 | 10.64 | 166.12 |
| *Firm characteristics* | | | | | | |
| Age | 295,194 | 26.34 | 17.39 | 0.00 | 24.00 | 117.00 |
| Employees | 295,194 | 169.96 | 1162.76 | 10.00 | 50.00 | 152,069.33 |
| Assets (m) | 295,194 | 25.10 | 520.40 | 0.00 | 2.20 | 59,549.66 |
| Revenues (m) | 292,139 | 58.50 | 497.08 | 2.00 | 12.44 | 52,987.04 |
| TFP | 291,372 | 0.05 | 0.48 | -2.27 | 0.06 | 1.46 |
| *Board characteristics* | | | | | | |
| PcBoard | 295,194 | 50.92 | 25.81 | 1.00 | 51.00 | 100.00 |
| BoardSize | 295,194 | 4.25 | 3.14 | 1.00 | 4.00 | 50.00 |
| DestBorn | 295,194 | 0.81 | 6.15 | 0.00 | 0.00 | 100.00 |
| ExpDest | 295,194 | 1.57 | 9.12 | 0.00 | 0.00 | 100.00 |
| ExpNonDest | 269,578 | 2.24 | 10.07 | 0.00 | 0.00 | 100.00 |

Table 4: Sample selection

This table presents summary statistics for the sample and non-sample Italian firms. *Train* is a dummy variable, taking a value of one if firm's municipality is located within 10km from the station, connected by a high-speed train. *LocalPOOL* is the logarithmic value of a number of directors active in firms of the LLM. *Age* is the logarithmic value of a number of years since the firm was founded. *Employees* is the number of employees working at a firm. *Assets* and *Revenues* are firm's annual levels of assets and revenues, respectively, in million EUR, winsorized at 1 percent and 99 percent levels. *TFP* is a measure of total factor productivity, calculated using Levinsohn and Petrin (2003) semiparametric estimator. The following variables measure the fractions of directors (%), who were born in the connected LLM (*DestBorn*), last year served on a board of a firm in the connected LLM (*ExpDest*) or any other LLM (*ExpNonDest*).

| | Non sample firm | | Sample firm | | Difference |
|---|---|---|---|---|---|
| | N | Average | N | Average | Average |
| Train | 276,357 | 0.15 | 295,194 | 0.20 | 0.05*** |
| LocalPOOL (k) | 276,357 | 34.63 | 295,194 | 42.87 | 8.24*** |
| BoardSize | 262,752 | 2.37 | 295,194 | 4.25 | 1.87*** |
| Age | 276,357 | 25.23 | 295,194 | 26.34 | 1.11*** |
| Employees | 276,357 | 48.09 | 295,194 | 169.96 | 121.87*** |
| Assets (m) | 276,357 | 2.64 | 295,194 | 25.10 | 22.46*** |
| Revenues (m) | 272,774 | 12.07 | 292,139 | 58.5 | 46.43*** |
| TFP | 272,022 | 0.07 | 291,372 | 0.05 | -0.02*** |
| DestBorn | 262,752 | 0.44 | 295,194 | 0.81 | 0.37*** |
| ExpDest | 262,752 | 0.22 | 295,194 | 1.57 | 1.35*** |
| ExpNonDest | 240,803 | 0.40 | 269,578 | 2.24 | 1.84*** |

