Executive Quirks in Operational Decisions

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We ask if corporate executives have fixed effects ("quirks") that explain operational decisions made in firms, independent of firm effects. We replicate the approach in Bertrand et al. (2003)[2], solving the empirical challenge of distinguishing firm and executive effects by constructing a dataset of executives who move from one firm to another, in essence. We find that executives indeed exhibit fixed effects separate from firm effects. These quirks are large, although there is a wide dispersion of sizes among executives. The quirks also come in themes, such as a bias toward investing in human rather than physical capital. We also find that quirks mostly lead to inefficient outcomes for firms. Finally, we link quirks to observable characteristics of executives, such as their age or education. We conclude by arguing for an increased focus on individual effects in operations management research.

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[2] That is, we only claim credit for replicating their approach in a different setting. And all errors here are ours.

Executive Quirks in Operational Decisions

"Within General Motors, the brilliant cost cutter [purchasing and operations chief J. Ignacio Lopez de Arriortua] was something of a cult leader. He called his three dozen or so top disciples "Warriors;" they ate a "Warrior diet" (fresh fruits were in; meats and coffee were out) and had their own rituals. For instance, whenever a bid met their pricing target, the Warriors, like Visigoths hearing of a fresh kill, would lustily pound their fists on the table. For many, their loyalty was not so much to GM as to López himself…

"Lopez also had a flair for the grand gesture. During a dinner at [G.M. CEO Jack] Smith's house, he dramatically stripped his watch off his left wrist and strapped it to his right, proclaiming he would keep it there until General Motors made record profits in North America. Smith instantly followed suit; within days, the Warriors had also transferred their watches from left to right wrists."

- "Bloodfeud," *Fortune*, April 14, 1997

1. Introduction

On Thursday, March 11, 1993, when the *New York Times* announced that Lopez de Arriortua was leaving General Motors for Volkswagen to be production director, GM's share price dropped $1.375 to close at $38.75 (see also Moffet et al. (1998)). What followed was a nuclear war of lawsuits between the two firms. The media reported allegations of stolen GM blueprints for a futuristic "Plant X" and a secret production process called "Plateau 6," private detectives who tailed Lopez in Germany, and secret settlement talks by the firms' directors (including the former CEO of Procter & Gamble, former chairman of CBS, and Gerhard Schroder, now president of Germany). There was even an attractive young female operative to fake a bike accident in front of a Warrior's apartment, to lure him into letting her into the premise so she could stealthily uncover G.M. documents that might be inside.

Not all executives with a hand in operational decisions have such colorful traits. But other executives like Kevin Rollins of Dell and Larry Bossidy of Allied Signal are also sometimes reported as larger than life in their firms' operational matters. In this paper, we ask if there are executive fixed effects ("quirks") associated with operational decisions on top of firm fixed effects. If so, how big

are these? Do they come in themes? Are they good for firms? Are there observable characteristics of executives that are associated with certain quirks?

The main empirical challenge in answering these questions is to disentangle the executive and firm effects. To address this, we *replicate* the effective approach in Bertrand et al. (2003)[3]. For example, we solve the identification challenge by building a dataset involving executives who move from one firm to another. The dependent variables are operational decisions associated with capacity and growth (such as property), line balancing (such as inventory), and the cash conversion cycle (such as receivables). The independent variables are dummies for various types of executives, with suitable controls.

We find that executives indeed exhibit fixed effects separate from firm effects. These executive fixed effects, which might be called "quirks," are large. For example, the mean quirk for net PPE (property, plant, and equipment, scaled by assets) reduces it by 1.6% percentage points, compared to the mean PPE of 33%. However, this mean masks a large dispersion in the size of the quirks among individual executives. For net PPE, the inter-quartile range of quirks is 7%, which is very sizeable compared to the 33%. Using a factor analysis, we find that the quirks come in themes. For example, one set of quirks emphasizes "building" out infrastructure, with a reduction in firm value. Another emphasizes a bias toward human capital and against physical capital..

There are three possible stories for whether quirks are good for firms. An "agency" story is that quirks generally lead to inefficient outcomes. They are present because governance is poor and executives exploit this for private benefits. A "sorting" story is that quirks are neutral; some quirks fit some firm-years better than others. A "premium" story is that there are some quirks are good and some bad. Firms pay a premium for executives with good quirks; conversely, paying "peanuts"

[3] But all errors here are ours.

get "monkeys." We find that the agency story is most consistent with the data.

Finally, we find that some observable characteristics of executives are associated with these quirks. For example, age and tenure in the firm tend to go with lower inventory levels.

