BANCA D'ITALIA

EUROSISTEMA

Temi di discussione

(Working Papers)

Trainspotting: board appointments in private firms

by Audinga Baltrunaite and Egle Karmaziene

June 2020

Number 1278

BANCA D'ITALIA
EUROSISTEMA

Temi di discussione

(Working Papers)

Trainspotting: board appointments in private firms

by Audinga Baltrunaite and Egle Karmaziene

Number 1278 - June 2020

ISSN 1594-7939 (print)
ISSN 2281-3950 (online)

Printed by the Printing and Publishing Division of the Bank of Italy

TRAINSPOTTING: BOARD APPOINTMENTS IN PRIVATE FIRMS

by Audinga Baltrunaite* and Egle Karmaziene**

Abstract

We examine how the size of the corporate directors' labor market affects the quality of board appointments in Italian private firms. To establish the causality of the relationship, we exploit exogenous variations in firms' access to non-local potential directors following the gradual introduction of a high-speed train, which improved rail connections between cities. Using administrative data on board members belonging to the universe of limited liability companies and a two-way fixed-effects model, we obtain time-invariant measures of firm and director quality. We demonstrate that a positive shock to the non-local director supply increases positive assortative matching between firms and directors. High-quality firms improve the quality of their boards, while lower-quality firms attract lower quality directors. The effect arises from a more active re-matching along the high-speed train line. Our results further suggest that the private firms' boards with higher quality directors are associated with higher firm growth and productivity, and a lower probability of default.

JEL Classification: G32, G34.
Keywords: director supply, board of directors, match quality.
DOI: 10.32057/0.TD.2020.1278

Contents

* Bank of Italy, Directorate General for Economics, Statistics and Research.
** VU University Amsterdam; Swedish House of Finance; Tinbergen Institute.

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 in listed companies highlights the role of directors' independence (e.g., Knyazeva, Knyazeva and Masulis, 2013), experience or diversity (e.g., Bernile, Bhagwat and Yonker, 2018; Chen, Chen, Kang and Peng, 2020). Naturally, board appointments are determined by a firm's demand for directors and varies with such factors as firm's size, age (Boone, Field, Karpoff and Raheja, 2007) or firm's advising and monitoring needs (Becher, Walkling and Wilson, 2019). However, board appointments may also reflect supply-side factors. As argued in Knyazeva et al. (2013, p.1562), "*ability of most firms to recruit qualified independent directors is significantly affected by the local supply of prospective directors*".

When selecting a director not only the actual pool (Knyazeva et al., 2013) but also the bounded pool of connected directors, which the firm envisions to be its potential pool of candidates (Cai, Nguyen, Walkling, 2017; Ferreira, Ginglinger, Laguna and Skalli, 2020), affects the board appointments. Larger supply of candidates improves the match between a firm and its workers (Wheeler, 2001; Dauth, Findeisen, Moretti and Suedekum 2019) or CEOs (Francis, Hasan, John and Waisman, 2016). A thinner market of possible candidates for a top executive position reduces chances of successfully replacing lost managers, with negative effects of firm performance (Sauvagnat and Schivardi, 2020). However, to the best of our knowledge, there is no empirical evidence showing the relationship between director supply and the quality of board appointments in private firms.

This paper extends the existing literature beyond the study of large public companies and sheds light on board appointments in private firms. In particular, we exploit an exogenous shock in director supply to study the effects of this supply on the quality of a match between a director and a firm. To overcome the endogenous board selection – e.g., worse firms may fail to recognize the importance of seeking expert directors – we exploit a gradual introduction

*We thank Silvia Giacomelli, Swarnodeep Homroy, Sauro Mocetti, Naciye Sekerci, participants of the seminars at the Bank of Italy workshop on "Labour mobility and migration: determinants and consequences" in Rome, the 2nd Baltic Economic Conference in Riga, 4th Marco Fanno Alumni Workshop in Naples, 25th International Panel Data Conference in Vilnius, Corporate Finance Webinar, the University of Edinburgh, the University of Groningen, the University of Namur, Workshop for Women in Political Economy 2019 in Mannheim. We are responsible for all remaining errors. The views and opinions expressed in this paper pertain to the author only and do not represent in any way those of the Bank of Italy.

of the high-speed train service in Italy. Namely, the underlying idea is that the reduction in travel time and the increase in travel comfort expand the supply of potential directors willing to accept a board appointment, *ceteris paribus* firm location, remuneration and workload package offered to them, improving the quality of firm-director matching in equilibrium.[1]

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 the identities and demographic characteristics of board members 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 the quality of board appointments based on how well board quality fits firm quality. Under the assumption that director and firm quality are complements in the production process, the optimal allocation in this framework implies the positive assortative matching, under which best (worst) directors lead best (worst) firms (similarly to Dauth, Findeisen, Moretti and Suedekum, 2019). We use a two-way fixed effects model to separately estimate firm and director fixed effects (Bertrand and Schoar, 2003; Baltrunaite et al., 2019a) in total factor productivity regressions for the largest connected set of firms.[3] Director fixed effects may be interpreted as an individual contribution in boosting the firm's productivity and comprises, among others, unobservable time-invariant and portable personal characteristics, such as ability, charisma, or skills. We then refer to director "talent" and firm quality as their relative position in the corresponding fixed effects

[1]We argue that the duration of the journey is an essential factor for board members when they decide whether to accept a position. The boards meet relatively frequently, and these meetings usually last for at least three to four hours (Hadzima, 2005). Italian law requires private firms' boards to gather at least once a year. Soon after the end of the financial year, these boards are required to approve the financial statements and allocate profit and losses. Yet, meeting so infrequently leads to disengaged and uninformed boards, undirected management (Carter, 2019). Therefore, most of the boards meet more frequently. Early-stage companies may have monthly Board Meetings; more established companies usually gather six to four times per year. The time of these meetings is often related to the financial reporting periods or major industry events (Hadzima, 2005). Moreover, we assume that firms prefer in-person rather than online board meetings. As the evidence from shareholder meetings moved online due to covid-19 suggests, "in a room full of people you can take the pulse of the crowd" and "allow for a proper grilling of bosses" (Economist, 2020).

[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]The largest connected set of firms is a set of firms linked to each other via director mobility.

distribution in each year. We study how the firm's access to potential non-local directors in the destinations connected to the firm's headquarters by a fast train affects the director's quality, depending on the firm quality. Improved quality of firm-director matching would be consistent with good firms attracting more talented leaders at the expense of low-quality firms.

We demonstrate that a shock in the supply of potential non-local directors improves firm governance using a measure of firm's board quality – the percentile rank of the average director fixed effect ($PcBoard$). For example, Milan and Bologna get connected via a high-speed train line in 2008, and approximately 157,000 directors serve on boards in Milan and 31,000 – in Bologna. These numbers are arguably a good proxy for the overall number of individuals whom companies can appoint to their boards. We find that in relatively productive firms located reasonably close to the high-speed train station in a city like Bologna, the board percentile rank increases by 1.3 percentage points. In other words, 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. Our result is robust to stringent regression specifications, including firm fixed effects, and region-specific and sector-specific non-parametric time trends. The results are not sensitive to alternative definitions of the shock in the director pool.

The director supply shock variable is not mechanically correlated with the presence of a high-speed train to the headquarters from other cities in Italy. It also 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. Thus, 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 train between firm headquarters and other cities in Italy, as well as the size of the director pool at these locations. High-speed train line connecting cities of similar sizes in different years and cities of various sizes in the same year reinforces the validity of this assumption.[4] We address remaining threats to identification by holding constant several potentially confounding factors in our regression specifications.