Table 5: Director supply and talent

The dependent variable *PcBoard* measures an annual percentile ranking of the average directors' quality in their firms, *PcDirector* measures an average of the annual percentile ranking of directors' quality in their firms. *NonLocalPOOL* is a logarithmic value of a number of directors active in firms whose municipalities are within 10km from the station connected (via fast train line during the 2005-2017-year period) with the station closest to the affected firms. *PcFirm* measures an annual percentile ranking of the firm quality. *Good* is an indicator variable taking a value of one if the firm's quality is above year-median. *NonLocalPOOL_PcFirm* or *NonLocalPOOL_Good* is an interaction between *NonLocalPOOL* and *PcFirm* or *Good*, respectively. All regressions include the following control variables, but the table does not report their coefficients: *LocalPOOL* - the logarithmic value of a number of directors active in firms of the local labor market (LLM); *Age* - the logarithmic value of a number of years since the firm was founded; *Size* - a logarithmic value of firm's assets in firm's first year in the sample; *logGDPcap* - a logarithmic GDP per capita value in the firm's province. Differently from the previous table, the sample in Column 6 uses only observations of firms that had no less than 20 employees in any year of our sample. In Column 7 we define firm and director quality percentiles over the 2005-2006 year period, before opening of any high speed train connections in our sample. Regression specifications include the following fixed-effects: year, region, and sector (all Columns); firm, year-region, year-sector, and region (Columns 2-7). *NonLocalPOOL+NonLocalPOOL_Good* is the non local director supply effect on good firms. *Probability* refers to the sum of the two coefficients being different from zero. Standard errors are clustered at a firm-level and reported in the parentheses below the coefficients. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | PcBoard | PcBoard | PcBoard | PcBoard | PcDirector | PcBoard | PcBoard |
| NonLocalPOOL | 0.050 | 0.036 | -0.0683* | -0.043 | -0.039** | -0.061* | -0.100*** |
| | (0.033) | (0.022) | (0.0379) | (0.029) | (0.019) | (0.032) | (0.029) |
| NonLocalPOOL_PcFirm | | | 0.0016*** | | | | |
| | | | (0.0006) | | | | |
| NonLocalPOOL_Good | | | | 0.110*** | 0.074*** | 0.140*** | 0.186*** |
| | | | | (0.034) | (0.023) | (0.038) | (0.034) |
| Observations | 295,193 | 293,248 | 289,271 | 289,271 | 289,271 | 213,742 | 185,400 |
| Adj. R-squared | 0.0247 | 0.804 | 0.807 | 0.807 | 0.799 | 0.812 | 0.874 |
| Year FE | Yes | | | | | | |
| Region FE | Yes | | | | | | |
| Sector FE | Yes | | | | | | |
| Firm FE | | Yes | Yes | Yes | | | Yes |
| Year region FE | | Yes | Yes | Yes | | | Yes |
| Year sector FE | | Yes | Yes | Yes | | | Yes |
| Min emp | | | | | | 20 | |
| Pctiles | | | | | | | Early |
| NonLocalPOOL+NonLocalPOOL_Good | | | | 0.067 | 0.035 | 0.080 | 0.086 |
| Probability | | | | 0.016 | 0.067 | 0.010 | 0.001 |

Table 6: Robustness test. Alternative specifications of director supply

The dependent variable *PcBoard* measures an annual percentile ranking of the average directors' quality in their firms. *NonLocalPOOL* is 1) an indicator that takes value of one if the LLM train station was connected with a high-speed train line in a given year (Column 1); a logarithmic value of a number of directors active in firms whose municipalities are within 2) the LLM (Columns 2 and 5); 3) 20km from the train station (Column 3). *Good* is an indicator variable taking a value of one if the firm's quality is above year-median. *NonLocalPOOL_Good* is an interaction between *NonLocalPOOL* and *Good*.Regressions in Columns 1-3 include the following control variables, but the table does not report their coefficients: *LocalPOOL* - the logarithmic value of a number of directors active in firms of the local labor market (LLM); *Age* - the logarithmic value of a number of years since the firm was founded; *logGDPcap* - a logarithmic GDP per capita value in the firm's province. Regression specifications in Columns 1-3 include the following fixed-effects: year-region, year-sector, firm, are at a firm-year level with standard errors clustered at a firm level. Regression specification in Column 4 controls for *LocalPOOL* and *logGDPcap*, has year and LLM fixed effects, is at a year-LLM level with standard errors clustered at an LLM level. *NonLocalPOOL+NonLocalPOOL_Good* is the non local director supply effect on good firms. *Probability* refers to the sum of the two coefficients being different from zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | PcBoard | PcBoard | PcBoard | PcBoard |
| NonLocalPOOL | -0.483 | -0.060*** | -0.022 | -0.118** |
| | (0.309) | (0.019) | (0.025) | (0.054) |
| NonLocalPOOL_Good | 1.166*** | 0.114*** | 0.104*** | 0.192** |
| | (0.367) | (0.018) | (0.028) | (0.082) |
| Observations | 289,271 | 289,242 | 289,271 | 10,924 |
| Adj. R-squared | 0.807 | 0.807 | 0.807 | 0.485 |
| NonLocal pool | Train | LLM | 20 km | LLM |
| NonLocalPOOL+NonLocalPOOL_Good | 0.683 | 0.054 | 0.082 | 0.074 |
| Probability | 0.020 | 0.003 | 0.000 | 0.156 |