The findings have important implications for operations management in theory and practice. For example, there could be a fruitful research agenda in understanding how individual effects come about, how they change, and more important, how they might affect the assumptions and results of models in operations management. Some of these issues might come under the emerging field of "behavioral operations." Practically, the findings imply that there may be a case for managing agency effects arising from these quirks. There might also be a need to sensitize executives to possibly subconscious biases. Overall, and as Boudreau et al. (2003) note, "the fields of operations management (OM) and human resources management (HRM) have a long history of separateness." We plead for greater emphasis on the study of individuals in the field of operations management.

2. Executive Quirks on Operational Decisions

. It is well-known that empirically, parameters such as lead times and costs of capital explain less than 20% of operational performance. For example, Netessine et al. (2005) find that the adjusted *R*-squared's for well-specified regressions of inventory turns are between 11% and 14%. Similarly, Lai (2005) finds that rational causes explain only about 14% of the bullwhip effect. A clue to what else might explain heterogeneity in operational setups comes from industry. Many practitioners believe that it is their executives, such as those in the opening paragraphs of this paper, who create and leave marks on their firms' operational decisions.

In the theoretical literature, the question of whether individuals have an imprint on organizations is an ancient but empirically hard-to-answer one. In the sphere of philosophy and politics, Tolstoy's historical theory posits that much of history is not within the grasp of individuals, and Marx's materialistic dialectic argues that it is social and economic forces that determine outcomes, leaving

little for individual maneuver. Weber, however, argues for charismatic leadership, especially when the bureaucracy does not stand in the way. These arguments have their cousins in psychology, economics, and the management literature. For example, Gemmill et al. (1992), summing up the arguments from psychology and sociology, argue that leadership is primarily a social construct. In economics, Rotemberg et al. (1993) use a model to show that certain kinds of leaders (participative ones) are better for shareholders when there are plenty of business opportunities, and harsher ones are better otherwise. In the management literature, Weber et al. (2001) show in an experiment that such executive traits might not be real. Subjects commit attribution errors, over-assigning success and failure to leaders rather than situations (such as group size). Khurana (2002) argues that the market for CEOs is culturally determined, often because of the emphasis on charisma. Finally, there is also a debate that attempts to explain the existence of individual quirks in terms of their origins – as disposition or learned behavior (*e.g.,* Staw et al. (1986), Davis-Blake et al. (1989), House et al. (1996)).

Our paper also builds on the related literature of human issues in operations, although the emphasis there is usually on worker motivation, productivity, learning, or turnover (*e.g. ,* Cook et al. (2002), Gans et al. (2002); Boudreau et al. (2003) provide a comprehensive survey). Nevertheless, some of the work is of relevance to our empirics. For example, Schultz et al. (1999) show that firm effects such as low inventory levels might induce productivity norms, so our econometrics must take care of reverse causality from operational parameters to executive effects.

To summarize, there is an abundance of theories, both for and against the importance of the role of individuals in organizations, to various degrees and in various contingencies.

Empirically, there is a less in the literature. Most of the work is in the context of science and technology-based settings or in psychology. As an example of the former, Huckman et al. (forthcoming) report that surgeon fixed effects in a cardiac surgery setting might be hospital-

specific, so that what is learned in one hospital can be difficult to transfer to another. As an example from psychology, Staw et al. (1986) track several hundred individuals over fifty years to see how job attitudes might have arisen from disposition. In the context of more general firm performance, Wasserman et al. (2002) look at CEO effects, but do not disentangle firm and manager effects. Bertrand et al. (2003), in a paper that most closely relates to ours, show that top officers (CEOs, CFOs, and "others") do influence investment policies like capital expenditures and the number of acquisitions, financial policies like leverage and interest coverage, recurring expenditures like R&D spend and advertising, and two performance measures: return on assets and operating return on assets. They find generally significant impact by these senior executives. We aim to construct our study as closely as possible to theirs to facilitate comparison, but because of our focus on operational rather than their mostly financial dependent variables, there will necessarily be some areas of differences, which we will highlight.

3. Data

Our main data sources are ExecuComp, the merged CRSP-COMPUSTAT tapes, Zoominfo, BoardAnalyst, I/B/E/S, and First Call. We start with ExecuComp, where the data is for the period 1992 through 2004, on mostly S&P 1,500 firms, and the five to nine highest paid executives per firm. This core has 134,728 firm-executive-year observations, but only 4,003 involve an executive who has made at least one firm-to-firm transition. We further restrict the sample to manufacturing, wholesaling, and retailing, as other industries are sufficiently different that operational comparisons are difficult to interpret. Finally, we include only those executive-firm-year observations in which the transitioning executive stays at least three years in the before-firm and after-firm, so that there is sufficient time for executive effects, if any, to take hold on operational decisions. The result is 250 executives, 277 firms, 1951 executive-firm-years. In all the analysis below, we repeat with just the top five (instead of up to nine) of the highest paid executives, as well as without the minimum three-

year stay requirement. The (unreported) results are qualitatively the same.

