The Wolves of Wall Street?
Managerial Attributes and Bank Risk

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We find that chief executive officers and chief financial officers exert significant individual effects on bank risk. Manager transitions, including transitions generated by plausibly exogenous manager departures, lead to abnormally large changes in bank risk. We demonstrate that the effects of managers on bank risk are sizable and manager-specific. The effects are also partly anticipated by the board because they are reflected in managers' pay. However, wide-ranging personal attributes, including biographical, experience, and compensation data, only explain a small share of managers' impact on bank risk. This implies that attempts to rein in bank risk-taking by targeting manager characteristics will be challenging for investors and regulators.

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1. Introduction

A growing literature demonstrates how specific manager attributes, including pay, education and experience, influence bank risk and risk-related policies (Fahlenbrach and Stulz, 2011; DeYoung, Peng and Yan 2013; Berger, Kick and Schaeck, 2014; Boyallian and Ruiz-Verdú, 2018; Nguyen, Hagendorff and Eshraghi, 2018, and others).[1] However, this work has yet to offer a more comprehensive understanding of the extent *individual* managers shape bank risk. If, as the literature on specific manager attributes suggests, managers direct banks in response to their incentives or environment, does that mean bank managers are effectively interchangeable with observationally similar managers? This paper studies two questions around the influence of individual managers. Do individual managers matter for bank risk? And which personal attributes are key for bank risk?

The banking industry is unusual, if not unique, in terms of the level of scrutiny that specific manager characteristics attract. Banks are at the sharp end of official recommendations regarding the qualifications or compensation arrangements of their senior management. However, such activism can only be effective if managers exert sizeable effects on risk and if the key manager attributes that correlate with risk can be identified. If not, unsustainable business models cannot be easily reined in by regulators or investors by recruiting managers with certain characteristics.

We build a unique dataset of the chief executive (CEOs) and the chief financial officers (CFOs) of large U.S. banks. We collate data on the education, life and work experience of bank managers as well as details on their pay (including bonus payments and pay-based risk-taking

[1] Outside the financial industry, examples of studies that examine the role of individual managerial heterogeneity and corporate actions and performance include Bertrand and Schoar (2003), Malmendier, Tate and Yan (2011), Benmelech and Frydman (2015), Falato, Li and Milbourn (2015), Dittmar and Duchin (2016), Bernile, Bhagwat and Rau (2017), Huang, Chen and Chen (2018), and Page (2018).

incentives). We then relate the characteristics of managers to market indicators of bank risk (using measures of equity volatility, extreme risk exposures, and systemic risk) and a selection of risk-relevant policy choices (including the capital, funding and income structures of banks).

Our first set of tests follow the intuition that, if individual CEOs and CFOs were to impact bank risk, we expect to see abnormal changes in risk following the appointment of new managers. To aid a cleaner identification of manager effects, we focus on manager transitions that are plausibly exogenous and make it less likely that risk changes result because banks simultaneously pursue a major set of changes that include changing the senior management team along with changes to risk-relevant policies. This is a key contribution of our paper.

We start by showing that when managers depart due to ill health, death, or a pre-announced retirement plan, the arrival of a new manager is associated with significant changes in risk relative to banks without management transitions. Virtually all bank risk measures increase significantly in the aftermath of manager transitions; many increase by as much as 40+% against our benchmark. In heterogeneity analysis, we show that significant changes in risk occur around transitions that generate sweeping changes to the characteristics of the managers in office. Additionally, we use changes to the state-wide enforcement of non-compete agreements, which restrict employees from joining competitors, as exogenous shocks to the mobility of managers (see Garmaise, 2011). We show banks in states that loosen the enforceability of non-compete provisions in employment contracts experience larger variability in risk relative to banks in states with constant enforcement. Jointly, our tests provide clean evidence of manager-specific risk effects.

To quantify how important managers are for risk, we estimate the fraction of bank risk that can be explained by manager fixed effects. Manager fixed effects in bank risk ('risk styles') are

the amalgamation of time-invariant manager characteristics in risk. Consequently, risk styles incorporate idiosyncratic manager characteristics (e.g., personal risk preferences) that are difficult to identify or quantify for outsiders (Bertrand and Schoar, 2003; Coles and Li, 2018; Page, 2018). Our data show substantial manager-specific effects in bank risk. On average, risk styles explain 23% of the variance of our bank risk measures.

We next analyze which manager attributes matter. We describe the economic origins of manager styles by regressing risk styles on a wide range of manager attributes. We find that various manager attributes, in particular indicators of professional experience outside the banking sector, are associated with manager preferences for lower risk. That is, managers with military experience, ex-accountants, ex-lawyers, and managers with professional experience during a banking crisis show preferences for less risk-taking.

Since relevant manager attributes are difficult to identify and quantify for us, the analysis of the origins of styles could omit important manager variables. However, relevant manager attributes should be more obvious to the boards of directors that appoint managers and design their compensation contracts. Therefore, we use manager fixed effects in managers' pay to capture the managerial attributes that boards deem relevant when managers transfer across firms (Graham et al., 2012). We find that manager pay fixed effects are determinates of risk styles (boards generally value and reward managers with higher risk preferences) which are shaped by managers' professional experience.

Importantly, while some manager characteristics explain the origins of manager-specific effects in risk and pay, their overall explanatory power remains relatively limited. On average, about 70% of the cross-sectional variation in manager styles and manager pay fixed effects cannot be explained by the manager attributes in our analysis. This implies that managers affect risk in

important, but ultimately, idiosyncratic ways. Further, our findings imply that while boards recognize *some* of the manager attributes that are relevant for manager-specific impact, they struggle to do so in a comprehensive way. Consequently, key manager attributes, that are important for how much managers contribute to bank risk, are difficult to identify for any of the stakeholders in the recruitment or monitoring of managers.

Our paper relates to different strands of the literature. First, we contribute to work on specific manager attributes and bank behavior (Fahlenbrach and Stulz, 2011; DeYoung et al., 2013; Berger et al., 2014; Nguyen et al., 2018; Boyallian and Ruiz-Verdú, 2018) by demonstrating that individual managers are important drivers of bank risk. In a series of empirical settings designed to aid the identification of manager-specific effects, we highlight that a significant portion of the variation in bank risk is due to individual managers and orthogonal to the specific manager attributes previously identified in the literature.

Second, our work is related to studies that report evidence of manager styles for non-financial institutions (e.g., Bertrand and Shoar, 2003; Graham et al., 2012; Ewens and Rhodes-Kropf, 2015; Shevlin and Wangerin, 2016; Shoar and Zuo, 2017). Questions remain over whether manager styles are indeed transferred across employers and how to interpret them (Fee et al., 2013). We contribute to this work by identifying styles in bank risk as well as in manager pay data that reflect how boards anticipate individual managers affect risk. We show that managers in the banking industry have robust risk styles and identify some of the manager characteristics that are correlated with bank managers' styles.

Finally, we contribute to work on the corporate governance of financial institutions (Beltratti and Stulz, 2012; Erkens et al., 2012; Berger et al., 2014; Anginer et al., 2016). Our analysis of manager pay fixed effects shows that the manager-specific attributes that are valued by

bank boards consistently describe higher manager risk-preferences. Our findings therefore help explain the persistence in the risk culture of banks documented elsewhere in the literature (Fahlenbrach, Prilmeier, and Stulz, 2012; Ellul and Yerramilli, 2013) by suggesting that boards value and reward managers with more aggressive risk-taking preferences.

2. Sample and Data

2.1 Bank Managers and Manager Transitions

We analyze the importance of managers for banks risk by focusing on changes in bank risk that are associated with management transitions. Execucomp provides data on the highest paid managers for firms currently or previously included in the S&P 500, S&P MidCap 400 and S&P SmallCap 600. We include firms with SIC codes between 6000 and 6300 that report Y-9C financial statement data to the Federal Reserve. We retrieve the names and appointment details for chief executive (CEOs) and the chief financial officers (CFOs) to identify CEO and CFO transitions between 1993 and 2014. Panel A of Table 1 lists the 221 management transitions on which we base our main analysis.

********TABLE 1 AROUND HERE********

We then read articles from the *Wall Street Journal*, *The Financial Times,* and bank press releases to determine the reasons behind manager changes. We follow Dittmar and Duchin (2016) and class manager turnovers as plausibly exogenous if they meet one of the following criteria: the manager departs as a result of death or illness or is a at least 60 years old; alternatively, the departure is part of a pre-planned retirement plan (with the departure date announced at least six months prior). That is, we focus on manager transitions are either unexpected or part of a bank's succession planning. These manager transitions are less likely to be motivated by changes in bank

variables that warrant changes in bank policies. Panel B of Table 1 shows that 114 management transitions are plausibly exogenous manager departures. The remaining 107 leadership changes are potentially endogenous turnover events, often dismissals, where banks are likely to endogenously choose both a new manager and changes in policies.

