Managerial Talent and Managerial Practices: Are They Complements?

A. Baltrunaite, G. Bovini and S. Mocetti

Bank of Italy[1]

Annual Conference of the Global Forum on Productivity

July 1, 2021

Motivation

- Substantial productivity differences among firms (Melitz, 2003; Syverson, 2011)

- Largely due to management quality, both in terms of people who manage the firm and practices adopted within the firm (Syverson, 2011; Gibbons and Henderson, 2013)

- Managers matter (Bertrand and Schoar, 2003; Graham et al., 2011; Lazear et al., 2015; and Fenizia, 2021)

- Managerial practices matter (Ichniowski et al., 1997; Bloom et al., 2007, 2010 and 2013)

What we do (and how)

- Bridge between two (separate) strands of literature: managers vs. managerial practices

- Use unique administrative data on firms and their managers to measure managers' talent (i.e., their contribution to firm-level variation in TFP) in a two-way fixed effects model

- Combine these measures with survey data containing information on organization and managerial practices

- Examine whether managerial talent and managerial practices do boost firm productivity on their own and whether there are complementarities between the two

Data

1. Balance sheets from *Cerved* (2005-2018):

   - universe of corporations in the private non-financial sector (20+ employees)
   - TFP estimated as in Levinsohn and Petrin (2003)

2. *Infocamere* from Chambers of Commerce (2005-2018):

   - identities of directors (i.e., name, age, gender, place of birth, etc.)
   - directors $\approx$ establishment managers (average firm size is <70)

3. *Invind* from the Bank of Italy (2005-2019):

   - representative sample of (20+ employees) firms with data on organization and managerial practices

Our measure of managerial talent

- Talent includes both observable (education, experience, etc.) and unobservable (ability, leadership, etc.) personal traits

- We define as *talent* the portable and time-invariant contribution that a director brings to the TFP of the firm that she/he runs (i.e., the director's fixed effect in a two-way fixed effects model)

- A similar approach has been used in the seminal work of Bertrand and Schoar (2003) and, more recently, by Graham et al. (2012), Lazear et al. (2015) and Fenizia (2021)

- It is essentially the AKM model (Abowd et al., 1999; Card et al., 2013) applied to managers instead of workers

The two-way fixed effect model

- Directors' and firms' fixed effects can be estimated separately insofar as there are *movers*; in the largest *connected* set we run the following regression:

$$y = F\alpha + D\psi + X\beta + \varepsilon \qquad (1)$$

y is a $T \times 1$ vector whose j-th element is the TFP of firm i in period t;

F is a $T \times N$ matrix of firm dummies;

D is a $T \times J$ matrix of directors dummies;

- Managerial talent of firm i in year t is:

$$q_{it} = \sum_{j \in J_{it}} \psi_j \qquad (2)$$

Analysis of the variance

Dependent variable:	Total factor productivity			
	(1)	(2)	(3)	(4)
Industry × Year FE	Yes	Yes	Yes	Yes
Province × Year FE	Yes	Yes	Yes	Yes
Firm FE		Yes	Yes	Yes
Board characteristics			Yes	Yes
Board talent				0.761***
				(0.005)
Adj-R^2	0.024	0.536	0.536	0.637
N	479,038	479,038	479,038	479,038

Notes: Data are drawn from the combined *Infocamere-Cerved* sample. Panel with fixed effects. The table shows how much of the variation of firm TFP is explained by: industry- and province-year FEs (column 1); firm FEs (column 2); the observable characteristics of the board of directors (column 3); the talent of the board measured as the average of director fixed effects at the firm-year level (column 4). Standard errors clustered at the firm level in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Managerial talent matters

- Firm productivity significantly rises when a better manager takes charge

- The effect is larger in firms exposed to higher competition (e.g., in more agglomerated areas or in sectors more exposed to international trade)

- Part of the effect is attributable to endogenous sorting: more (less) talented directors appear to sort into firms whose performance is improving (deteriorating) over time

- However, talent is correlated with education and ability in forecasting firm's performance, i.e., it reflects (albeit noisily) true managerial acumen and brightness

Managerial practices score (Bloom et al., 2019)

- Monitoring

    - e.g. "How many key performance indicators are monitored in your firm?", with response options ranging from "none" to "10 or more"

- Targeting

    - e.g. "How easy or difficult is it in your firm for people to achieve their operational targets?" with answers ranging from "Possible without much effort" to "Only possible with extraordinary effort"

- Incentives

    - e.g. "How were workers promoted in your firm?" with answers ranging from "no promotion" or "mainly on factors such as tenure or family connections" to "solely on performance and ability".