We classify the executives into CEOs, COOs/Presidents, CFOs, operations executives, and others. Operations executives are those who are not COOs and whose titles have variations of the words "operations," "logistics," "purchasing," "mechandising," "store," "distribution," and "supply." We manually inspect the titles of both operations executives and the "others" to ensure that is no mis-classification.

We then merge other datasets into the ExecuComp dataset. The main one is CRSP-COMPUSTAT, where we use restated figures whenever they are available.

In Table 1, panel (a), we show summary statistics of the executives. In panel (b), we show transitions by executives. Not surprisingly, some transitions such as CFO-to-operations executive are rare. By way of comparison, we find that 58% of the transitions are across industry, and Bertrand et al. (2003) report a close 42%. We attribute the difference to their using data from Forbes 800 and ExecuComp, and include only CEO, CFO, and "others." In panel (c), we show the summary statistics of the firms involved. We observe that there is a fair amount of heterogeneity in the dataset. For example, assets per firm range from $19.2 million to $123 billion. Apart from the high-level variables like market capitalization or sales, we show three groups of operational variables, regarding capacity and growth, line balancing, and cash conversion cycle. Our empirical strategy is to see if executive fixed effects can explain these as dependent variables.

4. Empirical Strategy

Our main challenge is to disentangle firm from executive fixed effects. To do this, we build a new dataset using executive transitions between firms. This technique has been used in studies such as Allison et al. (1990), Almeida et al. (1999), Groysberg et al. (2001), Bertrand et al. (2003), Rosenkopf et al. (2003), Song et al. (2003), and Huckman et al. (forthcoming).

Our baseline specification is:

(1) $$OP\_PARAMETER_{eft} = CEO_{eft} + COO_{eft} + CFO_{eft} + OPS_{eft} + OTHERS_{eft} + YEAR_t + FIRM_f + \boldsymbol{X}_{eft}.\boldsymbol{\beta}_{eft} + \varepsilon_{eft},$$

where *CEO, COO, CFO, OPS,* and *OTHERS* are the fixed effects for executive, $YEAR_t$ for year, and $FIRM_f$, firm. $\boldsymbol{X}$ is a set of controls by firm and time, and ε the disturbance term for executive e in firm f and year t. To clarify, if an executive moves from being COO to CEO, then this specification codes her before-firm effect as a COO effect and her after-firm one as CEO effect. In general, however, we are interested in effects in aggregate among the top executives. To minimize problems associated with endogeneity, specification errors, and serial correlation, we lag the $\boldsymbol{X}$ variables by a year, take the log of the $\boldsymbol{X}$'s, and cluster around firms.

OP_PARAMETER is one of the variables described earlier, in Table 1, panel (c). We focus on three categories of these operational decisions.

First, under capacity and growth, we pick six measures of PPE (property, plant, and equipment), the number of employees, rental expense, and rental commitment one year and five years out. The six PPE variables measure the tangible operational capacity of the firm: total net of depreciation, land, buildings, machinery, leases, and those under construction. Employees measure human capital capacity. Rental expense captures the capacity such as retail space that might be leased, not owned. Rent commitment capture decisions on capacity growth. Rental expense is scaled by sales, rental commitments by rental expense, and others by assets. The COMPUSTAT item number for each variable is in the captions for the tables in the appendix.

The second category is line balancing. We pick lead time, order backlog, and four types of inventory. Lead time in days is measured as in Netessine et al. (2005), as the log of a multiple: payables times 365 divided by cost of goods sold. Order backlog is scaled by sales. Inventory, in log form, include that for total, raw materials, work in progress, and finished goods.

The third category deals with the cash conversion cycle. Apart from inventory, which we

classify into the second category above, we select receivables, payables, operating cash flow, and change in cost of goods sold (the purchasing function highlighted for the GM executive in the opening paragraph). The first two are in log form. Operating cash flow is defined as sales less SGA plus depreciation and amortization, scaled by market value of assets, defined as market capitalization plus carrying value of preferred stock, long-term debt, and debt in current liabilities.

We now run through a number of empirical issues in identifying equation (1).

First, there is the question of learning. We follow the approach in Bertrand et al. (2003). Executives might do better in the after-firm than the before-firm, so it could be that executive quirks are not found in the before-firm even if they could be found in the after-firm. Since our goal is to identify the *existence* of executive quirks and not their *relative magnitudes*, learning across firms is not an empirical issue for us. Specifically, if there is learning, our method will understate the level of executive quirks. Although not the main message of this paper, we will document magnitudes of executive quirks, so it is there that any interpretation is subject to non-randomness in learning.

Second, there is the issue of what should enter $\boldsymbol{X}$, the control matrix of regressors. Our overall strategy is to be conservative in estimating executive quirks, so we include as many variables as possible to pick up most plausible explanations. We include lag values of log sales (for growth), log assets (for size), and log cash flow (for financial constraint). These are also the variables used by Bertrand et al. (2003). To be extra careful, we also include lagged dependent variables, but the specifications turn out to be invariant up to three lags, so we do not report these.