2.2 Biographical Manager Attributes and Pay Variables

Upper echelons theory (Hambrick and Mason 1984; Hambrick 2007) posits that observable manager characteristics reflect managers' formative experiences which shape their preferences and, ultimately, corporate outcomes. We introduce this insight into our analysis and posit that if managers affect risk, changes in the attributes of the managers in post will be associated with changes in risk.

We obtain biographical data on bank managers from Boardex, Marquis Who's Who, Riskmetrics, and via Google searches and other public data sources. We collect data on age, gender, and whether managers were exposed to the consequences of the Great Depression during their formative years which we define to lie between ages 5 to 15 (*Depression child*). Further, we collect data on whether managers hold an *MBA* degree and whether they graduated from an *Ivy League* university.

Career and experience variables include dummy variables for whether managers have completed *Military service*, whether they entered the labor market either during a *Recession* (based on the business cycle dating database of the National Bureau of Economic Research), and were appointed to their first executive position during a *Banking crisis* (i.e. the savings and loan crisis (1986–1992) or the Global Financial Crisis (2007–2010)).

Further, we include the (ln of the) age of their first executive positions including vice president and department heads (*Fast track*), a dummy that equals one if a manager has served as a non-executive director outside the banking sector (*Nonbank experience (N_ex)*, and a dummy which equals one if a manager had executive appointments outside the banking sector (*Nonbank experience (Ex)*). We also control for manager careers that started in a *Highly-trained profession*. This variable takes the value of one if the manager's first appointment was in an accounting firm, university or law firm. The biographical manager characteristics are listed in Panel C of Table 1.

Manager compensation data from Execucomp present us with additional manager characteristics. Agency theory views pay as a mechanism that encourages risk-related manager efforts by reconciling the risk preferences of naturally risk-averse managers with those of risk neutral shareholders (Jensen and Meckling, 1976). Additionally, compensation data may correlate with manager attributes that are relevant for risk (e.g., ability or risk preferences), but difficult to measure (Graham et al., 2012; Francis et al., 2016). Since manager pay has been shown to influence risky bank policies (Fahlenbrach and Stulz, 2011; DeYoung et al., 2013), we expect differences in compensation arrangements between incoming and the outgoing executives to significantly affect risk.

Panel D of Table 1 shows the sensitivity of managers' wealth to bank risk (*Vega*) as the dollar change in wealth linked to a 0.01 increase in stock return volatility. If riskier policies increase equity volatility, mangers with higher *Vega* have incentives to engage in riskier bank policies. Further, the sensitivity of manager wealth to bank performance (*Delta*) measures dollar changes in CEO wealth to stock price performance. As *Delta* exposes managerial wealth also to

falling stock prices, a higher *Delta* might discourage managers from choosing risky bank policies.[2] We scale both incentive measures by cash compensation and use the ln transformation of the resulting variable in our analysis. We also employ the ln of cash bonuses (*Bonus*). Bonus may incentivize managers to take more risk to achieve higher performance-related payoffs.

Pay disparity is a manager's total compensation relative to average compensation of employees who are not among the top managers listed in Execucomp. Specifically, we compute total wages less the wages of managers listed in Execucomp and divide this by the number of all employees who are not amongst the top managers listed in Execucomp (i.e. the number of full-time bank employees minus the number of managers in Execucomp). Differences in pay disparity between a top-level executive and the average employee can be interpreted as job-related skill premia (Mueller, Ouimet and Simintzi, 2017).

Finally, Panel E of Table 1 summarizes differences between incoming and outgoing managers using multi-dimensional measures of the changes in the demographic and compensation data. We construct an index of *Biographical differences* based on the manager characteristics listed Panel C as follows. For binary variables, we compute the absolute difference between the incoming and the outgoing manager. For continuous variables (Age and Fast track), we convert absolute differences to an ordinal scale based on terciles (with values of 0.5, 1 and 1.5 assigned to each tercile) and compute the absolute difference between the incoming and the outgoing manager. *Biographical differences* is the sum of the absolute differences of each variable in each turnover

[2] We obtain detailed information on outstanding equity awards at each fiscal year-end (and other compensation data) from Execucomp and use these awards to compute the Black-Scholes value of each option as well as its sensitivity to volatility and stock price changes. Coles, Daniel and Naveen (2006) and Core and Guay (2002) provide details on the calculation of these variables.

event. Larger values indicate turnovers are associated with larger differences in the characteristics of outgoing and incoming managers.

We compute an index of *Compensation differences* as the Euclidean distance between the compensation characteristics of the incoming and outgoing manager using the compensation variables in Panel D.

3. Do Managers Affect Bank Risk?

3.1 Evidence from Manager Transitions

If individual CEOs and CFOs impact bank risk, we expect to see changes in risk following the appointment of new managers to these positions. We, therefore, estimate the unexpected changes in risk experienced by banks that see management changes.

We focus on eight risk proxies. As market risk measures, we compute annual equity *Volatility*, *Expected shortfall* (*ES*), and *Marginal Expected Shortfall* (*MES*). *ES* is (minus) the average return on the worst 5% of days each year. *MES* is (minus) the average return of a bank when the market is under distress (defined as of the worst 5% of days of the CRSP equal-weighted marked index).[3] *MES* captures systemic risk exposures by quantifying a bank's exposure to extreme market-wide events (Acharya et al., 2017). Higher values of each of the risk measures correspond to higher risk exposures.

Additionally, five balance sheet variables proxy for risk-taking by managers. *Leverage*, defined as the ratio between total liabilities and total assets, captures a bank's ability to absorb losses, a key concept underlying risk-based capital regulation. The ratio of *Non-interest income* to total operating income captures the importance of sources of income other than interest, with

[3] Our results are qualitatively similar if we employ the CRSP value-weighted market index as the market return.

higher values linked to more volatile earnings (DeYoung and Roland, 2001) and higher systemic risk (Brunnermeier, Dong and Palia, 2020). *Gap12,* as in Flannery and James (1984), is the difference between assets and liabilities maturing within the next 12 months scaled by total assets. Greater values of this ratio indicate greater re-investment risk as banks see more of their assets mature relative to their liabilities. Finally, we consider the proportion of bank liabilities that are not financed via deposits (*Non-deposit funding*). The literature emphasizes that short-term finance from capital markets made banks fragile and vulnerable to runs during the financial crisis of 2007-2009 (Beltratti and Stulz, 2012; Brunnermeier, 2009).

Since we are concerned that banks with management transitions display risk changes even in the absence of manager changes, our analysis is *not* based on raw changes in risk. Instead, we follow Fee, Hadlock and Pierce (2013) and estimate risk changes against a benchmark of risk changes experienced by Execucomp banks without manager changes over the same event window. Specifically, we start by estimating unexpected risk changes in the sample of turnover banks as the residuals (ε_{it}) from a regression that explains expected changes in risk as follows:

$$\Delta Risk_{i(t+2,t-1)} = X_{it-1}\beta + \mu_{t-1} + \varepsilon_{it} \quad (1)$$

$\Delta Risk$ is the change in risk from -1 to +2 years relative to the fiscal year of the manager change which we explain by $Risk_{t-1}$ and the ln(total assets $_{t-1}$), changes in risk and changes in size (between years -2 and -1), and μ_{t-1}, state-level economic conditions in year -1 (the 12-month average of the Federal Reserve Bank of Philadelphia's Coincident Index).[4]

[4] Coincident Indexes are monthly indicators of economic conditions compiled at state-level. The components are non-farm payroll employment, average hours worked in manufacturing, the unemployment rate, and wage and salary disbursements (deflated by the consumer price index).

For each bank with manager changes, we divide the absolute value of the residuals from (1) by the median of the absolute residuals from (1) for banks that do not experience management changes (in the period from *t*-1 to *t*+2). We focus on absolute values because abnormal changes in risk result from banks either increasing or decreasing their risk-exposures. If manager transitions do not affect risk, the mean (median) ratio of abnormal variation in bank will not be significantly different from one. By contrast, a mean (median) ratio significantly larger than 1 indicates significant abnormal variation in bank risk around turnovers compared to the benchmark without turnovers.

********TABLE 2 AROUND HERE********

Panel A of Table 2 displays abnormal risk changes for the full sample of turnovers. The results offer broad support for the view that manager transitions lead to significant abnormal changes in risk. We find that the mean (median) abnormal ratio is significantly higher than one is seven out of eight risk variables according to a t-test (Wilcoxon sign rank test). The magnitude of these change is economically large. For instance, the mean abnormal change in equity volatility for banks with manager changes is 1.387 times the median of banks without manager transitions.

