Skilled Labor Risk and Compensation Policies

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Abstract

Many U.S. publicly traded companies discuss potential failure in attracting and retaining skilled labor as a risk factor in their 10-K filings. In this study, we measure firms' exposures to skilled labor risk by the intensity of such discussions in their 10-Ks. We find that this measure effectively captures firm risk due to the mobility of skilled labor. We then examine the impact of skilled labor risk on firms' compensation policies. To overcome the reverse causality potentially present in the equilibrium relation between skilled labor risk and compensation policies, we use housing market factors that affect home owners' mobility as instruments for local firms' skilled labor risk, based on the insight that talents are likely homeowners. Consistent with theories on optimal compensation design in the presence of mobile talents, our results suggest that firms facing higher skilled labor risk use more incentive pay for both top executives and employees below the top rank. Skilled labor risk has a larger effect on compensation structure than on compensation level. The effect is also larger for employees below the top rank than for top executives, suggesting that our measure is more about the mobility of skilled labor in general than that of top executives. Finally, we find that firms facing higher skilled labor risk invest more in strengthening employee relations, but such investment tend to be concentrated in compensation and benefits related dimensions. Our results also suggest that these compensation policies help to mitigate skilled labor risk.

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1. Introduction

In recent decades, human capital has become increasingly important for firm productivity. Both the importance and the inalienable nature of human capital make the attraction and retention of skilled labor ever more crucial in today's businesses. In this paper, we examine firms' exposures to skilled labor risk, that is, the risk of failing to attract and retain skilled labor, and the impact of such risk on corporate compensation policies.

Our approach to identifying firms' exposures to skilled labor risk is motivated by the observation that many U.S. publicly traded companies discuss the potential failure in attracting and retaining skilled labor and key talents as a risk factor in their 10-K filings.[1] There are substantial variations both in the cross section and over time in the intensity of such discussions. We thus measure a firm's skilled labor risk in a year by the number of sentences that the firm spends discussing the reliance on and the retention of skilled labor and key talents in the 10-K.

Theories suggest that skilled labor risk arises from the mobility of skilled labor, which is closely related to their outside options. We thus examine the relation between our measure of skilled labor risk and various proxies for skilled labor's outside options and mobility. First, we examine the effect of labor market competition on firms' skilled labor risk. We find that the intensity of discussion on skilled labor risk in a firm's 10-K filings significantly increases with the number of industry rivals in the local market, which is largely within a 50-mile radius around the firm's headquarters. A one-standard-deviation increase in the number of local industry rivals increases the intensity of discussion by 19% relative to the sample mean. In contrast, the number

[1] For example, Apple stated in its 2012 10-K that "the Company's success depends largely on the continued service and availability of key personnel." A tissue product provider Cybrid, Inc. stated that "If we cannot attract skilled personnel, our operations will likely suffer and any competitive edge that we have in the marketplace will quickly erode." An outdoor equipment manufacturer Johnson Outdoors Inc. stated that "The loss of key personnel, or the failure to attract qualified personnel, could have a material adverse effect on our business, financial condition or results of operations."

of local firms outside the firm's industry does not contribute to the firm's skilled labor risk, neither does the number of industry rivals outside the 50-mile radius. These results suggest that the outside options for skilled labor and key talents are largely industry-specific and local.

If skilled labor's outside options tend to be local, then state regulations and tax policies that affect labor mobility could have a large impact on firms' skilled labor risk. We find that firms headquartered in states with more stringent enforcement of non-compete agreements discuss skilled labor risk less intensively in their 10-Ks, and the discussion is also less sensitive to local labor market competition. If skilled labor and key talents are likely homeowners, then state policies that affect homeowners' mobility could also have unintended consequences on skilled labor risk in local firms. For example, the state and local taxes levied on residential real estate transactions can increase the cost of moving and negatively affect home owners' mobility. Indeed, we find that in states with higher transfer tax rates on housing transactions, households are less likely to move for job-related reasons, and firms' discussion on skilled labor risk in 10-K filings is less intense and less sensitive to local labor market competition.

Attracting and retaining skilled labor may be easier if the firm has access to a larger supply of highly educated labor. We find that firms that have longer average distances to land-grant universities, which are major sources of educated labor, tend to discuss skilled labor risk more intensively. Although firms endogenously choose their headquarters locations based on the demand for highly educated labor, our estimations suggest that the supply effects dominate.

Since our skilled labor risk measure is based on firms' risk-related disclosure, we further address the possibility that the cross-sectional variation in our measure simply reflects the variation in firms' disclosure style (more disclosure vs. less disclosure). We compute "*Non-Skilled-Labor-Related Discussion*" as the number of sentences not specific to skilled labor risk in the relevant

sections of a firm's 10-K, which should have information about the firm's disclosure style as well as its general risk profile (Campbell et al. (2014)). We find that our results cannot be explained away by the firm's disclosure style, and that the bulk part of the information content in the skilled labor risk measure is not captured by the firm's general risk disclosures.

Overall, the evidence suggests that our skilled labor risk measure does contain useful information about firms' exposures to risk arising from the mobility of their skilled labor. For firms that more intensively discuss the attraction and retention of skilled labor as a risk factor, the participation constraints of their key employees are more likely to be binding.

Compensation policy is perhaps the most relevant corporate policy for the attraction and retention of skilled labor. Theories suggest that the optimal compensation contract for key talents should be sensitive to their time-varying outside options (see, e.g., Oyer (2004) and Lustig, Syverson, and Van Nieuwerburgh (2011)). These theories suggest that the optimal compensation contract in the presence of mobile talents involves more incentive pay, which gives the key talents a larger share of the cash flows in higher productivity states when the talents' outside options are higher. Thus, we expect firms facing higher skilled labor risk to structure their compensation contracts for key talents more towards incentive pay and away from cash pay. Edmans et al. (2012) proposes a dynamic optimal compensation contract that features gradual vesting of equity, which helps to align the manager's interest with that of shareholders in future periods and deter managerial short-termism. Since managerial turnover may reflect or result from substantial managerial incentive misalignment and short-termism, time-vesting of equity should help to retain mangers. Forfeiture of unvested equity also increases the cost of pursuing outside options. Thus, we expect firms facing higher skilled labor risk to give their key talents longer compensation duration with gradual vesting of incentive compensation.

However, empirical tests of these theoretical predictions face a challenge. If a compensation structure is effective at attracting and retaining key talents, then we expect firms with such compensation structure to have lower skilled labor risk. This reverse causality implies that the OLS estimates of the effects of skilled labor risk on compensation structure could be biased towards zero. To overcome this challenge, we consider two instruments for firms' skilled labor risk based on the insight that talented labor are likely to be homeowners and thus their mobility is affected by policies and housing market conditions that affect homeowners' mobility. One instrument is the historical real estate transfer tax rate in a firm's headquarters state at the beginning of our sample period. The other one is the local (MSA level) home equity shock driven by the national house price changes and the local topological elasticity of housing supply. Both instruments significantly affect mobility of homeowners and thus firms' skilled labor risk, and both are reasonably exogenous to firms' compensation policies for talents.

We find that the OLS estimates of the effects of skilled labor risk on the incentive structure of compensation are indeed close to zero for both top executives and employees below the top rank, while the instrumental variable estimates are larger, statistically significant, and consistent with the theoretical predictions. For example, when using the historical real estate transfer tax rate as the instrument, a one-standard-deviation increase in *Skilled Labor Risk* would increase the top executive team's average incentive pay to total pay ratio by about 27% and the pay duration by 24% relative to the sample mean, and would increase the average incentive pay ratio by 53% relative to the sample mean for employees below the top rank. Furthermore, skilled labor risk has a larger effect on compensation structure than on compensation level, suggesting that the structure potentially plays a more important role than the level in talent retention. For both compensation structure and level, the skilled labor risk effect is larger for employees below the top rank than for

top executives, suggesting that our skilled labor risk measure is more about mobility of firms' skilled labor in general than about top executive mobility. Lastly, we find that firms facing higher skilled labor risk also tend to invest more in strengthening employee relations, but such investment tend to be concentrated in employee compensation and benefits related dimensions. The 2SLS estimation using the home equity shock as the instrument yields similar results, even though the two instruments capture different sources of variation in skilled labor mobility. This gives us confidence that our identification strategy is sensible.

This study contributes to a growing strand of research in the labor and finance literature, which not only highlights the increasing importance of skilled labor and key talents in production, but also analyzes its implications for firm risk (e.g., Eisfeldt and Papanikolaou (2013), Ochoa (2013), Belo et al. (2016), and Israelsen and Yonker (2015)), firm value (e.g., Eisfeldt and Papanikolaou (2014)), compensation design (e.g., Oyer (2004) and Lustig, Syverson, and Van Nieuwerburgh (2011)), and capital structure (e.g., Baghai et al. (2016) and Klasa et al. (2016)). We construct a new firm-level measure of skilled labor risk using firms' own discussions on this issue in their annual filings. There are three existing measures related to firms' skilled labor risk. One is the measure of organizational capital based on firms' Selling, General, and Administrative (SG&A) expenses (Eisfeldt and Papanikolaou (2013)). Another measure is based on a firm's disclosure on "Key Man Life Insurance", which insures the firm against losses from losing certain key talents due to deaths (Israelsen and Yonker (2015)). The third one measures an industry's reliance on skilled labor based on the skill level required for each occupation in an industry (Belo et al. (2016)). We think that a key advantage of our measure relative to these related measures is that it more effectively captures firm risk due to the *mobility* of skilled labor, which allows for better understanding of skilled labor's outside options and factors that affect their mobility. Our

approach also provides a way to capture skilled labor risk in all firms, and thus can potentially provide a more complete understanding of such risk. For example, public and academic discussions on skilled labor risk tend to focus on high-tech R&D intensive companies. Yet little is known about traditional low-tech companies' exposures to skilled labor risk. Our measure suggests that skilled labor risk is pervasive in the economy, and the within-industry variation in firms' skilled labor risk is much larger than the cross-industry variation.

Our study also contributes to the literature on optimal compensation design by providing the first direct evidence for contract theories in which the agent's outside option and mobility are a key determinant of the optimal compensation contract. Our findings suggest that when skilled labor are more mobile, the compensation contracts do feature higher incentive and longer duration, and these pay features play a role in mitigating skilled labor risk. Three recent studies also provide evidence suggesting that equity-based compensation matters in retaining employees. Aldatmaz, Ouimet and Van Wesep (2016) finds that broad-based employee stock option grants temporarily reduce rank-and-file employee turnover during the vesting periods. On the top executive side, Jochem, Ladika and Sautner (2016) identifies the retention effect of unvested CEO stock options, exploiting a unique regulatory change that leads to sudden elimination of CEO stock option vesting periods in some firms. Gao, Luo, and Tang (2015) find that firms tend to increase equity-based pay for incumbent executives after losing top executives to other firms. Our study complements these studies by providing evidence on the *ex ante* compensation design for firms facing high skilled labor risk.

The rest of the paper is organized as follows. Section 2 presents the construction of our skilled labor risk measure and discusses its advantages and potential concerns. Section 3 presents comprehensive analysis on the information content of our skilled labor risk measure by relating it

to proxies of skilled labor mobility and supply. Section 4 examines the effect of skilled labor risk on corporate compensation policies. Section 5 concludes.

2. Skilled Labor Risk

2.1 Measuring Skilled Labor Risk

We define skilled labor risk as the risk of failing to attract and retain skilled labor. To quantify firms' exposures to skilled labor risk, we develop a measure based on the textual analysis of firms' discussions on risk related to skilled labor in their 10-K filings in the SEC's EDGAR database from 1996 to 2014. The relevant discussions have been mainly in Item 1A (Risk Factors) since December 1st, 2005 when the SEC Regulation S-K Item 305(c) required U.S. publicly traded companies to explicitly discuss risk factors for investors in 10-Ks. Before this regulation, the discussions on skilled labor related risk were mainly in Item 1 (Business) and Item 7 (Management's Discussion and Analysis). As a result, we focus on these three items in 10-Ks to develop our measure.

Based on our reading of 300 randomly selected 10-K files, we develop the following three keyword lists:

(1) "essential", "key", "core", "important", "skilled", "skillful", "trained", "experienced", "talented", "qualified";

(2) "worker", "(eligible) employee", "personnel", "colleague", "team member", "individual", "people", "specialist", "labor", "(professional) staff", "professional", "workforce", "scientist", "technician";

(3) "recruit(ing)/attract(ing) and/or retain(ing)", "retain(ing) and/or recruit(ing)/attract(ing)", "research profession", "scientific personnel", "effective/quality employee".[2]

Following Kravet and Muslu (2013), we use sentence rather than word as the analysis unit. We develop a Perl code to parse each of the three 10-K items into sentences and a sentence is defined to mention risk related to skilled labor if it contains a combination of a word in list (1) and a word in list (2) or it contains any phrase from list (3). For the first two phrases in list (3), we do not combine them with the keywords in lists (1) and (2) since firms sometimes do not mention skilled labor risk in this specific way.[3] In order to mitigate the concern that we extract sentences including any of the first two phrases in list (3) but are not related to skilled labor risk, we further exclude the hits if the noun following the phrases is "customer", "supplier", "client", "contract", "creditor", "investor", "business", "segment", "subscriber", "right" or all possible plural forms of these words to make sure that we mainly capture the discussions on attracting and retaining key employees. For all the adjective words in lists (1) and (3), we also exclude the hits that include the negative prefixes.[4]

To check the validity of our approach, we ex post randomly select 300 10-K files and manually verify whether the extracted sentences correctly identify the disclosure of risk related to skilled labor. The validation process shows that 1,340 of the 1,440 randomly selected sentences correctly identify the risk according to our definition, implying a success rate of 93.06% for our algorithm.

[2] For "employee" in the list (2), we further require that "defined/pension/retirement benefit(s)" do not follow "employee". For "personnel" or "specialist", we allow one to three words between the word from the list (1) and "personnel" or "specialist". For "labor" in the list (2), we further exclude the cases in which "atory" or "atories" follow "labor".

[3] For example, the fiscal year 2005 10-K filing of the company HEARUSA INC states that "If we are not able to attract and retain qualified audiologists, we will be less able to compete with networks of hearing aid retailers or with the independent audiologists who also sell hearing aids and our business may be adversely affected." The combination of the first two phrases in the keyword list (3) with the keyword lists (1) and (2) will fail to capture such disclosure.

[4] For example, we exclude the hits that contain "unskilled labor".

Finally, we define "*Skilled Labor Risk*" as the total number of sentences including the keywords related to skilled labor risk in all three 10-K items. In Figure 1, we present the time-series trends of *Skilled Labor Risk* in each fiscal year. The figure shows that the average intensity of the discussions on skilled labor risk increased substantially over time, from about one sentence in 1996 to five sentences in 2013. There is a large jump in the intensity of the skilled labor risk discussions in fiscal year 2005 when the SEC regulation required all firms to discuss risk factors in their 10-Ks. This suggests that the mandatory requirement of the discussion on risk factors prompts firms to explicitly acknowledge skilled labor risk. The summary statistics for *Skilled Labor Risk* are presented in Table 1. The sample firms on average spend about three sentences on skilled labor risk in their 10-Ks.

In Table 2, we present the ten SIC2 industries with highest (Panel A) and lowest (Panel B) skilled labor risk in fiscal year 2013 based on the employment-weighted average *Skilled Labor Risk*.[5] The results show that various service industries that heavily rely on human capital are among the industries with the highest skilled labor risk. Petroleum and coal products, paper products, wholesale and food industries are among the industries with the lowest skilled labor risk. The results in Table 2 are largely consistent with our prior about the differential reliance on skilled labor across industries. Furthermore, industries with high skilled labor risk are not limited to high-tech R&D-intensive industries. Our measure, applicable to *all* firms, can potential provide a more complete understanding of skilled labor risk in the economy. Finally, we find that the within-industry variation in *Skilled Labor Risk* is almost six times of the cross-industry variation, which is why we mostly focus on understanding the former in our analysis.

2.2 Relation to Related Measures and Advantages

[5] To make sure that statistics in Table 2 is not driven by the small number of firms in each industry, we require the number of firms in each industry to be at least 20 to be included in this analysis.

There are three existing measures that are related to firms' skilled labor risk. The first one is a measure of organizational capital based on firms' SG&A expenses (Eisfeldt and Papanikolaou (2013)). The authors define organizational capital as a production factor that is embodied in a firm's key talents, and measure the stock of *Organizational Capital* by cumulating firms' SG&A expenses using the perpetual inventory method. SG&A expenses are relevant to capturing the flow to organizational capital because a part of SG&A represents the labor related expenses (e.g., white collar wages, training). Two recent studies, however, recognize some shortcomings of the SG&A based measure due to the way Compustat reports the SG&A item (Falato et al. (2013) and Peters and Taylor (2016)). First, the SG&A reported in Compustat (item *xsga*) includes R&D expense (item *xrd*). Second, a large fraction of the reported SG&A in Compustat represents operating costs that are unrelated to the investments in organizational capital. For the expenses that are related to organizational capital investments, they reflect not only investments in employee training but also expenses in advertising, marketing and commissions. Peters and Taylor (2016) modify the organization capital measure by replacing SG&A with 0.3*(*xsga-xrd*).