Complementarities: empirical strategy

- Complementarities exist if the output produced by combining two or more economic factors in a production process exceeds that would have been otherwise generated through the use of the same factors in isolation (Brynjolfsson and Milgrom, 2013)

- We run the following cross-sectional regression:

$$TFP_i = \alpha + \beta q_i + \gamma z_i + \theta q_i z_i + \rho x_i + \epsilon_i \tag{3}$$

where TFP_i is the firm's total factor productivity; q_i is the managerial talent; z_i is the managerial practices score; x_i include controls at the firm level

Complementarities: main results

Dependent variable:	TFP			
	(1)	(2)	(3)	(4)
Managerial score (MS)	0.051**	0.045*	0.020	0.020
	(0.024)	(0.026)	(0.029)	(0.028)
Board talent (BT)		0.746***	0.756***	0.765***
		(0.055)	(0.056)	(0.060)
MS × BT				0.081**
				(0.039)
Firm controls			Yes	Yes
R^2	0.002	0.326	0.330	0.336
N	1,683	1,078	1,078	1,078

Notes: Data are drawn from the combined *Infocamere-Cerved-Invind* sample, using the 2019 wave. OLS cross-section regression. The dependent variable is firm TFP while the explanatory variable is the managerial score computed following Bloom et al. (2019). Firm controls include firm fixed effects - those estimated using the two-way fixed effect model described in specification (1) - and sector, region and size fixed effects. Standard errors clustered at the firm level in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Complementarities: further results

- Among the different practices, the main impact comes from the number of performance indicators monitored, the proper definition of operational targets (in terms of time frame and difficulty) and the adoption of performance-based systems

- Results are robust if we use the 2010 survey (it includes a specific question on performance pay schemes)

- Results are robust to the use of managerial talent measure estimated in the largest connected set that excludes firms belonging to the *Invind* sample ("leave-out" measure)

Complementarities: panel analysis

Dependent variable:	TFP		
	(1)	(2)	(3)
Incentives related to performance (I)	0.103**	0.084**	0.086**
	(0.041)	(0.041)	(0.040)
Board talent (BT)		2.206***	1.900***
		(0.374)	(0.308)
I × BT			0.731***
			(0.224)
Firm FEs	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes
R^2	0.785	0.861	0.870
N	336	336	336

Notes: Data are drawn from the combined *Infocamere-Cerved-Invind* sample, using the 2010 and 2019 waves. Panel with fixed effects. The dependent variable is firm TFP while the explanatory variable is an indicator for the presence of performance-related pay systems. The model includes firm and year fixed effects, thus exploiting within firm variation in TFP, board talent and incentives. Standard errors clustered at the firm level in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Conclusions

- Individuals we identify as talented managers more often possess adequate education or training, and are better in precisely forecasting the firm's performance

- They significantly affect firm productivity, particularly in more competitive environments

- Moreover, they are able to extract more value added from the use of the same managerial practices

Policy implications

- Investment in human capital, thus improving (quantitatively and qualitatively) the talent pool from which managers are selected

- Strengthen market competition that represents a powerful tool to increase management efficiency within the firm and across firms (e.g., by improving talent allocation within the economy)

- Increase the size of the (usually tiny) labor market pool of managers (e.g., Baltrunaite and Karmaziene, 2021)

- Removal of frictions that hampers the opening of (family) firms to external managers

Thank you!