The results tend to hold in Panel B which examines transitions we classify as exogenous. Exogenous management turnovers are less likely to be motivated by dissatisfaction with previous policies and risk and, thus, less likely to be motivated by a desire of the board for immediate changes under the incoming manager. The significant abnormal changes in risk we document in this sub-sample (for seven out of the eight risk measures), thus, strengthen our interpretation that managers influence bank risk. Abnormal changes are especially large for non-interest income which is around 50% higher in banks that experience exogenous management turnover relative to the benchmark. To further strengthen the identification of manager effects on bank risk, we adopt

an even more stringent definition of exogenous turnovers. Specifically, we now only include transitions where the departing manager is 66+ years old and announced her or his retirement at least six months prior. This reduces the sample to 93 manager transitions, but our results remain substantially unchanged. The results are shown in Section 1 of the Internet Appendix.

Finally, Panel D documents that significant abnormal changes in bank risk are also present in the sub-sample of endogenous turnovers and this is in line with the argument that these turnovers might signal the intention of the board to implement as significant strategic shift (see Fee, Hadlock and Pierce, 2013; Dittmar and Duchin, 2015).

3.2 Heterogeneity Analysis by Manager Characteristics

This section leverages the insights of upper echelons theory (Hambrick and Mason, 1984; Hambrick, 2007) and posits that, if managers affect risk, changes in risk around manager transitions should be pronounced if incoming and outgoing managers are more different along observable characteristics. This is exactly what we find.

Panel A of Table 3 shows exogenous manager transitions are associated with significant changes in our risk measures primarily when incoming manager and outgoing manager differ in terms of biographical characteristics. For instance, when *Biographical differences* is above the sample median, changes in equity volatility and MES are approximately 40% higher than the equivalent changes in the benchmark group of banks that do not experience manager turnover. Similar results hold for all risk measures and risk-related policy measures we examine (bar Gap12).

********TABLE 3 AROUND HERE********

Interestingly, Panel B shows that exogenous manager transitions lead to few significant changes in risk when the incoming and outgoing managers have similar profiles. Panels C and D

focus on endogenous management turnovers as a reference point to the exogenous turnover results. The changes in risk after manager transitions tend to be still more detectable, in the subset of endogenous transitions with pronounced differences in the characteristics of the incoming and outgoing executive.

********TABLE 4 AROUND HERE********

Next to changes in biographical manager attributes, manager transitions also lead to changes in manager pay. This raises the prospect that the transition-related changes in risk we document above could at least in part be due to changes in the compensation arrangements of the managers in office. Table 4 shows that banks experience significant risk changes after exogenous management turnovers when differences in the compensation arrangements between incoming and outgoing managers are above the sample median (Panel A). Importantly, Panels C and D separate turnovers by biographical manager differences (as used in Table 3) and show that biographical differences result in changes in bank risk even in the absence of large compensation differences. The latter shows that the effects that biographical managerial characteristics exert on risk exist beyond any effects that compensation arrangements also have on risk.

3.3 Evidence from Shocks to Manager Mobility

The analysis above focuses on management transitions that are plausibly exogenous because the need to replace an outgoing manager is less likely to be due to unobserved bank heterogeneity in these cases. However, since banks endogenously choose *incoming* managers, some concerns remain that the manager effects identified above result from bank-manager matching.

This section exploits a source of exogenous variation in the labor market mobility of managers to confirm that individual managers are important for bank risk. We use changes to the state-wide enforcement of non-competition agreements, which restrict employees from joining competitors, as exogenous shocks to the mobility of managers. Non-compete provisions are a common feature in the employment contracts of senior managers (Germaise, 2011). The enforceability of non-compete provisions is governed by state law, and successive court rulings have led to changes in the treatment of non-compete provisions over time (Malsberger, 2004). Critically, the resulting cross-sectional and time-series variation in labor market mobility is exogenous to individual managers.

********TABLE 5 AROUND HERE********

Because non-compete provisions are enforced in the states where managers work, we use a difference-in-difference design that tests if banks headquartered in states that have changed the enforcement of non-compete agreements experience larger variability in risk relative to banks in states with constant enforcement. The intuition behind this test is as follows. Changes in manager mobility change how deep the pool of candidates for manager positions is. If managers do indeed affect risk, changes in the supply of managers will see more pronounced year-on-year variation in risk.

We include all banks in Execucomp between 1992 and 2016 in this analysis (i.e., we include banks without manager transitions) and obtain data on changes in the state-level enforcement of non-compete agreements from Germaise (2011) and Tang, Wang and Zhou (2021) for post-2013 coverage. We then relate variation in risk to manager mobility as follows:

$$\text{Abs}\,(\Delta \text{Risk}_{i,(t+1;t)}) = \beta_1\,\text{Increase mobility}_t + \beta_2\,\text{Size}_{it-1} + \beta_3\,\text{Economy}_t + \phi_i + \mu_t + + \varepsilon_{it} \quad (2)$$

Where Abs ($\Delta Risk_{i,(t+1;t)}$) is the absolute change in risk from year t to year t+1, *Increase mobility* is 1 (-1) for banks located in a state and year during which the state increased (reduced) manager mobility by loosening (tightening) the enforceability of non-compete clauses. *Size* is ln(total assets) in constant 2000 prices, *Economy* is the state Coincident Index as previously, (ϕ_s) and year fixed effects (μ_t). In additional tests, we include further bank controls (the change in ln (total assets) from t-2 to t-1 and the lag value the market-to-book ratio (charter value) and bank productivity, defined as the ratio between bank total assets and total employees). Table 5 reports summary statistics of the variables employed in these tests.

********TABLE 6 AROUND HERE********

Panel A of Table 6 reports the results for equation (2) and confirms that greater manager mobility is linked with greater variation in year-on-year bank risk. After enactment of greater manager mobility, the absolute values of one-year changes in risk and risk-related policies is significantly higher for banks that experience a greater supply of managers compared banks which operate in a stagnant managerial labor market. Panel B, where we account for additional bank controls, reaches the same conclusion. This result is consistent with manager effects becoming more salient in the aftermath of increased manager supply to banks. We interpret this finding as additional evidence of the effects of managers on bank risk.

4. How Important are Managers for Bank Risk?

After establishing that individual managers have detectable effects on risk, we next examine how important managers are for risk. We follow a literature that estimates how important managers are using the fraction of the variation in corporate outcomes that can be explained by

manager fixed effects (Bertrand and Shoar, 2003; Malmendier and Tate, 2005; Ewens and Rhodes-Kropf, 2015; Shoar and Zuo, 2017). Therefore, we estimate manager fixed effects in bank risk

To separately identify manager fixed effects and bank fixed effects, we adopt the connectedness sampling method of Abowd, Kramarz and Margolis (1999). This approach identifies manager effects from *within-sample* mobility and includes all banks in Execucomp that have employed at least one manager who has worked for two or more Execucomp banks during our sample period. Since the within-sample mobility of CEOs and CFOs is very low, we expand the analysis and include all managers listed in Execucomp.

A key benefit of this approach is that a modest amount of manager mobility generates a large degree of bank connectedness. The Internet Appendix shows that the 5.20% of managers who move at least once during the sample period result in the inclusion of 53% of Execucomp banks in the "connectedness sample." This is comparable to the figure provided by Graham et al. (2012) in their analysis of manager pay fixed effects for non-financial firms.

To extract manager fixed effects, we estimate three-way fixed effect regressions for the sample of connected banks as reported below:

$$Risk_{(it)} = \beta_1 Size_{it-1} + \beta_2 Economy_t + M_{j(it)}\gamma + \theta_j + \phi_i + \mu_t + + \varepsilon_{it} \quad (2)$$

where $Risk_{j(it)}$ are our various bank risk measures for manager j and bank i. We control for bank size, economic conditions, the time-varying manager attributes listed in Panels C and D are contained in M (the remainder are absorbed by the manager fixed effects), manager (θ_j), bank (ϕ_i) and year fixed effects (μ_t). We refer the estimated manager fixed effect ($\hat{\theta}$) as "risk styles." By definition, a manager's risk style expresses her or his unique contribution to bank risk *after* controlling for other determinants of bank risk-taking. Risk styles, therefore, are the amalgamation

of time-invariant manager characteristics in bank risk, including characteristics that may otherwise be difficult to identify or quantify (e.g., risk preferences). We report the full estimation results for (2) in section 2 of the Internet Appendix.

Panel A of Table 7 shows the economic relevance of the manager fixed effects in risk is substantial. We examine how much risk styles contribute to the total variation in a risk measure by using the covariance between a risk measure and its related risk style, normalized by the variance of the risk measure. On average, manager fixed effects explain around 23% of the variance in bank risk. The contribution of manager fixed effects ranges between 14% for MES and 41% of the variation in non-interest income. This implies a significant share of the variation in bank policy and risk is explained by manager-specific factors.

********TABLE 7 AROUND HERE********

To demonstrate that the manager fixed effects we estimate are not spurious, we break the structure of our data and randomly allocate managers to banks in each year. We perform 1,000 Monte Carlo permutations of the data and re-estimate the significance level of the estimated manager fixed effects each time via F-tests. We then compare the actual F-tests with the F-tests we obtain on the simulated datasets. If the significance level of the manager fixed effects, we report is genuine, the actual F-tests should be larger than the F-tests we obtain when managers are randomly allocated to firms. This is indeed what we find. The resulting *p*-values are based on Davison and Hinkley (1997) and indicate the probability that the F-tests on the joint significance of the manager fixed effects based on the simulations are larger than the actual F-test in our data. This probability is close to zero for each risk measure.