The second measure is based on firm's disclosures on the "Key Man Life Insurance" in corporate filings, which insures the firm against losses from losing certain key talents due to deaths (Israelsen and Yonker (2015)). The authors create dummy variables to identify both firms that mention but do not necessarily carry such insurance in 10-K filings (*Mention Key Man Insurance*) and those that actually carry such insurance on key employees (*Carry Key Man Insurance*).

The last measure is the industry-level labor skill measure, *Industry-level Skilled Labor Reliance*, developed in Belo et al. (2016). The authors use the information on the skill level required for each occupation and calculate the fraction of high skilled labor in an industry as a proxy for the reliance on skilled labor in the industry.

Table 3 presents both the pairwise and the Spearman rank correlation matrices for our skilled labor risk measure and these related measures. For the correlations between any firm-level skilled labor risk measure and *Industry-level Skilled Labor Reliance,* we first calculate the average of the firm-level measure in each industry-year and then calculate the correlations at the industry-year level. The results show that our skilled labor risk measure is strongly and positively correlated with the industry-level measure of skilled labor reliance and firms' tendency to discuss key man life insurance in corporate filings. The correlation with the SG&A based organizational capital measures is, however, weaker.

A potential advantage of our skilled labor risk measure relative to these related measures is that it can better capture skilled labor risk due to the *mobility* of skilled labor. Intuitively, firms that intensively discuss the attraction and retention of skilled labor as a risk factor are likely those for which skilled labor are not only important but their participation constraints are also likely binding. The industry-level occupation-skill based measure focuses mainly on the reliance of labor skill. The key man life insurance is more about risk of losing key employees due to deaths than due to their mobility. The SG&A based measure seems to be an indirect measure of a firm's reliance on skilled labor and is unlikely to pick up the risk due to skilled labor mobility. We provide explicit comparison on each measure's sensitivity to skilled labor mobility in Section 3.3.

2.3 Potential Issues

Since our measure is based on corporate disclosures, it can be subject to the concern that corporate risk disclosures are driven more by disclosure regulations or firms' disclosure styles than firms' actual risk exposures. In the time series, there is a general trend for more disclosures in 10-Ks over time, driven by either the increase in mandated disclosures or investors' preference for more corporate disclosures over time. In the cross section, some firms may be more thorough in

their disclosures than others, and may have longer discussions on every risk factor than other firms with similar risk exposures.

The evidence in Campbell et al. (2014) to some extent mitigates the above concern. The authors show that the disclosures in the "Risk Factors" section in 10-K filings are informative about actual firm risk. Firms provide longer discussions on risk factors when they face greater risk, and the type of risk a firm faces determines the discussion intensity for that risk type. In Section 3, we provide comprehensive evidence that our measure is indeed informative about the risk of losing or failing to attract skilled labor.

3. Information Content of the Skilled Labor Risk Measure

In this section, we examine the information content of our skilled labor risk measure by examining its relation to probability of skilled labor turnover in the firm and various factors that affect the mobility and supply of skilled labor in the firm's headquarters region. We also control for a firm's disclosure on risks not related to skilled labor to address the potential concern that the variation in our measure reflects variation in firms' disclosure styles rather than true exposures to skilled labor risk. Finally, we examine the impact of a major disclosure regulation on the information content of our measure and relate the measure to standard notions of firm risk and risk management.

We first examine whether firms with higher skilled labor risk tend to experience more frequent skilled labor turnover. We focus on the turnover of one group of key talents in the firm, CEO and other top four executives in terms of total compensation, as the information about them are readily available via the Execucomp and Capital IQ databases. Note that our algorithm described in Section 2 does not pick up discussions directly about executive turnovers, and thus

the relation between *Skilled Labor Risk* and realized executive turnover is not mechanical. We relate *Skilled Labor Risk* in year *t* to executive turnovers in the firm in the past three years (including year *t*) and in the next three years. The results are reported in Table 4. We find that firms with more intense discussions about skilled labor risk in year *t*'s 10-K tend to be those that have experienced executive turnovers in the recent past, and they are also more likely to experience executive turnovers in the near future. The results suggest that our skilled labor risk measure does respond to a firm's realized or potential failure of retaining key talents.

The results in Table 4 Panel A also suggest that a set of firm characteristics are related to firms' skilled labor risk. Appendix A presents the definitions of all variables. Larger but younger firms tend to have higher skilled labor risk. Growth opportunities are also associated with higher skilled labor risk, no matter whether we measure growth opportunities by the market-to-book equity ratio, sales growth rate, R&D intensity, or capital investment. Firms with more volatile sales also tend to have higher skilled labor risk.

Next, we examine the relation of our skilled labor risk measure with regional forces that affect the mobility and supply of skilled labor.

3.1 Mobility of Skilled Labor

The mobility of skilled labor is closely related to their outside options, which are influenced by labor market competition as well as various state policies that restrain or facilitate skilled labor's ability to pursue their outside options.

3.1.1 Labor Market Competition

We expect a firm's exposure to skilled labor risk to increase when skilled labor's outside option set expands, that is, when the labor market competition for talents is more intense. To gauge the size of the labor market pool relevant for the competition of key talents, we consider both the

industry dimension and the geography dimension. Are the desired skills in key talents industry-specific or general? How constrained is the mobility of skilled labor by geography? To answer these questions, for each firm we consider industry rivals and non-industry rivals with varying distances to the firm's headquarters as the potential set of outside options for key talents. To gauge the relevant size of locality, we use the headquarters address extracted from a firm's 10-K filings to determine the latitude and longitude of its location, and then use different mileage radius around the headquarters: within 50 miles, between 50 and100 miles, between 100 and 200 miles, and outside 200 miles. *"# of Industry Rivals (m mi radius)*" counts the number of publicly traded firms in the same 2-digit SIC (SIC2) industry and within an *m*-mile radius from the firm's headquarters location. Similarly, "*# of Non-Industry-Rivals (m mi radius)*" counts the number of publicly traded firms outside the firm's industry in an *m*-mile locality around the firm. Table 1 presents the summary statistics for the labor market competition measures.

In Table 5, we present the estimated relation between measures of labor market competition and firms' skilled labor risk. All the measures of labor market competition are scaled by their standard deviations to facilitate comparison of marginal effects across variables and across regressions. The results suggest that the outside option set most relevant to a firm's skilled labor consists of industry rivals located within a 50-mile radius of a firm's headquarters. Based on the estimates in column (1), a one-standard-deviation increase in the number of local rivals increases the firm's skilled labor risk by 19% (=0.58/3.01) relative to the sample mean. However, the number of distant industry rivals does not contribute to the firm's skilled labor risk, suggesting that the most relevant labor market pool for a firm's skilled labor tends to be in the commutable zone around the firm's headquarters. The number of firms outside the firm's industry, no matter local

or distant, also does not contribute to the firm's skilled labor risk. These results suggest that the desired skills from skilled labor tend to be industry-specific rather than general across industries.

The estimates in columns (2)-(4) suggest that the pattern is robust to controlling for industry fixed effects, industry-state fixed effects and firm fixed effects. In addition, in Appendix B we consider alternative industry classifications (SIC3, Fama-French 48, Hoberg-Phillips peer firms (Hoberg and Phillips (2010)) as well as alternative measures for local labor market competition. Overall, the results suggest that our skilled labor risk measure is robustly sensitive to local labor market competition.

3.1.2 State Non-Compete Agreements

Non-compete agreements prohibit employees from joining or starting rival companies and therefore restrict employees' outside options. If skilled labor risk is related to key employees' mobility, then we expect firms headquartered in states with stronger enforcements of the non-compete agreements to be less concerned about losing their key talents. Furthermore, a firm's skilled labor risk should also be less sensitive to the local labor market competition when the non-compete agreements are more strongly enforced at the state level.

Although the majority of states recognize various formats of non-compete agreements, the enforcement levels vary across states. The data on the enforcement index of non-compete agreements at the state level come from Garmaise (2011) and are available between 1994 and 2004. For years after 2004, we impute the enforcement index using the values in 2004.

Table 6 presents the results. In columns (1) and (2), we use the data from 1996 to 2004. The estimation in column (1) shows that firms' skilled labor risk is lower in states with stronger enforcement of the non-compete agreements. The estimates suggest that a one-standard-deviation increase in the enforcement index of non-compete agreements is associated with a 7.7% (= (-

0.125×1.854)/3.01) decrease relative to the sample mean in a firm's skilled labor risk. In column (2), we examine the interaction effect between the non-compete agreements enforcement index and local labor market competition. The interaction effect is negative and significant, which suggests that a firm's skilled labor risk becomes less sensitive to the local labor market competition when the state-level enforcement of non-compete agreements is stronger. In column (3), we impute the non-compete enforcement index data after 2005 with the value in 2004 and estimate the specification in column (2) using the full sample and the results are similar.

Another related state policy is the Inevitable Disclosure Doctrine (IDD), which is a legal doctrine adopted by a state court that can prevent a firm's former employee from working for a rival firm if this would "inevitably" lead the employee to disclose the firm's trade secrets to the rival. The IDD may further restrain the mobility of key talents beyond the effects of the non-compete agreement because it is applicable even if the employee does not sign a non-compete or non-disclosure agreement with the firm. However, there is no consensus in the current literature about the key state court rulings that led to material changes in the recognition of the IDD. For example, the court rulings on the IDD identified by Klasa, et al. (2016) are not consistent with those identified by Flammer and Kacperczyk (2016). We thus present only some preliminary results regarding the relation between the IDD adoption (rejection) and our skilled labor risk measure in Appendix C.

3.1.4 Residential Real Estate Transfer Tax

Residential real estate transfer taxes are taxes imposed by states, counties and municipalities on the transfer of the title of real property within the jurisdiction. Although these taxes are not levied with the purpose of regulating skilled labor mobility, they could have an impact on it by affecting the cost of moving for skilled labor, who are likely home owners.

The data on the residential real estate transfer tax rate come from the Thomson Reuters Checkpoint and the Lincoln Institute of Land Policy, and are available for most of the states between 1996 and 2014.[6] If a state has both deed recording tax and mortgage recording tax, then we aggregate these two types of tax and calculate the transfer tax rate as the ratio of transfer taxes paid to the house value, assuming that the mortgage value is 80% of the house value. For the majority of the states, the transfer tax rate is independent of the house value. However, the transfer tax rate is progressive in Connecticut, Hawaii (since 2005), New Jersey, New York and Vermont. For these five states, we assume that the house value is $1 million and calculate the transfer tax rate. But the results are robust to other house value assumptions (e.g., $0.4 million or $0.8 million).

In Panel A of Table 7, we first confirm that transfer taxes indeed affect the mobility of households. We utilize the data from the Annual Social and Economic Supplement (ASEC) of the Current Population Survey (CPS) from 1997 to 2015. The data provides information on whether a person changed residence since the previous year. If a person moved, the reason for moving is also available in four categories: job, housing, family, and others. In all estimations, we focus on people who are household heads with age between 18 and 60 (i.e., the working age), and control for personal characteristics, state of residence conditions and year fixed effects. The standard errors are clustered by state. [7]

The estimations in Panel A of Table 7 show that the probability of household moving decreases when the state and local transfer tax rate is higher. All dependent variables are scaled by their own sample means to facilitate comparison of effects across regressions. A one-percentage-point increase in the transfer tax rate is associated with an 9% decrease relative to the sample mean

[6] The data from the Lincoln Institute of Land Policy is available at: https://www.lincolninst.edu/subcenters/significant-features-property-tax/Report_Real_Estate_Transfer_Charges.aspx. We do not have the transfer tax rate information for Alabama, Arkansas, Washington D.C., Delaware, Georgia, Hawaii, Kansas, Nebraska, New Jersey, Nevada, Ohio, South Carolina, and South Dakota in 1996 and Georgia in 1999.

[7] The estimations are similar if we perform all the analysis in this table at the state-year level rather than the person-year level.

in the overall probability of moving. Among the four main reasons for moving, transfer tax has the largest effect on job-related moving (a 13% decrease in the probability relative to the sample mean). One stylized fact, which is also evident in Panel A, is that people with high education (college degrees or above) are more likely to have job-related moving. Column (3) shows that the effect of transfer tax on job-related moving for highly educated households doubles that for less educated households. If skilled labor are likely to be highly educated homeowners, then transfer tax could be a meaningful constraint on their mobility. Overall, the results in Panel A suggest that transfer taxes on residential housing transactions do affect the mobility of households and particularly the job-related mobility for highly educated people.

Given the effect of real estate transfer tax on household mobility, we expect firms headquartered in states with higher transfer tax rates on residential housing transactions to mention less about skilled labor risk in 10-Ks. The results in Panel B of Table 7 suggest that this is indeed the case. The estimation in column (1) shows that skilled labor risk is lower when the state transfer tax rate is higher. In particular, a one-standard-deviation increase in the transfer tax rate is associated with an 11.0% (-0.472*0.7/3.01) decrease in skilled labor risk relative to the sample mean. In column (2), we estimate the marginal effect of the transfer tax rate on the sensitivity of skilled labor risk to local labor market competition. The result suggests that skilled labor risk is less sensitive to local labor market competition for firms headquartered in states with higher transfer tax rates on residential housing transactions.

The transfer tax rates are stable over time. During our 18-year sample period that covers multiple economic recessions and expansions, only 13 states and the District of Columbia changed their transfer tax rates. In column (3) of Panel B we further control for state fixed effects to isolate the effect of changes in transfer tax rate on changes in firms' skilled labor risk. The results show

that transfer tax rates are still negatively related to skilled labor risk, although we don't have enough power to identify a statistically significant effect. However, the interaction term between transfer tax rate and local labor market competition still has a negative and significant effect on skilled labor risk. In column (4), we use the 1997 transfer tax rates instead of the contemporaneous rates. [8] The magnitudes of the estimated effects are very similar to those in column (2), suggesting that the cross-state variation in the 1997 transfer tax rates already captures the bulk part of the variation in transfer tax rates that is relevant for skilled labor risk.

In Panel B we further control for the home ownership rate in a state for two reasons. First, Panel A of Table 7 suggests that home owners are significantly less likely to move, regardless of the reason for the move. Second, the state real estate transfer tax rate could be a function of the state's home ownership rate and we want to identify the effect of the tax policy beyond that of home ownership. The data on home ownership rate at the state level come from the United States Census Bureau.[9] We find that the state home ownership rate is negatively and significantly related to firms' skilled labor risk, consistent with the finding in Panel A that home ownership decreases labor mobility.

Overall, the estimations in Tables 5-7 suggest that the firm-level skilled labor risk is related to key talents' mobility. Firms discuss such risk less intensively in annual reports when labor market competition is less intense and when state policies that intentionally or unintentionally restrain labor mobility are stronger.

3.2 Supply of Educated Labor

[8] We do not use the 1996 transfer tax rates because there are several states for which we do not have information about the 1996 rates.

[9] The data on home ownership rate at the state level are available at http://www.census.gov/housing/hvs/data/ann15ind.html.

The risk of failing to attract and retain skilled labor should also depend on the supply of educated labor. We thus examine whether firms discuss risk related to skilled labor less intensively in 10-Ks when the educated labor supply increases. We use three measures for the supply of educated labor. The first two measures represent each firm's average distance to land-grant universities and colleges, which are major sources of supply for educated labor. In particular, for each firm we calculate the average distance between the firm's headquarters and the land-grant institutions in the U.S. and the average distance between the headquarters and the land-grant institutions in the headquarters states. The land-grant universities and colleges are identified using the classifications in 1862 and 1890 and there are 73 land-grant universities in total.[10] The third measure for the supply of highly educated labor is the number of higher education institutions per one-million-population in each state. The number of higher education institution data come from the National Center for Education Statistics.[11]

Table 8 presents the results. The estimations in columns (1) and (2) show that when a firm's average distance to land-grant universities and colleges increases, the firm is more concerned about the risk related to skilled labor. Based on the estimate in column (1), when the average distance to all land-grant universities and colleges in the U.S. increases by 100 miles, the firm's skilled labor risk increases by about 4% relative to the sample mean. Column (3) shows that the number of higher education institutions per one-million population in a state does not have additional power in explaining the firm-level skilled labor risk beyond the other determinants.[12]

A firm may endogenously choose the headquarter state based on its demands for highly educated labor. Therefore, the OLS estimations in Table 8 present the equilibrium effects and

[10] The information about land-grant universities and colleges are available from the United States Department of Agriculture at http://nifa.usda.gov/sites/default/files/resource/lgu_map_6_25_2014_0.pdf
[11] The data is available at http://nces.ed.gov/ipeds/datacenter/DataFiles.aspx
[12] We do not control natural logarithm of population at the state level since this variable is highly correlated with this measure for the educated labor supply.

could be biased towards zero when estimating the supply effects of educated labor. The results, however, suggest that the supply side effects dominate the demand side effects.