Consistent with the improved mobility across locations, we show that firms with access

[4]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.

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. These findings are in line with the firms responding to an increase in director supply by hiring directors located close to the fast-train-destination stations. A larger pool of potential directors facilitates search in corporate directors' labor market and induces firms to appoint better-suited directors, who can reach the firm relatively quickly. Interestingly, there is no evidence of the effect heterogeneity for firms located in areas with a metro line. This may be explained by the presence of the metro line in systematically larger cities, equalizing commute times in larger cities with a metro with those in smaller cities without one.

Board diversity along dimensions such as gender, age, or race is often spelled out as a synonym for board quality. We study whether firm access to the pool of non-local potential directors changes observable directors' characteristics, such as their demographic composition, family or geographical ties. In fact, a positive shock in the supply of non-local directors encourages the change in generations on corporate boards by lowering the average age of a director, while there is no effect on the fraction of females on boards. Although young people and women are disproportionally few among directors in Italian firms (Baltrunaite et al., 2019b), these 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, Jofre-Monseny and Torrecillas, 2020).

A positive shock to directors' supply may also affect director appointments based on family links, which likely signal a sub-optimal choice from a restricted pool of talent.[5] We use a proxy for relative-favoritism defined as a fraction of the same surname directors as the owning family surname.[6] We find that an increased supply of directors lowers the share of the family members on boards. Reassuringly, this confirms the intuition that the presence of relatives in the board room is indicative of a limited firms' propensity to draw from a

[5]Appointing relatives or friends to the boards may be efficient. 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 personal engagement into a family business. In other words, if feasible candidates' supply is limited, family members' appointments may be optimal in equilibrium, and not due to social preferences (e.g., nepotistic considerations or inheritance norms). 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 result in a reduction in family appointments.

[6]In this respect, this 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.

broader pool of talent (Burkart et al., 2007; Perez-Gonzalez, 2006; Bennedsen et al., 2007).

To shed light on the effects of better-suited board appointments on firm outcomes, we show that a shock in potential directors' supply benefits higher quality firms. More specifically, more talented directors on their boards are associated with higher revenues and total factor productivity, and a lower probability of default. This finding suggests that better board appointments render firm input utilization more effective and is consistent with the idea that the scarce supply of suitable directors hinders firm growth and performance. The increase in performance of high-quality firms 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 literature on the labor market for corporate directors (e.g., Becher et al., 2019; Cai et al., 2017; Ferreira et al., 2020), which almost entirely focuses on publicly listed firms. Our study is the first to examine board appointments in private firms. Unlike in public firms (Denis and Sarin, 1999), board turnover is much lower in Italian limited liability companies. Nevertheless, their board selection is significantly affected by access to non-local directors' pool, confirming Knyazeva et al. (2013) findings on listed companies.

Second, this paper contributes to studies on the relationship between board composition and firm outcomes (e.g., Adams et al., 2018; Eisenberg et al., 1998; Field and Mkrtchyan, 2017; Yermack, 2004). We extend the analysis beyond evidence on publicly-traded companies and offer a new comprehensive measure of board appointment quality. In particular, we show that a higher potential supply of corporate directors improves the director-firm matches, which lead to positive effects on firm performance. Besides, 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 or geographical ties speaks to the literature on board independence.[7]

Third, this paper is related to a rich literature on agglomeration economies. In particular, 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 this is also relevant for board appointments in private firms. Furthermore, better director-firm matches may be one of the channels behind the observed higher manager compensation in large cities (Francis et al., 2016).

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

The remainder of the paper is organized as follows. Section 2 describes the institutional setting by shedding light on the high-speed train service. Section 3 introduces the data sources used in the analysis and provides variable definitions. Section 4 describes the empirical strategy. Section 5 displays the main findings of the paper, their robustness and discusses the mechanisms. The last section concludes.

2 High-speed train in Italy

High-speed rail in Italy consists of two major lines connecting most of the country's major 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). Trains are operated with a maximum speed of 300 kilometers per hour. 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. On top of a significant reduction in traveling time, the high-speed service offers an improvement in the quality of train travel. 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, additional comfort, and quiet environments). Accordingly, the high-speed train service is significantly more expensive than regional train travel. Table 1 lists the pairs of cities connected by a high-speed train line and year of their connection. To minimize assumptions regarding passenger mobility patterns (e.g., limits to the number of stops or travel time they are willing to travel), we only consider direct (i.e., the shortest) city-to-city connections via high-speed train throughout the paper.

The premium travel service via high-speed train may favor long-distance commuting. This effect is likely to be more pronounced for high-skill workers, who both are more likely to afford it due to their higher wages and to work in occupations with more flexible work hours and location. To investigate this possibility, we rely on the Italian Labour Force Survey, which covers a repeated cross-section of a representative sample of Italian households. We use the data for the period 2005-2017 on workers' demographic characteristics, occupation status, segment, residence, and work locations.

We provide evidence on the effect of the train introduction on the long-distance commuting of Italian workers, distinguishing by occupational segment (Table 2). The variable *High speed train* indicates firms located in a province in the years following the opening of high-speed line to the capital city of the province. *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. We study how the high-speed train introduction affects long-distance commuting. We define the dependent variable *Commute long distance* as an indicator for individuals who work outside the region of their residence and use it in the regression specifications in Table 2, Columns 1 and 2, which both control for non-parametric province-level time shocks. On top, Column 2 includes individual controls such as gender, age, education, and broad occupational segment. The point estimate on the *High speed train* indicator suggests that, on average, high-speed train service does not affect long-distance commuting patterns. There is no differential effect for high-skill professional workers either, as the interaction term *High speed train* $\times$ *Professional* is not significant as well. Next, we focus on long-distance commuting to the train destination province and use an indicator for individuals who work in the train destination province (outside the region of their residence)as the dependent variable. This analysis sheds light on these long-distance commuting patterns that occur via the train-line. Interestingly, high-speed train connections among cities result in more intense worker's commuting across these train lines, and 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 increased long-distance commuting among the high-skill occupations, supporting the use of the train-induced identifying variation in our analysis.

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, managers, 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.[8,9]

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 estimate a high-dimensional two-way fixed effects model as in Baltrunaite et al. (2019a). To estimate how much of the unexplained variation in firms' total factor productivity can be attributed to an 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. The estimated director fixed effects, conditional 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 some among J directors, whose identities are known to us. We therefore 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

[8] 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.

[9] 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 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.

t;[10] 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); ε is the $T \times 1$ vector containing the error terms.

The OLS estimation of equation (1) provides a meaningful estimate of the coefficients ψ 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. (2019a).

The average of the estimated directors' fixed effects at the firm level is used as the measure of 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 percentile rank of the average director fixed effect, and $PcFirm$, defined as the percentile rank of the firm fixed effect.

We measure the non-local pool of directors, $NonLocalPOOL$, to which a firm is exposed based on its location and on the number of directors working in a location (or locations) accessible to this firm via the high-speed train. The most common occupation of a director is an executive in an another firm (Guner, Malmendier, and Tate, 2008; Linck, Netter, and Yang 2008). A firm's geographical location in our data is at the municipality level, which is the most granular administrative unit in Italy (e.g., one local labor market typically comprises several municipalities). We define $NonLocalPOOL$ as the logarithm (to avoid the right skewness of the densities) of the sum of the number of directors in location(s) $b \in B$ accessible for firms located in a location A, after a city A and a given city b become connected via the high-speed train. More precisely, we use a pool of individuals that currently work as firm directors at the local labor market (LLM) in city b as a proxy for the overall pool of potential directors in a city b. Moreover, we assume that 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.[11] Figure 2 illustrates the relationship between a

[10]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.

