The Intangible Value of Key Talent:
Decomposing Organization Capital

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Abstract

Intangible assets are a key contributor to firm value, enabling the firm to differentiate itself from competitors on the basis of its access to specialized, efficient, firm-specific information, activities and procedures, identified as organization capital (OC). Since OC contains a heterogeneous group of disparate items, we isolate firm value creation by decomposing OC into two major parts: (1) key talent in the form of disclosed compensation of top executives which creates value and (2) a residual comprised of undisclosed perquisites and empire building expenses that do not increase firm value. Furthermore, residual OC creates systematic risk exposure, whereas key talent engenders idiosyncratic risk only.

Keywords: Organization capital, Human capital, Executive compensation, Firm value, Idiosyncratic Risk, Systematic Risk
JEL classification: G12, G30, G34

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"The manner in which information is accumulated in a firm offers an explanation for the firm's existence. Information is an asset to the firm, since it affects the production possibility set and is produced jointly with output. We call this asset of the firm its organization capital." – Prescott and Visscher (1980)

1. Introduction

A firm is more than a collection of assets. There is something intangible that identifies each firm and differentiates an Apple from a Microsoft. This intangible asset constitutes the firm's culture, internal knowledge and language, firm-specific policies and procedures, growth opportunities and information technology, brand name and any other aspects that are not directly related to the production process and are unique to the firm itself. A critical component of this intangible asset is the firm's key talent. However, it is very difficult to measure the value of key talent. Executive compensation represents part of the value of key talent. However, firms may offer perquisites and special arrangements as additional compensation to attract strategic executives. These arrangements are sometimes not publicly disclosed. For example, during Jeff Immelt's sixteen year tenure at General Electric, a spare jet routinely accompanied the corporate jet on overseas trips. This was not even revealed to GE's Board.[2] The presence of perquisites and other cash and non-cash emoluments complicates measures of the value of key talent in determining firm value.

There is a literature on organization capital (OC), which attempts to measure the intangible asset that defines a firm and potentially enhances its value (Lev and Radhakrishnan (2005), Eisfeldt and Papanikolaou (2013)). These studies have focused on various empirical constructions using overhead and non-allocated expenses as empirical measures of the firm's investment in the firm itself, rather than in the products it produces and sells. Selling, general and administrative (SG&A) expenses are considered the inputs into an intangible organization capital production function since these costs relate to the firm's operation but are not directly connected to the firm's outputs. If we consider the components contained within SG&A to be the factors in an organization capital production function, we must specify the output. Since organization capital represents an

[2] *Wall Street Journal*, October 29, 2017, https://www.reuters.com/article/us-ge-airplane/ge-board-did-not-know-about-ceos-extra-plane-wsj-idUSKBN1CY0RI

investment in the firm itself, the output is the firm value. Thus, in this paper, we examine the impact of organization capital on the firm's Tobin's q (market to book value). Our results are consistent with other studies that show that organization capital is positively related to firm performance (Lev, Radhakrishnan and Zhang (2009), Lev and Radhakrishnan (2005), Banker, Huang and Natarajan (2011), Chen, Lu and Sougiannis (2012), Eisfeldt and Papanikolaou (2013)).

However, SG&A expenditures encompass many different factors of production, ranging from personnel costs (i.e., for top executives and other non-allocated employees) to advertising, office rent, corporate perquisites, etc. It is unreasonable to expect that these disparate factors of production all enter into the organization capital production function in the same manner. Thus, in this paper, we decompose the heterogeneous elements of SG&A into component parts in order to identify the portion of organization capital that drives value. This decomposition allows us to differentiate observable payments to key talent in the form of executive compensation from other unobservable costs aggregated into SG&A. We utilize Execucomp data on executive compensation in order to isolate the explicit component of key talent in organization capital. This allows us to determine whether the human capital component of organization capital increases firm value through the strategic advantage provided by key talent, or decreases firm value through undisclosed empire building and entrenched management agency problems.

To address this question, we divide organization capital into two empirical measures: (1) the disclosed human capital component, defined as the capitalized value of compensation paid to top executives or key talent (denoted HC_OC), and (2) the residual comprised of all other elements of organization capital (denoted Residual_OC), which includes an undisclosed component of perquisites and other emoluments available to key talent. This decomposition allows us to determine which component of organization capital drives firm value. In particular, higher investment in HC_OC may be value enhancing if executives diligently and effectively manage the firm. Alternatively, however, agency problems may lead to higher measures of HC_OC as highly remunerated and entrenched management pursues empire building or risk diversification strategies at odds with shareholder value.[3] The expenses associated with perquisite consumption, empire building, and other expenditures are captured by the Residual_OC measure, allowing us to directly examine the impact of these fixed costs on firm value. We find that the key talent component of

[1] For example, Venieris, et al. (2015) find that costs are stickier when OC is high as management delays reductions in intangible investments in response to decreases in the firm's production level.

organization capital enhances firm value (as measured by market to book value), whereas the Residual_OC expenditures do not contribute to firm value.

These results remain when we use a two-stage analysis to address potential selection bias stemming from the firm's endogenous hiring of key talent. Over recent years, the job market has changed dramatically in terms of labor mobility and job polarization, thereby impacting the decomposition of OC (but not market to book directly) via changing labor supply and demand conditions. As one of our instrumental variables, we utilize the classification of Donangelo (2014), which measures the degree of worker specialization, thereby impacting the breakdown between key talent (HC_OC) and white-collar support personnel (Residual_OC). A second instrumental variable follows Jaimovich and Siu (2012) in measuring the ratio of non-routine, high wage employees (HC_OC) to routine, low wage employees (Residual_OC) as firms reallocate their work force to the polar extremes away from higher paying middle level employment. Our third instrumental variable relates the firm's executive compensation (HC_OC) to industry median levels.

Furthermore, our decomposition of organization capital allows us to more precisely measure the risk associated with key talent. We create five value-weighted portfolios sorted on OC_HC and Residual_OC individually in order to assess the risk characteristics of each component. We utilize CAPM, Fama-French three-factor model (Fama and French 1993) and Carhart four-factor model (Carhart 1997) for portfolios created using the quintiles of HC_OC and Residual_OC separately. The results show that high HC_OC firms do not have higher returns on average than low HC_OC firms, whereas high Residual_OC firms have positive and statistically significant average returns throughout the sample period. That is, high minus low HC_OC portfolios have no significant systematic risk incorporated into returns, whereas high minus low Residual_OC portfolios have a systematic risk premium. Thus, we find that there are two components of organization capital risk: idiosyncratic and systematic.

This result extends the work of Eisfeldt and Papanikolaou (2013), who contend that key talent poses a systematic risk to the firm as a result of the outside option executives have to leave the firm and take out their value enhancing contribution. Our decomposition allows us to pinpoint the source of the systematic risk associated with the loss of key talent. There is a component of key talent value production that is firm specific, since the outside option opportunity cost to the executive may be less valuable than the first best, continuation option of remaining in the firm.

Prescott and Visscher (1980) state that "the information set that makes a person productive in one organization may not make that person as productive in another organization even if both firms produce identical output." The remuneration of key talent compensates executives for their next best employment opportunity, but not for the firm specific, idiosyncratic component, which is the value added to the firm that cannot be transferred when the executive departs. Therefore, the executive compensation component of organization capital does not include the systematic risk to the firm of the loss of key talent, but rather includes undiversifiable firm specific risk.

In contrast, the Residual_OC component does include systematic risk associated with key talent. Top executives compensate themselves for their undiversifiable risk in the firm through consumption of perquisites and empire building. This process contributes to the costs incorporated in SG&A for personnel, R&D, advertising, company amenities (such as planes and limousines) that are captured in Residual_OC. The agency costs of these undisclosed expenditures do not increase firm value and expose shareholders to systematic risk. Therefore, isolating HC_OC allows us to disentangle the idiosyncratic from the systematic risk embedded in key talent. In sum, we find that HC_OC captures idiosyncratic risk, whereas Residual_OC captures systematic risk.

