

**Generalists versus Specialists:
The Board's Revealed Perception of CEO General Skill and CEO Pay**

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Abstract

We construct a new index of CEO general managerial skill using the industry composition of the CEO compensation peer group and use it to examine the relation between CEO general skill and CEO pay. Our index has the advantage of capturing the board's perception of CEO general skill and is less subject to concerns for confounding factors than existing measures based on lifetime work experience. Using our index, we find that the board does set a higher pay benchmark for generalist CEOs than specialist CEOs, however, the premium is not large enough to significantly increase CEO total pay. To validate our index, we provide evidence that industry composition of peer groups contains information about a CEO's general skill and our index performs better and is less affected by CEO power and other confounding factors in capturing general skill than the existing measure. Overall, our evidence supports the existence of a pay premium for generalist CEOs but we find its effect on CEO total pay to be too small to explain the rise in executive compensation over the past decades.

Keywords: Executive Compensation, Compensation Peer Group, Board of Directors

1. Introduction

The dramatic increase in executive compensation over the past four decades has attracted a lot of attention from academic researchers and the public. Although the public has expressed open outrage, what drive this rise remain a subject of intense academic debate. One side of the debate attributes this to managerial power and rent extraction (Bebchuk, Fried and Walker, 2002), while the other side argues that this trend can be justified by increased market competition for managerial talents.¹ Gabaix and Landier (2008) develop a model of labor market competition that relates the rise in CEO pay to increases in firm size. Murphy and Zabojnik (2004, 2007) on the other hand offer a different model of competitive labor market that attributes the rise to the growing importance of general managerial skills (transferrable across firms and industries) over firm-specific skill (valuable only within the firm).² Their model says that, as general skills become more important, more firms choose to fill their CEO vacancies with outside hires, which intensifies the labor market competition for CEOs with general skills and leads to higher CEO pay. A testable prediction of the Murphy and Zabojnik (2004, 2007) model is that CEOs with more general skills have more outside options and earn higher pay. Whether this prediction holds in the data is an important empirical question that has implications not only for understanding the trend in executive compensation but also for understanding the relation between CEO skill and pay. In this paper, we develop a new measure of CEO general skill to test this prediction.

The biggest challenge in studying the relation between CEO general skill and CEO pay is that CEO general skill is not directly observable. Existing studies have used observable characteristics of CEOs to proxy for their general managerial skills. For example, Murphy and Zabojnik (2004, 2007)

¹ See, among others, Murphy and Zabojnik (2004, 2007), Frydman (2010), Gabaix and Landier (2008), Tervio (2008), Edmans, Gabaix and Landier (2009) and Pan (2015).

² As stated in the paper, general managerial skills have become more important because of the changing nature of CEO's job. First, they argue that, over the past few decades, the society has steadily accumulated a body of knowledge in economics, management science, accounting, finance, and other disciplines, which, if mastered by a CEO, can substantially improve his ability to manage any modern corporations successfully. Second, improved communication and information technologies enable CEOs to acquire firm-specific knowledge more easily than decades ago. Therefore, CEO job now requires more general skills than firm-specific skills or knowledge.

use MBA degree to proxy for CEO's general knowledge that can be applied to any modern corporations. Custódio, Ferreira, and Matos (2013) use CEO's lifetime working experience to quantify the general skill that CEOs have developed from the experiences of working in different positions, firms and industries (Henceforth the CFM index).³ Since these measures are based on observable career paths of CEOs, they inevitably also capture other observable and unobservable characteristics of the CEO that affects pay on their own. For example, MBA degrees also captures CEOs' talent as higher education is also viewed as a talent measure and talented CEOs are expected to earn higher pay (Falato, Li, and Milbourn (2015)). The lifetime working experience could capture a variety of factors that affect a CEO's pay besides general skill, such as talent, influence or other non-managerial skills like the skill to capture the board. Both measures may also capture the size of the social and professional network that a CEO can leverage to increase her bargaining power. Even though time-invariant unobservable characteristics, such as intelligence, can often be controlled for using CEO fixed effects, it is difficult to fully control for all the time-varying characteristics.

The ex post nature of the lifetime experience-based measure of general skill also means that it would leave out the group of CEOs whose general skill is known to the board but who have not changed their jobs very often, maybe because their employers are able to retain them by offering a competitive pay. Such CEOs may exist because having experience in multiple firms and industries is not the only way to show and develop general managerial skills. Even for CEOs who have worked in different firms and industries, they may have already exhibited general managerial skills to the board and potential employers even before their first move to a different firm or industry. Also, the group of CEOs who can hop among different firms and industries is unlikely to be a randomly selected sample. Some CEOs

³ We refer the measure as past-experience-based measure throughout the paper. These authors quantify general ability by creating general ability index that combines five dimensions of CEO's past experience: number of firms worked, number of industries worked, number of positions worked, prior CEO experience and conglomerate management experience, and find CEOs who have general ability index above the sample median earn 19% more than CEOs who are below the median.

could simply be more talented in this aspect than others. If the higher pay to CEOs with more lifetime work experience is driven by their experience rather than general skill, then missing out the group of generalist CEOs who do not have a rich lifetime work experience can bias towards finding a generalist CEO pay premium.

In this paper, we take an innovative approach to recover the board of directors' perception of the CEO's general skill and thus overcome most of these problems. Our measure of CEO general skill is motivated by the fact that many firms use a compensation peer group to set a competitive market wage for their CEO. For example, in 2015, 95% of the S&P 500 companies disclosed a peer group. These data are made available by a SEC rule in 2006 that required public companies that utilize a group of peer companies to benchmark compensation to disclose those peers. The compensation committee of the board typically has the responsibility of choosing and approving the peers.⁴ A typical claim made by compensation committees is that benchmarking is done to attract and retain valuable human capital. Hence, in theory, the compensation peers of a benchmarking firm should be selected to proxy for its CEO's outside options.⁵ Intuitively, the immediate competitors for the CEO's talent are firms in the same industry and size group as the benchmarking firm. Consistent with this, in general, industry and size are the most common criteria for choosing a peer group. However, pay consultants also notice that firms also often select peers based on whether the potential peer is a source or destination of executive talents.⁶ Our examination of the composition of peer groups reveals that many benchmarking firms

⁴ See Reda, Reifler, and Thatcher (2008) and Elson and Ferrere (2012) for detailed discussion of the peer selection process.

⁵ See Bizjak, Lemmon, and Naveen (2008, 2011) and Faulkender and Yang (2010). These authors provide evidence that peer group reflect CEOs' outside options. Specifically, Bizjak, Lemmon, and Naveen (2008) provides examples where firms explicitly state they use peer group to gauge CEO's opportunities in other firms, and they compete their CEO talents with these peer companies.

⁶ For example, Pay Governance Partner Patrick Haggerty wrote: "In general, industry and revenue are the most common criteria for choosing a peer group. In fact, more than 90% of S&P 500 companies use industry as a benchmark, and 75% choose peers based on revenue. However, there are some circumstances where companies

include firms from outside their industry as compensation peers. If these firms from other industries are selected to benchmark the CEO's outside options by the board, then by examining the industry composition of a firm's CEO peer group, we should be able to recover the board's perception of the CEO's general managerial skills that are transferrable across industries. Based on this reasoning, we propose to use the number of industries that are represented in a CEO's compensation peer group to measure the CEO's general skills that are transferrable across industries. Specifically, we create a new index of CEO general skill that equals to the natural logarithm of the number of industries in a CEO's peer group. The logarithmic transformation is used because we expect that the marginal contribution of an additional industry in the peer group to capture a CEO's general skill is likely to decrease with the number of industries already in the group. In addition, this also reduces the noise in the measure in case not all industries are included to benchmark a CEO's outside options.

Our index has the following advantages over the existing lifetime work experience-based index of CEO general skill. First, since our index is not based on observable CEO career paths, it is less affected by other confounding factors that are associated with a CEO's career paths and affect CEO pay. Especially, our index allows us to examine the pay to the group of CEOs whose general skills are known to the board but who have not worked in many different firms and industries, which is a relatively clean sample of CEOs with general skills. Second, our index reveals boards' perception of a CEO's general skill. Since the board sets the CEO's compensation, it is the most relevant measure for investigating the relationship between CEO general skill and pay.

We first validate our assumption that industry composition of a peer group contains useful information about a CEO's general skills transferrable across industries by data. To do so, we focus on

steer from selecting peers based on industry and revenue such as, market cap, whether the potential peer is a source/destination of executive talent, and other financial measures.”

the subsample of CEOs who have worked in different industries before their current industry. Apparently, these CEOs should have the skill to work in those industries as top executives. If compensation peers are selected to benchmark CEOs' outside options, then we expect a greater likelihood that firms from these industries are represented in the compensation peer group. We find that a CEO's past industries are indeed more likely to be included in her current peer group. In addition, we find that even though both executive and board experience in other industries increase the likelihood of those industries being represented in the CEO's peer group, previous executive experience has a greater effect. In unreported results, we also find that previous CEO experience has a bigger impact than previous non-CEO executive experience. These results suggest that peer groups are carefully chosen to benchmark CEO's outside options and thus validate our index as a proper measure of CEO general skill that are transferrable across industries.

We then use our index to examine the relation between CEO general skill and pay. Although our index is not based directly on a CEO's work experience, CEOs who have worked in many industries would still score high in our index. To filter out this correlation between our index of general skill and CEO's past work experience, we control for a CEO's past work experience using either the number of industries the CEO has worked in or the lifetime work experience-based index of Custódio, Ferreira, and Matos (2013) in all our regressions. Hence, the effect of general skill on pay in our regression is mainly driven by CEOs who are generalist based our index but whose work experience does not involve job hopping among different firms and industries. Consistent with the findings in Custódio, Ferreira, and Matos (2013), we find that the CFM index has a significantly positive relation with CEO total pay. The number of different industries a CEO has worked in has just as significant a positive effect on CEO total pay as the CFM index. However, we find that our index of general skill is not significantly associated with higher CEO total pay even though the sign of the coefficient is positive.

Since CEO total pay is affected by many factors, such as firm performance, the proportion of equity-based pay, the risk aversion of the CEO, etc., differences in total pay can be due to factors other than pay premium. Also, when the premium is relatively small, the noise in total pay can make it difficult to detect the premium. To address these concerns, we next examine the association between our index and the median pay of compensation peer group. Most firms benchmark their CEO compensation to the median of the compensation peer group. Because the board chooses the benchmark, it is a direct measure of the board's response to greater competition for the CEO's talent and skills. In addition, this median should be much less volatile than total pay, which makes it easier to detect the pay premium. Again, to filter out the effect of a CEO's work experience, which may not be all driven by general skill, we control for either the number of different industries the CEO has worked in or the CFM index. Here, we find that our index is positively related to the peer group median pay and the coefficient estimate on our index is statistically significant at the 1% level. The coefficient estimate indicates a 3.6-3.7% increase in the peer group pay median for a doubling of the number of industries that are represented in the compensation peer group. This evidence supports a pay premium for generalist CEOs. As for control variables, we find that the number of industries a CEO has worked in and the CFM index are also positively related to peer group median pay and they are statistically significant at the 5% level. To the extent that both variables are correlated with CEO general skill, this also supports a pay premium for generalist CEOs. However, compared with these two variables, our index has a cleaner interpretation and thus is more convincing evidence on a pay premium based on peer group median pay. Together with the results on CEO total pay, the collective evidence supports the existence of a pay premium for generalist CEOs, however, the magnitude of the premium seems to be too small to have a significant impact on CEO total pay. Thus, it is unlikely that the growing importance of general skills over firm-specific skills is a main driving force behind the rise in executive compensation in the past few decades.