[11]The definition of the "catchment area" in the two locations is asymmetric in the baseline specification.

firm and its non-local director supply in the simplest case with B consisting of one element only.

Formally, the variable $NonLocalPOOL$ is defined as an interaction between the indicator variable for firms located within a 10 kilometer distance from a station with a high-speed train connection and the non-local director pool at the destination location(s) (in logarithms).[12] The variable can be summarized by the following formula, 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 located in municipality l located fewer than 10km from the the closest train station served by HST.

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

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 city (or cities).

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 last year served on a board of a firm in the connected LLM (*DestExp*), at any other LLM ($NonDestExp$).

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

This is motivated 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 also relax this assumption and check if the results are robust to using a symmetric definition of $NonLocalPOOL$ variable in Section 5.1.

[12]In case the same city gets connected to different destinations in different years, we consider separate years for each location.

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

Fifth, 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 ($Default$).

We also define several control variables that we use in the regression analysis. $LocalPOOL$ is the logarithm of the number of directors in firms in the same local labor market. Age is the logarithmic value of the number of years since the firm was founded. $Size$ is a logarithmic asset value in the firm's first year in the sample. $logGDPcap$ is a logarithmic GDP per capita value in the firm's province.

3.2 Descriptive statistics

Table 3 shows the main descriptive statistics for our sample of firms, covering over 295 thousand firm-year observations. We follow more than 31 thousand firms and 162 thousand unique individuals who have held positions on their boards.

During the 2005-2017-year period, our director supply shock measure uses 14 direct connections between 15 stations, as shown in Table 1. The average train trip is 127-km long and takes 0.9 of an hour. 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. 18% of our firm-year observations and 27% of sample firms have access to a non-local pool of directors via a high-speed train.[13]

Every year we divide the board quality measure $PcBoard$ and firm quality measure $PcFirm$ in the percentile rank (from 1 to 100). The sample averages of the two variables are both around 50. A median firm is 24-year-old, using its 2.2 million EUR assets produces

[13]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.

12.4 million EUR annual revenues. On average, a board has four directors, 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.

To evaluate the quality of firms and their boards, we build on director and firm fixed effects, calculated within the largest set of companies connected via director mobility (for more details see Baltrunaite et al., 2019a). The size of this sample corresponds to 30% of the universe of Italian companies. Next, we assess the differences between firms in and out of our sample in Table 4. The comparison illustrates that our sample firms are significantly different from the remaining population of Italian firms in several dimensions. More specifically, they are:

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

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 important characteristics of the firm, either observable or unobservable. A strong concern in estimating this relationship by OLS is, hence, that it may yield biased estimates, with little information on the causal question of interest.

We propose a novel identification strategy based on a director supply-based shock, which we argue captures plausibly exogenous variation in board appointment criteria. In particular, we use the introduction of the high-speed train line to construct a measure of the non-local directors' supply shock for firms located in cities connected by a high-speed train line (defined in Section 3.1). The logic of our approach rests on the idea that a director's travel costs determine the likelihood of a firm-director match, similar to the idea in Bernile et al. (2018) 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. With more candidates to choose from, firms would face a broader set of choices, enabling them to find more suitable directors.

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 defined as in Section 3 for each firm i, in location l and year t. X_{it} is a vector of firm-level controls: firm age in logarithmic value of years, firm size in terms of logarithmic value of assets (measured in the first year a firm appears in *Cerved* database). μ_{tr} is a vector of year-times-region fixed effects, while ν_{ts} is the vector of sector-times-year fixed effects.

Due to the inclusion of region fixed effects and province-level controls, 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. Moreover, one may argue that improvement in a connection to a firm may affect its operations – for example, easier access to a city may increase a tourist flow, leading to more business activity – and then lead to a trickle-down effect on director appointments. If this happens *at* the province level (including any effect on province population), we tackle this concern in the main regression specification by controlling for the economic output per capita in each province. Yet, if this happens *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.[14] Most important, firm fixed effects σ_i account for

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

time-constant firm unobservables, while μ_{tr} and ν_{ts} absorb non-parametric region-specific and sector-specific time trends.

The identifying assumption of this analyzes is that there are no omitted variables that co-vary with board appointments, the timing of fast 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 argue that the timing of the opening of the high-speed train line is not correlated with the country-level economic cycle by construction, since different provinces received the high-speed train line in different years. Furthermore, to test whether the local economic cycle does not drive firm-level outcomes, we include region-year fixed effects, which make sure that any region-specific time shocks are not driving board appointments. Second, high-speed train connection did not alter the market conditions, in which firms operate substantially, as it improved the comfort of passenger travel (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, who represent 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. Third, we explicitly account for the latter factor by including province-level GDP per capita as a control variable in our regression specifications.

To investigate the relationship between directors' supply on 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 its effect on $PcBoard$.

5 Results

5.1 Director supply and quality of the boards

Table 5 reports the relationship between the supply of directors and the quality of the board. 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 a parsimonious (with year, sector, and region fixed effects) and stringent (with firm, year-sector and year-region

al. (2018).

fixed effects) regression specifications (Table 5, Columns 1 and 2). In the latter specification, we limit concerns that there is a systematic unobservables-based selection of firms which are founded in the city center – hence, close to the station – and have systematically different patterns in their boards selection by including firm-fixed effects in the regression. Such specification only exploits the time variation within the firm over time.

Board appointments are an equilibrium outcome of a matching process between firms and potential directors and, therefore, 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. We evaluate this conjecture by interacting $NonLocalPOOL$ variable with measures of firm quality.

The results suggest that the director supply-quality relationship is indeed heterogeneous across firms. To be precise, only better firms are able to benefit from the increased supply of directors, at the expense of the worse quality firms. To be precise, firms with below-median annual fixed effects face a significant impairment in their director-firm match. The coefficient on $NonLocalPOOL$ is negative and significant. 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 the quality of a firm using a percentile of its fixed-effect or an indicator for firms with quality higher than the annual median.

The results are not only statistically but also economically significant. For example, over 158 thousand directors serve on boards of firms that are registered with the municipality within 10 kilometers from Milan train station. Opening a high-speed train line to Milan increases the percentile of the firm-board quality by 1.3 percentage points for better firms, controlling for the firm, year-region, and year-sector fixed effects. This effect is large; opening a train line to Milan explains 23% of the sample median standard deviation of board quality percentile within the firm.

We evaluate if the director supply-quality effect is robust to alternative variable definitions and regression specifications. We define board quality as the average of annual director fixed effect percentiles instead of the percentile of the average director fixed effect. The director supply effect is negative for the worse firms, and positive, of the larger absolute value for the better firms (Table 5, Column 5).

Moreover, small firms may have far less sophisticated director selection practices compared to larger ones and, therefore, may benefit relatively little from the expansion of the non-local directors' supply. In other words, the relevant sample of firms actually affected by our shock may consist of the larger ones. To test if it is the case, we exclude the firms with fewer than 20 employees. In fact, not only our results are confirmed qualitatively (Table 5, Column 6), but are even larger in the absolute value.

We define our firm and director quality measures over the whole sample period. Despite sample selection, the results are consistent even if we keep only the firms and directors that were active in pre-high speed train connection period, 2005-2006 (Table 5, Column 7).

