Executive Mobility in the United States, 1920 to 2011[*]

John R. Graham[†]

Dawoon Kim[‡]

Hyunseob Kim[§]

March 2019

Abstract

We examine the evolution of executive mobility and its implications for corporate decisions from 1920-2011. We find that in the eight decades leading up to 2001 (1) movements of executives to new executive positions became more common; (2) executives moved across an increasingly diverse set of industries; and (3) conditional on moving, executives moved to larger, more profitable, and higher-paying firms, even more so in recent decades. However, many of these trends reversed starting in the early-2000s. Exploiting these mobility trends, we hypothesize that improved mobility for executives mitigates incentive problems. Using CEO deaths in connected industries as an instrument for mobility, we find that increased mobility leads to lower pay-for-performance sensitivity, board monitoring, and financial leverage, and higher corporate investment. Our findings are consistent with predictions of career concern and dynamic agency models that implicit incentives from the labor market reduce the need for explicit incentives and monitoring.

Key Words: Executive mobility; Executive labor markets; CEO compensation; Dynamic agency; Corporate governance trends

JEL: G30, J41

[*] We thank Hengjie Ai, Attila Balogh, Murillo Campello, Adrian Corum, Carola Frydman, Jessica Jeffers, Andrew Karolyi, Roni Michaely, Kevin J. Murphy, Giorgia Piacentino, S. "Vish" Viswanathan, Mike Waldman, Wei Wei, John Zhu, and seminar participants at Babson College, Carnegie Mellon University, Cornell University, Duke University, Florida International University, MFA, Rising Five-Star Workshop (Columbia), University of Sydney, and Yonsei University for helpful comments. We thank Kevin J. Murphy for sharing data on CEOs, and Charlie Hadlock, Timothy Quigley, Jesus Salas, and Steven Karolyi for sharing their CEO turnover datasets. All errors are our own.

[†] Fuqua School of Business, Duke University, and NBER; Email; john.graham@duke.edu; Phone: (919) 660-7857.

[‡] Johnson Graduate School of Management, Cornell University; Email: dk722@cornell.edu.

[§] Johnson Graduate School of Management, Cornell University; Email: hk722@cornell.edu; Phone: (607) 255-8335.

1. Introduction

Several important trends in the labor market for corporate executives have emerged in recent decades. The level of executive pay and its dispersion have increased significantly since the 1970s (e.g., Murphy 1999; Frydman and Saks 2010). Over a similar period, chief executive officer (CEO) turnover and external-to-the-firm hires have increased as general managerial skills have become more important (e.g., Huson, Parrino, and Starks 2001; Murphy and Zabojnik 2007).[1] In addition, the numbers of firms and occupations that typical executives work in during their careers have increased since 1970 (Frydman 2017).

A common thread across these trends is increasing executive mobility across firms. In this paper, we examine the long-run evolution of across-firm executive mobility and its implications for incentives and corporate decisions by constructing a new dataset of executive movements between US firms over the 1920-2011 period. The dataset contains more than 14,000 executive moves and 315,000 unique executives, involving nearly 18,000 public firms. Our long data sample allows us to document new patterns over the century, and also put recent trends in the context of century-long patterns in executive mobility.

We document several new trends in executive mobility. First, movements of executives to jobs in new firms became much more common in recent decades relative to previous decades. While fewer than 2% of departing CEOs became CEOs of other firms before 1986,[2] nearly 5% of departing CEOs moved to other firms to become CEO during 1986-2001 (see Table 2). Second, executives move across an increasingly diverse set of industries over time, consistent with the skill sets of CEOs becoming more general. For example, during 1986-2011, the proportion of new manufacturing CEO hires from non-manufacturing jobs has nearly doubled relative to the 1950-

[1] See also Kaplan and Minton (2012) and Graham, Kim, and Leary (2019) for related evidence.
[2] See also Vancil (1987), who shows a 2.2% fraction using a smaller sample before 1985.

1985 era (see Table 1). More generally, the Herfindahl-Hirschman Index (HHI) of the fraction of CEO moves between industry pairs, a measure of concentration of across-industry moves, was 0.187 during 1920-1949, 0.144 during 1950-1985 and decreased to 0.063 during 1986-2011, indicating that moves in the latter period have been across a wider range of industries.

Third, conditional on moving to other firms, executives typically moved to larger, more profitable, higher-paying firms, even more so in recent decades. During 1950-1985, the fraction of CEOs who move to new jobs at larger (more profitable) firms was 67% (58%), which increased to 83% (80%) during 1986-2001. In addition, CEO salary plus bonus increased by 16% when CEOs moved to other firms as executive during 1950-1985, while it increased by 105% upon moving during 1986-2001.

Fourth, another new result in our paper is documenting declining executive mobility since the early 2000s.[3] During 2002-2011 executives moved to larger and more profitable firms less often, and the magnitude of pay increases upon moving decreased relative to 1985-2001. In addition, movements of executives to new jobs in other firms became less common in the 2002-2011 period relative to 1985-2001. Consistent with these patterns, the measures of executive mobility that we construct below show an increasing-then-declining mobility trend, as well as considerable cross-sectional variation in mobility over 1920-2011 (details below).

Given that we document substantial variation in executive mobility across firms and through time, in the second part of our paper we explore the important issue of whether and how labor mobility affects executive incentives, monitoring of executives, and corporate decision-making. Fama (1980) is the first to argue that efficient labor markets for executives can solve agency problems inherent in modern corporations. If executives expect that their current actions

[3] This trend for executives appears to be consistent with a general decline in labor mobility in the US since 2000. See e.g., "Fewer Americans Uproot Themselves for a New Job," *The Wall Street Journal*, August 20, 2018.

affect the marketable value of their human capital, improved mobility would increase work incentives in their current jobs, thereby reducing the need for monitoring and compensation structure to incentivize them.

We empirically explore this general prediction in the context of career concern and dynamic agency models (e.g., Gibbons and Murphy 1992; Holmstrom 1999; DeMarzo and Fishman 2007a,b). In these models, when agents (executives in our context) can shirk or divert cash flows to themselves as private benefits, several forces motivate employees to work: implicit incentives from mobility ("career concerns"), deferred compensation, and the threat of termination. In particular, a key insight from dynamic agency models is that an optimal contract for the agent (such as the CEO) can be implemented (partly) using firms' financial and investment policies.

Thus, when an increase in executive mobility provides additional implicit incentives, incentives from corporate policies will change to offset, as the optimal contract adjusts to a new equilibrium. For example, when mobility increases, corporate debt usage (which improves incentives by increasing the threat of termination), will decrease to maintain the overall incentive (e.g., DeMarzo and Fishman 2007b). Similarly, pay-performance sensitivity will decline as executives become more mobile (Gibbons and Murphy 1992). Improved executive mobility will also substitute for board monitoring (e.g., less independent boards or appointing the CEO as board chair more often). Moreover, reduced agency costs due to improved labor-market incentives will increase the return on investment for shareholders and thus spur investment (e.g., DeMarzo and Fishman 2007a; DeMarzo et al. 2012).

We test these theoretical implications by analyzing how a positive external shock to CEO mobility (through the external labor market) affects the aforementioned corporate policies that, as previously mentioned, are part of the optimal contracting environment. The external shock in our

experiment is the death of CEO A in industry A. This shock improves potential job opportunities for CEO B in connected industry B because the executive job market spans these two industries (we define "connected" to mean that CEOs from industry B moved to new jobs in industry A in the past three years; we validate this measure in several different ways below). Thus, following the shock, CEO B experiences improved labor opportunities, which increase implicit labor market incentives on CEO B (Fama 1980; Holmstrom 1999). As a result, potential agency conflicts fall in Firm B, which in turn affects the corporate policies in Firm B given their role in the new optimal contract. In short, we estimate how the exogenous death of a CEO in industry A affects executive incentives and firm policies in industry B, where A and B are connected via the executive labor market.

We measure executive mobility at the industry level as the number of CEOs who move to other firms (both within and across industries) scaled by the lagged number of CEOs in the industry. This measure increased from the mid-1980s until the early-2000s, and then began to decline, consistent with increasing-then-decreasing mobility during the most recent three decades we discussed above. We instrument an industry's executive mobility using the value-weighted average number of CEO deaths in other, connected industries, scaled by the lagged number of CEOs in the industry. To get a sense of the magnitude of this labor market shock during our main sample period, note that when the current CEO dies in office, a majority of firms hire an external-to-the-firm replacement CEO; and that 84% of these replacements were CEOs in their previous firms, and about half of these emanate from other one-digit SIC industries. Furthermore, there is a 'chain reaction' in that the newly hired CEO also needs to be replaced at her old firm, so within one year a single CEO death results in approximately two external CEO hires across the affected industries.

We first analyze whether the implicit incentives provided by increased labor mobility lead to reduced explicit CEO incentives and/or less internal monitoring by the board. Using the instrumental variable approach, we find that an increase in executive labor market mobility leads to a significant reduction in pay-for-performance sensitivity. We also show that an increase in mobility leads to reduced monitoring of the CEO (a decrease in board independence and an increase in CEO-board chair duality), consistent with the prediction by dynamic agency models of a substitution between monitoring and incentives (e.g., Piskorski and Westerfield 2016).

We next explore the prediction from dynamic agency models that a reduction in agency problems decreases the need for implicit termination threats (such as high leverage or low financial slack) to incentivize the agent (DeMarzo and Fishman 2007b; Piskorski and Westerfield 2016). Consistent with this prediction, we find that an increase in labor market mobility leads to a decrease in net financial leverage. We also find that firms increase investment and grow faster in response to increased labor market mobility of executives, consistent with the argument in dynamic agency models that a reduction in agency problems increases investors' return on investment (e.g., Quadrini 2004; DeMarzo and Fishman 2007a).

Finally, we investigate whether the decline in labor market mobility that we document during the 2000s alters the patterns in corporate policies just mentioned. We in fact find that the links between executive mobility and these policies become insignificant over 2001-2011 as external labor market incentives presumably declined. Overall, our results suggest that labor mobility provides executives with important incentives, which in turn affect explicit incentives, monitoring, and corporate decisions.

As discussed above, we organize our analysis of corporate policies around predictions from dynamic agency theory. In addition to the contracting theory already mentioned (which interprets

an increase in mobility as an increase in the CEO's labor-market incentives), contracting models featuring limited commitment (for the CEO not to leave the firm) would also predict an increase in investment and firm growth, as well as increased pay, to match the CEO's outside option (e.g., Harris and Holmstrom 1982; Ai, Kiku, Li, and Tong 2018). In addition, bargaining models also make predictions that could help explain our results. For example, adding an assumption that CEOs prefer to manage larger firms ("empire building" as in e.g., Jensen 1986), a bargaining model between the CEO and board could generate the predictions regarding investment and firm size. Moreover, bargaining models in which the CEO is risk averse and/or values private benefits of control could generate the prediction that increased mobility will (optimally) lead to lower pay-for-performance sensitivity, board monitoring intensity, and financial leverage (e.g., Hermalin and Weisbach 1998). Thus, while we organize our paper around career concern and dynamic agency models because of the rich set of predictions inherent in these models, we recognize that other models could generate some of the same predictions.

To shed light on mechanisms underlying our results, we examine how firm value, measured by Tobin's *q*, changes in response to an increase in executive mobility. Using the IV approach described above, we find that a one-SD increase in mobility leads to a 0.41% increase in Tobin's *q* two years after the shock (significant at the 1% level). While only suggestive, this finding is consistent with the view that improved executive labor market mobility provides additional incentives (Fama 1980), so that firms optimally alter other aspects of their contracts with the CEO, such as pay-for-performance. In contrast, the increased Tobin's *q* is not consistent with a class of bargaining models in which the CEO simply extracts more rent in response to an increase in mobility (and outside option) without a change in incentives.

In summary, while previous research has explored trends in the executive labor market and implications for compensation, ours is the first to study how executive mobility drives corporate decisions using a large sample of firms and executives over 90 years. Our approach has several important advantages. First, prior research uses small, selected samples of firms (often large companies) over long time horizons, or broader sets of firms over relatively short horizons. Relative to these studies, we are able to document patterns of executive mobility over a near-century using a sample of firms representing a wide variety of firm sizes.

Second, thanks to our detailed data on executive movements across firms over a long period, we document new patterns of labor market mobility. For example, we construct "heat maps" of across-industry executive mobility for several periods from 1920 to 2011, uncovering that executives move across an increasingly diverse set of industries over time. In addition, we document for the first time that departing executives' moving to new jobs has become more common over the century. In comparison, earlier work measures executive mobility by focusing on career paths of given individuals or executive turnover rates (e.g., Huson, Parrino, and Starks 2001; Murphy and Zabonjik 2007; Frydman 2017).

Third, we document a reversal in the mobility trend starting in the early 2000s; this is new relative to existing evidence that shows increasing executive mobility through the early-2000s. We also explore implications of this recent change in trends. Fourth, we explore how executive mobility affects a broad set of corporate decisions, adding to existing research that focuses on the relation between executive mobility and compensation (e.g., Custodio, Ferreira, and Matos 2013). Our paper is also among the first to test predictions of dynamic agency models.

2. Data and Measurement

2.1 Data Sources and Sample Selection

We construct a comprehensive database of corporate officers, such as the chief executive officer (CEO), chief financial officer (CFO), various corporate vice presidents (VPs), and others, and their movements across US public firms from 1920 to 2011. We combine information from a number of sources. First, we hand-collect names of corporate executives, as well as financial data on their firms, from Moody's Industrial Manuals ('Moody's') from 1920 to 1988, and also the year 1998. Second, we collect names of corporate executives from Compact Disclosure during 1985-2005. Third, we supplement these two primary data sources using Mergent (which took over the Industrial Manual from Moody's; 2002-2009) and Board Analyst (2002-2011) for more recent years. We also gather information on corporate boards of directors from the same sources from 1920 to 2011.

CEO Compensation data are from Jensen and Murphy (1990), Frydman and Saks (2010), and Execucomp covering 1950-2011.[4] Industry-level GDP growth is from the Bureau of Economic Analysis and firm characteristics are from Compustat and Moody's. The appendix describes definitions and sources of variables for executive, board, and firm characteristics. We exclude firms in the financial (SIC 6000-6999) and utility (4900-4999) sectors and firms whose total assets are less than $5 million in 2011-constant dollars.

Our full sample includes 184,494 firm-year observations for 17,767 unique firms and 315,423 executives (including 37,529 CEOs) from 1920 to 2011. We describe trends in executive mobility using this full sample (see the next section) and perform auxiliary tests. For our analysis of the effect of executive mobility on incentives and corporate decisions, we focus on 1986 to 2011; previous research, as well as our data, suggests that executive mobility is relatively high for the

[4] We thank Kevin J. Murphy for sharing his dataset of CEOs collected from Forbes and Carola Frydman for making her dataset available on her website.

most part (e.g., Murphy and Zabojnik 2007), though we find a reversal of this trend for the last decade of the sample.[5] The post-1986 subsample includes 67,949 firm-year observations for 8,345 unique firms and 206,127 executives (including 13,010 CEOs) from 1986 to 2011.