To further check whether the insignificant relation between our index and CEO total pay is because our index does a poorer job capturing general skills. We compare the performance of our index and the CFM index as proxies for CEO general skill in a variety of settings. First, we find that the variance of CEO total pay is significantly smaller for generalist CEOs than specialist CEOs as defined by our index, consistent with generalist CEOs having more outside options and thus their reservation value should be less volatile. However, no such relation is found when we define generalist and specialist using the CFM index. Second, we compare the turnover risk premium for generalist CEOs vs specialist CEOs under the two competing general skill indices. Consistent with the finding of Peters and Wagner (2014), we find that CEO pay is higher in high volatility industries. Since generalist CEOs have more options outside the current industry than specialist CEOs do, efficient contracting should predict a lower turnover risk premium for generalist CEOs. Consistent with this, we find that the positive relation between CEO pay and industry volatility is weaker when the CEO is a generalist as defined by our index. In contrast, no such evidence is found when we define generalist CEO using the CFM index. Third, we find that our index is not significantly related to the likelihood that the CEO is also the chairman of the board while the CFM index is, suggesting that the CFM index captures some CEO talent or power.

We contribute to the large executive compensation literature by providing improved evidence on the relation between CEO general skill and pay. Using a new index that is less affected by confounding factors that come with a CEO's work experience than the existing measure of Custódio, Ferreira, and Matos (2013), we do not find a significant relation between CEO general skill and total pay. This contrasts with the significant relation Custódio, Ferreira, and Matos (2013) document. We also go beyond existing literature and examine the relation between CEO general skill and the compensation benchmark chosen by the board. Here, we find that our index is significantly positively related to the compensation peer group median pay and so does the CFM index. Our evidence provides new support to the argument of Murphy and Zabojnik (2007) that generalist CEOs have more outside

options and thus command a higher pay, however, the effect is only significant on the compensation benchmark not on total pay. Hence, the growing importance of general skills over firm-specific skills cannot be a main driver of the rise in executive compensation over the past few decades.

Recently, some scholars have questioned the ability of the market-based theory that is based on the growing importance of general skill over firm-specific skill argument to explain the dramatic rise in executive compensation. For example, Frydman and Saks (2010) question whether the managerial general skill can explain the sharp change in the trend in pay since the 1970s. Murphy (2012) observes that it seems that simply attributing the rising CEO pay to prevailing recruiting CEOs from outside the firm is not productive because it is not plausible that the doubling of outside hiring from the 1970s to the 2000s could lead to such a huge increase in real CEO pay over this period. Elson and Ferrere (2012) also question the growing importance of general skills over firm-specific skills. The development and implementation of the firm-specific strategy and directions rely on manager's in-depth understanding of the business and such firm-specific knowledge can only be obtained through experience within the firm and cannot be replaced by general skills. Also, the argument that firm-specific knowledge can be easily obtained through improved communication and information technologies and CEO can reach in-depth analysis of the business by applying their general skills seems to be counter-intuitive. In-depth analysis of the firm cannot be done without knowing their business well, and improved technology can only help with the analytical process rather than being the key input. Our paper provides evidence that mostly support these concerns.

Our paper introduces an innovative use of the compensation peer group data and thus contribute to the literature on compensation peer group. Existing studies are mostly concerned about the manipulation of the peer group by the CEO for self-serving purposes (Bizjak, Lemmon, and Nguyen (2011), Faulkender and Yang (2010, 2013), Albuquerque, De Franco, and Verdi (2013)). These studies take the industry composition of the peer group as given and compare the CEO pay in the selected peers

against CEO pay in otherwise similar but unselected peers. To our knowledge, we are the first to examine the determinants of the industry composition of peer groups. We provide evidence that the industry composition of peer groups contains important information about the board's perception of the CEO's outside options in other industries and general skill. Despite the small positive bias that is documented by prior studies, our evidence suggests that the peer group is carefully chosen to benchmark a CEO's outside options.

The rest of the paper is organised as follows. Section 2 describes the data. In Section 3, we show our index of general ability based on CEO's compensation peer group incorporates and refines the measure based on CEO's lifetime working experiences. In Section 4, we show CEO's general ability leads to a pay premium with a magnitude much smaller than what has been documented in the current literature. Section 5 provides one reason that why the general skills should not lead to a significant pay premium. In Section 6, we provide several pieces of evidences that the general skills index based on peer group is a cleaner and better measure. Section 7 presents the evidence that general skills index based on lifetime working experience capture CEO's managerial power rather than only general ability. Section 8 concludes.

2. Data

Our main dataset comes from ISS Incentive Labs. It provides compensation peer group composition data of over 2000 US firms starting from 2006 since when SEC required the disclosure of compensation peers. Because we also require CEO's other compensation details, our dataset limits to Execucomp's S&P1500 US firms. To construct past-experience-based measures of CEO's general skills, we extract CEO's past working experience using BoardEx's director profile data. Firms' accounting and stock information come from Compustat and CRSP. The whole sample period is from 2006 to 2014.

Firstly, to construct a merged dataset of both CEO compensation detail and CEO past working experience, we perform a name match between CEOs in Execucomp and executives in BoardEx to

locate the same CEO in both databases. We found 87% of CEOs (3392 different CEOs) in Execucomp have resumes in BoardEx during the period 2006 to 2014. The percentage of matched CEO is similar to the number reported in Custódio, Ferreira, and Matos (2013). Our matched sample is robust to CEOs who has the same name because we require the matched CEOs to work in the same firm before.

We then merge ISS Incentive Lab compensation peer group with Execucomp. We find valid peer group data for 48% of firms in Execucomp during the period from 2006 to 2014, and in the merged sample, we find valid compensation data from Execucomp for 84% of the peers. Then, we patch the missing peer compensation observations using the average compensation data from the neighbour years. For example, if one peer firm has missing compensation data in Execucomp in 2006, we use the average of compensation data from the year 2005 and 2007 for that peer firm in 2006. In such way, we increase the matched peer observations to 88%. Finally, we have 6,645 firm-year observations or 105,170 firm-year-peer observations. In this paper, we winsorise all continuous variables at 1st and 99th percentile levels⁷ to mitigate the concerns of potential outliers. Now we present our summary statistics and perform preliminary analysis using the difference of mean t-tests.

2.1 Summary statistics

Table 1 presents the summary statistics of variables used in this paper and variable definitions are provided in appendix Table A1. We have divided the variables used in this paper into six categories: (i) Peer-group-based measure of general abilities, (ii) Past-experience-based measure of general abilities, (iii) Peer group variables, (iv) CEO characteristics (v) Firm characteristics and (vi) board characteristics. Our main measure of CEO's general ability is the number of industries in CEO's compensation peer group. It measures how many industries the CEO could potentially work for. Main empirical tests use the logarithm of this variable. The stronger ability that can be transferable across

⁷ All results remain unchanged if we winsorise at 0.5th and 99.5th percentiles.

industries, the larger number of industries the CEO can work for and higher value of the measure. On average, there are 4.5 distinct fama48 industries in the peer group and the median is 3. To mitigate the concern of different function forms. We also construct a generalist dummy variable based on our full sample's industry-year median of the continuous variable, and generalist dummy equals to one if the number of industries in CEO's compensation peer group is larger than the industry-year median and zero otherwise. It accounts for the different levels of CEO's general skills in different industries and different times. To gain further insights, we also construct other measures using the peer group industry composition. We calculate the proportion of peers from outside industries which measures the relative importance of CEO's outside option in other industries to firm's own industry. For a CEO who has many valuable outside options in other industries, we would observe firms from other industries dominate the peer group. On average, there are 43% of peers are from outside industries using Fama48 industry classification. The other measure is peer group's industry composition Herfindahl-Hirschman index. Our empirical results are consistent using any of the peer-group-based measures of general skills. We also present summary statistics of two past-experience-based measure of CEO's outside options as in Custódio, Ferreira, and Matos (2013). The first measure is the number of CEO's industry experiences. The average number of industry experience are approximately two for all three industry classifications. It means more than half of CEOs in our sample have worked in another industry before taking the current position. The second measure is the general ability index⁸.

For peer group variables, peer group pay median is around 7.4 million dollars. The pay levels of peers from outside the reporting firm's industry is much higher than the industry peers (7.98 million dollars versus 7.44 million dollars). The statistics also shows boards consider CEO's past industry

⁸ The general ability index (GAI) uses principal component analysis to combine five dimensions of CEO's past working experience: number of industries worked, number of firms worked, number of positions worked, whether has prior CEO experience and whether has conglomerate management experience. They only use the principal component with eigenvalue above 1, and in their case, the first component. We calculate GAI closely following their procedure.

experience into the peer group selections. In the sub-sample that we find at least one past industry experience for the CEOs (4205 out of 6645 total observations), there is on average 14% of the peers that come from fama48 industries in which CEO has worked before. It indicates that peer group captures CEO's outside options in the industries he has worked before. It is a substantial amount, considering the average proportion of peers from other industries is only 43%. Next, we compare the difference between CEO pay and the peer group pay median, we find on average, CEO pay is 11% less than the peer group pay median. In other words, the firm often benchmarks on a small percentage lower than the peer group median. It is consistent with prior findings that firms often motivate and inspire the CEO by benchmarking on better firms (see Faulkender and Yang (2013)), Hayes and Schaefer (2009), and Francis, Hasan, Mani, and Ye (2016)). We use propensity score matching to match firm's compensation peers with unselected firms based on a variety range of firm characteristics and compare the pay between the selected peer and the unselected peer that has similar firm characteristics. We observe a pay premium of the median of propensity score matched peers compared to the median of peer group pay. The pay at the selected peer is on average 12% more than propensity-score-matched peers. This finding is consistent with Faulkender and Yang (2010, 2013) and Bizjak, Lemmon, and Nguyen (2011) that firm tend to select higher-paid firms as peers from a set of companies with similar characteristics.

For CEO characteristics, we collect the information from Execucomp. Age and tenure are CEO's age and tenure at current CEO position, respectively. Notice that there are some missing values for these two variables, we treat the missing values in the following way. For each CEO-year observation where CEO age or tenure value is missing, we fill the missing values using the information available from elsewhere in the dataset. For example, if the CEO's age was missing in 2014, and we observe CEO was 30 in 2010, we will put age 34 in 2014 for that CEO. For those CEOs' information that is entirely missing in the data, we use the average age and tenure of all CEOs in the same fama48 industry in a given year. For firm characteristics, the average total asset is 27 million dollars, and the

average sale is 10 million dollars, it is not surprising because we focus on S&P1500 firms which are the large corporations in the US economy.

For board characteristics, we include board size and the level of independence. The board size has an average of 10 and there are, on average, 80% of independent directors on the board.