Panel B of Table 7 presents correlations between the manager styles in risk and risk-related policies. While correlations between styles in market-based risk measures are high, the correlations

between market risk and policy variable as well as the correlations amongst the policy variables are much lower. For instance, manager styles in MES correlate 12% with manager styles in non-interest income. This indicates that, jointly, the various risk styles cover a broad and multi-dimensional range of managerial preferences for risk.

In additional analysis, we confirm the importance of time-invariant and manager-specific characteristics for risk using manager pay data. Arguably, boards of directors, that appoint managers and design their compensation contracts, should be in a particularly strong position to assess the importance for manager-specific attributes for risk. If boards deem individual managers indeed important, manager pay will also contain a sizeable manager-specific component.

We follow Graham et al. (2012) and Francis et al. (2016) and estimate manager fixed effects in executive pay. Using the same sample and connectedness sampling method, we now use the ln(total manager compensation) as the dependent variable. Total compensation is Execucomp data item TDC1 (measured in $ thousands).[5] Following Graham et al., we control for bank $size_{t-1}$, ROA and annual bank stock returns (both in *t* and *t*-1), the market-to-book $ratio_{t-1}$ and return $volatility_t$, ln(manager age) and a CEO indicator. In this setting, the manager pay fixed effects capture all time-invariant manager attributes that boards deem valuable for their banks.

Panel C of Table 7 shows that manager pay fixed effects make up a sizable and significant contribution to manager pay. These fixed effects explain nearly half of the variance in total manager pay which is consistent with boards anticipating that managers yield important and person-specific effects.

[5] TDC1 includes salary, bonus, total value of restricted stock granted, the total Black-Scholes value of stock options granted, and long-term incentive payouts.

5. Which Manager Characteristics Matter for Risk-taking?

5.1 Cross Sectional Analysis of Manager Fixed Effects

Which manager characteristics correlate with the sizable manager-specific risk effects we identify above? The answer to this question has important implications. First, if manager preferences were shaped by a manager's biography, education, or experience, this provides further assurance that the estimated styles are not spurious. Second, identifying the economic origins of manager styles offers an opportunity to partly predict a bank's risky policies under a manager. E.g., if younger or male managers had risk styles that were highly distinct, otherwise hard-to-observe manger risk styles could be predicted using observable manager characteristics.

********TABLE 8 AROUND HERE********

Table 8 regresses the risk styles of CEOs and CFOs on manager characteristics and manager pay fixed effects. This analysis includes the manager pay fixed effects to minimize potential omitted variable bias. Arguably, while important risk-relevant attributes (e.g., ability, risk aversion, or personality) may be difficult to quantify for us, boards of directors should be in a better position to anticipate these attributes. The manager pay fixed effects, as estimated in Section 5, should provide a comprehensive measure of the time-invariant manager attributes that boards deem valuable for their banks.

Table 8 shows that managers with experience of military service, depression children, or managers with professional experience during a banking crisis show preferences for less risk and less risky business models. Additionally, there is some evidence that male managers have lower market risk preferences, but no evidence of gender differences in policy preferences more

generally.[6] While education has little effect on risk preferences, career experience is highly relevant for shaping a manager's risk preferences. Managers with previous appointments at an accounting firm, university or a law firm and managers with experience outside the banking industry display a preference for less risk-taking.

Furthermore, the manager pay fixed effects enter positively and significantly in six out of the eight risk regressions. That is, manager-specific attributes that are valued by bank boards (and orthogonal to the observable characteristics in our analysis) consistently describe higher manager risk-preferences. This finding complements existing evidence in the literature that links powerful and shareholder-friendly boards to riskier bank policies (e.g., Beltratti and Stulz, 2012; Anginer et al., 2016). Our analysis suggests these boards oversee riskier banks because they value and reward managers with more aggressive risk-taking preferences.

********FIGURE 1 AROUND HERE********

When analyzing the economic origins of the manager pay fixed effects (Column 9 of Table 8), the results imply that manager pay fixed effects are mainly shaped by a manager's work experience. Manager-specific pay components correlate positively with a manager's experience outside the banking sector in both executive and non-executive roles and with managers who were appointed to their first executive position at a younger age.

Overall, we note that while some manager characteristics explain the origins of manager-specific effects in risk and pay, their overall explanatory power is relatively limited. Figure 1 shows that the adjusted R^2 of the regressions on risk styles is around 23% on average (based on the results in Table 8). Consequently, more than 70% of variation in manager risk style remains unexplained.

[6] Similarly, Berger et al. (2014) find that more female management teams are linked to higher bank portfolio risk.

Similarly, variation in manager pay fixed effects also remains largely unexplained by the manager attributes in our analysis. That is, most of the attributes that are valued by the boards of directors that appoint managers are idiosyncratic and are not captured by careers or other biographical information readily available to outsiders. This implies that, while boards recognize (and reward) *some* of the manager attributes that are relevant for manager-specific risk effects, they struggle to do identify these attributes in a comprehensive way. Arguably, if boards were able to identify the personal styles that mattered, the manager pay fixed effects would explain a much larger fraction of the manager styles.

Nevertheless, these idiosyncratic factors identified by bank boards are far from capturing the full set of idiosyncratic manager characteristics that matter for bank risk-taking. Jointly, our analysis implies that risk styles mainly capture a component of manager preferences that is idiosyncratic, rooted in manager preferences, and only partially understood by bank boards. A key implication of this finding is that this component is difficult, perhaps nearly impossible, to target when recruiting or monitoring bank managers.

5.2 Robustness: Alternative Approaches

The results in this section are robust to us employing alternative data structures and estimation techniques. The results of these additional tests are summarized in Table 9.

Tightening the sample of non-mover managers. Our results remain very similar if we restrict the sample of non-mover managers to CEOs and CFOs. This alternative approach has potentially two benefits. First, it substantially increases the proportion of movers in the sample. While the connectedness sampling method of Abowd et al., (1999) permits us to estimate a manager fixed effect for managers who did not move (as long as there was one manager who

switched banks), identification ultimately rests on the sample of movers. Second, this approach reduces the need to use repeated bank observations in each year.

Correcting for sampling bias. Our analysis could be biased if banks in our sample of connected banks were to differ from other Execucomp banks. To control for potential sample selection bias, we apply a two-step Heckman (1979) selection model. The model first estimates the criteria for sample selection and then reports the results of our policy regressions conditional upon sample selection.

The first step of the Heckman procedure estimates the probability that banks are included in our sample using data on banks included as well as on banks that are not included due to lack of manager mobility. Identification rests on the exclusion restriction that requires the first stage to be estimated using a set of variables that is larger by at least one variable than the set of variables in the second stage that estimates our bank policy (risk) variables.

We use the distance from a bank's headquarters to the nearest airport as an additional variable that is included in the first but not the second stage. Geographic coordinates are obtained from U.S. Census files. The rationale for this variable is that proximity to an airport facilitates bank connectedness. Banks that are located in closer proximity to an airport will find it easier to recruit managers. At the same time, a bank's proximity to an airport is not plausibly related to its policy choices other than through the effect that distance has on recruitment decisions.

The inverse Mills ratio obtained from the first-stage regression is then added as a control variable in the three-way fixed effect model before estimating manager fixed effects. To conserve space, the results are not tabulated. The results are available from the authors upon request. The results show that the estimates of manager fixed effects after controlling for sample selection bias are near-identical to our previous results.

Low manager mobility. Finally, we exclude explanations according to which our estimates of manager fixed effects could be biased because of low manager mobility in some of the groups of connected banks. We stipulate that connected groups of managers need to exhibit three or more movers. Further, we run the analysis only for the most connected group of banks (which accounts for a large number of connections in our sample (see Panel C of Internet Appendix 3). The results remain broadly similar even though the average variance explained by manager fixed effects in the policy regressions is reduced, possibly because of the significant decline in the number of managers and banks included in the analysis.

6. Conclusions

Neoclassical and agency theory depict managers as rational decision-makers who respond to contractual incentives and other monitoring mechanisms. This makes managers effectively interchangeable with observationally identical managers. In this paper, we show that individual managers are important drivers of bank risk. We show manager exert sizeable and person-specific effects on a range of risk measures and risk-related bank policies. However, the economic roots of how managers affect bank risk are highly idiosyncratic and, ultimately, difficult to explain for outsiders.

Our findings have two key implications for bank regulators. First, they imply that regulatory interventions targeted towards publicly available manager characteristics are likely to have only a minor impact on bank risk-taking. For regulations of bank activities to be effective, they need to be primarily targeted at banks rather than bankers.

