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Julien Sauvagnat

Fabiano Schivardi

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Maurizio Franzini

Are Executives in Short Supply? Evidence from Death Events

Julien Sauvagnat
(Bocconi University, IGIER, and CEPR)

Fabiano Schivardi
(Luiss University, EIEF, and CEPR)

Are Executives in Short Supply? Evidence from Death Events
C'è scarsità di offerta di dirigenti? Evidenza da episodi di morte[†]

Julien Sauvagnat
Bocconi University and CEPR

Fabiano Schivardi
Luiss University, EIEF and CEPR

Abstract

Using exhaustive administrative data on Italian social security records, we construct measures of local labor market tightness for executives that vary by industry and location. We then show that firm performance is negatively affected by executive death, but only in thin local labor markets. Death events are followed by an increase in the separation rate for the other executives, in particular for those with a college degree. Consistent with the hypothesis that the drop in performance is due to executive short supply, we find that after a death event executive wages in other firms increase, but only in thin markets.

Utilizzando dati amministrativi esaustivi di previdenza sociale italiana, costruiamo misure di densità del mercato del lavoro locale dei dirigenti che variano a seconda del settore e della provincia. Dimostriamo quindi che la performance delle imprese è influenzata negativamente dalla morte dei dirigenti, ma solo nei mercati del lavoro locali poco densi. Al decesso di un dirigente segue un aumento del tasso di separazione degli altri dirigenti, in particolare di quelli laureati. Coerentemente con l'ipotesi che il

[†]Julien Sauvagnat is with Bocconi University, IGIER, and CEPR. Contact: julien.sauvagnat@unibocconi.it. Fabiano Schivardi is with Luiss University, EIEF, and CEPR. Contact: fschivardi@luiss.it. We thank Nicola Gennaioli, Felix Koenig, Marco Manacorda, our discussant Marco Sammon, and seminar participants at the 2020 Econometric Society World Congress, 3rd Bank of Italy CEPR Labour workshop, the Stockholm Labor and Finance Group Conference, Visitinps Annual Conference, and the CAED seminar series for their valuable comments. We thank the Visitinps program for granting us access to the Social Security records. Julien Sauvagnat thanks the Italian Ministry of Education for financial support (PRIN 2017). Fabiano Schivardi thanks the ERC for financial support (ERC grant 835201). The findings and conclusions expressed are solely those of the author and do not represent the views of INPS. La realizzazione del presente articolo è stata possibile grazie alle sponsorizzazioni e le erogazioni liberali a favore del programma "VisitINPS Scholars".

calo delle prestazioni sia dovuto alla scarsità di offerta di dirigenti, dopo un evento di morte i salari dei dirigenti in altre aziende aumentano, ma solo nei mercati poco densi.

Keywords: Executive supply, firm performance, local growth.
Parole chiave: Offerta di dirigenti, performance d'impresa, crescita locale.
JEL classification numbers: J24, M51, R11.

1 Introduction

Recent research shows that differences in performance between firms are substantial, persistent over time and largely unexplained (Syverson, 2011). As a potential explanation, a growing body of work highlights the role of management quality in shaping firm outcomes (Bertrand and Schoar, 2003; Bloom and Van Reenen, 2007, 2010). However, we still have a poor understanding of the factors that determine the differences in managerial quality across firms. In particular, what are the frictions that account for the fact that some firms allocate control to inferior managerial talent, hurting firm performance and, through this, aggregate productivity?

This paper focuses on the role of the local supply of managerial skills, and provides evidence on the causal role that the thickness of local markets for skilled labor plays in contributing to firm performance. Empirically, the main challenge is to set up an identification strategy that addresses the joint endogeneity of firm productivity and labor market thickness to unobserved features of localities. One also needs rich micro data on both firms and workers in order to understand empirically the mechanism through which the supply of executives in a given labor market affects firm performance. Our approach satisfies both requirements and allows us to isolate the causal effect of the local supply of executives on firm performance.

We use employer-employee administrative data from the Italian social security records covering the entire population of Italian workers in the private sector over the period 2005-2015, matched with firm balance sheet and income statement information. We first document that executives direct disproportionately their job searches toward firms within the same industry and geographical area, arguably due to mobility costs and industry-specific human capital. We therefore define the relevant market for executives at the industry-location level and construct measures of local labor market tightness for executives that vary by industry and location.

Our empirical design exploits negative exogenous shocks to the executive team and traces their impact on firm performance in respectively thin and thick local labor markets. This allows us to isolate causal mechanisms through which the thickness of the local labor market for executives has an impact on firm performance. As the main source of shocks to the executive team, we exploit executive death, thus circumventing the endogeneity of executive exits. We focus on deaths that are arguably unexpected, and check that this set of sudden death events are random to firm characteristics. Deaths are rare events: the probability of death for an executive below 60 years old is 0.10% per year. Despite this, the size of Italian labor market (around 14 million workers and 123,000 executives in 2015) generates a number of executive deaths sufficiently large to allow for reliable inference.

Death events have a substantial negative and long-lasting impact on firm performance. Using returns on assets (ROA) as our preferred measure, we find that it drops by around -0.9 percentage points in the three years following an executive death. Given the sample mean of 4%, the estimate is economically large. This estimate remains virtually the same when we control for industry and geographical dummies interacted with year fixed effects, and when we control for heterogeneous trends across firms with few or many executives.

The estimated decline in firm performance following executive death is not per se evidence that the local supply of executives matters. After all, executives are likely to have accumulated a certain level of firm-specific or team-specific capital, which gets destroyed when the executive dies, possibly inducing a deterioration in performance, irrespective of the external supply of executives. To estimate whether local supply matters, we leverage the research design and estimate heterogeneity in firm response to executive death events depending on the thickness of local labor markets for executives. We hypothesize that firms are more likely to find a good match with another executive if the local pool of executives working for other firms in the same area and industry is large (referred to as a thick local labor market in the rest of the paper). Consistent with this idea, we find that firm performance drops significantly after the death of one of their executives only in thin markets, in which case the effect is significantly larger (-1.7 percentage points). We show that our results are robust to both changes in the measure of market thickness – using a continuous rather than dichotomous indicator – and in the measure of performance – using productivity instead of ROA. We also run a large number of additional robustness checks, finding that the results are remarkably consistent across all specifications.

Other mechanisms could give rise to stronger effects of death events in thin markets. Executive deaths could, for example, more severely disrupt local input-output relationships when the market is thin. In order to nail down search frictions for finding replacement executives as the economic mechanism through which executive-specific shocks affect firm performance, we look at the elasticity of peers wages to executive deaths in the same market. If firms hit by death events search for a replacement locally, their demand for executives will generate an upward pressure on executive pay, whose intensity depends on the thickness of executive supply. In line with our results on firms, we find evidence of spillovers on the compensation of existing executives in other firms in the same market, but only in thin local labor markets.

Finally, we exploit the richness of our micro data to investigate the specific channels though which the effects of executive deaths are magnified in thin markets. We show that executive deaths in thin local markets are associated with an increase in other executive separation rates in the following years. Strikingly, the effect on separation rates is heterogeneous across education levels: in thin local markets, executive exits are followed by a disproportionate increase in the separation rate of executives with a college degree, arguably those who are more likely to have better outside options. Moreover, firms are also less likely to attract executives with a college degree. The combined effect is a deterioration of the average quality of the executive team, which explains the relatively long-lasting effects of executive exit on firm performance.

Overall, our findings highlight that the local supply of executives is an important driver of firm performance. Our work has important implications for the design of location-based policies to foster growth (see e.g. Glaeser and Gottlieb, 2008; Kline, 2010). In particular, the results suggest that local policies aiming at boosting growth should take into consideration the supply of executive skills.

Our work relates to several strands of literature. We first contribute to the literature on the consequences of frictional workers' mobility and the associated agglomeration effects. Our analysis rests on Marshall's 1890 idea that firms and workers in thicker labor markets face fewer frictions in finding a suitable match, and particularly for skilled workers (Abowd and Kramarz, 2003; Blatter and Schenker, 2012). Better worker-firm matches resulting from larger labor pools increase firms productivity (Diamond and Simon, 1990; Helsley and Strange, 1990; Combes and Duranton, 2006), also due to knowledge flows through workers mobility (Greenstone, Hornbeck, and Moretti, 2010; Bloom, Brynjolfsson, Foster, Jarmin, Patnaik, Saporta-Eksten, and Van Reenen, 2019; Serafinelli, 2019). Compared to this literature, we focus on a particular category of workers – the executives. Local labor markets matter because workers' mobility is costly (Artuç, Chaudhuri, and McLaren, 2010; Dix-Carneiro, 2014). Consistently, Marinescu and Rathelot (2018) and Manning and Petrongolo (2017) find that job search behavior is quite local. There is also evidence that labor mobility has declined significantly in the U.S. (Moretti, 2011; Molloy, Smith, Trezzi, and Wozniak, 2016; Molloy, Smith, and Wozniak, 2011, 2017; Kaplan and Schulhofer-Wohl, 2017). We show that, despite substantially higher wages, mobility is low for executives too.

Our results also relate to the body of work in management economics that emphasize the key role of top executives in shaping firms outcomes. Bertrand and Schoar (2003) find that executive fixed effects matter for a wide range of corporate decisions. Bloom and Van Reenen (2007, 2010) and Schivardi and Schmitz (2020) focus on measurable management practices, and find a strong association between these practices and firm productivity. Bender, Bloom, Card, Van Reenen, and Wolter (2018) use matched employer-employee data to show that firm performance is disproportionately dependent on the human capital of the executives, rather than of the average worker. More directly related to our work, several studies rely on the occurrence of exogenous events such as CEO deaths or hospitalizations to shed light on the importance of executives for firm outcomes (see e.g. Johnson, Magee, Nagarajan, and Newman, 1985; Bennedsen, Nielsen, Perez-Gonzalez, and Wolfenzon, 2007; Bennedsen, Pérez-González, and Wolfenzon, 2020; Becker and Hvide, 2013; Holland and Lel, 2015; Smith, Yagan, Zidar, and Zwick, 2019; Choi, Goldschlag, Haltiwanger, and Kim, 2019). Compared to these papers, we estimate the causal impact of the thickness of local labor markets for executives on firm performance. Fee, Hadlock, and Pierce (2013) show that, for US listed firms, endogenous CEO replacements – i.e., decided by the board – are more effective in changing the firm's policies when the firm's headquarters are in thick markets. We look at private firms, for which the executive market is more likely to be local; moreover, we consider exogenous executive changes following death events. Our work isolates a supply-side friction that can explain why some firms allocate control to inferior managerial talent, hurting their performance and, through this, aggregate productivity. In doing so, our results speak to previous work in corporate finance on the performance effects of managerial turnover (see for instance Denis and Denis, 1995; Huson, Malatesta, and Parrino, 2004), and to recent research showing that differences in productivity between firms are substantial, persistent over time and remain large even after controlling for differences in the quality of production inputs (Syverson, 2004; Foster, Haltiwanger, and Syverson, 2008).

We also add to the literature that studies the effects of labor supply shocks on firm performance and employees' compensation. Prior work focuses on large, market-wide labor supply shocks, e.g., due to immigration or changes in the college graduation rate (Katz and Murphy, 1992; Card, 2009; Dustmann, Ludsteck, and Schönberg, 2009). More recent studies use matched employer-employee data to single out idiosyncratic supply shocks and zoom in within the firm. Isen (2013) uses worker sudden deaths to show that workers are paid less than their marginal product. Jäger and Heining (2019) show that workers' exits on average raise co-workers' wages and retention probabilities, and the more so in thin markets. Compared to us, they consider all workers and focus on co-workers wage responses rather than firm performance and wages in *other* firms in the same local labor market.

Finally, we contribute to the recent literature on peer effects and wage spillovers among workers. Herkenhoff, Lise, Menzio, and Phillips (2018) and Jarosch, Oberfield, and Rossi-Hansberg (2019) combine structural models of team production with learning and matched employer-employee data to assess the extent of learning from coworkers. Both papers find that workers learn from high ability coworkers. Cornelissen, Dustmann, and Schönberg (2017) investigate the presence of peer effects in wages, finding that they are higher for low-skilled occupations. We show that the effects of executive exits on other executives depend on the structure of the local market for executives. The analysis also adds to previous studies on peer effects that have so far either examined workers performing routine tasks (e.g. Falk and Ichino, 2006) or focused on specific occupations in which knowledge spillovers are expected to be large, such as scientists, academics, and physicians (see e.g. Waldinger, 2010, 2011; Azoulay, Graff Zivin, and Wang, 2010). Consistent with the results of this literature, we find that executive exits in thin markets have negative effects on peers retention, particularly for the high skilled ones.

The remainder of the paper is organized as follows. Section 2 presents our empirical strategy. Section 3 presents the data and some motivating evidence. Section 4 describes the results on firm performance, Section 5 describes the results on outcomes at the executive level. Section 6 discusses the external validity and economic significance of the results. Section 7 concludes.

2 Identification strategy

Our goal is to determine if the local supply of top managerial skills is a determinant of firm performance. To this end, we need to define the firm's relevant market for managerial skills.[1] Below, we show that executive mobility across industries and space is limited. We therefore define the combination of the commuting zone and industry as the relevant labor market for executives ("the market" in what follows) and the executives working in other firms in such market as the pool from which each firm is likely to hire executives. Ideally, one would then use random variation in the supply of executives to determine its effects on firm performance. In practice, finding exogenous shocks to the supply of managerial skills at the industry-local level is very difficult.