Allen and Yildirim (2017) utilize the OC decomposition to address the investment gap puzzle. Fundamental tenets of capital allocation (e.g., the q-theory of investment) imply that higher Tobin's q should elicit higher levels of capital investment. Lee et al. (2016) and Gutierrez and Philippon (2016) document a puzzle dating back to the mid-1990s in which there is an inverse relationship between capital investment and firm value. Further, Gonzalez and Trivin (2017) identify an inverse relationship between labor income growth and Tobin's q over the last three decades. Investigating a similar time period, researchers have also discovered a secular trend of job polarization in which mid-level routine jobs are disappearing (e.g., Autor et al. (2006) and Jaimovich and Siu (2012)). Increasingly the U.S. labor market is dichotomized into low level, low paying routine versus high level, strategic non-routine job opportunities (see Firpo et al. (2011)). To reconcile these empirical observations, Allen and Yildirim (2017) investigate whether firms have substituted investment in intangible OC for tangible capital investments over the past decades. Since a component of OC investment is comprised of human capital investments for key talent, this shift in the composition of investment activity further exacerbates the job polarization trend, further feeding income inequality. Moreover, to the extent that key talent drives firm value, entrenched management is more likely to engage in behavior that does not increase firm value, thereby exacerbating systematic risk exposure.

The paper proceeds as follows. The literature on organization capital is discussed in Section 2. Our empirical decomposition methodology and the impact of each of the components of organization capital on firm Tobin's q are analyzed in Section 3. Section 4 estimates the risk characteristics of each of the components of organization capital. Finally, Section 5 concludes.

2. Literature Review

The concept of organization capital dates back to economists' attempts to justify the existence of firms. Organizing assets into distinct companies occurs because these assets are more productive in unison than in isolation. That is, there is an intangible glue, called organization capital that connects the assets and makes them more productive. Organization capital incorporates the non-production related unique knowledge produced within the firm using the interaction of human capital and production technologies within themselves and among each other. Prescott and Visscher (1980) model the firm's organization capital in terms of improvements in the productivity of the firm's human capital, since the firm's knowledge of the capabilities of its individual employees improves efficiency by matching the worker to the best job, by creating effective teams of employees and by investment in on-the-job training. Evenson and Westphal (1995) summarize the organization capital as: "the knowledge used to combine human skills and physical capital into systems for producing and delivering want-satisfying products. Carlin et.al. (2012) view organization capital as a form of intra-firm language. This captures the idea that the value of organization capital depends on its being shared across managers and that it must be transmitted to the next generation of employees to be preserved. A firm's language includes informal work routines, convenient technical jargons, and a vocabulary of patterns remembered from past experiences. They show that firms with more organization capital have less employee turnover, and therefore, can invest over the long term. Eisfeldt and Papanikolaou (2013, 2014) identify the value of key talent as critical to the role of organization capital in creating firm value. Berk et al. (2016) find that actively managed mutual funds create value by reallocating funds based on the firm's private information about the skill of its money managers.

Organization capital encompasses the firm's know-how embedded in its work force. However, it is more than that. Indeed, Atkeson and Kehoe (2005) estimate that the payments to intangible capital represent about 8% of U.S. manufacturing output, with return on organization capital encompassing 40% of those payments. Corrado et al. (2009) attribute 30% of all intangible assets in the U.S. to organization capital (in their terms "firm-specific economic competancies"), representing the largest category. Moreover, Leung et al. (2016) find that organization capital impacts stock returns in 20 OECD countries. Organization capital includes the firm's intellectual capital embodied in research and development, growth opportunities and corporate culture with respect to innovations. Francis et al. (2015) connect the firm's organization capital to the number of patents granted. Martin-Oliver and Salas-Fumas (2012) show that organization capital increases firm value through the optimal deployment of the firm's investment in information technology and other material assets.

Whether investment in organization capital increases or decreases firm value is an empirical question. Oshima et al. (2008) view organization capital as entrepreneurial human capital that has been transformed from a non-tradable asset into tradable capital that is embedded in firm value. However, there are limits to the ability to write contracts based on this entrepreneurial talent. Organization capital is an intangible asset, and therefore, susceptible to agency problems which may reduce firm value. For example, Eisfeldt and Papanikolaou (2013) highlight the role of key talent in building the firm's organization capital. However, these talented executives have an outside option to leave the firm and use their expertise at another firm. Thus, the firm's shareholders are exposed to the risk that key talent will depart, thereby taking valuable organization capital with them. Eisfeldt and Rampini (2008) show that capital is less efficiently reallocated during downturns because executives have capital control rights as a result of their private information about asset productivity. Venieris et al. (2015) also find that selling, general and administrative expenses are sticky due to managerial reluctance to reallocate capital during downturns. Thus, key talent can pursue private objectives (such as empire building or risk diversification) at odds with value maximization. Firms' shareholders provide incentive pay to induce managers to relinquish control rights. Eisfeldt and Papanikolaou (2013) find that organization capital makes firms riskier, resulting in a 4.5% increase in risk-adjusted returns. Lustig et al. (2011) find that shareholders must share economic rents to key talent to prevent them leaving the firm. This takes the form of pay for performance and greater inequality of income among the firm's employees. Further, Boguth et al. (2016) find that organization capital is fragile, thereby exposing the firm to risk of loss. They estimate a 6% p.a. risk premium for organizational capital fragility, as measured by the size of the management team (the smaller the team, the more fragile the firm's OC).

Previous studies find significant association of higher executive compensation (included in SG&A expenses) with increasing agency problems between managers and shareholders of a firm. Agency theory argues that misalignment of interests between shareholders and managers could lead to agency problems, so that managers engage in activities for their own benefits rather than the benefits of the firm's shareholders (Jensen and Meckling 1976). One well-known agency problem is managerial empire building, which refers to managers' tendencies to grow the firm beyond its optimal size or to maintain unutilized resources with the purpose of increasing personal utility from status, power, compensation, and prestige (Jensen (1986), Stulz (1990), Bebchuk, Fried and Walker (2002), Masulis, Wang, and Xie (2007), Hope and Thomas (2008), Chen, Lu and Sougiannis (2012)). For example, in his seminal paper on managers' utility-maximizing tendencies, Williamson (1963) specifically uses the expansion of staff (proxied by SG&A costs) beyond optimal levels as an example to illustrate the effects of managerial discretion on managers' opportunistic behavior.

Another agency problem is the managers' disincentives to downsize as they derive monetary and nonmonetary benefits from managing larger and more complex organizations. Since any benefits from downsizing accrue primarily to shareholders rather than managers, managers may prefer the quiet life and try to avoid the difficult decisions and costly efforts associated with downsizing (Bertrand and Mullainathan (2003), Datta, Guthrie, Basuil, and Pandey (2010), Chen, Lu and Sougiannis (2012)).

There are a significant number of studies on the effect of executive compensation on firm performance. Some of these focus on the executive compensation structure and find evidence that equity compensation and managerial ownership have a positive relationship with firm value (Mehran (1995), Chang, Dasgupta and Hilary (2009), Frydman and Saks (2010)), while, others show that the relationship has a nonlinear inverted-U shape (Morck, Shleifer and Vishny (1988), McConnell and Servaes (1990), McConnell, Servaes and Lins (2008), Coles, Lemmon and Meschke (2012)). There is also evidence in the literature that the relationship between managerial ownership and firm value is asymmetric in the sense that large increases in managerial ownership increases firm value, whereas large decreases do not result in decrease in firm value (Fahlenbrach and Stulz (2009)).