2.2 Generalist versus specialist CEO: Difference in firm, CEO, and peer group characteristics

In Table 2, we perform difference-in-mean t-tests to investigate the difference between generalist CEOs and specialist CEOs under the peer-group-based measure to understand further how they differ. We define generalist CEOs as the same way as we define our generalist dummy variable: those CEOs having larger number of industries than the industry-year median in our sample. We find generalist CEOs have more industry experiences and higher GAI, consistent with the notion that these two measures capture CEO's mobility to other industries. We also find generalist CEOs receive higher pay than specialist CEOs, but simultaneously, generalist CEOs manage larger firms (the difference in firm sales is large). Therefore, the higher pay may just be the manifestation that the larger firm size because firm size largely determines the level of pay (Baker, Jensen, and Murphy (1988)). Ideally, we would need to observe the pay difference conditioning on the firm size, which we will discuss in Section 4. For other differences, generalist CEOs are on average 0.6 years younger than specialist CEOs. The difference is negligible. Generalists also have shorter tenure. It is expected because CEOs who have stronger mobility would have less time staying in one firm. Generalist CEOs also manage firms with higher free cash flows, stronger performance, non-zero R&D expenses and older age. The result of R&D is somehow consistent with Custódio, Ferreira, and Matos (2015) that generalist CEOs spurs innovation.

3. Peer-group versus past-experience-based measure of general ability

Compensation peer group reveals the places that the CEOs potentially move to. Since CEOs are easier to move to industries in which they worked before, we expect the compensation peer group often contains these industries. In this way, peer group would incorporate the information about CEO's past experiences. Also, board's insights on CEO's general ability would help to fine-tune such information in determining pay because, instead of treating all past experiences equally as the past-experience-based measure, boards would be more likely to include valuable industry experiences in the peer group than those experiences do not grant CEOs additional bargaining power.

In this section, we show boards only selectively incorporate CEO's past working experiences into peer group selection, and those industry experiences incorporated in the compensation peer group represent CEO's valuable outside options and thus are valid counting towards CEO's general ability. First, we show boards often choose peers from industries CEO has worked in the past and they are more likely to select industries in which the CEO has executive experiences than director experiences. It is consistent with the notion that top executive working experiences are more likely to grant the employment options working as a CEO in that industry than board experiences. The evidence suggests the boards consider very carefully in filtering out the unimportant industry experiences. Second, we show boards select more peers from CEO's industry experiences when retaining the CEO is a concern (either when the CEO has greater mobility or outside opportunities become more attractive). It suggests that the selection of the peers from CEO's industry experiences represents CEO's valuable outside options. The evidence collectively shows our index of general ability incorporate and refine the measure based on CEO's past working experience.

3.1 Does compensation peer group incorporate CEO's past experiences?

To quantify the importance of a CEO's past industry experience for peer group selection, we start with the sample of all reporting firms and their compensation peers. We then pair up each reporting firm

with each of the other firms in this sample to obtain a sample that includes all possible combinations of reporting firms and peer firms. An observation in this sample is a pair of the reporting firm and a potential peer company (the other company in our sample). We then estimate a probit model following Faulkender and Yang (2010). The model takes the form:

$$P(\text{Peer}_{ijt} = 1) = \Phi(\alpha + \theta \text{CEO past experience}_{ijt} + \sum \beta_m \text{Firm characteristics}_{m,ijt} + \delta \text{Peer pay}_{ijt} + \epsilon_{ijt})$$

where $\Phi(\cdot)$ is the standard normal distribution function.

The dependent variable equals to one when the peer in the combination is in the reporting firm's compensation peer group and equals to zero otherwise. Following Faulkender and Yang (2010), we control for whether the potential peer is in the same Fama and French 48, two- and three-digit SIC industry, respectively, as the reporting firm, whether the potential peer is within 50% - 200% of the sales, book assets and market capitalization of the reporting firm, whether the potential peer and the reporting firm are both components of the Dow (DJIA) 30, S&P 500 index, and S&P MidCap 400 index, whether the CEO in the potential peer and the reporting firm is also the chairman of the board, and whether any of the top executives moved between the reporting firm and the potential peer during the time period of 1992-2005. These variables are included to capture similarities between the potential peer and the reporting firm along industry, size, visibility, CEO responsibility, and competition for talent. Also, we add peer group size of the reporting firm as well as total compensation of the potential peer. We also add multi-segment dummy takes the value of one when both firms have more than one business segment and zero otherwise, and single-segment dummy takes the value of one when both firms have only one business segment. We include industry and year fixed effect to control for time-invariant characteristics of industries and aggregate time trends. Standard errors are clustered at the reporting firm and the peer level, as peer selection can be correlated over time within the reporting firm as well as within the peers.

Table 3 reports the results. The coefficients on these control variables are similar to those in Faulkender and Yang (2010). The results show that firms tend to select peers from the same industry, the same size group, the same index and with same CEO responsibilities and same business complexity. Also, talent flow is a good predictor of peer selection. The results indicate that when there are exchanges of the top 5 executives between two firms in the past (in our sample, during 1992-2005), they are more likely to select each other as CEO compensation peers.

We also find results consistent with prior literature that the firms tend to select higher paid peers after controlling industry, size, index component, talent flow and business complexity. The coefficient on the logarithm of peer CEO's total compensation is positive and statistically significant. It suggests firms tend to select higher paid peers. Some of the prior studies have interpreted this effect as an indication of board capturing by the CEO, however, Albuquerque, De Franco, and Verdi (2013) provided evidence that it as a reward for unobservable CEO talent. We take advantage of this finding to investigate if generalist CEOs based on past-experience-measures are talented CEOs and the results are discussed in Section 5.

To see whether CEO's past industry experience affects the board's peer group selection, we construct an indicator variable for whether the matched peer firm in a combination is in an industry that the CEO has worked before. We use BoardEx's director profile dataset to track the firms that a CEO has previously worked at and record the industry of these firms, where industry is defined using Fama French 48 industry code, two- and three-digit SIC code, respectively. We assign a value of one to the indicator variable for peer firms that fall in a industry that the CEO has previously worked and zero otherwise. As we are mainly interested in how a CEO's experience outside her current industry affects peer selection, we code all firms in the reporting firm's current industry as not in the CEO's previously worked industry even when the CEO has worked in other firms in the industry before. To control for the effect of same industry on peer firm selection, we include a same industry dummy to control for this

effect. The results are reported in columns 1, 3, and 5 of Table 3. As we can see, a CEO's past industry experience significantly increases the likelihood of firms from those industries being selected as compensation peers using all three industry definitions. The effect is economically significant. Comparing the magnitude of the coefficient estimate on the indicator for CEO's previously worked industries with those on other indicator variables in the regression, we find that CEO's past industry experience has a larger effect than size match (sales, asset, and market capitalisation), two out of the three index component match (S&P 500 and S&P MidCap 400), and CEO responsibility and firm complexity match. That is, the board prioritizes firms in the industries in which CEO has working experience, over those potential peers with similar size, index membership, CEO responsibility and business complexity. This result suggests that a CEO's outside options are an important consideration in the board's peer group selection, which is consistent with the efficient benchmarking view of peer selection.

Next, for each reporting firm, we classify industries that the incumbent CEO has worked in before into two groups, those she worked as a top executive and those she worked only as a director. If the inclusion of peer firms from a CEO's previously worked industries is driven by the motive to benchmark her outside options, we expect previous executive experience in an industry to have a bigger impact on the board's selection of peer firms from that industry than mere previous board experience. Intuitively, because board experience does not necessarily grant the same knowledge and skill to work as a top executive in the industry as executive experience, prior executive experience in an industry represents a more valuable outside option than board experience and should give the CEO greater bargaining power for matching the CEO pay in that industry. The results are reported in column 2, 4 and 6 of Table 2 for three different industry classifications (Fama and French 48, two- and three-digit SIC code). Consistent with our expectation, we find that prior executive industry experience has a larger effect on peer selection than prior board industry experience and the difference is statistically significant across all three specifications. In unreported results, we also find that, when we separate executive

experience into CEO experience and non-CEO experience, prior CEO experience has a larger effect on peer firm selection than prior non-CEO executive experience. These results collectively show that the industry composition of compensation peer group is carefully chosen by the board to match the degree of labor market competition for the CEO's talent the reporting firm face from firms in these industries. Although our test only speaks directly to industries that the CEO has previously worked in, the variation of the effects with the type of the CEO's previous industry experience suggests that the board's peer group selection is very careful and this carefulness should extend to other industries that are represented in the peer group even if the CEO has not worked in these industries before. This is consistent with the claims that firms typically make in their proxy statements that they select compensation peers to benchmark the CEO's outside options. The evidence provides support for our use of the industry composition of a CEO's compensation peer group to measure a CEO's cross-industry general skill.

One could argue selecting these peers from other industries are not necessarily to capture CEO's valuable outside options, but it could be due to other motives such as signalling CEO ability (see Hayes, Rachel and Scott (2009)) or simply because the firm has multiple business segments. If these concerns drive peer selections from CEO's industry experiences, our argument that boards evaluate CEO's industries experience and only include those valuable industry experience into our peer-group-based measure would be invalid. Therefore, we will now address these concerns by showing the industry experiences incorporated in the peer group represent CEO's valuable outside options and should be counted towards CEO's general ability.

4. CEO's general skills and total compensation

In this section, we examine the main question of whether generalist CEOs earn a higher pay than specialist CEOs. Having validated that peer group selection reveals valuable information about the board's perception of the CEO's general ability above, we proxy for a CEO's general ability using

several alternative measures of the industry composition of her compensation peer group. Unlike the general ability index of Custódio, Ferreira, and Matos (2013) who do not distinguish a CEO's general ability that is transferrable within the current industry and that across different industries, our index focuses on a CEO's general ability that is transferrable across different industries. According to the model in Murphy and Zbojnik (2007), generalist CEOs have greater outside options because they possess management skills that are transferrable across industries. As a result, competition in the labor market for their talent and skill would allow them to extract greater rents than specialist CEOs do, whose skills are mostly firm- or industry-specific. We conduct several tests to investigate if generalist CEOs earn a higher pay and whether the pay premium (if there is any) is due to market competition for their general skills.

4.1 Do generalist CEOs earn more?

We estimate the following regression

$$\ln(\text{CEO total pay}_{it}) = \alpha + \beta_1 \text{Measures of general ability}_{it} + \sum \text{Controls} + \varepsilon_{it}$$

The dependent variable is the natural logarithm of CEO total pay (TDC1 in Execucomp). The main independent variables of interests are the proportion of peers from other industries in the compensation peer group, the number of CEO's industry experiences and the general ability index (GAI). We only include the number of industries in the peer group as the peer-group-based measure to conserve space, the results for these specifications are similar using the other two peer-group-based measures. The control variables include firm and CEO characteristics and peer group variables that were shown by the prior literature to influence CEO pay. In all specifications, we include industry and year fixed effects to control for heterogeneity among industries and aggregate time trends.