We propose an alternative identification strategy based on the occurrence of executive deaths. Specifically, we use sudden death as a random shock for executive exit at the firm level and check if it affects firm performance. Of course, the death of an executive can cause disruption in a firm's operations independently from the supply of executives in the local market. In fact, an executive might have accumulated firm specific human capital that takes time to be reconstructed by a replacement, even when replacements are easy to find. The key element of our identification strategy is to distinguish the effect according to the thickness of the local market for executives. Conditional on other controls, differences in the effect of a sudden death according to executive market thickness indicate that executive supply matters for a firm's capacity to respond to an exogenous shock and, therefore, for its

[1] The existing agglomeration literature generally considers the workforce as a whole rather than the workers in top positions within firms. A recent body of work suggests that the local supply of executives might play a key role (Gennaioli, LaPorta, de Silanes, and Shleifer, 2013; Bloom et al., 2019), but, to the best of our knowledge, no causal evidence is available yet.

performance.

Our identification strategy closely approximates the following example. Assume that an executive dies unexpectedly in, say, a textile firm located in Prato, a large textile cluster. We will estimate the impact on firm performance in several years surrounding the event. We will then contrast the magnitude and duration of this impact with death events of executives occurring instead at firms located in thin local labor markets, such as for instance another firm in Prato operating in the Chemicals industry, for which the local pool of replacement executives is thin. If the probability of finding good executives is lower in this case, we expect a large negative effect of executive exit on performance.

To implement our identification strategy, we leverage a matched and exhaustive employee-firm panel, which provides us with precise information on the working address of all executives, as well as on the firms they work for. Specifically, we run the following OLS regression at the firm-year level:

$$\text{ROA}_{i,j,t} = (\beta_{\text{tn}}\text{Thin}_{j,t} + \beta_{\text{tk}}\text{Thick}_{j,t}) \times \text{DecEx}_{i,\tau} + \beta_2 X_{i,j,t} + \eta_{i,j,t} \tag{1}$$

where $\text{ROA}_{i,j,t}$ is return on assets of firm i in market j at time t and the market is defined as the combination of the commuting zone and the industry in which the firm operates; $\text{DecEx}_{i,\tau}$ is a dummy taking the value of one if at least one of the firm's executives dies in period τ, where τ can be a single year or, in our preferred specification, the years from $t-3$ to t; Thin and Thick are dummies for thin and thick executive markets, based on median split; and $X_{i,j,t}$ are additional controls, including a rich set of dummies. If the local supply of executives matters, then we expect β_{tn} to be larger than β_{tk} in absolute value: the effect of executive death is stronger in thin markets, when the firm faces relatively large costs of searching for and switching to alternative executives.[2]

Formally, identification rests on the assumption that, conditional on controls, the interaction between market thickness and the sudden death event is orthogonal to the error term: $E(\eta_{i,j,t}|\text{Thin}_{jt} \times \text{DecEx}_{i,\tau}, X_{i,j,t}) = 0$. Next, we discuss potential threats to this assumption and how we address it. A first possibility is that firms in thin markets are different from those in thick ones for reasons unrelated to executive supply. To account for this, in all specifications we include firm fixed effects, so that β_{tn} and β_{tk} capture the effects of deaths

[2] Differently from other recent papers which use death events (Jäger and Heining, 2019; Jaravel, Petkova, and Bell, 2018; Smith et al., 2019), we do not employ matching techniques. In fact, given that our focus is on executive markets, defined in terms of local labor market and industry, in many markets we have just a few observations per year (see Table 1), making matching within market basically impossible. Instead, as we explain next, we use a large set of controls that greatly restrict the data variation used to estimate the parameter of interests, addressing concerns of comparability between treated and controls. In particular, we carefully control for market level shocks that could affect both death events and firm performance, something that cannot be done in a matched sample that does not condition on operating in the same market.

in different markets in deviation from the firm's "normal" returns. This also controls for the possibility that firms hit by a death event are low-performing in general. Second, to account for time-varying shocks related to market thickness, we always include the indicators of market thickness themselves, so that the effect we measure is in deviation from any general correlation between thickness and performance. There might also be negative shocks that simultaneously affect firm performance, market thickness and executive death probability. In our most saturated specification, we add market×year fixed effects to account for any shock to performance at the market-year level. In this specification, identification comes from comparing performance of treated (ie., hit by a death event) and control firms *within* the same market and time period separately in thin versus thick labor markets. This largely addresses the concern that our measures of local labor market thickness could spuriously correlate with market characteristics driving the differential firm response to executive exit.

Still, differential responses to deaths might be generated by differences in firm characteristics across thin and thick markets, above and beyond the fixed attributes captured by firm fixed effects. To control for this, we introduce lagged controls for size, age, and profitability, interacted with year fixed effects. Including these controls ensures that the estimates are not driven by heterogeneous trends among large, old, or profitable firms. We also augment some specifications with dummies indicating terciles of the number of firms' executives interacted with year dummies, in order to make sure that the results are driven by the treatment - the death of an executive - rather than indirectly by the number of firms' executives. A further concern is that there might be firm characteristics correlated with market thickness which imply a differential response to executive deaths. For example, small firms might suffer more from executive death and be more common in thin markets. We add in robustness tests the interactions of firms and deceased executive characteristics with the death dummy. Reassuringly, our estimate of interest remains remarkably stable. We also run additional robustness checks discussed in details in Section 4.2.

One could still argue that a stronger effect of an executive death in thin markets is related to factors different from executive market thickness. For example, suppose that the death of an executive disrupts firms' relationships with their suppliers and customers, which could have a significant effect on firm performance (see e.g. Barrot and Sauvagnat, 2016). If executives' relationships with their local suppliers and customers are more valuable in thin markets – maybe because these are also markets with sparse local production networks in which existing relationships are less substitutable – we would still get a stronger effect of deaths in thin markets, but for a different reason. To obtain more direct evidence of the channel we hypothesize, we look at spillovers on executives working at other firms in the same market, and focus on their wages. If firms' searches for new executives are mainly local, theory predicts that we could gauge the tightness of local labor markets for executives with the elasticity of other executive wages in the same market. Specifically, we estimate the following (executive level) equation:

$$\text{Ln(Wage)}_{k,-i,j,t} = (\gamma_{\text{tn}}\text{Thin}_{j,t} + \gamma_{\text{tk}}\text{Thick}_{j,t}) \times \text{DecEx}_{j,t-1} + \gamma_2 X_{k,-i,j,t} + u_{k,-i,j,t} \quad (2)$$

where $\text{Ln(Wage)}_{k,-i,j,t}$ is the logarithm of the wage of executive k working in firm $-i \neq i$ in the same market as firm i hit by a death event, $\text{DecEx}_{j,t-1}$ is a dummy taking the value of one if at least one executive died in the previous year in the same market. Firms ever hit by an executive death are excluded from the sample. All regressions include year, firm, and we then progressively add executive fixed effects, commuting zone×year and industry×year fixed effects, as well as controls for executive gender, age, and tenure, interacted with year fixed effects. We build the age and tenure controls by interacting year dummies with terciles of executive age and tenure, in year t. In all regressions, standard errors are clustered at the commuting zone × industry level to account for serial correlation of the error term within executives in the same market. We expect that γ_{tn} is larger than γ_{tk}: the pressure exerted on executive wages by the extra demand from the affected firm shows up more in terms of executive wages the thinner the market for executives.

Yet another concern is that executive deaths disrupt firms, which might benefit executives employed at other firms in the same executive market if they are competitors in local product markets. If workers wages share to a certain degree firms shocks, as shown for example by Guiso, Pistaferri, and Schivardi (2005), the improvement in firm performance would explain the increase in the wage, without resorting to equilibrium response of wages due to changes in local demand for executives. To address this concern, we run a version of Equation 2 in which we exclude executive wages of firms operating in non-tradable industries, for which product market competition is local, and check if our results change. We also run a placebo test using white collar wages, which should benefit from reduced competition but not from the increase in executive demand.

Finally, one might worry that firms endogenously select their location by taking into account the fact that executive turnover might have a negative impact on performance, especially in thin labor markets. This is not a threat to the identification strategy: if anything, this should bias the results against finding larger effects in thin labor markets, given that the most vulnerable firms to executive exits are likely to endogeneously select their location in thick labor markets. However, it might affect the external validity of these estimates, a point that we discuss in the last section of the article.

3 Data

In this section we describe our data sources, provide summary statistics, and establish some facts about executive mobility that motivate our definition of local markets for executives.

3.1 Data description and summary statistics

We leverage restricted-access administrative data available at the Italian Social Security Institute (INPS, Istituto Nazionale Previdenza Sociale). We have access to matched employer-employee records for all private firms with at least one employee. The dataset contains longitudinal information on all workers' job position, compensation, and employer since they joined the labor force. The data start in 1984, but the information on the municipality in which each firm is located is available only from 2005. We therefore focus on the period 2005-2015 (in 2015 constant euros). We also exclude financial firms from the sample.

The Italian economy features large heterogeneity in the thickness of labor markets across areas. We consider Commuting Zones (hereafter CZs) – around 600 – defined by the Italian National Institute of Statistics (Istat) as the relevant geographical unit for computing measures of labor market thickness. These areas are aggregated as clusters of municipalities that are characterized by strong within-cluster and weak between-cluster commuting ties. We then measure thickness at the CZ $\times$ (2-digit) industry level with the total number of executives in a CZ $\times$ industry.[3] As a result, a given labor market can be described as thick in one set of industries, and thin in others.

The INPS data allow us to precisely identify firms' *executives*. The job title of executives ("dirigente" in Italian) applies only to the set of workers that have an executive collective contract, a fact that is recorded by social security data as the job title matters to determine pension contributions and entitlements. Legally, executives are defined as employees that manage a firm or a part of it and exert their role with some discretionary decision power. Executives therefore constitute the workers that take the strategic decisions within the firm: in fact, they represent around 1% of the Italian workforce. The next category in the firm hierarchy is that of "managers" ("quadro" in Italian), who are hierarchically below executives and have limited or no autonomous decision power, followed by "clericals" ("impiegati" in Italian). We refer to the superset of "managers" and "clericals" as *white-collars*.[4] The hierarchical structure is clearly reflected in compensation: The average (median) executive

[3]The 19 2-digit industries are Agriculture Fishing, Mining, Wood Furniture, Food Tobacco, Basic Metals, Mechanics, Textile, Chemicals, Shoes, Non Metallic Minerals, Paper and Publishing, Construction, Utilities, Transport, Personal Services, Trade, Real Estate, Hotel Restaurant, and Professional Services.

[4]The last category is that of blue collar workers ("operai" in Italian), which we do not use in our analysis.

gross wage in 2015 is 135,000 euros (111,000 euros), against 61,000 euros for managers and 28,000 for clericals.

Information on the year of death is known from Social security records. The cause of death is unknown. As in Jaravel et al. (2018), in order to reduce the likelihood that death results from a lingering health condition, we consider executives passing away before or at the age of 60.[5] We identify 1,076 such events. Figure 1 shows the set of Italian CZs for which we observe at least one death of an executive over our sample period. As expected, we are more likely to observe death events in northern CZs, given that on average these local markets are larger. Note however that the set of death events spans the entire Italian territory and, importantly for us, we do observe death events both in thin and thick markets.

The INPS has some information on firms (location, industry, and all the information on employees), but no information on their economic and financial performance. We therefore match the INPS records with a firm database (referred to as CERVED, the data provider) that contains balance sheet information of all incorporated companies in Italy. These companies account for approximately two thirds of private sector GDP. The matched executive-firm dataset provides us with a large sample of events hitting executives, allowing for precise estimates.

Following the literature on executive turnover (see, among others, Denis and Denis, 1995; Huson et al., 2004; Bennedsen et al., 2007, 2020), we use ROA as preferred measure of performance, defined as EBIT (Earnings Before Interest and Taxes) over lagged assets. ROA measures the average return on the capital immobilized by the firm, without distinguishing between its sources (debt vs. equity). As such, it is a measure of profitability of the overall capital stock. If a firm suffers from the death of one of its executives, we expect this to show up in terms of ROA. An alternative would be to consider ROE, that more directly reflects returns to equity holders. The problem with ROE it is that it depends on the firm's financial structure and it is more volatile than ROA.

Table 1 presents summary statistics for our sample.[6] Panel A describes the firm sample, which consists of 306,246 firm-year observations between 2005 and 2015. A firm is included in our sample if it appears as having at least one executive in the INPS files in any year over the sample period. ROA for the average (median) firm is around 4.1% (3.8%), and firm value-added per worker is equal to €84,553 on average. The average firm in our sample has 3.2 executives.

The second part of Panel A compares the size, age, and return on assets of firms in thin

[5] In robustness checks, we repeat the analysis by excluding deceased executives with claims to the administration for paid-sick leave in any prior year.

[6] To account for outliers, we winsorize all continuous variables below the 1st and above the 99th percentile to value of the 1st and of the 99th percentile respectively.

versus thick local labor markets for executives. Firms in thick local labor markets tend to be on average more profitable, and slightly smaller and younger. The third part of Panel A compares instead the size, age, and return on assets of eventually treated and never treated firms. Eventually treated firms – those hit by the death of one of their executives at least once during the sample period – are larger and more profitable than never treated firms. This makes it all the more important to ensure in the empirical analysis that firm-level characteristics are not driving the results.