Another strand of this literature discusses the effect of CEOs on firm performance. Adams, Almeida and Ferreira (2009) and Villalonga and Amit (2006) find evidence that founder-CEOs increase firm value. Malmendier and Tate (2008) find evidence that award-winning CEOs subsequently underperform and that the ex-post consequences of media-induced superstar status for shareholders are negative. Bebchuk, Cremers and Peyer (2011) find that an increase in the fraction of aggregate compensation of the top-five executive team captured by the CEO leads to decreases in firm value.

In this paper, we utilize a novel decomposition of organization capital in order to resolve some of the disagreements in the literature. Indeed, we hypothesize that the executive compensation component of OC has a different relationship with firm value than other fixed costs (such as R&D, staffing, perquisities, etc.). To test this, we hypothesize that:

Hypothesis 1. The key talent component of organization capital (HC_OC) enhances firm value whereas the Residual_OC does not contribute to firm value.

If executive compensation reflects the second best opportunity cost of key talent, then the firm retains the differential between the idiosyncratic value to the firm and the alternative use of key talent. This explains the positive contribution of key talent (measured by HC_OC) to firm value. However, if executives take back some of this firm value in the form of perquisite consumption and empire building, the Residual_OC component of organization capital will not contribute to increases in firm value. This agency problem (measured by Residual_OC) exposes firm shareholders to systematic risk, whereas executive compensation (measured by HC_OC) creates only an idiosyncratic risk exposure. Thus, we hypothesize:

Hypothesis 2. There are two components of organization capital risk: idiosyncratic and systematic. High-minus-low HC_OC portfolios have no significant systematic risk incorporated into returns, whereas high-minus-low Residual_OC portfolios have a systematic risk premium.

3. OC and Firm Value

3.1. Sample construction

We obtain financial data concerning firms and executive compensation from Compustat, CRSP, Execucomp and Thomson Reuters Form 13F filings databases for the period from 1992 to 2015.[4] The Compustat sample consists of all firms with sales and total assets higher than $5 million

[4] The period is restricted to 1992 because it is the earliest year Execucomp database is available.

excluding financial firms and utilities, as these industries are highly regulated. We exclude firms with have less than three consecutive years of data. Our final sample consists of 9,060 firm-year observations of 965 firms.

3.2. Variable definitions

We follow Faleye (2007) and measure Tobin's q as the market value of equity plus the book values of debt and preferred equity, all divided by the book value of assets. Our main variable of interest is the OC measure and its components; human capital (HC_OC) and residual (Residual_OC). Previous studies use selling, general and administrative expenses item (SG&A) of the income statement as a proxy for OC measure (Lev, Radhakrishnan and Zhang (2009), Eisfeldt and Papanikolaou (2013)). Following Eisfeldt and Papanikolaou (2013), we construct the stock of OC using the perpetual inventory method. Therefore, we calculate the following:

$$OCstock_{it} = (1-\delta)OCstock_{it-1} + \frac{SG\&A_{it}}{cpi_t} \quad (1)$$

in which cpi_t denotes the consumer price index and δ is the depreciation rate. In order to implement the law of motion, we choose an initial stock by:

$$OCstock_{i0} = \frac{SG\&A_{i1}}{g+\delta_0} \quad (2)$$

As in Eisfeldt and Papanikolaou (2013), we use the depreciation rate of 15%, which is equal to the depreciation rate used by the BEA in its estimation of R&D capital in 2006 and match the growth rate, g, with average annual real growth rate of firm-level SG&A expenditures, which is 7% in our sample. We scale this *OCstock* by the firm's book value of assets and denote this ratio as OC.

For the human capital component of OC measure, we capitalize the total executive compensation (item tdc1[5] in Execucomp) of top five executives that a firm reports on annual proxy (DEF14A SEC form).[6] We construct the HC_OC measure following the same procedure used in Equations (1) and (2). As it is a proxy for the human capital of a firm, we use 1% depreciation

[5] This item includes both cash compensation and the value of stocks and options granted. However, SG&A expenses did not include the value of options granted until 2005 when FAS 123r statement came into effect. Therefore, in our construction, we exclude the value of options granted from total executive compensation until 2005.
[6] To avoid heterogeneity of firms' reporting in ExecuComp, we limit our sample to firms with five executives listed in ExecuComp. Our results are robust to including total compensation to three or more executives listed in ExecComp.

rate[7] and a 19% real growth rate of executive compensation.[8] Similar to *OCstock*, we scale this measure by firm's book value of assets. To construct Residual_OC, we subtract the dollar amount of total executive compensation from SG&A expenses and follow the procedure in Equations (1) and (2) using a 15% depreciation rate and a real growth rate of 8% per annum.[9, 10]

Besides organization capital and its components, there are other variables that affect firm value such as governance and firm performance measures. We measure firm governance using institutional ownership and insider ownership (e.g., Bethel, Liebeskind and Opler (1998)). We also include the square of insider ownership to capture any nonlinearity in the relationship between governance and firm value (Morck, Shleifer and Vishny (1998)). The institutional ownership data are obtained from Thomson Reuters Form 13F filings. We collect data on insider ownership from the Execucomp database. Firm performance measures are constructed using Compustat variables. We follow Yermack (1996) and include profitability measured by return on assets (ROA), which is defined as the ratio of operating income before depreciation to total assets. We also include tangibility, defined as net property, plant and equipment scaled by total assets; leverage, defined as the ratio of long term debt to total assets; capital expenditures scaled by total assets; and firm age, defined as the number of years since IPO. We also control for firm size using the natural logarithm of book value of assets. To control for industry variations, we include 48 industry classifications from Fama and French (1997).

Table 1 presents summary statistics for the variables described above. As the table shows, the mean Tobin's q in our sample is 1.78. The SG&A item has a mean of $1,153.38 million, and total executive compensation is $9.02 million on average. Therefore, the executive compensation component constitutes approximately 1% of SG&A expenses. Accordingly, the total OC measure has an average of 0.75. This is decomposed into HC_OC with a mean of 0.05, and Residual_OC, which has a mean of 0.71. Average firm size is 7.65, which corresponds to approximately $2 billion of total assets with 14.9% annual return on assets and long-term debt constituting 20.7% of the

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[7] Previous studies find human capital depreciation rate between 0.1% and 0.8%. (Browning et.al (1999), Ludwig et.al (2012). Arrazola and Hevia (2004) find the depreciation rate to be 1% and 1.5% in Spain. Our results are robust to a depreciation rate in 0-1% interval. The robustness tests with δ=0 can be found in the Appendix.

[8] Average annual real growth rate of firm-level Executive compensation is 19% in our sample.

[9] Firm level Residual_OC has a real growth rate of 8% per annum in the sample. We use 15% depreciation rate as in the construction of OC.

[10] Alternatively, we define Residual_OC2 from the regression of OC on HC_OC variable to estimate a residual component of OC that is orthogonal to HC_OC. Our results are robust to either definition and are available in the Internet Appendix.

total assets. On average, institutional ownership is 68.7% of the firm's outstanding shares, whereas managerial ownership is 2.6% of a firm's shares on average.

3.3. Empirical analysis

3.3.1. Components of OC and firm value analysis

In order to validate the results of earlier studies, we first perform our analysis using the aggregate measure of organization capital, OC. We use the Tobin's q proxy for firm value as the dependent variable. Table 2 presents our results. Using the OC coefficient shown in column (1) of Table 2, a one standard deviation increase in OC (equal to 0.65 from Table 1) increases firm value by 11.05% (0.65*0.17), statistically significant at the 1% significance level. Controlling for firm fixed effects in columns (2) and (3) to reduce omitted variable bias, a one standard deviation increase in OC (equal to 0.27 using within standard deviation)[11] increases firm value by 8.04% (0.27*0.302) in column (2) and 5.8% (0.27*0.215) in column (3), both significant at the 1% level.