The results are reported in column 1 to 4 in Table 4. In column 1, the coefficient on the number of industries in the peer group is positive but statistically insignificant. One standard deviation increase

in the number of industries in the peer group is associated with approximately 2.2% increase in pay. In untabulated results, we repeat the analysis for cash-based compensation (i.e. salary plus bonus) and find similar insignificant results. We also include the other peer-group-based measures of CEO's general skills such as percentage of peers from outside industries and peer group industry composition HHI and find similar results. Hence, we fail to find evidence that CEOs with general management ability that is transferrable across more industries earn a higher pay than CEOs whose management ability is only transferrable across fewer industries. Similar to the findings in Custódio, Ferreira, and Matos (2013), in column 2, the coefficients on the number of CEO's industry experience and GAI are positive and both economically and statistically significant. The reported coefficient is even larger than that of Custódio, Ferreira, and Matos (2013). One standard deviation increase in industry experience and GAI leads to 15.3% and 9.5% increase in pay. It is not surprising because our sample is constructed after 2006 where their sample ends. The larger effect could be due to growing importance of general skills as suggested in Murphy and Zbojnik (2007). To mitigate the concerns of different function forms, we repeat the analysis using dummies to indicate the level of general skills, the results remain unchanged.

In column 5-8, we repeat the same analysis using peer group pay median, which is often seen as the level of peer group benchmark (Bizjak, Lemmon, and Naveen (2008)). In column 5, we find both measures of CEO's general skills across industries are statistically significant with similar level of statistical significance. Our index of general ability is statistically significant at 1% level. This result suggests that CEO's general skills do alter CEO's outside option and her bargaining power. Similar results were found under Column 6 and results using dummies in Column 7 and 8.

Our interpretation is the following: our ex-ante measure of general skills suggests general skills leads to stronger bargaining power of the CEO, but the additional bargaining power does not accumulate to alter the pay level in a significant way. The ex-post measure of general skills by observing CEO's working experience shows a pay premium as well as higher benchmark, but the pay premium is much

larger than the benchmark, suggesting some of the premium may not be driven by CEO's bargaining power extracted from general skills.

4.2 Is generalist CEOs' pay driven by their general ability?

Since generalist CEOs have the management ability transferable across firms and industries, they should have a broader set of outside employment options than specialists, and their pay should be benchmarked on these options. In other words, boards need to competitively set the pay based on the pay levels of competing firms in outside industries to retain generalist CEOs who can work for several industries. Therefore, if generalist CEOs' pay is an outcome of competition in the labour market for their skills, we would expect generalist CEOs' pay is more likely to benchmark on peers from outside industries than specialist CEOs. A valid measure of CEO's general skills should show those generalist CEOs classified under such measure have the pay benchmarked on those employment options outside current industry i.e. the pay level of peers from other industries. To compare the index based on peer group and past experiences, we perform OLS regression analysis to test if generalist CEOs are more likely to benchmark on peer firms from outside industries, and it takes the form

$$\begin{aligned}
 \ln(\text{CEO total pay}_{it}) & \\
 &= \alpha + \beta_1 \sum \text{Peer pay benchmark}_{it} \\
 &+ \beta_2 \sum \text{Peer pay benchmark}_{it} \times \text{General skills}_{it} + \beta_3 \text{General skills}_{it} \\
 &+ \theta \sum \text{Controls} + \lambda \sum \text{FE}
 \end{aligned}$$

where the dependent variable is the logarithm of CEO total pay, the independent variables are the peer-group-based and past-experience-based measures of CEO' general ability, the median pay of peers from the same industry as the firm and peer median pay of peers from outside industries. The key variables of interests are the interaction terms between the measures of general abilities and the median pay of peers from current industry and peers from outside industries. These terms are meant to capture generalist CEO's extra (or less) tendency to benchmark on these peer pay levels. We include a battery

of controls, industry and year fixed effects to control observable firm, CEO characteristics and time-invariant unobservable characteristics of industry and time.

The results are reported in Table 7. Column 1 presents the results using the peer-group-based measure of general skills, i.e. number of industries in the peer group (logarithm transformed). We find the median of peer pay from same industry as the reporting firm primarily determines the actual CEO pay. For one standard deviation increase the median of the peer pay, CEO pay increases by 42.3%, which is consistent with the benchmarking role of compensation peer group. This effect is attenuated by having the CEO with stronger general ability. For one standard deviation increase in the number of industries in the peer group, there is 2% drop in the effect of peer pay from same industry on CEO pay. While this effect is small, an increase in the number of industries significantly improves the impact of peer pay from outside industry on CEO pay, which increases from 5.4% to 7.6% (5.4%+2.2%). Taking together, when the CEO has the strong general ability, his pay will be less likely to be set on peers from same industry and more likely to be benchmarked on peers from outside industries. It is consistent with our expectation that board consider generalist CEO's outside opportunities to set their pay efficiently.

Column 2 and 3 presents the results using the past-experience-based measure of general ability, i.e. number of CEO's industry experiences (logarithm transformed) and General ability index as in Custódio, Ferreira, and Matos (2013). We find generalist CEOs under these measures tend to have their pay deviate from the pay level of peers from the same industry (the interaction term between the general ability index and peer pay level from the same industry is significant) and simultaneously *do not* benchmark on peers from outside industries either (the interaction term between general ability index and peer pay level from outside industries is negative and statistically insignificant). The results suggest that pay premium under general ability index is unlikely to be solely driven by CEO's outside options and may be driven by other factors. From this benchmarking test, the index based on peer group composition seem to be a cleaner and better measure of CEOs' general skills.

5. Potential explanation of the small wage premium for generalist CEOs.

Murphy and Zabojnik (2007)'s model indicates generalist CEOs could earn a wage premium because they have stronger bargaining power sourced from their larger set of employment options. However, specialist CEOs would demand a turnover premium because they have limited job opportunities. If they are dismissed, it is more difficult for them to locate next job due to their specialised skills. Therefore, the reason why we only observe generalist CEOs have small wage premium may be simply because this wage premium extracted from their general skills is partially offset by specialist CEO's job risk premium. In this section, we show this is likely to be the case.

Our identification strategy is relying on the idea that CEOs' job risk premium varies across industries. CEOs' dismissal does not only depend on idiosyncratic performance of the CEO, it also depends on industry conditions. More volatile industry condition leads to a higher probability of CEO turnover (see Peters and Wagner (2014) and Eisfeldt and Kuhnen (2013)). Therefore, we expect specialist CEOs in volatile industries would demand more compensation than generalist CEOs holding other things constant. To capture this job risk premium, we estimate the following regression:

$$\begin{aligned} \ln(\text{CEO total pay})_{it} \\ = \alpha + \beta_1 \text{HighVol}_{it} + \beta_2 \text{HighVol}_{it} \times \text{Generalist}_{it} + \beta_3 \text{Generalist}_{it} + \lambda \text{controls} \\ + \theta \text{Year Dummies} \end{aligned}$$

HighVol is an indicator variable that equals to one if the firm is in a highly volatile industry (using fama48 industry classification). We define a highly volatile industry as the following. We calculate the variance of the industry equity return over past 10 years using Ken French's data, and if the industry's return variance is in the top half, we regard it as a highly volatile industry otherwise it is not. *Specialist* is an indicator variable that equals to one if the CEO has only one industry in her compensation peer group and zero otherwise. The coefficient of interest is β_2 , it can be interpreted as a difference-in-difference coefficient. The first difference is the pay differential between generalist CEO and specialist

CEO and take the second difference between highly volatile industries and low volatile industries. Therefore, the coefficient would capture the specialists' premium when they are facing higher probability of turnover. We add CEO and firm level controls as well as year dummies. Therefore, we speak to cross-sectional difference.

The results are presented in Table 6. In column one, β_3 (second row) is positive and marginally statistically significant (t-stat of 1.56). It means generalist CEOs earn more pay when they are in low volatile industries. It is consistent with our expectation that generalist CEOs have wage premium because of their stronger bargaining power. simultaneously, specialist CEOs do not demand much turnover risk premium. More importantly, β_2 (first row) is negative and statistically significant, which means the pay differential of specialist CEOs between high and low volatile industries is higher than that of generalist CEOs. It is consistent with our expectation that specialist CEOs demand more turnover risk premium than generalists when the turnover risks are higher. Notably, the turnover risk premium captured using industry volatility is larger than the wage premium earned by general skills (9.4% versus 5.6%) although only marginally statistically significant. It indicates specialists' job risk premium could offset the generalists' wage premium, leading to negligible pay differential as in Table 4.

Similar results were not found using CEO's lifetime working experience as the measure of general skills. β_3 of the coefficient of CEO's industry experiences and GAI as in Custódio, Ferreira and Matos (2013).

6. Validating General Skills Index using compensation peer group

In this section, we present the results of the additional features of our index of general ability based on CEO's compensation peer group. These results should hold for a valid measure of CEO's general skills, but our evidence shows they only hold for our index and not for the measure based CEO's working experiences. First, we show generalist CEOs under our index based on compensation peer group have

lower volatile pay over time. It is consistent with the notion that generalist CEOs who have extensive sets of outside options would have lower volatile reservation wages. Similar results were not found. Second, we show generalist CEOs under our index are popular in places where firms have stronger demand for general skills. We proxy the firm's exogenous demand for generalist CEOs using state's noncompetition law which forces firms to hire generalist CEOs, and we find firms pay more to hire generalist CEOs in states with stronger enforcement of the law. Lastly, we find generalist CEOs under our index receive a greater number of peer group citations by other firms which suggests the labour market recognises their stronger ability to work across firms and industries. For these results, we do not have similar findings for CEO's general ability measured based on CEO's past working experiences, and therefore we show our index brings significant improvements to existing measure.

6.1 Pay volatilities and CEO's general skills

One would expect, as a generalist CEO, her pay would be less volatile because her pay benchmark is more diversified across industries and firms. In this subsection, we would test whether the index of general ability at our disposal (peer group based and working experience based measure) would capture this feature. We regress the rolling variance (5 year, logarithm transformed) of CEO's total compensation on measure of general abilities. A set of CEO and firm controls are included. Industry and time fixed effects are included to control for industry heterogeneity and aggregate time trends.

The results are reported in Table 7. In column 1, we find the generalist dummy based on compensation peer group, which equals to one if the CEO's compensation peer group have more industries than the sample's industry year median, is strongly negatively associated with CEO's pay volatility, the reported coefficient shows generalist CEOs defined under our measure have their pay 3% less volatile than specialist CEOs. We expect the economic magnitude of effect to be small because although generalist CEOs have broader set of outside options, the main competitor for a typical generalist CEO often comes from firms from the same industry and the influence of benchmarking on

other industries on CEO's pay level is often marginal as shown in Table 4. Nevertheless, similar results were not found under measures based on CEO's working experiences, which means only the index based on compensation peer group captures decremental pay volatility for generalist CEO. It supports our index of general skills is a cleaner and better measure. If the measure based on working experience could capture something other than general skills, it would fail to capture this small economic effect.

6.2 Generalist CEO's compensation and firm's demand for general skills

To further compare two set of general skills indices, we investigate whether firm's the demand for general skills would influence generalist CEOs' compensation. We expect generalist CEOs under a valid measure of general skills will receive a higher pay if firms demand their general skills. We explore the exogenous cross-sectional variations in firms' demand for general ability using state-level labour law on non-competition agreements which prevent employees from joining or creating a competing company after ending an employment contract. In our sample, the enforceability of such contracts varies across U.S. states, as in Garmaise (2009), i.e., the *Non-Compete Enforcement Index*. The higher the enforcement of the agreement, the greater demand of the firm for CEOs with higher general ability because stronger enforcement of the law limits the within-industry executive transfer and facilitates the between-industry transfer. Therefore, we expect generalist CEOs in states with higher *Non-Compete Enforcement Index* will receive a higher pay when they are hired because of the state law force the demand up for generalist CEOs in those states' local CEO markets⁹.