There is one exception to this set of $\boldsymbol{X}$s, which is when we have inventory variables as dependent variables. In these cases, we follow the practice in the literature. Following Netessine et al. (2005), for example, we include the log of cost of goods sold, log gross margin, log lead time, log sigma sales, sales growth, log of the one-month T-bill rate, and an indicator variable for sales surprise. Sigma sales is a proxy for demand uncertainty, and is calculated by first regressing sales on

five trend terms (t to t^5) and taking the root-mean-squared error of the regressions. The sales surprise indicator is 1 if sales surprise, defined as the median of the First Call analyst forecasts for sales at the fiscal year end date, is greater than the actual announced sales; it is 0 otherwise. There is an alternative specification, from Gaur et al. (2005). Following them, I include in $\boldsymbol{X}$ log gross margin, log capital intensity (net PPE divided by net PPE plus cost of goods sold), and log sales surprise. Because this has fewer regressors and a lower *R*-squared, I take the more conservative approach of reporting results using the Netessine *et. al.* specification, which probably captures more variation. However, in unreported regressions, I find the two specifications produce the qualitatively similar results in terms of the existence of executive quirks.

Third, there might be systematic changes in firms that coincide with executive transitions, so the specification in (1) alone does not allow identification or show causality. Again, following Bertrand et al. (2003), a plausible alternative story is that firms first make certain operational decisions and then systematically fire or hire designated types of executives based on these decisions. One way to get around this is to use exogenous variation in the *timing* of transitions (but we do note that the matching of executive *characteristics* to firms could not be random), arising from sudden deaths of incumbent executives. This is the approach we take in a separate paper, which shows causality. In this paper, for comparison with Bertrand et al. (2003) and to show methodological robustness, we borrow their test. Specifically, we run control experiments in which we artificially move the executive transition backward by some years. If the alternative story is true, we should see executive quirks even in the control experiments. Econometrically, we first adjust the dataset so that the transitions are moved forward by say, three years. Then we create firm-year residuals by regressing our operational decision variables on firm and year fixed effects, and time-varying firm controls. Third, we collapse these residuals by executive-firm periods, by taking medians of the residuals. Fourth, we estimate executive quirks with these residuals. Finally, we regress the after-firm

executive quirks (estimated using the control transition) on the before-firm executive quirks. If we find that the coefficient on the regressor is small compared with that in the actual "treatment" test, then there is evidence that operational decisions are not made without the involvement of the transitioning executive.

After these tests of the existence and impact of executive quirks, we proceed to test for themes that might emerge from the data. We take two approaches, with factor analysis and correlations. The former is straightforward and standard, but the latter can better account for measurement error. Specifically, we first regress the operations decision variables on our previous set of firm and year fixed effects as well as time-varying firm effects. In the second stage, we regress the residuals from these regressions on executive fixed effects. In the third stage, we estimate the correlations between the predicted values from the second stage regressions, using GLS (generalized least squares) with the known standard errors of the first stage as weights. In this paper, we do not distinguish how these themes arise. For example, they could come about because there are types of executives with types of quirks. But they could also arise because of complementarities among operational parameters (e.g., Milgrom et al. (1995)), preventing quirks from being observed independently of each other.

To investigate the efficiency implications of executive quirks, we construct tests that can distinguish the alternative stories of agency, sorting, and premium, all studied in Bertrand et al. (2003). The agency story is distinct among the three for its prediction that executives have greater room to impose their quirks on weaker-governed firms. To test this, we regress quirks obtained in the earlier paragraph on the G (for governance) index from I/B/E/S constructed by Gompers et al. (2003). The sorting story is distinct from the premium one for its prediction that there is no compensation premium for any executive quirk. To test this, we first regress the log of total compensation and log salary on firm and year fixed effects and time-varying firm controls: lagged

log assets, lagged log sales, ROA, the G index, tenure of the executive in the firm, and indicator variables for the position of the executive (CEO, CFO, etc.). We then regress the compensation residuals from the first-stage estimations on executive fixed effects. Once again, we use GLS weights as before to minimize measurement error.

Finally, we see if there are observable characteristics of their executives that correlate with their quirks. We regress executive quirks from the previous regressions as follows:

$$(2)\ EXEC\_QUIRK_{eft} = f(AGE_{eft}, MALE?_{e}, TENURE_{eft}, NUM\_DIRECTORSHIPS_{eft}, BBusiness?_{e}, BEng?_{e}, BSc?_{e}, MBA?_{e})$$

where AGE_{eft} is the age of the executive e at year t, $MALE?_{e}$ an indicator for whether the executive is male, $TENURE_{eft}$ the executive's years with firm f at year t, $NUM\_DIRECTORSHIPS_{eft}$ the executive's number of directorships outside firm f in year t, $BBusiness?_{e}$ an indicator for whether the executive has a bachelor's degree in business, $BEng?_{e}$ for a bachelor's degree in engineering, $BSc?_{e}$ for a degree in science, and $MBA?_{e}$ if the executive has an MBA. The bachelor's degree in the arts is used as a baseline. These regressions are clustered at the firm level.