Second, our results imply that manager attributes that are difficult to identify and, as such, difficult to regulate can produce negative systemic externalities. If drivers of bank risk-taking and systemic risk are ultimately rooted in idiosyncratic manager preferences, regulatory attempts to

reign in bank risk-taking in a meaningful way will be challenging. Regulators in the U.S. have recognized this important fact. The management factor (M) in the "CAMEL" rating, which is for instance used for regulatory purposes, such as in setting deposit insurance premia, now has the same weighting as capital adequacy in calculating this rating (i.e. 25%).[7] More qualitative approaches to assess the management factor are therefore needed, and we hope that our paper inspires more research in this direction.

[7] See FDIC Federal Register (25 February 2011), www.fdic.gov/deposit/insurance/11rulead35.pdf.

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Table 1. Manager turnovers and manager attributes

Panel A lists manager turnovers for CEOs and CFOs of banks in the Execucomp database. Panel B classes the turnover events as exogenous if the manager departs as a result of death or illness, is 60+ years old, or because of a pre-announced succession plan. Panel C shows manager characteristics collected from Boardex, Marquis Who's Who, Riskmetrics, and from Google. Manager pay data in Panel D are from Execucomp. Panel E summarizes differences between incoming and outgoing managers using multi-dimensional measures of the changes in the demographic and compensation data.

Panel A: Turnover Sample by Year		
	Total	**Total %**
1993	2	0.90
1994	7	3.17
1995	15	6.79
1996	6	2.71
1997	6	2.71
1998	7	3.17
1999	3	1.36
2000	19	8.6
2001	12	5.43
2002	12	5.43
2003	7	3.17
2004	15	6.79
2005	14	6.33
2006	7	3.17
2007	18	8.14
2008	11	4.98
2009	12	5.43
2010	11	4.98
2011	11	4.98
2012	9	4.07
2013	13	5.88
2014	4	1.81
Total	221	100.00

Panel B: Turnover Sample by Typologies		
	Total	**Total %**
Endogenous	107	48.41
Exogenous	114	51.59
Total	221	100.00

(Continued)

Panel C: Manager Biographical Characteristics

		Incoming Executive			Outgoing Executive		
		N	Mean	Median	N	Mean	Median
Demographics							
Age	Ln(age)	221	3.895	3.912	200	4.040	4.078
Male	Equals 1 for male managers	221	0.946	1.000	200	0.955	1.000
Depression child	Equals 1 if the executive was between 5 and 15 years old during the Great Depression (from 1930 to 1939)	221	0.000	0.000	200	0.135	0.000
Education							
MBA	Indicator for managers with an MBA degree	218	0.468	0.000	193	0.409	0.000
Ivy League	Graduated from an Ivy League university (Brown, Columbia, Cornell, Dartmouth College, Harvard, Princeton, Pennsylvania and Yale University)	218	0.174	0.000	193	0.181	0.000
Career and Experience							
Military service	Indicator for managers with prior military service	221	0.063	0.000	194	0.149	0.000
Recession	First entered the labor market during an NBER recession year	221	0.330	0.000	200	0.405	0.000
Banking crisis	Equals 1 for managers with their first executive position during the S&L crisis or during the Global Financial Crisis	220	0.273	0.000	192	0.427	3.761
Fast track	Ln(age) of first executive-level appointment	220	3.691	3.689	192	3.754	0.000
Nonbank experience (N_Ex)	Equals 1 if a manager has served as non-executive in non-banking firms	221	0.104	0.000	191	0.084	0.000
Nonbank experience (Ex)	Equals 1 if the manager has served as executive in non-banking firms	221	0.380	0.000	191	0.330	0.000
Highly-trained profession	Equals 1 if the first appointment was with an accounting firm, university or a law firm	221	0.253	0.000	191	0.162	0.000

Panel D: Manager Compensation Variables

		Incoming Executive			Outgoing Executive		
		N	Mean	Median	N	Mean	Median
Vega	Ln ($ value of pay-risk sensitivity / cash compensation)	199	0.052	0.019	193	0.070	0.028
Delta	Ln ($ value of the pay-performance sensitivity / cash compensation)	199	0.196	0.057	193	0.195	0.099
Moneyness	Ln (1 + value of in-the-money stock options / cash compensation)	199	0.731	0.446	194	0.993	0.711
Bonus	Ln (1 + the $ value of cash bonuses)	208	3.572	4.555	198	3.411	4.513
Pay disparity	Ln (total pay / average pay of employees who are not senior managers)	202	3.168	3.114	196	3.273	3.272

Panel E: Depth of Changes in Manager Characteristics

		N	Mean	Median
Biographical differences	Index of biographical differences based on the manager characteristics in Panel C. For binary variables, we compute the absolute difference between incoming and the outgoing managers. For continuous variables, we convert absolute differences to an ordinal scale based on terciles (with values of 0.5, 1 and 1.5 assigned to each tercile) and compute the absolute difference between the incoming and the outgoing manager. We then take the absolute differences of each variable in each turnover event	188	4.715	4.500
Compensation differences	Euclidean distance between the compensation characteristics of the incoming and outgoing executive in terms of Vega, Delta, Moneyness, Bonus, and Pay disparity.	177	10.165	1.554

Table 2. Changes in bank risk after manager turnover

The table examines abnormal variation in bank risk around CEO and CFO transitions for eight bank risk variables (Volatility ES, MES, NPL, Leverage, Non-interest income, Gap12, Non-deposit funding). Abnormal variability is computed as the ratio between abnormal changes in risk from year -1 to +2 relative to the turnover year for banks with CEO and CFO turnover to abnormal changes over the same time window for non-turnover banks. Abnormal changes are the absolute value of the residuals from OLS regressions that estimate expected risk as described in Section 3.1. A mean (median) ratio > 1 indicates significant abnormal variation in bank risk around turnovers compared to the benchmark without turnovers. Panel A uses all turnover events, Panel B employes114 plausibly exogenous CEO and CFO transitions where outgoing managers departed due health reasons (including death), retired at age 60+, or departed as part of a succession plan announced 6+ months preceding their departure. Panel C focuses 107 potentially endogenous turnovers. *significant at 10%; ** significant at 5%; *** significant at 1%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable:	**Volatility**	**ES**	**MES**	**NPL**	**Leverage**	**Non-interest income**	**Gap12**	**Non-deposit funding**
Panel A: All Turnovers								
1 N	221	221	221	221	221	221	221	221
2 Mean	**1.387*** **	**1.286*** **	**1.396*** **	**1.288*** **	**1.253*** **	**1.436*** **	1.115	**1.368*** **
3 (P-value Mean=1)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.001)**	**(0.000)**	(0.111)	**(0.000)**
4 Median	**1.209*** **	**1.101*** **	**1.254*** **	**1.029** **	1.013	**1.011*** **	0.753	**1.133*** **
5 (P-value Median=1)	**(0.000)**	**(0.003)**	**(0.000)**	**(0.029)**	(0.132)	**(0.005)**	(0.285)	**(0.001)**
Panel B: Exogenous Turnovers								
1 N	114	114	114	114	114	114	114	114
2 Mean	**1.291*** **	**1.216*** **	**1.390*** **	**1.358*** **	**1.249*** **	**1.518*** **	1.100	**1.300*** **
3 (P-value Mean=1)	**(0.000)**	**(0.008)**	**(0.000)**	**(0.006)**	**(0.010)**	**(0.000)**	(0.296)	**(0.005)**
4 Median	**1.264*** **	**1.134***	**1.210*** **	**1.063** **	1.048	**1.045** **	0.818	1.052
5 (P-value Median=1)	**(0.009)**	**(0.061)**	**(0.001)**	**(0.017)**	(0.153)	**(0.019)**	(0.526)	(0.152)
Panel C: Endogenous Turnovers								
1 N	107	107	107	107	107	107	107	107
2 Mean	**1.489*** **	**1.361*** **	**1.402*** **	**1.213*** **	**1.275** **	**1.349*** **	1.136	**1.443*** **
3 (P-value Mean=1)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.031)**	**(0.042)**	**(0.009)**	(0.232)	**(0.001)**
4 Median	**1.138*** **	**1.040** **	**1.296*** **	0.990	0.906	0.995	0.661	**1.162*** **
5 (P-value Median=1)	**(0.009)**	**(0.019)**	**(0.005)**	(0.506)	(0.469)	(0.102)	(0.374)	**(0.003)**

Table 3. Changes in bank risk when new managers have different biographical characteristics