2.2 Trends in Executive Mobility in the Past Century

The breadth of the US executive labor market has changed considerably over the past 90 years. The first three tables explore whether these changes indicate improved mobility for executives, particularly CEOs. Table 1 presents the fraction of CEO moves from an "origin" to a "destination" industry defined at the one-digit SIC level. In our empirical analysis below (and as explained more fully in Section 2.4), we use the frequency of executive movements between two industries to measure how "connected" the industries are in terms of managerial skills. Panel A (1920-1949) and Panel B (1950-1985) show that before 1986, over 60% of CEO move-to-new-firms, including moves to same- and different-industry firms, occur within the manufacturing sector (SIC = 2 or 3).[6] In comparison, Panel C shows that, from 1986 through 2011, the fraction of moves between manufacturing industries decreases to 31%. This magnitude of reduction (nearly 50%) is greater than that for the general reduction in the fraction of manufacturing firms among public firms during the same period (a 31% reduction, from 71% to 49%). Thus, Panel C demonstrates a more varied set of origin and destination industries for external CEO hires in recent decades.

[Insert Table 1 here]

[5] Our results are robust to alternative sample periods that begin in the 1980s, such as 1980-2011. In addition, we repeat our main analysis separately for the 2002-2011 period (the period during which we find executive mobility declined). See Table 12.

[6] 63.3% = 19.1% + 7.4% + 36.8% for 1920-1949; and 61.1% = 14.7% + 6.0% + 7.9% + 32.5% for 1950-1985.

We examine the diversity of industries across which CEOs move more generally using the Herfindahl-Hirschman Index (HHI) of the fraction of moves between industry pairs. This concentration measure of between-industry moves was 0.187 during 1920-1949, 0.144 during 1950-1985, and decreased to 0.063 during 1986-2011, indicating that CEO moves in the later period are more widely dispersed across industries. In addition, we find that "off-diagonal" movements (i.e., across different industries) became more frequent over the century: The fraction of across-different-industry movements was 35.3% during 1920-1949, and increased to 42.9% and 44.2% during 1950-1985 and 1986-2011.[7] The finding that CEOs moved to a more diverse set of industries in recent decades is consistent with the increasing importance of general managerial skills, as opposed to industry- or firm-specific skills, in the executive labor market (Murphy and Zabojnik 2007; Frydman 2017). Overall, the evidence in Table 1 suggests enhanced across-industry mobility for CEOs through time (though, as explored below, we find that this trend reversed in the recent decade).

[Insert Table 2 here]

In addition to the increased breadth of the managerial labor market, in recent decades executive who leave their current jobs have become increasingly more likely to accept a new job as an executive in another (public) company (versus retiring from executive work). Table 2, Panel A shows that among the CEOs who left their jobs during 1920-1949 and 1950-1985, only 3.6% (= 68/1,864) and 5.7% (= 382/6,697) moved to other firms to become executives, respectively. In comparison, during 1986-2001, 9.7% (= 1,222/12,594) of former CEOs became officers at other firms, representing 166% and 56% increases in the "move rate" after vacating a CEO position. A more detailed examination reveals that this increase in the rate at which CEOs move to other firms

[7] In Appendix Table A5, we find that the fraction moderately decreased to 42.5% during 2002-2011.

is driven by those moving from one CEO position to another CEO position. 611 out of 12,594 departing CEOs (4.9%) became CEOs at other firms during 1986-2001, while only 38 out of 1,864 (2.0%) and 115 out of 6,697 departing CEOs (1.7%) moved to other firms as CEO for the periods from 1920 to 1949 and from 1950 to 1985.[8] The fraction of former CEOs who move to become non-CEO officers at their new firms also increased, from 1.6% during 1920-1949 to 4.0% and 4.9% during the 1950-1985 and 1986-2001 periods.

Comparing the two right-most columns, however, reveals that this trend has somewhat reversed in the last ten years of the sample horizon. The fraction of former CEOs moving to become executives at other firms declined from 9.7% to 8.0% between 1986-2001 and 2001-2011. The fraction of CEO-to-CEO moves has also declined from 4.9% to 4.0% over the same period.

[Insert Table 3 here]

Table 3 explores an important question: Do these CEO movements represent improved opportunities for the CEOs through the labor market (e.g., an external promotion)? Panel A shows that CEOs move to firms with different characteristics and compensation. First, over the full sample period (1920-2011), about three-fourths of CEO moves are to larger and more profitable (measured by ROA) firms (74.8% and 70.1%, respectively), and more moves involve a pay increase on average. Second, CEOs who become non-CEO executives (such as CFOs and VPs) at other firms tend to move to larger and more profitable firms more so than for those who become CEOs at other firms. Moving to non-CEO executive positions involves a pay increase that is similar to the increase for moving to new CEO positions. Thus, results for the full sample in Panel A suggest that the majority of CEO moves are likely external promotions in terms of prestige of the employer and compensation.

[8] These fractions of CEO-to-CEO moves are similar to estimates in Vancil (1987), which show that 2.2% of 1,631 departing CEOs in his dataset become CEOs at other firms before 1985.

Importantly, compared to the 1920-1949 and 1950-1985 periods, during 1986-2001 the fraction of CEOs who move to larger firms increased by 39.0% (from 59.5% to 82.7%) and 23.4% (from 67.0% to 82.7%), respectively. Similarly, compared to the earlier two periods, over 1986-2001 the fraction of CEOs who move to more profitable firms increased substantially (from 37.8% and 58.4% to 80.2%). In addition, during 1986-2001 CEO salary and bonus more than doubled on average following a move to another firm, while during 1950-1985, the average pay increase was 15.9%. These trends suggest that a typical executive move in most of the 1980s and 1990s is more likely a promotion than in the preceding decades (in terms of job title, pay, or prestige of the new employer). These findings are consistent with Frydman and Saks (2010) and Frydman (2017), who use samples of select large public firms and show that executive compensation and mobility have risen substantially between the mid-1970s and early-2000s, arguably due to rising importance of general managerial skills.

The last column in Panel A shows that these patterns have reversed in the last ten years of the sample period (2002-2011). In the most recent decade, the fraction of moving CEOs who join larger and more profitable firms decreased to levels similar to those in the 1950-1985 period. Relative to the 1986-2001 period, the magnitude of pay increases upon moving also declined during the recent ten years (e.g., from 104.5% to 62.9% for the case of CEO-to-CEO moves). These reversed trends, combined with the declining rate of executives moving to other firms (Table 2) and lack of changes in firm-imposed incentives and contracts in response to variation in mobility during this period, indicate that executive mobility as measured by external hire opportunities has declined in the recent decade. This pattern is new to the literature, and future research may want to investigate underlying reasons for the decreasing mobility.

The second part of our paper examines what happens to cooperate policies when a shock (i.e., the death of a CEO in a connected industry) improves CEO mobility across firms. Therefore, Panel B of Table 3 presents similar information for the subset of cross-industry moves initiated by the death of a CEO in a connected industry. All moves in the panel are CEO-to-CEO by construction. The findings are generally similar to that in Panel A, namely that cross-industry moves due to the death of a CEO are primarily to larger, more profitable firms, with partial reversal in the last ten years of the sample. Overall, these patterns suggest that implicit incentives from mobility from a CEO's current employer became more important over the past century, though they declined in the last decade.

2.3 Measuring Executive Mobility

We construct industry-level measures of executive mobility as the number of CEOs who move to other firms as executives (either within or across industries), scaled by the lagged number of CEOs (or separately, CEO turnover events) in a given industry and year. These measures capture the average rate at which sitting CEOs are hired by other firms at the industry level. The resulting measure is defined as follows:

$$Mobility_{i,j,t} = \frac{\#\ CEO\ moves_{-i,j,t}}{\#\ CEOs_{j,t-1}},\ \text{or}\ = \frac{\#\ CEO\ moves_{-i,j,t}}{\#\ CEO\ turnovers_{j,t-1}} \quad (1)$$

where $Mobility_{i,j,t}$ is a measure of mobility for a CEO of firm *i*, employed in one-digit SIC industry *j*, in year *t; # CEO moves*$_{-i,j,t}$ represents the number of moves between years *t-1* and year *t* by CEOs in industry *j* to become officers in another firm in any industry, excluding firm *i*'s own turnover;[9] *# CEOs* (or *# CEO turnovers*$_{j,t-1}$) is the number of CEOs (or their turnovers) in industry *j* in year *t-*

[9] Whether excluding a firm with its own CEO turnover from the analysis does not significantly affect our results.

1.[10] We use one-digit SIC codes to define industries, given the relatively low frequency of CEO moves. Figure A1 illustrates construction of the *Mobility* measure using an example.

Figure 1 shows that the two measures of the executive mobility (whether deflated by the number of CEOs or CEO turnover events) move 'in parallel' from 1920 through 2011, on average (ρ = 0.93). Importantly, the measures generally trend up throughout most of the sample period, suggesting that mobility of US executives increased over most of the century. A new result in our paper is that executive mobility, measured by the frequency of across-firm moves, began to decline in the early 2000s, which is consistent with the post-2002 patterns we documented in the previous section. In Section 4.3, we examine the implications of the recent decline in mobility for managerial incentives and firm decisions.

[Insert Figure 1 here]

2.4 Instrumental Variables: CEO Deaths in Connected Industries

The measures of executive mobility defined above could be correlated with economic and labor market conditions. For example, mobility of executives could be correlated with business cycles, industry- or firm-level performance (e.g., Saks and Wozniak 2011; Jenter and Kanaan 2015; Chodorow-Reich and Wieland 2016).[11] In this case, an association between executive mobility and corporate decisions may not necessarily imply a causal link.

To mitigate this omitted-variable concern, we employ an instrumental variables approach that exploits variation in mobility due to CEO deaths elsewhere in the labor market (i.e., outside a given CEO's own industry). Specifically, we instrument the mobility measures in equation (1)

[10] In the numerator of equation (1), we exclude cases where there is an M&A between firm *i* and other firms in years *t-2*, *t-1* and *t*.

[11] For example, the time-series correlation between the average measure of mobility based on the number of CEO moves and the US GDP growth rate is -0.21 (significant at the 5% level).

using the one-year lagged weighted average number of CEO deaths across connected industries divided by the number of CEOs or CEO turnovers in a given industry.[12] We measure connectedness (and the associated weight) by the fraction of CEO moves from a given ("origin") industry to each of the other ("destination") industries in the past three years (see Table 1).[13] Presumably, a pair of industries that shares executives is likely to share managerial human capital.[14] Thus, a sudden increase in demand for top managers in connected industries would lead to improved across-firm mobility for executives in a given industry. The main identifying assumption underlying our instrument is that executive deaths in other industries affect managerial decisions only through their impact on labor mobility. We exclude CEO deaths in a firm's own industry to avoid potential omitted-variable bias.[15] The resulting instrumental variable is defined as follows:

$$Death_{j,t-1} = \frac{\sum_{k \neq j} w_{j \to k,t-1} \, \# \, Deaths_{k,t-1}}{\# \, CEOs_{j,t-1}}, \quad or \quad \frac{\sum_{k \neq j} w_{j \to k,t-1} \, \# \, Deaths_{k,t-1}}{\# \, CEO \; turnover_{j,t-1}} \tag{2}$$

where $Death_{j\text{-}1,t}$ is an instrumental variable for the mobility measures in equation (1), representing a shock to mobility due to CEO deaths in year *t-1* in industries connected to industry *j*; $\# Deaths_{k,t\text{-}1}$ represents the number of CEO deaths in industry *k* and year *t-1*; and $w_{j \to k,t\text{-}1}$ is the 'connectedness weight' and represents the fraction of CEO hires from industry *j* to industry *k*, among all moves from industry *j*, from year *t-3* to year *t-1*; $\# CEOs_{j,t\text{-}1}$ and $CEO\ turnovers_{j,t\text{-}1}$ are defined as in equation (1). Figure A2 illustrates construction of the instrument *Death* using an example.

[12] We include the financial industry (SIC6) in the calculation to define connected industries.
[13] For example, from 1986 through 1988, 11% of CEO moves from the mining and construction industry (one-digit SIC = 1) are to firms in the light manufacturing industry (one-digit SIC = 2). Thus, for mining and construction, we define light manufacturing as a connected industry for 1988 and use 11% as the weight of the industry in constructing the instrument.
[14] See Tate and Yang (2017) and Kim (2018) for approaches to defining labor markets using worker moves within and across industries based on the US Census Bureau's worker-level micro data.
[15] We obtain qualitatively similar results when including CEO deaths in own industries in constructing the instrument.

To implement the instrument in equation (2), we collect CEO death events from 1950-2010 from the following sources. We start with CEO death events from Salas (2010), Fee, Hadlock, and Pierce (2013), Quigley, Crossland, and Campbell (2017), and Karolyi (2018).[16] We supplement these data with our own data collection as follows. First, we collect names of CEOs who died as reported in the obituary section of Standard and Poor's Register of Corporations, Directors, and Executives ('S&P Register') from 1950 through 2010. Second, we perform news searches to collect additional CEO changes due to death at public firms from 1950 through 2010. Third, we supplement this set by examining all CEO turnover events in our database from 1950 through 2010 that are not identified above, and determine whether they are due to the death of a CEO by searching for news articles in Factiva and Google. We keep track of which CEOs passed away suddenly (e.g., due to accident, heart attack, etc.).

All total, we match 265 death events from 1950 to 2010 to our database, and use 173 CEO deaths in our main analyses for the 1986-2011 period, 87 of which we classify as sudden deaths.[17] Panel B of Table 3 describes characteristics of CEO moves due to the death of a CEO (see Section 2.2).

One potential concern with our instrument is whether a CEO death is a sufficiently large shock to the executive labor market. Table 4 shows that within one year (two years) following the death of a single CEO, there are on average 1.81 (3.06) external CEOs hires in connected industries that can be directly tied to the initial CEO death; these numbers are greater than one because they capture the 'chain reaction' of replacing the CEO who replaced the deceased CEO, and so on. Within five years after an initial death, 9.13 external CEO hires in connected industries can be

[16] We thank Charlie Hadlock, Steven Karolyi, Timothy Quigley, and Jesus Salas for sharing their datasets on CEO death events.

[17] We also collect 62 events of CEO turnovers due to health-related reasons. See Table A3 for results that also incorporate CEO turnovers due to serious health issues in constructing the instrument.

traced to the initial death. To put these numbers in perspective, the average industry hires about 14 external CEOs per year, which suggests that the cumulative effect of the death of one CEO on the mobility of other executives is moderate-to-large in magnitude. Furthermore, there likely are unobserved chain reactions to each death event (e.g., for firms not in our sample), which will increase true executive mobility even more.

[Insert Table 4 here]

2.5 Descriptive Statistics for Firm Characteristics

Table 5 presents descriptive statistics for characteristics of firm-years in our main analysis sample from 1985 to 2011, including the measures of executive mobility and instruments. For a typical firm in the sample, there are 129.2 departing CEOs (i.e., turnovers) per year in its one-digit SIC industry, 14.0 of whom become executives (including CEOs) in other firms. In addition, the mean and standard deviation of the $Mobility_{Turnover}$ measure are 0.114 and 0.075, respectively, suggesting that there is considerable executive mobility and that the mobility exhibits substantial cross-sectional variation. The average number of CEO deaths in connected industries is 1.23 per year. Given the average number of CEO moves (14.0) at the industry level, this magnitude of death should induce a meaningful shock to executive mobility. Other characteristics of the CEO and board are comparable to those from previous research (e.g., Graham, Kim, and Leary 2019). For example, the average CEO tenure is 5.76 years and the ratio of the number of independent directors to all directors ("independence ratio") is 0.60.