5. Results

For easier comparison, we present the results in the same order and format as those in Bertrand et al. (2003). In Table 2, we report the fixed effects for different types of executives on our operational decision variables. The adjusted *R*-squared is very high to begin with, given our strategy to capture as much as possible using our controls and firm and year fixed effects. This is consistent with Bertrand et al. (2003), who find their baseline *R*-squared's in the high 90's. Like them, we find that adding executive effects increases the *R*-squared. Comparing the first row (unlabeled; no executive quirks) and last (labeled "All"), we see that the explanatory power for net PPE increases from 89% to 90% in panel (a), lead time from 79% to 81% in panel (b), and receivables from 95% to 96% in panel (c). In almost all cases, the effects under "All" are significant with very low *p*-values.

Although it is not the main point of this paper to consider quirks below the aggregate "All" level, we note some interesting observations in the data. The most important is that CEOs appear to have the most statistically significant quirks among the executives. This is understandable since we have chosen only manufacturing and retailing/wholesaling firms, in which operational matters are strategically important. The biggest CEO quirks are found in the forward commitment of rent, sourcing (change in COGS), and total and raw materials inventory. It is possible that these are areas where there is better information for CEOs and where control is more easily achieved (compared with say, downsizing by laying off employees).

Surprisingly, COOs do not appear to have much influence. This could be an artifact of the vague functions of COOs, some of whom are responsible for vast number of functions, other are for operations, and still others are really just CEOs-designate. To test if this last is in play, we select observations in which COOs do *not* become CEOs within five years of their CEOs' departure, and find that the significance is still absent (unreported). Operations executives below the level of COO appear to have more influence, such as in PPE leases, rent, and receivables.

Taken altogether, I interpret the analysis to mean that executive quirks for operational decisions are present. The lack of significance at the role level (*i.e.,* CEO or COO) could mean that either quirks only occur at the management team level or that the average individual quirk may be small but the average masks a wide distribution in magnitudes among individuals. The latter turns out to be true. Table 3 shows why.

There is wide variation in the effects among individual executives. To see this, we compare the inter-quartile range of individual fixed effects with the mean of the dependent variable, labelled μ(DV). We see that the inter-quartile range is often the same order of magnitude as μ(DV). To minimize estimation error, we re-estimate the statistics so that each fixed effect is weighted by the inverse of its standard error. The (unreported) result is qualitatively unchanged.

In Table 4, we report the results of the persistence test to see if non-causality could be ruled out. In the "treatment" test, we see that most of the coefficients are positive and significant, which we interpret as persistence of executive quirks over firm transitions. In the "control" test, most of the coefficients are statistically not different from zero, suggesting that causality cannot be ruled out.

In Table 5, we explore if there are themes in the fixed effects. Using factor analysis, we find that the eigenvalues (variances) of the first two factors are 6.97 and 3.08, contributing 57.8% and 25.5% respectively, to the total variance. This cumulative 83.4% shows that the first two factors practically exhaustive the themes in the data. The chi-squared of an LR (likelihood ratio) test for independence is 378, with a *p* value significant at 0.00%. The factor loadings for the orthogonal solution can be interpreted as how the quirks are weighted for each factor ("theme") and the correlation between the quirks and the factor. The first factor, which we label as "build," suggests that there are some executives who focus on building out capital, land, and staff, often to the detriment of performance on measures like Tobin's Q, cash flow margin, and return on assets. With these investments, they are able to reduce lead time and shorten the cash conversion cycle. The second theme is less clear, but it seems to be one of a bias against physical capital and toward human capital. For example, it is associated with curtailed investments in PPE and inventory, and the use of rental rather than purchased infrastructure. It is also associated with higher SGA and more employees. Given that the first two themes already explain 83.4% of the variation, the third theme is less important. We also undertake another approach to findings the themes, based on correlations. The results are qualitatively similar, so we do not report them.

We now report evidence on efficiency implications. In Table 6, we see that the G index has a significant coefficient on almost every executive quirk. Recall that the "agency" story predicts that executive quirks detrimental to performance get reduced by strong governance. Therefore, it predicts that the coefficients on the G index column have the same sign as the correlations of the

quirks with Q, an indication of firm value. This turns out to be true, for 13 of the 19 fixed effects, and for all of the 5 significant ones. The "sorting" story, which predicts that the G index coefficients are insignificant, is not supported. The rightmost two columns produce mixed results. Many of the coefficients are not statistically significant, and even those which are do not support the "premium" story that executive quirks that are positively correlated with Q are rewarded with positive compensation and vice versa. We interpret these as preliminary evidence that the "agency" story seems to fit the data best.