The analysis is based on 114 exogenous CEO and CFO turnovers where managers departed due health reasons (including death), retired at age 60+, or departed as part of a succession plan announced 6+ months preceding their departure, and 107 endogenous turnovers. The analysis is conducted for eight bank risk variables (Volatility ES, MES, NPL, Leverage, Non-interest income, Gap12, Non-deposit funding). Abnormal variability is computed as the ratio between the absolute *residual* change in the risk and policy variable from year+2 to year-1 (where year is the turnover year) divided by the median absolute *residual* change in the same time window for a sample of non-turnover banks. The residual absolute change is obtained from the absolute value of the residuals of OLS regressions where the dependent variable is the directional change in one of the risk (policy) variables and the explanatory variables are the value of the risk (policy) variable, bank size (the ln of bank total assets) and economic conditions (the 12-month average of the monthly coincident index at the state level) at year-1, the change in the risk (policy) variable and in the ln of bank size form year-2 to year-1. Bank-level data for 1992-2016 are from form FR Y-9C of the Consolidated Financial Statements published by the Board of Governors of the Federal Reserve System with references to data mnemonics displayed. Managerial attributes are from Boardex, Marquis Who's Who and Riskmetrics. We estimate the regressions separately for turnover and non-turnover banks. We measure the degree of Biographical differences between the incoming and the outgoing executive by using differences in twelve biographical characteristics reported in Panel C of Table 1. We summarize these differences in an index of diversity as described in Section 2. *significant at 10%; ** significant at 5%; *** significant at 1%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable:	**Volatility**	**ES**	**MES**	**NPL**	**Leverage**	**Non-interest income**	**Gap12**	**Non-deposit funding**
Panel A: Exogenous Turnovers with High Biographical differences								
1 N	69	69	69	69	69	69	69	69
2 Mean	**1.437*****	**1.343*****	**1.423*****	**1.346****	**1.215****	**1.713*****	1.169	**1.337****
3 (P-value Mean=1)	**(0.000)**	**(0.004)**	**(0.000)**	**(0.014)**	**(0.044)**	**(0.001)**	(0.181)	**(0.021)**
4 Median	**1.362*****	**1.183****	**1.325*****	0.919	1.030	**1.119*****	0.826	1.070
5 (P-value Median=1)	**(0.004)**	**(0.020)**	**(0.005)**	(0.103)	(0.273)	**(0.009)**	(0.860)	(0.210)
Panel B: Exogenous Turnovers with Low Biographical differences								
1 N	33	33	33	33	33	33	33	33
2 Mean	1.179	1.153	**1.421****	**1.460****	1.311	1.005	0.962	1.126
3 (P-value Mean=1)	(0.118)	(0.195)	**(0.021)**	**(0.014)**	(0.173)	(0.973)	(0.801)	(0.434)
4 Median	1.161	1.218	1.160	**1.089***	0.980	0.676	0.630	0.934
5 (P-value Median=1)	(0.140)	(0.221)	(0.106)	**(0.072)**	(0.586)	(0.376)	(0.339)	(0.936)
Panel C: Endogenous Turnovers with High Biographical differences								
1 N	47	47	47	47	47	47	47	47
2 Mean	**1.566****	**1.425****	**1.467*****	1.132	**1.386****	1.240	1.194	**1.551*****
3 (P-value Mean=1)	**(0.013)**	**(0.020)**	**(0.006)**	(0.326)	**(0.011)**	(0.249	(0.277)	**(0.007)**
4 Median	**1.352****	**1.213***	**1.288****	0.961	**1.204***	0.923	0.693	**1.162****
5 (P-value Median=1)	**(0.032)**	**(0.081)**	**(0.030)**	(0.865)	**(0.053)**	(0.866)	(0.783)	**(0.039)**
Panel D: Endogenous Turnovers with Low Biographical differences								
1 N	39	39	39	39	39	39	39	39
2 Mean	**1.505****	**1.303***	**1.293****	1.326	1.254	**1.338***	1.198	1.284
3 (P-value Mean=1)	**(0.037**	**(0.090)**	**(0.035)**	(0.108)	(0.379)	**(0.062)**	(0.320)	(0.107)
4 Median	0.968	0.993	**1.388***	0.998	0.530	1.033	0.724	0.954
5 (P-value Median=1)	(0.308)	(0.308)	**(0.060)**	(0.530)	(0.468)	(0.225)	(0.665)	(0.530)

Table 4. Changes in bank risk when new managers have different pay characteristics

The analysis is based on 114 exogenous CEO and CFO turnovers where managers departed due health reasons (including death), retired at age 60+, or departed as part of a succession plan announced 6+ months preceding their departure, and 107 endogenous turnovers. The analysis is conducted for eight bank risk variables (Volatility ES, MES, NPL, Leverage, Non-interest income, Gap12, Non-deposit funding). Abnormal variability is computed as the ratio between the absolute *residual* change in the risk and policy variable from year+2 to year-1 (where year is the turnover year) divided by the median absolute *residual* change in the same time window for a sample of non-turnover banks. The residual absolute change is obtained from the absolute value of the residuals of OLS regressions where the dependent variable is the directional change in one of the risk (policy) variables and the explanatory variables are the value of the risk (policy) variable, bank size (the ln of bank total assets) and economic conditions (the 12-month average of the monthly coincident index at the state level) at year-1, the change in the risk (policy) variable and in the ln of bank size form year-2 to year-1 . Bank-level data for 1992-2016 are from form FR Y-9C of the Consolidated Financial Statements published by the Board of Governors of the Federal Reserve System with references to data mnemonics displayed. Managerial attributes are from Boardex, Marquis Who's Who and Riskmetrics, compensation data are from Execucomp, state-level coincident indices are from the Federal Reserve Bank of Philadelphia. We estimate the regressions separately for turnover and non-turnover banks. In the first two Panels, we measure the degree of Compensation differences between the incoming and the outgoing executive by using five compensation characteristics reported in Panel D of Table 1. We summarize these differences in a Euclidean index of compensation differences as described in Section 2. In the last two Panels, we measure Compensation differences as absolute difference in risk-taking incentives between the incoming and outgoing executive. *significant at 10%; ** significant at 5%; *** significant at 1%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable:	**Volatility**	**ES**	**MES**	**NPL**	**Leverage**	**Non-interest income**	**Gap12**	**Non-deposit funding**
Panel A: Exogenous Turnovers with High Compensation differences								
1 N	50	50	50	50	50	50	50	50
2 Mean	**1.491*****	**1.376*****	**1.540*****	**1.489*****	1.206	**1.433***	1.163	1.183
3 (P-value Mean=1)	**(0.000)**	**(0.004)**	**(0.000)**	**(0.005)**	(0.126)	**(0.068)**	(0.32)	(0.288)
4 Median	**1.390*****	**1.234****	**1.364*****	**1.100****	1.002	0.735	0.708	0.927
5 (P-value Median=1)	**(0.002)**	**(0.011)**	**(0.001)**	**(0.014)**	(0.502)	(0.409)	(0.579)	(0.696)
Panel B: Exogenous Turnovers with Low Compensation differences								
1 N	47	47	47	47	47	47	47	47
2 Mean	1.199	1.201	**1.333****	**1.290***	1.212	**1.522****	1.094	**1.335****
3 (P-value Mean=1)	(0.124)	(0.126)	**(0.026)**	**(0.053)**	(0.203)	**(0.013)**	(0.451)	**(0.018)**
4 Median	1.068	1.152	**1.160***	0.867	0.922	**1.101***	0.871	**1.150***
5 (P-value Median=1)	(0.276)	(0.249)	**(0.094)**	(0.363)	(0.767)	**(0.054)**	(0.932)	**(0.047)**
Panel C: Exogenous Turnovers with High Biographical differences and Low Compensation differences								
1 N	30	30	30	30	30	30	30	30
2 Mean	**1.403****	**1.389****	**1.570*****	1.261	1.171	**1.758****	1.188	**1.372***
3 (P-value Mean=1)	**(0.026)**	**(0.034)**	**(0.004)**	(0.164)	(0.032)	**(0.016)**	(0.266)	**(0.053)**
4 Median	**1.391***	**1.269***	**1.596*****	0.766	1.040	**1.342****	0.863	1.151
5 (P-value Median=1)	**(0.054)**	**(0.069)**	**(0.008)**	(0.504)	(0.465)	**(0.039)**	(0.745)	(0.111)
Panel D: Exogenous Turnovers with High Biographical differences and High Compensation differences								
1 N	31	31	31	31	31	31	31	31
2 Mean	**1.517****	**1.401****	**1.461****	**1.506****	1.276	**1.769****	1.174	1.281
3 (P-value Mean=1)	**(0.016)**	**(0.036)**	**(0.016)**	**(0.045)**	(0.123)	**(0.035)**	(0.430)	(0.242)
4 Median	**1.362***	**1.183***	**1.394****	**1.097***	1.027	1.183	0.718	1.008
5 (P-value Median=1)	**(0.052)**	**(0.066)**	**(0.030)**	**(0.055)**	(0.410)	(0.112)	(0.518)	(0.739)

Table 5. Summary statistics

Bank-level data for 1992-2016 are from form FR Y-9C of the Consolidated Financial Statements published by the Board of Governors of the Federal Reserve System with references to data mnemonics displayed. Data on changes in the state-level enforcement of non-compete agreements are from Germaise (2011) and Tang, Wang and Zhou (2021) for post-2013 coverage. Changes in risk are absolute year-on-year changes for eight bank risk variables (Volatility ES, MES, NPL, Leverage, Non-interest income, Gap12, Non-deposit funding).