We next study the sensitivity of our results to alternative definitions of the director supply shock measures, by varying the distance which determines the reach of the high-speed-train induced director supply shock. Different from the baseline definition, which considers firms within the 10-km distance from the station as "treated", we use an alternative set of variables that vary this distance. 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). Second, we define 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.

Cities with a better within-area connection may benefit more from a train-induced director supply shock. For example, the arriving directors may reach their final destination quicker in the cities that have a metro line. If it is the case, then the director-supply effect is stronger for firms located in the better-connected areas. We test this conjecture by adding an interaction of $NonLocalPOOL\_Good$ with a $Metro$ dummy variable indicating if a firm is located within the area that has a metro line. 4 out of 10 fast-train-connected cities – Milan, Rome, Turin and Naples – had a metro line during all our sample period. Even though these are the larger cities with a higher number of located firms, we still have a sufficient amount of variation rising from firms affected by a director supply shock and located in the cities without a metro line. 73 % of our non-zero values of $NonLocalPOOL$ variable are related to such cities. We demonstrate that after including the interaction term, the supply effect on a board's quality for good firms remains significant. Yet, the effect on the interaction variable is not significant (Table 6, Column 4), which does not provide the empirical support for the presence of higher returns to the director supply in metro-served cities. Nevertheless, this finding may be explained by the presence of the metro line in systematically larger cities, equalizing commute times in larger cities with a metro with those in smaller cities without one. Moreover, it is in line with the potential director supply improving with the connection across cities, not within cities.

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 5), distinguishing by the firm quality. Even though we now work with an over 26-times smaller sample, the coefficients remain of the same sign and statistical significance. This finding also illustrates that the effects of board quality are robust to considering the aggregate measure of economic activity, rather than that of a single firm.

Finally, 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 in Table 7. The results are confirmed.

5.2 Director appointments and the supply shock

5.2.1 New and leaving directors

The results in the previous section indicate that an increase in director supply negatively affects the board quality of the worse firms. We provide a couple of explanations for such an outcome. First, the worse firms lose directors. Second, as improved train connection eases directors' commuting, worse firms experience difficulties attracting better directors.

Regarding the first explanation, two relationships hold. First, the worse firms lose directors and, on average, the size of their boards decreases. 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 8, Column 1). The coefficient on *NonLocalPOOL* is negative and significant. 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 8, Column 2).

Second, 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 replace *NonLocalPOOL* in our main regression specification with a combination of these four variables and study how probability that there is an exiting director changes in reaction to the supply shock, depending on the firm-director combination type. We, therefore, use the dependent variable defined as an indicator for a director leaving the firm in the current year.

The regression results suggest that as director supply increases, directors are more likely to leave worse firms. The coefficients *NonLocalPOOL BadFGoodD* and *NonLocalPOOL BadBadD* are both positive and significant, but the difference between the two is not statistically significant. Moreover, 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 8, Column 3).

In the second explanation, we suggest that after opening a high-speed train line, directors are less likely to take a new position in a bad-quality firm. 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 *Non-*

LocalPOOL_BadFGoodD and *NonLocalPOOL_BadFBadD* are negative (Table 8, Column 4). The good firms instead manage to differente across the director types. With the increase in director supply, the good firms are more likely to hire better directors and less likely to hire worse directors. The coefficients on *NonLocalPOOL_GoodFGoodD* and *NonLocalPOOL_GoodFBadD* are positive and negative, respectively (Table 8, Column 4).

5.2.2 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 past experience in other non-train-destination locations (Table 9, Columns 1, 3, and 5).

For example, opening a fast 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 (or 53 % and 169 % of the standard deviation of the measures in firms in not connected areas). It also decreases the fraction of directors that last year had experience in other LLM (not Milan, not Bologna) by 0.5 percentage points or 6.3 % of standard deviation.

These results are in line 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 augments board appointments along the high-speed train uniformly for all firms (Columns 2, 4, and 6). These changes then induce firms to appoint better-suited directors (as shown in the previous subsection), who can reach the firm relatively quickly.

5.2.3 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 10, Column 1) on average. The coefficient is negative and significant on average, and more than twice stronger for the good firms (Table 10, Column 2). Gaining high-speed train access to Milan decreases the average age of a board director 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 10, Column 3-4). Although women are disproportionally few among directors in Italian firms (Baltrunaite et al., 2019b), 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, Jofre-Monseny and Torrecillas, 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). We examine whether such "nepotistic" board appointment practices decrease with the director-choice. We define measures of "constrained" director choices based on the presence of directors with family links on firm boards. We use a proxy for relative favoritism defined as 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 10, 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 10, Column 6) - both reduce the share of family members on their boards, yet their directors' quality changes differently depending on the firm type.

5.3 Director supply and firm outcomes

To shed light on the effects of better-suited board appointments on firm outcomes, we study if a better board quality is associated with higher measures of firm performance. In particular, we focus on firm growth, which we proxy by firm revenues, productive efficiency, which we proxy by its total factor productivity, and its default. The results show that for better firms at the expense of worse firms, a positive shock to the director supply increases firm's revenues (Table 11, Column 1), TFP (Table 11, Column 2), and decreases the probability of default (Table 11, Column 3).

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 11, Columns 4-6 we instrument for the board quality with a supply shock interacted with firm quality measure.[15] The scaled results confirm that board quality raises firm's revenues and total factor productivity, and lowers the probability of default. This finding is in line with more capable directors bringing a positive contribution to firms' outcomes, for instance, due to their ability to better lead the firm.

6 Concluding remarks

This paper exploits a novel rich dataset on a large set of Italian private firms to study how the size of corporate directors' labor market affects the quality of 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 increased comfort via the high-speed train line. There is evidence that firms improve their director matches by increasing the closeness of the director-firm quality fit, once the market for corporate director appointments expands. In other words, our study shows that more productive companies are more able to attract talented directors, at the expense of less efficient firms, thus increasing the overall efficiency of the system. Last, consistent with the board quality improving firm performance, we find that the shock in director supply improves firms' growth and performance.

We argue that our evidence on Italy on the effects of the potential directors' supply on board appointment quality are 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

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

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 also in other countries. All in all, the Italian context appears rather comparable with that of numerous other large economies world-wide. Lastly, 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 may expect our findings may apply rather well in places with relatively extensive urban development, and less so where the economic activity is more sparse.

Our results also 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 act upon improving mobility or, e.g., increasing flexibility in board attendance or invest in human capital to raise the quality of the local pool of talent. Our results may indicate that these would not only benefit private firms, but also the overall efficiency of the productive system.

References

Adams, R. B., Akyol, A. C., & Verwijmeren, P. (2018). Director skill sets. *Journal of Financial Economics*, 130, 641-662.

Adams, R. B. & Ferreira, D. (2007). A theory of friendly boards. *Journal of Finance*, 62(1), 217-250.

Ackerberg, D. A., Caves, K. & Frazer, G. (2015). Identifi
cation properties of recent production function estimators. *Econometrica*, 83(6), 2411-2451.

Armstrong, C. S., Core, J. E., & Guay, W. R. (2014). Do independent directors cause improvements in firm transparency? *Journal of Financial Economics*, 113(3), 383-403.

Baltrunaite, A., Bovini, G. & Mocetti, S. (2019). Opening the Black-box of Managerial Talent, Bank of Italy Working Papers, forthcoming.

Baltrunaite, A., Brodi, E. & Mocetti, S. (2019). Assetti proprietari e di governance delle imprese italiane: nuove evidenze e effetti sulla performance delle imprese. Bank of Italy Occasional Papers, No.514.