In Table 7, we report the characteristics of executives who exhibit different types of fixed effects. Age shows no particular impact on executive fixed effects, except being associated with smaller effects on some aspects of inventory, which drive Q negative. Therefore, we interpret age to have positive effect on the value of the firm through these channels. The economic significance is large. For example, five more years in age is associated with a 0.138 point increase in the payables fixed effect, which on the average, is associated with about 5.19 percentage points in payables.

Tenure in the firm is associated with smaller executive quirks on PPE and inventory, which in turn generally drive Q negative. It is associated with bigger fixed effects on forward rental commitments. The importance of tenure *on top of* firm fixed effects is consistent with a story of complementarity between executive quirks and firm effects (*e.g.,*: Huckman et al. (forthcoming)). The number of outside directorships is generally associated with bigger quirks, such as those for number of employees and various aspects of rent. Again, this is could be explained by different theories, although it is certainly consistent with one in which executives learn from outside and apply these to the firms in which they work.

Finally, executives with first degrees in engineering or science and MBA's tend to have quirks for more inventory and shorter lead times. They are also associated with negative Q and ROA. In unreported regressions of the quirk directly on Q, the coefficients are -0.960, -1.086, and -0.498 for

these three groups, all statistically significant at the 1% level, confirming their negative effect on Q.

In this paper, we simply want to document these, creating a richer fabric for our core message that executive quirks are present and can be significant. We leave further tests to future work.

6. Discussion and Conclusion

Many of the additional concerns are pointed out in Bertrand et al. (2003). For example, how representative are transitioning executives in the population of all executives? We believe this representativeness issue is not serious in the context of our message of executive quirks. First, there are 250 such transitioning executives out of the 3,383 in our dataset, so the sample is not small. More formally, we conduct a Heckman correction for sample bias, using a selection function based on age, tenure, gender, total annual compensation, log of firm assets, firm sales growth, and find that there is no qualitative difference in the significance of executive quirks (unreported).

As Bertrand et al. (2003) noted, there is also a potential problem that outside hires are systematically different from internally promoted ones. We can think of at least two ways to deal with this. The first is to take the executives in our dataset and split them into one group who have internal promotions from the other who have not, and compare their quirks. Tests show that the two groups could be drawn from the same distribution. For instance, the mean quirk on net PPE for the first group is -.015 and that for the second is -.023, and the standard deviation is .086 and .103. A *t*-test does not reject the null that they are different. The second way is to see if the identified quirks of our executives change much over time. Our persistence tests earlier provide some assurance that they do not. Neither of these tests are perfect, since there is still a question of whether executives who have *never* been outside hires are any different.

Finally, as in Bertrand et al. (2003), we use reported data in firms' reported accounts. Although most of COMPUSTAT's data comes from SEC 10-K reports, which are regulatory requirements, one cannot rule out some forms of self-reporting biases, such as selective disclosures and choice of

accounting conventions.

We begin this paper by arguing for more research into the people effects in operations management. What might some of these look like? A clue might be found in the literature of other fields. One of them is that on technology and innovation. Although scientists and engineers, the protagonists in this literature, are quite different from corporate executives, the flavor of the research might point out the interesting questions. For example, there is a cluster of studies around what drives their productivity, how they form networks, how they learn and diffuse their learnings. These same questions might apply to how, for example, innovations in operations management diffuse over time and space. Another interesting area is to see what might arise from the literature on agency effects, and how suitable incentives might alleviate the agency problems that arise from quirks.

We conclude by summarizing that executive quirks exist, are sizable, and seem to fall into themes. They are especially prevalent in weaker governed firms, suggesting that they might be negative for firms (but not necessarily for the executives themselves). They also appear to be associated with certain observable characteristics.

Table 1 – Summary Statistics

Panel (a) – Executives

The data is from ExecuComp, Zoominfo, and BoardAnalyst, for 1992 through 2004, in manufacturing, wholesaling, and retailing. We include only those executive-firm-year observations in which the transitioning executive stays at least 3 years in the before-firm and after-firm. Some executives hold different positions (e.g., from COO to CEO) over the transition. Each sub-panel below summarizes observations which have executives in the position. For brevity, we skip the panel for "other executives."