Variable Name	Definition	N	Mean	St.Dev	Median	P1	P99
Panel A: Manager Mobility							
Increase mobility$_t$	Equals 1(-1) for banks located in a state and year during which the state increased (reduced) manager mobility by loosening (tightening) the enforceability of non-compete clauses. For all other bank-year observations, Increase mobility is 0.	1,729	0.018	0.378	0.000	-1.000	1.000
Panel B: Changes in Risk							
abs(Change in Volatility)	Absolute change in Volatility from t to t+1	1,729	0.007	0.009	0.004	0.000	0.048
abs(Change in ES)	Absolute change in ES from t to t+1	1,729	0.015	0.020	0.009	0.000	0.102
abs(Change in MES)	Absolute change in MES from t to t+1	1,729	0.013	0.014	0.008	0.000	0.070
abs(Change in NPL)	Absolute change in NPL from t to t+1	1,729	0.006	0.015	0.002	0.000	0.042
abs(Change in Leverage)	Absolute change in Leverage from t to t+1	1,729	0.008	0.010	0.005	0.000	0.048
abs(Change in Non-interest income)	Absolute change in Non-Interest Income from t to t+1	1,729	0.028	0.035	0.018	0.000	0.168
abs(Change in GAP12)	Absolute change in GAP from t to t+1	1,729	0.061	0.071	0.040	0.001	0.378
abs(Change in Non-deposits funding)	Absolute change in Non-deposit funding from t to t+1	1,729	0.032	0.030	0.022	0.000	0.135
Panel C: Main Controls							
Size$_{t-1}$	Ln of total assets (in constant 2000 $)	1,729	16.486	1.553	16.209	13.950	21.125
Economy$_t$	12-month average of the monthly coincident index at the state level	1,729	136.275	23.721	133.793	99.916	209.412
Panel D: Additional Controls							
Asset Growth $_{(t-1;t-2)}$	Change in the ln of total assets	1,712	4.125	2.248	3.631	1.252	12.211
Charter Value$_{t-1}$	Ratio between the market and the book value of equity	1,729	1.936	0.997	1.733	0.378	5.403
Productivity$_{t-1}$	Ln of the ratio between total assets and total employees	1,727	0.088	0.155	0.052	-0.171	0.708

Table 6. Exogenous Shocks to Managerial Mobility and Changes in Risk

The table relates shocks to manager mobility to absolute change in risk for all banks in Execucomp between 1992 and 2016. *Increase mobility* is 1 (-1) for banks in a state and year during which the state loosened (tightened) the enforceability of non-compete clauses. The analysis is conducted for absolute changes (between years *t* and *t*+1) for eight bank risk variables (Volatility ES, MES, NPL, Leverage, Non-interest income, Gap12, Non-deposit funding). Panel B controls for Asset Growth, Productivity, and Charter Value.

Panel A: Baseline results

	(1) **abs(Change in Volatility)**	(2) **abs(Change in ES)**	(3) **abs(Change in MES)**	(4) **abs(Change in NPL)**	(5) **abs(Change in Leverage)**	(6) **abs(Change in Non-int' inc)**	(7) **abs(Change in Gap12)**	(8) **abs(Change in Non-dep' fund)**
Increase mobility	**0.002*****	**0.003*****	**0.003*****	**0.002****	**0.002*****	0.001	-0.012	0.004
	(0.001)	**(0.001)**	**(0.001)**	**(0.001)**	**(0.001)**	(0.004)	(0.008)	(0.003)
$Size_{t-1}$	0.001***	0.004***	0.001	0.003***	-0.001	0.003	-0.008	-0.009***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.006)	(0.003)
$Economy_t$	-0.000	-0.000*	-0.000*	-0.000*	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.018***	-0.042***	-0.006	-0.019*	0.026	-0.012	0.210**	0.162***
	(0.005)	(0.014)	(0.011)	(0.011)	(0.017)	(0.050)	(0.088)	(0.047)
Observations	1,729	1,729	1,729	1,729	1,729	1,729	1,729	1,729
Number of Banks	162	162	162	162	162	162	162	162
Adjusted R-squared	0.690	0.651	0.618	0.159	0.096	0.112	0.034	0.100
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: with additional controls

	(1) **abs(Change in Volatility**	(2) **abs(Change in ES**	(3) **abs(Change in MES**	(4) **abs(Change in NPL**	(5) **abs(Change in Leverage**	(6) **abs(Change in Non-int' inc)**	(7) **abs(Change in Gap12)**	(8) **abs(Change in Non-dep' fund)**
Increase mobility	**0.001*****	**0.003*****	**0.003****	**0.002****	**0.002*****	0.000	-0.012	**0.004***
	(0.001)	**(0.001)**	**(0.001)**	**(0.001)**	**(0.001)**	(0.004)	(0.007)	**(0.003)**
$Size_{t-1}$	0.001***	0.003***	0.000	0.002**	-0.001	0.003	-0.010	-0.007**
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.007)	(0.003)
$Economy_t$	-0.000	-0.000*	-0.000	-0.000*	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.011*	-0.027*	0.009	-0.015	0.022	-0.008	0.229**	0.134***
	(0.006)	(0.015)	(0.012)	(0.015)	(0.017)	(0.051)	(0.104)	(0.046)
Bank control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,712	1,712	1,712	1,712	1,712	1,712	1,712	1,712
Number of Banks	162	162	162	162	162	162	162	162
Adjusted R-squared	0.694	0.653	0.621	0.165	0.097	0.114	0.037	0.095
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 7. Manager fixed effects in bank risk

Panel A (Panel C) reports manager fixed effects in three-way fixed effect regressions on risk (total compensation) for a connectedness sample. The connectedness sample is based on Abowd, Kramarz, and Margolis (1999) and includes all banks listed in Execucomp that have employed at least one manager who has worked for two or more banks during the sampling period. The analysis is conducted for eight bank risk variables (Volatility ES, MES, NPL, Leverage, Non-interest income, Gap12, Non-deposit funding). F-statistics (p-values in parenthesis) to test if the fixed effects (FE) are jointly significantly differently from zero. In the last row, we compare F-tests based on 1,000 Monte Carlo simulations that randomly assign managers to banks to the actual F-tests. The reported P-values indicate the probability that the simulated F-tests on the joint significance of a manager fixed effect are larger than the actual F-tests in our data. Panel B shows pairwise correlations between the manager fixed effects.

Panel A: How important are bank manager fixed effects in bank risk?

	(1) Volatility	(2) ES	(3) MES	(4) NPL	(5) Leverage	(6) Non-interest income	(7) Gap12	(8) Non-deposit Funding
F-test	1.80*** (0.000)	1.85*** (0.000)	1.41*** (0.000)	2.34*** (0.000)	2.48*** (0.000)	3.85*** (0.000)	2.71*** (0.000)	3.06*** (0.000)
% of explained variance	21.33%	19.45%	13.64%	27.46%	14.70%	40.62%	30.89%	17.67%
H0: Actual F-test <= F-test based on simulations (P-value)	0.001	0.001	0.015	0.000	0.000	0.001	0.001	0.001

Panel B: Pairwise correlations between manager risk fixed effects

	(1) Volatility	(2) ES	(3) MES	(4) NPL	(5) Leverage	(6) Non-interest income	(7) Gap12
ES	0.966***						
MES	0.734***	0.805***					
NPL	0.729***	0.688***	0.499***				
Leverage	0.397***	0.357***	0.403***	0.201***			
Non-interest income	-0.290***	-0.259***	-0.140***	-0.530***	0.142***		
Gap12	-0.474***	-0.435***	-0.369***	-0.593***	-0.360***	0.409***	
Non-deposit funding	0.134***	0.181***	0.504***	0.0910**	0.404***	0.136***	-0.166***

Panel C: How important are bank manager fixed effects in pay?

	(1) Total compensation
F-test	3.89***
% of explained variance	48.29%
H0: Actual F-test <= F-test based on simulations (P-value)	0.000

Table 8. Do manager attributes explain the manager fixed effects?

This Table reports OLS regressions on the estimated bank manager fixed effects in bank risk measures and manager pay. We control for *Male* (via a binary variable), *Depression child* which indicates if a manager was aged between 5 and 15 years during the Great Depression, *MBA* indicates if managers hold a degree from an *Ivy League* university, *Military service* indicates if a manager has served in the military. *Fast track* is the age at which the manager held her first appointment as an executive. We also include the number of board level appointments outside the banking sector (*NonBank experience*) and board-level appointments as an executive only (*NonBank Experience (Ex)*) during a manager's career. Manager pay fixed effect are estimated in a manager's total compensation. Huber White robust standard errors are reported in parentheses. *significant at 10%; ** significant at 5%; *** significant at 1%.