3.3 Advantages over Existing Related Measures

In Table 9, we compare the sensitivities of various measures related to skilled labor risk to skilled labor mobility and supply. Each measure is scaled by its sample mean to facilitate comparison across measures. The results show that in general, the two *Organizational Capital* measures and the two measures based on firm disclosure of Key Man Life Insurance are either insignificantly correlated with skilled labor mobility and supply or significantly correlated with them in unexpected ways. Overall, the results in Table 9 suggest that compared with existing related measures, our measure better captures firm risk due to mobility of skilled labor and the lack of supply of educated labor.

3.4 Addressing Other Potential Concerns

As we have discussed in Section 2.3, the time-series variation in our skilled labor risk measure may reflect the general trend for more disclosures in 10-Ks over time, and the cross-sectional variation may be driven by different corporate disclosure styles. The fact that our measure is sensitive to various proxies of skilled labor mobility and supply suggests that it does have relevant information content. Here we further address the concern in the following ways.

First, in all regressions, we include year fixed effects, which means that our results essentially explain the variation in skilled labor risk across firms in a given year and mitigates the effect of the time trend in disclosure length on the results.

Second, we create a variable "*Non-Skilled-Labor-Related Discussion*" to capture the number of sentences unrelated to skilled labor risk in the relevant sections of a firm's 10-K. The length of a firm's general risk disclosure should reflect both time-series trend in disclosure and a

firm's disclosure style. When the *Skilled Labor Risk* measure is positive, the value of this variable equals the total number of sentences in the sections where the firm mentions skilled labor risk minus the number of sentences related to skilled labor risk. When the *Skilled Labor Risk* measure is zero, the value of this variable equals the total number of sentences in "Business" and "Management Discussion & Analysis" for 10-Ks filed before December 2005 and the total number of sentences in "Business", "Risk Factors", and "Management Discussion & Analysis" for 10-Ks filed after December 2005.

Column (1) of Panel A, Table 10 repeats the results in column (1) of Table 9 as the benchmark. In column (2), we control for *Non-Skilled-Labor-Related Discussion* and find that our skilled labor risk measure is still sensitive to proxies of skilled labor mobility and supply, although the magnitude of the sensitivity becomes a bit smaller for all proxies but transfer tax. In column (3), we put *Non-Skilled-Labor-Related Discussion* as the dependent variable. We find that although the real estate transfer tax rate affects skilled labor risk, it has no effect on firms' general risk disclosures. Other proxies of skilled labor mobility and supply do affect firms' general risk disclosures, but the magnitudes of the effects are significantly smaller than those on skilled labor risk. These results suggest that *Skilled Labor Risk* is unlikely to be driven by the firm's disclosure style, and the bulk part of the information content in *Skilled Labor Risk* is not captured by the firm's general risk disclosures.

Third, a major disclosure regulation in our sample period is the Regulation S-K Item 305(c) in December 2005, which mandates the risk factor disclosure in 10-Ks and seems to have led to a jump in our measure of skilled labor risk (see Figure 1). Although this regulation is not about skilled labor risk per se, the mandates likely have prompted firms to put more effort into acknowledging all possible risks. Thus, disclosures of skilled labor risk in firms' 10-Ks before

December 1st 2005 were voluntary and less subject to the boilerplate-disclosure concern, but there could be underreporting of the risk. The disclosures of skilled labor risk after 2005 were less subject to underreporting but could be more subject to the boilerplate-disclosure concern.

In Panel B, we assess the impact of this regulation on the information content of our skilled labor risk measure. Column (1) reports the results for *Skilled Labor Risk* before the regulation and column (2) reports the results after the regulation. The skilled labor risk measure is standardized by the mean value of each period to facilitate comparison of marginal effects. We find that *Skilled Labor Risk* is sensitive to proxies of skilled labor mobility and supply in both sub-sample periods. However, the sensitivity is significantly lower in the post-regulation period, suggesting that the regulation makes the disclosure somewhat less informative about the underlying risk exposure.

Finally, we relate the skilled labor risk measure to standard notions of firm risk and risk management. The results in Panel C of Table 10 suggest that firms with higher skilled labor risk tend to have higher stock return volatility, higher idiosyncratic volatility, and higher equity beta. Those firms also tend to adopt more conservative financial management policies, holding more cash and having lower financial leverage. These results suggest that our skilled labor risk measure does pick up information about firm risk.

4. Skilled Labor Risk and Compensation Policies

4.1 Theoretical Predictions

Compensation policy is probably the most relevant corporate policy for the attraction and retention of skilled labor. Theories suggest that the optimal compensation scheme in the presence of mobile talents should involve more incentive pay (e.g., Oyer (2004) and Lustig, Syverson, and Van Nieuwerburgh (2011)). When the agents' outside options are correlated with the firm's

performance, the compensation contracts would give the agents a larger share of profits in the good states so that the participation constraints can be satisfied. Therefore, we expect the compensation contracts for key talents to be structured towards more incentive pay and less cash pay for firms facing higher skilled labor risk.

A related but distinct contracting device for the retention of key talents is to defer part of the compensation and equity incentive to the future and increase the compensation duration by utilizing gradual vesting of equity (Edmans et al. (2012)). The existence of unvested compensation can help retain key talents by not only better aligning their interests with those of shareholders, but also by effectively increasing the agents' costs of pursuing outside options. Therefore, we expect firms with higher skilled labor risk to increase the duration of compensation for key talents.

4.2 Measures of Compensation Structure

4.2.1 Top Executives

We examine the compensation structure for both top executives and non-executive employees in a firm. The data for executive compensation policies come from both Execucomp and Equilar Consultants (Equilar).[13] For all compensation structure measures, we compute the values for CEO and the average values for the executive team (all executives with reported compensation).[14] We use the fractions of cash pay and incentive pay in total compensation to measure the incentive structure of executive compensation. Cash compensation is defined as the

[13] We obtain the following data from Equilar for fiscal years 2006 to 2013 under the 2006 compensation disclosure regulation: grant date present value of stock awards (calculated by Equilar), option awards (Black-Scholes value), incentive plan awards (target award value), and vesting periods and schedules of each type of awards. Other information on executive compensation is from Execucomp for fiscal years 1996 to 2013. We carefully merge the data between Equilar and Execucomp by firms' names, ticker and executive names. 99.24% of executive-year observations in the Equilar data are successfully matched to Execucomp.

[14] To identify the CEO for each firm-year observation, we first use "CEOANN" in Execucomp. If an executive's "CEOANN" is "CEO", then the person is identified as the CEO for the firm-year. If "CEOANN" is missing for all executives in a firm-year, then we assign the CEO title to the person whose "TITLEANN" contains "CEO" or "CHIEF EXECUTIVE". If still no CEO is identified in a firm-year, then we assign the CEO title to the executive with the highest total compensation.

sum of salary and bonus, and incentive compensation is defined as the sum of grant date value of stock, option and incentive plan awards.

For the compensation duration, we employ the measure developed in Gopalan et al. (2014). For salary and bonus, the vesting period is zero. For stock and option awards, if the vesting schedule is cliff, then the effective vesting period equals the vesting period specified in the contract; if the vesting schedule is graded, the effective vesting period is $\frac{t+1}{2}$, where t is the vesting period specified in the contract. If the vesting schedule is not available in the data but the present value of the awards is non-missing, then we set the effective vesting period as zero. For incentive plan awards, we assume the vesting schedule is cliff, that is, the awards can only be vested at the end of the performance period. We set an executive's compensation duration as zero if Equilar does not have the vesting schedule information for his or her compensation. Thus, an executive's pay duration is the value-weighted average of each compensation component's effective duration.

4.2.1 Employees below the Top Rank

We take two approaches to examine the compensation policy for employees below the top rank. The first one is to construct the average ratio of incentive pay to total compensation for those employees in a similar fashion as we do for top executives. The second one is to examine firms' social investment in employee relations, particularly in employee compensation and benefits.

Under the first approach, the value of total incentive pay for employees below the top rank is proxied by the Black-Scholes value of stock option grants for all employees minus the value granted to top five executives. The data are available from ExecuComp for about 22% of firm-year observations in our sample between 1996 and 2005.[15] For the value of total compensation for

[15] For each option grant, ExecuComp reports the percentage of the grant to an executive in the total options granted to all employees during a fiscal year and such information allows us to estimate the value of option grants to non-executive employees. The estimate of the option grants to employees below the top rank equals to the total value of options granted to all employees minus the value

non-executive employees, ideally we'd like to use the firm-level total labor compensation to estimate it. However, the Compustat item "Staff Expense-Total" ("XLR") is not widely available.[16] To address this issue, we rely on the wage data in the Quarterly Census of Employment and Wages (QCEW) from the Bureau of Labor Statistics, which covers 98% of U.S. jobs. The wage data in QCEW include salaries, bonuses, stock options, profit distributions and other benefits, and are comparable to the total staff expense in Compustat.[17] In particular, for firms that do not report the total staff expense, we estimate their labor compensation in a given year as the product of the firm's own employment and the average private-sector annual wage per employee in the firm's headquarters county and 3-digit NAICS industry in the year.[18] For firms that report total staff expenses, our estimated values and the reported values have comparable distributions and a correlation of 87%.[19] Also, there is on average two (median is one) publicly traded companies in a county-industry bin, accounting for 53% of the total private-sector employment in the bin, suggesting that the county-industry average wage is heavily influenced by the wage paid by local public companies. We then take out the portion that goes to top executives by subtracting the average executive total compensation times five, i.e., assuming five executives for all firms, from the estimated total labor compensation. The average incentive pay to total compensation ratio for non-executive employees equals the ratio of non-chief-executive broad-based stock option value to their total compensation. The correlation between the average incentive pay to total compensation ratio for employees below the top and that for top executives is around 39%.

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of options granted to the top five executives. If the estimated value of option grants to non-executive employees is negative, then we set the value as zero.

[16] The "XLR" data are available for only about 14% of the firm-year observations with the broad-based employee stock option grant values.

[17] The definition is available at https://www.bls.gov/cew/cewfaq.htm#Q16.

[18] To identify a firm's headquarters county, we first extract the 5-digit zip code of a firm's headquarters from its 10-K filing and then match the zip code to the county using the cross walk provided by the Missouri Census Data Center. For cases in which the zip code of a firm's headquarters crosses multiple counties, we calculate the average wage per employee in all counties.

[19] The distribution of the reported labor compensation and that of the estimated values are very similar up to the 99th percentile. The difference is mainly in the top 1 percentile, where the reported values tend to be larger than the estimated ones.

Our second approach is to look into firms' social investment score in the employee relations category. The information is from the MSCI database.[20] MSCI rates a firm's strength in employee relations in 13 dimensions with a rating of 0 (bad) or 1 (good) in each evaluated dimension.[21] "*Total Strengths of Employee Relations"* is defined as the average rating across all evaluated dimensions in the strengths of employee relations and is between 0 and 1. This measure is constructed so that the values are comparable across firms and over time.[22] We further single out four dimensions related to employee compensation and benefits: cash profit sharing, employee involvement (related to employee stock ownership plan), retirement benefits, and compensation and benefits. "*Compensation & Benefits Related Strength*" is the average score in these dimensions, ranging from 0 to 1.

4.3 Empirical Design and Results

To test the theoretical predictions, we face a challenge. If a compensation structure is truly effective at attracting and retaining key employees, then firms using such a structure should be less concerned about losing their key talents, leading to a lower value of *Skilled Labor Risk*. In equilibrium, such reverse causality would dampen the true effect of *Skilled Labor Risk* on compensation structure, making the estimated effects in OLS regressions biased towards zero. We present the OLS results in Table 11 for the executive team (Panel A), for CEOs (Panel B), and for employees below the top rank (Panel C). Indeed, regardless of the facet of the compensation policy,

[20]The database on CSR was originally created by KLD Research & Analytics, Inc. (KLD) in 1991. MSCI acquired KLD in 2010. The matching procedure between the CSR data in MCSI and Compustat is as follows. In the first step, we merge the MCSI data with Compustat using the 8-digit CUSIP, and then for the matched data we manually check whether the corporate names are matched. In the second step, for the MCSI data that cannot be matched to Compustat in the first step, we match them with Compustat using TICKER. Again, for the matched data, we manually check whether the corporate names are matched. Around 74% of firm-year observations in the MCSI database are matched to Compustat.

[21] The 13 dimensions are cash profit sharing, compensation & benefits, controversial sourcing, human capital development, employee involvement, employee relations, employee health & safety, non-layoff policy, retirement benefits, professional development, supply chain labor standards, union relations, and other strengths.

[22] In addition to the data on CSR strengths, MCSI also has data on CSR concerns. Therefore, an alternative measure is the difference between the total number of strengths and the total number of concerns in these four dimensions. However, as discussed in footnote 9 in Flammer and Ioannou (2016), recent research argues that the data on CSR strengths and concerns in MCSI lack convergent validity and, as a result, such methodology is questionable.

all the OLS estimates for the effect of *Skilled Labor Risk* are close to zero and not consistently significant.

To overcome this challenge, we consider two plausible instruments for *Skilled Labor Risk*. The first one is the state real estate transfer tax rate in a firm's headquarters state in 1997. The results in Table 7 suggest that the 1997 transfer tax rate is strongly correlated with a firm's skilled labor risk. The historical housing transfer tax rates can be reasonably exogenous to corporate compensation policies for the following reasons. First, this is a policy directly relevant to residents rather than to businesses, and it is relevant to residents only when they buy or sell houses. Thus, firms are unlikely to sort into different states based on housing transfer tax rates. One may argue that firms could sort into states based on other permanent state characteristics that are correlated with the historical transfer tax rates. We thus examine a kitchen-sink list of firm characteristics that include and go beyond the determinants that have been studied in the executive compensation literature. The results in Appendix D suggests that overall there are no significant differences in firm characteristics between high and low transfer tax states. The exception includes the ratio of intangible assets to total assets and the CEO-Chairman duality, which we control in the 2SLS estimations. Second, being very stable over time, transfer tax rates, particularly the historical rates, are unlikely to be correlated with fluctuations in state economic or fiscal conditions, which may be correlated with firms' profitability and growth and thus compensation structure.

The second instrument is a measure of local home equity shock. Similar to the identification strategy used in Corradin and Popov (2015) and Chetty, Sándor and Szeidl (2016) , we construct "*Home Equity Shock*" to be the yearly percentage change in the national average house price index scaled by the local (MSA-level) topological elasticity of housing supply from Saiz (2010). The idea behind this instrument is that it captures an exogenous change in household

home equity in an MSA, which can affect home owners' mobility and thus firms' skilled labor risk. An increase in the nation-wide demand for housing will increase the national average house price, and the effect is amplified in areas with inelastic housing supply due to land availability. An increase (decrease) in home equity can facilitate (decrease) skilled labor mobility. On the one hand, Corradin and Popov (2015) suggest that an increase in home equity spurs entrepreneurship as housing wealth helps to alleviate credit constraints for potential entrepreneurs. New business formation can also enhance the outside options of skilled people other than the entrepreneurs themselves. On the other hand, using the U.S. Census data, Goetz (2013) shows that housing lock-in has contributed to the decreased labor mobility of homeowners during the recent housing bust.

A limitation of *Home Equity Shock* is that our skilled labor risk measure could be insensitive to decreased labor mobility due to negative shocks to home equity during the recent housing bust. This is because once a firm starts to disclose skilled labor risk in its 10Ks in the post SEC Regulation S-K Item 305(c) period (i.e., after 2005), the value of skilled labor risk measure is unlikely to decrease over time. As we explain in detail in Appendix E, this problem can cause this instrument to be invalid in periods with national house price declines (i.e., years 2008-2011). Thus, we can only use this instrument in periods with positive home equity shocks. This also means that we cannot use this instrument for executive compensation duration because the duration data covers only the period of 2006-2013 and the exclusion drives down the estimation power.

Overall, we think that both instruments are reasonably exogenous to firms' compensation policies for skilled labor and key talents. Although neither instrument is perfect, they do represent different sources of variation in skilled labor mobility and thus firms' skilled labor risk. Thus, if both instruments yield consistent results, then this will give us confidence that our identification strategy is sensible.

Table 12 reports the 2SLS estimates for the relation between *Skilled Labor Risk* and executive compensation policies using the historical state real estate transfer tax rate as the instrument. The 2SLS estimation suggests that firms with higher skilled labor risk due to a lower state-level historical real estate transfer tax rate do use less cash pay, more incentive pay, and longer pay duration in executive compensation contracts, consistent with the theoretical predictions. The estimated effects are not only statistically significant but also economically larger than the OLS estimates. For example, for the executive team, a one-standard-deviation increase in *Skilled Labor Risk* would increase the average fraction of incentive pay in total executive compensation by about 27% relative to the sample mean and increase the pay duration by 24% relative to the sample mean.

Table 13 reports the 2SLS estimates for the relation between *Skilled Labor Risk* and executive compensation policies using the home equity shock as the instrument. The estimates are consistent with those in Table 12, and even the magnitudes are comparable. Firms facing higher skilled labor risk due to larger positive home equity shocks in the region do use less cash pay and more incentive pay.