[Insert Table 5 here]

3. Empirical Results

3.1 Conceptual links between labor market incentives, contracts, and corporate policies

Career concern models argue that implicit incentives from the labor market help resolve managerial incentive problems (e.g., Fama 1980; Holmstrolm 1999). In particular, Fama (1980) argues that as the labor market incorporates firm performance to determine an executive's external opportunities (e.g., becoming CEO of another firm), the CEO essentially has a "stake" in the firm's success, which induces efficient behavior. Gibbons and Murphy (1992) argue that the optimal contract balances the combination of this implicit, labor-market incentive and explicit incentives from contracts, such as pay-for-performance. Thus, this class of models predicts that explicit contracts are more important when implicit incentives are weaker, and vice versa.

In addition, dynamic agency theory argues that firms' capital structure, investment, and monitoring of the agent are important parts of the explicit contract that provides optimal incentives. In this class of models, the agent's (an executive in our context) continuation value (i.e., "stake" in the firm) and the threat of termination or monitoring help align incentives. Because labor market mobility provides an implicit stake in the firm, an increase in mobility reduces the need for these explicit incentive and monitoring mechanisms.

Thus, career concern and dynamic agency theories predict that when executive mobility and associated incentives increase, firms will substitute for explicit incentives from contracts such as high-powered incentive pay and financial leverage, as well as internal monitoring (e.g., Gibbons and Murphy 1992; Piskorski and Westerfield 2016; DeMarzo and Fishman 2007b). In the cross-section, these effects will be more pronounced for executives with many years until retirement or high mobility, for whom the implicit incentives from the labor market are more important.

3.2 Executive Mobility, Incentives and Monitoring

3.2.1 Pay-for-Performance Sensitivity

We now explore the prediction that strong labor market incentives will substitute for incentives from contracts, starting with pay-for-performance sensitivity. As described in Section 2.4, we test this and other predictions by instrumenting executive mobility in a given industry and year using the number of CEO deaths in connected industries scaled by the number of CEOs in the industry in the previous year. Specifically, we estimate the following two-stage least square (2SLS) regressions:

$$Mobility_{i,j,t} = \alpha + \beta Death_{j,t-1} + \gamma X_{i,j,t} + \delta_t + \theta_{i,c} + \varepsilon_{i,j,t}, \quad (3)$$

$$Pay - Perf_{i,j,t} = \mu + \varphi \widehat{Mobility}_{i,j,t} + \rho X_{i,j,t} + \pi_t + \tau_{i,c} + \sigma_{i,j,t}, \quad (4)$$

where $Mobility_{i,j,t}$ represents our measure of executive mobility defined in equation (1);[18] $Death_{j-1,t}$ represents the weighted average number of CEO deaths in connected industries scaled by the number of CEOs in industry *j* in year *t-1*; $Pay\text{-}Perf_{i,j,t}$ is pay-for-performance sensitivity, defined as changes in CEO pay (the sum of salary and bonus) between year *t* and year *t+1* scaled by changes in market value of equity between year *t-1* and year *t* (in percentage points) (e.g., Inderst and Mueller 2010); $X_{i,j,t}$ represents a vector of control variables including one-digit SIC-level industry GDP growth rates and average Tobin's *q* (both of which control for time-varying industry-level economic conditions which may be correlated with the measure of mobility), CEO tenure, a dummy for CEO turnover, firm size (measured by log book assets), ROA, cash flow, cash holdings, leverage, asset tangibility, and market-to-book for firm *i* in industry *j* and year *t*; δ_t and π_t represent year fixed effects; $\theta_{i,c}$ and $\tau_{i,c}$ represent firm-by-CEO fixed effects; and $\varepsilon_{i,j,t}$ and $\sigma_{i,j,t}$

[18] To facilitate comparisons across two versions of this variable, we scale each by its standard deviation in all regression analysis.

represent random errors double clustered both at the industry and year levels. Given that we include firm-by-CEO fixed effects in equations (3) and (4), we identify the effect of mobility on explicit incentives using within-firm-CEO variation.

[Insert Table 6 here]

Table 6 presents the estimation results based on a subsample of firm-years for which the variable for pay-for-performance is available (N = 16,386). Panel A shows that both instruments ($Death_{CEO}$ and $Death_{Turnover}$) in the first-stage regression are significant at the 10% level, indicating that executive mobility increases with the death of connected industry CEOs. Consistent with the prediction that increased labor market incentives substitute for explicit incentives, Panel B (second stage) show that the coefficients on *Mobility* are significantly negative. For example, estimates in column 1 show that a one-standard deviation (SD) increase in executive mobility leads to a 33.6-percentage-point decrease in a CEO's pay-for-performance sensitivity, which is 21.2% of its standard deviation (1.59).[19]

The next subsections continue to explore this issue of whether increased executive mobility affects corporate policies in ways that reduce monitoring and explicit incentives, measured by board structure and leverage.

3.2.2 Monitoring by the Board

In a dynamic agency framework, improved mobility of the agent (an executive in our context) increases her continuation value (or implicit "stake" in the firm). Thus, total incentives can be maintained with less intensive monitoring or a smaller termination threat, when incentives from the labor market mobility strengthen (e.g., DeMarzo and Fishman 2007a; Piskorski and

[19] In unreported analysis, we find that CEO pay level increases modestly (2.8%) when CEO mobility increases by one standard deviation (*t*-stat = 0.62).

Westerfield 2016). In this section, we examine this prediction using board structure as a measure of monitoring intensity. In particular, we test whether an increase in executive mobility reduces the board's monitoring intensity reflected in the fraction of independent directors (Hermalin and Weisbach 1998) and whether the CEO is appointed board chair (Graham, Kim, and Leary 2019).

[Insert Table 7 here]

Table 7, Panel A presents the first-stage estimation results for equation (3) using the full sample of firm-years from 1986 to 2011. It shows that the number of CEO deaths in related industries in the previous year is significantly positively related (at the 1% level) to the mobility of executives in a given industry and year. The F-statistics for testing the relevance of $Death_{CEO}$ and $Death_{Turnover}$ as instruments are 101.12 and 114.99, well over the usual threshold value of ten (e.g., Staiger and Stock, 1997). In the second stage shown in columns 1 and 2 of Panel B, we use the board independence ratio, defined as the ratio of the number of independent directors to total directors, as the dependent variable in equation (4). We find that executive mobility instrumented by the scaled weighted average number of CEO deaths in connected industries has a significantly negative effect on board independence ratio (at the 1% level). Estimates in column 1, which uses $Death_{CEO}$ as the instrument, indicate that a one-SD increase in mobility leads to a 0.10-percentage-point decline in the independence ratio.[20] This reduced independence of the board is consistent with the CEO being optimally monitored less when the labor market mobility provides her with stronger incentives.

One would also expect that boards chaired by the CEO would be weaker in monitoring the CEO. The results in columns 3 and 4 of Table 7, Panel B suggest that CEOs who experience an

[20] In unreported analysis, we find that this decrease in board independence is due both to an increase in the number of inside directors and a decrease in the number of outside directors, with the decrease in outside directors representing two-thirds of the change in independence.

increase in across-firm mobility are more likely to be board chairs, again implying less monitoring. Estimates in column 3 indicate that a one-SD increase in mobility leads to a 0.20-percentage-point increase in the probability that the CEO is board chair (significant at the 1% level). Taken together, the results in Table 7 are consistent with the prediction that increased mobility provides additional labor-market incentives to the CEO, which partially substitute for the board's monitoring role.

3.2.3 Capital Structure as a Termination Threat

In addition to explicit pay-for-performance sensitivity and board monitoring, dynamic agency models suggest that the firm's capital structure can also work as an indirect monitoring mechanism (e.g., DeMarzo and Sannikov 2006; DeMarzo and Fishman 2007b). Specifically, the firm can incentivize the CEO by using long-term debt, which increases the threat of termination, as part of an optimal contract. Thus, if heightened mobility provides stronger incentives to executives, the firm will optimally decrease debt usage in its capital structure. In addition, holding (excess) cash helps the agent avoid costly termination (e.g., losing private benefits of control or continuation value). Thus, we consider net leverage (defined as total debt minus cash holdings scaled by total assets, in percentage points) as an outcome to test the implication for termination threat. We explore this link using the instrumental variables regressions in equations (3) and (4).[21]

[Insert Table 8 here]

Table 8 shows that an increase in executive mobility leads to a decrease in net leverage (significant at the 5% level). The coefficient on $Mobility_{CEO}$ in column 1 suggests that a one-SD increase in CEO mobility leads to a 0.11-percentage-point decrease in the net leverage ratio (mean = 5.0%). These results are consistent with the prediction from dynamic agency models that

[21] In this and subsequent analyses, the first stage result is the same as that in Panel A of Table 7, which uses the same sample and instrumental variables.

additional implicit incentives due to enhanced mobility substitutes for termination threats as a mechanism to discipline the CEO.

3.3 Executive Mobility, Corporate Investment and Growth

The results so far indicate that an increase in executive mobility leads to lower pay-for-performance, board monitoring intensity, and less debt usage, consistent with career concern and dynamic agency models. In this section, we turn our analysis to the relation between CEO mobility and corporate investment and growth. Specifically, we examine the prediction from dynamic agency models that firms will invest more (and grow assets faster) as the manager's implicit labor market incentives increase (e.g., Quadrini 2004; DeMarzo and Fishman 2007a; DeMarzo et al. 2012).[22] The intuition for this prediction is that the executive's increased stake in the firm due to heightened mobility mitigates agency conflicts, which in turn increases *shareholders'* return on investment. We measure investment (in percentage points) using capital expenditures scaled by total assets and estimate a variant of equation (4) that uses it as the dependent variable.

[Insert Table 9 here]

Table 9 presents the estimation results. We find that increased executive mobility precedes an increase in corporate investment (significant at the 1% level). Estimates in column 1 suggest that a one-SD increase in the mobility measure leads to a 0.13-percentage-point increase in the investment rate, which represents 2.1% of the average annual investment rate in the sample (6.1%). In unreported analysis, we also find that an increase in executive mobility leads to a significant increase in asset growth rate. These results are consistent with a dynamic agency framework in

[22] Alternatively, dynamic contracting models with limited commitment (e.g., Ai et al. 2018), in which increased mobility increases the outside option of the agent, can generate the same prediction. See the Introduction for a related discussion.

which a reduction in agency problems optimally leads to increases in firm growth and investment (e.g., DeMarzo and Fishman 2007a).

4. Heterogeneity in Executive Mobility and Career Concerns

In this section, we examine whether variation in executive mobility and career concerns, both in the cross-section and time-series, shapes the link between implicit incentives from the labor market, explicit contracts and corporate decisions.

4.1 CEO Tenure and Incentive Effect of Executive Mobility

We first explore whether the effects of executive mobility on explicit contracts differ conditional on CEO tenure. We hypothesize that the effects are stronger for CEOs with longer careers ahead of them (e.g., CEOs with short tenure) because they have greater career concerns (e.g., Gibbons and Murphy 1992). To examine this hypothesis, we interact our instrument based on deaths of other CEOs with a measure of CEO tenure as follows:[23]

$$Mobility_{i,j,t} = \alpha + \beta_1 Death_{j,t-1} + \beta_2 Short\ tenure_{i,j,t} + \beta_3 Short\ tenure_{i,j,t} \times Death_{j,t-1} + \gamma X_{i,j,t} + \delta_t + \theta_{i,c} + \varepsilon_{i,j,t}, \quad (5)$$

$$Outcome_{i,j,t} = \mu + \varphi_1 \widehat{Mobility}_{i,j,t} + \varphi_2 Short\ tenure_{i,j,t} + \varphi_3 Mobility_{i,j,t} \times \widehat{Short\ tenure}_{i,j,t} + \rho X_{i,j,t} + \pi_t + \tau_{i,c} + \sigma_{i,j,t}, \quad (6)$$

where *Short tenure*$_{i,j,t}$ is an indicator variable equal to one if CEO tenure is less than eight years (median ultimate tenure in the sample); we instrument the interaction term between *Mobility* and the *Short tenure* indicator by interacting the *Death* instrument with the indicator, assuming that this indicator variable is relatively free from omitted variable concerns (see e.g., Angrist and Pischke 2009); *Outcome*$_{i,j,t}$ is either of pay-for-performance sensitivity, board independence, an

[23] Another sensible proxy for the degree of career concerns is CEO age. However, the variable is not available in Moody's or Mergent; thus, we do not use it as a conditioning variable.

indicator for CEO-chair duality, net leverage, or capital expenditures scaled by lagged assets; and all other variables are defined in equations (3) and (4). The main coefficient on interest is φ_3, which measures the additional effect of executive mobility for CEOs with shorter tenure.

[Insert Table 10 here]

Table 10 presents estimates of equation (6) across the five outcome variables concerning explicit incentives and corporate policies as contracts. For brevity, starting with this table we show results based on the $Mobility_{CEO}$ measure only (but results are quantitatively similar using the $Mobility_{Turnover}$ measure). Column 1, which uses pay-for-performance sensitivity as the dependent variable, shows that the coefficient on $Mobility_{CEO} \times Short\ tenure$ is -66.121 and significant at the 10% level, consistent with a larger negative impact of executive mobility on explicit incentives for CEOs with longer careers ahead. Estimates in columns 2 and 3 show that in response to heightened mobility, CEOs with shorter tenures experience a greater decline in board independence (significant at the 10% level) and increase in CEO-board chair duality (insignificant at a conventional level). This finding is consistent with firms optimally reducing monitoring intensity more when the strengthened labor market incentives affect CEOs more.

Column 4, which uses the net leverage ratio as the dependent variable, shows that the negative effect of executive mobility on leverage, a measure of termination threat (or indirect monitoring), is more pronounced for firms with CEOs with short tenures ($Mobility_{CEO} \times Short\ tenure$ = -0.071; t-stat = -3.01). In contrast, the effect on leverage is economically and statistically insignificant (-0.017; t-stat = -0.60) for firms headed by CEOs with tenure greater than seven, whose incentives are presumably less affected by labor market mobility. Lastly, estimates in column 5 show that the effect of mobility on investment is significantly more pronounced among CEOs with shorter tenures. Taken together, the results that the impact of improved mobility on

these outcomes is more pronounced among short-tenure CEOs are consistent with career concern models (e.g., Fama 1980; Gibbons and Murphy 1992; Holmstrom 1999), in which the incentive effect of external labor markets hinges on the prospects of executives' moving to other firms.