In the aggregate, our results suggest that an increase in organization capital is correlated with increased firm value. However, to determine the source of that value creation, we decompose OC into two components (HC_OC and Residual_OC) as outlined in Section 3.2. To test our first hypothesis, we estimate fixed effects regressions of firm value on our two components of OC and present the results in columns (4), (5) and (6) of Table 2. Our results show a significant and positive impact on firm value related to executive compensation for key talent (HC_OC), whereas the residual component (Residual_OC) remains insignificant in all three estimations. Using the standard deviation of HC_OC from Table 1 (equal to 0.05), column (4) of Table 2 shows that a one standard deviation increase in HC_OC increases firm value by 20.26% (0.05*4.052), significant at the 1%. In column (5), using the within standard deviation of HC_OC (equal to 0.01), a one standard deviation increase in HC_OC increases firm value by 7.4% (0.01*7.406), significant at the 1% level. After controlling for the lagged Tobin's q in column (6), a one standard deviation increase in HC_OC increases firm value by 3.01% (0.01*3.015), significant at the 1% level. These results are consistent with Hypothesis 1 that there is a statistically and economically significant increase in firm value from the key talent component of organization capital. In

[11] In the fixed effects regression the variables are transformed to estimate within variation (Baltagi 2008). Therefore, in order to analyze the magnitude of the effect of OC or components of OC on firm value, we use the standard deviation of within transformation of x_{it}. That is, the estimation uses $\tilde{x}_{it} = x_{it} - \bar{x}_i$ and the within standard deviation is equal to 0.27 for OC and 0.01 for HC_OC.

contrast, the residual component of organization capital has an insignificant effect on firm value in all specifications. Our fixed effects model does not suffer from the lack of time variation in the total executive compensation since it has increased significantly during the sample period (1992-2015) although the standard deviation is 0.01. According to Bebchuk and Grinstein (2005), equity-based compensation tripled during the period 1993-2003 and cash compensation increased by 40% during the same period. Similarly, Shue and Townsend (2017) report that option compensation grew by more than six fold between 1992-2011 whereas; non-option compensation remained relatively flat during the same period. However, the model does not fully address endogeneity problems.

3.3.2. Resolving the endogeneity problem

The results presented in Table 2 suffer from potential sample selection bias as a result of the endogenous choice to hire key talent and pay the required level of executive compensation. For example, if successful firms have the financial resources to hire expensive executives, we may find a spurious connection that reflects reverse causality between key talent compensation and firm value. We address the endogeneity problem in the Tobin's q regressions utilizing a two-stage estimation approach. We identify three sets of instrumental variables for our decomposition of OC. Our first instrumental variable is the industry specific labor mobilization measure of Donangelo (2014). The more industry-specific the skill set required in a particular industry, the lower the degree of labor mobility. This creates systematic risk as firms with inflexible labor supply face frictions in adjusting to industry shocks. We utilize the classification of Donangelo (2014) in which workers in occupations concentrated in a few industries are associated with industry specialists with low labor mobility, while workers in occupations dispersed across the economy are associated with generalists with high labor mobility. We argue that firms in high labor mobility industries face more frequent turnover, which is reflected in their hiring and training costs incorporated in Residual_OC. Moreover, attracting and retaining key talent requires the offering of more perquisites and emoluments, thereby increasing Residual_OC for high mobility industries. On the other hand, more frequent turnover and lower average tenure would reduce HC_OC in high mobility industries.

Our second instrumental variable utilizes the measure of job polarization developed in Jaimovich and Siu (2012) that identifies the increasing concentration of jobs in high wage and low wage extremes coupled with a declining secular trend in middle level employment. We hypothesize that the growing reliance on routine, low level employees in the work force reduces firm's salary expenditures for non-routine middle level workers, as well as reduces the firm's incentive to expend ongoing resources for labor support and training activities, thereby reducing Residual_OC. An increase in the job polarization instrumental variable also implies greater reliance on nonroutine labor, which includes but is not limited to key talent. We hypothesize a positive relationship with HC_OC as a result of the greater expenditures for high wage employees in general administrative expenses. We construct the *Job Polarization* ratio of nonroutine cognitive occupations to routine cognitive occupations using the occupational classification system obtained from the St. Louis Federal Reserve Bank FRED monthly database. [12] We use the end of December values to proxy annual employment numbers.[13]

We utilize *Relative_Salary_OC* as our third instrumental variable. The salary component of total executive compensation (TDC1 on Execucomp) constitutes about 25% of total executive compensation on average and its annual real growth rate is 2.6% during our sample period. Therefore, it is a fairly stable component of HC_OC. We calculate the total Salary component of the top five executives on Execucomp and follow the same procedure outlined in Equations (1) and (2) to construct *Salary_OC*. Then, we define *Relative_Salary_OC* as the difference between *Salary_OC* of firm *i* and the industry median *Salary_OC,* excluding firm *i* in each year.[14] This variable directly impacts the HC_OC component of organization capital by construction. It also impacts Residual_OC as increases in cash salary may be met with increases in perquisites and empire building especially when other components of executive compensation do not grow proportionately, thereby contributing to increases in Residual_OC. Increases in the components of the executive pay package will impact the components of organization capital without directly

[12] Non-routine cognitive workers are defined as those employed in "management, business, and financial operations occupations" and "professional and related occupations" and routine cognitive workers are those in "sales and related occupations" and "office and administrative support occupations." Routine manual occupations are "production occupations," "transportation and material moving occupations," "construction and extraction occupations," and "installation, maintenance, and repair occupations." Non-routine manual occupations are "service occupations." We only use nonroutine cognitive occupations and routine cognitive occupations to construct the job polarization variable since only these two categories' wages are included in the SG&A expenses.
[13] Our results are robust to measuring the ratio using total of all months' employment as well as the mean value of all months' employment during each year.
[14] As a robustness test, we define *Relative_Salary_OC2* as the difference between *Salary_OC* of firm *i* and the industry mean *Salary_OC,* excluding firm *i* in each year. We also use *Next_Salary_OC* as an instrument, which is the nearest competitor's Salary_OC, where nearest competitor is defined by revenue sorting in each year and industry. Our results in Table 3 and 4 are robust to either alternative specification.

impacting the firm's Tobin's q. The Sargan-Hansen test statistic fails to reject the null that overidentifying restrictions are valid. Furthermore, the Sanderson and Windmeijer (2016) multivariate F tests of excluded instruments rejects the null that instruments are weak at 1% significance level for IVs of both components of OC. These show that both the exclusion restriction and relevance conditions are met for our IV estimations. We present the first stage of our two-stage estimation in Table 3. Consistent with our expectations, we find that *Labor Mobility* increases Residual_OC but reduces HC_OC. The effect is significant at 5% significance level for both Residual_OC and HC_OC. *Job polarization* ratio reduces Residual_OC but does not have an impact on HC_OC. Finally, the coefficient estimate on the *Relative_Salary_OC* variable is significantly positive (at the 1% level) in Table 3, indicating that higher cash salaries paid to top executives contribute directly to higher HC_OC and to higher Residual_OC.

Our second stage results, presented in Table 4, provides evidence that after controlling for endogeneity, we find strong evidence supporting our hypothesis that the value-enhancing component of organization capital is HC_OC. A one standard deviation increase in instrumented HC_OC (equal to 0.04) increases Tobin's q by 17.7% (0.04*4.428) at the 1% level of statistically significance. On the other hand, we find that the coefficient on Residual_OC is statistically insignificant. Thus, the two-stage analysis suggests that HC_OC enhances firm value, whereas Residual_OC does not contribute to firm value.

4. The Risk of Organization Capital Components

To test our second hypothesis, we analyze the risk of each of the two components of organization capital to distinguish between priced systematic risk and idiosyncratic risk. In order to test this, we estimate CAPM, Fama-French three-factor model (Fama and French 1993) and Carhart four-factor model (Carhart 1997) for five portfolios of firms sorted on HC_OC and Residual_OC separately within each year and industry.