Table 14 reports the OLS and 2SLS estimates for the relation between *Skilled Labor Risk* and incentive pay ratio for employees below the top rank. We see a similar pattern as for top executive compensation. Firms with higher skilled labor risk tend to use more incentive pay for non-chief-executive employees as well. The sensitivity of incentive pay to skilled labor risk is even larger for employees below the top rank than for top executives. The estimation in column (2) suggests that a one-standard-deviation increase in *Skilled Labor Risk* would increase the average fraction of incentive pay in total pay for employees below the top rank by about 53% relative to the sample mean.

The theories provide no specific predictions for the effect of skilled labor risk on the total compensation level. Empirically, we find that skilled labor risk has a much larger effect on compensation structure than on compensation level.[23] For top executives, there is no significant effect on the compensation level. For employees below the top rank, the effect is positive and significant. A one-standard-deviation increase in skilled labor risk increases employee total compensation by about 12-21%, much smaller than the effect on the incentive pay to total pay ratio. These results suggest that compensation structure potentially plays a more important role than compensation level in talent retention.

Table 15 reports the OLS and 2SLS estimates for the relation between *Skilled Labor Risk* and firms' strength in employee relations. The results in Panel A suggest that skilled labor risk has a positive and weakly significant effect on the firm's strength in employee relations. In Panel B, we compare and contrast the strength in compensation and benefits related dimensions and that in other dimensions of employee relations. The results suggest that the positive relation between skilled labor risk and firms' investment in employee relations mainly lies in compensation and benefits related dimensions. Firms with higher skilled labor risk tend to grand employees better compensation and benefits packages. Note that the strength in compensation and benefits is not just about the level, as several dimensions within this category is about providing incentives to employees via profit sharing plans and employee stock ownership plans. But skilled labor risk does not explain firms' investment in other dimensions of employee relations.

[23] For the compensation level tests using the home equity shock as the instrument, we scale the compensation level by the average Regional Price Parities (RPP) from the Bureau of Economic Analysis (BEA). This is because we find that the topological elasticity of housing supply is negatively correlated with the average house price in an MSA and thus could be correlated with compensation level through its correlation with the average cost of living in the area rather than its effect on labor mobility. According to BEA, Regional Price Parities (RPPs) measure the differences in the price levels of goods and services across states and metropolitan areas for a given year. RPPs are expressed as a percentage of the overall national price level for each year. The data is available for years 2008-2014. We compute the average RPP for an area and use it to scale the level of executive compensation.

5. Conclusion

Skilled labor has become increasingly important for corporations. The reliance on skilled labor also exposes firms to skilled labor risk, which we define as the risk of failing to attract and retain skilled labor. We create a measure of firms' exposures to skilled labor risk based on the intensity of firms' discussions on this risk in their 10-K filings. We find that this measure can effectively capture firm risk due to skilled labor mobility and short supply. Firms discuss more about skilled labor risk in their 10-Ks when they face more local labor market competition, or when their headquarters states have policies that directly or indirectly put less restrictions on the mobility of skilled labor, or when they have worse access to the supply of highly educated labor. Our results also suggest that our measure picks up the risk due to skilled labor mobility and supply better than any of the existing related measures.

Given the information content of our skilled labor risk measure, we believe that it can shed light on the nature of outside options and mobility of skilled labor because for firms that more intensively discuss the retention of skilled labor as a risk factor, the participation constraints of their key employees are more likely to be binding. Our findings suggest that skilled labor's outside option set is industry-specific, which means that the desired skills and talents are industry-specific rather than general. The outside option set is local, mostly in a 50-mile radius around the firm's headquarters, suggesting that skilled labor are not very mobile geographically. Our results do not necessarily mean that skilled labor are not demanded across geographic areas. The reason could come from the supply side. People may have various reasons to prefer not to move.[24] One reason for skilled labor not being very mobile geographically could be that they are likely home owners and Census survey data show that home owners are significantly less likely to move than non-

[24] The Current Population Surveys (CPS) in the U.S. suggest that on average only about 13% of the population move (i.e., change residence) in a year, and majority of the moves are within-state moves.

home owners. The local nature of skilled labor mobility suggests that local and state level policies that affect household mobility can have a large influence on skilled labor risk in local firms and externalities on the local economy.

Compensation policy is perhaps the policy that is most sensitive to skilled labor risk. We find that firms do adjust compensation contract for both top executives and employees below the top rank when facing skilled labor risk. The adjustment is more on the structure of compensation than on the level of compensation. In particular, we find that firms adjust compensation towards more incentive pay and longer pay duration when they face higher skilled labor risk, consistent with recent theories on optimal compensation when key talents are mobile. Analysis on firms' investment in strengthening employee relations also suggests that compensation and benefits related strength is most relevant for talent retention.

Our study suggests that skilled labor risk is pervasive in today's economy, not just a problem of high-tech companies. Yet more needs to be known about firms' exposures to such risk, particularly the vast majority of firms in traditional low-tech industries. Future studies that shed light on effective corporate policies to help firms mitigate skilled labor risk and the general equilibrium effects of state policies that affect labor mobility and firms' skilled labor risk will be very fruitful.

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Figure 1: Trends of Skilled Labor Risk

This figure presents the time-series trend of the Skilled Labor Risk measure. Each dot in the plot represents the average of Skilled Labor Risk in each fiscal year.

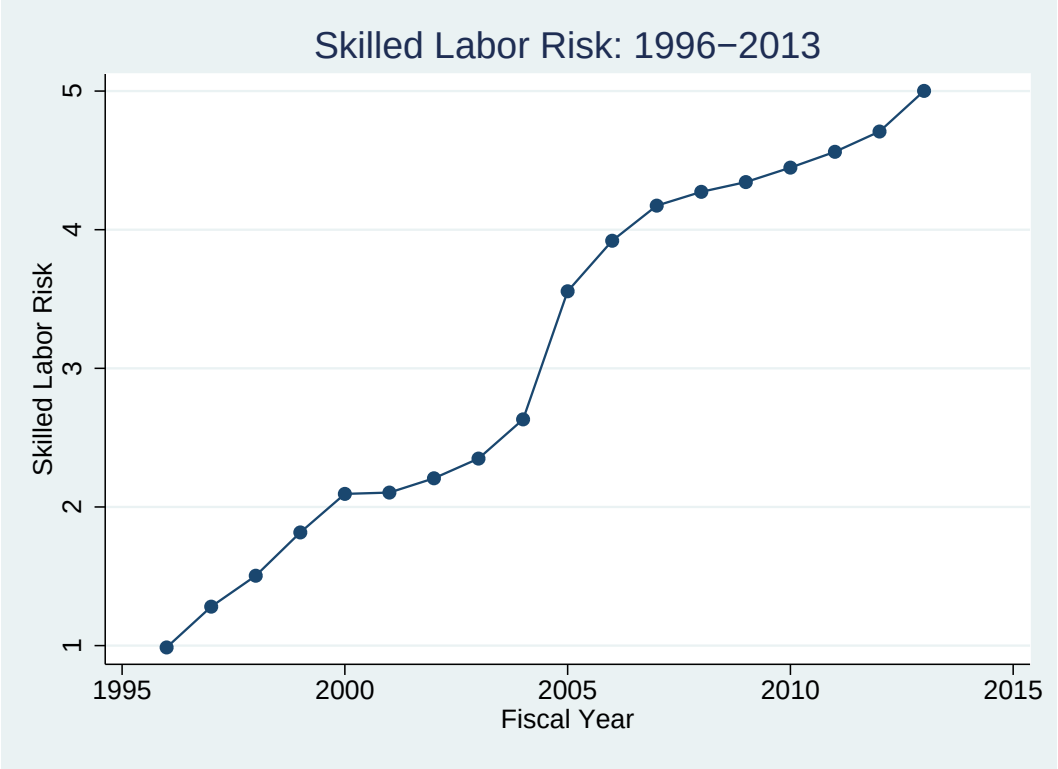

Table 1: **Summary Statistics**

This table reports the summary statistics for the firm-year and state-year level variables used in the paper. Firm characteristics and variables related to top executive and non-chief-executive employee compensation are winsorized at the 1% and 99% percentiles to mitigate the effects of outliers. The summary statistics for cash holding and book and market leverage are based on the sample that excludes firms in financial (SIC $\geq$ 6000 & SIC $\leq$ 6999)and utility (SIC $\geq$ 4900 & SIC $\leq$ 4999) industries. All variable definitions and data sources are available in Appendix A.

	Panel A: Firm-Year Level Variables					
	N	Mean	P25	Median	P75	Std. Dev.
Skilled Labor Risk and Determinants						
Skilled Labor Risk	109,958	3.012	0.000	2.000	5.000	3.571
# of SIC2 Rivals (50 mi radius)	106,238	17.881	1.000	6.000	22.000	27.733
# of SIC2 Rivals (50-100 mi radius)	106,238	6.759	0.000	1.000	7.000	13.118
# of SIC2 Rivals (100-200 mi radius)	106,238	15.182	1.000	4.000	16.000	24.430
# of SIC2 Rivals (Outside 200 mi radius)	106,238	282.422	82.000	220.000	450.000	234.272
# of Non-SIC2-Rivals (50 mi radius)	106,238	239.037	47.000	175.000	321.000	248.765
# of Non-SIC2-Rivals (50-100 mi radius)	106,238	116.465	13.000	46.000	170.000	165.829
# of Non-SIC2-Rivals (100-200 mi radius)	106,238	257.235	52.000	135.000	418.000	271.990
# of Non-SIC2-Rivals (Outside 200 mi radius)	106,238	5709.105	4791.000	5624.000	6713.000	1134.882
Distance to Land-Grant U.(100 Miles)	106,100	11.598	9.171	10.483	12.849	3.593
Distance to In-State Land-Grant U.(100 Miles)	106,100	1.263	0.645	1.134	1.739	0.807
Compensation and Executive Characteristics						
CEO Compensation ($000)	29,774	2528.317	730.528	1480.377	3045.588	3043.877
Avg. Executive Compensation($000)	30,590	1239.555	431.494	779.788	1476.441	1373.898
CEO Cash Pay/Total Pay	29,742	0.400	0.175	0.325	0.567	0.277
Avg. Executive Cash Pay/Total Pay	30,587	0.453	0.268	0.415	0.611	0.231
CEO Incentive Pay/Total Pay	29,742	0.552	0.362	0.623	0.793	0.292
Avg. Executive Incentive Pay/Total Pay	30,587	0.496	0.327	0.531	0.687	0.239
CEO Pay Duration	14,219	1.412	0.874	1.527	1.937	0.777
Avg. Executive Pay Duration	14,522	1.209	0.804	1.255	1.622	0.623
CEO Age	31,736	55.440	50.000	55.000	60.000	7.583
CEO Tenure	29,961	7.151	2.000	5.000	10.000	7.303
Execu.Turnover in Past 3 Yr	68,464	0.621	0.000	1.000	1.000	0.485
Execu.Turnover in Next 3 Yr	68,464	0.577	0.000	1.000	1.000	0.494
Non-chief-executive Employee Compensation ($000)	10,360	57.658	37.614	50.789	69.182	35.617
Non-chief-executive Employee Incentive Pay/Total Pay	10,360	0.123	0.013	0.040	0.140	0.189
Total Strengths of Employee Relations	28,015	0.062	0.000	0.000	0.000	0.133
Compensation&Benefits-Related Strengths of Employee Relations	24,427	0.085	0.000	0.000	0.000	0.200
Other Strengths of Employee Relations	28,015	0.047	0.000	0.000	0.000	0.141

	Panel A: Firm-Year Level Variables (Continued)					
	N	Mean	P25	Median	P75	Std. Dev.
Firm Characteristics						
Log(AT)	107,992	4.771	3.215	4.966	6.496	2.571
Log(1+Firm Age)	109,958	2.804	2.197	2.890	3.466	0.943
ROA	104,650	-0.145	-0.006	0.072	0.142	1.045
Market to Book	91,895	2.061	1.031	1.317	2.104	2.210
Sales Growth	101,504	0.200	-0.063	0.049	0.209	0.830
R&D	103,897	0.265	0.000	0.000	0.041	1.358
Capex	102,152	0.048	0.008	0.027	0.060	0.065
Tangibility	104,659	0.226	0.033	0.131	0.343	0.244
Intangible Assets	101,240	0.121	0.000	0.026	0.178	0.181
Sales Vol.	103,503	0.229	0.044	0.121	0.265	0.340
Cash Holding (%)	81,912	21.759	2.828	11.066	32.564	25.085
Book Leverage (%)	71,211	27.785	0.956	22.204	46.897	26.938
Market Leverage (%)	77,875	21.460	0.438	11.665	34.241	25.202

	Panel B: State-Year Level Variables					
	N	Mean	P25	Median	P75	Std. Dev.
Non-Compete	963	4.348	3.000	5.000	6.000	1.854
Inevitable Disclosure Doctrine	963	0.346	0.000	0.000	1.000	0.476
Real Estate Transfer Tax (%)	949	0.505	0.000	0.230	0.532	0.698
Log (GDP Per Cap.)	963	3.041	2.888	3.005	3.152	0.254
Employment Rate	963	0.607	0.557	0.590	0.628	0.112
Log(Income Per Cap.)	963	2.861	2.751	2.837	2.963	0.166
Log(Population)	963	1.261	0.460	1.402	1.887	1.032
State Colleges Per Cap $\times 10^6$	963	11.977	8.192	10.498	13.404	6.482

Table 2: **Industry Distribution of Skilled Labor Risk**

This table reports the top 10 two-digit SIC industries (Panel A) and the bottom 10 industries (Panel B) based on the employment-weighted average Skilled Labor Risk in the most recent fiscal year in our sample (year 2013).

Panel A: Industries with Highest Skilled Labor Risk		
SIC2	Industry Description	Skilled Labor Risk
87	Engineering, accounting, research, management, and related services	10.14
82	Educational services	10.00
80	Health services	9.90
73	Business Services	8.43
65	Real estate	7.03
62	Security and commodity brokers, dealers, exchanges, and services	6.98
16	Heavy construction other than buildings construction–contractors	6.69
79	Amusement and recreation services	6.26
39	Miscellaneous manufacturing industries	5.99
36	Electronic and other electric equipment	5.61
Panel B: Industries with Lowest Skilled Labor Risk		
SIC2	Industry Description	Skilled Labor Risk
29	Petroleum and coal products	0.92
26	Paper and allied products	1.42
51	Wholesale trade - nondurable goods	1.46
20	Food and kindred products	1.91
42	Motor freight transportation and warehousing	1.95
45	Transportation by air	2.01
25	Furniture and fixtures	2.11
49	Electric, gas, and sanitary services	2.13
54	Food stores	2.14
48	Communications	2.24

Table 3: **Correlations with Existing Related Measures**

This table reports the pairwise (Panel A) and Spearman rank (Panel B) correlations between Skilled Labor Risk and existing related measures. Organizational Capital is the measure for the stock of organizational capital in Eisfeldt and Papanikolaou (2013), which accumulates the deflated value of SG&A expenses, divided by total assets. Modified Organizational Capital is the measure for the stock of organizational capital in Peters and Taylor (2016), which accumulates the deflated value of 30% of the SG&A expenses after excluding R&D expenses, divided by total assets. Mention Key Man Insurance and Carry Key Man Insurance are measures for key human capital in Israelsen and Yonker (2015). Mention Key Man Insurance is a dummy variable that equals to one if a firm mentions key man life insurance in corporate filings a year and zero otherwise. Carry Key Man Insurance is a dummy variable that equals to one if a firm actually carries key man life insurance on key employees in a year and zero otherwise. Industry-level Skilled Labor Reliance is the fraction of high skilled labor in an industry in Belo et al. (2016). For the pairwise and rank correlations in the last row of each panel, we first calculate the average of the firm-level measures in each industry-year and then calculate the correlations at the industry-year level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	Panel A: Pairwise Correlations				
	Skilled Labor Risk	Organizational Capital	Modified Organizational Capital	Mention KeyMan Insurance	Carry KeyMan Insurance
Skilled Labor Risk	1.000				
Organizational Capital	-0.025***	1.000			
Modified Organizational Capital	-0.034***	0.972***	1.000		
Mention KeyMan Insurance	0.174***	0.052***	0.048***	1.000	
Carry KeyMan Insurance	0.071***	0.032***	0.037***	0.650***	1.000
Industry-level Skilled Labor Reliance	0.283***	0.036**	-0.001	0.045**	0.0200
	Panel B: Rank Correlations				
	Skilled Labor Risk	Organizational Capital	Modified Organizational Capital	Mention KeyMan Insurance	Carry KeyMan Insurance
Skilled Labor Risk	1.000				
Organizational Capital	0.066***	1.000			
Modified Organizational Capital	0.034***	0.984***	1.000		
Mention KeyMan Insurance	0.193***	0.054***	0.046***	1.000	
Carry KeyMan Insurance	0.089***	0.055***	0.056***	0.650***	1.000
Industry-level Skilled Labor Reliance	0.223***	-0.0700***	-0.104***	0.016	0.035*