4.2 State-Level Enforcement of Non-Compete Clauses

Our main measures of mobility (equation (1)) capture mobility of *average* executives in a given industry and year. However, there could be considerable heterogeneity in mobility among executives within the same industry-year, for example, across firms in different geographical areas. This heterogeneity will lead to variation in the effects on explicit incentives and firm decisions we document. We explore non-competition agreements ('non-competes') as a driver of executive mobility across firms located in different locations (states in particular). Non-competes, which are widely used among US firms particularly for executives, create a significant legal constraint to their moving to other firms (see e.g., Kaplan and Strömberg 2003; Marx, Strumsky, and Fleming 2009; Garmaise 2011; Kini, Williams, and Yin 2018). For example, Garmaise (2011) finds that (i) 70.2% of firms in his sample from 1992 through 2004 use non-compete agreements with their top executives, and that (ii) when a state's enforcement of non-compete clauses is stricter, executives of firms located in that state become less mobile. Thus, we predict that the effect of an increase in industry-level mobility will be more pronounced in states where non-compete agreements are less strictly enforced, which increases labor mobility.

We test this prediction by estimating an IV specification similar to those in equations (5) and (6) that interacts our industry-year-level measure of executive mobility with a measure of non-compete enforceability from Garmaise for a given firm's headquarter state by year.[24] The

[24] Non-competes generally prohibit movements within industries, whereas our instruments are based on the number of CEO deaths in other, connected industries. However, enforcement of non-competes is likely to provide variation in

definition of the enforceability index is in Table A1. We follow Garmaise (2011) and use headquarters location (from Compustat) to determine the level of non-compete enforcement for executives.[25]

[Insert Table 11 here]

Table 11 presents the estimation results. We find that the effects of managers' mobility on pay-for-performance sensitivity (column 1), net leverage (column 4), and investment (column 5) are significantly weaker for firms located in states where non-compete agreements are more strongly enforced (hence reduced mobility). The estimated coefficients on $Mobility_{CEO} \times Non\text{-}compete$ for the board monitoring variables in columns 2 and 3 have the correct sign (i.e., positive for board independence and negative for CEO-chair duality) but are not significant.

Estimates in column 1 suggest that a one-SD (2.23) increase in the enforceability index would reduce the effect of increased mobility on pay-for-performance by 14% from -38.11 to -33.45 (= -38.113 + 2.093 × 2.23). Estimates in column 5 suggest that the same magnitude of increase in non-compete enforceability would reduce the effect of improved executive mobility on investment by 19%, from 0.20 to 0.16 (= 0.201 + (-0.017 × 2.23)). Thus, the results presented in Table 11 are consistent with the interpretation that enforceability of non-compete laws provides an additional dimension of executive mobility, contributing to the heterogeneity in the effects of the industry-level mobility measure on explicit incentives, capital structure, and investment we document above.

executive mobility in our IV specification, given that a CEO death leads to multiple executive movements, approximately half of which are moves within the same industry (see Section 2.4).

[25] See Garmaise (2011, p.15): "…the enforcement of non-competition agreements is governed by employment law, not corporate law, so the relevant jurisdiction is typically the one in which the employee works. Our study analyzes top executives at large firms, who will typically work at headquarters, so it is the headquarters location, not the state of incorporation that we consider."

4.3 The Effect of Market-Wide Variation in Executive Mobility

The trends in executive movements shown in Section 2 point toward generally increasing mobility of corporate executives in the US from the 1970s-1980s to the early 2000s.[26] In contrast, we find new evidence that executive mobility has declined since the early 2000s (see Figure 1). This reversal of the mobility trend during the last decade in the sample coincides with more prevalent use of non-compete agreements in executive labor contracts (Kini, Williams, and Yin 2018),[27] as well as declining CEO turnover rates and declining external CEO appointments during the 2000s (Graham, Kim, and Leary 2019).[28]

Exploiting this rich time-series variation in executive mobility over nearly a century, we address the following question: Do implicit incentives from the labor market affect explicit incentives and contracts when overall executive mobility is low? We hypothesize that low market-wide mobility makes the labor market less efficient in terms of reallocating executives conditional on their performance, thus providing weaker Fama (1980)-like incentives. To test this hypothesis, we examine whether during 1950-1985 and 2002-2011 (periods of low mobility) incentive effects are low relative to the 1986-2001 period.

[Insert Table 12 here]

Table 12 shows results from estimating IV regressions in equations (3) and (4) separately for three periods: 1950-1985, 1986-2001, and 2002-2011. We find that the effects on pay-for-performance and other measures of explicit contracts and firm decisions are indeed weaker for the two periods when market-wide mobility is lower (1950-1985 and 2002-2011). In particular, Panels A (1950-1985) and C (2002-2011) show that across the columns, the coefficients on *Mobility* are

[26] See e.g., Murphy and Zabojnik (2007) and Frydman (2017).
[27] Non-complete agreements are also more widely used in labor contracts in recent years (Krueger and Posner 2018).
[28] See also "More CEO Jobs Go to Insider Candidates," *The Wall Street Journal*, March 9, 2016 for evidence for a decline in the fraction of outside-the-firm CEO hiring at large US public firms over 2004 to 2015.

insignificant or opposite from the predictions of career concern and dynamic agency models. In contrast, Panel B shows that the effects of mobility on these incentives and corporate policies are highly significant in the 1985-2001 period, when overall executive labor market mobility is high.

This heterogeneity in the effect of mobility across time periods is consistent with the notion that low market-wide labor mobility offers little incentive to the CEO, small enough apparently that we detect no evidence of substitution for firm-implemented incentives and contracts.

5. Robustness Tests

5.1 Alternative Explanation: Product and Input-Output Market Links

Our interpretation of the findings above is that the changes in corporate decisions are due to firms substituting between explicit incentives and incentives from labor market mobility. Alternatively, changes in corporate decisions could be driven by changes in product markets or interactions of firms through supply chains. For example, when a firm's CEO dies unexpectedly, another firm that directly competes in the product market could respond by investing more aggressively and growing faster to exploit the temporarily weaker competitor. To help rule out this type of alternative explanation, we construct alternative measures of executive mobility that exclude CEO moves between firms that produce similar products or between industries with close input-output relations.

We first construct an alternative version of the *Mobility* measure and *Death* instrument in equations (1) and (2) that excludes CEO moves between firm pairs with high product similarity (a proxy for competition). Specifically, we use the Hoberg-Phillips (2010, 2016) TNIC-3 product similarity scores, and exclude firm pairs with similarity above the annual median. This results in eliminating 4.8% of the total moves in the sample. The idea is that the remaining 95.2% of moves

represent executive labor market connections above and beyond any that might occur due to close product market relations. In addition, we construct versions of the *Mobility* measure and *Death* instrument that exclude CEO moves between industry pairs with above-the-median input-output flows from the Bureau of Economic Analysis (BEA) Use Table.[29] This results in excluding 35.6% of the total moves from the sample, implying that the remaining 64.4% of moves represent executive labor market connections above and beyond input-output relations between firms.

Panel A of Table 13 shows that our findings are essentially unchanged after excluding moves related to product markets. The economic magnitudes remain similar to the baseline results. In unreported analysis, we alternatively use Hoberg-Phillips fixed industry classifications (FIC)-by-year fixed effects, which controls for time-varying shocks for product-market peers, and again find robust results.[30] Panel B presents results with the mobility measure and instrument that exclude CEO moves between industry pairs with high input-output relations. These estimates are similar to our baseline findings in terms of both statistical and economic significance. Thus, results in Table 13 are consistent with our empirical results being attributable to executive mobility and its implicit incentive effects on CEOs; we do not find evidence that our results are driven by the effects of product markets or input-output linkages that may be correlated with CEO movements or deaths.

[Insert Table 13 here]

5.2 Alternative Measures and Instruments for Mobility

[29] The BEA Use table describes input-output flows at the BEA industry level. We use a concordance table between BEA industry classifications and SIC industry classifications to match the Use table with our dataset.
[30] Specifically, we use FIC25, FIC50, and FIC100.

We employ several alternative measures of executive mobility as robustness checks of the baseline results. First, we use the three-year moving average of the baseline measures and find results that are similar to those presented in Tables 6 through 11 (unreported). Second, we expand our measurement of mobility in equation (1) to include movements of other top executives, such as CFOs and VPs, in addition to CEOs, and find similar results (Table A2). With the exception of pay-for-performance sensitivity, the estimates in Table A2 are comparable with the baseline results in terms of both statistical and economic significance.

Moreover, to check the robustness of our IV estimates, we employ several alternative instruments: i) the number of sudden CEO death events, ii) the number of CEO turnover events due to serious health issues as well as deaths (see Jenter et al. 2017; Graham, Kim, and Leary 2019), and iii) the number of CEOs approaching retirement age (Karolyi 2018). Panel A of Table A3 shows that the results using only sudden death (87 events) in the instrument are quantitatively similar to the main results, both statistically and economically significance remaining similar across the columns. Panel B of Table A3 also shows qualitatively similar results using the number of CEO turnover events due to health-related reasons (additional 62 events) as well as deaths scaled by the number of CEOs in a given industry as an alternative instrument.

Last, we use the proportion of CEOs in connected industries who are close to a retirement age as another alternative instrument for mobility of executives. While not as discrete as CEO deaths, the age measure captures the fraction of CEOs who may potentially retire, which increases *expected* mobility for executives in connected industries. We use the weighted number of CEOs in connected industries who are 63 or older, scaled by the number of CEOs in a given one-digit SIC industry and year, as an alternative instrument (see e.g., Gibbons and Murphy 1992; Jenter

and Kanaan 2015).[31] Table A4 shows that using the alternative instrument, the overall results are qualitatively similar to the baseline results with the coefficients for pay-for-performance significant at the 1% level, and net leverage and investment at the 10% level. The monitoring variables (board independence and CEO-chair duality) have the correct sign on their estimated coefficients but are not significant. Relative to the death instrument, the reduced statistical significance is expected given that the age-based instrument measures a potential increase in executive mobility, as opposed to an actual increase.

6. Executive Mobility and Firm Value

Do changes in labor market-induced incentives affect firm value? On the one hand, enhanced implicit incentives from the labor market reduce agency conflicts, which may benefit shareholders (Fama 1980). On the other hand, we show above that increased mobility-induced incentives appear to be offset by company-implemented incentives (such as high performance pay and leverage) so any valuation effect may be small. Moreover, it is plausible that improved executive mobility increases the CEO's outside option (or bargaining power), which the CEO could use to extract rents from the firm (see a related discussion in the introduction). To shed light on this issue, we explore potential valuation effects by estimating the relation between executive mobility and Tobin's *q* using an IV approach, as described in equations (3) and (4), up to two years after a shock to mobility.

[Insert Table 14 here]

Table 14 presents the estimation results. As seen in Panel A, we find that an increase in executive mobility is associated with higher Tobin's *q*. Coefficients on *Mobility* are positive and

[31] We thank Kevin J. Murphy for sharing the CEO age data.

significant one to two years after an increase in the executive mobility. In terms of economic magnitude, a one-SD increase in the measure is associated with a 0.007 increase in Tobin's *q* in two years out (column 3), which represents a 0.41% increase from the average *q* in the sample (1.62). Panel B uses a sub-sample of firms that survive throughout the three-year period after the shock, for which changing sample composition is less of concern. The panel again shows that an improvement in executive mobility has a positive effect on firm value up to two years. While only suggestive, this result is consistent with improved executive mobility modestly increasing firm value, on net, plausibly due to reduced agency problems and subsequent optimal contracting. In contrast, the increase in Tobin's *q* is inconsistent with alternative explanations that emphasize rent extraction by powerful CEOs (e.g., Bebchuk and Fried 2004) or the "dark side" of managerial mobility such as slow revelation of agents' ability (e.g., Acharya, Pagano, and Volpin 2016).

7. Conclusion

Researchers have observed notable trends in the market for corporate executives in the US over the past few decades. The level and dispersion of executive pay have increased considerably as the frequency of CEO moves and external-to-the-firm CEO hires have increased. In this paper, we uncover several new long-run trends in mobility of executives by constructing a new dataset of executive movements over the 1920-2011 period. First, movements of executives to new jobs across firms became more common in recent decades (e.g., 1986-2001) relative to previous decades over the century. Second, executives moved across an increasingly diverse set of industries over time. Third, conditional on moving, executives move to larger and more profitable firms more often, and their pay increases more, even more so in recent decades. However, we show for the first time that many of these trends have reversed over the last ten years of the sample

period (2002-2011), indicating declining executive mobility in the recent decade. In addition, we find considerable cross-sectional variation in mobility over 1920-2011.

Given the substantial variation in executive mobility that we document, understanding whether and how labor mobility affects executive incentives, monitoring of executives, and corporate decision-making is an important issue. To this end, we construct measures of executive mobility that vary across industry and over time, and capture movements of corporate officers across firms. Motivated by dynamic agency models, in which explicit contracts include company policies, as well as board and compensation structures, we examine whether there is a substitution of the incentives provided by company-implemented policies to offset incentives provided by the external mobility.

Using CEO deaths in connected industries as an instrument for executive mobility, we find that increased mobility leads to lower pay-for-performance sensitivity, net leverage, and monitoring intensity (decrease in board independence; increase in CEO-chair duality). We interpret these findings as being consistent with mobility of executives mitigating agency problems, thereby substituting for explicit incentives and monitoring. Furthermore, consistent with executive mobility providing incentives to managers and thus increasing the return on investment for shareholders, we find that firms increase investment and grow faster in response to these positive shocks to mobility. Overall, our paper is among the first to show that the labor market for corporate executives provides dynamic incentives, which, in turn, affect key incentive compensation, corporate governance and financial decisions of firms.

References:

Chodorow-Reich, Gabriel and Johannes Wieland, 2016, "Secular Labor Reallocation and Business Cycle", *working paper*, Available at SSRN: https://ssrn.com/abstract=2713589.

Custodio, Claudia, Miguel A. Ferreira, and Pedro Matos, 2013, "Generalists versus specialists: Lifetime work experience and chief executive officer pay", *Journal of Financial Economics* 108 (2), 471-492.

DeMarzo, Peter M. and Michael J. Fishman, 2007a, "Agency and Optimal Investment Dynamics", *The Review of Financial Studies* 20 (1), 151-188.

DeMarzo, Peter M. and Michael J. Fishman, 2007b, "Optimal Long-Term Financial Contracting", *The Review of Financial Studies* 20 (6), 2079-2128.

DeMarzo, Peter M., Michael J. Fishman, Zhiguo He, and Neng Wang, 2012, "Dynamic Agency and the q Theory of Investment", *The Journal of Finance* 67 (6), 2295-2340.

Fama, Eugene F., 1980, "Agency Problems and the Theory of the Firm", *Journal of Political Economy* 88 (2), 288-307.

Fee, C. Edward, Charles J. Hadlock, and Joshua R. Pierce, 2013, "Managers with and without Style: Evidence Using Exogenous Variation", *The Review of Financial Studies* 26 (3), 567-601.

Frydman, Carola and Raven E. Saks, 2010, "Executive Compensation: A New View from a Long-Term Perspective, 1936-2005", *The Review of Financial Studies* 23 (5), 2099-2138.

Frydman, Carola, 2017, "Rising Through the Ranks: The Evolution of the Market for Corporate Executives, 1936-2003" Forthcoming, *Management Science*.