4.1. Sample construction

Data on risk factors are from Kenneth French's website. We obtain monthly stock returns data from CRSP and match each year's HC_OC and Residual_OC, calculated using the Compustat data described in section 2 for the period from 1992 to 2015. Our sample includes all nonfinancial firms in Compustat with fiscal year ending in December with common shares that are traded on

NYSE, AMEX, or NASDAQ and that have non-missing SIC codes and nonzero values of HC_OC and Residual_OC.

Following Eisfeldt and Papanikolaou (2013) we first group firms into 17 industries based on the Fama and French (1997) classification. Then, within each industry and each year, we sort firms into five subportfolios based on HC_OC (Residual_OC). We then pool the subportfolios across industries and years to form five portfolios of firms sorted on HC_OC (Residual_OC), where the breakpoints are industry and year specific. Finally, we form five value-weighted portfolios based on each firm's within-industry HC_OC (Residual_OC) rank in each year, and rebalance these portfolios in June every year.[15] Therefore, portfolio 1 (5) contains firms in the lowest (highest) HC_OC or Residual_OC quintile in each year and industry.

4.2. Asset Prices of portfolios sorted on components of OC

We present our asset pricing results for portfolios sorted on HC_OC in Table 5 and on Residual_OC in Table 6. As in Eisfeldt and Papanikolaou (2013), in addition to estimating CAPM, Fama and French three-factor and Carhart four-factor models, we also use high-minus-low portfolio of both HC_OC and Residual_OC as additional risk factors in panel B of Table 5 and 6, respectively. These results show that the beta of high-minus-low HC_OC and Residual_OC portfolios increases from low to high quintile portfolios suggesting that both components of OC are sources of risk that increase monotonically from low to high portfolios. However, when controlling for other factors in Panel C (3-factor) and Panel D (4-factor), the alpha of high-minus-low HC_OC portfolio (5-1) becomes negative and insignificant whereas, alpha of high-minus-low Residual_OC portfolio (5-1) becomes positive and significant. In the four-factor model presented in panel D of Table 6 the significance of alpha in high-minus-low (5-1) is at 5%.

Our results suggest that the risk premium of high-minus-low Residual_OC portfolio (5-1) corresponds to 7.03% higher annual returns in three-factor model (i.e., 12 times the monthly alpha coefficient of 0.586 in Panel C of Table 6) and 4.60% higher annual return in four-factor model (i.e., 12 times the monthly alpha coefficient of 0.384 in Panel D of Table 6). These results support our second hypothesis that HC_OC fluctuations engender firm-specific idiosyncratic risk since there is no risk premium required for diversifiable risk. However, Residual_OC encompasses

[15] Our results using equal-weighted portfolio returns are stronger and statistically significant at 1% level. We provide those results in the Internet Appendix.

systematic risk that exposes firms with high Residual_OC portfolios to the risks associated with agency costs from empire building and perquisite consumption.

5. Conclusion

We introduce a new decomposition of the aggregate organization capital measure used in the literature to explain intangible firm value. We distinguish the contribution of key talent, as measured by executive compensation, from the remainder of organization capital, which includes perquisite consumption and empire building costs. We find that key talent is an important value creation vehicle for firms. However, investment in the remaining component of organization capital does not contribute to firm value.

We also examine the risk characteristics of each of our newly introduced components of organization capital. We find that the human capital component of organization capital exposes shareholders to company-specific, idiosyncratic risk. Thus, there is no key talent systematic risk premium. In contrast, however, the residual component of organization capital engenders systematic risk, offering a risk premium that is significant both economically and statistically. We attribute this to the inclusion of agency costs in residual organization capital. That is, the residual organization capital includes perquisite consumption, agency building and other non-value increasing activities pursued by key talent. The value created by executives empowers them to demand these intangible benefits, thereby exposing shareholders to systematic risk.

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Table 1: Summary Statistics

Variable	Obs	Mean	Std.Dev.	Q1	Median	Q3
Tobin's q	9,060	1.78	1.36	0.97	1.37	2.05
SG&A expenses ($ millions)	9,060	1153.38	3021.04	112.92	296.83	844.55
Total Executive Compensation ($ millions)	9,060	13.73	15.02	4.94	9.02	16.83
OC	9,060	0.75	0.65	0.28	0.55	1.01
HC_OC	9,060	0.05	0.06	0.01	0.02	0.05
Residual_OC	9,054	0.71	0.62	0.26	0.52	0.95
Institutional ownership	9,060	0.69	0.22	0.57	0.72	0.84
Managerial ownership	9,060	0.03	0.07	0.00	0.00	0.01
Managerial ownership^2	9,060	0.00	0.02	0.00	0.00	0.00
Size	9,060	7.65	1.57	6.51	7.53	8.69
Tangibility	9,055	0.31	0.23	0.12	0.24	0.43
Leverage	8,997	0.21	0.19	0.06	0.16	0.30
ROA	9,012	27.37	22.89	10	20	39
Firm Age	9,060	0.06	0.06	0.02	0.04	0.07
Capex/TA	9,560	0.15	0.11	0.10	0.14	0.19
Labor mobilization	8,014	0.23	0.87	-0.51	0.28	0.89
Job polarization	9,060	1.42	0.16	1.27	1.39	1.56
Relative_Salary_OC	9,003	0.02	0.07	-0.01	0.00	0.03

Table 2: Tobin's q regressions with OC and components of OC

The dependent variable in all regressions is Tobin's q, defined as the market value of equity plus the book values of debt and preferred equity, all divided by the book value of assets. Regressions in columns (1) and (4) are OLS estimations with industry and year fixed effects. Other estimations include firm and year fixed effects. Columns (3) and (6) include lagged dependent variable as a control. All independent variables are one period lagged. In all estimations the standard errors are clustered at the firm level. The sample period is 1992 to 2015. *, ** and *** indicate 10%, 5% and 1% significance levels, respectively.

Dependent variable: M/B	(1)	(2)	(3)	(4)	(5)	(6)
OC_{t-1}	0.170***	0.298***	0.215***			
	(3.43)	(4.01)	(4.36)			
HC_OC_{t-1}				4.052***	7.406***	3.015***
				(5.56)	(5.53)	(3.85)
$Residual\_OC_{t-1}$				0.023	-0.059	0.083
				(0.45)	(0.67)	(1.46)
M/B_{t-1}			0.535***			0.523***
			(17.47)			(17.19)
Institutional Ownership $_{t-1}$	0.030	-0.195**	-0.257***	0.051	-0.126	-0.229***
	(0.28)	(1.98)	(3.29)	(0.49)	(1.34)	(3.02)
Managerial Ownership$_{t-1}$	2.489*	3.402**	2.161**	2.257*	3.211**	2.122**
	(1.91)	(2.13)	(2.04)	(1.71)	(2.11)	(2.04)
Managerial Ownership$^2_{t-1}$	-6.232*	-6.974	-5.036*	-5.725	-6.982*	-5.108*
	(1.73)	(1.62)	(1.82)	(1.59)	(1.73)	(1.89)
Standardized Size$_{t-1}$	-0.043**	-0.278***	-0.145***	-0.020	-0.280***	-0.148***
	(2.20)	(2.78)	(2.69)	(1.09)	(2.79)	(2.70)
Tangibility$_{t-1}$	-0.770***	-0.759***	-0.236	-0.668***	-0.661**	-0.216
	(3.87)	(2.70)	(1.49)	(3.55)	(2.46)	(1.36)
Leverage$_{t-1}$	-1.440***	-1.012***	-0.162*	-1.314***	-0.948***	-0.153*
	(9.41)	(7.15)	(1.74)	(9.25)	(6.79)	(1.65)
ROA$_{t-1}$	4.078***	2.244***	0.454**	4.215***	2.258***	0.501**
	(6.31)	(3.80)	(2.12)	(6.74)	(4.01)	(2.34)
Firm age$_{t-1}$	-0.004***	-0.001	-0.002	-0.002	-0.014***	-0.008**
	(2.90)	(0.25)	(0.71)	(1.32)	(2.69)	(2.10)
Capex/TA$_{t-1}$	0.649	0.188	-0.401*	0.540	0.159	-0.409*
	(1.15)	(0.49)	(1.73)	(0.99)	(0.45)	(1.75)
Constant	1.535***	1.657***	0.855***	1.340***	1.816***	0.940***
	(8.18)	(5.24)	(3.69)	(7.23)	(6.02)	(4.17)
Firm Fixed Effects	NO	YES	YES	NO	YES	YES
Industry Fixed Effects	YES	NO	NO	YES	NO	NO
Year Fixed Effects	YES	YES	YES	YES	YES	YES
R^2	0.41	0.19	0.43	0.43	0.21	0.43
N	9,015	9,015	9,015	9,009	9,009	9,009