Panel B presents the executive-level sample, separately for deceased executives, taken in the year of death, and non-deceased executives. Executive characteristics are fairly similar across both samples, even though the average deceased executive tends to be older - 52.8 years old compared to 48.4 for non-deceased executives -, has worked slightly more in the same firm - her/his tenure is 11.9 at the time of the death versus 9.8 years for non-deceased executives, and is slightly less likely to be a woman (9.7% versus 13.2% for non-deceased executives). Note however that wages in the year preceding the death event are virtually identical to the average wage in the sample of non-deceased executives. This is consistent with the notion that the death events that we observe in the data are fairly unexpected, as we would expect the compensation to be lower in the year prior to the death if the executive had some health conditions that impaired her ability to work.

Since 2010, firms are required to report to the ministry of labor the educational attainment of new hires. We use the INPS codification in order to construct three dummies corresponding to the executive having less than a high school degree,[7] high school and a college degree. Even though reporting education attainment of all new hires is a legal obligation since 2010, firms have the possibility to report "not known". The consequence for our analysis is that we observe information on education for around 65% of the executives who changed job after 2010. In the sample of executives changing firms after 2010, 5% have no high school degree, 21% have a high school degree, and 73% have a college degree.

3.2 Stylized facts on executive mobility

In this section we present stylized facts on the mobility of executives to support our assumption that employees' industry specific human capital and geographical mobility costs direct their job searches toward firms within the same industry and geographical area.

We first describe in Table 2, Panel A, transitions between executives and white-collars occupations. A very large fraction of workers remains in the same layer of the hierarchy

[7]Note that in Italy compulsory schooling age is 16, while high school requires three more years of education. Differently from the US, therefore, a large part of the population does not hold a high school degree.

over time, even when they move from a firm to another: the unconditional probability that an executive in year t is also an executive in year $t+1$ is 99.5%, and remains at a high 95.2% for executives moving from a firm to another. These numbers are similar for white-collars. Similarly, the probability of moving up the hierarchy (to the position of executive) for managers and clericals is small: respectively 0.3%, and 1.3% in a given year (conditional on remaining within a given firm or moving to another). Not surprisingly, executive demotions tend to occur almost exclusively with firm-to-firm mobility. These numbers provide strong support for our working hypothesis that executives employed at other firms represent the relevant labor market for firms when hiring a new executive.

In Panel B, we report the fraction of executive moves that are within the same CZ, and within the same 2-digit industry. Importantly for our identification strategy presented below, we find that a large fraction of executive moves in our sample tend to occur within the same CZ, and the same industries. We find that 65% percent of executive moves are within the same CZ, whereas 55% percent occurs within the same 2-digit industry. For the sake of comparison, we also report what would be the associated fraction of executive moves within the same CZ and 2-digit industry assuming instead that executive moves between two firms are random. Assuming executive moves as being random, we would have observed instead 13% percent of executive moves within the same CZ, and 12% within the same 2-digit industry. When considered jointly, we find that 39% percent of executive moves are within the same CZ $\times$ industry, while this number would be 1.7% under random moves. These patterns suggest that executives in our sample deploy significant industry specific knowledge, and face significant costs for moving from one area to the other.

One may wonder whether the Italian economy is an outlier in terms of executive mobility. As a first comparison, we reproduce in Panel C the same computations for the French economy, for which we have similar matched employer-employee records from a random sample of 1/12th of the French workforce (provided by the French statistical office, INSEE). We use an industry classification with a similar granularity (17 industries instead of 19), and the list of CZs as defined by the French statistical office. The pattern of executive moves within industry and CZ is remarkably similar to the one in Italy: 71% percent of French executive moves are within the same CZ, 66% percent within the same industry, and 50% percent within the same CZ $\times$ industry, against respectively 15%, 13%, and 3% in counterfactuals with random moves. We do not have similar matched employer-employee data for the United States. However, the same computations using alternatively Execucomp data which covers the top five highest-paid executives of a large sample of U.S. listed firms also indicate that even (the tail of) U.S. listed firms' top executives tend to move disproportionately more within the same area and industry.

Finally, we confirm in the data that there is a positive correlation between market thickness and the probability of hiring external executives from the same local market. We measure market thickness of market j with the log of 1+the number of executives working in firms belonging to such market. A first implication of the fact that a thicker local supply of executives is more likely to satisfy a firm's managerial needs is that, when a firm hires an executive, the probability of hiring locally should be higher the thicker the market. To test this simple implication, we run a regression of the share of local hires over total hires for market j at t on market j thickness at $t-1$. The results, reported in Table 3, confirm this implication: the share of local hires increases with thickness. Results are robust to controlling for industry×year and CZ×year fixed effects, which take care of any local or industry time-varying shocks. In the most saturated regression, the coefficient is equal to 0.044 (and highly statistically significant) which implies that doubling the number of executives goes together with an increase in the share of locally hired executives of approximately 4.4%. Given that the average share of locally hired executives is 39% (see Table 2), this represents an increase of 11% over such average share.

Next, we check whether the "quality" of executives hired is also correlated with market thickness. For this, we exploit the education data, available for a majority of executives who changed job from 2010. Table 3, Panel B, shows that the thicker the market the less likely it is that a newly hired executives has a high-school degree and the more likely that she is a college graduate. This is consistent with the idea that the thickness of the local executive market has a positive impact on the quality of new executive hires. Of course, this correlation cannot be interpreted in a causal sense. In particular, it might be that firms located in thicker markets are "better" firms, that is, more productive, more innovative or export oriented, and therefore they might express a demand for executives of higher quality. To take a step towards a causal interpretation of the correlation between executive supply and firm performance we now move on to our main identification scheme: firm response to executive death in markets with different degrees of thickness.

4 Results

In this section, we estimate the effect of executive exit on firm ROA. We interpret executive death as a shock to firm demand for new hires. Appendix Figure A.1 plots the change in the number of executives following a death event, distinguishing between thin and thick markets. Consistent with our interpretation, in both market types the number of firms' executives drops by virtually 1 on the year of the death, and then it recovers in the following two years, by around 0.30 each year. The coefficient is virtually zero in years 3 and 4. The fact that the patterns are very similar in thin and think markets is a first indication that any difference in the effects of deaths on performance is likely to come from match quality rather than quantity. We further show in Panel B that this effect on the number of executives is not driven by internal promotions: the number of promotions is not significantly different after the death event both in thin and thick markets. This indicates that the increase in executives following the death event is driven by executive hiring on the external labor market.

4.1 Baseline results

To check for the effects of executive deaths, we first run a simplified version of Equation 1 without distinguishing between thin and thick markets, and present the results in Table 4, Panel A. We look at the effects of an executive death on the firm performance over the three subsequent years: in the notation of Equation 1, $\tau = [t-3, t]$. The estimate in first column, where we only control for firm and year fixed effects, indicates that ROA drops by an average of approximately 0.9 percentage points in the three years after the death event.[8] The estimate is significant at the 1% level. Given the sample mean of 4%, the effect implies a drop of ROA by almost a quarter. In the second column we include industry×year and CZ×year fixed effects. The estimate remains virtually the same. Not surprisingly, this confirms that the effect on firm performance is not related to shocks at the industry or geographical levels correlated with executive deaths. In the third column we add firm characteristics (dummies for tercile of: assets, age, ROA interacted with year dummies, all measured at t-3) and dummies for terciles of the total number of firms' executives interacted with year dummies. Again, the results are unaffected. This addresses the concern that the results could be driven by diverging trends between firms with different characteristics or with a small versus large number of executives. Finally, in the fourth column we add market×year fixed effects. In this specification, we absorb any shock that hits the firm's executive market and that could be correlated with executive death, including natural disasters and the like. The effect is slightly reduced, at -0.66%, and significant at 10%.

The results of our basic estimation indicate that executive deaths have a large impact on profitability. This regression is a useful starting point in our analysis but arguably a negative effect of death on performance can result independently from executive supply: an executive is likely to have some firm specific capital that gets destroyed by death and, in the process of rebuilding it, firm performance might suffer. To implement our identification strategy, we then move to the estimation of Equation 1, where we allow the executive death effect on

[8]In terms of comparison, Bennedsen et al. (2020) find a slightly large value in their Danish data (-1.86%, see the fourth column in their Table VI), arguably because they only consider the year of death and focus on CEOs only rather than all executives.

ROA to depend on the thickness of the local market for executives. In these regressions, one could think of the effect in thick markets as the one resulting from the destruction of firm specific human capital, and any extra effect in thin market as due to low executive supply.

The results of Panel B in Table 4 are clear cut: all the effect come from deaths in thin markets. In fact, we find that, across all specifications, the drop of ROA in thin markets is around 1.7 percentage points, and highly statistically significant at the 1% level. This means that, compared to the sample mean, ROA drops approximately by half. Instead, in thick markets we find virtually no effect. The test of the hypothesis $\beta_{tn} = \beta_{tk}$ clearly rejects the null in all specifications (see Table 4). The estimates indicate that the firm-specific human capital channel finds little support in the data. In thick markets, where it is easier to find a replacement, the firm's performance is hardly affected by the death event. Instead, in thin markets the drop is large and precisely estimated. This is consistent with the hypothesis that the (local) supply of top management skills affects firm performance.

Our basic specification estimates an average effect in the three years following the death event. We next examine the dynamics of the effects, re-estimating a version of Equation 1 where we allow the effect to differ for each year surrounding the event. We report the full results in Table 5, where we separately estimate the regression for thick and thin labor markets. Given that the results are extremely stable across specifications, we only comment the regressions of the first and third columns, whose coefficients are also plotted in Figure 2. First, for our identification strategy to hold, ROA should show no prior trend. Reassuringly, the coefficients on DecEx_{t+1} and DecEx_{t+2} are small and not statistically different from zero both in thin and in thick markets. Second, in thick markets we observe a drop in the year of the event (-1%), and values very close to zero in all the following years. None of the coefficients is statistically significant, indicating that for these firms there is no departure from the firm-level average ROA (recall that all regressions include firm fixed effects). On the contrary, in thin markets ROA drops substantially on the year of the event, with an estimated value of -2.56 percentage points, and remains below -2% and highly significant in the two following years. It is still negative three years after the death event (-1.48%), and marginally loses significance after 4 years (-1.12%), and the effect clearly disappears only after 5 years. We conclude that while in thick markets executive deaths hardly affect performance, in thin market the effect is substantial and long lasting.

4.2 Robustness

Our granular data allow us to explore in details the robustness of the results. For the sake of brevity, we report all the results in the appendix.

Measure of market thickness. We first assess the robustness of our main result to using a continuous indicator of labor market thickness, defined as the logarithm of one plus the number of executives working at other firms in the same CZ× industry in the previous year. Specifically, we run the following equation:

$$\text{ROA}_{i,j,t} = \beta_1 \text{Thickness}_{j,t} \times \text{DecEx}_{i,\tau} + \beta_2 X_{i,j,t} + \beta_3 \text{Thickness}_{j,t} + \beta_4 \text{DecEx}_{i,\tau} + w_{i,j,t} \quad (3)$$

Results are reported in Appendix Table A.1, which replicates the structure of Table 4. We find that the impact effect of the death event is strong, around 3.33 percentage points in the most saturated specification of the last column. This effect should be interpreted as that for a firm in a local market with no other executives. The interaction is 0.49 and significant at 1%, indicating that, as thickness increases, the negative effects of executive deaths are attenuated. These values imply that the effect is negative for most of the markets, with the exception of the very large ones. Finally, we find some evidence of a negative effect of thickness in itself in the first two columns. Note however that this should not be interpreted in a cross sectional sense, that is, firms in thicker markets having lower ROA. Given that we always include firm fixed effects, and given that firms do not change markets, the coefficient is only identified by the time series variation in the number of executives within market. In fact, when we add more controls at the level of the firm (third column), the effect disappears (in the fourth column market thickness is absorbed by market-year effects).

Firm characteristics. Our regressions already control for firm characteristics. However, one remaining concern is that our estimates for thin and thick markets might reflect the differential responses of some types of firms to death events within thin and thick markets as opposed to the true causal impact of labor market thickness. For example, firms with many executives might be both more present in thick markets and less adversely affected by death events than firms with few executives, irrespective of the thickness of their labor market. To control for this possibility, we augment our specification with interactions between firm characteristics (number of executives, assets, age and ROA, all measured 3 years before the death event) and the death dummy. To allow for more flexibility in the controls, we use the continuous measure of thickness. Appendix Table A.2 shows that, even with these additional controls, the estimate of the interaction between the deceased executive dummy and market thickness remains remarkably stable at around 0.45 in all cases.

Deceased executive characteristics. A similar argument can be made regarding the characteristics of the deceased executives. For example, older executives might be more common in thin markets, where it is harder to find a replacement, and their death might have a stronger impact on performance. To gauge the severity of these concerns, we include interactions between age, tenure, gender and wage of the deceased executive in the year prior to death and the deceased executive dummy.[9] Results reported in Table A.3 confirm that the estimate on the interaction term between the deceased executive dummy and market thickness remains stable when adding these additional controls.

Geographical areas. The Italian economy is characterized by a large heterogeneity in economic development, with a clear negative gradient from the North to the South. One might be concerned that our effects are induced by some specific area, for example the South, where markets are thin and firms are generally weaker in terms of performance. This concern is greatly mitigated by the fact that, as shown in Figure 1, death events are spread across Italy, and that our specifications exploit within CZ variation only. In any case, we have estimated our regressions separately for the North and the Center-South, as well as dividing the North in North East and North West. Once again, Table A.4 shows that the estimates are similar across areas.