Bandeira, O., Guiso, L., Prat, A. & Sadun, R. (2015). Matching Firms, Managers, and Incentives, *Journal of Labor Economics*, 33(3), 623-681.

Becher, D.A., Walkling, R.A., Wilson, J.I. (2019). Understanding the motives for director selection. ECGI - Finance Working Paper No. 498/2017.

Bennedsen, M., Nielsen, K. M., Pérez-González, F., & Wolfenzon, D. (2007). Inside the family firm: The role of families in succession decisions and performance. *The Quarterly Journal of Economics*, 122(2):647-691.

Beria, P., Grimaldi, R., Albalate, D., & Bel, G. (2018). Delusions of success: Costs and demand of high-speed rail in Italy and Spain. *Transport Policy*, 68, 63-79.

Bernile, G., Bhagwat, V., & Yonker, S. (2018). Board diversity, firm risk, and corporate policies. *Journal of Financial Economics*, 127(3): 588-612.

Bertrand, M. & Schoar, A. (2003), Managing with style: the effect of managers on firm policies, *Quarterly Journal of Economics*, 118:1169-1208.

Bertrand, M., & Schoar, A. (2006). The role of family in family firms. *Journal of Economic Perspectives*, 20(2): 73-96.

Boone, A. L., Field, L. C., Karpoff, J. M. & Rahejad, C. G. (2007). The determinants of corporate board size and composition: An empirical analysis. *Journal of Financial Economics*, 85 (2007) 66–101.

Burkart, M., Panunzi, F. & Shleifer, A. (2007). Family firms. *Journal of Finance*, 58:2167-2202.

Cai, J., Nguyen, T., & Walkling, R. A. (2017). Director appointments - It is who you know. Working paper. 28th Annual Conference on Financial Economics and Accounting.

Carter, E. (2019). How Often Should Your Board Meet? Retrieved from https://charitylawyerblog.com/2019/10/14/how-often-should-your-board-meet/.

Chen, S. S., Chen, Y. S., Kang, J. K., & Peng, S. C. (2020). Board Structure, Director Expertise, and Advisory Role of Outside Directors. *Journal of Financial Economics*, forthcoming.

Dahya, J., Dimitrov, O., & McConnell, J. J. (2008). Dominant shareholders, corporate boards, and corporate value: A cross-country analysis. *Journal of Financial Economics*, 87(1), 73-100.

Dauth, W., Findeisen, S., Moretti, E. & Suedekum, J. (2019). Matching in cities. IZA Working paper No. 12278.

Denis, D. J., & Sarin, A. (1999). Ownership and board structures in publicly traded corporations. *Journal of Financial Economics*, 52(2), 187-223.

Desmaris, C. (2016). High speed rail competition in Italy: A major railway reform with a "win-win game"?. *International Transport Forum Discussion Paper.*

Duchin, R., Matsusaka, J. G., & Ozbas, O. (2010). When are outside directors effective? *Journal of Financial Economics*, 96(2), 195-214.

Eisenberg, T., Sundgren, S., and Wells, M.Y. (1998). Larger board size and decreasing firm value in small firms, *Journal of Financial Economics*, 48: 35-54.

Flabbi, L., Macis, M., Moro, A., & Schivardi, F. (2019) Do female executives make a difference? The impact of female leadership on gender gaps and firm performance, *The Economic Journal*, 129 (August), 2390-2423.

Ferreira, D., Ginglinger, E., Laguna, M. A., & Skalli, Y. (2020). Board quotas and director-firm matching. ECGI - Finance Working Paper No. 520/2017.

Field, L. C., & Mkrtchyan, A. (2017). The effect of director experience on acquisition performance. *Journal of Financial Economics*, 123(3), 488-511.

Francis B. B., Hasan, I., John, K. & Waisman, M. (2016). Urban agglomeration and CEO compensation. *Journal of Financial and Quantitative Analysis*, 51(6), 1925–1953.

Guner, B., U. Malmendier, and G. Tate (2008). Financial expertise of directors. *Journal of Financial Economics*, 88, 323–354.

Hadzima, J. (2005). Don't Bore the Board of Directors (How To Use A Board Effectively). Retrieved from http://web.mit.edu/e-club/hadzima/dont-bore-the-board.html.

Knyazeva, A. , Knyazeva, D., & Masulis, R. (2013). The supply of corporate directors and board independence. *Review Financial Studies*, 26: 1561-1605.

Kramarz, F., Thesmar, D. (2013). Social networks in the boardroom. *Journal of the European Economic Association*, 11, 780-807.

Linck, J., J. Netter, and T. Yang (2008). The effects and unintended consequences of the Sarbanes-Oxley Act on the supply and demand for directors. *Review of Financial Studies*, 22, 3287–3328.

Low resolution: Online annual meetings may favour managers over shareholders. (2020, April 30). *The Economist*. Retrieved from https://www.economist.com/business/2020/04/30/online-annual-meetings-may-favour-managers-over-shareholders.

Levinsohn, J., & Petrin, A. (2003). Estimating production functions using inputs to control for unobservables. *Review of Economic Studies*, 70(2): 317-341

Perez-Gonzalez F. (2006). Inherited control and firm performance. *American Economic Review*, 96, 1559-1588.

Rossitti (2019). centers of power US capitals' location and ability sorting of legislators. Working paper.

Sauvagnat, J., & Schivardi, F. (2020). Are Executives in Short Supply? Evidence from Deaths' Events. Working paper.

Wheeler, C. H. (2001). Search, sorting, and urban agglomeration. *Journal of Labor Economics*, 19(4), 879-899.

Yermack, D. (1996). Higher market valuation of companies with a small board of directors. *Journal of Financial Economics*, 40, 185-211.

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 (in hours) 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. ***, **, 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). 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) PcBoard	(2) PcBoard	(3) PcBoard	(4) PcBoard	(5) PcDirector	(6) PcBoard	(7) 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

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*. *NonLocalPOOL_Metro* is *NonLocalPOOL* with values of zero if a connected city does not have a metro line. Regressions in Columns 1-4 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 1-4 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 5 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. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) PcBoard	(2) PcBoard	(3) PcBoard	(4) PcBoard	(5) PcBoard
NonLocalPOOL	-0.483	-0.060***	-0.022	-0.121***	-0.118**
	(0.309)	(0.019)	(0.025)	(0.045)	(0.054)
NonLocalPOOL_Good	1.166***	0.114***	0.104***	0.122**	0.192**
	(0.367)	(0.018)	(0.028)	(0.060)	(0.082)
NonLocalPOOL_Good_Metro				-0.015	
				(0.073)	
NonLocalPOOL_Metro				0.126**	
				(0.058)	
Observations	289,271	289,242	289,271	289,271	10,924
Adj. R-squared	0.807	0.807	0.807	0.807	0.485
NonLocal pool	Train	LLM	20 km		LLM

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, and sector. 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)
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
	(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
	(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

Table 8: 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. ***, **, 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

Table 9: 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. ***, **, 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

Table 10: 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. ***, **, 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

Table 11: 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. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) logRev	(2) TFP	(3) Default	(4) logRev	(5) TFP	(6) 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