Garmaise, Mark J., 2011, "Ties that Truly Bind: Non-competition Agreements, Executive Compensation and Firm Investment", *Journal of Law, Economics, & Organizatio*n 27 (2), 376-425.

Gibbons, Robert and Kevin J. Murphy, 1992, "Optimal Incentive Contracts in the Presence of Career Concerns: Theory and Evidence", *Journal of Political Economy* 100 (3), 468-505.

Graham, John R., Hyunseob Kim, and Mark Leary, 2019, "CEO-Board Dynamics", *working paper*, Available at SSRN: https://ssrn.com/abstract=2938120.

Hoberg, Gerard and Gordon Phillips, 2010, "Product Market Synergies and Competition in Mergers and Acquisitions: A Text-Based Analysis", *The Review of Financial Studies* 23 (10), 3773-3811.

Hoberg, Gerard and Gordon Phillips, 2016, "Text-Based Network Industries and Endogenous Product Differentiation", *Journal of Political Economy* 124 (5), 1423-1465.

Hermalin, Benjamin and Michael Weisbach, 1998, "Endogenously Chosen Boards of Directors and Their Monitoring of the CEO", *The American Economic Review* 88 (1), 96-118.

Holmstrom, Bengt, 1999, "Managerial Incentive Problem: A Dynamic Perspective", Review of Economic Studies 66 (1), 169-182.

Huson, Mark R., Robert Parrino, and Laura T. Starks, 2001, "Internal Monitoring Mechanisms and CEO Turnover: A Long-Term Perspective", *The Journal of Finance* 56 (6), 2265-2297.

Inderst, Roman and Holger M. Mueller, 2010, "CEO Replacement Under Private Information", *The Review of Financial Studies* 23 (8), 2935-2969.

Jenter, Dirk and Fadi Kanaan, 2015, "CEO Turnover and Relative Performance Evaluation", *The Journal of Finance* 70 (5), 2155-2183.

Jenter, Dirk, Egor Matveyev, and Lukas Roth, 2017, "Good and Bad CEOs", *working paper*.

Kaplan, Steven N. and Per Strömberg, 2003, "Financial Contracting Theory Meets the Real World: An Empirical Analysis of Venture Capital Contracts", *The Review of Economic Studies* 70 (2), 281-315.

Kaplan, Steven N. and Bernadette A. Minton, 2012, "How has CEO turnover changed?", *International Review of Finance* 12 (1), 57-87.

Karolyi, Stephen, 2018, "Personal lending relationships", *Journal of Finance* 73, 5-49.

Kim, Hyunseob, 2018, "How Does Labor Market Size Affect Firm Capital Structure? Evidence from Large Plant Openings", *working paper*, Available at SSRN: https://ssrn.com/abstract=2147932.

Kini, Omesh, Ryan Williams, and Sirui Yin, 2018, "Restrictions on CEO Mobility, Performance-Turnover Sensitivity, and Compensation: Evidence from Non-compete Agreements", *working paper*, Available at SSRN: https://ssrn.com/abstract=3170804.

Krueger, Alan and Eric Posner, 2018, "A Proposal for Protecting Low-Income Workers from Monopsony and Collusion", *The Hamilton Project*.

Marx, Matt, Deborah Strumsky, and Lee Fleming, 2009, "Mobility, Skills, and the Michigan Non-Compete Experiment", *Management Science* 55 (6), 875-889.

Murphy, Kevin J. and Jan Zabojnik, 2007, "Managerial Capital and the Market for CEOs", *working paper*, Available at SSRN: https://ssrn.com/abstract=984376.

Quadrini, Vincenzo, 2004, "Investment and Liquidation in Renegotiation-proof Contracts with Moral Hazard", *Journal of Monetary Economics* 51 (4), 713-751.

Quigley, Timothy J., Craig Crossland, and Rober J. Campbell, 2017, "Shareholder perceptions of the changing impact of CEOs: Market reactions to unexpected CEO deaths, 1950–2009", *Strategic Management Journal* 38 (4), 939-949.

Saks, Raven E. and Abigail Wozniak, 2011, "Labor Reallocation over the Business Cycle: New Evidence from Internal Migration" *Journal of Labor Economics* 29 (4), 697-739.

Tate, Geoffrey A. and Liu Yang, 2017, "The Human Factor in Acquisitions: Cross-industry Labor Mobility and Corporate Diversification", *working paper,* Available at SSRN: https://ssrn.com/abstract=2578636.

Vancil, Richard F., 1987, "Passing the Baton: Managing the Process of CEO Succession", *Harvard Business School Press*.

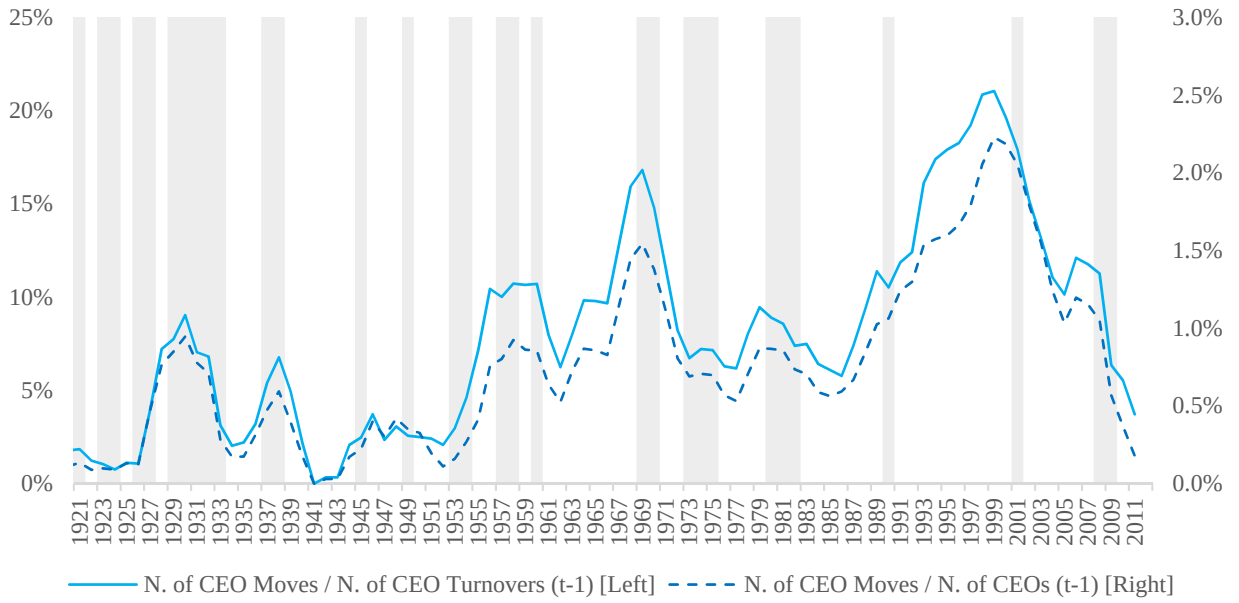

Figure 1. Measures of Executive Mobility. This figure plots two measures of executive mobility averaged across one-digit SIC industries from 1920 through 2011 (three-year moving average). *N. of CEO Moves* indicates the number of CEOs who become CEOs or other executive officers at other firms in our sample within 2 years after their departure. *N. of CEO Turnovers* indicates the number CEOs who leave firms in a given year. *N. of CEOs* indicates the total number of CEOs a given year. The correlation between the two measures is 0.928. Shaded area indicates NBER recession periods.

Table 1. Frequency of CEO Moves between Industries

This table presents the frequency of CEOs moving from a firm in the origination industry to another firm in the destination industry for three time periods from 1920 through 2011. *SIC-From* indicates the one-digit SIC industry of the firm that a given CEO departs and *SIC-To* indicates the one-digit SIC industry of the firm to which the CEO moves as CEO or another executive position. The mean and Herfindahl-Hirschman Index of the frequency across industries are in the parentheses.

Panel A. 1920-1949: 68 moves (Mean 5.26%, HHI 0.187)

SIC-From \ SIC-To	SIC0 Agric., Forestry, Fishing	SIC1 Mining & Constr.	SIC2 Light Manuf.	SIC3 Heavy Manuf.	SIC4 Transport. & Public Utilities	SIC5 Wholesale & Retail Trade	SIC6 Finance, Insurance, Real state	SIC7 Services	SIC8 Health Services	SIC9 Public Admin.	Total
0.Agriculture, Forestry, Fishing											0.0%
1.Mining & Construction		2.94%	2.94%	2.94%		1.47%					10.3%
2.Light Manufacturing			19.12%		1.47%		2.94%				23.5%
3.Heavy Manufacturing		1.47%	7.35%	36.76%		2.94%					48.5%
4.Transportation & Public Utilities				1.47%	1.47%						2.9%
5.Wholesale & Retail Trade			1.47%	1.47%		4.41%					7.4%
6.Finance, Insurance, Real Estate		2.94%	2.94%								5.9%
7.Services			1.47%								1.5%
8.Health Services											0.0%
9.Public Administration											0.0%
Total	0.0%	7.4%	35.3%	42.6%	2.9%	8.8%	2.9%	0.0%	0.0%	0.0%	100%

Panel B. 1950-1985: 382 moves (Mean 2.17%†, HHI 0.144)

SIC-From \ SIC-To	SIC0 Agric., Forestry, Fishing	SIC1 Mining & Constr.	SIC2 Light Manuf.	SIC3 Heavy Manuf.	SIC4 Transport. & Public Utilities	SIC5 Wholesale & Retail Trade	SIC6 Finance, Insurance, Real state	SIC7 Services	SIC8 Health Services	SIC9 Public Admin.	Total
0.Agriculture, Forestry, Fishing	0.26%										0.3%
1.Mining & Construction	0.26%	3.40%	1.31%	1.31%	0.52%	0.26%	0.26%		0.26%		7.6%
2.Light Manufacturing		0.52%	14.66%	6.02%	0.79%	2.36%		1.31%			25.7%
3.Heavy Manufacturing		1.05%	7.85%	32.46%	0.52%	1.83%	1.57%	0.52%	0.79%		46.6%
4.Transportation & Public Utilities				0.52%		1.05%		0.26%			2.1%
5.Wholesale & Retail Trade			2.09%	3.14%	0.26%	4.97%	0.52%		0.26%		11.3%
6.Finance, Insurance, Real Estate			0.26%	0.52%	0.26%	0.26%	0.26%		0.26%		1.8%
7.Services			0.79%	1.05%		0.79%	0.52%	1.05%			4.2%
8.Health Services			0.26%	0.26%							0.5%
9.Public Administration											0.0%
Total	0.5%	5.0%	27.2%	45.3%	2.6%	11.5%	3.1%	3.1%	1.6%	0.0%	100%

indicates top 10%, top 20%, top 30% and top 50% industry pairs in terms of frequency of moves

† indicates t-stat for Mean difference from the previous period

*** p<0.01, ** p<0.05, * p<0.1

Table 1. Frequency of CEO Moves between Industries (Continued)

Panel C. 1986-2011: 1,655 moves (Mean 1.27%†, HHI 0.063)

SIC-From \ SIC-To	SIC0 Agric., Forestry, Fishing	SIC1 Mining & Constr.	SIC2 Light Manuf.	SIC3 Heavy Manuf.	SIC4 Transport. & Public Utilities	SIC5 Wholesale & Retail Trade	SIC6 Finance, Insurance, Real state	SIC7 Services	SIC8 Health Services	SIC9 Public Admin.	Total
0.Agriculture, Forestry, Fishing	0.06%	0.06%		0.12%		0.06%			0.06%		0.4%
1.Mining & Construction		4.95%	0.73%	1.03%	0.54%	0.36%	0.12%	0.36%	0.18%		8.3%
2.Light Manufacturing	0.12%	0.24%	8.82%	2.84%	0.54%	1.45%	0.30%	0.42%	1.03%	0.12%	15.9%
3.Heavy Manufacturing		0.42%	3.02%	16.80%	1.81%	1.51%	0.42%	3.02%	0.85%	0.06%	27.9%
4.Transportation & Public Utilities		0.30%	0.48%	1.09%	6.04%	0.18%	0.18%	1.27%	0.18%		9.7%
5.Wholesale & Retail Trade	0.06%	0.30%	1.15%	1.75%	0.48%	6.04%	0.30%	0.97%	0.66%		11.7%
6.Finance, Insurance, Real Estate		0.12%	0.42%	0.73%	0.24%	0.42%	0.48%	0.73%	0.12%		3.3%
7.Services	0.06%	0.12%	0.60%	2.54%	0.48%	0.85%	0.48%	10.21%	1.09%		16.4%
8.Health Services	0.12%	0.18%	1.03%	0.73%	0.24%	0.48%	0.12%	0.91%	2.36%	0.06%	6.2%
9.Public Administration		0.06%		0.06%		0.06%					0.2%
Total	0.4%	6.8%	16.3%	27.7%	10.4%	11.4%	2.4%	17.9%	6.5%	0.2%	100%

indicates top 10%, top 20%, top 30% and top 50% industry pairs in terms of frequency of moves

† indicates t-stat for Mean difference from the previous period

*** p<0.01, ** p<0.05, * p<0.1

Table 2. CEO Departures and New Job Titles

This table presents the number of CEOs who leave office and the number of these CEOs who are hired at new firms in our sample from 1920 through 2011. The new title is the first new job title of an externally hired former CEO, with *Non-CEO* indicating a move to a non-CEO role at the new firm (e.g., CFO). Numbers in parentheses indicate the number of externally hired former CEOs divided by the number of CEO turnovers in each period. Panel B data are only for CEO-to-CEO moves by construction.

Panel A. CEO Departures and New Job Titles

	All	1920-1949	1950-1985	1986-2001	2002-2011
CEO Turnovers	26,559	1,864	6,697	12,594	5,404
- Become officer of new firm (%)	2,105	68	382	1,222	433
	(7.9%)	(3.6%)	(5.7%)	(9.7%)	(8.0%)
- Become CEO of new firm (%)	981	38	115	611	217
	(3.7%)	(2.0%)	(1.7%)	(4.9%)	(4.0%)
- Become Non-CEO officer of new firms (%)	1,124	30	267	611	216
	(4.2%)	(1.6%)	(4.0%)	(4.9%)	(4.0%)

Panel B. New Job Titles of departing CEOs

	All	1950-1985	1986-2001	2002-2011
CEO	46.7%	30.1%	50.0%	50.1%
President/Vice-President	4.8%	5.0%	5.2%	4.4%
CFO	3.3%	1.9%	3.6%	3.9%
Other Executive Job Titles	45.2%	63.0%	46.4%	41.6%

Table 3. Firm Size, Profitability and Compensation at Moving CEO's New Firm

For CEOs who move to other firms from 1920 through 2011, this table reports the size and profitability of the new firm and the mover's change in compensation. Not all CEOs are hired as CEO at their new firm, and 'New title' indicates the first new job title of an externally hired former CEO. 'Larger Firms' indicates the proportion of former CEOs whose new firms are larger than their previous firms in terms of total assets. For example, for 63.39% of CEOs who became CEO of a new firm, their new firm is larger than their previous firm in the full sample ("All" column). 'More Profitable Firms' indicates the proportion of former CEOs who are hired by firms with higher ROA. 'Pay Change' indicates the difference between an externally hired CEO's first salary and bonus and the same from previous employment. The bottom row is 'Pay Change' divided by the CEO's most recent salary and bonus from previous employment. Panel B is for the death sample and thus contains only CEO-to-CEO moves by construction.