	(1) Volatility	(2) ES	(3) MES	(4) NPL	(5) Leverage	(6) Non-interest income	(7) Gap12	(8) Non-deposit funding	(9) Manager pay fixed effects
Demographics									
Male	-0.006**	-0.011**	-0.005*	-0.008	-0.003	-0.053	-0.008	-0.012	-0.531
	(0.003)	(0.005)	(0.003)	(0.007)	(0.005)	(0.043)	(0.035)	(0.026)	(0.432)
Depression child	-0.009***	-0.013***	-0.006*	-0.037***	-0.009**	0.102***	0.121***	-0.034	-1.474***
	(0.002)	(0.004)	(0.003)	(0.006)	(0.004)	(0.030)	(0.031)	(0.029)	(0.327)
Education									
MBA	-0.001	-0.002	-0.002	0.001	-0.003	-0.019	0.005	-0.017	0.123
	(0.001)	(0.002)	(0.001)	(0.003)	(0.002)	(0.016)	(0.015)	(0.011)	(0.177)
Ivy League	-0.001	-0.000	0.001	-0.003	0.004	0.055***	0.027	0.021	-0.012
	(0.001)	(0.002)	(0.002)	(0.003)	(0.003)	(0.017)	(0.017)	(0.015)	(0.228)
Career and Experience									
Military service	-0.003**	-0.005*	-0.001	-0.015***	-0.003	0.050**	0.071***	-0.002	-0.336
	(0.001)	(0.003)	(0.003)	(0.004)	(0.003)	(0.024)	(0.027)	(0.019)	(0.271)
Fast track	-0.011***	-0.018***	-0.003	-0.049***	-0.008	0.130**	0.132***	0.027	-3.434***
	(0.003)	(0.006)	(0.005)	(0.010)	(0.007)	(0.052)	(0.047)	(0.038)	(0.518)
Recession	-0.000	-0.001	0.000	-0.002	0.002	-0.002	-0.012	0.012	0.037
	(0.001)	(0.002)	(0.001)	(0.003)	(0.002)	(0.017)	(0.015)	(0.012)	(0.172)
Banking crisis	-0.002**	-0.002	-0.001	-0.012***	-0.003	0.025	0.035**	-0.008	-0.618***
	(0.001)	(0.002)	(0.002)	(0.003)	(0.002)	(0.017)	(0.015)	(0.012)	(0.166)
Nonbank experience (Ex)	-0.001	-0.001	0.001	0.001	-0.000	-0.024	-0.054*	0.009	0.433*
	(0.001)	(0.003)	(0.003)	(0.005)	(0.005)	(0.031)	(0.029)	(0.024)	(0.225)
Nonbank experience (Non ex)	-0.003***	-0.006***	-0.003**	-0.012***	0.003	0.067***	0.045***	0.013	0.527***
	(0.001)	(0.002)	(0.001)	(0.003)	(0.003)	(0.017)	(0.015)	(0.013)	(0.185)
Highly Trained Profession	0.003**	0.005*	0.000	0.015***	0.001	-0.056**	-0.053***	-0.004	-0.057
	(0.001)	(0.003)	(0.002)	(0.004)	(0.004)	(0.025)	(0.019)	(0.018)	(0.242)
Other Characteristics									
Manager pay fixed effects	0.002***	0.003***	0.002***	0.003***	0.005***	0.025***	-0.026***	-0.001	
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.005)	(0.004)	
Constant	0.050***	0.083***	0.021	0.200***	0.034	-0.470**	-0.518***	-0.077	13.466***
	(0.013)	(0.026)	(0.019)	(0.038)	(0.027)	(0.201)	(0.182)	(0.147)	(2.005)
Observations	325	325	325	325	325	325	325	325	325
Adj. R^2	0.383	0.285	0.105	0.434	0.178	0.158	0.320	-0.008	0.263

Table 9. Alternatives approaches to estimating manager fixed effects ('styles') in bank risk

This table compares the results to alternative methods of estimating manager fixed effects (FE) in bank policies for a connectedness sample that includes all banks listed in Execucomp that have employed at least one manager who has worked for two or more banks during the sampling period. The results refer to averages across eight bank risk variables (Volatility ES, MES, NPL, Leverage, Non-interest income, Gap12, Non-deposit funding). Row (1) presents three-way fixed effect regressions as in Panel A of Table 7; (2) only includes CEOs and CFOs who move across banks in our sample; (3) applies a two-step Heckman (1979) selection model to control for selection bias (we use the distance from a bank's headquarters to the nearest airport to predict inclusion in the connectedness sample); (4) imposing a minimum number of three moves per connected manager group; and (5) restricts the sample to the single most connected group of managers. The last column reports the average variation in styles explained by observable manager characteristics (we use the same model as in Table 8). Average adjusted R2s are computed across eight bank policy variables.

	# of estimated manager FE	Average % variance explained by manager FE	Average correlation with (1)	Are manager FE statistically significant?	Average Adj R2 from manager traits as in Table 8
Risk and Policy Variables					
(1) Three-way FE on connectedness sample	987	23.22%	-	Yes	23.19%
(2) Including only moving CEOs and moving CFOs	372	19.51%	96.84%	Yes	18.25%
(3) Heckman correction for sampling bias	987	23.57%	99.80%	Yes	23.36%
(4) 3+ movers per connected manager group	671	18.03%	94.19%	Yes	16.44%
(5) Only the largest connected group	419	15.46%	92.18%	Yes	26.98%

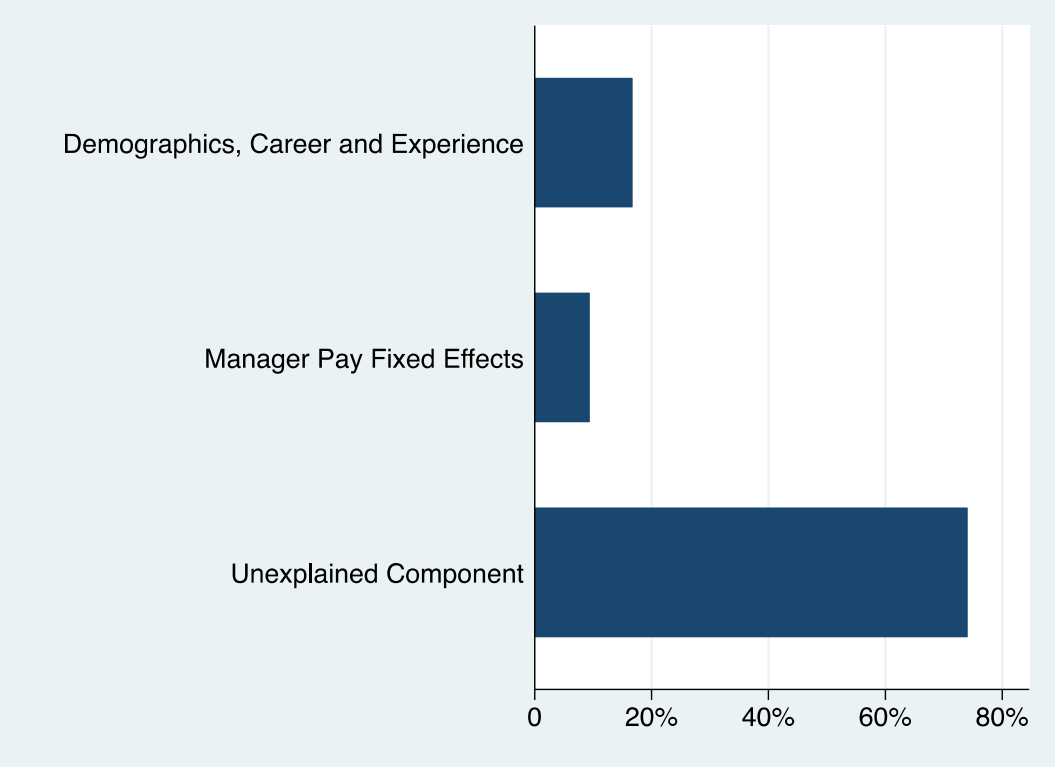

Figure 1: Variance decomposition of manager risk styles

The figure plots the % of total variation in manager fixed effects (styles) in bank risk that is explained by three groups of variables: (i) demographic, career and experience attributes, (ii) manager fixed effects in a manager's total compensation, (iii) and an unexplained component (the residuals). The decomposition is based on OLS regressions estimated for all bank CEOs and CFOs in Execucomp. The numbers show the average % of the variance explained by each group of explanatory variables across eight risk measures (Volatility, ES, MES, NPL, Leverage, Non-interest income, Gap12, Non-deposit funding). The variance decomposition follows Graham et al. (2012). We compute the covariance between the risk variables and each of the three groups of variables, normalized by the variance of styles. The covariance values correspond to the percentages of the variance of the dependent variable (styles) attributable to the group of explanatory variables.