Table 4: **Skilled Labor Risk and Executive Team Turnover**

This table reports the relations between a firm's skilled labor risk and the executive team turnover in the past and next three years. The dependent variables in columns (1) and (2) are *Skilled Labor Risk* and *Execu.Turnover in Next 3 Yr*, respectively. *Execu.Turnover in Past 3 Yr* is a dummy variable equal to one if a firm experiences at least one executive departure in the past three years (including current year) and zero otherwise. *Execu.Turnover in Next 3 Yr* is a dummy variable equal to one if a firm experiences at least one executive departure in the next three years and zero otherwise. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	Skilled Labor Risk	Execu.Turnover in Next 3 Yr
	(1)	(2)
Execu.Turnover in Past 3 Yr	0.284***	
	[0.049]	
Skilled Labor Risk		0.004***
		[0.001]
Log(Assets)	0.150***	0.064***
	[0.018]	[0.002]
Log(1+FirmAge)	-0.651***	0.013***
	[0.043]	[0.004]
ROA	-0.082	-0.010
	[0.098]	[0.010]
Market to Book	0.055***	0.016***
	[0.015]	[0.001]
Sales Growth	0.186***	-0.005**
	[0.021]	[0.002]
R&D	0.185***	-0.001
	[0.023]	[0.002]
R&D Missing	-0.405***	-0.039***
	[0.085]	[0.007]
Capex	4.035***	0.157***
	[0.443]	[0.052]
Tangibility	-2.206***	-0.014
	[0.199]	[0.020]
Intangible Assets	-0.481**	-0.029*
	[0.194]	[0.016]
Sales Vol.	0.400***	0.010
	[0.096]	[0.010]
Employment Rate	0.785	0.133**
	[0.626]	[0.054]
Log(Income Per Cap.)	-0.183	-0.074***
	[0.249]	[0.024]
Log(Population)	0.320***	0.003
	[0.042]	[0.004]
Ind. FE, Yr FE	Y	Y
Adj. R^2	0.315	0.317
N	68464	68464

Table 5: **Skilled Labor Risk and Local Labor Market Competition**

This table reports the effect of labor market competition on a firm's skilled labor risk using industry classifications based on the 2-digit SIC industries. To facilitate comparisons, all variables for labor market competition are standardized by their own standard deviations. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
# of SIC2 Rivals (50 mi radius)	0.583***	0.376***	0.311***	0.187**
	[0.044]	[0.046]	[0.068]	[0.073]
# of SIC2 Rivals (50-100 mi radius)	-0.101*	-0.061	0.075	-0.017
	[0.056]	[0.051]	[0.070]	[0.070]
# of SIC2 Rivals (100-200 mi radius)	-0.273***	-0.177***	-0.024	-0.067
	[0.052]	[0.050]	[0.083]	[0.082]
# of SIC2 Rivals (Outside 200 mi radius)	0.042	-0.238**	-0.289**	-0.019
	[0.080]	[0.106]	[0.117]	[0.078]
# of Non-SIC2-Rivals (50 mi radius)	-0.512***	-0.495***	-0.333***	-0.128
	[0.079]	[0.076]	[0.087]	[0.081]
# of Non-SIC2-Rivals (50-100 mi radius)	-0.267***	-0.239***	-0.244***	-0.065
	[0.063]	[0.059]	[0.070]	[0.075]
# of Non-SIC2-Rivals (100-200 mi radius)	-0.279***	-0.337***	-0.207**	-0.043
	[0.087]	[0.082]	[0.097]	[0.091]
# of Non-SIC2-Rivals (Outside 200 mi radius)	-1.135***	-1.077***	-1.028***	-0.104
	[0.320]	[0.304]	[0.292]	[0.179]
Log(Assets)	0.041***	0.156***	0.172***	0.374***
	[0.016]	[0.017]	[0.018]	[0.040]
Log(1+FirmAge)	-0.529***	-0.595***	-0.555***	-0.094
	[0.042]	[0.041]	[0.041]	[0.113]
ROA	0.252***	-0.022	-0.015	-0.291***
	[0.090]	[0.088]	[0.085]	[0.075]
Market to Book	0.077***	0.046***	0.045***	0.040***
	[0.016]	[0.013]	[0.013]	[0.011]
Sales Growth	0.143***	0.165***	0.158***	0.075***
	[0.021]	[0.020]	[0.020]	[0.016]
R&D	0.169***	0.191***	0.152***	0.034**
	[0.022]	[0.022]	[0.022]	[0.017]
R&D Missing	-0.498***	-0.367***	-0.273***	-0.005
	[0.070]	[0.081]	[0.087]	[0.108]
Capex	5.579***	3.817***	2.776***	0.715**
	[0.442]	[0.407]	[0.395]	[0.294]
Tangibility	-1.633***	-2.138***	-1.904***	0.095
	[0.146]	[0.187]	[0.197]	[0.208]
Intangible Assets	1.393***	-0.322*	-0.116	0.461**
	[0.175]	[0.185]	[0.187]	[0.195]
Sales Vol.	0.794***	0.391***	0.374***	0.027
	[0.093]	[0.088]	[0.087]	[0.091]
Employment Rate	-1.048	-1.492**	-2.083	-1.145
	[0.705]	[0.661]	[2.848]	[1.097]
Log(Income Per Cap.)	1.793***	1.539***	2.626**	1.013*
	[0.398]	[0.371]	[1.040]	[0.603]
Log(Population)	0.182***	0.170***	-0.033	-0.066
	[0.047]	[0.043]	[0.745]	[0.099]
Yr FE	Y	Y	Y	Y
Ind. FE	N	Y	N	N
Ind. $\times$ State FE	N	N	Y	N
Firm FE	N	N	N	Y
Adj. R^2	0.258	0.325	0.399	0.756
N	71976	71976	71976	71976

Table 6: **The Effect of the Non-compete Agreements**

This table reports the effect of non-compete agreements enforcement in a firm's headquarters state on the firm's skilled labor risk and the sensitivity of skilled labor risk to local labor market competition. # of SIC2 Rivals (50 mi radius) is standardized by its standard deviation. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	Before 2005	Before 2005	1996-2013
	(1)	(2)	(3)
Non-Compete	-0.125***	-0.088***	-0.092***
	[0.014]	[0.015]	[0.016]
# of SIC2 Rivals (50 mi radius)	0.260***	0.343***	0.371***
	[0.045]	[0.052]	[0.050]
# of SIC2 Rivals (50 mi radius)*Non-Compete		-0.069***	-0.080***
		[0.016]	[0.016]
Log(Assets)	0.140***	0.138***	0.162***
	[0.016]	[0.016]	[0.017]
Log(1+FirmAge)	-0.591***	-0.585***	-0.601***
	[0.041]	[0.041]	[0.041]
ROA	-0.124	-0.122	-0.045
	[0.108]	[0.107]	[0.087]
Market to Book	0.072***	0.070***	0.044***
	[0.013]	[0.013]	[0.013]
Sales Growth	0.179***	0.178***	0.165***
	[0.024]	[0.024]	[0.020]
R&D	0.157***	0.157***	0.188***
	[0.026]	[0.026]	[0.023]
R&D Missing	-0.398***	-0.377***	-0.353***
	[0.079]	[0.079]	[0.081]
Capex	3.050***	3.055***	3.758***
	[0.405]	[0.404]	[0.407]
Tangibility	-1.740***	-1.748***	-2.097***
	[0.169]	[0.170]	[0.187]
Intangible Assets	-0.316*	-0.312*	-0.303
	[0.189]	[0.189]	[0.185]
Sales Vol.	0.514***	0.534***	0.395***
	[0.095]	[0.095]	[0.088]
Employment Rate	1.557***	1.051*	0.746
	[0.549]	[0.546]	[0.629]
Log(Income Per Cap.)	-1.103***	-0.491*	-0.499*
	[0.250]	[0.262]	[0.263]
Log(Population)	0.125***	0.086**	0.063
	[0.042]	[0.042]	[0.043]
Ind. FE & Yr FE	Y	Y	Y
Adj. R^2	0.293	0.295	0.326
N	35848	35848	71976

Table 7: **Real Estate Transfer Tax and Labor Mobility**

This table reports the effect of state transfer tax rate on residential housing transactions on labor mobility and Skilled Labor Risk. Panel A uses the data from the Annual Social and Economic Supplement (ASEC) of the Current Population Survey (CPS) and presents the estimated effects of the state transfer tax rate on households' moving decisions. The dependent variables in Panel A are all scaled by their own sample means. Panel B presents the estimated effect of the house transfer tax rate in a firm's headquarters state on the firm's skilled labor risk and the sensitivity of skilled labor risk to local labor market competition. # of SIC2 Rivals (50 mi radius) is standardized by its standard deviation. Standard errors in parentheses are robust and clustered at the state level in Panel A and at the firm level in Panel B. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	Panel A: Real Estate Transfer Tax and Household Mobility					
	All Move	Job	Job	Family	Housing	Other
	(1)	(2)	(3)	(4)	(5)	(6)
Real Estate Transfer Tax	-0.089**	-0.130**	-0.073	-0.072*	-0.085**	-0.102**
	[0.040]	[0.062]	[0.064]	[0.042]	[0.032]	[0.045]
Real Estate Transfer Tax*College Degree or Above			-0.166***			
			[0.050]			
Age	-0.042***	-0.043***	-0.043***	-0.048***	-0.037***	-0.047***
	[0.001]	[0.002]	[0.002]	[0.001]	[0.001]	[0.002]
Female	0.015**	-0.172***	-0.171***	0.093***	0.039***	-0.118***
	[0.006]	[0.016]	[0.015]	[0.012]	[0.008]	[0.021]
White	0.022	0.158*	0.155*	0.101*	-0.034	-0.050
	[0.047]	[0.084]	[0.084]	[0.056]	[0.045]	[0.077]
Black	-0.136***	-0.309***	-0.320***	-0.110*	-0.022	-0.386***
	[0.049]	[0.091]	[0.091]	[0.061]	[0.053]	[0.079]
Asian	-0.079***	0.066	0.064	-0.238***	-0.076*	0.114*
	[0.028]	[0.086]	[0.088]	[0.058]	[0.044]	[0.058]
Married	-0.143***	0.483***	0.483***	-0.465***	-0.101***	-0.216***
	[0.010]	[0.035]	[0.035]	[0.027]	[0.012]	[0.027]
Presence of Child	-0.311***	-0.562***	-0.564***	-0.286***	-0.131***	-0.803***
	[0.008]	[0.025]	[0.024]	[0.017]	[0.011]	[0.025]
College Degree or Above	0.109***	0.965***	1.062***	-0.138***	-0.041***	0.320***
	[0.008]	[0.042]	[0.050]	[0.016]	[0.011]	[0.022]
Log(Total Personal Income)	0.009***	0.004	0.004	0.007***	0.013***	-0.002
	[0.001]	[0.004]	[0.004]	[0.002]	[0.002]	[0.004]
Home Owner	-1.200***	-1.754***	-1.754***	-1.205***	-0.964***	-1.574***
	[0.072]	[0.112]	[0.112]	[0.080]	[0.063]	[0.096]
Employment Rate	-0.153	0.167	0.249	-0.351*	-0.238	-0.095
	[0.236]	[0.445]	[0.430]	[0.204]	[0.195]	[0.320]
Log(Income Per Cap.)	-0.432***	-0.848***	-0.866***	-0.647***	-0.155	-0.632***
	[0.141]	[0.297]	[0.294]	[0.162]	[0.142]	[0.191]
Log(Population)	-0.004	0.063	0.065	-0.019	-0.020	0.018
	[0.020]	[0.050]	[0.050]	[0.025]	[0.015]	[0.026]
Yr. FE	Y	Y	Y	Y	Y	Y
Adj. R^2	0.125	0.020	0.020	0.038	0.040	0.025
N	1002676	1002676	1002676	1002676	1002676	1002676

	Panel B: Real Estate Transfer Tax and Skilled Labor Risk			
	(1)	(2)	(3)	(4)
Real Estate Transfer Tax	-0.472***	-0.257***	-0.469	
	[0.055]	[0.062]	[0.295]	
Real Estate Transfer Tax*				
# of SIC2 Rivals (50 mi radius)		-0.246***	-0.128***	
		[0.040]	[0.042]	
Real Estate Transfer Tax (Yr 1997)				-0.243***
				[0.065]
Real Estate Transfer Tax (Yr 1997)*				
# of SIC2 Rivals (50 mi radius)				-0.237***
				[0.040]
# of SIC2 Rivals (50 mi radius)	0.233***	0.388***	0.340***	0.372***
	[0.043]	[0.049]	[0.051]	[0.049]
Non-Compete	-0.042**	-0.041**	-0.076	-0.042**
	[0.017]	[0.017]	[0.088]	[0.018]
Log(Assets)	0.162***	0.160***	0.160***	0.160***
	[0.017]	[0.017]	[0.017]	[0.017]
Log(1+FirmAge)	-0.594***	-0.583***	-0.529***	-0.583***
	[0.041]	[0.041]	[0.040]	[0.040]
ROA	-0.046	-0.036	-0.006	-0.035
	[0.088]	[0.088]	[0.086]	[0.087]
Market to Book	0.045***	0.044***	0.038***	0.044***
	[0.013]	[0.014]	[0.013]	[0.013]
Sales Growth	0.169***	0.172***	0.166***	0.170***
	[0.020]	[0.020]	[0.020]	[0.020]
R&D	0.188***	0.185***	0.178***	0.186***
	[0.023]	[0.023]	[0.022]	[0.022]
R&D Missing	-0.341***	-0.299***	-0.250***	-0.310***
	[0.081]	[0.082]	[0.081]	[0.081]
Capex	3.694***	3.697***	3.478***	3.706***
	[0.410]	[0.409]	[0.404]	[0.405]
Tangibility	-2.130***	-2.110***	-2.013***	-2.108***
	[0.187]	[0.188]	[0.187]	[0.186]
Intangible Assets	-0.280	-0.244	-0.153	-0.251
	[0.186]	[0.186]	[0.185]	[0.185]
Sales Vol.	0.363***	0.376***	0.394***	0.366***
	[0.088]	[0.088]	[0.087]	[0.087]
Employment Rate	-0.928	-1.280*	-2.098	-1.154*
	[0.648]	[0.660]	[2.761]	[0.655]
Log(Income Per Cap.)	-0.051	-0.254	2.465**	-0.464
	[0.291]	[0.291]	[1.045]	[0.285]
Log(Population)	-0.045	-0.094*	0.219	-0.075
	[0.048]	[0.048]	[0.731]	[0.048]
Home Ownership	-0.039***	-0.044***	0.013	-0.045***
	[0.007]	[0.006]	[0.015]	[0.007]
Ind. FE & Yr FE	Y	Y	Y	Y
State FE	N	N	Y	N
Adj. R^2	0.328	0.331	0.342	0.331
N	71334	71334	71334	71975

Table 8: **Supply of Educated Labor**

This table reports the estimated effect of a firm's access to the supply of educated labor on the skilled labor risk. We use a firm's average distance to land-grant universities and colleges within the headquarters state or across all states in the U.S. and the number of higher education institutions per one-million-population in the headquarters state to measure the access to educated labor. # of SIC2 Rivals (50 mi radius) is standardized by its standard deviation. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Distance to Land-Grant U.	0.118***		
	[0.011]		
Distance to In-State Land-Grant U.		0.217***	
		[0.046]	
State Colleges Per Cap			-0.005
			[0.009]
# of SIC2 Rivals (50 mi radius)	0.231***	0.290***	0.271***
	[0.042]	[0.042]	[0.042]
Non-Compete	-0.023	-0.076***	-0.103***
	[0.016]	[0.015]	[0.015]
Real Estate Transfer Tax	-0.259***	-0.389***	-0.353***
	[0.050]	[0.051]	[0.053]
Log(Assets)	0.165***	0.163***	0.163***
	[0.017]	[0.017]	[0.017]
Log(1+FirmAge)	-0.562***	-0.597***	-0.604***
	[0.041]	[0.041]	[0.041]
ROA	-0.021	-0.044	-0.056
	[0.087]	[0.088]	[0.088]
Market to Book	0.043***	0.044***	0.046***
	[0.013]	[0.013]	[0.013]
Sales Growth	0.168***	0.169***	0.171***
	[0.020]	[0.020]	[0.020]
R&D	0.184***	0.188***	0.189***
	[0.023]	[0.023]	[0.023]
R&D Missing	-0.294***	-0.342***	-0.340***
	[0.081]	[0.082]	[0.081]
Capex	3.636***	3.669***	3.683***
	[0.411]	[0.410]	[0.411]
Tangibility	-2.100***	-2.122***	-2.149***
	[0.188]	[0.187]	[0.188]
Intangible Assets	-0.184	-0.288	-0.290
	[0.186]	[0.186]	[0.186]
Sales Vol.	0.367***	0.365***	0.369***
	[0.088]	[0.088]	[0.088]
Employment Rate	0.510	0.114	-0.387
	[0.632]	[0.621]	[0.631]
Log(Income Per Cap.)	-0.349	0.223	0.114
	[0.290]	[0.294]	[0.291]
Log(Population)	0.039	-0.007	
	[0.043]	[0.047]	
Ind. FE & Yr FE	Y	Y	Y
Adj. R^2	0.335	0.328	0.326
N	71334	71334	71334

Table 9: **Comparisons with Existing Related Measures**

This table compares the effects of the mobility and supply of skilled labor on our skilled labor risk measure and existing related measures. The dependent variable in each column is standardized by its own sample mean. *Organizational Capital* is the measure for the stock of organizational capital in Eisfeldt and Papanikolaou (2013), which accumulates the deflated value of SG&A expenses, divided by total assets. *Modified Organizational Capital* is the measure for the stock of organizational capital in Peters and Taylor (2016), which accumulates the deflated value of 30% of the SG&A expenses after excluding R&D expenses, divided by total assets. *Mention Key Man Insurance* and *Carry Key Man Insurance* are measures for key human capital in Israelsen and Yonker (2015). *Mention Key Man Insurance* is a dummy variable that equals to one if a firm mentions key man life insurance in corporate filings in a year and zero otherwise. *Carry Key Man Insurance* is a dummy variable that equals to one if a firm actually carries key man life insurance on key employees in a year and zero otherwise. # of SIC2 Rivals (50 mi radius) is standardized by its standard deviation. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent statistical significance at 1%, 5%, and 10% levels, respectively. Letters a, b, and c represent statistical difference at 1%, 5%, and 10% levels, respectively, for the differences between the coefficients in column (1) and those in each of the other columns.