Panel A. Entire Sample (2,105 moves)

	All	1920-1949	1950-1985	1986-2001	2002-2011
New Firms					
Larger Firms	74.8%	59.5%	67.0%	82.7%	67.1%
New Title: CEO	63.3%	45.5%	56.8%	66.8%	64.0%
New Title: Non-CEO	76.5%	65.4%	71.3%	84.2%	70.2%
More Profitable Firms	70.1%	37.8%	58.4%	80.2%	62.4%
New Title: CEO	54.4%	42.9%	32.4%	63.6%	55.8%
New Title: Non-CEO	71.7%	30.8%	59.9%	82.1%	69.0%
CEO Pay†					
Pay Change ($ Thousands)	481.2	-	45.7	544.8	426.8
New Title: CEO	513.4	-	49.1	562.0	477.3
New Title: Non-CEO	466.7	-	32.5	525.7	417.4
Pay Change / (Salary+Bonus)	88.9%	-	15.9%	104.5%	74.2%
New Title: CEO	101.8%	-	17.0%	116.2%	88.8%
New Title: Non-CEO	71.3%	-	11.8%	80.8%	62.9%

†Data is from Execucomp and Frydman and Saks (2010). There are 12 obs for 1950-1985, 327 obs for 1986-2001 and 286 for 2002-2011.

Panel B. CEO moves due to CEO death (206 moves)

	All	1950-1985	1986-2001	2002-2011
New Firms				
Larger Firms	63.8%	56.1%	73.0%	56.9%
More Profitable Firms	63.3%	60.6%	65.2%	62.7%
CEO Pay‡				
Pay Change ($ Thousands)	422.9	-	568.7	306.4
Pay Change / (Salary+Bonus)	187.4%	-	183.2%	189.2%

‡Data are from Execucomp and Frydman and Saks (2010). There are no observations for 1950-1985, 56 obs for 1986-2001 and 24 obs for 2002-2011.

Table 4. Impact of CEO Death Events on Subsequent External Hires

This table reports the number of external CEOs hired in the sample and the number of external CEO hires following pertinent CEO deaths from 1985 through 2010 (*t-1* death).

	N
External CEOs	17,467
External CEO Hires after CEO Deaths	173
"Chain Reaction" Hires	
Number of CEOs (replacing CEOs) hired within 1 year to replace CEOs who died or who left to replace a deceased CEO, and so on	1.81
Number of CEOs (replacing CEOs) hired within 2 years to replace CEOs who died or who left to replace a deceased CEO, and so on	3.06
Number of CEOs (replacing CEOs) hired within 5 years to replace CEOs who died or who left to replace a deceased CEO, and so on	9.13

Table 5. Descriptive Statistics

This table reports sample summary statistics from 1986 through 2011. *N. of CEO Moves* indicates the number of CEOs in a one-digit SIC industry who become CEOs or other executive officers at other firms within 2 years of departing their most recent firm. *N. of CEO Turnovers* indicates the total number of one-digit SIC industry CEOs who left firms each year. *N. of CEOs* indicates the total number of one-digit SIC industry CEOs each year. *Mobility* indicates *N. of CEO Moves*$_t$ divided by *N. of CEO Turnovers*$_{t-1}$ or *N. of CEOs*$_{t-1}$. *Connected Industry Death* is the weighted average number of CEOs in connected one-digit SIC industries who pass away in a year. Both weight and connectedness are determined by the external CEO hires over the past three years between one-digit SIC industries. *Death* indicates *Connected Industry Death*$_{t-1}$ divided by *N. of CEO Turnovers*$_{t-1}$ or *N. of CEOs*$_{t-1}$ respectively. *Independence* indicates the number of outside directors who are not affiliated with a CEO based on last names divided by the total number of directors. *CEO-Chair* is a dummy variable that takes the value of 1 if a CEO is also the Chair and 0 otherwise. CEO Turnover takes the value of 1 if the CEO changes and 0 otherwise. Total CEO Tenure is the total number of years a CEO spends at a firm (ultimate tenure). *Pay-Perf* indicates changes in a CEO's salary and bonus from *t* to *t+1* over changes in firm value from *t-1* to *t*. Net Leverage is total debt less cash divided by total assets. Firm and Industry Characteristic variables are defined in the Appendix.

	N	Mean	Median	Stddev
Executive Mobility Characteristics				
N. of CEO Moves	67,949	14.0	12.0	9.6
N. of CEOs	67,949	995.7	870.0	550.3
N. of CEO Turnovers	67,949	129.2	112.0	76.0
Mobility$_{CEO}$	67,949	0.006	0.006	0.004
Mobility$_{Turnover}$	67,949	0.114	0.113	0.075
Connected Industry Death	67,949	1.23	1.12	0.76
Death$_{CEO}$	67,949	0.08%	0.05%	0.19%
Death$_{Turnover}$	67,949	1.61%	0.92%	4.04%
CEO & BOD Characteristics				
N. of Directors	67,949	7.5	7.0	4.2
Independence	67,949	0.600	0.636	0.217
CEO-Chair = 1	67,949	0.485	0.000	0.500
CEO Turnover = 1	67,949	0.123	0.000	0.329
CEO Tenure	67,949	5.762	4.000	4.946
Total CEO Tenure	67,949	9.795	8.000	6.195
Pay-Perf	16,386	0.015	0.003	1.597
Firm Characteristics				
Leverage	67,949	0.227	0.187	0.224
Net Leverage	67,949	0.050	0.088	0.388
Cash flow	67,949	0.188	0.263	1.866
Size	67,949	5.599	5.442	2.052
ROA	67,949	-0.031	0.034	0.263
PPE/TA	67,949	0.281	0.219	0.224
M/B	67,949	2.882	2.000	2.539
Investment	67,949	0.061	0.041	0.066
CASH/TA	67,949	0.180	0.091	0.215
Tobin's *q*	67,949	1.618	1.185	1.185
Industry Characteristics				
Industry Tobin's *q*	67,949	2.607	2.356	1.182
Industry GDP Growth	67,949	0.044	0.050	0.034

Table 6. Executive Mobility and Pay-for-Performance Sensitivity

This table presents 2SLS estimation results for the effect of executive mobility on the CEO's pay-for-performance sensitivity from 1986 through 2011. *Pay-Perf* indicates changes in a CEO's salary and bonus from year *t* to *t+1* divided by changes in firm value from year *t-1* to *t*. The instrumental variable is *Death*, which is calculated as the weighted number of connected industry CEOs who passed away at *t-1* divided by $N.\ of\ CEOs_{t-1}$ or $N.\ of\ CEO\ Turnovers_{t-1}$. Each weight and connectedness is determined by past three-year external CEO hires between one-digit SIC industries. Numbers in parentheses are *t*-statistics based on standard errors clustered at the industry and year levels.

Panel A. First Stage

Dependent Variables:	$Mobility_{CEO}$	$Mobility_{Turnover}$
	(1)	(2)
$Death_{CEO}$	1.864*	
	(2.15)	
$Death_{Turnover}$		0.103*
		(2.23)
Industry GDP Growth	0.007	0.007
	(0.76)	(0.80)
Industry Tobin's *q*	-0.001	-0.001
	(-1.26)	(-1.32)
CEO Turnover	-0.000	-0.000
	(-0.43)	(-0.36)
Lagged CEO Turnover	-0.000	-0.000
	(-1.07)	(-1.10)
CEO Tenure	0.000	0.000
	(0.12)	(0.12)
Size	-0.000	-0.000
	(-0.70)	(-0.69)
ROA	0.000	0.000
	(0.06)	(0.09)
Cash Flow	0.000	0.000
	(0.44)	(0.51)
Cash/TA	0.000	0.000
	(0.51)	(0.46)
Leverage	0.001	0.001
	(0.63)	(0.60)
PPE/TA	-0.002	-0.002
	(-1.72)	(-1.65)
M/B	-0.000	-0.000
	(-0.18)	(-0.17)
N	16,386	16,386
Year Fixed Effect	YES	YES
CEO-Firm Fixed Effect	YES	YES
F-stat	23.80	5.50
R^2	0.613	0.614

*** p<0.01, ** p<0.05, * p<0.1

Panel B. Second Stage

Dependent Variables:	*Pay-Perf*	
	(1)	(2)
$Mobility_{CEO}$	-33.653**	
	(-2.24)	
$Mobility_{Turnover}$		-39.220*
		(-1.85)
Industry GDP Growth	0.378	0.463
	(1.00)	(1.20)
Industry Tobin's *q*	-0.010	-0.013
	(-0.74)	(-0.80)
CEO Turnover	-0.049	-0.048
	(-0.91)	(-0.88)
Lagged CEO Turnover	0.037	0.037
	(0.82)	(0.85)
CEO Tenure	0.007	0.007
	(0.48)	(0.48)
Size	-0.083**	-0.084**
	(-2.52)	(-2.48)
ROA	0.054	0.050
	(0.53)	(0.49)
Cash Flow	0.004	0.004
	(0.27)	(0.30)
Cash/TA	-0.178	-0.176
	(-1.08)	(-1.07)
Leverage	-0.329***	-0.330***
	(-4.33)	(-4.09)
PPE/TA	-0.792**	-0.808**
	(-2.29)	(-2.29)
M/B	0.026***	0.025***
	(3.21)	(3.35)
N	16,386	16,386
IV	$Death_{CEO}$	$Death_{Turnover}$
Year Fixed Effect	YES	YES
CEO-Firm Fixed Effect	YES	YES
R^2	0.02	0.01

*** p<0.01, ** p<0.05, * p<0.1

Table 7. Effect of Executive Mobility on Board Monitoring

This table presents 2SLS estimation results for the effect of executive mobility on board monitoring from 1986 through 2011. Monitoring intensity is measured by board independence and whether the CEO is also board chair. *Independence* indicates the number of independent directors divided by the total number of directors. *CEO-Chair* takes the value of 1 if a CEO serves as chair of the board and 0 otherwise. The instrumental variable is *Death*, which is calculated as the weighted number of connected industry CEOs who passed away at *t-1* divided by *N. of CEOs*$_{t-1}$ or *N. of CEO Turnovers*$_{t-1}$. Each weight and connectedness is determined by past three-year external CEO hires between one-digit SIC industries. Numbers in parentheses are *t*-statistics based on robust standard errors clustered at the industry and year levels.

Panel A. First Stage

Dependent Variable:	*Mobility*$_{CEO}$	*Mobility*$_{Turnover}$
	(1)	(2)
Death$_{CEO}$	3.726***	
	(10.06)	
Death$_{Turnover}$		0.188***
		(10.72)
Industry GDP Growth	-0.008	-0.013
	(-0.35)	(-0.69)
Industry Tobin's *q*	-0.000	-0.000
	(-0.92)	(-0.43)
CEO Turnover	-0.000	-0.000
	(-0.57)	(-0.57)
Lagged CEO Turnover	-0.000	-0.000
	(-0.98)	(-1.32)
CEO Tenure	-0.000	-0.000
	(-0.24)	(-0.10)
Size	0.000	0.000
	(1.00)	(0.43)
ROA	-0.000	-0.000
	(-1.03)	(-0.47)
Cash Flow	0.000	0.000
	(1.11)	(1.43)
Cash/TA	-0.000	-0.000
	(-0.01)	(-0.48)
Leverage	0.000	0.000
	(0.11)	(0.44)
PPE/TA	0.000	0.000
	(0.20)	(0.13)
M/B	-0.000	-0.000
	(-0.21)	(-0.04)
N	67,949	67,949
Year Fixed Effect	YES	YES
CEO-Firm Fixed Effect	YES	YES
F-stat	101.12	114.99
R^2	0.733	0.757

*** p<0.01, ** p<0.05, * p<0.1

Panel B. Second Stage

Dependent Variables:	*Independence*		*CEO-Chair*	
	(1)	(2)	(3)	(4)
$Mobility_{CEO}$	-0.100***		0.200***	
	(-4.92)		(4.71)	
$Mobility_{Turnover}$		-0.087***		0.158***
		(-4.96)		(9.03)
Industry GDP Growth	-0.096***	-0.096***	-0.050***	-0.049***
	(-6.90)	(-7.05)	(-2.88)	(-2.60)
Industry Tobin's *q*	0.000	0.000	0.000	0.000
	(0.46)	(0.49)	(0.29)	(0.26)
CEO Turnover	-0.001	-0.001	-0.101***	-0.101***
	(-0.86)	(-0.86)	(-14.05)	(-14.06)
Lagged CEO Turnover	-0.002	-0.002	-0.043***	-0.043***
	(-0.91)	(-0.91)	(-12.15)	(-12.16)
CEO Tenure	0.000	0.000	-0.002	-0.002
	(0.57)	(0.57)	(-1.28)	(-1.28)
Size	0.009***	0.009***	0.017**	0.017**
	(9.53)	(9.49)	(2.34)	(2.34)
ROA	0.003	0.003	-0.009	-0.009
	(0.81)	(0.82)	(-1.14)	(-1.14)
Cash Flow	-0.001**	-0.001**	0.003***	0.003***
	(-2.55)	(-2.55)	(19.95)	(20.11)
Cash/TA	0.004	0.004	-0.022**	-0.022**
	(0.32)	(0.32)	(-2.11)	(-2.11)
Leverage	-0.005	-0.005	0.032***	0.032***
	(-0.55)	(-0.55)	(3.02)	(3.02)
PPE/TA	-0.000	-0.000	-0.050**	-0.050**
	(-0.02)	(-0.02)	(-2.25)	(-2.24)
M/B	0.001**	0.001**	0.001**	0.001**
	(2.02)	(2.02)	(2.23)	(2.22)
N	67,949	67,949	67,949	67,949
IV	$Death_{CEO}$	$Death_{Turnover}$	$Death_{CEO}$	$Death_{Turnover}$
Year Fixed Effect	YES	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES	YES
R^2	0.06	0.06	0.11	0.11

*** p<0.01, ** p<0.05, * p<0.1

Table 8. Effect of Executive Mobility on Capital Structure

This table presents second stage 2SLS estimation results for the effect of executive mobility on capital structure decisions from 1986 through 2011. *Net Leverage* is total debt less cash divided by total assets. The instrumental variable is $Death_{CEO}$. The first stage results are in Table 7, Panel A. Numbers in parentheses are *t*-statistics based on robust standard errors clustered at the industry and year levels.