Table 3: First Stage Results of Two-Stage Least Squares Estimations

The instruments for HC_OC and Residual_OC are *Labor mobilization*, *Job polarization* and *Relative_Salary_OC*. All instruments and control variables are one period lagged. In all estimations the standard errors are clustered at the firm level. The sample period is 1992 to 2015. *, ** and *** indicate 10%, 5% and 1% significance levels, respectively.

Dependent variable:	HC_OC	Residual_OC
Labor mobilization $_{t-1}$	-0.003**	0.051**
	(2.18)	(2.56)
Job polarization $_{t-1}$	0.006	-0.776***
	(1.25)	(9.29)
Relative_Salary_OC $_{t-1}$	0.501***	1.769***
	(15.87)	(5.09)
Institutional Ownership $_{t-1}$	0.008*	-0.279***
	(1.66)	(4.14)
Managerial Ownership$_{t-1}$	-0.044	1.068
	(0.81)	(1.54)
Managerial Ownership$^2_{t-1}$	0.039	-2.198
	(0.20)	(1.00)
Standardized Size$_{t-1}$	-0.004***	-0.047***
	(4.20)	(3.76)
Tangibility$_{t-1}$	-0.051***	-0.883***
	(8.74)	(10.07)
Leverage$_{t-1}$	-0.018**	-0.239***
	(2.48)	(2.82)
ROA$_{t-1}$	-0.041**	0.272*
	(2.43)	(1.65)
Firm age$_{t-1}$	-0.000***	0.002**
	(3.99)	(2.22)
Capex/TA$_{t-1}$	0.028*	0.616**
	(1.92)	(2.36)
SW F statistic of excluded instruments	33.35	32.81
(p-value)	(0.0000)	(0.0000)
R^2	0.53	0.28
N	7,436	7,436

Table 4: Second Stage Results of Two-Stage Least Squares Estimations

The dependent variable in all regressions is Tobin's q, defined as the market value of equity plus the book values of debt and preferred equity, all divided by the book value of assets. HC_OC and Residual_OC variables are the estimates from the first stage regressions in Table 3. The instruments for HC_OC and Residual_OC are *Labor mobilization*, *Job polarization* and *Relative_Salary_OC*. All independent variables are one period lagged. In all estimations the standard errors are clustered at the firm level. The sample period is 1992 to 2015. *, ** and *** indicate 10%, 5% and 1% significance levels, respectively.

Dependent variable: M/B	(2)
HC_OC $_{t-1}$	4.428***
	(3.19)
Residual_OC $_{t-1}$	0.078
	(0.49)
Institutional Ownership $_{t-1}$	-0.315**
	(2.35)
Managerial Ownership$_{t-1}$	-0.750
	(0.49)
Managerial Ownership$^2_{t-1}$	2.091
	(0.47)
Standardized Size$_{t-1}$	-0.003
	(0.12)
Tangibility$_{t-1}$	-0.441**
	(2.55)
Leverage$_{t-1}$	-1.769***
	(10.65)
ROA$_{t-1}$	4.204***
	(5.84)
Firm age$_{t-1}$	-0.001
	(0.52)
Capex/TA$_{t-1}$	0.274
	(0.51)
Sargan overidentification test statistic	1.177
(p-value)	(0.2780)
R^2	0.29
N	7,436

Table 5: Asset Pricing: Five portfolios sorted on HC_OC

This table shows asset-pricing estimations for five portfolios sorted on HC_OC over book value of assets relative to their industry peers within each year. In Panel A we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio. In Panel B we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio and high-minus-low HC_OC factor (HMLHC). In Panel C we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio and the Fama and French (1993) SMB and HML factors. In Panel D we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio, the Fama and French (1993) SMB and HML factors and the Carhart (1997) MOM factor. Data on SMB, HML, and MOM are from Kenneth French's website. The sample period is June 1992 to December 2015. All portfolio returns correspond to value-weighted returns by firm market capitalization.

Panel A: CAPM

	1	2	3	4	5	5 -1
α	0.200*	0.297**	0.159	0.174	0.209	0.009
	(1.92)	(2.14)	(0.95)	(1.12)	(1.20)	(0.04)
β_{MKT}	0.913***	0.896***	0.954***	0.930***	0.988***	0.075
	(33.04)	(20.89)	(16.76)	(20.11)	(19.64)	(1.19)
R^2	0.85	0.77	0.73	0.75	0.71	0.01

Panel B: two-factor model

	1	2	3	4	5
α	0.203**	0.297**	0.157	0.171	0.203**
	(2.51)	(2.14)	(0.98)	(1.27)	(2.51)
β_{MKT}	0.936***	0.896***	0.940***	0.906***	0.936***
	(43.61)	(21.05)	(18.29)	(24.50)	(43.61)
β_{HMLHC}	-0.307***	-0.002	0.181***	0.323***	0.693***
	(10.04)	(0.04)	(2.92)	(7.69)	(22.69)
R^2	0.91	0.77	0.74	0.80	0.94

Panel C: three-factor model

	1	2	3	4	5	5 -1
α	0.224**	0.273**	0.089	0.109	0.132	-0.091
	(2.43)	(2.07)	(0.57)	(0.74)	(0.89)	(0.54)
β_{MKT}	0.955***	0.937***	0.973***	0.923***	0.938***	-0.016
	(39.81)	(23.66)	(19.31)	(20.93)	(20.00)	(0.31)
β_{SMB}	-0.257***	-0.120**	0.110**	0.216***	0.444***	0.701***
	(7.22)	(2.28)	(2.29)	(3.46)	(5.76)	(9.77)
β_{HML}	-0.031	0.115	0.237***	0.196***	0.190**	0.221***
	(0.70)	(1.60)	(3.14)	(2.76)	(2.54)	(2.61)
R^2	0.88	0.78	0.75	0.77	0.79	0.40

Panel D: four-factor model

	1	2	3	4	5	5 -1
α	0.300***	0.300**	0.152	0.123	0.170	-0.130
	(3.29)	(2.20)	(0.92)	(0.81)	(1.11)	(0.73)
β_{MKT}	0.916***	0.924***	0.942***	0.916***	0.919***	0.003
	(35.24)	(21.88)	(18.73)	(19.61)	(20.22)	(0.06)
β_{SMB}	-0.243***	-0.115**	0.121***	0.219***	0.451***	0.694***
	(7.97)	(2.27)	(2.67)	(3.62)	(6.13)	(9.21)
β_{HML}	-0.064*	0.103	0.210***	0.190***	0.173**	0.237***
	(1.66)	(1.46)	(2.95)	(2.70)	(2.54)	(2.97)
β_{MOM}	-0.097***	-0.033	-0.079*	-0.017	-0.047	0.049
	(3.34)	(0.94)	(1.73)	(0.50)	(1.04)	(0.79)
R^2	0.90	0.79	0.75	0.77	0.79	0.40

Table 6: Asset Pricing: Five portfolios sorted on Residual_OC

This table shows asset-pricing estimations for five portfolios sorted on Residual_OC over book value of assets relative to their industry peers within each year. In Panel A we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio. In Panel B we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio and high-minus-low Residual_OC factor (HMLRes). In Panel C we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio and the Fama and French (1993) SMB and HML factors. In Panel D we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio, the Fama and French (1993) SMB and HML factors and the Carhart (1997) MOM factor. Data on SMB, HML, and MOM are from Kenneth French's website. The sample period is June 1992 to December 2015. All portfolio returns correspond to value-weighted returns by firm market capitalization.