To test this conjecture, we limit our sample to newly appointed CEOs to see if firms which are more affected by the state law would be willing to pay a premium to generalist CEOs. To test this, we perform an OLS regression with dependent variable is the logarithm of the CEO's total pay and pay benchmark from compensation peer group. The independent variable of interests is the interaction term

⁹ See Yonker (2016) for an example of the geographical CEO market segmentation.

between the peer-group-based measure of general ability and *Non-Compete Enforcement Index*. It measures how much more (or less) generalist CEO would receive if she works in states with stronger enforcement of noncompetition laws comparing to states with weaker law enforcement. Here, we use generalist dummy, defined as those CEOs whose compensation peer group has more industries than the sample's industry-year median. Similarly, for working-experience-based measure, we use multi-industry experience dummy which takes value of one if the CEO has more than one industry experiences and zero otherwise and also the GAI dummy as in Custódio, Ferreira and Matos (2013). Individual terms and several firm, CEO characteristics are added to control for factors that influence CEO's pay level. Additionally, to control for heterogeneity in hiring decisions among different industries in different time, we control for industry-year fixed effects in each regression. Results are robust to controlling industry and year fixed effects separately.

Table 8 presents the results. In column 1 and 4 the coefficient on the interaction term is positive and significant. It suggests generalist CEOs earn more in states with stronger noncompetition law enforcement. One standard deviation increase in *Non-Compete Enforcement Index* would lead to a pay increase of approximately 6.3% and 2.3% increase in pay benchmark for generalist CEOs. In column 2, we find similar results for generalist CEOs measured using industry experiences, but the economic and statistical significance (4% at 1.9 t-statistics) is less than our index, and also this difference is not reflected in peer group benchmark as in column 5. In column 3 and 6, we do not find similar results for GAI.

6.3 Generalist CEOs' peer group citations by other firms

Choi, Cicero and Mobbs (2016) argue that the peer group citations by other firms represent the attentions that a CEO received from external labour market. Generalist CEOs who can work across firms and industries should draw more attentions from other firms than specialist CEOs who tend to just work in one firm or industry. Therefore, we expect that generalist CEOs who can work across

industries are more likely to be cited in the compensation peer groups of other firms, especially cited by firms outside the CEO's current industry. Also, if our measure captures CEO's general ability more accurately, we would expect the probability of the generalist CEOs under our index to be cited by other firms is higher than generalist CEOs based on existing measure. To test this, we use the multivariate probit regression as in Table 3 to evaluate the effect of a CEO's general skills on her probability of being cited as peer. The sample setup is the same as in Table 3. One observation is a pair of the peer group reporting firm and its potential peer (the other firm in our sample). The dependent variable is an indicator variable, which takes value of one if the potential peer is selected as compensation peer by the reporting firm and zero otherwise. To test if generalist CEOs receive more attentions from firms outside the CEO's current industry, the sample excludes potential peers from the same industry as the reporting firm. The independent variable of interests are measures of potential peer CEO's general skills. A positive coefficient on measures of general skills means the stronger general skills the CEO has, the higher probability that such CEO would be cited by other firms as peer. Again, our measures of general skills are generalist CEO dummy, which takes value of one if the CEOs have more than one industry in her peer group and zero otherwise, and multiple industry experience dummy which takes value of one if the CEO has more than one industry experiences and zero otherwise. In addition to the independent variables of interests, we include several factors that are previously shown to have influences on peer choice. We add industry and year fixed effect to control for heterogeneity among industries and aggregate time trend. Standard errors are clustered at the firm and peer level because the error terms may be correlated within firms and peers.

The results are presented in Table 9. Consistent with our expectations, the coefficients on generalist CEO dummy and multiple industry experience dummy based on all three industry classifications are positive and statistically significant. It suggests generalist CEOs receive more citations by firms outside their current industry. In addition, we find the coefficients on the generalist CEO dummy, our peer-group-based measure of general ability, are significantly greater than the

coefficients on the multiple industry experience dummy, the past-experience-based measure. It is consistent with the argument that our index of general ability refines the past-experience-based measure and provide better gauge of a CEO's general ability.

Overall, we show our index of general ability does a better job measuring a CEO's general ability in several dimensions.

7. What else does working-experience based measure capture?

In this paper, we create a new index of a CEO's general ability and show evidence that our measure provides better gauges of a CEO's general ability than existing measure based CEO's working experiences. However, generalist CEOs based on lifetime working experiences earn a significant wage premium whilst no wage premium is found under our index of general ability. Therefore, we expect the at least some wage premium is not due to those generalist CEOs' stronger general skills but the noises captured in the measure. In this section, we explore what the noises are. In particular, we test whether the pay premium is driven by CEO's management talent and whether it is because they are powerful managers who capture the pay-setting process. The evidence lends support to the latter argument.

6.1 Do working experience capture something else?

Another alternative explanation for the higher pay of generalist CEOs based on working experience is they are powerful CEOs who set their own pay. Jensen and Meckling (1976) argue the executives often influence both the level and composition of their own compensation packages at the expense of shareholders. Researchers such as Lucian Bebchuk and Jess Fried argue in a series of papers that both the level and composition of pay are determined not by competitive market forces but rather by captive board members catering to rent-seeking entrenched CEOs. Generalist CEOs are likely to be powerful managers for two reasons. First, they could gather board entrenchment skills through their working experiences. Some of the general managers even have extensive board member working experiences

themselves and such that they know what it takes to capture board members. Second, they could be skilful in handpicking weak boards or firm with weaker internal and external governance so that they could enjoy entrenchment benefits. Mishra (2014) provided evidence that generalist CEOs based on past-experience-based measure can have greater agency problems because the investors require higher returns for holding firms with these CEOs. We expect generalist CEOs are more powerful than specialist and hence gain more control over the board.

7.1 CEO's working experience and chairman titles.

A simple but useful measurement of CEO's power over the board is CEO's chairman titles (duality roles in the firm). A clean measure of CEO's general skills should not capture managerial power unless the skillset gives the CEO more power. It is unlikely that general skills of the CEO would be correlated with her managerial power or more captive board, as the skills should only alter CEO's outside options. However, we expect generalist CEOs with extensive working experience would possess more power because they can be also experienced with capturing board or picking the weaker board to enjoy entrenchment benefits or they can be also more senior and higher profile, making the board more submissive. Consequently, we would expect they are more powerful and are often the chairman of the board. CEO duality promotes CEO entrenchment by reducing board monitoring effectiveness (Finkelstein and D'aveni (1994)) and have more influence on corporate decisions (Adams, Almeida, and Ferreira (2005)). Therefore, the higher pay of generalist CEOs under lifetime experience measures may well due to their strong managerial power. Note here that we do not claim the casual relation between being a generalist CEO and greater power. A reverse causality story that certain firms which tend to hire CEO also as a chairman often hire generalist CEOs would also hold for our claim here. In sum, we only predict the positive correlation between general skills and managerial power.

To test if they are more likely to become the chairman of the board, we employ logistic regression with fixed effects. The dependent variable is the chairman indicator variable that equals to

one if the CEO sits on the chair and zero otherwise. The independent variables of interests are measures of CEO's general skills. We use the logarithm of number of industries in the compensation peer group and generalist dummy as a benchmark. Also, and we employed peer-group-based measure of general skills as in Custódio, Ferreira and Matos (2013) i.e. number of CEO's industry experience (taking logarithm) and General Ability index. We include CEO's age and tenure to control for CEO's characteristics along these two dimensions. All regressions include board size and level of board independence to control for board characteristics along these two dimensions. To investigate cross-sectional difference between general skills and power, we include industry and time fixed effects.

Table 10 reports the results, Column 1 and 2 report the results using continuous measure, i.e. number of CEO's industry experiences and number industries in the compensation peer group. We find generalist CEOs under peer-group-based measure are not more likely to hold chairman titles whereas those CEOs with extensive industry experiences are 8% (average marginal effects) more likely to hold the title, indicating they are on average have more power over the board than specialist CEOs. Similar results are reported in column 3 and 4 if we use dummy variables. In sum, we show the CEO's lifetime working experiences may capture managerial power and hence contaminated the measure of general skills based on working experience. Also, acquiring chairman title of generalist CEOs based on working experience is not likely to be driven by endogeneity story that CEOs who perform well would be rewarded by a chairman title (Adams, Hermalin, and Weisbach (2010)) because in the next subsection we provide casual evidence that they perform worse than specialists.

7.2 CEO's industry experiences and firm performance

To further investigate the source of generalist CEOs' pay premium under measure based on working experience, we test those CEOs' performance. The higher pay could be a reward for their management ability, and the prediction is that they have better operating performance. Alternatively, they could be captive managers who levy the firm a greater agency cost and thus lead to worse firm performance.

Borokhovich, Brunarski, and Parrino (1997) and Core, Holthausen, and Larcker (1999) argue that weaker boards would allow CEOs to have excessive pay contract. In particular, Core, Holthausen, and Larcker (1999) argue CEOs at firms with greater agency problem perform worse. We investigate if the higher compensation is paid for generalist CEOs' stronger performance or they are captive managers who receive a higher compensation but do not perform.

We proxy firm performance using Tobin's Q and ROA to evaluate generalist CEOs' performance. Endogeneity is an important concern in our study on firm performance (Coles, Lemmon, and Wang 2011). In particular, it is possible that both CEO's working experiences and firm performance are jointly determined by some omitted variables. Such omitted variable that is correlated with CEO's working experiences would cause the error terms to be correlated with CEO's working experience, rendering OLS invalid. Another source of endogeneity is that firm performance reversely determines CEO's working experience. A reverse causality story could be that firms with weak performance dedicate to hire CEOs with extensive working experiences to turn things around, rather than generalist CEOs have poor performance. To address endogeneity concerns, we use a two-stage least square (2SLS) approach. We use non-competition law at the state level as our instrumental variable (IV). Such law prevents employees from joining or creating a rival company after ending an employment contract. In our sample, the enforceability of such contracts varies across U.S. states, as in Garmaise (2009), i.e., the *Non-Compete Enforcement Index*. Following Custódio, Ferreira, and Matos (2015), The instrument is the average non-compete agreement enforcement index at the state-year level across all career positions the CEO has had in publicly traded firms. It aims to extract the exogenous variations in CEO's acquiring experiences across industries. To fulfil the exclusion restriction of the IV, we argue that the enforcement of state-level non-competitive law across CEO's career is not likely to be related to firm's specific performance.

In Table 11, we present the results of performance regression using OLS and IV approach. In column 1 and 2, we find CEO's industry experiences are strongly negatively correlated with firm performance. One standard deviation increase from the mean of CEO's industry experiences are associated with a lower Tobin's Q of 4% and ROA of 0.1 percentage point. To claim causality, we perform 2SLS regression and present the results in column 3-5. Column 3 confirms the non-compete index is strongly associated with CEO's working experiences across industries, fulfilled the relevance restriction of IV regression. In column 4 and 5, although the coefficients are not statistically significant at traditional levels of significance, they are negative and economically significant. One standard deviation increase from the mean of CEO's industry experiences lead to 21% decrease in Tobin's Q and 1.1 percentage point decrease in ROA. The results suggest generalist CEOs based on working experiences have poor performance.