Performance measure. We use an alternative measure of performance. We choose productivity, defined as value added (in 2015 constant thousand euros) per worker. Productivity is a more comprehensive measure of the firm's efficiency, as it also accounts for the number and the compensation of employees. The results are reported in Appendix Table A.5 and fully confirm those obtained with ROA. As shown in Panel A, productivity in affected firms in thin markets drops by between 4 and 8 thousand euros per workers according to the specification in the three years following the death event. As for ROA, no effect emerges for firms in thick markets: if anything, the estimate is positive, but statistically insignificant. In Panel B we repeat the exercise using the continuous indicator of thickness, finding a negative intercept and a positive coefficient of the interaction, both significant at 1% in all specifications. This indicates that, as thickness increases, the negative effects of executive deaths on labor productivity are attenuated.

Definition of death events. Next, we check the sensitivity of the results to restricting the sample to a more conservative set of sudden executive deaths. For this, we repeat the analysis by excluding deceased executives with claims to the administration for paid-sick leave in any prior year, and present the baseline specifications in Appendix Table A.6. The coefficients are virtually the same as in Panel B of Table 4.

Firms attrition. Another possibility is that our results are driven by the firms that eventually exit the market. It might be that in thin markets some firms do not find a suitable

[9] In the unlikely event in which two executives of the same firm died in the same year, we take the average of each executive characteristic. Note that we do not include the interaction between market thickness and deceased executive characteristics because the latter are only defined for firms hit by death events.

replacement and therefore, after a deterioration in performance, they exit, while firms that find a replacement do as well as those in thick markets.[10] While this hypothesis confirms that executive market thickness affects performance, it implies that the average effect we measure is actually concentrated in a few low-performing firms, and it is therefore interesting to assess its validity. To do so, we repeat the dynamic regressions of Table 5 focusing on the closed sample, that is, excluding firms that exit the sample at some point. Table A.7 reports these estimates, showing that the results are very similar to those obtained on the complete sample. This indicates that the results are not driven by eventually exiting firms.

Non executive white-collar. Finally, we analyze if the effect is specific to executives by considering the evolution of ROA when at least one (non-executive) white-collar dies. Table A.8 repeats the regressions of the Table 4, panel B, substituting the Deceased Executive dummy with a Deceased white-collar dummy. We find no significant effect of a white-collar death, both in thin and in thick markets. This can be due both to the fact that one white-collar worker other than an executive is not a key asset for firms, or that there is no shortage of white collar workers: they are not in short supply in any market. Either way, this placebo test rejects the concern that differences in firm characteristics between thin and thick markets could drive both worker deaths and performance.

5 Is it really executive supply?

Our evidence so far is consistent with the hypothesis that the local supply of executives matters for firm performance. However, one might still argue that the effect we find is spurious, as there might be unobserved firm characteristics that are correlated with thickness and that determine the intensity of a firm's reaction to the death shock. For example, thin executive markets might be also thin in terms of other firm's inputs, such as general workers and intermediates. It might be that firms in such areas are more fragile and therefore more affected by any negative shock, including an executive death. We believe that our rich set of local, sectoral and firm controls, as well as the interactions considered in the previous section, makes this possibility unlikely. However, given that it is theoretically possible, we now supply further evidence building on some unique implications of the economic mechanism behind our hypotheses.

[10]We might also wrongly interpret the dynamics presented in Figure 2 as evidence that firms gradually absorb death shocks while it might simply reflect the fact that the most-severely affected firms exit first.

5.1 Executive wage response in other firms

As a first exercise, we study the wage response of executives employed by firms in the same market as the affected one. Our hypothesis is that affected firms need to replace the deceased executive, possibly poaching the replacement executive from other firms in the same local market. One implication of this theory is that executive wages in neighboring firms should increase after a death event in another firm due to the increase in executive demand, and the more so the thinner the market. In fact, as reported in Table 1, the median market has four executives, so that one death represents a substantial shock to executive supply in most markets. Our granular data allow us to test this hypotesis. Specifically, we estimate Equation 2, regressing executive wages on the interaction of the dummy variable $\text{DecEx}_{j,t-1}$ with the dummies for thin and thick markets. Note the change of observation unit, now at the executive rather than at the firm level. We only use one lag of the death shock, as the hiring pressure on the local executive market tends to concentrate in the year following the death event. We exclude all firms that ever had a death event, so that the sample is only of never affected firms. In addition to the firm level controls of the previous tables, all regressions also include executive fixed effects and, in some specifications, executive controls.

Table 6 presents the results. In the first column we do not distinguish by market thickness and find a positive but statistical insignificant coefficient. Once we distinguish between thin and thick markets, the estimates in the second column indicate that executive wages increase on average by around 0.56%, statistically significant at 1% confidence level, when a neighboring executive dies in the same thin labor market in the previous year. In thick markets we find no effect. A test of equality of the coefficients rejects the null with a p-value of 6.7%. The coefficient drops slightly to around 0.4%, significant at 5%, when we gradually include industry×year, and CZ×year fixed effects, and when we control for potential diverging trends between young and old executives, male and female executives, and executives with short and long tenure, although in these specifications we fail to reject the null of equality of the coefficients. These results lend further support to the hypothesis that the effects on performance are due to differences in executive supply.

While the wage spillovers are consistent with the idea that executive deaths are associated with an increases in the demand for executives, there is another potential explanation. In fact, the disruption caused by executive deaths in affected firms might benefit competitors on the product market and, consequently, their employees. If the set of competitors overlaps with that of the executive market, that is, if competitors are mostly local firms in the same industry, the increase in the wage might be due to an improved performance in neighboring firms. We handle this problem in two ways. First, we check in Panel B of the same Table 6 whether other white-collars in the firm hierarchy experience an increase in wages, which would presumably be the case if employees pay is indirectly affected through product market competition. Reassuringly, we find no effect on other white-collars compensation in either thin or thick markets. Second, we run the same specification as in Panel A but exclude from the sample executives working in non-tradable industries, for which product market competition is local, and higher performance of non-affected firms in the same local market could in principle explain the increase in wages that we observe. As shown in Appendix Table A.9, the estimates on executive wages employed at neighboring firms are still strongly statistically significant, and if anything larger, once we exclude non-tradable industries.[11] We conclude that the effect on wages is attributable to the upward pressure of the demand for executives of the firms affected by the death event.

5.2 Disruption within affected firms

Our theory predicts that in thin markets it should be harder to form good matches. This effect should be particularly apparent after executive deaths, which induce unplanned hires. We exploit this prediction to derive a set of testable implications related to the quality of the matches formed after the death event in thin and thick markets, through both the education level of new hires and future separation rates.

First, we look at the educational attainments of new hires. We have seen in Table 3 that, in general, new hires are of lower "quality" in thinner markets. We now check if this is the case following a death event. In Panel A of Table 7 we run the same regression as in Table 3, but change the explanatory variable and the set of controls: Instead of an indicator of market thickness, we use the deceased executive dummy interacted with the thin and thick market dummies, and we add firm fixed effects. We find that firms in thin markets are more likely to hire an executive without a high school diploma and less likely to hire one with a college degree following death events. While these result are in line with the reduced form evidence of Table 3, we stress the difference in the data variation used to identify the coefficients: there, we show that higher thickness is correlated with higher education cross-sectionally. Here, given that we have firm (and thin market) dummies, the regression shows that, after being hit by an executive death, a firm in a thin market is more likely to hire executives with lower education compared to the hires of *the same firm* in "normal" periods. This indicates that, when facing an unexpected executive exit, firms in thin markets on average hire less educated executives compared to cases in which the exit was expected and therefore the replacement planned in advance.[12]

[11]We classify the following industries as non-tradable: Construction, Utilities, Transport, Personal Services, Trade, Real Estate, Hotel and Restaurant, and Professional Services.

[12]In the last column we also run a check of any potential selection effect deriving from missing education

We hypothesize that the lower quality of matches could also lead to an increase in subsequent separations for executives within affected firms. We test this in Table 8, where we look at how death events affect the intensity of executive separations. We run a regression at the firm level, where the dependent variable is the ratio of executives that leave the firm in year t and work for another firm in year t+1 to the total number of executives in the firm in year t. We focus on executives that work at $t + 1$ to single out voluntary quits from retirements and firings. We find a positive and statistically significant coefficient in all specifications. For firms in thin markets, the fraction of executive turnover increases in the three years following a death event by around 1.5 percentage points. Compared to a sample mean of 4%, this represents an increase in the separation rate of 37%.

In addition to a higher separation rate, disruption should also imply that the ones leaving the firms are those with more outside options, that is, the high skilled executives. In Table 7, Panel B, we study the education of the executives who leave the firm, symmetrically to what we do for new hires in Panel A. We find that, after a death event, executives with a high school degree are less likely to leave a firm in a thin market and those with a college degree more likely to do so. Again, no significant effect emerges for firms in thick markets.

Putting all these results together, we conclude that an executive death event has little effect on firms in thick markets in terms of executive quality. On the contrary, in thin markets both the direct effect (new hires) and the indirect effects (separation of existing executives) point to a deterioration of the quality of the executive pool, which is likely to cause the deterioration in performance documented above.

6 Discussion

6.1 External validity

Our results are informative for the effects of unexpected executive turnover on firm outcomes. Nonetheless, these results can plausibly be extended to other types of shocks that require firms to acquire quickly new types of skills on the market – say a new, large potential business opportunity in China. If the firm does not respond quickly by hiring a new executive with the required skills (for instance, having experience with doing business in China), the opportunity is gone. Arguably, firms are continuously subject to a variety of similar shocks. How do our findings speak to the implications of labor market thickness for firm performance in "normal

information. We construct a dummy equal to 1 for missing education information and run the same regression as before using this dummy as the dependent variable. We find that the probability of a missing education entry is not correlated with our explanatory variables, reassuring us that there is no systematic bias in missing education data after a death event.

times", that is, when firms might have more time to find a suitable match? Even if this remains outside the scope of this paper, one first pass to shed light on this question is to estimate the effect on firm performance of executive exits that are arguably more likely to be anticipated. For this, we re-run our baseline regression using executive retirement as an anticipated form of executive exit. We present the results in Table 9. As for executive death, the effect of executive retirement on performance is negative and significant only in thin markets. Quantitatively, the effect on performance is significantly weaker, around -0.5 against -1.7 for unplanned exit in Table 4, Panel B. Still, it represents a sizeable drop in ROA compared to average in the three years following the exit. Given that executive exits are common events in a firm's life cycle, this result indicates that the scarcity of executive supply affects steady-state firm performance in a consistent way.

6.2 Economic significance of the effects

Is the negative effect of executive exit on firm ROA in thin CZ×industry reflected in market-level data, or is it offset in the aggregate? To answer this question, we first sum separately the earnings before interest and taxes (EBIT), and the assets of all firms operating in the same CZ×industry, and construct a measure of ROA at the market level, defined as the ratio of market-level EBIT over lagged market-level assets for each CZ×industry and year. For each CZ×industry and year, we also compute a dummy indicating whether (at least) one firm in that CZ×industry is hit by the death of (at least) one executive in the same or previous three years, and interact this dummy depending on whether this occurs in a thin or thick market. We then run similar regressions as those with firm-level data, here aggregated at the CZ×industry level, and present the results in Table A.10. We find that a death event hitting one firm in a given thin CZ×industry market causes a drop by around 0.6 percentage point in the overall profitability of that local industry (Panel A). The effect is confirmed when using the continuous measure of market thickness (Panel B).

Finally, we compute a back-of-the-envelope total value of the aggregate losses associated to death events in thin markets (in which we found statistically significant negative effects on firm profits). To compute the aggregate losses, we apply the estimated coefficient (-1.698) in Table 4 on the variable Deceased executive (t-3,t) $\times$ thin market (multiplied by 4) to the 2015 constant dollar value of the affected firm assets in the year before death events. We aggregate these estimated lost profits across the set of affected firms operating in thin markets only. We find that lost profits amount to approximately 18.7 billion euros over the sample period, that is around 1.7 billion euros per year.[13] Compared to Italian aggregate

[13]The aggregate losses sum up to approximately 26 billion euros over the sample period when we alternatively use the estimates from the last column of Table A.1 from the ROA specification using the continuous

(non-financial) corporate earnings in 2015 (around 570 billion euros), this corresponds to around 0.3% of aggregate corporate profits. Given the rare frequency of death events, this suggests that the relative shortage of executive supply in the economy has a sizeable effect on firm performance in the aggregate.

One may wonder how these results extend beyond the case of Italy. First, how representative is Italy in terms of the role of executives for firm performance? Thanks to the World Management Survey (Bloom, Sadun, and Van Reenen, 2012), recent years have seen a substantial increase in our capacity to measure the quality of firms managerial practices and to compare them across countries. For example, Schivardi and Schmitz (2020) show that Italy ranks in the middle of the distribution of advanced economies, suggesting that it is a good benchmark in terms of comparability. A second questions is how representative Italy is in terms of workers' mobility. While international comparisons of labor market dynamics are difficult, due to data comparability issues, the available evidence suggest that Italy is fairly representative also along this dimension. First, in Section 3.2 we have shown that the mobility patterns of executives are similar in Italy, France and the U.S. Second, the few papers that perform international studies supply a mixed picture. Gómez-Salvador, Messina, and Vallanti (2004) compute job reallocation rates (equal to the sum of job creation and job destruction) for 13 European countries, finding that Italy has the highest rate (12.3%, against an average of 9.3%). Bassanini and Garnero (2013) focus on workers flows for OECD countries and find that Italy is somehow on the low side of the distribution. For example, the hiring rate is 13% in Italy, 14.41% in Germany and 16.3% in France, while the U.S. and the U.K. display higher values (21% and 19.5% respectively). The numbers are similar for the separation rate. A particularly important flow for our analysis is job-to-job mobility. Using highly comparable social security data, Berson, de Philippis, and Viviano (2020) show that job-to-job mobility rate is similar in Italy and France at around 8-9% – if anything, it is higher in Italy. Corresponding numbers computed for the U.S. by Hahn, Hyatt, Janicki et al. (2018) indicate lower mobility rates. Overall, this evidence suggests that the Italian labor market is not an outlier in terms of jobs and workers flows.