APPENDIX

Firms in the largest *connected* set
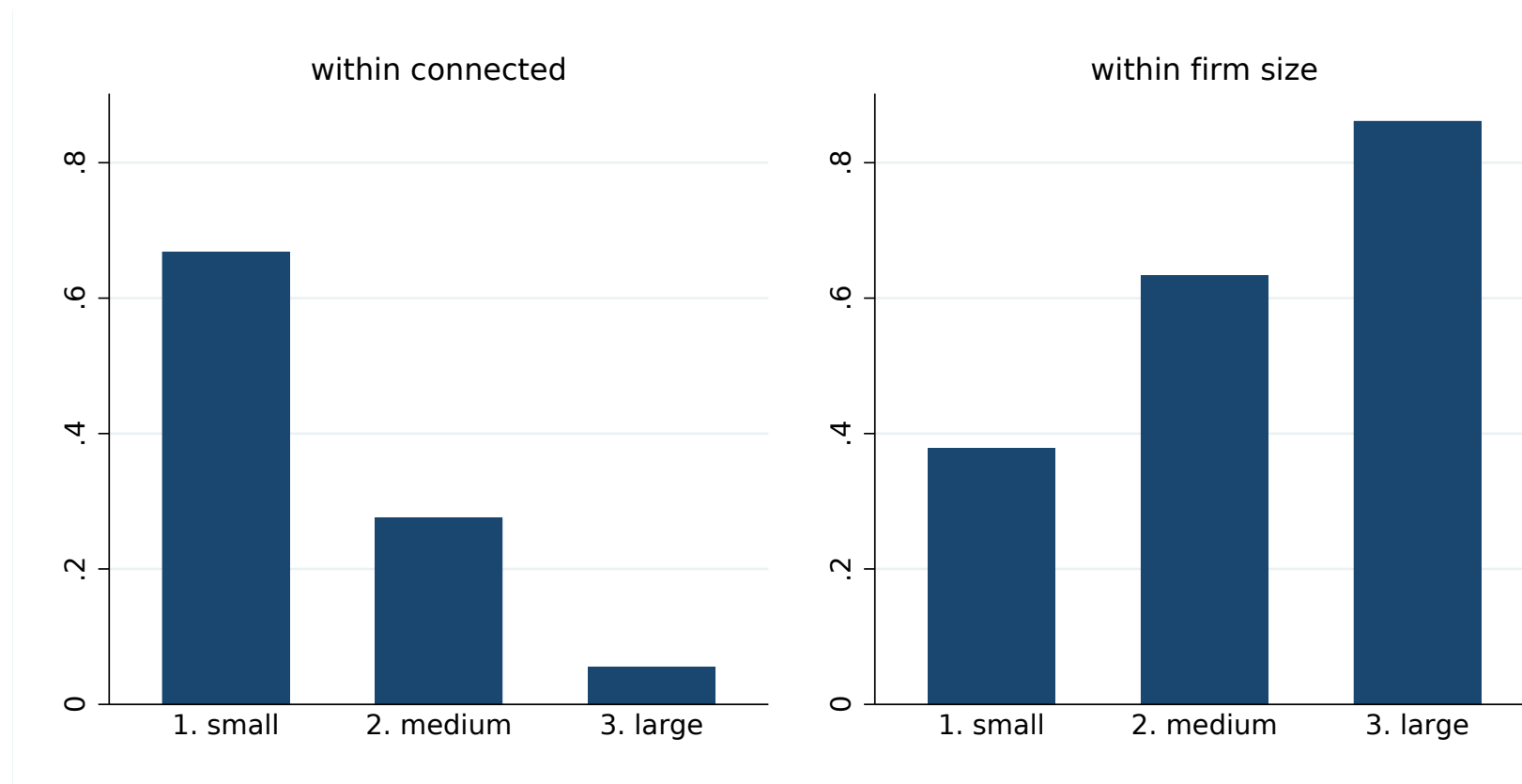
Notes: Data are drawn from the combined *Infocamere-Cerved* sample. The left panel shows the distribution of firms in the connected set by size; the right panel shows the share of firms in the connected set with respect to the universe by size. Following the European Commission classification, small firms have from 10 to 50 employees, medium-sized firms have up to 250 employees while large firms have more than 250 employees.

Firms in the *connected* set

	(1) other firms	(2) connected set	(3) Δ	(4) *Invind* sample
# employees	34.660	97.057	-62.397***	370.000
Firm age	14.231	18.107	-3.876***	30.800
# directors	1.874	3.229	-1.356***	4.430
% manufacturing	0.355	0.321	0.034***	0.603
% South	0.288	0.146	0.142***	0.252
TFP	-0.060	-0.040	-0.020***	-.0256
Share	0.559	0.441		
N		144,632		6,224

Notes: Data are drawn from the combined *Infocamere-Cerved* sample, including the universe of limited companies with more than 20 employees in the private non-financial sector in the years 2005-2018, in the first two columns and from the combined *Infocamere-Cerved-Invind* sample in the last column. Columns (1) and (2) report mean values for firms outside the largest connected set and within it, respectively; Δ indicates the corresponding difference in means; the last column reports mean values for the subsample of the connected firms included in the *Invind* survey. N represents the total number of firms in the period considered.