Table 7: Robustness test: excluding stations

The dependent variable *PcBoard* measures an annual percentile ranking of the average directors' quality in their firms. *NonLocalPOOL* is a logarithmic value of a number of directors active in firms whose municipalities are within 10km from the station connected (via fast train line during the 2005-2017-year period) with the station closest to the affected firms. *Good* is an indicator variable taking a value of one if the firm's quality is above year-median. *NonLocalPOOL_Good* is an interaction between *NonLocalPOOL* and *Good*. All regressions include the following control variables, but the table does not report their coefficients: *LocalPOOL* - the logarithmic value of a number of directors active in firms of the local labor market (LLM); *Age* - the logarithmic value of a number of years since the firm was founded; *logGDPcap* - a logarithmic GDP per capita value in the firm's province. Each regression excludes firms with areas within 10km from each of the 15 stations, connected with a high-speed train line during the sample period. Regression specifications include the following fixed-effects: year-region, year-sector, firm. Standard errors are clustered at a firm-level and reported in the parentheses below the coefficients. *NonLocalPOOL+NonLocalPOOL_Good* is the non local director supply effect on good firms. *Probability* refers to the sum of the two coefficients being different from zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Exclude | AN | BO | BR | FI | MI |
| NonLocalPOOL | -0.045 | -0.033 | -0.047 | -0.042 | -0.030 |
| | (0.029) | (0.031) | (0.030) | (0.030) | (0.036) |
| NonLocalPOOL_Good | 0.113*** | 0.116*** | 0.112*** | 0.104*** | 0.089** |
| | (0.034) | (0.036) | (0.035) | (0.035) | (0.044) |
| Observations | 278,997 | 274,611 | 271,870 | 271,205 | 201,703 |
| Adj. R-squared | 0.806 | 0.806 | 0.805 | 0.808 | 0.815 |
| NonLocalPOOL+NonLocalPOOL_Good | 0.067 | 0.082 | 0.065 | 0.062 | 0.059 |
| Probability | 0.015 | 0.004 | 0.026 | 0.028 | 0.099 |
| | (6) | (7) | (8) | (9) | (10) |
| Exclude | NA | PA | RE | RM | RN |
| NonLocalPOOL | -0.041 | -0.041 | -0.033 | -0.067** | -0.049* |
| | (0.030) | (0.030) | (0.030) | (0.030) | (0.029) |
| NonLocalPOOL_Good | 0.114*** | 0.109*** | 0.108*** | 0.131*** | 0.108*** |
| | (0.035) | (0.035) | (0.035) | (0.037) | (0.035) |
| Observations | 281,224 | 273,575 | 269,716 | 266,915 | 279,950 |
| Adj. R-squared | 0.806 | 0.807 | 0.807 | 0.807 | 0.807 |
| NonLocalPOOL+NonLocalPOOL_Good | 0.072 | 0.068 | 0.075 | 0.064 | 0.060 |
| Probability | 0.010 | 0.017 | 0.009 | 0.027 | 0.034 |
| | (11) | (12) | (13) | (14) | (15) |
| Exclude | SA | TO | TR | VE | VR |
| NonLocalPOOL | -0.030 | -0.051* | -0.042 | -0.042 | -0.042 |
| | (0.029) | (0.031) | (0.029) | (0.030) | (0.029) |
| NonLocalPOOL_Good | 0.111*** | 0.101*** | 0.111*** | 0.110*** | 0.107*** |
| | (0.034) | (0.036) | (0.034) | (0.035) | (0.035) |
| Observations | 279,251 | 273,979 | 283,113 | 272,373 | 271,111 |
| Adj. R-squared | 0.807 | 0.808 | 0.807 | 0.806 | 0.806 |
| NonLocalPOOL+NonLocalPOOL_Good | 0.080 | 0.050 | 0.069 | 0.068 | 0.065 |
| Probability | 0.024 | 0.089 | 0.013 | 0.016 | 0.021 |