7 Conclusion

This article explores whether the local supply of executives affects firm performance. Using exhaustive administrative data on Italian social security records, we construct measures of

measure of market thickness, arguably a more precise way of computing these aggregate losses. To obtain this result, for each firm we multiply the 2015 constant dollar value of the affected firm assets in the year before death events by 4*(-3.329+0.493*Ln(1+#NbExecutives (Industry,CZ)) (t-1)) where #NbExecutives (Industry,CZ)) is the total number of executives in the market in which the firm operates.

local labor market tightness for executives that vary by industry and location. We then exploit executive deaths as an exogenous shock to executive exit, and show that firms in thin labor market experience a drop of 1.7 percentage point in ROA following death events, which amounts to a large reduction with respect to the sample average. Strikingly, we find virtually no impact for death events that occur in thick markets for executives. The effect shows no prior trends, and lasts for at least three years.

Consistent with the notion that thin labor markets lead to poorer firm-executive matches, we find that death events are followed by an increase in the separation rate for the other executives of the firm, in particular for those with a college degree. We confirm firms' difficulty in finding a suitable replacement as the source of the drop in performance: in fact, peers wages in the same market increase, but only in thin markets. Taken together, these findings suggest that the scarcity of managerial skills is an important dimension in explaining differences in firm performance across industries and regions. From a policy perspective, they suggest that local policies aiming at boosting growth should take into consideration the supply of executive skills.

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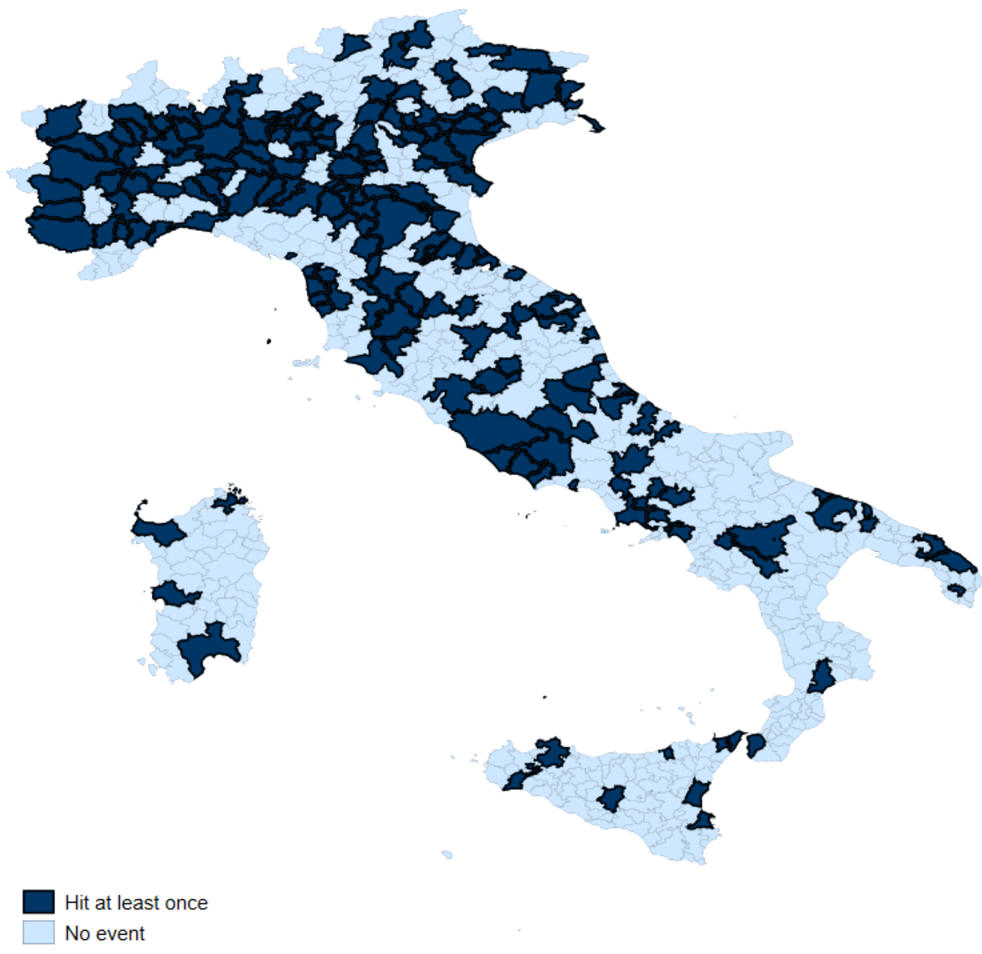
8 Figures and tables

Figure 1

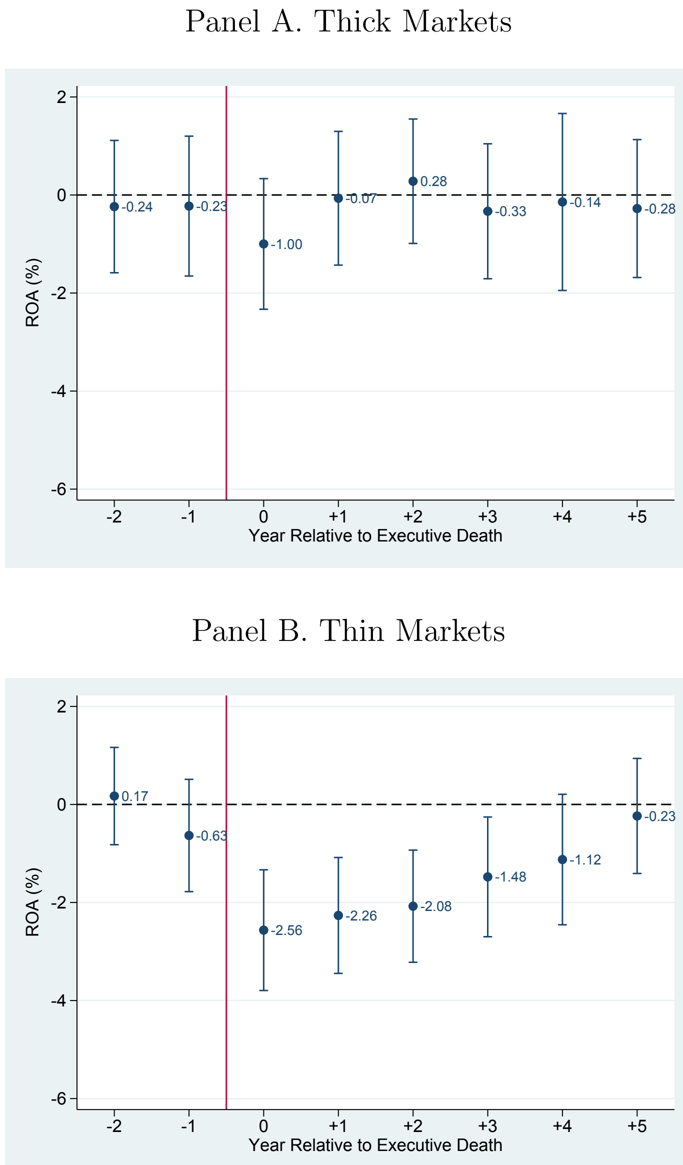
Location of Executive Death Events



Notes: This map presents executive death events located in each Italian Commuting Zone over the sample period.

Figure 2

Executive Exits and Firm ROA in Thin versus Thick Labor Markets



Notes: This figure presents difference-in-differences estimates of return on assets in the two years before and five years after the occurrence of a deceased executive in respectively thick (Panel A) and thin (Panel B) labor markets. Return on assets (ROA) is defined as earnings before interest and taxes, over the value of assets in the previous year. Each graph plots estimated coefficients, β_τ, as well as the associated 95% confidence interval, of the following regression:

$$\text{ROA}_{i,j,t} = \sum_{\tau=-2}^{5} \beta_\tau \text{DecEx}_{i,t-\tau} + f_i + d_{s,t} + d_{cz,t} + \eta_{i,j,t}$$

where $\text{DecEx}_{i,t-\tau}$ is a dummy equal to one if the death of an executive hits firm i in year $t-\tau$ in a thin labor market (respectively in a thick labor market). The specification also includes firm fixed effects f_i, industry and CZ dummies interacted with year dummies, $d_{s,t}$ and $d_{cz,t}$. Standard errors are clustered at the firm level. The sample period spans 2005 to 2015.

Table 1
Summary Statistics

This table presents the summary statistics for our sample. Panel A presents the firm sample, which consists of 306,246 firm-years between 2005 and 2015. A firm is included in our sample if it appears as having at least one executive in the INPS files in any year over the sample period. We exclude financial firms. ROA is defined as earnings before interest and taxes (EBIT) over lagged assets. Firm Size if defined as the logarithm of assets. Firm Age is the number of years since firm creation. Labor productivity is value added divided by the number of employees at the end of the previous year. Deceased executive is a dummy indicating the death of at least one executive of the firm in year t or any of the previous three years. Retired executive is a dummy indicating the retirement of at least one executive of the firm in year t or any of the previous three years. Executive separation rate is the ratio of the number of executives who leave the firm in year t (and work for another firm in year $t+1$) over the total number of executives in the firm in year t. The first part of Panel A is based on all firms. The second part distinguishes by labor market type. A labor market (the combination of a CZ and an industry) is defined as thin (respectively thick) if it lies below (respectively above) the yearly sample median in terms of the total number of executives in each market. The third panel distinguishes between treated and untreated firms. Eventually treated firms are those that are hit by the death of one executive at least once over the sample period, and never treated firms are those never hit by a death event. The last part reports characteristics at the market (commuting zones × industry) level, namely the total number of executives employed in all firms in a given market, and a dummy indicating whether at least one executive dies in a given market × year. Panel B presents the executives sample, separately for deceased and non-deceased executives. We exclude executives with pay below €50,000 in the previous year (around 2% of the full sample). Executive tenure is the number of years since the individual has joined the firm as an executive. The last panel of Panel B reports the education of executives. Information on education is available only for executives who changed job since 2010. All monetary values are in 2015 constant thousand euros, and all continuous variables are winsorized at the first and ninety-ninth percentiles.

Panel A:	Firm Sample					
	Obs.	Mean	Std. Dev.	p1	p50	p99
ROA (%)	306,246	4.155	15.163	-52.103	3.796	54.034
Exit	306,246	0.034	0.180	0.000	0.000	1.000
Eventually Exit	306,246	0.170	0.376	0.000	0.000	1.000
Labor Productivity	290,617	84.553	78.901	-67.640	66.940	394.000
Firm Size	306,246	9.095	1.732	4.663	9.131	13.324
Firm Age	306,246	17.539	12.606	1.000	14.000	48.000
Number of Executives	306,246	3.201	18.255	0.000	1.000	38.000
Number of Employees	306,246	136.363	1146.706	1.000	37.000	1398.000
Deceased executive (t,t-3) (%)	306,246	0.792	8.863	0.000	0.000	0.000
Retired executive (t,t-3) (%)	306,246	5.802	23.379	0.000	0.000	100.000
Executive separation rate	306,246	0.040	0.169	0.000	0.000	1.000
	Thin Labor Markets			Thick Labor Markets		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
ROA (%)	153,630	3.554	13.167	152,616	4.760	16.914
Firm Size	153,630	9.359	1.651	161,176	9.32	1.68
Firm Age	153,630	17.958	12.637	161,176	17.53	12.71
	Eventually Treated			Never Treated		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
ROA (%)	8,727	5.794	12.317	297,519	4.107	15.236
Firm Size	8,727	11.131	1.928	297,519	9.036	1.689
Firm Age	8,727	16.839	11.857	297,519	17.560	12.627
	Obs.	Mean	Std. Dev.	p1	p50	p99
CZ × Industry characteristics						
Number executives (CZ× Industry)	33,044	29.184	223	1	4	335
At least one Deceased executive (CZ× Industry)	33,044	0.021	0.142	0.000	0.000	1.000

Summary Statistics – Continued

Panel B:	Executive Sample					
	Obs.	Mean	Std. Dev.	p1	p50	p99
Sample of deceased executives						
Executive Tenure	1,076	11.908	8.017	1.000	10.000	30.000
Executive Age	1,076	52.840	5.506	37.000	54.000	60.000
Female	1,076	0.097	0.296	0.000	0.000	1.000
Wage (t-1)	1,076	136.462	93.891	55.521	113.561	519.764
Sample of non-deceased executives						
Executive Tenure	1,060,971	9.856	7.286	1.000	8.000	29.000
Executive Age	1,060,971	48.461	6.600	34.000	49.000	60.000
Female	1,060,971	0.132	0.339	0.000	0.000	1.000
Wage (t-1)	1,060,971	134.992	114.357	55.001	110.630	498.250
Education of new hires (from 2010)						
Below High-School	15,730	0.051	0.219	0.000	0.000	1.000
High-School	15,730	0.213	0.409	0.000	0.000	1.000
College	15,730	0.727	0.445	0.000	1.000	1.000

Table 2
Executive Transitions between Positions, Industries, and Areas

This table presents patterns in executive transitions across positions, industries, and areas in the executive-firm matched panel dataset. The sample period is 2005-2015. Panel A presents transitions for workers between white-collar occupations and executive occupations. Transitions are restricted to workers changing firms in the last two columns. The first entry in each cell reports the fraction of the transitions from the row position (white-collar or executive) to the column position (white-collar or executive). Panel B presents statistics for executive transitions across two different firms. The first column represents the fraction of the transitions that are within respectively the same Commuting Zone, the same 2-digit industry, and the same 2-digit industry × Commuting Zone. The second column represents the analogous fractions assuming random transitions for executives across two different sample firms. Panel C reproduces the same statistics for the French economy, and Panel D for executive turnover in a sample of U.S. listed firms using data from the Execucomp database.