Overall, our evidence suggests that the higher pay of generalist CEOs based on working experiences could be due to their strong managerial power, rather than rewards for their management talents or performance.

8. Conclusion

In this paper, we create a new index of a CEO's general ability across industries and show it is a better gauge of a CEO's general ability than existing measures. Our index is theoretically better because it reveals boards of directors' insider information on CEO's ability. Such information is also helpful in testing whether generalist CEOs earn higher pay since boards are also responsible for setting CEO's compensation. We provide empirical evidence that our index of general ability is a better measure. First, our index incorporates and refines the measure based on CEO's lifetime working experiences. We show boards filter out unimportant industry experiences that have little power altering CEOs' bargaining power, and the remaining industry experiences in the peer group represent CEOs' valuable outside employment options. Second, we show that the pay of generalist CEOs defined by our index is less

volatile, consistent with fact that their pay is benchmark to employment options outside their current industry. Third, we show generalist CEOs defined by our index receive a pay premium in states where firms demand generalist CEOs. Last, we show generalist CEOs defined by our index receive greater peer group citations of firms from outside industries, consistent with the fact they can work across industries and thus receive more attentions from external job market. These results are most insignificant for the lifetime work experience-based index of Custódio, Ferreira, and Matos (2013).

Using our index, we do not find that generalist CEOs receive a significantly higher pay than specialist CEOs. However, at the same time, we find that the board benchmarks the CEO's pay higher when the CEO has more general skill under our index. The same is true is for the general skill index of Custódio, Ferreira, and Matos (2013) as well. Hence, no matter which index we use, CEOs with more general skill are associated with a higher compensation peer group pay median. The difference between our results and that of Custódio, Ferreira, and Matos (2013) lies in total pay. We attribute this difference to the index of Custódio, Ferreira, and Matos (2013) capturing some CEO talent or power. Hence, although our evidence supports the existence of a pay premium to generalist CEOs, we find that the premium is small and its effect on total pay is insignificant. Overall, we conclude that the growing importance of general skill over firm-specific skill is unlikely to be the main driver of the dramatic increase in executive pay over the past decades.

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Table 1: Summary Statistics

This table presents the summary statistics of variables used in this paper. For peer-group-based measure of general ability, the number of industries in the peer group is the number of distinct fama48 industries included in the peer group. Generalist CEO dummy takes value of one if there are more than one industry in the peer group and zero otherwise. Proportion of peers from outside industry is the proportion of peers from industries that have different fama48 industry classification from reporting firm. Peer group industry herfindale index is the herfindale index of peer group of fama48 industry composition. For past-experience-based measure of general ability, number of fama48 industry experience is CEO's number of fama48 industry experience (boardEx). General ability index (GAI) is the general ability measure as in Custodio, Ferreira, and Matos (2013). For peer group variables, proportion of peers from outside industries is the number of peers from outside industries using fama48 industry classification divided by peer group size. Median of pay group pay from same and outside industry using fama48 industry classification is the pay median of peers from same and outside industries using fama48 industry classification. Peer group size is the number of the peers in the peer group. For CEO characteristics, Total pay is TDC1 in Execucomp. Cash pay is TDC_CURR in Execucomp. Age is CEO's age in a given year (Execucomp:age). Tenure is number of years since CEO take the current CEO position. For firm characteristics, Total assets is firm's total assets (AT: compustat). Common Equity (000') is CEQ in compustat. Sales is SALE in compustat. Capital expenditures is CAPX in compustat. R&D expenses / Total Assets is XRD / AT. Tobin's Q is (Compustat: AT x CSHO PRCC_F - CEQ)/AT). Prior year's ROA is NI/AT for previous year. Leverage ratio (common equity / total asset) is CEQ / AT (compustat). Free Cash Flow is firm's cash flow scaled by its market cap: (oancf-capx)/(prcc_f*csho) in compustat. Capital expenditure / Total assets is CAPX / AT in compustat.

Variable	Obs	Mean	Median	Std. Dev.
Peer-group-based measure of general ability				
Number of industries in the peer group (fama48)	6,645	4.53	3.00	4.99
Generalist CEO dummy	6,645	0.38	0	0.49
Proportion of peers from outside industry (fama48)	6,645	0.43	0.41	0.36
Peer group industry herfindale index (fama48)	6,645	0.57	0.52	0.32
Past-experience-based measure of general ability				
Number of fama48 industry experience	6,645	2.03	2	1.15
General Ability Index (GAI)	6,645	0.24	0.09	1.00
Peer group variables				
Peer group pay median	6,645	7445.38	6607.66	4376.50
Peer group pay median :				
- from same industry (Fama48)	6,254	7440.98	6466.44	4891.66
- from outside industry (Fama48)	5,030	7980.29	7085.51	4470.60
Proportion of peers from industries in which CEO has worked before (fama48)	4,205	0.14	0.00	0.22
Percentage difference between CEO pay and peer median	6,645	-11%	-6%	59%
Percentage pay difference between selected and PSM unselected peer	6,645	12%	11%	53%
Dollar pay difference between selected and PSM unselected peer (000')	6,645	813.90	579.20	3481.34
Peer group size	6,645	15.08	13.00	11.08

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Table 1 – continued

Variable	Obs	Mean	Median	Std. Dev.
CEO characteristics				
Total pay	6,645	7895.90	6065.529	7618.07
Cash pay	6,645	1251.72	990.00	1899.43
CEO Age	6,576	55.21	55.00	6.38
CEO Tenure	6,604	6.13	4	5.98
Firm characteristics				
Total Assets (000')	6,645	27146.89	5705.96	125663.30
Common Equity (000')	6,645	5421.64	1891.89	14426.83
Sales (000')	6,645	10672.02	3519.82	27812.12
Firm age	6,645	27.1	20	21
Capital expenditures (000')	6,645	609.22	126.00	2003.57
R&D expenses / Total Assets	6,645	0.03	0.00	0.06
Tobin's Q	6,645	1.80	1.49	1.00
ROA	6,645	0.09	0.08	0.08
Leverage ratio (common equity / total asset)	6,645	0.26	0.23	0.23
Free Cash Flow	6,645	0.05	0.06	0.12
Capital expenditure / Total assets	6,645	0.04	0.03	0.05
Stock return	6,645	0.12	0.10	0.47
Board characteristics				
Board size	5,522	10.03	2.3	10
Independence	5,522	0.8	0.11	0.83

Table 2: Generalist versus specialist CEO: Difference in firm, CEO, and peer group characteristics

This table presents the difference-in-mean t-test for generalist versus specialist CEOs under the peer-group-based measure. CEOs are defined as generalist CEOs if the number of industries (fama48) in her compensation peer group is larger than the sample's industry-year median. The comparison is made between a number of firm, CEO and peer group characteristics. No. of industry experiences and GAI are past-experience-based measure of general skills as in Custodio, Ferreira, and Matos (2013), and calculated from BoardEx. CEO total pay, Sales and Assets are logarithm transformed. ***, **, and * denote significance at the 1%, 5% and 10% levels.

Variables	Industry generalist	Industry specialist	Difference	t-statistics
No. of industry experiences	2.28	1.69	0.59	21.15***
GAI	0.26	0.22	0.04	1.71*
CEO total pay	8.77	8.51	0.26	13.53***
Peer group pay median	8.86	8.64	0.22	16.89***
CEO age	54.89	55.49	-0.60	-3.92***
CEO tenure	5.55	6.74	-1.19	-8.58***
Sales	8.50	7.85	0.65	19.81***
Leverage	0.26	0.26	-0.01	-1.11
Asset	8.76	8.77	-0.01	-0.25
Free Cash Flow	0.05	0.05	0.01	2.21**
Tobin's Q	1.91	1.71	0.20	7.9***
R&D	0.54	0.23	0.31	26.44***
ROA	0.06	0.04	0.02	10.58***
Stock return	0.16	0.12	0.03	3.12***
Firm Age	28.07	25.78	2.30	4.39***

Table 3: Peer selection of industries CEO has experience

This table reports the results of the multivariate regression on peer choice. The dependent variable is the indicator variable that equals to one if the firm is selected as peer and zero otherwise. Industry that CEO has experience is an indicator variable that equals to one if the firm is in the industries the CEO has experience and zero otherwise. Industry that CEO has executive experience and Industry that CEO has board experience are indicator variables that equals to one if the firm is in the industries the CEO has executive and board experience, respectively and zero otherwise. Ln(peer total pay) is the logarithm of CEOs total pay at the potential peer firm. Peer group size is the number of peers within the peer group. Fama48, Two- and Three-digit SIC code match are indicator variables that equals to one if the firm and the potential peer has the same Fama48, Two- and Three-digit SIC code industry classifications and zero otherwise. Sales, Assets and Market Cap between 50-200% are indicator variables that equal to one if the potential peers total sales, total assets and market capitalisation are within the range of 50-200% of the firm, respectively and zero otherwise. Dow30, S&P500 and S&P mid 400 match are indicator variables that equal to one if the firm and potential peer both have Dow30, S&P500 and S&P mid 400 index membership, respectively and zero otherwise. Chairman and Non-chairman match are indicator variables that equal to one if both the firm and the potential peer have the CEO as the chairman of the board, and do not have the CEO as the chairman of the board, respectively and zero otherwise. Talent flows is an indicator variable that equal to one if at least one of top five executives move between the firm and the potential peer during the year 1992 to the current year. Multi-segments and Non-multi-segments are indicator variables that equal to one if both the firm and potential peer have more than one segments, and both have only one segments, respectively and zero otherwise. Robust t-statistics that adjusted for firm and peer level clustering are reported in the parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively. Chi-square statistics, for null hypotheses that the coefficient on industry CEO has executive experience and on industry CEO has board experience are equal, are reported at the end of the main statistics.