Table 8: Robustness test: ownership and industries

The dependent variable *PcBoard* measures an annual percentile ranking of the average directors' quality in their firms. *NonLocalPOOL* is a logarithmic value of a number of directors active in firms whose municipalities are within 10km from the station connected (via fast train line during the 2005-2017-year period) with the station closest to the affected firms. *Good* is an indicator variable taking a value of one if the firm's quality is above year-median. *NonLocalPOOL_Good* is an interaction between *NonLocalPOOL* and *Good*. *NonLocalPOOL+NonLocalPOOL_Good* is the non local director supply effect on good firms. *Probability* refers to the sum of the two coefficients being different from zero. In the subsamples, directors own more than 50% (Column 1), 50% or less shares (Column 2) of the firm; there is any change in ownership of the previous year (Column 3). The firms in industries with local services (accommodation, catering, health, artistic, entertainment and fun activities) are excluded in Column 4. All regressions include the following control variables, but the table does not report their coefficients: *LocalPOOL* - the logarithmic value of a number of directors active in firms of the local labor market (LLM); *Age* - the logarithmic value of a number of years since the firm was founded; *logGDPcap* - a logarithmic GDP per capita value in the firm's province; year-region, year-sector and firm fixed effects. Standard errors are clustered at a firm-level and reported in the parentheses below the coefficients. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | PcBoard | PcBoard | PcBoard | PcBoard |
| NonLocalPOOL | -0.053 | -0.043 | -0.033 | -0.053* |
| | (0.051) | (0.033) | (0.035) | (0.030) |
| NonLocalPOOL_Good | 0.161** | 0.123*** | 0.108** | 0.124*** |
| | (0.067) | (0.038) | (0.042) | (0.036) |
| Constant | 63.850 | -13.025 | 10.677 | 6.622 |
| | (40.538) | (30.170) | (32.140) | (26.515) |
| Observations | 61,084 | 223,705 | 157,420 | 275,292 |
| NonLocalPOOL+NonLocalPOOL_Good | 0.108 | 0.080 | 0.074 | 0.071 |
| Probability | 0.041 | 0.010 | 0.030 | 0.014 |
| Adj. R-squared | 0.895 | 0.800 | 0.845 | 0.806 |
| Director ownership | High | Low | | |
| Capital change | | | None | |
| Drop particular ind | | | | Yes |

Table 9: Heterogeneous board supply-appointment effect

The dependent variables are the number of directors on a board ($BoardSize$), an indicator variable taking a value of one if the director is leaving or starting a job at the particular firm in a given year - $Left$ and $New$, respectively. $NonLocalPOOL$ is a logarithmic value of number of directors active in firms, whose municipalities are within 10km from the station connected (via fast train line during 2005-2017-year period) with the station closest to the affected firms. $Good$ ($Bad$) is an indicator variable taking a value of one if the firm's quality is above (below) year-median. $GoodD$ ($BadD$) is an indicator variable taking a value of one if the director's quality is above (below) the firm's quality. _ indicates an interaction term. All regressions include the following control variables, but the table does not report their coefficients: $LocalPOOL$ - the logarithmic value of number of directors active in firms of the local labor market (LLM); $Age$ - the logarithmic value of number of years since the firm was founded; $Size$ - a logarithmic value of firm's assets in firm's first year in the sample; $logGDPcap$ - a logarithmic GDP per capita value in the firm's province. Regression specifications include year-sector (Columns 1-4), year-region (Columns 1-4), firm fixed-effects (Columns 1) and director fixed-effects (Columns 2-4). The panel is at firm-year level (Column 1) and at director-firm-year level. Standard errors are clustered at a firm-level (Column 1) or at a director-level (Columns 2-4) and reported in the parentheses below the coefficients. *NonLocalPOOL+NonLocalPOOL_Good* is the non local director supply effect on good firms. *Probability* refers to the sum of the two coefficients being different from zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| | (1) BoardSize | (2) Left | (3) Left | (4) New |
|---|---|---|---|---|
| NonLocalPOOL | -0.0076** | 0.0008*** | | |
| | (0.0030) | (0.0002) | | |
| NonLocalPOOL_Good | 0.0047 | -0.0011*** | | |
| | (0.0036) | (0.0002) | | |
| NonLocalPOOL_Good_GoodD | | | -0.0022*** | 0.0006** |
| | | | (0.0003) | (0.0002) |
| NonLocalPOOL_Good_BadD | | | 0.0006*** | -0.0014*** |
| | | | (0.0002) | (0.0002) |
| NonLocalPOOL_Bad_GoodD | | | 0.0009*** | -0.0004** |
| | | | (0.0002) | (0.0002) |
| NonLocalPOOL_Bad_BadD | | | 0.0007*** | -0.0007*** |
| | | | (0.0003) | (0.0002) |
| Observations | 289,271 | 1,026,311 | 1,024,399 | 1,024,399 |
| Adj. R-squared | 0.885 | 0.141 | 0.141 | 0.135 |
| NonLocalPOOL+NonLocalPOOL_Good | -0.0029 | -0.0003 | | |
| Probability | 0.0314 | 0.3190 | | |