Panel A: In the Hierarchy	Full sample		Conditional on turnover	
	White-collars (t)	Executives (t)	White-collars (t)	Executives (t)
White-collars (t-1)	99.7%	0.3%	98.7%	1.3%
Executives (t-1)	0.5 %	99.5%	4.8%	95.2%

Panel B: Executive transitions:	Data	Assuming random
% within same CZ	0.65	0.13
% within same 2-digit industry	0.55	0.12
% within same CZ × 2-digit industry	0.39	0.017
Panel C: France (DADS Panel)	**Data**	**Assuming random**
% within same CZ	0.71	0.15
% within same Industry (NES 17)	0.66	0.13
% within same CZ × Industry	0.50	0.03
Panel D: Top executives U.S. listed firms	**Data**	**Assuming random**
% within same State	0.32	0.055
% within same FF17 industry	0.4	0.14
% within same State × FF17 industry	0.17	0.012

Table 3
Market Thickness and New Hires Characteristics

Panel A of this table presents estimates from cross-section regressions of a dummy indicating whether a given executive joining a new firm in a given CZ × industry was employed in the previous year in a firm from the same CZ and industry on the previous year thickness of the executive labor market. All regressions include year fixed effects. In Column (2) we add industry dummies interacted with year dummies and in Column (3) CZ dummies interacted with year dummies. The sample includes all executives joining a new firm over the sample period, and employed by another firm in the previous year. The thickness is defined at the CZ × industry level and is constructed as the logarithm of one plus the total number of executives in the firm's CZ × industry. Panel B presents estimates from cross-section regressions of dummies for three education levels of executives who join a given firm in a given year on the previous year thickness of the executive labor market in which each executive takes their new jobs. All regressions in Panel B include industry dummies and CZ dummies interacted with year dummies. Standard errors are clustered at the CZ × industry level. The sample period is 2005-2015 in Panel A, and 2010-2015 in Panel B. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)
Panel A:	Hired Executive from same CZ×Industry?		
ln(1+# NbExecutives (Industry,CZ)) (t-1)	0.020***	0.019***	0.044***
	(0.005)	(0.004)	(0.006)
Year FE	Y	Y	Y
Industry-Year FE		Y	Y
CZ-Year FE			Y
Observations	43,219	43,219	43,219
R^2	0.014	0.057	0.193
Panel B:	Executive Education Level		
	Below High School	High School	College
ln(1+# NbExecutives (Industry,CZ)) (t-1)	-0.001	-0.012*	0.012*
	(0.004)	(0.007)	(0.007)
Industry-Year FE	Y	Y	Y
CZ-Year FE	Y	Y	Y
Observations	15,730	15,730	15,730
R^2	0.095	0.119	0.126

Table 4
Executive Exits and Firm ROA

This table presents estimates from panel regressions of firm ROA on respectively one dummy indicating whether the firm is hit by the death of (at least) one executive in the same or previous three years (Panel A), and two dummies indicating whether the firm is hit by the death of (at least) one executive in the same or previous three years in separately either a thin labor market, or a thick labor market (Panel B). A labor market is defined at the CZ × industry level and is defined as thin (respectively thick) if it lies below (respectively above) the sample median in terms of the total number of executives in each CZ × industry. All regressions include firm and year fixed effects. In Column (2) we add industry and CZ dummies interacted with year dummies, in Column (3) firm-level characteristics (dummies indicating terciles of size, age, and ROA respectively) as well as terciles of the number of executives interacted with year dummies. In Column (4), we include market (CZ × industry) dummies interacted with year dummies. Regressions contain all firm-years of our firm sample (described in Table 1, Panel A) between 2005 and 2015. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
Panel A:	ROA (× 100)			
Deceased executive (t,t-3)	-0.883***	-1.014***	-0.816***	-0.659*
	(0.321)	(0.324)	(0.308)	(0.336)
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Industry-Year FE		Y	Y	Y
CZ-Year FE		Y	Y	Y
Nb executives, Size, Age, ROA (t-3) × Year FE			Y	Y
Market (CZ × Industry) -Year FE				Y
Observations	306,246	306,246	306,246	306,246
R^2	0.520	0.530	0.553	0.579
Panel B:	ROA (× 100)			
Deceased executive (t,t-3) × thin market	-1.626***	-1.940***	-1.782***	-1.698***
	(0.421)	(0.418)	(0.423)	(0.484)
Deceased executive (t,t-3) × thick market	-0.164	-0.149	0.106	0.082
	(0.473)	(0.477)	(0.436)	(0.454)
Thin market	0.063	0.380	-0.025	
	(0.264)	(0.302)	(0.303)	
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Industry-Year FE		Y	Y	Y
CZ-Year FE		Y	Y	Y
Nb executives, Size, Age, ROA (t-3) × Year FE			Y	Y
Market (CZ × Industry) -Year FE				Y
P-value $\beta_{\text{tn}} = \beta_{\text{tk}}$	0.020	0.004	0.002	0.007
Observations	306,246	306,246	306,246	306,246
R^2	0.520	0.530	0.553	0.579

Table 5
Executive Exits and Firm ROA - Dynamics

This table presents estimates from panel regressions of firm ROA on dummies indicating whether the firm is hit by the death of (at least) one executive in each of the following two years, the current, and each of the previous five years, separately for thick (Columns 1 and 2) and thin labor market (Columns 3 and 4). A labor market is defined at the CZ × industry level and is defined as thin (respectively thick) if it lies below (respectively above) the sample median in terms of the total number of executives in each CZ × industry. All regressions include firm fixed effects, and industry and CZ dummies interacted with year dummies. In Columns (2) and (4) we add firm-level characteristics (dummies indicating terciles of size, age, and ROA respectively) interacted with year dummies, as well as dummies indicating terciles of the number of executives interacted with year dummies. Regressions contain all firm-years of our firm sample (described in Table 1, Panel A) between 2005 and 2015. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
	ROA (× 100)			
	Thick Markets		Thin Markets	
Deceased executive (t+2)	-0.237	-0.083	0.171	0.214
	(0.689)	(0.635)	(0.506)	(0.465)
Deceased executive (t+1)	-0.226	-0.199	-0.633	-0.096
	(0.728)	(0.689)	(0.584)	(0.579)
Deceased executive (t)	-0.998	-0.641	-2.564***	-2.112***
	(0.680)	(0.679)	(0.628)	(0.614)
Deceased executive (t-1)	-0.066	0.110	-2.264***	-2.246***
	(0.696)	(0.646)	(0.603)	(0.628)
Deceased executive (t-2)	0.281	0.787	-2.076***	-2.037***
	(0.647)	(0.646)	(0.584)	(0.605)
Deceased executive (t-3)	-0.332	0.031	-1.477**	-1.369**
	(0.702)	(0.696)	(0.623)	(0.655)
Deceased executive (t-4)	-0.142	0.422	-1.124*	-1.123
	(0.921)	(0.874)	(0.679)	(0.695)
Deceased executive (t-5)	-0.276	0.327	-0.235	-0.277
	(0.718)	(0.688)	(0.599)	(0.639)
Firm FE	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y
CZ-Year FE	Y	Y	Y	Y
Size, Age, ROA, Nb executives (t-3) × Year FE		Y		Y
Observations	151,544	151,544	152,028	152,028
R^2	0.532	0.555	0.539	0.564

Table 6
Executive Compensation at Neighboring Firms

This table presents estimates from panel regressions of executive (and white-collars in Panel B) wages on two dummies indicating whether a given CZ × industry is hit by the death of (at least) one executive in the previous year in either a thin labor market or a thick labor market. A labor market is defined at the CZ × industry level and is defined as thin (respectively thick) if it lies below (respectively above) the sample median in terms of the total number of executives in each CZ × industry. All regressions include firm, executive, and year fixed effects. In Column (3) industry and CZ dummies interacted with year dummies, in Column (4) executive-level characteristics (dummies indicating gender, and terciles of age and tenure respectively) interacted with year dummies. Regressions contain all executive-year of our executive sample (described in Table 1, Panel B) between 2005 and 2015, which includes only executives at firms never treated during the sample period. Standard errors are clustered at the Industry × CZ level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
Panel A:	Executive Ln(Wage) (× 100)			
Deceased executive other firm (t-1)	0.220			
	(0.199)			
Deceased executive other firm (t-1) × thin market		0.563***	0.393**	0.393**
		(0.202)	(0.185)	(0.174)
Deceased executive other firm (t-1) × thick market		0.066	0.098	0.073
		(0.264)	(0.210)	(0.208)
Thin market		-0.212	-0.244	-0.464
		(0.303)	(0.328)	(0.327)
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Executive FE	Y	Y	Y	Y
Industry-Year FE			Y	Y
CZ-Year FE			Y	Y
Age, Tenure, Gender × Year FE				Y
P-value $\beta_{\text{tn}} = \beta_{\text{tk}}$		0.067	0.126	0.280
Observations	615,658	615,658	615,658	615,658
R^2	0.906	0.906	0.909	0.912
Panel B:	White-Collar Ln(Wage) (× 100)			
Deceased executive other firm (t-1)	0.108			
	(0.090)			
Deceased executive other firm (t-1) × thin market		0.032	-0.036	-0.005
		(0.159)	(0.130)	(0.125)
Deceased executive other firm (t-1) × thick market		0.114	0.090	0.101
		(0.104)	(0.074)	(0.077)
Thin market		-0.084	0.276	0.165
		(0.256)	(0.238)	(0.218)
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Executive FE	Y	Y	Y	Y
Industry-Year FE			Y	Y
CZ-Year FE			Y	Y
Age, Tenure, Gender × Year FE				Y
Observations	3,739,088	3,739,088	3,739,088	3,739,088
R^2	0.949	0.949	0.950	0.954

Table 7
Executive Exits and Education Levels of Entrants/Leavers (From 2010)

This table presents estimates from panel regressions of the education level of executives respectively joining the firm (*new hires*, Panel A) and leaving the firm (*leavers*, Panel B) in year t on two dummies indicating whether the firm is hit by the death of (at least) one executive in the previous three years in separately either a thin labor market, or a thick labor market. A labor market is defined at the CZ × industry level and is defined as thin (respectively thick) if it lies below (respectively above) the sample median in terms of the total number of executives in each CZ × industry. All regressions include firm fixed effects, as well as industry and CZ dummies interacted with year dummies. The sample period is 2005 and 2015. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
Panel A:	New Hires			
	Below High School	High School	College	Missing Info
Deceased executive (t-1,t-3) × thin market	0.054**	0.065	-0.112**	-0.018
	(0.025)	(0.040)	(0.047)	(0.059)
Deceased executive (t-1,t-3) × thick market	0.002	-0.015	0.040	-0.020
	(0.020)	(0.027)	(0.031)	(0.057)
Thin market	-0.062	-0.041	0.086	0.044
	(0.057)	(0.096)	(0.101)	(0.056)
Firm FE	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y
CZ-Year FE	Y	Y	Y	Y
P-value $\beta_{\text{tn}} = \beta_{\text{tk}}$	0.106	0.099	0.007	
Observations	15,730	15,730	15,730	22,663
R^2	0.790	0.694	0.704	0.739
Panel B:	Leavers			
	Below High School	High School	College	Missing Info
Deceased executive (t-1,t-3) × thin market	0.002	-0.149**	0.180**	0.013
	(0.047)	(0.073)	(0.089)	(0.031)
Deceased executive (t-1,t-3) × thick market	0.027	-0.047	0.034	-0.032
	(0.030)	(0.037)	(0.048)	(0.026)
Thin market	-0.155	0.099	0.018	0.039
	(0.136)	(0.195)	(0.147)	(0.083)
Firm FE	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y
CZ-Year FE	Y	Y	Y	Y
P-value $\beta_{\text{tn}} = \beta_{\text{tk}}$	0.652	0.215	0.142	
Observations	5,777	5,777	5,777	24,137
R^2	0.838	0.808	0.806	0.553