Distribution of firms' and directors fixed-effects
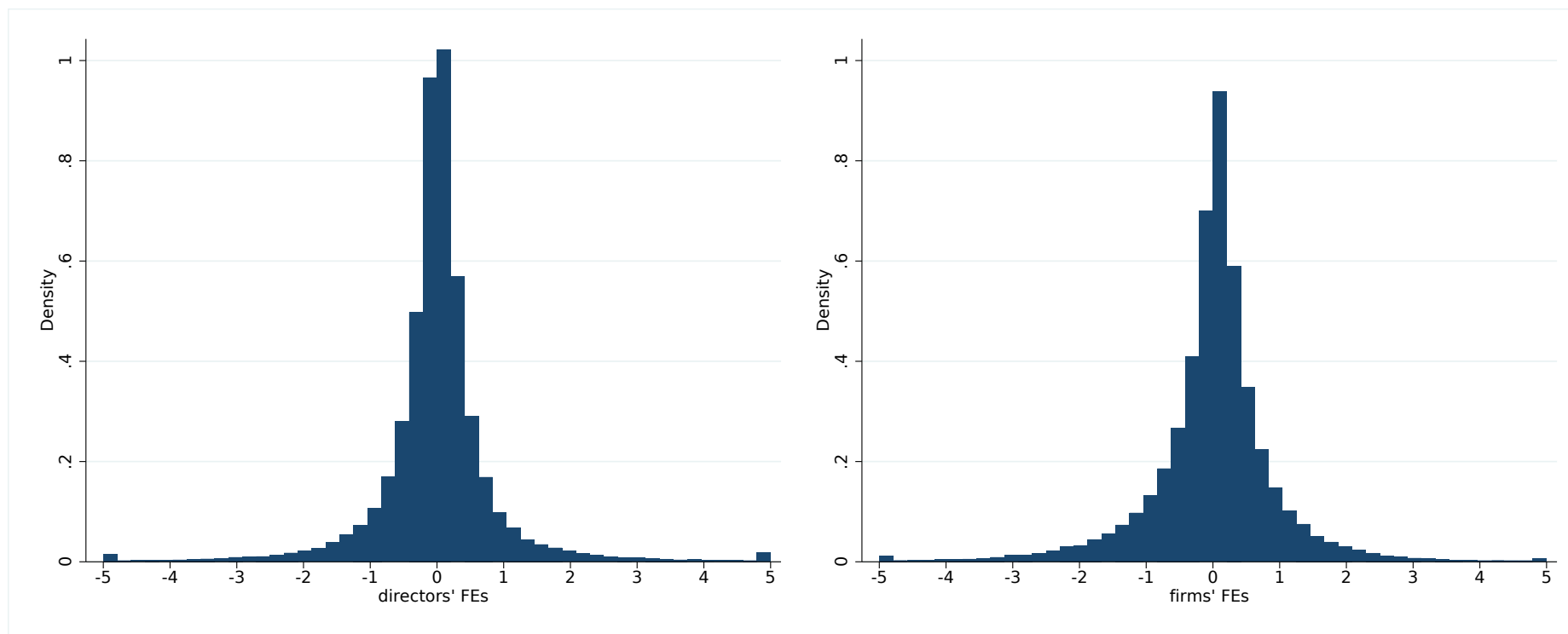
Notes: Data are drawn from the combined *Infocamere-Cerved* sample. Distribution of firms' and directors' fixed effects estimated through the two-way fixed effect model. Both variables are standardized.