	(1)	(2)	(3)	(4)	(5)	(6)
		Fama48		Two-digit SIC		Three-digit SIC
Industry that CEO has experience	0.609*** (20.773)		0.553*** (19.270)		0.649*** (17.303)	
Industry that CEO has executive experience		0.773*** (20.587)		0.672*** (18.422)		0.826*** (16.971)
Industry that CEO has board experience		0.374*** (9.812)		0.321*** (8.646)		0.418*** (7.614)
Ln(peer total pay)	0.123*** (12.236)	0.122*** (12.175)	0.124*** (12.657)	0.123*** (12.610)	0.124*** (13.824)	0.124*** (13.829)
Peer group size	0.008*** (15.645)	0.008*** (15.949)	0.008*** (15.709)	0.008*** (16.035)	0.008*** (16.121)	0.008*** (16.437)
Fama48 industry match			1.047*** (25.136)	1.039*** (24.545)	0.919*** (23.020)	0.911*** (22.886)
Two-digit SIC code match	0.727*** (18.931)	0.721*** (18.946)			0.499*** (12.433)	0.497*** (12.322)
Three-digit SIC code match	0.280*** (3.119)	0.265*** (2.773)				
Sales between 50-200%	0.475*** (24.060)	0.476*** (24.062)	0.475*** (24.694)	0.475*** (24.734)	0.479*** (26.099)	0.479*** (26.002)
Assets between 50-200%	0.243*** (20.093)	0.242*** (20.078)	0.244*** (20.151)	0.243*** (20.109)	0.253*** (22.586)	0.252*** (22.677)
Market Cap between 50-200%	0.086*** (7.770)	0.086*** (7.721)	0.084*** (7.624)	0.084*** (7.634)	0.090*** (8.623)	0.090*** (8.594)
Dow30 match	1.582*** (15.250)	1.585*** (15.331)	1.584*** (15.664)	1.590*** (15.852)	1.557*** (15.201)	1.562*** (15.320)
S&P500 match	0.431***	0.436***	0.438***	0.441***	0.437***	0.438***

Continued on next page

Table 3 – continued

	(1)	(2)	(3)	(4)	(5)	(6)
	Fama48		Two-digit SIC		Three-digit SIC	
S&P mid 400 match	(18.083)	(18.333)	(18.776)	(18.926)	(20.239)	(20.294)
	0.078***	0.078***	0.080***	0.080***	0.084***	0.083***
	(3.450)	(3.398)	(3.535)	(3.479)	(4.047)	(3.954)
Chairman match	0.090***	0.093***	0.086***	0.090***	0.089***	0.091***
	(5.945)	(6.187)	(5.882)	(6.146)	(6.713)	(6.907)
Non-chairman match	0.035**	0.030**	0.025*	0.020	0.009	0.006
	(2.357)	(2.039)	(1.698)	(1.380)	(0.660)	(0.467)
Talent flows	1.074***	1.045***	1.052***	1.031***	0.985***	0.965***
	(20.745)	(20.047)	(19.072)	(18.772)	(20.019)	(19.593)
Multi-segments match	0.201***	0.198***	0.179***	0.177***	0.197***	0.195***
	(8.028)	(7.967)	(7.526)	(7.483)	(9.036)	(8.926)
Non Multi-segments match	-0.063	-0.066	-0.059	-0.060	-0.001	-0.007
	(-1.280)	(-1.327)	(-1.298)	(-1.326)	(-0.031)	(-0.157)
Pseudo R-squared	0.2332	0.2352	0.2384	0.2398	0.2687	0.27
Chi - square for coefficients on board experience and executive experience are equal		53.29		43.03		32.75
Observations	9,059,287	9,059,287	9,075,249	9,075,249	9,284,662	9,284,662
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: CEO pay level, general skills and peer pay levels

This table reports the results on the generalist CEOs' pay benchmarking on outside employment options within and across industries. The dependent variable is the logarithm of CEO total pay. Ln(median of peer pay from other industries) is the median of peer pay of those peers having different industry classification (fama48) from the reporting firm. Ln(median of peer pay from same industry) is the median of peer pay of those peers having the same industry classification (fama48) with the reporting firm. No. of industries in the peer group is the peer-group-based measure of general ability that counts the number of distinct industries (fama48) in the peer group. No. of CEO's industry experience is the past-experience-based measure that counts the number of industry (fama48) in which CEO has working experience. GA index is the past-experience-based measure as in Custodio, Ferreira and Matos (2013). All regressions controls for firm, CEO characteristics but not reported. Robust t-statistics adjusted for firm-level clustering is reported the parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels.

Dependent variable	(1)	(2)	(3)
	ln(CEO total pay)		
Ln(No. of industries in the peer group (fama48)) × ln(median of peer pay from outside industry)	0.022*** (3.004)		
Ln(No. of industries in the peer group (fama48)) × ln(median of peer pay from same industry)	-0.020*** (-2.779)		
Ln(No. of industries in the peer group (fama48))	-0.026 (-0.384)		
Ln(No. of CEO's industry experiences (fama48)) × ln(median of peer pay from outside industry)		-0.007 (-0.314)	
Ln(No. of CEO's industry experiences (fama48)) × ln(median of peer pay from same industry)		-0.102*** (-3.321)	
Ln(No. of CEO's industry experiences (fama48))		1.025*** (4.302)	
GAI × ln(median of peer pay from outside industry)			-0.005 (-0.138)
GAI × ln(median of peer pay from same industry)			-0.100** (-2.054)
GAI			0.998*** (2.701)
ln(median of peer pay from outside industry)	0.054 (1.167)	0.138** (2.285)	0.124*** (2.907)
ln(median of peer pay from same industry)	0.423*** (6.623)	0.523*** (6.010)	0.312*** (6.566)
Observations	4,574	4,557	4,574
R-squared	0.395	0.404	0.402
Firm controls	Yes	Yes	Yes
CEO controls	Yes	Yes	Yes
Peer group controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Table 6: Specialist CEOs' Turnover Risk Premium

This table reports the results on specialist CEOs' turnover risk premium. HighVol is an indicator variable that equals to one if the firm's industry is in the top half ranked by variance of monthly equity returns over past 10 years and zero otherwise. Generalist dummy is an indicator variable that equals to one if the number of industries in CEO's compensation peer group is larger than the sample's industry-year median and zero otherwise. All control variables are the same as in Table 4. Robust t-statistics adjusted for firm-CEO pair clustering is reported the parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels.

VARIABLES	(1)	(2)	(3)
		Ln(CEO total pay)	
Generalist dummy \times HighVol	-0.094** (-1.972)		
Generalist dummy	0.056 (1.563)		
Multiple industry experience dummy \times HighVol		-0.002 (-0.040)	
Multiple industry experience dummy		0.124*** (2.853)	
GAI dummy \times HighVol			-0.005 (-0.098)
GAI dummy			0.146*** (3.465)
HighVol	0.136*** (3.840)	0.102** (2.113)	0.113*** (2.955)
CEO age	-0.002 (-0.947)	-0.002 (-1.052)	-0.003 (-1.249)
CEO tenure	0.009** (2.548)	0.009** (2.467)	0.010*** (2.705)
Sales	0.340*** (18.630)	0.335*** (18.518)	0.334*** (18.591)
Tobin's Q	0.133*** (5.339)	0.135*** (5.423)	0.136*** (5.473)
Leverage	0.267** (2.399)	0.228** (2.103)	0.255** (2.306)
Free Cash Flows	0.076 (0.592)	0.044 (0.340)	0.041 (0.322)
Diversification Dummy	-0.075 (-1.474)	-0.081 (-1.594)	-0.076 (-1.500)
R&D	0.150*** (3.669)	0.126*** (3.254)	0.145*** (3.517)
Ln(Firm age)	-0.035** (-2.031)	-0.036** (-2.073)	-0.032* (-1.871)
Stock return	0.088*** (2.754)	0.084** (2.578)	0.089*** (2.784)
ROA	-0.992** (-2.192)	-0.974** (-2.191)	-0.921** (-2.101)
Chairman title	0.059* (1.954)	0.054* (1.797)	0.049 (1.630)
Ln(Board size)	-0.050 (-0.487)	-0.061 (-0.593)	-0.086 (-0.828)
Independence	0.228 (1.217)	0.170 (0.936)	0.200 (1.094)
Equity pay ζ 0	0.490*** (11.491)	0.482*** (11.278)	0.483*** (11.346)
Observations	5,495	5,495	5,495
R-squared	0.346	0.349	0.351
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Table 7: CEO's general ability and pay dispersion

This table presents the results on the effect of CEO's general ability on dispersion of CEO pay. This sample is created by aggregating from panel data to cross section. One observation is unique firm-CEO pair. The dependent variable is variance of CEO pay across sample years as the measure of CEO pay dispersion. All independent variables are the average values calculated across sample years for each firm-CEO pair. lNo. of CEO industry experiences (fama48, two- and three-digit SIC code) are the number of industries in the peer group using fama48, two- and three-digit SIC code industry classifications, respectively. No. of industry experiences and GAI are number of CEO's industry experiences and CEO's GAI as in Custodio, Ferreira and Mato (2013). ln(CEO total pay) is the logarithm of CEO total pay. Sale is firm's sales. Leverage is firm's common equity scaled by assets. Tobin's Q is the market-to-book ratio. ROA is the Return on Asset ratio over the current fiscal year. Stock return is the stock return over the current fiscal year. Firm age is the number of years since its firm appearance in CRSP data. CEO Age is CEO's age in a given year. CEO Tenure is CEO's tenure at current CEO position. Robust t-statistics is reported the parentheses. ***,**, and * denote significance at the 1%, 5% and 10% levels.

VARIABLES	(1)	(2)	(3)
		Ln(variance of CEO total pay)	
Generalist Dummy	-0.030** (-2.197)		
Multiple Industry experience dummy		0.002 (0.159)	
GAI dummy			-0.004 (-0.241)
CEO age	-0.001 (-0.797)	-0.001 (-0.671)	-0.001 (-0.651)
CEO tenure	0.001 (0.846)	0.001 (1.000)	0.001 (0.998)
Sales	0.013 (1.524)	0.009 (1.129)	0.009 (1.168)
Tobin's Q	-0.007 (-0.932)	-0.008 (-0.948)	-0.008 (-0.966)
Leverage	0.004 (0.076)	0.001 (0.014)	0.001 (0.018)
Free Cash Flows	-0.154 (-1.214)	-0.156 (-1.214)	-0.155 (-1.208)
Diversification dummy	0.048* (1.761)	0.043 (1.619)	0.044 (1.640)
Ln(firm age)	-0.029*** (-2.838)	-0.029*** (-2.771)	-0.029*** (-2.777)
Chairman title	-0.012 (-0.827)	-0.014 (-0.924)	-0.013 (-0.910)
Ln(board size)	-0.088** (-2.470)	-0.086** (-2.423)	-0.086** (-2.406)
Independence	-0.101 (-1.245)	-0.111 (-1.362)	-0.108 (-1.327)
Observations	2,413	2,413	2,413
R-squared	0.133	0.130	0.130
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Table 8: Firm's demand for general ability and CEO pay