Dependent Variable: Net Leverage	(1)	(2)
$Mobility_{CEO}$	-0.109**	
	(-2.12)	
$Mobility_{Turnover}$		-0.098**
		(-2.15)
Industry GDP Growth	-0.103*	-0.103*
	(-1.85)	(-1.85)
Industry Tobin's *q*	-0.002	-0.002
	(-1.51)	(-1.49)
CEO Turnover	-0.018***	-0.018***
	(-5.45)	(-5.45)
Lagged CEO Turnover	-0.013***	-0.013***
	(-6.49)	(-6.49)
CEO Tenure	-0.000	-0.000
	(-0.04)	(-0.04)
Size	0.044***	0.044***
	(9.11)	(9.11)
ROA	-0.212***	-0.212***
	(-3.87)	(-3.87)
Cash Flow	-0.000	-0.000
	(-0.00)	(-0.00)
PPE/TA	0.748***	0.748***
	(13.83)	(13.83)
M/B	0.000	0.000
	(0.42)	(0.42)
N	67,949	67,949
Year Fixed Effect	YES	YES
CEO-Firm Fixed Effect	YES	YES
F-stat	101.12	114.99
R^2	0.14	0.14

*** p<0.01, ** p<0.05, * p<0.1

Table 9. Effect of Executive Mobility on Corporate Investment

This table presents second stage 2SLS estimation results for the effect of executive mobility on corporate investment from 1986 through 2011. *Investment* is capital expenditures divided by total assets. The instrumental variable is $Death_{CEO}$. The first stage results are in Table 7, Panel A. Numbers in parentheses are *t*-statistics based on robust standard errors clustered at the industry and year levels.

Dependent Variable: Investment	(1)	(2)
$Mobility_{CEO}$	0.134***	
	(4.03)	
$Mobility_{Turnover}$		0.120***
		(4.11)
Industry GDP Growth	0.023	0.023
	(0.74)	(0.78)
Industry Tobin's *q*	0.001*	0.001*
	(1.92)	(1.86)
CEO Turnover	-0.003***	-0.003***
	(-5.86)	(-5.84)
Lagged CEO Turnover	-0.002***	-0.002***
	(-3.08)	(-3.07)
CEO Tenure	-0.000*	-0.000*
	(-1.76)	(-1.76)
Size	0.004***	0.004***
	(3.55)	(3.56)
ROA	-0.000	-0.000
	(-0.11)	(-0.12)
Cash Flow	-0.000***	-0.000***
	(-3.77)	(-3.75)
Cash/TA	-0.001	-0.001
	(-0.52)	(-0.51)
Leverage	-0.026***	-0.026***
	(-5.30)	(-5.30)
PPE/TA	0.194***	0.194***
	(16.88)	(16.89)
M/B	0.002***	0.002***
	(4.90)	(4.91)
N	67,949	67,949
Year Fixed Effect	YES	YES
CEO-Firm Fixed Effect	YES	YES
F-stat	101.12	114.99
R^2	0.14	0.14

*** p<0.01, ** p<0.05, * p<0.1

Table 10. Executive Career Concern and the Effects of Executive Mobility on Incentives and Corporate Decisions

This table presents second stage 2SLS estimation results for the interactive effect of executive mobility measures with executive career concerns on CEO pay-for-performance sensitivity, board monitoring, capital structure and corporate investment from 1986 through 2011. *Short tenure* takes the value of 1 if a CEO's tenure is less than the median CEO's ultimate tenure (8 years), and zero otherwise. Instrumental variables are $Death_{CEO}$ and its interaction term with the dummy variable. We instrument the interaction term between *Mobility* and the *Short tenure* indicator by interacting the *Death* instrument with the indicator. Control variables are the same as those used in Table 6, excluding Cash/TA and Leverage in (4). Numbers in parentheses are *t*-statistics based on robust standard errors clustered at the industry and year levels.

Dependent Variables:	*Pay-Perf*	*Independence*	*CEO-Chair*	*Net Leverage*	*Investment*
	(1)	(2)	(3)	(4)	(5)
$Mobility_{CEO}$	38.591	0.096	-0.104	-0.017	0.046
	(1.64)	(1.08)	(-0.33)	(-0.60)	(0.97)
$Mobility_{CEO}$ × *Short tenure*	-66.121*	-0.279*	0.314	-0.071***	0.120**
	(-1.90)	(-1.90)	(0.84)	(-3.01)	(2.05)
Short tenure	0.152	0.004	0.017	0.002**	-0.003**
	(0.40)	(0.92)	(1.59)	(1.99)	(-2.02)
N	16,386	67,949	67,949	67,949	67,949
Controls	YES	YES	YES	YES	YES
Year Fixed Effect	YES	YES	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES	YES	YES
F-stat	6.72	43.10	43.10	43.10	43.10
R^2	0.02	0.06	0.11	0.14	0.14

*** p<0.01, ** p<0.05, * p<0.1

Table 11. Non-compete Clauses and the Effect of Executive Mobility on Incentives and Corporate Decisions

This table presents second stage 2SLS estimation results for the interactive effect of noncompete enforcement with executive mobility on CEO pay-for-performance sensitivity, board monitoring, capital structure and corporate investment from 1986 through 2011. *Non-compete* indicates the state-level index of non-compete clause enforcement as in Garmaise (2011), where a high score indicates stricter enforcement. The instrumental variables are $Death_{CEO}$ and its interaction term with *Non-compete*. Control variables are the same as those used in Table 6, excluding Cash/TA and Leverage in in (4). Numbers in parentheses are *t*-statistics based on robust standard errors clustered at the industry and year levels.

Dependent Variables:	*Pay-Perf*	*Independence*	*CEO-Chair*	*Net Leverage*	*Investment*
	(1)	(2)	(3)	(4)	(5)
$Mobility_{CEO}$	-38.113***	-0.123	0.288	-0.159***	0.201***
	(-5.72)	(-0.68)	(1.49)	(-3.70)	(4.32)
$Mobility_{CEO}$ × *Non-compete*	2.093***	0.002	-0.027	0.024**	-0.017**
	(3.17)	(0.05)	(-0.63)	(2.31)	(-2.00)
Non-compete	-0.096	-0.005***	0.007**	-0.001	-0.001
	(-1.55)	(-3.20)	(2.41)	(-0.85)	(-1.13)
N	16,386	67,949	67,949	67,949	67,949
Controls	YES	YES	YES	YES	YES
Year Fixed Effect	YES	YES	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES	YES	YES
F-stat	6.69	23.96	23.96	23.96	23.96
R^2	0.02	0.06	0.11	0.14	0.14

*** p<0.01, ** p<0.05, * p<0.1

Table 12. Executive Mobility Effects for Three Eras: 1950-1985, 1986-2001, and 2002-2011

This table presents second stage 2SLS estimation results for the effect of executive mobility on CEO pay-for-performance sensitivity, board monitoring, capital structure and corporate investment from 1950 through 1985 (Panel A), from 1986 through 2001 (Panel B), and from 2002 through 2011 (Panel C). The instrumental variable is $Death_{CEO}$. Control variables are the same as those used in Table 6, excluding Cash/TA and Leverage in (4). Numbers in parentheses are *t*-statistics based on robust standard errors clustered at the industry and year levels.

Panel A. 1950-1985

Dependent Variables:	*Pay-Perf*	*Independence*	*CEO-Chair*	*Net Leverage*	*Investment*
	(1)	(2)	(3)	(4)	(5)
$Mobility_{CEO}$	89.682	0.421	-8.274	2.994	-1.207
	(1.39)	(0.23)	(-0.88)	(1.44)	(-1.09)
N	2,827	20,663	20,663	20,663	20,663
Controls	YES	YES	YES	YES	YES
Year Fixed Effect	YES	YES	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES	YES	YES
F-stat	1.19	3.41	3.41	3.41	3.41
R^2	0.02	0.07	0.18	0.08	0.05

*** p<0.01, ** p<0.05, * p<0.1

Panel B. 1986-2001

Dependent Variables:	*Pay-Perf*	*Independence*	*CEO-Chair*	*Net Leverage*	*Investment*
	(1)	(2)	(3)	(4)	(5)
$Mobility_{CEO}$	-4.549***	-0.109***	0.165***	-0.070**	0.124***
	(-7.78)	(-4.34)	(3.68)	(-2.25)	(5.44)
N	6,620	44,280	44,280	44,280	44,280
Year Fixed Effect	YES	YES	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES
F-stat	16.34	101.68	122.50	122.56	122.50
R^2	0.01	0.04	0.10	0.18	0.12

Panel C. 2002-2011

Dependent Variables:	*Pay-Perf*	*Independence*	*CEO-Chair*	*Net Leverage*	*Investment*
	(1)	(2)	(3)	(4)	(5)
$Mobility_{CEO}$	-18.422	0.835	-0.066	1.305**	-0.973*
	(-1.34)	(0.95)	(-0.03)	(2.38)	(-1.65)
N	9,766	22,276	22,276	22,276	22,276
Year Fixed Effect	YES	YES	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES
F-stat	8.53	5.55	5.55	5.55	5.55
R^2	0.02	0.08	0.14	0.14	0.11

Table 13. Accounting for Product Market Competition and Input-Output Linkages

This table examines the robustness of the baseline results to adjusting the measures of mobility for product market competition and input-output relations between firms. When constructing $Mobility_{CEO}$ and $Death_{CEO}$, we exclude CEO moves between firms that have above the median *TNIC-3* product similarity scores (Hoberg-Phillips 2010, 2016) or exclude CEO moves between industries that have above median input-output flows (BEA, Panel B). Pre-1996 period *TNIC-3* product similarity scores are imputed based on 1996 scores. Control variables are the same as those used in Table 6, excluding Cash/TA and Leverage in (4). Numbers in parentheses are *t*-statistics based on robust standard errors clustered at the industry and year levels.

Panel A. Mobility excluding CEO external hires between above median *TNIC-3* firms

Dependent Variables:	*Pay-Perf*	*Independence*	*CEO-Chair*	*Net Leverage*	*Investment*
	(1)	(2)	(3)	(4)	(5)
$Mobility_{CEO}$	-29.052**	-0.101***	0.195***	-0.126**	0.139***
	(-2.00)	(-4.60)	(3.76)	(-1.96)	(3.86)
N	15,482	67,548	67,548	67,548	67,548
Controls	YES	YES	YES	YES	YES
Year Fixed Effect	YES	YES	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES	YES	YES
F-stat	11.95	94.65	94.65	94.65	94.65
R^2	0.01	0.06	0.10	0.14	0.14

Panel B. Mobility excluding CEO external hires between above median input-output industries

Dependent Variables:	*Pay-Perf*	*Independence*	*CEO-Chair*	*Net Leverage*	*Investment*
	(1)	(2)	(3)	(4)	(5)
$Mobility_{CEO}$	-12.014***	-0.096**	0.234**	-0.091***	0.155***
	(-4.35)	(-2.34)	(2.37)	(-4.17)	(2.99)
N	14,855	66,929	66,929	66,929	66,929
Controls	YES	YES	YES	YES	YES
Year Fixed Effect	YES	YES	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES	YES	YES
F-stat	8.25	51.08	51.08	51.08	51.08
R^2	0.01	0.05	0.10	0.09	0.14

*** p<0.01, ** p<0.05, * p<0.1

Table 14. The Effect of the Executive Mobility on Firm Value

This table presents second stage 2SLS estimation results for the effect of executive mobility on firm value from 1986 through 2011. *t*, *t+1*, *t+2* and *t+3* indicate Tobin's *q* in years *t*, *t+1*, *t+2* and *t+3* respectively. The instrumental variable is $Death_{CEO}$. Control variables are the same as those used in Table 6, excluding M/B. Numbers in parentheses are *t*-statistics based on robust standard errors clustered at the industry and year levels.

Panel A. Full Sample

Dependent Variable: Tobin's q	*t*	*t+1*	*t+2*
	(1)	(2)	(3)
$Mobility_{CEO}$	0.548	0.908*	0.674***
	(1.08)	(1.72)	(3.04)
N	67,949	63,403	57,224
Controls	YES	YES	YES
Year Fixed Effect	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES
F-stat	85.66	91.07	98.72
R^2	0.12	0.11	0.11

Panel B. Firms with Minimum 3-year Observations in Sample

Dependent Variable: Tobin's q	*t*	*t+1*	*t+2*
	(1)	(2)	(3)
$Mobility_{CEO}$	0.961*	1.009*	0.677***
	(1.65)	(1.72)	(3.31)
N	50,758	50,758	50,758
Controls	YES	YES	YES
Year Fixed Effect	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES
F-stat	95.76	95.76	95.76
R^2	0.11	0.11	0.11

*** p<0.01, ** p<0.05, * p<0.1

Appendix

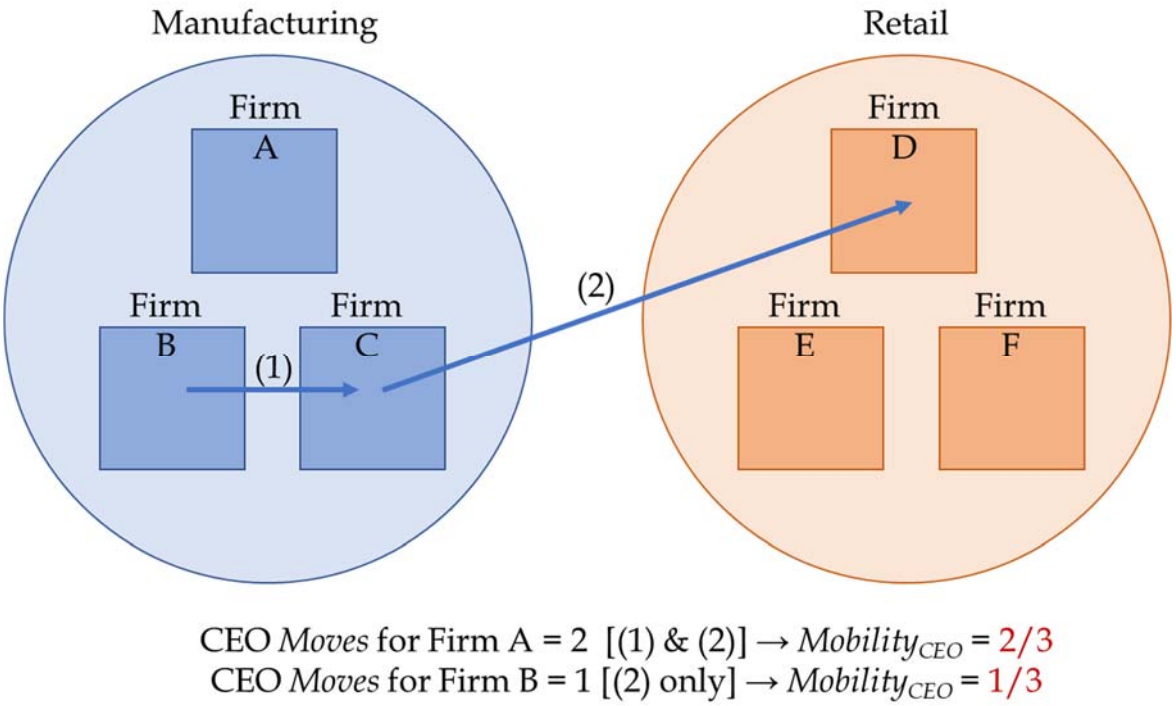

Figure A1. *CEO Moves* and *Mobility*. This figure describes how we define *CEO Moves* and *Mobility* in equation (1). *CEO Moves* is the number of within- and across-industry CEO moves for a given industry between year *t-1* and *t*, excluding a given firm's own CEO turnover. *Mobility* in equation (1) is the number of CEO moves divided by the number of CEOs at the industry level in year *t-1*. A second measure of mobility deflates by number of CEO turnovers at the industry level in year *t-1*.