	Skilled Labor Risk	Organizational Capital	Modified Organizational Capital	Mention KeyMan Insurance	Carry KeyMan Insurance
	(1)	(2)	(3)	(4)	(5)
# of SIC2 Rivals (50 mi radius)	0.077***	0.009[a]	-0.001[a]	0.028	-0.080[a]
	[0.014]	[0.010]	[0.009]	[0.035]	[0.056]
Non-Compete	-0.008	-0.001	0.001	-0.005	-0.008
	[0.005]	[0.004]	[0.003]	[0.017]	[0.029]
Real Estate Transfer Tax	-0.086***	-0.009[a]	0.001[a]	0.001[c]	0.219***[a]
	[0.017]	[0.013]	[0.012]	[0.048]	[0.084]
Distance to Land-Grant U.	0.039***	-0.004**[a]	-0.007***[a]	0.009[a]	-0.001[a]
	[0.004]	[0.002]	[0.002]	[0.010]	[0.015]
Firm&State Controls	Y	Y	Y	Y	Y
Ind. FE & Yr FE	Y	Y	Y	Y	Y
Adj. R^2	0.335	0.350	0.368	0.093	0.063
N	71334	71334	71334	34220	34220

Table 10: **Addressing Potential Concerns**

This table addresses potential concerns about our skilled labor risk measure. Panel A accesses the role of disclosure style in driving the results. Panel B accesses the effect of a major disclosure regulation in our sample period on the information content of Skilled Labor Risk. Panel C relates Skilled Labor Risk to traditional measures of firm risk and risk management. *Non-Skilled-Labor-Related Discussion* counts the number of sentences unrelated to skilled labor risk in the 10-K sections where a firm discusses skilled labor risk. If a firm does not discuss skilled labor risk, then *Non-Skilled-Labor-Related Discussion* counts the number of sentences in Item 1 and Item 7 before December 2005 and the number of sentences in Item 1, Item 1A, and Item 7 in 10-Ks after December 2005. To facilitate comparison of marginal effects, the dependent variables in Panels A and B are standardized by their own sample means. Total volatility is the standard deviation of daily stock return in a fiscal year. Idiosyncratic volatility is the standard deviation of the residual from a regression of daily stock returns on the three Fama-French factors in a fiscal year. Beta is the estimated coefficient on the market factor from a regression of daily stock returns on the three Fama-French factors in a fiscal year. For financial management, we focus on corporate cash holding and corporate leverage, both expressed in percentage points. # of SIC2 Rivals (50 mi radius) is standardized by its standard deviations. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively. In Panels A and B, letters a, b, and c represent statistical difference at 1%, 5%, and 10% levels, respectively, for the differences between the coefficients in column (1) and those in each of the other columns.

	Panel A: Non-Skilled Labor Disclosures as a Control and a Comparison		
	Baseline Estimation	Control for Disclosure Style	Non-Skilled-Labor-Related Discussion
	(1)	(2)	(3)
Non-Skilled-Labor-Related Discussion		0.001***	
		[0.000]	
# of SIC2 Rivals (50 mi radius)	0.077***	0.061***^{a}	0.030***^{a}
	[0.014]	[0.013]	[0.006]
Non-Compete	-0.008	-0.006	-0.003
	[0.005]	[0.005]	[0.003]
Real Estate Transfer Tax	-0.086***	-0.080***	-0.012^a
	[0.017]	[0.016]	[0.010]
Distance to Land-Grant U.	0.039***	0.034***^{a}	0.010***^{a}
	[0.004]	[0.003]	[0.002]
Firm&State Controls	Y	Y	Y
Ind. FE & Yr FE	Y	Y	Y
Adj. R^2	0.335	0.396	0.396
N	71334	71334	71334

	Panel B: Effects of the SEC Regulation	
	Before the Regulation	After the Regulation
	(1)	(2)
# of SIC2 Rivals (50 mi radius)	0.118***	0.061***[a]
	[0.024]	[0.016]
Non-Compete	-0.012	-0.004
	[0.008]	[0.006]
Real Estate Transfer Tax	-0.119***	-0.068***[a]
	[0.024]	[0.018]
Distance to Land-Grant U.	0.065***	0.026***[a]
	[0.006]	[0.003]
Firm&State Controls	Y	Y
Ind. FE & Yr FE	Y	Y
Adj. R^2	0.307	0.238
N	36094	35240

	Panel C: Traditional Measures of Corporate Risk and Financial Management					
	Traditional Measures of Corporate Risk			Financial Management		
	Total Volatility	Idiosyncratic Volatility	Beta	Cash Holding	Book Leverage	Market Leverage
	(1)	(2)	(3)	(4)	(5)	(6)
Skilled Labor Risk	0.028***	0.023***	0.017***	0.773***	-0.606***	-0.410***
	[0.005]	[0.005]	[0.002]	[0.045]	[0.059]	[0.045]
Log(Assets)	-0.495***	-0.550***	0.150***	0.653***	2.189***	0.902***
	[0.015]	[0.015]	[0.004]	[0.092]	[0.140]	[0.107]
Log(1+FirmAge)	-0.288***	-0.272***	-0.059***	-2.620***	1.038***	0.945***
	[0.028]	[0.028]	[0.008]	[0.215]	[0.329]	[0.267]
ROA	-1.582***	-1.563***	-0.074**	-2.230***	-5.688***	-6.030***
	[0.148]	[0.149]	[0.030]	[0.768]	[0.878]	[0.523]
Market to Book	-0.064***	-0.076***	0.049***	1.262***	-1.106***	-2.874***
	[0.010]	[0.010]	[0.003]	[0.073]	[0.087]	[0.082]
Sales Growth	0.031*	0.028	0.016**	1.175***	-0.147	-0.458***
	[0.018]	[0.018]	[0.007]	[0.117]	[0.149]	[0.113]
R&D	-0.077***	-0.080***	0.002	3.209***	-0.715***	-0.476***
	[0.014]	[0.014]	[0.005]	[0.120]	[0.125]	[0.078]
R&D Missing	0.067	0.089*	-0.058***	-3.313***	4.475***	5.293***
	[0.047]	[0.047]	[0.014]	[0.375]	[0.569]	[0.484]
Tangibility	0.134	0.181	-0.213***	-52.545***	36.054***	29.454***
	[0.134]	[0.132]	[0.036]	[1.134]	[1.526]	[1.274]
Intangible Assets	0.137	0.181	-0.233***	-55.042***	31.934***	23.049***
	[0.114]	[0.112]	[0.032]	[0.917]	[1.230]	[0.958]
Modified Zscore	-0.038***	-0.038***	-0.006***	-0.101***	-0.194***	-0.021
	[0.009]	[0.009]	[0.001]	[0.037]	[0.052]	[0.023]
Dividend Payer	-0.777***	-0.739***	-0.151***	-1.052***	-7.960***	-9.983***
	[0.046]	[0.045]	[0.015]	[0.339]	[0.550]	[0.445]
Ind. FE & Yr FE	Y	Y	Y	Y	Y	Y
Adj. R^2	0.486	0.504	0.195	0.589	0.280	0.359
N	24474	24474	24474	52355	52253	52253

Table 11: **Skilled Labor Risk and Compensation Structure: OLS Estimations**

This table reports the OLS estimations of the effects of skilled labor risk on the compensation structures for both top executives and non-chief-executive employees. For executive team and CEOs, the total compensation and incentive structure data is available from 1996 to 2013 and the duration data is available from 2006 to 2013. In all estimations, *Total Pay* is the natural logarithm of the total compensation for the executive team, CEOs, and non-chief-executive employees. The definitions of all dependent variables are in Appendix A. Panel A presents the results for the executive team (the average value of all executives with reported compensation). Panel B presents the results for CEOs. Standard errors in parentheses are robust and clustered at the firm level. Panel C presents the results for non-chief-executive employees. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	Panel A: Executive Team			
	Cash/Total	Incentive/Total	Pay Duration	Total pay
	(1)	(2)	(3)	(4)
Skilled Labor Risk	-0.002**	0.002***	0.000	0.006***
	[0.001]	[0.001]	[0.002]	[0.002]
Log(Assets)	-0.061***	0.061***	0.176***	0.439***
	[0.002]	[0.002]	[0.007]	[0.007]
Log(1+FirmAge)	0.032***	-0.036***	-0.020	-0.058***
	[0.003]	[0.003]	[0.014]	[0.012]
ROA	0.032	-0.005	0.029	0.290***
	[0.020]	[0.021]	[0.088]	[0.072]
Market to Book	-0.021***	0.024***	0.077***	0.095***
	[0.002]	[0.002]	[0.010]	[0.007]
Sales Growth	0.007*	0.001	-0.026	0.021
	[0.005]	[0.005]	[0.019]	[0.014]
R&D	-0.013*	0.018***	0.039	0.106***
	[0.007]	[0.007]	[0.025]	[0.017]
R&D Missing	0.033***	-0.035***	-0.106***	-0.056***
	[0.006]	[0.006]	[0.026]	[0.021]
Capex	-0.370***	0.422***	0.555**	1.200***
	[0.048]	[0.049]	[0.235]	[0.163]
Tangibility	0.096***	-0.113***	-0.166**	-0.516***
	[0.019]	[0.019]	[0.081]	[0.063]
Intangible Assets	-0.043***	0.041***	0.176***	0.104**
	[0.014]	[0.015]	[0.057]	[0.053]
Sales Vol.	-0.031***	0.028**	0.011	0.230***
	[0.011]	[0.011]	[0.050]	[0.039]
CEO&Chairman	-0.004	0.006	0.031*	0.075***
	[0.004]	[0.004]	[0.017]	[0.013]
CEO&Chairman Missing	0.009*	-0.010**	-0.094***	0.038**
	[0.005]	[0.005]	[0.020]	[0.017]
Employment Rate	-0.021	0.039	0.433**	-0.189
	[0.053]	[0.055]	[0.207]	[0.224]
Log(Income Per Cap.)	0.010	-0.004	-0.106	0.345***
	[0.018]	[0.019]	[0.073]	[0.065]
Log(Population)	-0.006**	0.008***	-0.004	0.051***
	[0.003]	[0.003]	[0.012]	[0.011]
Ind. FE, Yr FE	Y	Y	Y	Y
Adj. R^2	0.435	0.426	0.275	0.618
N	25487	25487	12679	25487

	Panel B: CEO			
	Cash/Total	Incentive/Total	Pay Duration	Total Pay
	(1)	(2)	(3)	(4)
Skilled Labor Risk	-0.001*	0.002**	-0.000	0.001
	[0.001]	[0.001]	[0.003]	[0.003]
Log(Assets)	-0.058***	0.059***	0.172***	0.466***
	[0.002]	[0.002]	[0.010]	[0.009]
Log(1+FirmAge)	0.025***	-0.027***	0.027	-0.044***
	[0.004]	[0.004]	[0.018]	[0.014]
ROA	0.041	0.005	-0.001	0.524***
	[0.027]	[0.027]	[0.120]	[0.092]
Market to Book	-0.019***	0.021***	0.071***	0.079***
	[0.002]	[0.003]	[0.015]	[0.009]
Sales Growth	0.012**	-0.002	-0.003	-0.015
	[0.006]	[0.006]	[0.024]	[0.021]
R&D	-0.016**	0.024***	0.059**	0.133***
	[0.007]	[0.008]	[0.029]	[0.020]
R&D Missing	0.032***	-0.033***	-0.071**	-0.076***
	[0.008]	[0.008]	[0.032]	[0.027]
Capex	-0.328***	0.371***	0.426	1.063***
	[0.059]	[0.060]	[0.270]	[0.212]
Tangibility	0.086***	-0.101***	-0.038	-0.486***
	[0.023]	[0.023]	[0.100]	[0.076]
Intangible Assets	-0.038**	0.036**	0.277***	0.095
	[0.017]	[0.017]	[0.075]	[0.063]
Sales Vol.	-0.020	0.017	-0.024	0.225***
	[0.014]	[0.015]	[0.070]	[0.048]
Log(CEO Age)	0.110***	-0.167***	-0.553***	-0.077
	[0.022]	[0.022]	[0.097]	[0.078]
Log(CEO Tenure)	0.030***	-0.031***	-0.052***	-0.034***
	[0.003]	[0.003]	[0.013]	[0.011]
CEO&Chairman	-0.025***	0.024***	0.047**	0.123***
	[0.005]	[0.005]	[0.022]	[0.019]
CEO&Chairman Missing	0.002	-0.007	-0.124***	0.056***
	[0.006]	[0.006]	[0.026]	[0.021]
Employment Rate	0.044	-0.029	0.195	-0.434
	[0.063]	[0.073]	[0.249]	[0.312]
Log(Income Per Cap.)	-0.018	0.015	-0.082	0.427***
	[0.022]	[0.023]	[0.095]	[0.083]
Log(Population)	-0.006*	0.009**	0.002	0.044***
	[0.004]	[0.004]	[0.015]	[0.014]
Ind. FE, Yr FE	Y	Y	Y	Y
Adj. R^2	0.357	0.360	0.205	0.540
N	23437	23437	12069	23437

	Panel C: Non-chief-executive Employees				
	Compensation Package		Employee Relations		
	Incentive/Total	Total Pay	Total Strengths	Compensation&Benefits-Related	Other
	(1)	(2)	(3)	(4)	(5)
Skilled Labor Risk	0.007***	0.011***	0.000	0.001*	-0.001
	[0.001]	[0.003]	[0.000]	[0.001]	[0.000]
Log(Assets)	0.002	0.059***	0.034***	0.037***	0.033***
	[0.002]	[0.005]	[0.002]	[0.003]	[0.002]
Log(1+FirmAge)	-0.038***	-0.007	0.002	-0.004	0.007***
	[0.005]	[0.011]	[0.002]	[0.004]	[0.002]
ROA	-0.077*	-0.115*	0.029***	0.038*	0.029***
	[0.041]	[0.059]	[0.011]	[0.019]	[0.010]
Market to Book	0.028***	0.020***	0.008***	0.011***	0.005***
	[0.003]	[0.005]	[0.001]	[0.002]	[0.001]
Sales Growth	0.018**	-0.013	-0.005***	-0.008***	-0.004**
	[0.008]	[0.010]	[0.002]	[0.003]	[0.002]
R&D	0.037**	-0.033	0.003**	0.007***	0.001
	[0.018]	[0.036]	[0.001]	[0.002]	[0.001]
R&D Missing	-0.026***	-0.043**	-0.022***	-0.025***	-0.022***
	[0.007]	[0.018]	[0.004]	[0.007]	[0.004]
Capex	0.179***	0.198	-0.009	0.012	-0.022
	[0.066]	[0.120]	[0.032]	[0.051]	[0.036]
Tangibility	-0.160***	-0.067	-0.012	-0.018	-0.016
	[0.024]	[0.060]	[0.012]	[0.020]	[0.014]
Intangible Assets	-0.061***	-0.137***	-0.063***	-0.074***	-0.057***
	[0.019]	[0.048]	[0.009]	[0.016]	[0.009]
Sales Vol.	0.001	0.014	0.005	0.001	0.007
	[0.016]	[0.044]	[0.007]	[0.011]	[0.007]
CEO&Chairman	-0.012*	-0.012	-0.008*	-0.018***	-0.001
	[0.006]	[0.013]	[0.004]	[0.007]	[0.004]
CEO&Chairman Missing	-0.017**	0.008	-0.011***	-0.026***	0.000
	[0.008]	[0.016]	[0.004]	[0.007]	[0.004]
Employment Rate	-0.041	0.520***	0.040	0.044	0.034
	[0.070]	[0.133]	[0.040]	[0.048]	[0.050]
Log(Income Per Cap.)	-0.035	0.623***	-0.009	-0.029	0.009
	[0.021]	[0.057]	[0.014]	[0.023]	[0.017]
Log(Population)	0.010**	0.082***	0.004*	0.006*	0.002
	[0.004]	[0.009]	[0.002]	[0.004]	[0.002]
Ind. FE, Yr FE	Y	Y	Y	Y	Y
Adj. R^2	0.290	0.748	0.218	0.122	0.204
N	8383	8383	24025	20896	24025