This table represents the results for the pay of the generalist CEOs under peer-group-based measure corresponds to firm's exogenous demand for general ability. Panel A present the results for negative binomial regression to estimate the partial correlation between the proxy for firm's demand - non-compete index and CEO's general ability across industries. Panel B present the results for generalist CEO's pay correspond to different demand of the firms for general ability. Firm, CEO characteristics are included as controls. Robust t-statistics adjusted for state-level clustering are reported the parentheses. ***,**, and * denote significance at the 1%, 5% and 10% levels.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Ln(CEO total pay)			Ln(CEO pay benchmark)		
Generalist dummy × Non-compete index	0.063*** (2.739)			0.023** (2.107)		
Generalist dummy	-0.240 (-1.680)			-0.058 (-1.048)		
Multiple industry experiences dummy × Non-compete index		0.040* (1.895)			-0.006 (-0.619)	
Multiple industry experiences dummy		-0.077 (-1.031)			0.012 (0.328)	
GAI dummy × Non-compete index			-0.001 (-0.033)			0.010 (1.214)
GAI dummy			0.160** (2.217)			-0.039 (-1.097)
Non-compete index	-0.052*** (-3.184)	-0.049** (-2.492)	-0.025* (-1.849)	-0.019* (-1.984)	-0.005 (-0.544)	-0.014** (-2.043)
CEO age	-0.001 (-0.523)	-0.002 (-0.784)	-0.002 (-1.048)	-0.002 (-1.680)	-0.002* (-1.785)	-0.002* (-1.802)
Sales	0.294*** (7.951)	0.288*** (8.575)	0.279*** (8.229)	0.294*** (20.275)	0.297*** (21.043)	0.297*** (20.681)
Tobin's Q	0.064* (1.895)	0.062 (1.683)	0.054 (1.560)	0.116*** (3.254)	0.113*** (3.223)	0.115*** (3.203)
Leverage	-0.178 (-1.050)	-0.157 (-0.924)	-0.148 (-0.821)	-0.002 (-0.027)	0.014 (0.171)	0.006 (0.072)
Free Cash Flows	-0.107 (-0.302)	-0.138 (-0.389)	-0.108 (-0.304)	0.043 (0.337)	0.032 (0.248)	0.027 (0.214)
Ln(firm age)	0.035 (1.441)	0.033 (1.499)	0.039 (1.668)	0.020 (1.247)	0.018 (1.146)	0.017 (1.133)
Diversification dummy	0.044 (0.586)	0.033 (0.440)	0.020 (0.232)	-0.054 (-0.989)	-0.054 (-1.044)	-0.050 (-0.991)
ROA	-0.548 (-0.874)	-0.487 (-0.795)	-0.355 (-0.578)	-0.825* (-1.767)	-0.788* (-1.732)	-0.796* (-1.720)
Stock return	0.140** (2.132)	0.129* (1.902)	0.136** (2.159)	-0.047 (-1.453)	-0.047 (-1.504)	-0.051 (-1.639)
Ln(board size)	-0.108 (-0.825)	-0.089 (-0.679)	-0.090 (-0.675)	-0.045 (-0.809)	-0.034 (-0.666)	-0.035 (-0.648)
Independence	0.561* (1.967)	0.485 (1.622)	0.484 (1.508)	0.139 (0.905)	0.158 (0.960)	0.155 (0.980)
Observations	1,062	1,062	1,062	1,062	1,062	1,062
R-squared	0.402	0.401	0.403	0.731	0.729	0.729
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 9: Generalist CEO's peer citations by other firms

This table reports the results of multivariate regression on peer choice to test the effect of CEO's general ability on her probability of being selected as peer by other firms. The model setup is the same as in Table 3 and it excludes potential peers with the same industry classification as the reporting firm (fama48 in column 1, two-digit SIC in column 2 and three-digit SIC in column 3). The dependent variable is the indicator variable that equals to one if the firm is selected as peer and zero otherwise. The independent variables of interests are peer-group-based measure of general ability. i.e. Generalist CEO dummy which takes the value of one if the number of industries in CEO's peer group is larger than the sample's industry-year median (fama48, two- and three-digit) and zero otherwise; and past-experience-based measure i.e. the multiple industry experience dummy which takes the value of one if the CEO has more than one industry experience and zero otherwise. For other factors guiding the peer choices that are included but not reported in the table, they are the logarithm of CEOs total pay at the potential peer firm, peer group size, industry match dummy (Fama48, two- and three-digit), Firm size match dummy (potential peer's sales, assets and market Cap are between 50-200% of the reporting firm), Index membership match dummy (Dow30, S&P500 and S&P mid 400 match), chairman and non-chairman match dummy, multi-segments match, and talent flows. Robust z-statistics that adjusted for firm and peer level clustering are reported in the parentheses. ***,**, and * denote significance at the 1%, 5% and 10% levels, respectively. Chi-square test for null hypothesis that the coefficient on generalist CEO dummy and multiple industry dummy are equal is reported at the end the main results.

	(1)	(2)	(3)
Generalist CEO dummy (fama48)	0.278*** (13.552)		
Multiple industry experience dummy (fama)	0.125*** (12.379)		
Generalist CEO dummy (Two-digit SIC)		0.295*** (13.889)	
Multiple industry experience dummy (Two-digit SIC)		0.099*** (10.379)	
Generalist CEO dummy (Three-digit SIC)			0.272*** (10.108)
Multiple industry experience dummy (Three-digit SIC)			0.094*** (9.803)
Chi-square test for null hypothesis that the coefficient on generalist CEO dummy and multiple industry dummy are equal	55.9	57.3	57.1
Factors guiding peer choices	Included	Included	Included
Observations	4,718,742	4,725,238	4,836,888
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Table 10: CEO's lifetime working experience and chairman titles

This table presents the results of logit regressions on the relationship of CEO's general skills measure and her obtaining a chairman title. The sample excludes those new CEOs with less or equal to three years of tenure in current firm. The dependent variable is an indicator variable that equals to one if the CEO sits on the chair and zero otherwise. Number of industry experiences is the number of CEO's industry experiences. GAI is the General ability index as in Custodio, Ferreira and Matos (2013). CEO tenure is the number of years that CEO is at current position. Ln(Sales) is logarithm of firm's total sales. Ln(Board size) is the number of directors on the board. Independence is the proportion of independent directors on the board. z-statistics corrected for firm-CEO pair clustering are reported the parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels.

VARIABLES	(1)	(2)	Chairman title indicator	
Ln(number of industries in peer group)	0.023 (0.227)	0.044 (0.427)		
Ln(number of industry experiences)	0.386** (2.395)			
GAI		0.204** (2.388)		
Generalist dummy			0.161 (1.129)	0.150 (1.057)
Multiple industry experience dummy			0.362** (2.080)	
GAI dummy				0.236 (1.419)
Ln(Sales)	0.182** (2.118)	0.175** (2.035)	0.173** (2.030)	0.183** (2.186)
Ln(firm age)	0.005 (0.052)	0.007 (0.076)	-0.007 (-0.074)	0.002 (0.027)
Ln(board size)	-0.201 (-0.505)	-0.215 (-0.539)	-0.191 (-0.481)	-0.195 (-0.484)
Independence	3.956*** (5.229)	4.184*** (5.628)	3.997*** (5.314)	4.193*** (5.635)
CEO age	0.036*** (2.780)	0.035*** (2.798)	0.038*** (2.987)	0.037*** (2.920)
CEO tenure	0.082*** (4.758)	0.085*** (4.967)	0.083*** (4.790)	0.083*** (4.844)
Constant	-7.707*** (-5.673)	-7.779*** (-5.718)	-7.994*** (-5.784)	-8.027*** (-5.834)
Observations	3,204	3,204	3,204	3,204
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes

Table 11: CEO's lifetime working experience and firm performance

This table presents the results on CEO's industry working experience and firm performance. Number of CEO's industry experiences are number of industries in which the CEO has worked before. ln(Sales) is the firm's total sales. Leverage is total common equity divided by total assets. Firm age is a number of years since it first appears in CRSP database. R&D is a dummy variable that equals to one if the firm has non-zero R&D expenses. Stock return is firm's equity return during the fiscal year. Robust t-statistics adjusted for Huber-white standard errors is reported the parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels.

Regression type	(1)	(2)	(3)	(4)	(5)
Dependent Variable	OLS ln(Q)	OLS ROA	IV - First stage Number of CEO's industry experiences	IV - Second stage ln(Q)	IV - Second stage ROA
Number of CEO's industry experiences (instrumented in IV)	-0.041*** (-3.938)	-0.003*** (-4.255)		-0.214 (-1.166)	-0.011 (-0.364)
Non-compete index			0.014** (2.034)		
ln(Sales)	-0.088*** (-9.107)	0.005*** (5.535)	0.175*** (14.843)	-0.000 (-0.011)	0.006 (1.129)
Leverage	-0.308*** (-2.752)	-0.085*** (-11.248)	0.330*** (4.186)	-0.057 (-0.776)	-0.081*** (-6.032)
Free cash flows	-0.246*** (-3.035)	0.089*** (6.911)	0.000 (0.002)	-0.071 (-1.456)	0.083*** (6.539)
Firm age	-0.003*** (-5.038)	0.000 (0.568)	0.000 (0.249)	-0.001** (-2.378)	0.000 (0.663)
R&D	0.255*** (5.560)	-0.009** (-2.399)	0.202*** (3.878)	0.184*** (4.482)	-0.008 (-1.033)
Stock return	0.594*** (12.607)	0.030*** (9.354)	0.046 (1.207)	0.274*** (14.624)	0.029*** (8.455)
Constant	3.132*** (16.420)	0.057*** (4.717)	-0.449*** (-2.639)	0.999*** (9.537)	0.055*** (3.246)
Observations	6,475	6,475	6,249	6,249	6,249
R-squared	0.302	0.198	0.163	0.172	0.184
Year Dummies	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes

Table A1: Variable definitions

Variable	Description
Peer-group-based measure of general ability	
Number of industries in the peer group	number of unique industries in CEO's compensation peer group [ISS]
Proportion of peers from outside industry (fama48)	Proportion of peers from outside industry in CEO's compensation peer group [ISS]
Peer group industry herfindale index (fama48)	the HHI of industry composition in CEO's compensation peer group [ISS]
Generalist CEO dummy	Indicates if the number of industries in CEO's compensation peer group is larger than the our sample's industry-year median (fama48) [ISS]
Past-experience-based measure of general ability	
Number of industry experience	Number of CEO's past industry experiences [BoardEx]
General Ability Index (GAI)	The GA index as in Custodio, Ferreira, and Matos (2013) [BoardEx]
Peer group variables	
Peer group pay median	The median pay of all peers in CEO's compensation peer group
Peer group size	Number of peers in compensation peer group [ISS]
CEO characteristics	
Total pay	Total CEO pay in thousands of dollars, which consists of salary, bonus, value of restricted stock granted, value of options [Execucomp TDC1]
Cash pay	Cash Pay Salary plus bonus in thousand in thousands of dollars [Execucomp TOTAL_CURR]
Equity pay	Equity Pay Value of restricted stock granted plus value of options granted in thousands of dollars [Execucomp RSTKGRNT+OPTION_AWARDS_BLK_VALUE]
CEO Age	CEO's age [Execucomp AGE]
CEO Tenure	Number of years CEO is at current position [Execucomp]
Firm characteristics	
Sales	Sales Log of sales in thousands of dollars [Compustat SALE].
Asset	Firm's total asset [Compustat AT]
Tobin's Q	Sum of total assets plus market value of equity minus book value of equity divided by total assets [Compustat (AT+CSHO× PRCC_F - CEQ)/AT].
Leverage ratio	Firm's common equity divided by total assets [Compustat CEQ/AT]
Firm age	Number of years since the firm list its shares [CRSP]
Diversification dummy	Dummy variable that indicates if the firm has multi-segments [Compustat]
CAPX	Capital expenditures divided by total assets (CAPX/AT).
Free cash flow	The firms free cash flows scaled by its market cap. [CRSP/Compustat (oancf-capx)/(prcc_f × csho)]
R&D expenses / Total Assets	R&D Research and development (R&D) expenses divided by total assets (Compustat XRD/AT).
ROA	ROA Earnings before interest and taxes divided by total assets (Compustat EBIT / AT)
Stock return	Annual stock return [Compustat (PRCC_F(t) / AJEX(t) + DVPSX_F(t)/AJEX(t) / (PRCC_F(t-1) / AJEX_F(t-1))].
Board characteristics	
Board size	Number of directors on the board [Riskmetrics].
Independence	Proportion of independent directors on the board [Riskmetrics].