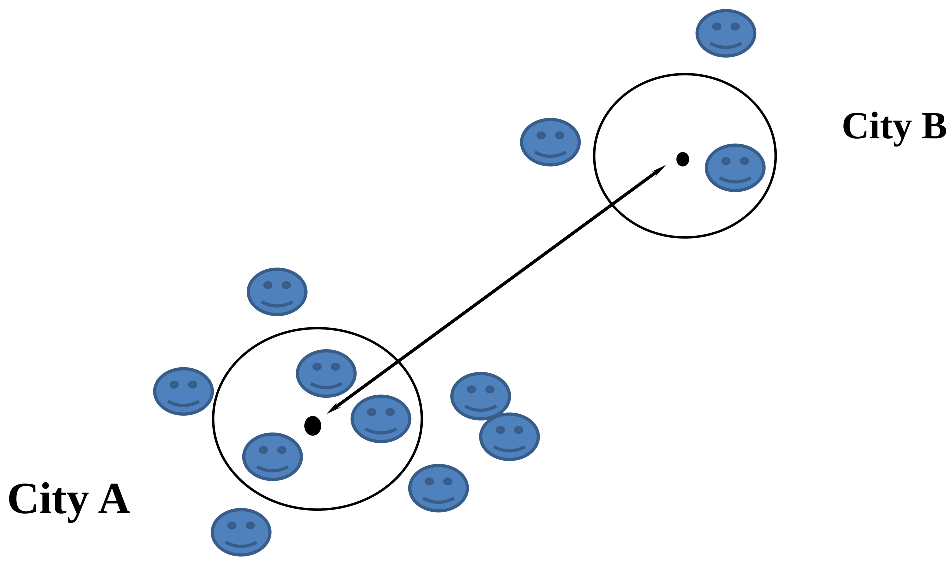
Figures

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

Milano Centrale 13:55	→	Torino Porta Nuova 14:55	1h 00'	Frecciarossa **9726**	da **36,00 €**
Milano Centrale 14:05	→	Torino Porta Nuova 15:05	1h 00'	Frecciarossa 1000 **9622**	da **36,00 €**
Milano Centrale 14:18	→	Torino Porta Nuova 16:10	1h 52'	Regionale Veloce **2020**	da **12,45 €**
Milano Centrale 15:18	→	Torino Porta Nuova 17:10	1h 52'	Regionale Veloce **2022**	da **12,45 €**
Milano Centrale 15:50	→	Torino Porta Nuova 16:50	1h 00'	Frecciarossa 1000 **9528**	da **36,00 €**
Milano Centrale 15:55	→	Torino Porta Nuova 16:55	1h 00'	Frecciarossa **9734**	da **36,00 €**

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

Figure 2: The non-local director pool measure.



This figure displays the circled firms in city A, within 10km from the station. For these firms, the opening of a high-speed train increases the supply of directors due to the access to directors in the city B, located in the same LLM as the the high-speed train station.

RECENTLY PUBLISHED "TEMI" (*)

N. 1257 – *Labour productivity and the wageless recovery*, by Antonio M. Conti, Elisa Guglielminetti and Marianna Riggi (December 2019).

N. 1258 – *Corporate leverage and monetary policy effectiveness in the Euro area*, by Simone Auer, Marco Bernardini and Martina Cecioni (December 2019).

N. 1259 – *Energy costs and competitiveness in Europe*, by Ivan Faiella and Alessandro Mistretta (February 2020).

N. 1260 – *Demand for safety, risky loans: a model of securitization*, by Anatoli Segura and Alonso Villacorta (February 2020).

N. 1261 – *The real effects of land use regulation: quasi-experimental evidence from a discontinuous policy variation*, by Marco Fregoni, Marco Leonardi and Sauro Mocetti (February 2020).

N. 1262 – *Capital inflows to emerging countries and their sensitivity to the global financial cycle*, by Ines Buono, Flavia Corneli and Enrica Di Stefano (February 2020).

N. 1263 – *Rising protectionism and global value chains: quantifying the general equilibrium effects*, by Rita Cappariello, Sebastián Franco-Bedoya, Vanessa Gunnella and Gianmarco Ottaviano (February 2020).

N. 1264 – *The impact of TLTRO2 on the Italian credit market: some econometric evidence*, by Lucia Esposito, Davide Fantino and Yeji Sung (February 2020).

N. 1265 – *Public credit guarantee and financial additionalities across SME risk classes*, by Emanuele Ciani, Marco Gallo and Zeno Rotondi (February 2020).

N. 1266 – *Determinants of the credit cycle: a flow analysis of the extensive margin*, by Vincenzo Cuciniello and Nicola di Iasio (March 2020).

N. 1267 – *Housing supply elasticity and growth: evidence from Italian cities*, by Antonio Accetturo, Andrea Lamorgese, Sauro Mocetti and Dario Pellegrino (March 2020).

N. 1268 – *Public debt expansions and the dynamics of the household borrowing constraint*, by António Antunes and Valerio Ercolani (March 2020).

N. 1269 – *Expansionary yet different: credit supply and real effects of negative interest rate policy*, by Margherita Bottero and Enrico Sette (March 2020).

N. 1270 – *Asymmetry in the conditional distribution of euro-area inflation*, by Alex Tagliabracci (March 2020).

N. 1271 – *An analysis of sovereign credit risk premia in the euro area: are they explained by local or global factors?*, by Sara Cecchetti (March 2020).

N. 1272 – *Mutual funds' performance: the role of distribution networks and bank affiliation*, by Giorgio Albareto, Andrea Cardillo, Andrea Hamaui and Giuseppe Marinelli (April 2020).

N. 1273 – *Immigration and the fear of unemployment: evidence from individual perceptions in Italy*, by Eleonora Porreca and Alfonso Rosolia (April 2020).

N. 1274 – *Bridge Proxy-SVAR: estimating the macroeconomic effects of shocks identified at high-frequency*, by Andrea Gazzani and Alejandro Vicondoa (April 2020).

N. 1275 – *Monetary policy gradualism and the nonlinear effects of monetary shocks*, by Luca Metelli, Filippo Natoli and Luca Rossi (April 2020).

N. 1276 – *Spend today or spend tomorrow? The role of inflation expectations in consumer behaviour*, by Concetta Rondinelli and Roberta Zizza (April 2020).

(*) Requests for copies should be sent to:
Banca d'Italia – Servizio Studi di struttura economica e finanziaria – Divisione Biblioteca e Archivio storico – Via Nazionale, 91 – 00184 Rome – (fax 0039 06 47922059). They are available on the Internet www.bancaditalia.it.

2018

ACCETTURO A., V. DI GIACINTO, G. MICUCCI and M. PAGNINI, *Geography, productivity and trade: does selection explain why some locations are more productive than others?,* Journal of Regional Science, v. 58, 5, pp. 949-979, **WP 910 (April 2013).**

ADAMOPOULOU A. and E. KAYA, *Young adults living with their parents and the influence of peers,* Oxford Bulletin of Economics and Statistics,v. 80, pp. 689-713, **WP 1038 (November 2015).**

ANDINI M., E. CIANI, G. DE BLASIO, A. D'IGNAZIO and V. SILVESTRINI, *Targeting with machine learning: an application to a tax rebate program in Italy,* Journal of Economic Behavior & Organization, v. 156, pp. 86-102, **WP 1158 (December 2017).**

BARONE G., G. DE BLASIO and S. MOCETTI, *The real effects of credit crunch in the great recession: evidence from Italian provinces,* Regional Science and Urban Economics, v. 70, pp. 352-59, **WP 1057 (March 2016).**

BELOTTI F. and G. ILARDI *Consistent inference in fixed-effects stochastic frontier models,* Journal of Econometrics, v. 202, 2, pp. 161-177, **WP 1147 (October 2017).**

BERTON F., S. MOCETTI, A. PRESBITERO and M. RICHIARDI, *Banks, firms, and jobs,* Review of Financial Studies, v.31, 6, pp. 2113-2156, **WP 1097 (February 2017).**