Table 10: Directors along the train line

The following dependent variables measure the fractions of directors (%), who were born in the connected LLM (*DestBorn*), last year served on a board of a firm in the connected LLM (*DestExp*) or any other LLM (*NonDestExp*). *NonLocalPOOL* is a logarithmic value of a number of directors active in firms whose municipalities are within 10km from the station connected (via fast train line during the 2005-2017-year period) with the station closest to the affected firms. *Good* is an indicator variable taking a value of one if the firm's quality is above year-median. *NonLocalPOOL_Good* is an interaction between *NonLocalPOOL* and *Good*. All regressions include the following control variables, but the table does not report their coefficients: *LocalPOOL* - the logarithmic value of a number of directors active in firms of the local labor market (LLM); *Age* - the logarithmic number of years since the firm was founded; *logGDPcap* - a logarithmic GDP per capita value in the firm's province. Regression specifications include the following fixed-effects: year-region, year-sector, firm. Standard errors are clustered at a firm-level and reported in the parentheses below the coefficients. *NonLocalPOOL+NonLocalPOOL_Good* is the non local director supply effect on good firms. *Probability* refers to the sum of the two coefficients being different from zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | DestBorn | DestBorn | ExpDest | ExpDest | ExpNonDest | ExpNonDest |
| NonLocalPOOL | 0.158*** | 0.152*** | 0.542*** | 0.527*** | -0.044*** | -0.055*** |
| | (0.013) | (0.018) | (0.021) | (0.026) | (0.011) | (0.013) |
| NonLocalPOOL_Good | | 0.015 | | 0.032 | | 0.020 |
| | | (0.022) | | (0.033) | | (0.014) |
| Observations | 293,074 | 289,271 | 293,074 | 289,271 | 267,726 | 264,326 |
| Adj. R-squared | 0.519 | 0.517 | 0.517 | 0.516 | 0.118 | 0.117 |
| NonLocalPOOL+NonLocalPOOL_Good | | 0.168 | | 0.558 | | -0.036 |
| Probability | | 0.000 | | 0.000 | | 0.005 |

Table 11: Quality and diversity of the boards

*DirAge* is the average age of a director. *Female* - a fraction (%) of women directors.*SameName* measures a fraction of firm's directors that have the same last name as firm's largest shareholder. *NonLocalPOOL* is a logarithmic value of a number of directors active in firms whose municipalities are within 10km from the station connected (via fast train line during the 2005-2017-year period) with the station closest to the affected firms. *Good* is an indicator variable taking a value of one if the firm's quality is above year-median. *NonLocalPOOL_Good* is an interaction between *NonLocalPOOL* and *Good* respectively. All regressions include the following control variables, but the table does not report their coefficients: *LocalPOOL* - the logarithmic value of a number of directors active in firms of the local labor market (LLM); *Age* - the logarithmic number of years since the firm was founded; *logGDPcap* - a logarithmic GDP per capita value in the firm's province. Regression specifications also include year-sector, year-region and firm fixed-effects. Standard errors are clustered at a firm-level and reported in the parentheses below the coefficients. *NonLocalPOOL+NonLocalPOOL_Good* is the non local director supply effect on good firms. *Probability* refers to the sum of the two coefficients being different from zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| | (1) DirAge | (2) DirAge | (3) Female | (4) Female | (5) SameName | (6) SameName |
|---|---|---|---|---|---|---|
| NonLocalPOOL | -0.037*** | -0.023** | 0.028 | 0.026 | -0.086*** | -0.100*** |
| | (0.009) | (0.011) | (0.022) | (0.027) | (0.027) | (0.032) |
| NonLocalPOOL_Good | | -0.027** | | 0.007 | | 0.029 |
| | | (0.012) | | (0.032) | | (0.036) |
| Observations | 293,074 | 289,271 | 293,074 | 289,271 | 293,074 | 289,271 |
| Adj. R-squared | 0.742 | 0.742 | 0.777 | 0.777 | 0.742 | 0.742 |
| NonLocalPOOL+NonLocalPOOL_Good | | -0.050 | | 0.032 | | -0.071 |
| Probability | | 0.000 | | 0.236 | | 0.031 |