Panel A: CAPM

	1	2	3	4	5	5 -1
α	-0.226	0.247**	0.256**	0.281**	0.394***	0.620***
	(1.55)	(2.06)	(2.00)	(2.15)	(2.60)	(3.10)
β_{MKT}	1.055***	0.939***	0.873***	0.789***	0.661***	-0.395***
	(28.68)	(31.71)	(25.19)	(21.43)	(15.96)	(7.86)
R^2	0.80	0.81	0.78	0.74	0.59	0.22

Panel B: two-factor model

	1	2	3	4	5
α	0.073	0.352***	0.243*	0.234*	0.073
	(0.64)	(3.00)	(1.80)	(1.79)	(0.64)
β_{MKT}	0.865***	0.872***	0.881***	0.819***	0.865***
	(25.40)	(28.27)	(21.96)	(22.79)	(25.40)
β_{HMLHC}	-0.483***	-0.169***	0.022	0.077*	0.517***
	(11.88)	(4.30)	(0.48)	(1.84)	(12.73)
R^2	0.89	0.83	0.78	0.74	0.78

Panel C: three-factor model

	1	2	3	4	5	5 -1
α	-0.231	0.284**	0.221*	0.285**	0.356**	0.586***
	(1.64)	(2.46)	(1.85)	(2.40)	(2.43)	(3.05)
β_{MKT}	1.087***	0.962***	0.913***	0.843***	0.701***	-0.386***
	(30.45)	(34.26)	(31.77)	(25.55)	(18.28)	(7.92)
β_{SMB}	-0.131**	-0.210***	-0.084*	-0.257***	-0.074	0.057
	(2.30)	(4.23)	(1.84)	(5.24)	(1.43)	(0.77)
β_{HML}	0.046	-0.092**	0.150***	0.044	0.159**	0.113
	(0.70)	(2.34)	(2.96)	(0.71)	(2.17)	(1.14)
R^2	0.81	0.83	0.80	0.79	0.62	0.23

Panel D: four-factor model

	1	2	3	4	5	5 -1
α	-0.116	0.370***	0.279**	0.321***	0.268*	0.384**
	(0.83)	(3.20)	(2.29)	(2.67)	(1.85)	(2.04)
β_{MKT}	1.030***	0.919***	0.884***	0.825***	0.744***	-0.285***
	(28.06)	(31.76)	(27.16)	(23.24)	(18.63)	(5.95)
β_{SMB}	-0.111**	-0.195***	-0.074*	-0.251***	-0.090*	0.021
	(2.26)	(4.63)	(1.73)	(5.34)	(1.71)	(0.32)
β_{HML}	-0.003	-0.130***	0.125***	0.028	0.197***	0.200**
	(0.06)	(3.49)	(2.66)	(0.46)	(2.75)	(2.21)
β_{MOM}	-0.144***	-0.108***	-0.073**	-0.046	0.110***	0.254***
	(3.81)	(3.46)	(2.32)	(1.43)	(3.11)	(4.72)
R^2	0.82	0.85	0.80	0.79	0.64	0.34

Internet Appendix

Table 1A: Tobin's q regressions on components of OC (with δ=0)

The dependent variable in all regressions is Tobin's q, defined as the market value of equity plus the book values of debt and preferred equity, all divided by the book value of assets. We calculate HC_OC with no depreciation of human capital ($\delta = 0$). Regression in columns (1) is OLS estimation with industry and year fixed effects. Other estimations include firm and year fixed effects. Column (3) includes lagged dependent variable as a control. All independent variables are one period lagged. In all estimations the standard errors are clustered at the firm level. The sample period is 1992 to 2015. *, ** and *** indicate 10%, 5% and 1% significance levels, respectively.

Dependent variable: M/B	(1)	(2)	(3)
HC_OC $_{t-1}$	5.761***	7.521***	4.158***
	(4.79)	(4.37)	(4.17)
Residual_OC $_{t-1}$	0.018	0.090	0.106*
	(0.36)	(1.00)	(1.83)
M/B $_{t-1}$			0.540***
			(17.89)
Institutional Ownership $_{t-1}$	-0.013	-0.157	-0.218***
	(0.13)	(1.63)	(2.95)
Managerial Ownership$_{t-1}$	0.009	3.046**	1.864*
	(0.01)	(1.97)	(1.83)
Managerial Ownership$^2_{t-1}$	-0.457	-6.319	-4.339*
	(0.14)	(1.54)	(1.67)
Standardized Size$_{t-1}$	-0.004	-0.285***	-0.144***
	(0.23)	(2.91)	(2.74)
Tangibility$_{t-1}$	-0.399**	-0.590**	-0.143
	(2.53)	(2.03)	(0.84)
Leverage$_{t-1}$	-1.633***	-0.947***	-0.117
	(10.71)	(6.62)	(1.28)
ROA$_{t-1}$	4.067***	2.276***	0.461**
	(6.55)	(4.01)	(2.25)
Firm age$_{t-1}$	-0.003**	-0.008	-0.006*
	(2.36)	(1.55)	(1.71)
Capex/TA$_{t-1}$	0.989**	0.352	-0.403
	(2.28)	(0.90)	(1.40)
Constant	1.907***	1.753***	0.867***
	(7.94)	(6.80)	(4.80)
Firm Fixed Effects	NO	YES	YES
Industry Fixed Effects	YES	NO	NO
Year Fixed Effects	YES	YES	YES
R^2	0.38	0.19	0.43
N	9,052	9,052	9,052

Table 2A: Tobin's q regressions on components of OC

The dependent variable in all regressions is Tobin's q, defined as the market value of equity plus the book values of debt and preferred equity, all divided by the book value of assets. Residual_OC2 is the residual of regression of OC on HC_OC. Regression in columns (1) is OLS estimation with industry and year fixed effects. Other estimations include firm and year fixed effects. Column (3) includes lagged dependent variable as a control. All independent variables are one period lagged. In all estimations the standard errors are clustered at the firm level. The sample period is 1992 to 2015. *, ** and *** indicate 10%, 5% and 1% significance levels, respectively.

Dependent variable: M/B	(1)	(2)	(3)
HC_OC $_{t-1}$	5.875***	8.208***	4.931***
	(5.25)	(5.54)	(5.72)
Residual_OC2 $_{t-1}$	0.022	0.015	0.066
	(0.42)	(0.16)	(1.09)
M/B $_{t-1}$			0.540***
			(17.88)
Institutional Ownership $_{t-1}$	-0.011	-0.162*	-0.221***
	(0.11)	(1.69)	(3.00)
Managerial Ownership$_{t-1}$	0.005	3.037**	1.840*
	(0.00)	(1.97)	(1.82)
Managerial Ownership$^2_{t-1}$	-0.435	-6.264	-4.256*
	(0.13)	(1.54)	(1.65)
Standardized Size$_{t-1}$	-0.004	-0.293***	-0.148***
	(0.23)	(2.98)	(2.80)
Tangibility$_{t-1}$	-0.401**	-0.558*	-0.127
	(2.53)	(1.93)	(0.75)
Leverage$_{t-1}$	-1.629***	-0.954***	-0.119
	(10.59)	(6.69)	(1.31)
ROA$_{t-1}$	4.068***	2.266***	0.457**
	(6.56)	(4.00)	(2.22)
Firm age$_{t-1}$	-0.003**	-0.011**	-0.009***
	(2.36)	(2.38)	(2.93)
Capex/TA$_{t-1}$	0.994**	0.361	-0.399
	(2.29)	(0.92)	(1.38)
Constant	1.920***	1.867***	1.006***
	(8.08)	(8.13)	(6.49)
Firm Fixed Effects	NO	YES	YES
Industry Fixed Effects	YES	NO	NO
Year Fixed Effects	YES	YES	YES
R^2	0.38	0.19	0.43
N	9,054	9,054	9,054

Table 3A: Asset Pricing: Five portfolios sorted on HC_OC (equal-weighted portfolios)

This table shows asset-pricing estimations for five portfolios sorted on HC_OC over book value of assets relative to their industry peers within each year. In Panel A we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio. In Panel B we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio and high-minus-low HC_OC factor (HMLHC). In Panel C we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio and the Fama and French (1993) SMB and HML factors. In Panel D we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio, the Fama and French (1993) SMB and HML factors and the Carhart (1997) MOM factor. Data on SMB, HML, and MOM are from Kenneth French's website. The sample period is June 1992 to December 2015. All portfolio returns correspond to equal-weighted returns.