BOFONDI M., L. CARPINELLI and E. SETTE, *Credit supply during a sovereign debt crisis,* Journal of the European Economic Association, v.16, 3, pp. 696-729, **WP 909 (April 2013).**

BOKAN N., A. GERALI, S. GOMES, P. JACQUINOT and M. PISANI, *EAGLE-FLI: a macroeconomic model of banking and financial interdependence in the euro area,* Economic Modelling, v. 69, C, pp. 249-280, **WP 1064 (April 2016).**

BRILLI Y. and M. TONELLO, *Does increasing compulsory education reduce or displace adolescent crime? New evidence from administrative and victimization data,* CESifo Economic Studies, v. 64, 1, pp. 15–4, **WP 1008 (April 2015).**

BUONO I. and S. FORMAI *The heterogeneous response of domestic sales and exports to bank credit shocks,* Journal of International Economics, v. 113, pp. 55-73, **WP 1066 (March 2018).**

BURLON L., A. GERALI, A. NOTARPIETRO and M. PISANI, *Non-standard monetary policy, asset prices and macroprudential policy in a monetary union,* Journal of International Money and Finance, v. 88, pp. 25-53, **WP 1089 (October 2016).**

CARTA F. and M. DE PHLIPPIS, *You've Come a long way, baby. Husbands' commuting time and family labour supply,* Regional Science and Urban Economics, v. 69, pp. 25-37, **WP 1003 (March 2015).**

CARTA F. and L. RIZZICA, *Early kindergarten, maternal labor supply and children's outcomes: evidence from Italy,* Journal of Public Economics, v. 158, pp. 79-102, **WP 1030 (October 2015).**

CASIRAGHI M., E. GAIOTTI, L. RODANO and A. SECCHI, *A "Reverse Robin Hood"? The distributional implications of non-standard monetary policy for Italian households,* Journal of International Money and Finance, v. 85, pp. 215-235, **WP 1077 (July 2016).**

CIANI E. and C. DEIANA, *No Free lunch, buddy: housing transfers and informal care later in life,* Review of Economics of the Household, v.16, 4, pp. 971-1001, **WP 1117 (June 2017).**

CIPRIANI M., A. GUARINO, G. GUAZZAROTTI, F. TAGLIATI and S. FISHER, *Informational contagion in the laboratory,* Review of Finance, v. 22, 3, pp. 877-904, **WP 1063 (April 2016).**

DE BLASIO G, S. DE MITRI, S. D'IGNAZIO, P. FINALDI RUSSO and L. STOPPANI, *Public guarantees to SME borrowing. A RDD evaluation,* Journal of Banking & Finance, v. 96, pp. 73-86, **WP 1111 (April 2017).**

GERALI A., A. LOCARNO, A. NOTARPIETRO and M. PISANI, *The sovereign crisis and Italy's potential output,* Journal of Policy Modeling, v. 40, 2, pp. 418-433, **WP 1010 (June 2015).**

LIBERATI D., *An estimated DSGE model with search and matching frictions in the credit market,* International Journal of Monetary Economics and Finance (IJMEF), v. 11, 6, pp. 567-617, **WP 986 (November 2014).**

LINARELLO A., *Direct and indirect effects of trade liberalization: evidence from Chile,* Journal of Development Economics, v. 134, pp. 160-175, **WP 994 (December 2014).**

NATOLI F. and L. SIGALOTTI, *Tail co-movement in inflation expectations as an indicator of anchoring,* International Journal of Central Banking, v. 14, 1, pp. 35-71, **WP 1025 (July 2015).**

NUCCI F. and M. RIGGI, *Labor force participation, wage rigidities, and inflation,* Journal of Macroeconomics, v. 55, 3 pp. 274-292, **WP 1054 (March 2016).**

RIGON M. and F. ZANETTI, *Optimal monetary policy and fiscal policy interaction in a non_ricardian economy,* International Journal of Central Banking, v. 14 3, pp. 389-436, **WP 1155 (December 2017).**

SEGURA A., *Why did sponsor banks rescue their SIVs?,* Review of Finance, v. 22, 2, pp. 661-697, **WP 1100 (February 2017).**

2019

ALBANESE G., M. CIOFFI and P. TOMMASINO, *Legislators' behaviour and electoral rules: evidence from an Italian reform,* European Journal of Political Economy, v. 59, pp. 423-444, **WP 1135 (September 2017).**

APRIGLIANO V., G. ARDIZZI and L. MONTEFORTE, *Using the payment system data to forecast the economic activity,* International Journal of Central Banking, v. 15, 4, pp. 55-80, **WP 1098 (February 2017).**

ARNAUDO D., G. MICUCCI, M. RIGON and P. ROSSI, *Should I stay or should I go? Firms' mobility across banks in the aftermath of the financial crisis,* Italian Economic Journal / Rivista italiana degli economisti, v. 5, 1, pp. 17-37, **WP 1086 (October 2016).**

BASSO G., F. D'AMURI and G. PERI, *Immigrants, labor market dynamics and adjustment to shocks in the euro area,* IMF Economic Review, v. 67, 3, pp. 528-572, **WP 1195 (November 2018).**

BATINI N., G. MELINA and S. VILLA, *Fiscal buffers, private debt, and recession: the good, the bad and the ugly,* Journal of Macroeconomics, v. 62, **WP 1186 (July 2018).**

BURLON L., A. NOTARPIETRO and M. PISANI, *Macroeconomic effects of an open-ended asset purchase programme,* Journal of Policy Modeling, v. 41, 6, pp. 1144-1159, **WP 1185 (July 2018).**

BUSETTI F. and M. CAIVANO, *Low frequency drivers of the real interest rate: empirical evidence for advanced economies,* International Finance, v. 22, 2, pp. 171-185, **WP 1132 (September 2017).**

CAPPELLETTI G., G. GUAZZAROTTI and P. TOMMASINO, *Tax deferral and mutual fund inflows: evidence from a quasi-natural experiment,* Fiscal Studies, v. 40, 2, pp. 211-237, **WP 938 (November 2013).**

CARDANI R., A. PACCAGNINI and S. VILLA, *Forecasting with instabilities: an application to DSGE models with financial frictions,* Journal of Macroeconomics, v. 61, **WP 1234 (September 2019).**

CHIADES P., L. GRECO, V. MENGOTTO, L. MORETTI and P. VALBONESI, *Fiscal consolidation by intergovernmental transfers cuts? The unpleasant effect on expenditure arrears,* Economic Modelling, v. 77, pp. 266-275, **WP 985 (July 2016).**

CIANI E., F. DAVID and G. DE BLASIO, *Local responses to labor demand shocks: a re-assessment of the case of Italy,* Regional Science and Urban Economics, v. 75, pp. 1-21, **WP 1112 (April 2017).**

CIANI E. and P. FISHER, *Dif-in-dif estimators of multiplicative treatment effects,* Journal of Econometric Methods, v. 8. 1, pp. 1-10, **WP 985 (November 2014).**

CIAPANNA E. and M. TABOGA, *Bayesian analysis of coefficient instability in dynamic regressions,* Econometrics, MDPI, Open Access Journal, v. 7, 3, pp.1-32, **WP 836 (November 2011).**

COLETTA M., R. DE BONIS and S. PIERMATTEI, *Household debt in OECD countries: the role of supply-side and demand-side factors,* Social Indicators Research, v. 143, 3, pp. 1185–1217, **WP 989 (November 2014).**