	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
	CEO					COO				
Age (yrs)	44	53.0	10.3	-5.0	64.0	15	48.9	6.6	37.0	58.5
Firm rank	79	1.4	1.1	1.0	6.0	31	3.7	1.2	2.0	6.0
Male?	102	0.9	0.2	0.0	1.0	49	0.9	0.2	0.0	1.0
Tenure (yrs)	37	1.2	5.5	-3.5	30.7	13	0.4	3.0	-3.0	9.5
Salary ($K/yr)	102	586.7	274.9	0.0	1867.2	49	306.2	197.3	133.0	1526.7
Bonus ($K/yr)	102	556.0	598.6	0.0	4122.6	49	216.2	406.9	0.0	2865.7
Other comp ($K/yr)	102	60.3	123.4	0.0	975.7	49	9.6	18.0	0.0	99.7
Total comp inc options ($K/yr)	102	4090.5	4116.3	191.1	21290.5	49	1390.7	1219.5	201.5	7174.1
Restricted stock grants ($K/yr)	102	437.5	833.2	0.0	4845.2	49	101.3	175.8	0.0	824.1
Restricted stock held ($K)	102	693.1	1110.8	0.0	4833.9	49	240.7	436.6	0.0	1897.9
Options exercised ($K/yr)	102	448.9	869.5	0.0	5540.4	49	161.8	373.4	0.0	1849.1
Unexer. options ($K)	102	2741.5	4935.7	0.0	38792.5	49	633.9	1287.5	0.0	5689.0
% of company stock held	50	2.2	4.5	0.1	22.9	2	0.4	0.4	0.1	0.7
Salary annual growth	98	65.6	185.0	-70.4	1666.6	46	101.1	201.9	-8.0	936.5
Total comp annual growth	98	67.9	238.5	-85.5	2244.4	46	111.6	238.6	-20.5	1220.5
Options granted ($K)	102	2530.9	3167.8	43.1	17291.3	49	684.7	731.7	0.0	3208.2
Years to retirement	102	4.6	8.5	0.0	35.0	49	4.3	6.9	0.0	30.0
Executive director?	102	0.8	0.3	0.0	1.0	49	0.1	0.2	0.0	1.0
	CFO					Ops Execs				
Age (yrs)	17	54.7	6.7	39.8	67.5	4	49.6	3.4	46.5	53.0
Firm rank	48	2.4	1.1	1.0	6.0	12	3.1	0.9	2.0	4.0
Male?	95	0.9	0.3	0.0	1.0	26	0.9	0.3	0.0	1.0
Tenure (yrs)	10	-0.3	3.3	-5.0	6.5	2	-2.8	2.5	-4.5	-1.0
Salary ($K/yr)	95	392.1	151.7	135.8	820.9	26	256.0	99.8	98.8	504.4
Bonus ($K/yr)	95	309.8	283.2	0.0	1625.0	26	111.1	138.8	0.0	658.3
Other comp ($K/yr)	95	31.3	78.9	0.0	562.9	26	20.8	45.5	0.0	200.8
Total comp inc options ($K/yr)	93	2419.4	2326.4	376.8	15165.3	26	1072.2	921.3	160.4	4965.9
Restricted stock grants ($K/yr)	95	224.2	371.1	0.0	1736.9	26	107.1	381.5	0.0	1958.4
Restricted stock held ($K)	95	572.5	1084.3	0.0	6724.8	26	299.9	1206.0	0.0	6197.3
Options exercised ($K/yr)	95	417.0	1006.4	0.0	6371.0	26	58.3	94.6	0.0	340.5
Unexer. options ($K)	95	1956.2	10664.6	0.0	103323.9	26	370.1	716.8	0.0	3311.3
% of company stock held	3	0.2	0.1	0.1	0.3	0				
Salary annual growth	86	106.1	253.3	-19.1	1775.0	25	149.1	519.1	-6.1	2627.5
Total comp annual growth	86	131.3	401.7	-38.6	2790.7	25	61.1	98.3	-14.9	407.0
Options granted ($K)	94	1399.9	2481.5	0.0	22697.1	26	447.9	531.6	0.0	2144.4
Years to retirement	95	3.6	8.6	0.0	39.0	26	1.3	5.9	0.0	30.0
Executive director?	95	0.2	0.4	0.0	1.0	26	0.0	0.2	0.0	0.8

Panel (b) – Executive Transitions

The top figure in each cell is the number of executives who transitioned from the position in the specified row to that in the specified column. The percentage is the portion of executives in the cell who makes the transition across firms with different 2-digit SIC codes.

		TO					
		CEO	COO	CFO	Ops execs	Others	Total
FROM	CEO	27 (51.9%)	12 (58.3%)	2 (100.0%)	0 (-)	14 (35.7%)	20 (68%)
	COO	14 (71.4%)	24 (58.3%)	3 (66.7%)	2 (100.0%)	14 (57.1%)	28 (75%)
	CFO	2 (50.0%)	2 (0.0%)	31 (41.9%)	0 (-)	5 (80.0%)	14 (21%)
	Ops execs	3 (33.3%)	2 (50.0%)	0 (-)	4 (50.0%)	9 (33.3%)	5 (40%)
	Others	21 (61.9%)	17 (64.7%)	3 (33.3%)	6 (33.3%)	33 (72.7%)	30 (59%)
	Total	67 (58.2%)	57 (57.9%)	39 (46.2%)	12 (50.0%)	75 (58.7%)	97 (58%)

Panel (c) – Firm Characteristics

The data is from the merged CRSP-COMPUSTAT tapes. Firm-year observations are included only if there is at least one executive transition (observed in panel (a)) associated with the firm over at least 3 years.