Table 12: **Skilled Labor Risk and Executive Compensation Structure: First Instrument**

This table reports the 2SLS estimations of the effects of skilled labor risk on the level and the incentive and duration structures of executive compensation. We use the 1997 residential real estate transfer tax rate in a firm's headquarters state as an instrument for the skilled labor risk. The total compensation and incentive structure data is available from 1996 to 2013 and the duration data is available from 2006 to 2013. In all estimations, *Total Pay* is the natural logarithm of the total compensation for the executive team and CEOs. In both stages of estimations, the control variables include all the independent variables other than skilled labor risk in Table 11 plus the home ownership rate at the state level. Panels A and B present first and second-stage estimations for the compensation structures of the executive team and the CEOs, respectively. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	Panel A: Executive Team							
	Cash/Total		Incentive/Total		Pay Duration		Total Pay	
	1^{st}-Stage	2^{nd}-Stage	1^{st}-Stage	2^{nd}-Stage	1^{st}-Stage	2^{nd}-Stage	1^{st}-Stage	2^{nd}-Stage
Real Estate Transfer Tax (Yr 1997)	-0.560***		-0.560***		-0.591***		-0.560***	
	[0.090]		[0.090]		[0.132]		[0.090]	
Skilled Labor Risk		-0.037***		0.039***		0.081**		-0.002
		[0.009]		[0.010]		[0.033]		[0.027]
First-stage F-stat	38.30		38.30		19.99		38.30	
Firm&State Controls	Y	Y	Y	Y	Y	Y	Y	Y
Ind. FE & Yr. FE	Y	Y	Y	Y	Y	Y	Y	Y
	Panel B: CEO							
	Cash/Total		Incentive/Total		Pay Duration		Total Pay	
	1^{st}-Stage	2^{nd}-Stage	1^{st}-Stage	2^{nd}-Stage	1^{st}-Stage	2^{nd}-Stage	1^{st}-Stage	2^{nd}-Stage
Real Estate Transfer Tax (Yr 1997)	-0.550***		-0.550***		-0.588***		-0.550***	
	[0.090]		[0.090]		[0.132]		[0.090]	
Skilled Labor Risk		-0.037***		0.042***		0.075*		0.053
		[0.011]		[0.011]		[0.039]		[0.034]
First-stage F-stat	36.98		36.98		19.90		36.98	
Firm&State Controls	Y	Y	Y	Y	Y	Y	Y	Y
Ind. FE & Yr. FE	Y	Y	Y	Y	Y	Y	Y	Y

Table 13: **Skilled Labor Risk and Executive Compensation Structure: Second Instrument**

This table reports the 2SLS estimations of the effects of skilled labor risk on the level and the incentive and duration structures of executive compensation. We use home equity shock as an instrument for the skilled labor risk and home equity shock is defined as the yearly change in the national house price index the Federal Housing Finance Agency divided by the topological elasticity of housing supply at the MSA level. The total compensation and incentive structure data is available from 1996 to 2013. In all estimations, *Total Pay* is the natural logarithm of the total compensation for the executive team and CEOs. In both stages of estimations, the control variables include all the firm-level independent variables other than skilled labor risk in Table 11. Panels A and B present first and second-stage estimations for the compensation structures of the executive team and the CEOs, respectively. The total compensation levels for the executive team and CEOs are adjusted by the average regional price parities at the MSA level between 2008 and 2014. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	Panel A: Executive Team			
	First-Stage	Cash/Total	Incentive/Total	Total Pay
Home Equity Shock	12.046***			
	[1.897]			
Skilled Labor Risk		-0.020**	0.026***	0.018
		[0.008]	[0.009]	[0.022]
First-stage F-stat	40.31			
Firm Controls	Y	Y	Y	Y
Ind. FE & Yr. FE	Y	Y	Y	Y
	Panel B: CEO			
	First-Stage	Cash/Total	Incentive/Total	Total Pay
Home Equity Shock	12.398***			
	[1.940]			
Skilled Labor Risk		-0.026**	0.035***	0.026
		[0.011]	[0.012]	[0.029]
First-stage F-stat	40.82			
Firm Controls	Y	Y	Y	Y
Ind. FE & Yr. FE	Y	Y	Y	Y

Table 14: **Skilled Labor Risk and Compensation Structure for Non-chief-executive Employees**

This table reports the 2SLS estimations of the effects of skilled labor risk on the incentive structure and level of the compensation for non-chief-executive employees. The dependent variable in columns (1)-(2), *Incentive/Total*, is the fraction of the Black-Scholes value of broad-based stock options (BBSO) granted to the non-executive employees in total compensation for the non-chief-executive employees. We follow the procedure in Aldatmaz et al. (2016) to estimate the Black-Scholes value of BBSO granted to the non-chief executive employees. To capture the total compensation for the non-chief-executive employees, we use the total staff expense reported in Compustat (item XLR) minus the total compensation for the top five executives. We use the product of the average annual pay per employee in Quarterly Census of Employment and Wages (QCEW) and a firm's total employment to impute the missing values in XLR and the total compensation for the top five executives is calculated as the average compensation for an executive in a firm multiplied by five. Incent./Total is set as missing if it is less than zero or larger than or equal to one. The dependent variable in columns (3)-(4), *Total Pay*, is the natural logarithm of the total compensation for the non-chief-executive employees. The total compensation in column (4) is adjusted by the average regional price parities at the MSA level between 2008 and 2014. In columns (1) and (3), we report the IV estimations (IV1) using the 1997 residential real estate transfer tax rate in a firm's headquarters state as an instrument for the skilled labor risk. Except for the dependent variable, the empirical specifications are the same as the one in Table 12. In columns (2) and (4), we report the IV estimations (IV2) using home equity shock as an instrument for the skilled labor risk. Except for the dependent variable, the empirical specifications are the same as the one in Table 13. Home equity shock is defined as the yearly change in the national house price index the Federal Housing Finance Agency divided by the topological elasticity of housing supply at the MSA level. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	Incentive/Total		**Total Pay**	
	IV1	IV2	IV1	IV2
	(1)	(2)	(3)	(4)
Skilled Labor Risk	0.022**	0.030***	0.041*	0.072***
	[0.009]	[0.010]	[0.025]	[0.021]
First-stage F-stat	32.84	27.88	32.84	32.59
Firm&State Controls	Y	Y	Y	Y
Ind. FE & Yr. FE	Y	Y	Y	Y

Table 15: **Skilled Labor Risk and Strengths of Employee Relations**

This table reports the 2SLS estimations of the effects of skilled labor risk on the strengths of employee relations. The data on the strengths of employee relations is from the MSCI database. The dependent variable in Panel A is *Total Strengths of Employee Relations*, which is defined as the average rating across all dimensions in employee relations. The dependent variable in columns (1)-(2) of Panel B is *Compensation&Benefits-Related Strengths*, which is defined as the average rating in employee relations related to compensation and benefits. There are four dimensions related to compensation&benefits including cash profit sharing, employee involvement, retirement benefits, and compensation & benefits. The dependent variable in columns (3)-(4) of Panel B is *Other Strengths*, which is defined as the average rating in employee relations that are not related to compensation or benefits. All dependent variables are forwarded one year. For the IV estimations (IV1) using the 1997 residential real estate transfer tax rate in a firm's headquarters state as an instrument for the skilled labor risk, the empirical specifications are the same as the one in Table 12 except for the dependent variables. For the IV estimations (IV2) using home equity shock as an instrument for the skilled labor risk, the empirical specifications are the same as the one in Table 13 except for the dependent variables. Home equity shock is defined as the yearly change in the national house price index the Federal Housing Finance Agency divided by the topological elasticity of housing supply at the MSA level. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	Panel A: Total Strengths of Employee Relations	
	IV1	IV2
	(1)	(2)
Skilled Labor Risk	0.010*	0.009*
	[0.005]	[0.005]
First-stage F-stat	36.25	44.03
Firm&State Controls	Y	Y
Ind. FE & Yr. FE	Y	Y

	Panel B: Compensation&Benefits-Related v.s. Other Strengths			
	Compensation&Benefits-Related		Other	
	IV1	IV2	IV1	IV2
	(1)	(2)	(3)	(4)
Skilled Labor Risk	0.022**	0.017**	0.005	0.001
	[0.009]	[0.008]	[0.005]	[0.005]
First-stage F-stat	35.23	45.07	36.25	44.03
Firm&State Controls	Y	Y	Y	Y
Ind. FE & Yr. FE	Y	Y	Y	Y

Appendix

Appendix A: Variable Definitions

Variable	Definition
Skilled Labor Risk and Labor Market	
Skilled Labor Risk	Number of sentences a firm spend discussing risk associated with skilled labor in the 10-K in a year. Source: Corporate 10-K filings in EDGAR Database.
# of SIC2 Rivals (50 mi radius)	Number of publicly traded firms in the same 2-digit SIC industry within a 50-mile radius around a firm's headquarters. Source: Corporate 10-K filings in EDGAR Database and Compustat.
# of SIC2 Rivals (50-100 mi radius)	Number of publicly traded firms in the same 2-digit SIC industry located outside a 50-mile radius but within a 100-mile radius around a firm's headquarters. Source: Corporate 10-K filings in EDGAR Database and Compustat.
# of SIC2 Rivals (100-200 mi radius)	Number of publicly traded firms in the same 2-digit SIC industry located outside a 100-mile radius but within a 200-mile radius around a firm's headquarters. Source: Corporate 10-K filings in EDGAR Database and Compustat.
# of SIC2 Rivals (Outside 200 mi radius)	Number of publicly traded firms in the same 2-digit SIC industry outside a 200-mile radius around a firm's headquarters. Source: Corporate 10-K filings in EDGAR Database and Compustat.
# of Non-SIC2-Rivals (50 mi radius)	Number of publicly traded firms that are not in the same 2-digit SIC industry and within a 50-mile radius around a firm's headquarters. Source: Corporate 10-K filings in EDGAR Database and Compustat.
# of Non-SIC2-Rivals (50-100 mi radius)	Number of publicly traded firms that are not in the same 2-digit SIC industry and located outside a 50-mile radius but within a 100-mile radius around a firm's headquarters. Source: Corporate 10-K filings in EDGAR Database and Compustat.
# of Non-SIC2-Rivals (100-200 mi radius)	Number of publicly traded firms that are not in the same 2-digit SIC industry and located outside a 100-mile radius but within a 200-mile radius around a firm's headquarters. Source: Corporate 10-K filings in EDGAR Database and Compustat.
# of Non-SIC2-Rivals (Outside 200 mi radius)	Number of firms that are not in the same 2-digit SIC industry and outside a 200-mile radius around a firm's headquarters. Source: Corporate 10-K filings in EDGAR Database and Compustat.
Distance to Land-Grant U. (100 Miles)	A firm's average distance to all land-grant universities and colleges in U.S. Source: Corporate 10-K filings in EDGAR Database and United States Department of Agriculture.
Distance to In-State Land-Grant U. (100 Miles)	A firm's average distance to all land-grant universities and colleges in the firm's headquarters state. Source: Corporate 10-K filings in EDGAR Database and United States Department of Agriculture.
Compensation and Executive Characteristics	
CEO Compensation ($000)	Total compensation for the CEO. For the data under the old disclosure rule, it equals to TDC1 in Execucomp; for the data under the new disclosure rule, it equals the sum of salary, bonus, deferred compensation earnings reported as compensation, other compensation (from Execucomp), and the present value of stock options (Black-Scholes value), restricted stocks and incentive plan awards at the grant data (From Equilar). Source: Execucomp and Equilar.

Variable	Definition
Avg. Executive Compensation($000)	Average total compensation for all executives with reported compensation data. The total compensation is defined in the same way as for CEO. Source: Execucomp and Equilar.
CEO Cash Pay/Total Pay	Fraction of cash pay in total compensation for the CEO. Cash pay equals the sum of salary and bonus. Source: Execucomp.
Avg. Executive Cash Pay/Total Pay	Average fraction of cash pay in total compensation for the executive team. Cash pay equals the sum of salary and bonus. Source: Execucomp.
CEO Incentive Pay/Total Pay	Fraction of incentive pay in total compensation for the CEO. Incentive pay equals the sum of grant date present value of stock options, restricted stocks, and incentive plan awards. Source: Execucomp and Equilar.
Avg. Executive Incentive Pay/Total Pay	Average fraction of incentive pay in total compensation for the executive team. Incentive pay equals the sum of grant date present value of stock options, restricted stocks, and incentive plan awards. Source: Execucomp and Equilar.
CEO Pay Duration	Average pay duration of the CEO. The definition follows Gopalan et al. (2014). Source: Execucomp and Equilar.
Avg. Executive Pay Duration	Average pay duration of the executive team. The definition follows Gopalan et al. (2014). Source: Execucomp and Equilar.
CEO Age	Age of the CEO. Source: Execucomp
CEO Tenure	Tenure (in years) of the CEO. Source: Execucomp
Execu.Turnover in Past 3 Yr	A dummy variable equal to one if a firm experiences at least one executive departure in the past three years (including current year) and zero otherwise. Source: Execucomp and authors' calculation
Execu.Turnover in Next 3 Yr	A dummy variable equal to one if a firm experiences at least one executive departure in the next three years and zero otherwise. Source: Execucomp and authors' calculation
Non-chief-executive Employee Compensation ($000)	Total compensation for the non-chief-executive employees. Source: Compustat and Quarterly Census of Employment and Wages (QCEW)
Non-chief-executive Employee Incentive Pay/Total Pay	The fraction of the Black-Scholes value of broad-based stock options granted to the non-executive employees in total compensation for the non-chief-executive employees. Source: Execucomp and Compustat
Total Strengths of Employee Relations	The average rating across all dimensions in employee relations. Source: MSCI database
Compensation&Benefits-Related Strengths of Employee Relations	The average rating in employee relations related to compensation and benefits. There are four dimensions related to compensation&benefits including Cash Profit Sharing Strength, Employee Involvement Strength, Retirement Benefits Strength, and Compensation & Benefits Strength. Source: MSCI database
Other Strengths of Employee Relations	The average rating in employee relations that are not related to compensation and benefits. Source: MSCI database
Firm-year level Characteristics and Financial Policies	
Cash Holding	(Cash + short-term investment)/total assets: (CHE/AT). Source: Compustat.