Panel A: CAPM

	1	2	3	4	5	5 -1
α	0.171	0.163	0.171	0.301*	0.467***	0.296*
	(1.47)	(1.11)	(1.02)	(1.77)	(2.80)	(1.85)
β_{MKT}	0.982***	1.047***	1.029***	1.007***	0.981***	-0.001
	(28.60)	(22.60)	(20.68)	(20.58)	(22.46)	(0.04)
R^2	0.84	0.79	0.74	0.73	0.73	0.00

Panel B: two-factor model

	1	2	3	4	5
α	0.243**	0.167	0.085	0.176	0.243**
	(2.14)	(1.13)	(0.52)	(1.12)	(2.14)
β_{MKT}	0.982***	1.047***	1.029***	1.008***	0.982***
	(29.18)	(22.54)	(20.96)	(21.61)	(29.18)
β_{HMLHC}	-0.243***	-0.015	0.290***	0.423***	0.757***
	(4.20)	(0.18)	(3.90)	(5.80)	(13.08)
R^2	0.86	0.79	0.76	0.77	0.88

Panel C: three-factor model

	1	2	3	4	5	5 -1
α	0.084	0.045	0.019	0.157	0.335***	0.252**
	(0.83)	(0.35)	(0.14)	(1.22)	(2.95)	(2.27)
β_{MKT}	1.032***	1.076***	1.025***	0.985***	0.933***	-0.099***
	(38.49)	(27.68)	(27.48)	(26.72)	(27.69)	(3.54)
β_{SMB}	0.020	0.203***	0.451***	0.511***	0.592***	0.571***
	(0.50)	(3.22)	(7.58)	(7.15)	(9.51)	(12.03)
β_{HML}	0.321***	0.395***	0.471***	0.428***	0.361***	0.040
	(6.61)	(5.62)	(7.01)	(6.24)	(6.48)	(0.89)
R^2	0.88	0.85	0.85	0.85	0.87	0.51

Panel D: four-factor model

	1	2	3	4	5	5 -1
α	0.180*	0.167	0.110	0.246*	0.360***	0.180
	(1.88)	(1.36)	(0.85)	(1.92)	(3.06)	(1.59)
β_{MKT}	0.984***	1.015***	0.979***	0.941***	0.921***	-0.064**
	(36.66)	(26.97)	(25.63)	(25.29)	(25.59)	(2.17)
β_{SMB}	0.037	0.225***	0.468***	0.527***	0.596***	0.559***
	(1.14)	(4.56)	(9.06)	(8.53)	(10.02)	(11.31)
β_{HML}	0.280***	0.342***	0.431***	0.389***	0.351***	0.071
	(5.76)	(5.11)	(6.60)	(6.17)	(6.41)	(1.50)
β_{MOM}	-0.121***	-0.152***	-0.115***	-0.112***	-0.031	0.090***
	(4.85)	(4.88)	(3.50)	(3.65)	(1.12)	(3.18)
R^2	0.90	0.87	0.86	0.86	0.87	0.54

Table 4A: Asset Pricing: Five portfolios sorted on Residual_OC (equal-weighted portfolios)

This table shows asset-pricing estimations for five portfolios sorted on Residual_OC over book value of assets relative to their industry peers within each year. In Panel A we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio. In Panel B we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio and high-minus-low Residual_OC factor (HMLRes). In Panel C we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio and the Fama and French (1993) SMB and HML factors. In Panel D we report portfolio alphas and betas of a regression of excess portfolio returns on excess returns of the market portfolio, the Fama and French (1993) SMB and HML factors and the Carhart (1997) MOM factor. Data on SMB, HML, and MOM are from Kenneth French's website. The sample period is June 1992 to December 2015. All portfolio returns correspond to equal-weighted returns.

Panel A: CAPM

	1	2	3	4	5	5 -1
α	0.028	0.121	0.256*	0.445***	0.433***	0.405***
	(0.17)	(0.81)	(1.84)	(3.38)	(2.85)	(3.22)
β_{MKT}	1.057***	1.029***	1.041***	0.950***	0.967***	-0.090***
	(20.13)	(23.73)	(25.22)	(24.87)	(21.92)	(2.73)
R^2	0.74	0.78	0.81	0.80	0.75	0.03

Panel B: two-factor model

	1	2	3	4	5
α	0.298**	0.248*	0.341**	0.452***	0.298**
	(2.00)	(1.70)	(2.48)	(3.34)	(2.00)
β_{MKT}	0.997***	1.000***	1.022***	0.948***	0.997***
	(21.81)	(23.42)	(25.05)	(24.16)	(21.81)
β_{HMLHC}	-0.667***	-0.314***	-0.210***	-0.017	0.333***
	(8.29)	(3.47)	(2.95)	(0.24)	(4.14)
R^2	0.81	0.79	0.82	0.80	0.77

Panel C: three-factor model

	1	2	3	4	5	5 -1
α	-0.120	-0.002	0.144	0.333***	0.299***	0.418***
	(0.84)	(0.02)	(1.27)	(3.18)	(2.69)	(3.42)
β_{MKT}	1.081***	1.040***	1.037***	0.945***	0.945***	-0.136***
	(25.13)	(28.86)	(31.95)	(31.25)	(28.97)	(4.00)
β_{SMB}	0.308***	0.298***	0.334***	0.336***	0.478***	0.170***
	(4.66)	(4.23)	(6.23)	(6.53)	(8.70)	(3.59)
β_{HML}	0.486***	0.394***	0.347***	0.343***	0.398***	-0.088**
	(6.81)	(5.99)	(6.03)	(6.34)	(6.92)	(1.98)
R^2	0.82	0.84	0.88	0.88	0.87	0.14

Panel D: four-factor model

	1	2	3	4	5	5 -1
α	-0.019	0.111	0.226**	0.398***	0.365***	0.383***
	(0.13)	(0.91)	(2.04)	(3.75)	(3.20)	(3.07)
β_{MKT}	1.031***	0.983***	0.996***	0.913***	0.912***	-0.119***
	(23.43)	(27.96)	(30.09)	(29.12)	(27.73)	(3.43)
β_{SMB}	0.326***	0.318***	0.348***	0.348***	0.490***	0.164***
	(5.62)	(5.45)	(7.80)	(7.51)	(10.21)	(3.43)
β_{HML}	0.443***	0.345***	0.311***	0.315***	0.369***	-0.073
	(6.52)	(5.56)	(5.52)	(5.84)	(6.82)	(1.62)
β_{MOM}	-0.127***	-0.142***	-0.104***	-0.081***	-0.083***	0.044
	(3.85)	(4.39)	(3.96)	(3.03)	(3.08)	(1.56)
R^2	0.84	0.86	0.89	0.88	0.88	0.15