Extent of interlocking and switching
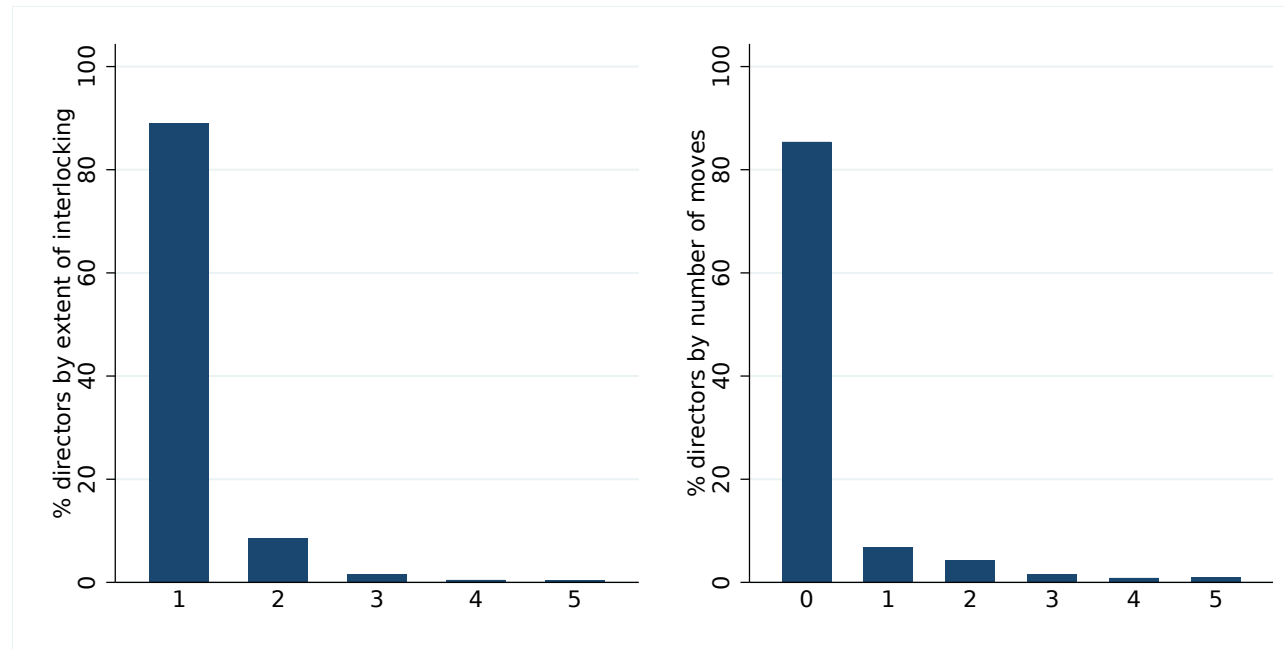
Notes: Data are drawn from the combined *Infocamere-Cerved* sample. The left panel shows the extent of interlocking, i.e. the distribution of directors by the number of boards (of different firms) on which they seat in the same year; the right panel shows the extent of switching, i.e. the distribution of directors by the number of switch (from one firm to another across time) over the period 2005-2017.

Identifying assumptions

- Sorting on the match component not important if:

    - residuals of the AKM model are small across deciles of directors and firms FEs

    - a saturated model (firm-directors FEs) has not a larger explanatory power than an additive one

    - TFP gains from "bad" to "good" changes symmetric to TFP losses from "good" to "bad" ones

- Sorting on the drift component not important if:

    - absence of pre-trends (changes uncorrelated with past TFP growth)

- Sorting on the transitory component not important if:

    - if there are no dips or spikes in TFP before management changes

Residuals distribution
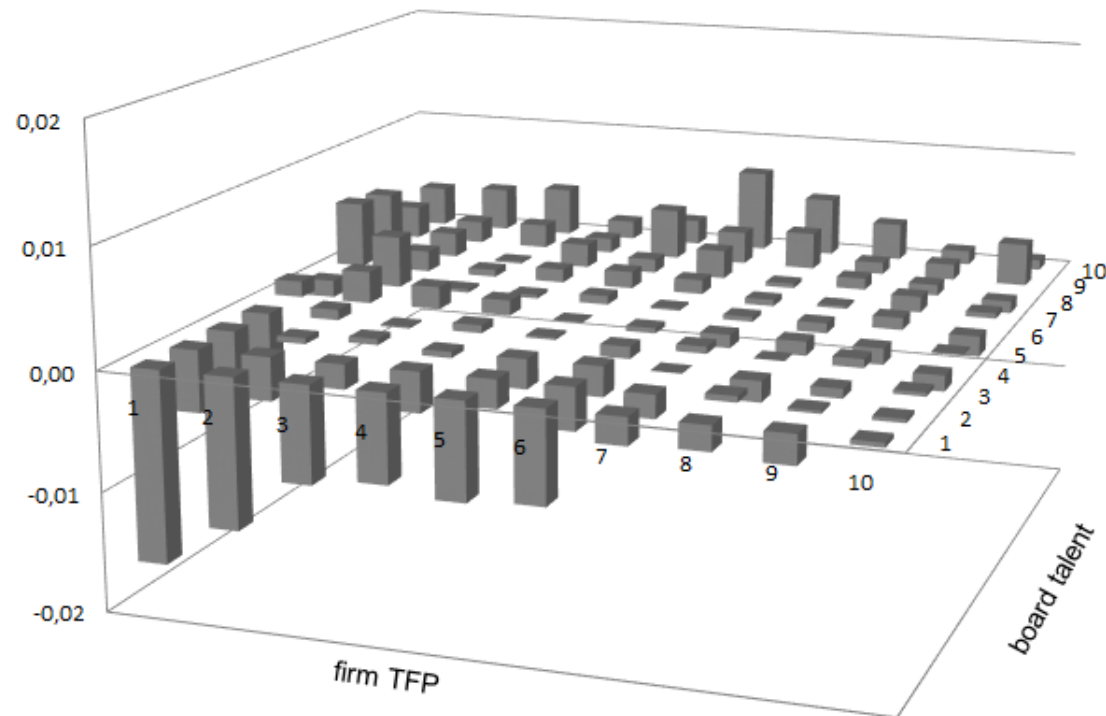
Notes: Data are drawn from the combined *Infocamere-Cerved* sample. Figure shows mean residuals from the regression on the largest connected set with cells defined by deciles of board talent, interacted with deciles of estimated firm fixed effects.