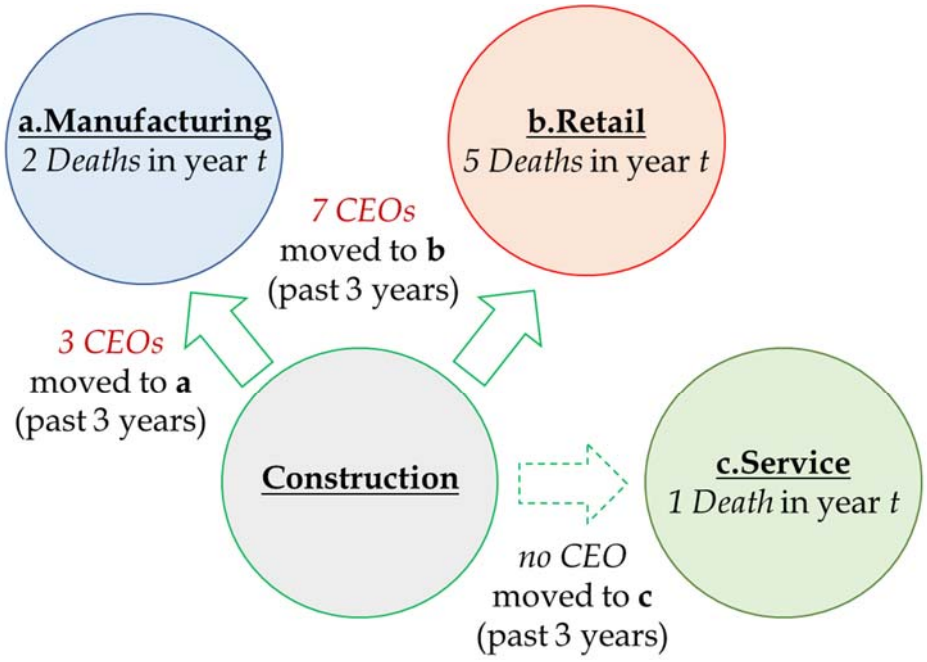

Figure A2. CEO Death in Connected Industries. This figure describes how we define *Death* in equation (2). Connectedness between two industries is defined using CEO moves between the industries in the past three years. *Death* of an industry is a weighted average number of CEO deaths in *t-1* where the weight of a given industry is determined by the industry pair's connectedness divided by the number of CEOs (or separately, by the number of CEO turnovers) in the industry in *t-1*.

Table A1. Variable Definitions

Item	Method	Source
*Firm & Industry Characteristics**		
Leverage	(DLC + DLTT) / AT	Compustat
Net Leverage	(DLC + DLTT - CHE) / AT	Compustat
Cash flow	(IB + DP) / lagged PPENT	Compustat
Size	logged AT converted to 2011-dollar value	Compustat
ROA	NI / AT	Compustat
PPE/TA	PPENT / AT	Compustat
M/B	(PRCC_F * CSHO + DLC + DLTT) / CEQ	Compustat
Investment	CAPX / AT	Compustat
CASH/TA	CHE / AT	Compustat
Tobin's *q*	Q = (PRCC_F * CSHO DLC + DLTT) / AT	Compustat
Industry Tobin's *q*	One-digit SIC average Q	Compustat
Industry GDP Growth	One-digit SIC GDP growth rate	BEA
Board and CEO characteristics		
CEO Tenure	The number of years a CEO has been CEO at her current firm	Moody's Industrial Manuals/ Compact Disclosure/ Mergent/Board Analyst
Total CEO Tenure	Total number of years served as CEO at a given firm	Moody's Industrial Manuals/ Compact Disclosure/ Mergent/Board Analyst
CEO Turnover	1 if a CEO is replaced in a given year, 0 otherwise	Moody's Industrial Manuals/ Compact Disclosure/ Mergent/Board Analyst
Independence	The number of independent directors divided by the total number of directors	Moody's Industrial Manuals/ Compact Disclosure/ Mergent/Board Analyst
CEO-Chair	1 if a CEO is currently chair of the board, 0 otherwise	Moody's Industrial Manuals/ Compact Disclosure/ Mergent/Board Analyst
Pay-Perf†	$[\{(Salary_{t+1} + Bonus_{t+1}) - (Salary_t + Bonus_t)\} / (Salary_t + Bonus_t)] / \{(PRCC\_F_t - PRCC\_F_{t-1}) / PRCC\_F_{t-1})\}$	Execucomp/ Frydman and Saks (2010)
Non-compete	10 for maximum non-compete clause enforcement, 0 for minimum enforcement	Garmaise (2011)‡

†Winsorized at the 5% and 95% levels, respectively
*Ratio Variables are winsorized at the 1% and 99% levels
‡We collect data on state-level legal reforms to extend and impute the scores in Garmaise (2011) for the 1986-2011 period.

Table A2. Alternative Measures of Executive Mobility

This table presents second stage 2SLS estimation results for the effect of executive mobility on CEO pay-for-performance sensitivity, board monitoring, capital structure and corporate investment using alternative measure from 1986 through 2011. *Executive Mobility (All)* is the number of executive officers (not just CEOs) in a one-digit SIC industry who move to another firm divided by the lagged number of firms in a one-digit SIC industry. The instrumental variable is $Death_{CEO}$. Control variables are the same as those used in Table 6, excluding Cash/TA and Leverage in (4). Numbers in parentheses are *t*-statistics based on robust standard errors clustered at the industry and year levels.

Dependent Variables:	*Pay-Perf*	*Independence*	*CEO-Chair*	*Net Leverage*	*Investment*
	(1)	(2)	(3)	(4)	(5)
Executive Mobility (All)	-8.236	-0.113***	0.222***	-0.078***	0.151***
	(-0.44)	(-9.76)	(6.77)	(-6.67)	(3.81)
N	16,386	67,949	67,949	67,949	67,949
Controls	YES	YES	YES	YES	YES
Year Fixed Effect	YES	YES	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES	YES	YES
F-stat	23.85	339.58	339.58	339.58	339.58
R^2	0.02	0.06	0.11	0.14	0.14

*** p<0.01, ** p<0.05,
* p<0.1

Table A3. Alternative Instrument: CEO Sudden Death and Health-Related Turnovers

This table reports second stage 2SLS estimation results for the effect of executive mobility on CEO pay-for-performance sensitivity, board monitoring, capital structure and corporate investment using alternative instruments from 1986 through 2011. The instrumental variable is $Death_{CEO}$, which only includes CEO deaths identified as "sudden" (Panel A) or includes all CEO deaths plus CEO turnovers due to health-related reasons (Panel B). Control variables are the same as those used in Table 6, excluding Cash/TA and Leverage in (3). Numbers in parentheses are *t*-statistics based on robust standard errors clustered at the industry and year levels.

Panel A. CEO Sudden Deaths

Dependent Variables:	*Pay-Perf*	*Independence*	*CEO-Chair*	*Net Leverage*	*Investment*
	(1)	(2)	(3)	(4)	(5)
$Mobility_{CEO}$	-27.424**	-0.111***	0.119**	-0.120*	0.139***
	(-2.17)	(-3.49)	(2.06)	(-1.92)	(4.03)
N	16,386	67,949	67,949	67,949	67,949
Controls	YES	YES	YES	YES	YES
Year Fixed Effect	YES	YES	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES	YES	YES
F-stat	20.97	85.68	85.68	85.68	85.68
R^2	0.02	0.06	0.11	0.14	0.14

Panel B. CEO Death and Health-related CEO Turnovers

Dependent Variables:	*Pay-Perf*	*Independence*	*CEO-Chair*	*Net Leverage*	*Investment*
	(1)	(2)	(3)	(4)	(5)
$Mobility_{CEO}$	-24.610**	-0.139***	0.241***	-0.092*	0.133***
	(-1.98)	(-5.42)	(3.17)	(-1.88)	(3.44)
N	16,386	67,949	67,949	67,949	67,949
Controls	YES	YES	YES	YES	YES
Year Fixed Effect	YES	YES	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES	YES	YES
F-stat	8.04	61.12	61.12	61.12	61.12
R^2	0.02	0.06	0.11	0.14	0.14

*** p<0.01, ** p<0.05, * p<0.1

Table A4. Alternative Instrument: CEO Retirement Age

This table reports second stage 2SLS estimation results for the effect of executive mobility on CEO pay-for-performance sensitivity, corporate monitoring, capital structure, and corporate investment using an alternative instrument based on CEO retirement age from 1986 through 2011. The instrumental variable is the weighted number of CEOs above 63 of age† (Jenter and Kanaan 2015) in connected industries at *t-1* divided by *N. of CEOs*$_{t-1}$. Both weight and connectedness are determined by the external CEO hires over the past three years between one-digit SIC industries. Control variables are the same as those used in Table 6, excluding Cash/TA and Leverage in (4). Numbers in parentheses are *t*-statistics based on robust standard errors clustered at the industry and year levels.

Dependent Variables:	*Pay-Perf*	*Independence*	*CEO-Chair*	*Net Leverage*	*Investment*
	(1)	(2)	(3)	(4)	(5)
Mobility$_{CEO}$	-6.967***	-0.166	0.160	-0.208*	0.312*
	(-6.94)	(-0.90)	(0.41)	(-1.82)	(1.74)
N	12,360	60,757	60,757	60,757	60,757
Controls	YES	YES	YES	YES	YES
Year Fixed Effect	YES	YES	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES	YES	YES
F-stat	25.27	21.54	21.54	21.54	21.54
R^2	0.01	0.05	0.08	0.09	0.13

†To calculate the proportion of CEOs above 63 of age, we use Forbes data. There are 27,775 non-missing age information in the data.

*** p<0.01, ** p<0.05, * p<0.1

Table A5. Frequency of CEO Moves between Industries: Pre and Post 2002

This table presents the frequency of CEOs moving from a firm in the origination industry to another firm in the destination industry by time period from 1986 through 2001 (Pre-2002) and from 2002 through 2011 (Post-2002). *SIC-From* indicates the one-digit SIC industry of the firm that a given CEO departs and *SIC-To* indicates the one-digit SIC industry of the firm that the CEO moves as CEO or other officers. The mean and Herfindahl-Hirschman Index of the frequency are in the parentheses.

Panel A. Pre-2002: 1,222 moves (Mean 1.37%, HHI 6.37%)

SIC1-From \ SIC1-To	SIC0 Agric., Forestry, Fishing	SIC1 Mining & Constr.	SIC2 Light Manuf.	SIC3 Heavy Manuf.	SIC4 Transport. & Public Utilities	SIC5 Wholesale & Retail Trade	SIC6 Finance, Insurance, Real state	SIC7 Services	SIC8 Health Services	SIC9 Public Admin.	Total
0.Agriculture, Forestry, Fishing		0.08%		0.16%		0.08%			0.08%		0.4%
1.Mining & Construction		4.99%	0.74%	1.06%	0.74%	0.33%	0.08%	0.49%	0.25%		8.7%
2.Light Manufacturing	0.16%	0.33%	8.27%	2.70%	0.49%	1.55%	0.08%	0.49%	0.74%		14.8%
3.Heavy Manufacturing		0.49%	3.11%	17.18%	1.64%	1.55%	0.41%	3.11%	0.74%		28.2%
4.Transportation & Public Utilities		0.16%	0.25%	1.15%	5.40%	0.08%	0.25%	1.55%	0.25%		9.1%
5.Wholesale & Retail Trade	0.08%	0.25%	0.98%	1.88%	0.25%	6.71%	0.41%	1.15%	0.82%		12.5%
6.Finance, Insurance, Real Estate		0.16%	0.57%	0.98%	0.33%	0.57%		0.82%	0.08%		3.5%
7.Services	0.08%	0.16%	0.57%	2.70%	0.41%	0.90%	0.65%	10.23%	0.82%		16.5%
8.Health Services	0.16%	0.25%	0.90%	0.65%	0.16%	0.49%	0.08%	1.06%	2.29%		6.1%
9.Public Administration				0.08%		0.08%					0.2%
Total	0.5%	6.9%	15.4%	28.6%	9.4%	12.4%	2.0%	18.9%	6.1%	0.0%	100%

Panel A. Post-2002: 433 moves (Mean 1.85%, HHI 6.35%)

SIC1-From \ SIC1-To	SIC0 Agric., Forestry, Fishing	SIC1 Mining & Constr.	SIC2 Light Manuf.	SIC3 Heavy Manuf.	SIC4 Transport. & Public Utilities	SIC5 Wholesale & Retail Trade	SIC6 Finance, Insurance, Real state	SIC7 Services	SIC8 Health Services	SIC9 Public Admin.	Total
0.Agriculture, Forestry, Fishing	0.23%										0.2%
1.Mining & Construction		4.85%	0.69%	0.92%		0.46%	0.23%				7.2%
2.Light Manufacturing			10.39%	3.23%	0.69%	1.15%	0.92%	0.23%	1.85%	0.46%	18.9%
3.Heavy Manufacturing		0.23%	2.77%	15.70%	2.31%	1.39%	0.46%	2.77%	1.15%	0.23%	27.0%
4.Transportation & Public Utilities		0.69%	1.15%	0.92%	7.85%	0.46%		0.46%			11.5%
5.Wholesale & Retail Trade		0.46%	1.62%	1.39%	1.15%	4.16%		0.46%	0.23%		9.5%
6.Finance, Insurance, Real Estate							1.85%	0.46%	0.23%		2.5%
7.Services			0.69%	2.08%	0.69%	0.69%		10.16%	1.85%		16.2%
8.Health Services			1.39%	0.92%	0.46%	0.46%	0.23%	0.46%	2.54%	0.23%	6.7%
9.Public Administration					0.23%						0.2%
Total	0.2%	6.2%	18.7%	25.2%	13.4%	8.8%	3.7%	15.0%	7.9%	0.9%	100%

indicates top 10%, top 20%, top 30% and top 50% industry pairs in terms of frequency of moves

*** p<0.01, ** p<0.05, * p<0.1

Table A6. Executive Mobility from 1986 through 2011 – OLS Estimates

This table presents baseline panel estimation results using ordinary least squares for the effect of executive mobility on CEO pay-for-performance sensitivity, board monitoring, capital structure and corporate investment from 1986 through 2011. Control variables are the same as those used in Table 6, excluding Cash/TA and Leverage in (4). Numbers in parentheses are *t*-statistics based on robust standard errors clustered at the industry and year levels.

Dependent Variables:	*Pay-Perf*	*Independence*	*CEO-Chair*	*Net Leverage*	*Investment*
	(1)	(2)	(3)	(4)	(5)
$Mobility_{CEO}$	-6.095**	-0.087	-0.072	-0.062	0.102***
	(-3.40)	(-0.99)	(-0.71)	(-1.06)	(6.66)
N	16,386	67,949	67,949	67,949	67,949
Year Fixed Effect	YES	YES	YES	YES	YES
CEO-Firm Fixed Effect	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES
Adjusted R^2	0.026	0.535	0.717	0.792	0.631