Table 12: Director supply and firm outcomes

*logRev* is logarithmic value of firm's annual revenues. $TFP$ - total factor productivity calculated using Levinsohn and Petrin (2003) semiparametric estimator that addresses the simultaneity bias. $Default$ is an indicator variable taking a value of one if the firm is not in the sample the following year and zero otherwise (for consistency we drop 2017-year observations). $NonLocalPOOL$ is a logarithmic value of a number of directors active in firms whose municipalities are within 10km from the station connected (via fast train line during the 2005-2017-year period) with the station closest to the affected firms. *Good* is an indicator variable taking a value of one if the firm's quality is above year-median. $NonLocalPOOL\_Good$ is an interaction between $NonLocalPOOL$ and *Good* respectively. *PcBoard* measures an annual percentile ranking of the average directors' quality in their firms. Regressions in Columns 4-6 use instrumental variables - $NonLocalPOOL$ and $NonLocalPOOL\_Good$. All regressions include the following control variables, but the table does not report their coefficients: $LocalPOOL$ - the logarithmic value of a number of directors active in firms of the local labor market (LLM); *Age* - the logarithmic number of years since the firm was founded; *logGDPcap* - a logarithmic GDP per capita value in the firm's province. Regression specifications also include year-sector, year-region and firm fixed-effects. Standard errors are clustered at a firm-level and reported in the parentheses below the coefficients. *NonLocalPOOL+NonLocalPOOL_Good* is the non local director supply effect on good firms. *Probability* refers to the sum of the two coefficients being different from zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | logRev | TFP | Default | logRev | TFP | Default |
| NonLocalPOOL | -0.004*** | -0.002*** | 0.001*** | | | |
| | (0.001) | (0.001) | (0.000) | | | |
| NonLocalPOOL_Good | 0.006*** | 0.003*** | -0.001*** | | | |
| | (0.001) | (0.001) | (0.000) | | | |
| PcBoard | | | | 0.052*** | 0.028*** | -0.009** |
| | | | | (0.017) | (0.006) | (0.004) |
| Observations | 289,479 | 289,479 | 269,146 | 289,271 | 289,271 | 268,968 |
| Adj. R-squared | 0.943 | 0.636 | 0.146 | -3.325 | -0.169 | -0.344 |
| NonLocalPOOL+NonLocalPOOL_Good | 0.002 | 0.001 | 0.000 | | | |
| Probability | 0.035 | 0.071 | 0.280 | | | |

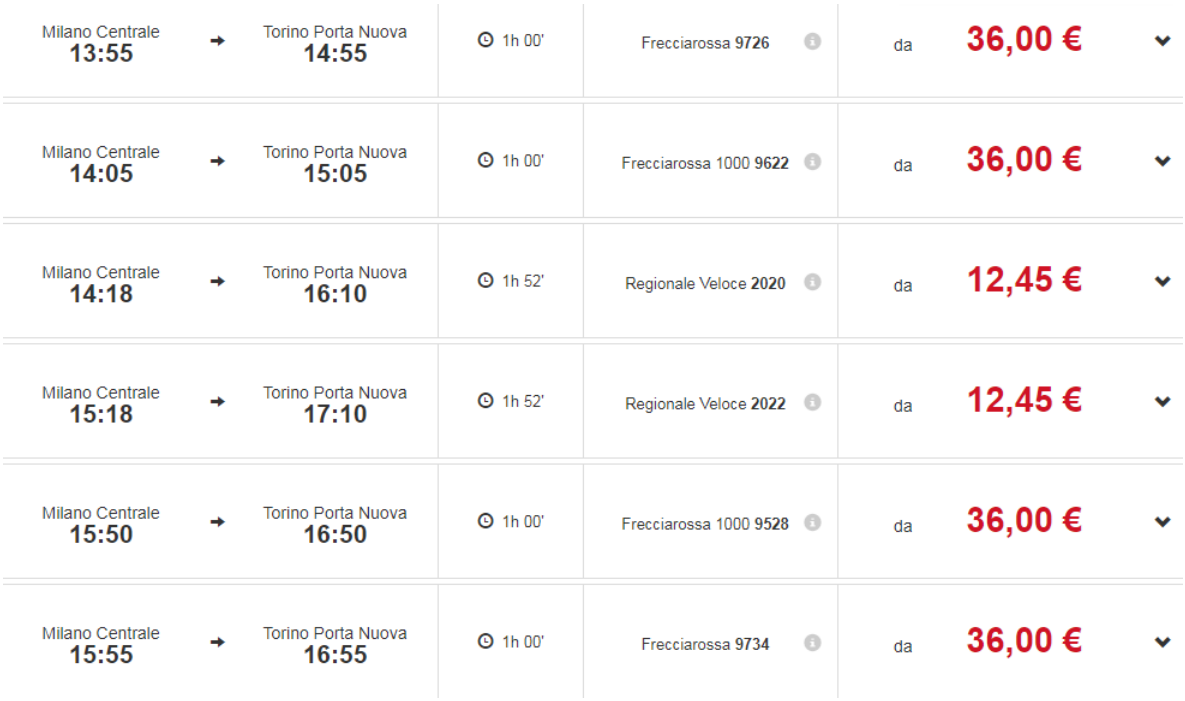
Table 13: Robustness test: Director supply and firm outcomes