Saturated vs. additive model

| Dependent variable:	Total factor productivity		
	(1)	(2)	(3)
Industry × Year FE	Yes	Yes	Yes
Province × Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Board characteristics	Yes	Yes	Yes
Board FE		Yes	Yes
Board FE × Firm FE			Yes
Adj-R^2	0.536	0.658	0.634
N	479,038	479,038	479,038

Notes: Data are drawn from the combined *Infocamere-Cerved* sample. Panel with fixed effects. The table shows how much of the variation of firm TFP is explained by industry- and province-year FEs, firm FEs and the observable characteristics of the board of directors (column 1); the talent of the board measured as centile FEs of the average talent at the firm-year level (column 2) and interaction between firm- and board talent centile- FEs. Standard errors clustered at the firm level in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Sorting on the drift component
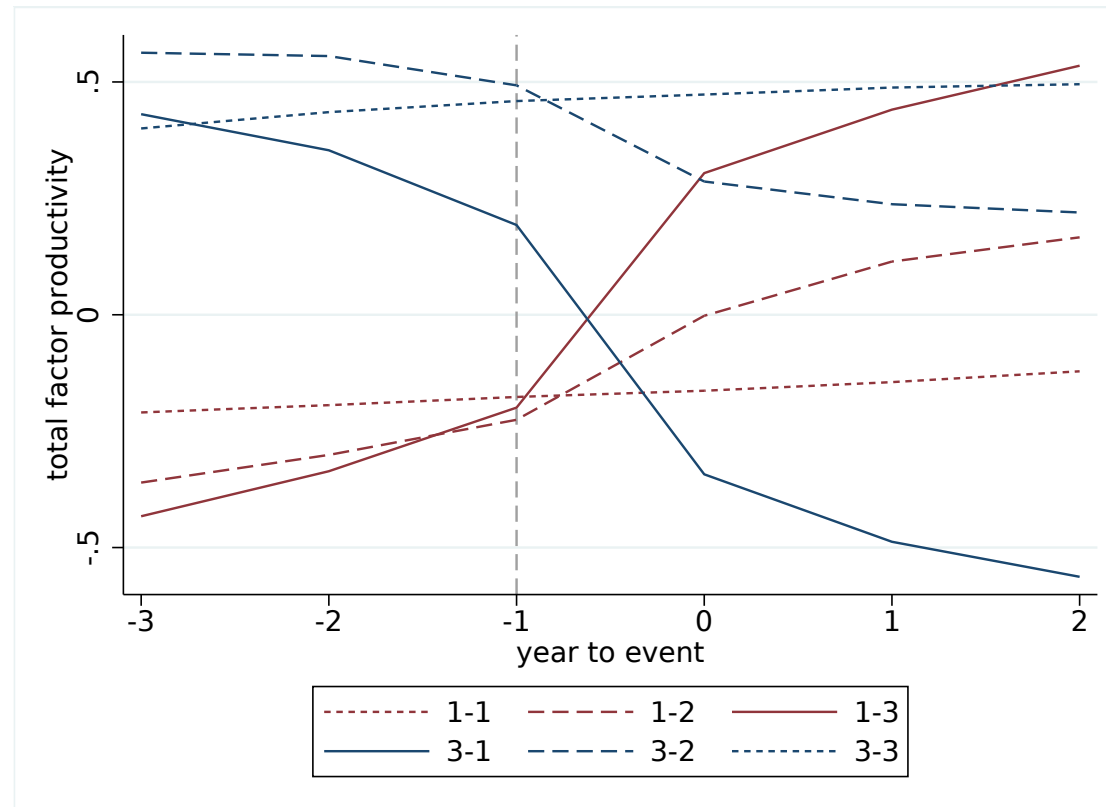
Notes: The figure plots the evolution of TFP from year-to-event -3 to year-to-event 2 on a balanced subset of firms that (i) change at least one director in year-to-event 0 and (ii) remain in the same tercile of board talent both in the 3 years before the event and in the following 3 years.