Table 8
Executive Exits and Future Separations

This table presents estimates from panel regressions of executive turnover on two dummies indicating whether the firm is hit by the death of (at least) one executive in the previous three years in separately either a thin labor market, or a thick labor market. The dependent variable is the ratio of the number of executives who leave the firm in year t (and work for another firm in year $t+1$) over the total number of executives in the firm in year t. A labor market is defined at the CZ $\times$ industry level and is defined as thin (respectively thick) if it lies below (respectively above) the sample median in terms of the total number of executives in each CZ $\times$ industry. All regressions include firm fixed effects, as well as industry and CZ dummies interacted with year dummies. In Column (3) we add firm-level characteristics (dummies indicating terciles of size, age, and ROA respectively) as well as terciles of the number of executives interacted with year dummies. In Column (4), we include market (CZ $\times$ industry) dummies interacted with year dummies. Regressions contain all firm-years of our firm sample (described in Table 1, Panel A) between 2005 and 2015. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
	Executive separation rate			
Deceased executive (t-1,t-3)	0.009			
	(0.005)			
Deceased executive (t-1,t-3) $\times$ thin market		0.014**	0.016**	0.012*
		(0.006)	(0.007)	(0.007)
Deceased executive (t-1,t-3) $\times$ thick market		0.004	0.006	0.006
		(0.005)	(0.005)	(0.005)
Thin market		-0.008**	-0.003	
		(0.003)	(0.004)	
Firm FE	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y
CZ-Year FE	Y	Y	Y	Y
Nb executives, Size, Age, ROA (t-3) $\times$ Year FE			Y	Y
Market (CZ $\times$ Industry) -Year FE				Y
P-value $\beta_{\text{tn}} = \beta_{\text{tk}}$		0.202	0.252	0.468
Observations	306,246	306,246	306,246	306,246
R^2	0.179	0.179	0.213	0.269

Table 9
Planned Exit and Firm ROA

This table presents estimates from panel regressions of firm ROA on respectively a dummy indicating whether at least one executive retires in the same or previous three years in a thin or thick market. All regressions include firm fixed effects, as well as industry and CZ dummies interacted with year dummies. In Column (3) we add firm-level characteristics (dummies indicating terciles of size, age, and ROA respectively) as well as terciles of the number of executives interacted with year dummies. In Column (4), we include market (CZ × industry) dummies interacted with year dummies. Regressions contain all firm-years of our firm sample (described in Table 1, Panel A) between 2005 and 2015. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
	ROA (× 100)			
Retired executive (t,t-3)	-0.433			
	(0.143)			
Retired executive (t,t-3) × thin market		-0.555***	-0.379***	-0.355**
		(0.136)	(0.135)	(0.156)
Retired executive (t,t-3) × thick market		-0.162	-0.122	-0.128
		(0.168)	(0.169)	(0.177)
Thin market		0.399	-0.017	
		(0.303)	(0.304)	
Firm FE	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y
CZ-Year FE	Y	Y	Y	Y
Nb executives, Size, Age, ROA (t-3) × Year FE			Y	Y
Market (CZ × Industry) -Year FE				Y
P-value $\beta_{\text{tn}} = \beta_{\text{tk}}$		0.064	0.227	0.328
Observations	306,246	306,246	306,246	306,246
R^2	0.530	0.530	0.553	0.579

Online Appendix

Are Executives in Short Supply? Evidence from Death Events

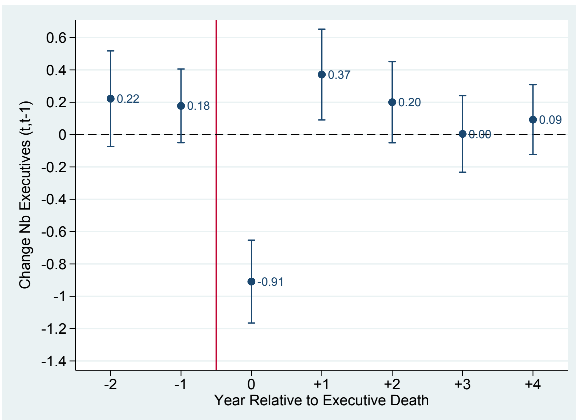
Julien Sauvagnat and Fabiano Schivardi

Figure A.1

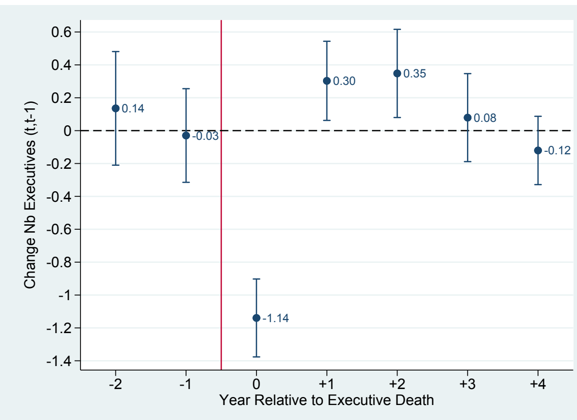
Death Shocks and External Versus Internal Hiring

Panel A. Change in Number of Executives

(a) Thin Markets

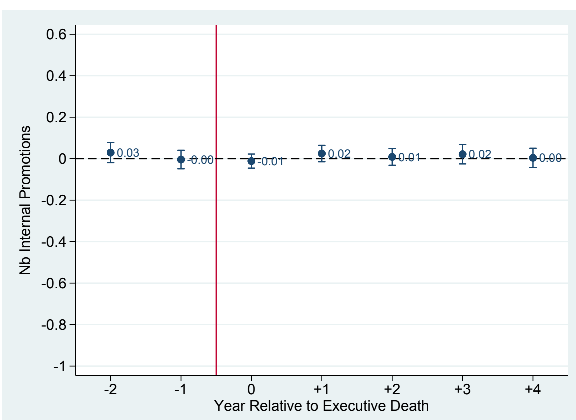


(b) Thick Markets

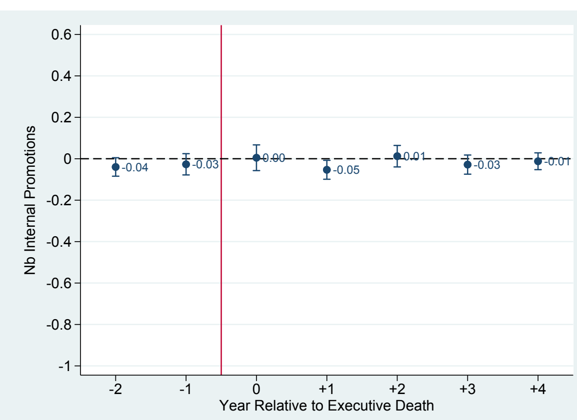


Panel B. # Internal Promotions

(c) Thin Markets



(d) Thick Markets



Notes: These graphs present estimates from panel regressions of the change in the number of executives and the number of internal promotions in a given firm for different years around the death event of one executive. Each graph plots estimated coefficients, β_τ, as well as the associated 95% confidence interval, of the following set of regressions:

$$\Delta \# Exec_{t+\tau-1,t+\tau} = \beta_\tau \text{DecEx}_{i,t} + f_i + d_t + \eta_{i,j,t}$$

where $\Delta \# Exec$ is the change in the number of executives between two dates and $\text{DecEx}_{i,t}$ is a dummy equal to one if the death of an executive hits firm i in year t in a thin labor market (respectively in a thick labor market). In Panel B, the dependent variable is replaced by the number of firm workers in non-executive occupations promoted to executives in year $t - \tau$. The specifications include firm fixed effects f_i, and year fixed effects d_t. Standard errors are clustered at the firm level. The sample period spans 2005 to 2015.

Table A.1
Executive Exits and Firm ROA - Continuous Measure of Market Thickness

This table presents estimates from panel regressions of firm ROA on a dummy indicating whether the firm is hit by the death of (at least) one executive in the same or previous three years, and its interaction term with the logarithm of one plus the number of executives working in the same CZ×industry. All regressions include firm and year fixed effects. In Column (2), we add industry and CZ dummies interacted with year dummies. In Column (3), we add firm-level characteristics (dummies indicating terciles of size, age, and ROA respectively) as well as terciles of the number of executives interacted with year dummies. In Column (4), we include market (CZ × industry) dummies interacted with year dummies. Regressions contain all firm-years of our firm sample (described in Table 1, Panel A) between 2005 and 2015. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
	ROA (× 100)			
Deceased executive (t,t-3)	-2.608***	-3.244***	-2.843***	-3.329***
	(0.663)	(0.678)	(0.658)	(0.856)
Deceased executive (t,t-3) × Market thickness	0.351***	0.449***	0.410***	0.493***
	(0.128)	(0.131)	(0.120)	(0.149)
Market thickness	-0.374***	-0.169	-0.007	
	(0.122)	(0.128)	(0.124)	
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Industry-Year FE		Y	Y	Y
CZ-Year FE		Y	Y	Y
Nb executives, Size, Age, ROA (t-3) × Year FE			Y	Y
Market (CZ × Industry) -Year FE				Y
Observations	306,246	306,246	306,246	306,246
R^2	0.520	0.530	0.553	0.579

Table A.2
Executive Exits and Firm ROA - Controlling for Interaction with Firm Characteristics

This table presents estimates from panel regressions of firm ROA on a dummy indicating whether the firm is hit by the death of (at least) one executive in the same or previous three years, and its interaction term with the logarithm of one plus the number of executives working in the same CZ×industry, augmented with additional interaction of firm's characteristics. We include the interaction of both the deceased executive dummy and the logarithm of one plus the number of executives working in the same CZ×industry with: the logarithm of one plus the number of executives in the firm (Column 1), the logarithm of firm asset (Column 2), the logarithm of firm age (Column 3), ROA (Column 4), all measured three years before the death events. All regressions include firm fixed effects, industry and CZ dummies interacted with year dummies, firm-level characteristics (dummies indicating terciles of size, age, and ROA respectively) interacted with year dummies and dummies indicating terciles of the number of executives interacted with year dummies. Regressions contain all firm-years of our firm sample (described in Table 1, Panel A) between 2005 and 2015. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
	ROA (× 100)			
Firm Charac.	Ln 1+Nb exec	Ln Assets	Ln Firm Age	ROA
Deceased executive (t,t-3) × Market thickness	0.483***	0.450***	0.438***	0.457***
	(0.125)	(0.132)	(0.122)	(0.131)
Market thickness	0.463**	-0.571**	-0.168	-0.072
	(0.197)	(0.239)	(0.124)	(0.128)
Deceased executive (t,t-3)	-6.786***	-2.290	-3.098***	-3.950***
	(2.243)	(1.441)	(0.669)	(0.838)
Deceased executive (t,t-3) × Firm Charac. (t-3)	0.354*	0.325*	-0.354	-0.032
	(0.206)	(0.182)	(0.493)	(0.036)
Market thickness × Firm Charac. (t-3)	-0.035	-0.064***	0.153**	0.000
	(0.030)	(0.016)	(0.074)	(0.000)
Firm Charac. (t-3)	-0.395***	-0.182***	-0.254	-0.002
	(0.148)	(0.068)	(0.360)	(0.003)
Firm FE	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y
CZ-Year FE	Y	Y	Y	Y
Size, Age, ROA, Nb exec(t-3) × Year FE	Y	Y	Y	Y
Observations	306,246	306,246	306,246	306,246
R^2	0.543	0.530	0.549	0.530

Table A.3
Executive Exits and Firm ROA - Controlling for Interaction with Deceased Exec. Characteristics

This table presents estimates from panel regressions of firm ROA on a dummy indicating whether the firm is hit by the death of (at least) one executive in the same or previous three years, and its interaction term with the logarithm of one plus the number of executives working in the same CZ×industry, augmented with additional interactions of deceased executive characteristics. We include the interaction of the deceased executive dummy and the logarithm of one plus the number of executives working in the same CZ×industry with: executive tenure upon death (Column 1), age (Column 2), sex (Column 3), log wage in the year prior to death (Column 4). All regressions include firm fixed effects, industry and CZ dummies interacted with year dummies, firm-level characteristics (dummies indicating terciles of size, age, and ROA respectively) interacted with year dummies and dummies indicating terciles of the number of executives interacted with year dummies. Regressions contain all firm-years of our firm sample (described in Table 1, Panel A) between 2005 and 2015. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
	ROA (× 100)			
Deceased executive Charac.	Tenure	Age	Female	Wage (t-1)
Deceased executive (t,t-3) × Market thickness	0.447***	0.452***	0.451***	0.451***
	(0.131)	(0.131)	(0.132)	(0.131)
Labor market thickness	-0.169	-0.168	-0.170	-0.168
	(0.128)	(0.128)	(0.128)	(0.128)
Deceased executive (t,t-3)	-3.140***	-2.902***	-3.234***	-2.907***
	(0.699)	(0.683)	(0.676)	(0.686)
Deceased executive (t,t-3) × Exec Charac.	-0.014	-0.012*	-0.418	-0.126*
	(0.025)	(0.007)	(0.866)	(0.074)
Firm FE	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y
CZ-Year FE	Y	Y	Y	Y
Nb executives, Size, Age, ROA (t-3) × Year FE	Y	Y	Y	Y
Observations	306,246	306,246	306,246	306,246
R^2	0.530	0.530	0.530	0.530