Variable	Definition
Book Leverage	Total debt/(Total debt+ equity): (DLC+DLTT)/(DLC+DLTT+CEQ). If CEQ<0, we set it as missing. If the calculated leverage is larger than one, we set it as one. Source: Compustat.
Market Leverage	Total debt/(Total debt+ market value of equity). If the calculated leverage is larger than one, we set it as one. Source: Compustat.
Log(Assets)	Natural logarithm of total assets: Log(AT). Source: Compustat.
Firm Age	Firm age is calculated as the difference between the current year and the firm's starting year. The starting year is defined in the following order: (1) the founding year; (2) the IPO year if the founding year is missing; (3) the year of first trading with non-missing price from CRSP if the IPO year is missing; (4) the first year in Compustat if there is no trading information in CRSP. Source: Jay Ritter's IPO Database, CRSP, and Compustat.
Market to Book	(Equity value+total assets-book equity)/total book assets: (PRCCF_F×CSHO+AT-CEQ)/AT. If CEQ<0, we set it as missing. Source: Compustat.
Tangibility	(Property, Plant and Equipment)/total assets: PPENT/AT. Source: Compustat.
Intangible Assets	(Intangible assets on the balance sheet)/total assets: INTAN/AT. Source: Compustat.
Capex	Capital expenditures/total assets: CAPX/AT. Source: Compustat.
R&D	(Research and development expenses)/total assets: XRD/AT. If XRD is missing, we set it as zero. Source: Compustat.
Sales Growth	(Sales(t)/CPI(t)-Sales(t-1)/CPI(t-1))/(Sales(t-1)/CPI(t-1). Source: Compustat and FRED Database.
ROA	(Operating Income Before Depreciation)/total assets: OIBDP/AT. Source: Compustat.
Sales Vol.	The standard deviation of 5-year (including the current year) sales to total assets ratio. Source: Compustat.
Organizational Capital	The measure for the stock of organizational capital in Eisfeldt and Papanikolaou (2013) divided by total assets. Source: Compustat
Modified Organizational Capital	The measure for the stock of organizational capital in Peters and Taylor (2016) divided by total assets. Source: Luke Taylor's webpage at `http://finance-faculty.wharton.upenn.edu/luket/publications/`
Mention Key Man Insurance	A dummy variable equal to one if a firm mentions "Key Man Life Insurance" in at least on electronic corporate filing in a year and zero otherwise. Source: Israelsen and Yonker (2015)
Carry Key Man Insurance	A dummy variable equal to one if a firm carries "Key Man Life Insurance" in a year and zero otherwise. Source: Israelsen and Yonker (2015)
Industry-level Skilled Labor Reliance	Fraction of high skilled labor in an industry. Source: Belo et al. (2016)
Total Volatility	Standard deviation of daily stock return in a fiscal year. Source: CRSP Daily Stock Return File
Idiosyncratic volatility	Standard deviation of the residual from a regression of daily stock returns on the three Fama-French factors in a fiscal year. Source: CRSP Daily Stock Return File
Beta	Estimated coefficient on the market factor from a regression of daily stock returns on the three Fama-French factors in a fiscal year. Source: CRSP Daily Stock Return File
G-Index	G-index. Source: ISS (Risk Metrics)
Fraction of Independent Directors	Fraction of Independent Directors in a firm. Source: ISS (Risk Metrics)

Variable	Definition
CEO & Chairman	A dummy variable indicating whether CEO is also the board chairman in a firm-year. Source: ISS (Risk Metrics)
State-year level Variables	
Non-Compete	Non-compete covenants enforcement index. Data since 2005 is imputed using the value in 2004. Source: Germaise (2011).
Inevitable Disclosure Doctrine (IDD)	A dummy variable that equals to one if a firm's annual report filing date is at least three months after the adoption of the IDD and before the rejection of previously adopted IDD, and equals to zero otherwise. Source: Klasa, Ortiz-Molina, Serfling, and Srinivasan (2016).
Real Estate Transfer Tax (%)	Transfer tax rate on residential housing transactions in a state. Source: Thomson Reuters Check-Point Database and Lincoln Institute of Land Policy.
Employment Rate	The ratio of number of jobs to total population in a state. Source: The Bureau of Economic Analysis.
Log(Income Per Cap.)	Natural logarithm of real income per capital in a state. Source: The Bureau of Economic Analysis.
Log(Population)	Natural logarithm of total population in a state. Source: The Bureau of Economic Analysis.
State Colleges Per Cap $\times 10^6$	Number of higher education institutions per one million population in a state. Source: The National Center for Education Statistics

Appendix B: Robustness Tests for Table 5

This table reports the effects of local labor market competition on a firm's skilled labor risk using alternative measures for local labor market competition. In addition to 2-digit SIC (SIC2), we use 3-digit SIC (SIC3), Fama-French 48 (FF48), and the recently developed Hoberg-Phillips text-based network (HP) industry classification in this table. The variable "# of Industry Rivals (m mi radius)" counts the number of publicly traded firms in the same industry and within an m-mile radius from the firm's headquarters location. Similarly, the variable "# of Non-Industry-Rivals (m mi radius)" counts the number of publicly traded firms outside the firm's industry in an m-mile locality around the firm. We also consider the size of industry rivals in the local market as an alternative measure. In particular, "SIC2 Rivals' Sales (Employment) Share (50 mi radius)" is the fraction of local industry rivals' sales (employment) in the total sales (employment) of publicly traded companies within a 50-mile radius around the firm's headquarters. We also utilize the data from County Business Pattern (CBP) and calculate the number of establishments in the same state and 2-digit SIC industry ("# of SIC2 Estab. (Within State)") for each firm. All variables for labor market competition have been standardized by their standard deviations. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	SIC3 Industry	FF48 Industry	CBP Data	Hoberg-Phillips Industry	SIC2 Rivals' Sales Share	SIC2 Rivals' Employment Share	Poisson	Log(Skilled Labor Risk)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
# of SIC3 Rivals (50 mi radius)	0.299***							
	[0.041]							
# of Non-SIC3-Rivals (50 mi radius)	-0.421***							
	[0.074]							
# of FF48 Rivals (50 mi radius)		0.320***						
		[0.047]						
# of Non-FF48-Rivals (50 mi radius)		-0.524***						
		[0.077]						
Log(# of SIC2 Estab. (Within State))			0.250**					
			[0.103]					
Log(# of Non-SIC2-Estab. (Within State))			-2.361***					
			[0.422]					
# of HP Rivals (50 mi radius)				0.542***				
				[0.037]				
# of Non-HP-Rivals (50 mi radius)				-0.373***				
				[0.075]				
SIC2 Rivals' Sales Share (50 mi radius)					0.211***			
					[0.033]			
SIC2 Rivals' Employment Share (50 mi radius)						0.199***		
						[0.032]		
# of SIC2 Rivals (50 mi radius)							0.074***	
							[0.010]	
# of Non-SIC2-Rivals (50 mi radius)							-0.157***	
							[0.028]	
Log(1+# of SIC2 Rivals (50 mi radius))								0.106***
								[0.013]
Log(1+# of Non-SIC2-Rivals (50 mi radius))								-0.039***
								[0.013]
Firm&State Controls	Y	Y	Y	Y	Y	Y	Y	Y
Ind. FE	Y	Y	Y	N	Y	Y	Y	Y
Yr FE	Y	Y	Y	Y	Y	Y	Y	Y
Adj. R^2	0.360	0.317	0.324	0.268	0.318	0.318		0.368
N	71996	71996	62605	66044	71996	71996	71996	71996

Appendix C: The Effects of the Inevitable Disclosure Doctrine (IDD)

Based on the court rulings on the IDD identified by Klasa et al. (2016), ten states had a change in their IDD recognition during our sample period.[1] These changes allow us to identify the IDD effect on firms' skilled labor risk. We assume that a firm-year is affected by the state court decision regarding the adoption or rejection of the IDD if the firm's annual 10-K filing date is at least three months after the decision date. Since the 10-K filing preparation time is on average about 3 months, the 3-month lag gives firms time to react to the court decision. For each firm, we create an indicator variable "IDD" that equals zero for years before the IDD adoption decision in its headquarters state or after the decision that reversed the state court's previous favorable position on IDD, and equals one after the adoption decision or before the rejection of the previous adoption.

Our empirical approach is a difference-in-differences method.[2] The results are reported below. The estimations show that the effect of IDD on Skilled Labor Risk is negative and significant, which suggests that the adoption (rejection) of the IDD in a state decreases (increases) firms' skilled labor risk. The results in column (3) further suggests that the adoption of the IDD makes firms' skilled labor risk insensitive to local labor market competition. In column (4), we report the dynamic treatment effects and examine whether the parallel trends assumption is satisfied. IDD-t is a dummy variable that indicates t years from the year of the IDD adoption date (plus 3 months). IDD Rejection is a dummy variable that equals to one if a firm's annual report filing date is at least three months after the rejection of the previously adopted IDD in the headquarters state and zero otherwise. The estimations show that the coefficients on IDD^{-3}, IDD^{-2}, IDD^{-1}, and IDD^{0} are insignificant and the skilled labor risk of affected firms decreases relative to unaffected firms only after the adoption of the IDD. Overall, the results suggests that the parallel trends assumption is not violated in our sample.

[1] They are Arkansas (adopted IDD in March 1997), Florida (rejected the previously adopted IDD in May 2001), Georgia (adopted IDD in June 1998), Kansas (adopted IDD in February 2006), Michigan (rejected the previously adopted IDD in April 2002), Missouri (adopted IDD in November 2000), Ohio (adopted IDD in September 2000), Texas (rejected the previously adopted IDD in April 2003), Utah (adopted IDD in January 1998), and Washington (adopted IDD in December 1997)

[2] Note that the specification with the IDD indicator and firm fixed effects and year fixed effects on the right-hand-side essentially produces the difference-in-differences estimator

The Effects of the Inevitable Disclosure Doctrine

This table reports the effect of the recognition of the Inevitable Disclosure Doctrine (IDD) in a firm's headquarters state on the firm's skilled labor risk. IDD is a dummy variable that equals to one if a firm's annual report filing date is at least three months after the adoption of the IDD and before the rejection of the previous adoption of the IDD if applicable in the headquarters state and equal to zero otherwise. IDD^{-3}, IDD^{-2}, IDD^{-1}, IDD^{0}, IDD^{+1}, IDD^{+2}, and IDD^{3+} are dummy variables that equal to one if the differences between a firm's annual report filing year and the year of IDD adoption date plus 3 months are minus three, minus two, minus one, zero, one, two, and at least three, respectively, and zero otherwise. IDD rejection is a dummy variable that equals to one if a firm's annual report filing date is at least three months after the rejection of the previously adopted the IDD in the headquarters state and zero otherwise. # of SIC2 Rivals (50 mi radius) is standardized by its standard deviation. Standard errors in parentheses are robust and clustered at the state level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
IDD	-0.109**	-0.150*	-0.005	
	[0.049]	[0.085]	[0.105]	
IDD*# of SIC2 Rivals (50 mi radius)			-0.366***	
			[0.076]	
# of SIC2 Rivals (50 mi radius)			0.311***	
			[0.036]	
IDD^{-3}				0.084
				[0.100]
IDD^{-2}				0.043
				[0.124]
IDD^{-1}				-0.069
				[0.153]
IDD^{0}				-0.204
				[0.166]
IDD^{+1}				-0.047
				[0.190]
IDD^{+2}				-0.254*
				[0.150]
IDD^{3+}				-0.238*
				[0.131]
IDD Rejection				0.115
				[0.090]
Log(Assets)		0.377***	0.359***	0.378***
		[0.027]	[0.029]	[0.027]
Log(1+FirmAge)		-0.115	-0.074	-0.119
		[0.190]	[0.171]	[0.191]
ROA		-0.296**	-0.274**	-0.296**
		[0.117]	[0.108]	[0.116]
Market to Book		0.041***	0.038***	0.041***
		[0.009]	[0.009]	[0.009]
Sales Growth		0.077***	0.076***	0.077***
		[0.017]	[0.016]	[0.017]
R&D		0.033**	0.035**	0.033**
		[0.013]	[0.014]	[0.013]
R&D Missing		-0.026	-0.012	-0.028
		[0.133]	[0.131]	[0.133]
Capex		0.685***	0.710***	0.687***
		[0.221]	[0.219]	[0.221]
Tangibility		0.101	0.093	0.102
		[0.189]	[0.175]	[0.189]
Intangible Assets		0.426***	0.496***	0.425***
		[0.154]	[0.154]	[0.155]
Sales Vol.		0.035	0.017	0.036
		[0.100]	[0.097]	[0.100]
Employment Rate		-0.348	-0.747	-0.365
		[0.785]	[0.711]	[0.763]
Log(Income Per Cap.)		0.607	0.651	0.608
		[0.487]	[0.482]	[0.484]
Log(Population)		-0.028	-0.124**	-0.019
		[0.050]	[0.050]	[0.049]
Firm FE & Filing Yr FE	Y	Y	Y	Y
Adj. R^2	0.735	0.756	0.757	0.756
N	104716	70500	70500	70500

Appendix D: Firm Characteristics by High and Low State Real Estate Transfer Tax Rates

This table compares firm characteristics for firms headquartered in states with high and low real estate transfer tax rates. High (Low) Tax Rate dummy equals one if a state's real estate transfer tax rate in 1997 is no less than the sample median and zero otherwise. Total volatility, idiosyncratic volatility, book leverage, market leverage, and cash holding are expressed in percentage points. Robust standard errors for calculating the p-value of difference are clustered at the state level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	High Tax Rate	Low Tax Rate	Difference	*p*-value of Difference
Firm Size	6.854	6.606	0.223	0.278
Firm Age	38.585	33.587	5.028	0.117
ROA	0.129	0.122	0.007	0.516
Market to Book	1.926	2.019	-0.085	0.624
Sales Growth	0.094	0.127	-0.032	0.101
R&D	0.046	0.081	-0.035	0.399
Capex	0.045	0.058	-0.014	0.120
Tangibility	0.240	0.274	-0.035	0.498
Intangible Assets	0.183	0.152	0.032	0.001
Sales Vol.	0.144	0.162	-0.017	0.122
Total Volatility (%)	3.032	3.297	-0.261	0.226
Idiosyncratic Volatility (%)	2.799	3.054	-0.250	0.216
Beta	1.052	1.109	-0.057	0.198
Book Leverage (%)	33.693	29.516	4.132	0.235
Market Leverage (%)	22.588	19.840	2.652	0.342
Cash Holding (%)	13.953	17.450	-3.465	0.455
G-Index	9.394	8.905	0.498	0.178
Fraction of Independent Directors	0.712	0.716	-0.004	0.564
CEO&Chairman	0.701	0.645	0.058	0.012

Appendix E: The Effects of Home Equity Shock on Skilled Labor Risk

The home equity shock is defined as the yearly change in the national house price index from the Federal Housing Finance Agency divided by the topological elasticity of housing supply in an MSA. We expect that positive (negative) shocks to household home equity in an area would facilitate (hinder) labor mobility (of home owners). Thus the home equity shock is expected to be positively related to local firms' skilled labor risk. However, the challenge we face is that once a firm starts to disclose skilled labor risk in its 10Ks in the post SEC Regulation S-K Item 305(c) period (i.e., after 2005), the value of the skilled labor risk measure does not vary much over time. This is possibly due to concerns of litigation risk. In areas with lower elasticities of housing supply, the housing prices increased more under the long rising national house price trend, leading to higher labor mobility and higher skilled labor risk for firms in those areas. When the positive house price trend turned to negative in 2008 (which is post the SEC regulation), those areas with lower elasticities of housing supply experienced larger drops in house prices. But we may not see a larger decrease in the value of our skilled labor risk measure in those areas due to the rigidity in the measure post the SEC regulation. This problem could even lead to a negative relation between home equity shock and firms' Skilled Labor Risk during years of negative home equity shocks. In the table below, we show that the data support our intuition. In the full sample, there is a significantly positive relation between Home Equity Shock and Skilled Labor Risk. But the positive relation is concentrated in the years of rising housing prices in the country. In the years with negative home equity shocks, the relation turns to negative, consistent with our discussion above. However, if we examine the probability of a firm initiating discussion about skilled labor risk in its 10K post 2007 (i.e., the value of Skilled Labor Risk increases from zero to positive), then we do find a significantly positive relation between Home Equity Shock and the probability of initiation in the housing market downturn. In areas with more negative home equity shocks, firms are less likely to start to concern about skilled labor mobility. Overall, the results in this table suggest that Home Equity Shock can be a valid instrument for our measure of firms' skilled labor risk, but only in periods with positive home equity shocks.

The Effects of Home Equity Shock on Skilled Labor Risk

This table reports the effects of home equity shock on our measure of firms' skilled labor risk. Home equity shock is the yearly change in the national house price index the Federal Housing Finance Agency divided by the topological elasticity of housing supply in an MSA. The dependent variable in the first three columns is Skilled Labor Risk. The dependent variable in the last column is Initiation of Skilled Labor Risk Discussion, which is a dummy variable equal to one if the year of a firm's first-time discussion about skilled labor risk is in or after 2007 and zero otherwise. The sample in the last column includes only the post-2007 period and excludes firms that initiated the skilled labor risk discussion in 10Ks before 2007. Standard errors in parentheses are robust and clustered at the firm level. ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

	Full Sample	Home Equity Shock>0	Home Equity Shock<0	Post-2007
Dependent Variable:	Skilled Labor Risk	Skilled Labor Risk	Skilled Labor Risk	Initiation of Skilled Labor Risk Discussion
Home Equity Shock	6.551***	11.121***	-14.139***	0.308**
	[0.804]	[1.138]	[2.351]	[0.149]
Log(Assets)	0.194***	0.190***	0.189***	-0.009*
	[0.019]	[0.018]	[0.032]	[0.005]
Log(1+FirmAge)	-0.676***	-0.673***	-0.606***	0.036***
	[0.045]	[0.043]	[0.078]	[0.011]
ROA	-0.000	0.038	-0.061	-0.054**
	[0.094]	[0.094]	[0.194]	[0.024]
Market to Book	0.055***	0.061***	0.014	-0.002
	[0.014]	[0.014]	[0.033]	[0.004]
Sales Growth	0.160***	0.148***	0.225***	0.017***
	[0.021]	[0.022]	[0.057]	[0.005]
R&D	0.183***	0.176***	0.197***	-0.004
	[0.024]	[0.023]	[0.050]	[0.005]
R&D Missing	-0.490***	-0.482***	-0.487***	-0.040*
	[0.089]	[0.085]	[0.161]	[0.024]
Tangibility	-2.432***	-2.197***	-2.603***	0.252***
	[0.205]	[0.189]	[0.394]	[0.058]
Intangible Assets	-0.544***	-0.493***	-0.484	0.220***
	[0.202]	[0.190]	[0.352]	[0.046]
Sales Vol.	0.347***	0.375***	0.367	0.109***
	[0.096]	[0.096]	[0.229]	[0.031]
Capex	4.094***	3.837***	4.731***	-0.161
	[0.450]	[0.441]	[1.012]	[0.121]
SIC2 FE & Yr FE	Y	Y	Y	Y
Adj. R^2	0.311	0.319	0.210	0.079
N	58740	46171	12569	12333