Sorting on the drift component
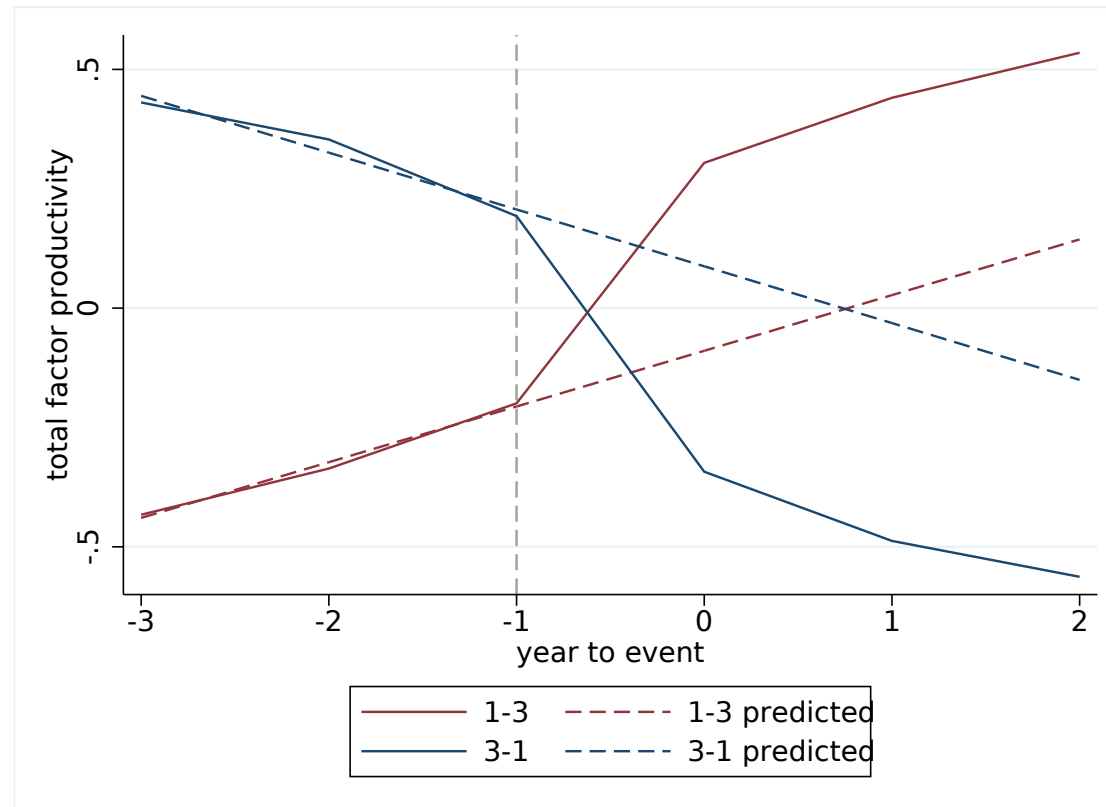
Notes: The figure plots the evolution of TFP from year-to-event -3 to year-to-event 2 on a balanced subset of firms that (i) change at least one director in year-to-event 0 and (ii) remain in the same tercile of board talent both in the 3 years before the event and in the following 3 years.