Table A.4
Executive Exits and Firm ROA - Geographic Areas

This table presents by macro area level estimates of panel regressions of firm ROA on a dummy indicating whether the firm is hit by (at least) one executive in the same or previous three years, and its interaction term with the logarithm of one plus the number of executives working in the same CZ×industry. Column (1) includes observations of firms located in the Center-South regions (Tuscany, Umbria, Marche, Lazio, Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicily, Sardinia), Column (2) in the North (all the others), Column (3) North East (Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Emilia-Romagna), Column (4) North-West (Piedmont, Aosta Valley, Liguria, Lombardy). All regressions include firm fixed effects, industry and CZ dummies interacted with year dummies, firm-level characteristics (dummies indicating terciles of size, age, and ROA respectively) interacted with year dummies and dummies indicating terciles of the number of executives interacted with year dummies. Regressions contain all firm-years of our firm sample (described in Table 1, Panel A) between 2005 and 2015. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
	ROA (× 100)			
	South+Center +Islands	North	North East	North West
Deceased executive (t,t-3) × Market thickness	0.474**	0.435**	0.721*	0.498**
	(0.199)	(0.177)	(0.379)	(0.225)
Deceased executive (t,t-3)	-3.256***	-3.219***	-3.877**	-3.881***
	(0.950)	(0.978)	(1.549)	(1.414)
Market thickness	0.036	-0.306*	-0.236	-0.283
	(0.217)	(0.159)	(0.224)	(0.227)
Firm FE	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y
CZ-Year FE	Y	Y	Y	Y
Nb executives, Size, Age, ROA (t-3) × Year FE	Y	Y	Y	Y
Observations	82,678	221,232	75,629	145,603
R^2	0.513	0.536	0.524	0.541

Table A.5
Executive Exits and Firm Labor Productivity

This table presents estimates from panel regressions of firm labor productivity (defined as value added over the total number of employees, in 2015 constant thousand euros) on two dummies indicating whether the firm is hit by the death of (at least) one executive in the same or previous three years in separately either a thin labor market or a thick labor market in Panel A, and interacted with the continuous measure of labor market thickness in Panel B (the logarithm of one plus the number of executives working in the same CZ ×industry). A labor market is defined at the CZ × industry level and is defined as thin (respectively thick) if it lies below (respectively above) the sample median in terms of the total number of executives in each CZ × industry. All regressions include firm and year fixed effects. In Column (2) we add industry and CZ dummies interacted with year dummies, in Column (3) firm-level characteristics (dummies indicating terciles of size, age, and ROA respectively) as well as terciles of the number of executives interacted with year dummies. In Column (4), we include market (CZ × industry) dummies interacted with year dummies. Regressions contain all firm-years of our firm sample (described in Table 1, Panel A) between 2005 and 2015. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
Panel A:	Labor Productivity			
Deceased executive (t,t-3) × thin market	-6.748***	-7.931***	-6.811***	-4.330*
	(2.295)	(2.332)	(2.208)	(2.275)
Deceased executive (t,t-3) × thick market	0.401	0.508	1.380	1.376
	(2.246)	(2.303)	(2.223)	(2.312)
Thin market	-0.537	1.662	1.612	
	(1.228)	(1.433)	(1.419)	
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Industry-Year FE		Y	Y	Y
CZ-Year FE		Y	Y	Y
Nb executives, Size, Age, ROA (t-3) × Year FE			Y	Y
Market (CZ × Industry) -Year FE				Y
P-value $\beta_{\text{tn}} = \beta_{\text{tk}}$	0.024	0.009	0.008	0.074
Observations	290,617	290,617	290,617	290,617
R^2	0.688	0.695	0.714	0.731

	(1)	(2)	(3)	(4)
Panel B:	Labor Productivity			
Deceased executive (t,t-3)	-11.529***	-14.131***	-12.936***	-11.090***
	(3.529)	(3.618)	(3.485)	(3.989)
Deceased executive (t,t-3) × Market thickness	1.710***	2.123***	2.079***	1.857***
	(0.631)	(0.649)	(0.617)	(0.701)
Market thickness	-1.491**	-0.755	-0.928	
	(0.659)	(0.720)	(0.727)	
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Industry-Year FE		Y	Y	Y
CZ-Year FE		Y	Y	Y
Nb executives, Size, Age, ROA (t-3) × Year FE			Y	Y
Market (CZ × Industry) -Year FE				Y
Observations	290,617	290,617	290,617	290,617
R^2	0.688	0.695	0.714	0.731

Table A.6
Executive Exits and Firm ROA - Excluding Deceased Executives With Prior Sick Leave

This table presents estimates from panel regressions of firm ROA on respectively two dummies indicating whether the firm is hit by the death of (at least) one executive in the same or previous three years in separately either a thin labor market, or a thick labor market. These specifications exclude all firms with events for deceased executives with paid-sick leave in any prior year. A labor market is defined at the CZ × industry level and is defined as thin (respectively thick) if it lies below (respectively above) the sample median in terms of the total number of executives in each CZ × industry. All regressions include firm and year fixed effects. In Column (2) we add industry and CZ dummies interacted with year dummies, in Column (3) firm-level characteristics (dummies indicating terciles of size, age, and ROA respectively) as well as terciles of the number of executives interacted with year dummies. In Column (4), we include market (CZ × industry) dummies interacted with year dummies. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
	ROA (× 100)			
Deceased executive (t,t-3) × thin market	-1.599***	-1.906***	-1.782***	-1.737***
	(0.433)	(0.431)	(0.437)	(0.494)
Deceased executive (t,t-3) × thick market	-0.234	-0.208	0.112	0.094
	(0.484)	(0.490)	(0.443)	(0.464)
Thin market	0.064	0.376	-0.027	
	(0.265)	(0.303)	(0.304)	
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Industry-Year FE		Y	Y	Y
CZ-Year FE		Y	Y	Y
Nb executives, Size, Age, ROA (t-3) × Year FE			Y	Y
Market (CZ × Industry) -Year FE				Y
P-value $\beta_{\text{tn}} = \beta_{\text{tk}}$	0.034	0.008	0.002	0.006
Observations	303,453	303,453	303,453	303,453
R^2	0.520	0.530	0.553	0.580

Table A.7
Executive Exits and Firm ROA - Dynamics - Excluding Eventually Exiting Firms

This table presents estimates from panel regressions of firm ROA on dummies indicating whether the firm is hit by the death of (at least) one executive in each of the following two years, the current, and each of the previous five years, separately for thick (Columns 1 and 2) and thin labor market (Columns 3 and 4). The sample is restricted to firms active from 2005 to 2015. A labor market is defined at the CZ × industry level and is defined as thin (respectively thick) if it lies below (respectively above) the sample median in terms of the total number of executives in each CZ × industry. All regressions include firm fixed effects, and industry and CZ dummies interacted with year dummies. In Columns (2) and (4) we add firm-level characteristics (dummies indicating terciles of size, age, and ROA respectively) interacted with year dummies, as well as dummies indicating terciles of the number of executives interacted with year dummies. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
	ROA (× 100)			
	Thick Markets		Thin Markets	
Deceased executive (t+2)	-0.603	-0.389	-0.031	-0.150
	(0.725)	(0.665)	(0.525)	(0.496)
Deceased executive (t+1)	0.193	-0.012	-0.778	-0.301
	(0.628)	(0.622)	(0.607)	(0.621)
Deceased executive (t)	-1.315*	-0.807	-2.339***	-1.906***
	(0.697)	(0.705)	(0.594)	(0.593)
Deceased executive (t-1)	-0.335	-0.027	-2.207***	-2.125***
	(0.631)	(0.637)	(0.569)	(0.573)
Deceased executive (t-2)	0.367	0.788	-2.450***	-2.284***
	(0.638)	(0.636)	(0.604)	(0.629)
Deceased executive (t-3)	-0.385	0.153	-1.410**	-1.227*
	(0.677)	(0.664)	(0.619)	(0.647)
Deceased executive (t-4)	-0.588	0.094	-1.088	-0.988
	(0.936)	(0.888)	(0.719)	(0.736)
Deceased executive (t-5)	-0.417	0.189	-0.043	-0.009
	(0.671)	(0.658)	(0.581)	(0.621)
Firm FE	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y
CZ-Year FE	Y	Y	Y	Y
Size, Age, ROA, Nb executives (t-3) × Year FE		Y		Y
Observations	125,702	125,702	127,063	127,063
R^2	0.530	0.554	0.540	0.568

Table A.8
White-Collar Deaths and Firm ROA - Placebo

This table presents estimates from panel regressions of firm ROA on respectively two dummies indicating whether the firm is hit by the death of (at least) one white-collar (non-executive) in the same or previous three years in separately either a thin labor market, or a thick labor market. A labor market is defined at the CZ × industry level and is defined as thin (respectively thick) if it lies below (respectively above) the sample median in terms of the total number of executives in each CZ × industry. All regressions include firm and year fixed effects. In Column (2) we add industry and CZ dummies interacted with year dummies, in Column (3) firm-level characteristics (dummies indicating terciles of size, age, and ROA respectively) as well as terciles of the number of executives interacted with year dummies. In Column (4), we include market (CZ × industry) dummies interacted with year dummies. Regressions contain all firm-years of our firm sample (described in Table 1, Panel A) between 2005 and 2015. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
	ROA (× 100)			
Deceased White-Collar (t,t-3) × thin market	-0.073	-0.177	-0.105	-0.043
	(0.172)	(0.172)	(0.167)	(0.187)
Deceased White-Collar (t,t-3) × thick market	-0.093	-0.048	0.053	0.015
	(0.181)	(0.183)	(0.179)	(0.186)
Thin market	0.050	0.372	-0.032	
	(0.265)	(0.303)	(0.304)	
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Industry-Year FE		Y	Y	Y
CZ-Year FE		Y	Y	Y
Nb executives, Size, Age, ROA (t-3) × Year FE			Y	Y
Market (CZ × Industry) -Year FE				Y
Observations	306,246	306,246	306,246	306,246
R^2	0.520	0.530	0.553	0.579

Table A.9
Executive Compensation at Neighboring Firms - Tradable Industries Only

This table presents estimates from variants of the panel regressions presented in Panel A of Table 6 in which the sample is restricted to executives in tradable industries only. A labor market is defined at the CZ × industry level and is defined as thin (respectively thick) if it lies below (respectively above) the sample median in terms of the total number of executives in each CZ × industry. All regressions include firm, executive and year fixed effects. In Column (3), we add industry and CZ dummies interacted with year dummies, in Column (4) executive-level characteristics (dummies indicating gender, and terciles of age and tenure respectively) interacted with year dummies. Regressions contain all executive-year of our executive sample operating in tradable industries (described in Table 1, Panel B) between 2005 and 2015, which includes only executives at firms never treated during the sample period. Standard errors are clustered at the Industry × CZ level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
	Executive Ln(Wage) (× 100)			
Deceased executive other firm (t-1)	0.495**			
	(0.197)			
Deceased executive other firm (t-1) × thin market		0.807***	0.614**	0.535**
		(0.224)	(0.245)	(0.234)
Deceased executive other firm (t-1) × thick market		0.317	0.068	0.070
		(0.255)	(0.228)	(0.224)
Thin market		-0.290	-0.124	-0.342
		(0.396)	(0.470)	(0.484)
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Executive FE	Y	Y	Y	Y
Industry-Year FE			Y	Y
CZ-Year FE			Y	Y
Age, Tenure, Gender × Year FE				Y
P-value $\beta_{\text{tn}} = \beta_{\text{tk}}$		0.136	0.091	0.132
Observations	327,209	327,209	327,209	327,209
R^2	0.909	0.909	0.913	0.916

Table A.10
Executive Exits and Market ROA

This table presents estimates from panel regressions aggregated at the market level of firm value-weighted ROA on respectively a dummy indicating whether a given Industry×CZ market is hit by death of (at least) one executive in the same or previous three years in separately either a thin labor market, or a thick labor market, in Panel A, and interacted with the continuous measure of labor market thickness in Panel B (the logarithm of one plus the number of executives working in the same CZ ×industry). ROA at the market level is defined as the ratio of market-level EBIT (the sum of the EBIT of each firm in a given market) over market-level assets for each CZ×industry and year. All regressions include market fixed effects, as well as industry and CZ dummies interacted with year dummies. Column (3) also includes dummies indicating terciles of the average size, the average age, and the average ROA of firms in the same market, interacted with year dummies, and Column (4) includes dummies indicating terciles of the number of executives in a given market interacted with year dummies. Regressions contain all (Industry×CZ) market-years in which there are at least three firms between 2005 and 2015. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)
Panel A:	Market ROA (× 100)			
Deceased executive in Industry×CZ (t,t-3)	-0.386**			
	(0.194)			
Deceased executive in Industry×CZ (t,t-3) × thin market		-0.623***	-0.617***	-0.587***
		(0.232)	(0.229)	(0.227)
Deceased executive in Industry×CZ (t,t-3) × thick market		0.266	0.325	0.321
		(0.305)	(0.310)	(0.310)
Thin market		0.240	0.236	0.235
		(0.488)	(0.496)	(0.497)
Market (CZ × Industry) FE	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y
CZ-Year FE	Y	Y	Y	Y
Market Average Size, Age, ROA (t-3) × Year FE			Y	Y
Market Nb of executives (t-3) × Year FE				Y
P-value $\beta_{\text{tn}} = \beta_{\text{tk}}$		0.018	0.012	0.015
Observations	15,531	15,531	15,531	15,531
R^2	0.660	0.657	0.662	0.664

Panel B::	Market ROA (× 100)			
Deceased executive in Industry×CZ (t,t-3)	-0.386**	-1.501**	-1.525**	-1.446**
	(0.194)	(0.691)	(0.685)	(0.681)
Deceased executive in Industry×CZ (t,t-3) × Market thickness		0.295*	0.307*	0.291*
		(0.163)	(0.162)	(0.161)
Market thickness		-0.594***	-0.551***	-0.496***
		(0.175)	(0.175)	(0.170)
Market (CZ × Industry) FE	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y
CZ-Year FE	Y	Y	Y	Y
Market Average Size, Age, ROA (t-3) × Year FE			Y	Y
Market Nb of executives (t-3) × Year FE				Y
Observations	15,531	15,531	15,531	15,531
R^2	0.660	0.660	0.666	0.667