$TFP$ - total factor productivity calculated using Levinsohn and Petrin (2003) semiparametric estimator that addresses the simultaneity bias. *logRev* is logarithmic value of firm's annual revenues. *PcBoard* measures an annual percentile ranking of the average directors' quality in their firms. As in the previous table, we instrument it with with $NonLocalPOOL$ (a logarithmic value of a number of directors active in firms whose municipalities are within 10km from the station connected with the station closest to the affected firms), *Good* is an indicator variable taking a value of one if the firm's quality is above year-median) and the interaction between the two variables. All regressions include the following control variables, but the table does not report their coefficients: $LocalPOOL$ - the logarithmic value of a number of directors active in firms of the local labor market (LLM); *Age* - the logarithmic number of years since the firm was founded; *logGDPcap* - a logarithmic GDP per capita value in the firm's province. Regression specifications also include year-sector, year-region and firm fixed-effects. Standard errors are clustered at a firm-level and reported in the parentheses below the coefficients. Regressions in Columns 1 and 2 use subsamples of firms with any and no change in their ownership structure over the previous year. Regressions in Columns 3 and 4 use subsamples of firms with higher than 50% and lower share ownership by their directors, respectively. The firms in industries with local services (accommodation, catering, health, artistic, entertainment and fun activities) are excluded in Columns 5-6. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| | (1) TFP | (2) TFP | (3) TFP | (4) TFP | (5) TFP | (6) logRev |
|---|---|---|---|---|---|---|
| PcBoard | 0.023*** | 0.028*** | 0.014* | 0.030*** | 0.029*** | 0.051*** |
| | (0.007) | (0.007) | (0.008) | (0.007) | (0.006) | (0.016) |
| Observations | 157,420 | 126,436 | 61,084 | 223,705 | 275,292 | 275,292 |
| Adj. R-squared | -0.011 | -0.100 | 0.0743 | -0.244 | -0.199 | -3.151 |
| Capital change | None | Exist | | | | |
| Director ownership | | | High | Low | | |
| Drop particular ind | | | | | Yes | Yes |

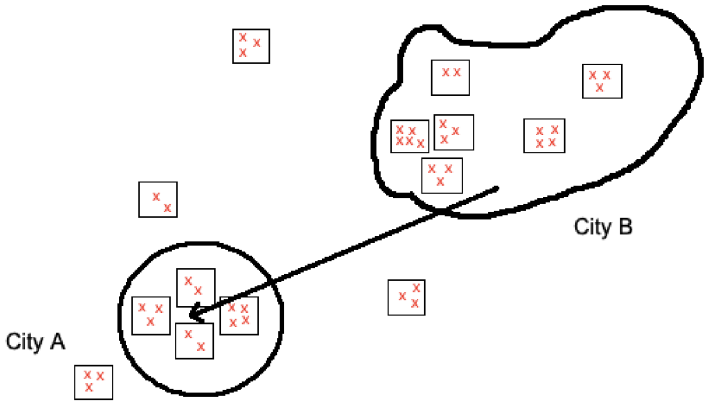
# Figures

Figure 1: The comparison of high and low speed train prices.




This figure displays the high and low speed train prices of a single ticket for a trip from Milan to Turin on March 11, 2019, when buying a ticket the day of the travel.

Figure 2: The non-local director pool measure.




Each square denotes a firm, each $x$ marks a director working in these firms. This figure displays the circled four firms in city $A$, which are located within 10km from the station. For each of these four firms, the opening of a high-speed train increases the non-local supply of directors by 20. These 20 directors, holding director positions in the six firms, located in LLM of the city $B$ high-speed train station.