Symmetry of gains and losses in TFP
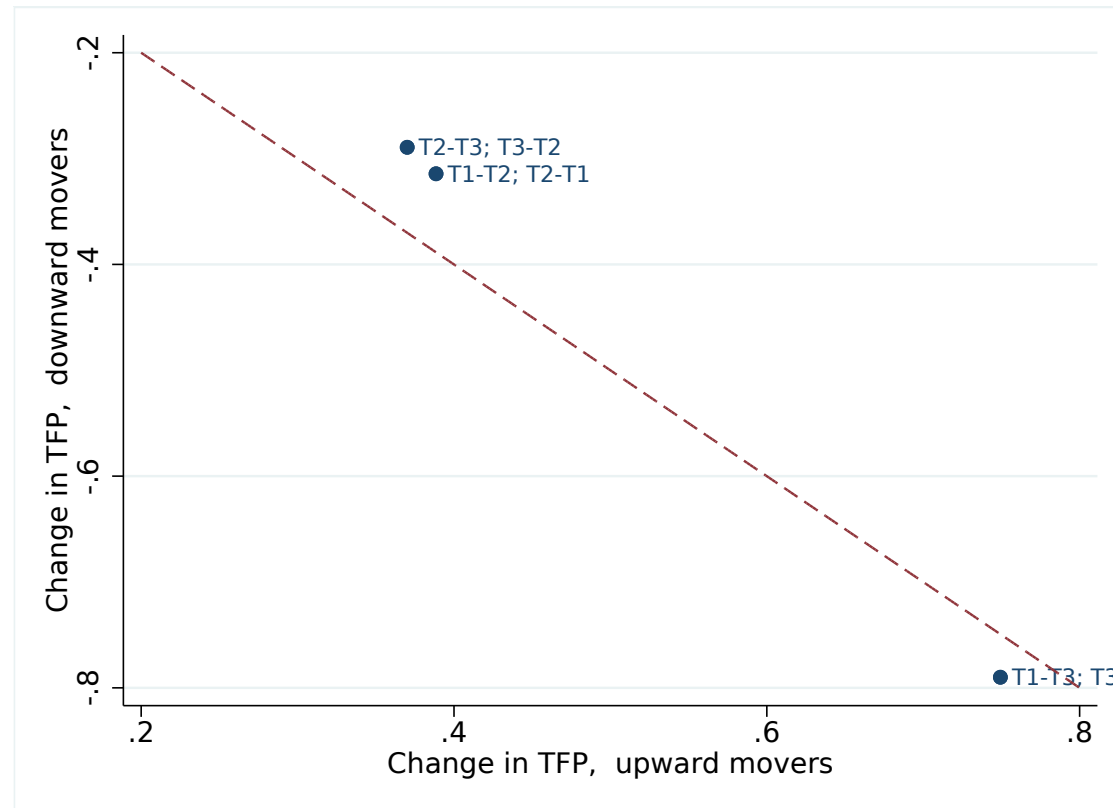
Notes: The figure plots the change in TFP between the years preeceding and following the event.

Geographical and sectoral distance of "moves"
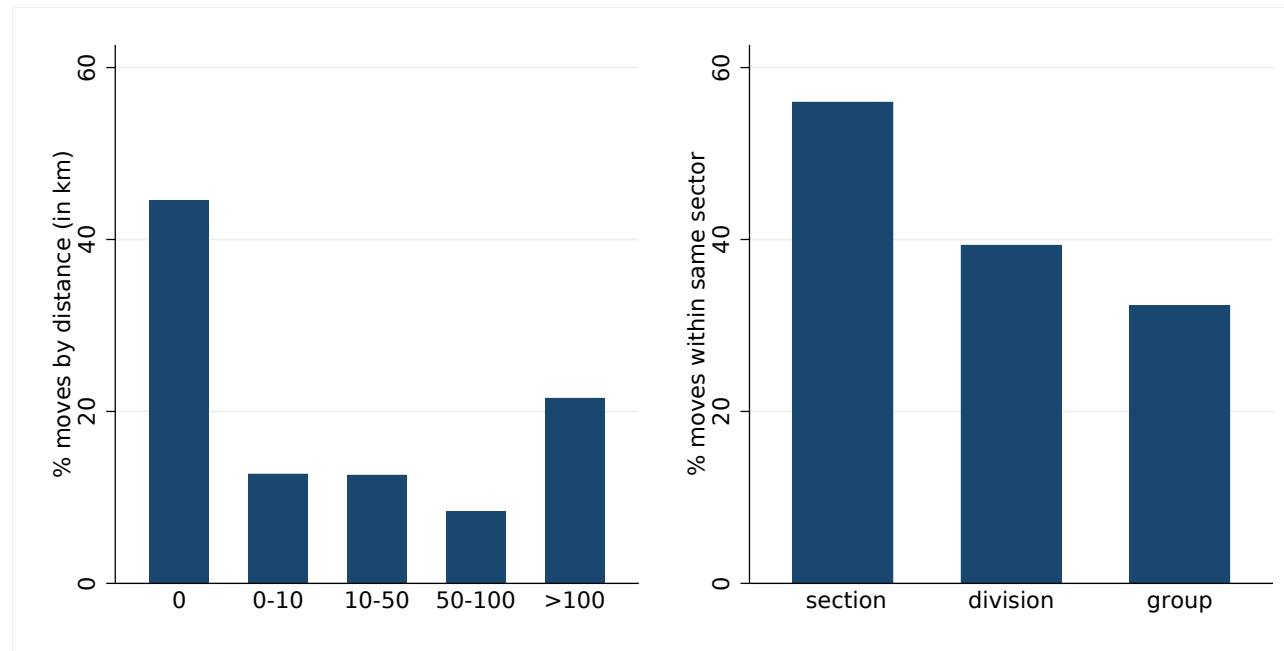
Notes: Data are drawn from the combined *Infocamere-Cerved* sample. We consider as moves both the presence in the board of two different firms in the same year and the switch from one firm to another across time.