COVA P., P. PAGANO and M. PISANI, *Domestic and international effects of the Eurosystem Expanded Asset Purchase Programme,* IMF Economic Review, v. 67, 2, pp. 315-348, **WP 1036 (October 2015).**

ERCOLANI V. and J. VALLE E AZEVEDO, *How can the government spending multiplier be small at the zero lower bound?,* Macroeconomic Dynamics, v. 23, 8. pp. 3457-2482, **WP 1174 (April 2018).**

FERRERO G., M. GROSS and S. NERI, *On secular stagnation and low interest rates: demography matters,* International Finance, v. 22, 3, pp. 262-278, **WP 1137 (September 2017).**

FOA G., L. GAMBACORTA, L. GUISO and P. E. MISTRULLI, *The supply side of household finance,* Review of Financial Studies, v.32, 10, pp. 3762-3798, **WP 1044 (November 2015).**

GIORDANO C., M. MARINUCCI and A. SILVESTRINI, *The macro determinants of firms' and households' investment: evidence from Italy,* Economic Modelling, v. 78, pp. 118-133, **WP 1167 (March 2018).**

GOMELLINI M., D. PELLEGRINO and F. GIFFONI, *Human capital and urban growth in Italy,1981-2001,* Review of Urban & Regional Development Studies, v. 31, 2, pp. 77-101, **WP 1127 (July 2017).**

MAGRI S., *Are lenders using risk-based pricing in the Italian consumer loan market? The effect of the 2008 crisis,* Journal of Credit Risk, v. 15, 1, pp. 27-65, **WP 1164 (January 2018).**

MAKINEN T., A. MERCATANTI and A. SILVESTRINI, *The role of financial factors for european corporate investment,* Journal of International Money and Finance, v. 96, pp. 246-258, **WP 1148 (October 2017).**

MIGLIETTA A., C. PICILLO and M. PIETRUNTI, *The impact of margin policies on the Italian repo market,* The North American Journal of Economics and Finance, v. 50, **WP 1028 (October 2015).**

MONTEFORTE L. and V. RAPONI, *Short-term forecasts of economic activity: are fortnightly factors useful?,* Journal of Forecasting, v. 38, 3, pp. 207-221, **WP 1177 (June 2018).**

NERI S. and A. NOTARPIETRO, *Collateral constraints, the zero lower bound, and the debt–deflation mechanism,* Economics Letters, v. 174, pp. 144-148, **WP 1040 (November 2015).**

PEREDA FERNANDEZ S., *Teachers and cheaters. Just an anagram?*, Journal of Human Capital, v. 13, 4, pp. 635-669, **WP 1047 (January 2016).**

RIGGI M., *Capital destruction, jobless recoveries, and the discipline device role of unemployment,* Macroeconomic Dynamics, v. 23, 2, pp. 590-624, **WP 871 (July 2012).**

2020

BRIPI F., D. LOSCHIAVO and D. REVELLI, *Services trade and credit frictions: evidence with matched bank – firm data,* The World Economy, v. 43, 5, pp. 1216-1252, **WP 1110 (April 2017).**

COIBION O., Y. GORODNICHENKO and T. ROPELE, *Inflation expectations and firms' decisions: new causal evidence,* Quarterly Journal of Economics, v. 135, 1, pp. 165-219, **WP 1219 (April 2019).**

CORSELLO F. and V. NISPI LANDI, *Labor market and financial shocks: a time-varying analysis,* Journal of Money, Credit and Banking, v. 52, 4, pp. 777-801, **WP 1179 (June 2018).**

D'IGNAZIO A. and C. MENON, *The causal effect of credit Guarantees for SMEs: evidence from Italy,* The Scandinavian Journal of Economics, v. 122, 1, pp. 191-218, **WP 900 (February 2013).**

RAINONE E. and F. VACIRCA, *Estimating the money market microstructure with negative and zero interest rates,* Quantitative Finance, v. 20, 2, pp. 207-234, **WP 1059 (March 2016).**

RIZZICA L., *Raising aspirations and higher education. Evidence from the UK's widening participation policy,* Journal of Labor Economics, v. 38, 1, pp. 183-214, **WP 1188 (September 2018).**

FORTHCOMING

ARDUINI T., E. PATACCHINI and E. RAINONE, *Treatment effects with heterogeneous externalities,* Journal of Business & Economic Statistics, **WP 974 (October 2014).**

BALTRUNAITE A., C. GIORGIANTONIO, S. MOCETTI and T. ORLANDO, *Discretion and supplier selection in public procurement*, Journal of Law, Economics, and Organization, **WP 1178 (June 2018).**

BOLOGNA P., A. MIGLIETTA and A. SEGURA, *Contagion in the CoCos market? A case study of two stress events,* International Journal of Central Banking, **WP 1201 (November 2018).**

BOTTERO M., F. MEZZANOTTI and S. LENZU, *Sovereign debt exposure and the Bank Lending Channel: impact on credit supply and the real economy,* Journal of International Economics, **WP 1032 (October 2015).**

BRONZINI R., G. CARAMELLINO and S. MAGRI, *Venture capitalists at work: a Diff-in-Diff approach at late-stages of the screening process,* Journal of Business Venturing, **WP 1131 (September 2017).**

BRONZINI R., S. MOCETTI and M. MONGARDINI, *The economic effects of big events: evidence from the Great Jubilee 2000 in Rome,* Journal of Regional Science, **WP 1208 (February 2019).**

COVA P. and F. NATOLI, *The risk-taking channel of international financial flows,* Journal of International Money and Finance, **WP 1152 (December 2017).**

COVA P., P. PAGANO, A. NOTARPIETRO and M. PISANI, *Secular stagnation, R&D, public investment and monetary policy: a global-model perspective,* Macroeconomic Dynamics, **WP 1156 (December 2017).**

DEL PRETE S. and S. FEDERICO, *Do links between banks matter for bilateral trade? Evidence from financial crises,* Review of World Economics, **WP 1217 (April 2019).**

GERALI A. and S. NERI, *Natural rates across the Atlantic,* Journal of Macroeconomics, **WP 1140 (September 2017).**

LIBERATI D. and M. LOBERTO, *Taxation and housing markets with search frictions,* Journal of Housing Economics, **WP 1105 (March 2017).**

LOSCHIAVO D., *Household debt and income inequality: evidence from Italian survey data,* Review of Income and Wealth, **WP 1095 (January 2017).**

MOCETTI S., G. ROMA and E. RUBOLINO, *Knocking on parents' doors: regulation and intergenerational mobility,* Journal of Human Resources, **WP 1182 (July 2018).**

NISPI LANDI V. and A. SCHIAVONE, *The effectiveness of capital controls,* Open Economies Review, **WP 1200 (November 2018).**

PANCRAZI R. and M. PIETRUNTI, *Natural expectations and home equity extraction,* Journal of Housing Economics, **WP 984 (November 2014).**

PEREDA FERNANDEZ S., *Copula-based random effects models for clustered data,* Journal of Business & Economic Statistics, **WP 1092 (January 2017).**

RAINONE E., *The network nature of otc interest rates,* Journal of Financial Markets, **WP 1022 (July 2015).**

SANTIONI, R., F. SCHIANTARELLI and P. STRAHAN, *Internal capital markets in times of crisis: the benefit of group affiliation*, Review of Finance, **WP 1146 (October 2017).**

SCHIANTARELLI F., M. STACCHINI and P. STRAHAN, *Bank Quality, judicial efficiency and loan repayment delays in Italy,* Journal of Finance, **WP 1072 (July 2016).**