	Obs	Mean	Std. Dev.	Min	Max
Year	1951	1997.6	3.3	1992.0	2004.0
Q	1088	8186.2	23662.4	2.1	290444.0
Market cap ($ bil)	1002	1.9	1.3	0.6	9.9
Sales ($ mil)	1088	7108.4	11122.6	0.0	89051.0
Assets ($ mil)	1088	6219.3	12413.5	19.2	123684.0
Capex ($ mil)	1071	304.2	526.9	0.1	4131.0
SGA ($ mil)	1046	1697.6	3039.5	0.0	24523.0
Ad ($ mil)	503	371.6	634.1	0.0	3724.0
ROA	1088	0.0	0.1	-1.2	0.4
Write downs ($ mil)	57	-75.5	200.3	-979.0	0.0
Capacity and Growth					
PPE net ($ mil)	1088	1857.2	3021.4	0.2	18894.0
PPE land ($ mil)	916	126.2	244.9	0.0	3559.0
PPE bldgs ($ mil)	916	785.9	1335.1	0.0	11290.0
PPE machinery ($ mil)	952	1725.1	2695.1	0.6	19566.0
PPE leases ($ mil)	814	205.6	579.0	0.0	4782.0
PPE construction ($ mil)	1016	147.4	324.4	0.0	2486.0
Employees (‘000)	1086	35.1	58.2	0.0	675.0
Rent ($ mil)	998	114.8	174.8	0.0	825.0
Rent commitment 1 year ($ mil)	961	93.6	154.8	0.1	782.0
Rent commitment 5 years ($ mil)	944	393.7	672.2	0.0	3373.0
Line Balancing					
Lead time (days)	1083	54.4	130.2	1.6	2278.8
Back log ($ mil)	431	34.6	149.3	0.0	1099.0
Inventory, total ($ mil)	1088	872.1	1542.9	0.0	15989.0
Inventory, raw materials ($ mil)	465	370.1	1009.9	0.0	5997.0
Inventory, WIP ($ mil)	420	79.5	248.2	0.0	2496.0
Inventory, finished goods ($ mil)	486	385.0	638.0	0.0	4228.0
Cash Conversion Cycle					
Receivables ($ mil)	1084	715.4	1982.0	0.0	31622.0
Payables ($ mil)	1088	500.7	854.1	0.3	7485.0
Operating cash flow ($ mil)	1046	158.8	279.3	-66.0	3627.0
Cash flow margin (%)	1051	0.0	4.2	-79.8	80.6

Table 2 – Executive Fixed Effects

The column headers are respectively, the adjusted *R*-squared, *F* statistic of a joint test of the executive fixed effects, *p*-value of the test, number of constraints in the joint test, and number of observations. The row headers are the different types of executives as defined in the text. The baseline specification is:

$$OP\_PARAMETER_{eft} = CEO_{eft} + COO_{eft} + CFO_{eft} + OPS_{eft} + OTHERS_{eft} + YEAR_t + FIRM_f + \mathbf{X}_{eft}.\beta_{eft} + \varepsilon_{eft},$$

where *CEO, COO, CFO, OPS,* and *OTHERS* are the fixed effects for executive, $YEAR_t$ for year, and $FIRM_f$, firm. $\mathbf{X}$ is a set of controls by firm and time, and ε the disturbance term for executive ***e*** in firm ***f*** and year ***t***. . Unless otherwise stated, $\mathbf{X}$ includes log sales (for growth), log assets (for size), log cash flow (for financial constraint). Estimations are done with fixed effects, clustered around the firm level.
In the tables below, we report coefficients for the CEO, COO, operations executives, and "all," which includes these and the CFO and "others." *** = significant at 1%, ** at 5%, * at 10%.

Panel (a) – Capacity and Growth

Rental expense is scaled by sales, rental commitments by rental expense, and others by assets. "Rent in 1 yr" and "Rent in 5 yrs" mean rental commitments 1 and 5 years ahead, and "PPE constr" is property, plant and equipment under construction. The COMPUSTAT item numbers for PPE are data8, data260, data263, data264, data265, and data266; employees is data29, rent data47, and rental commitments data95 and data96.

	PPE (net)		**PPE land**		**PPE bldgs**		**PPE mach**		**PPE leases**		**PPE constr**	
	R^2	*p*	R^2	*p*	R^2	*p*	R^2	*p*	R^2	*p*	R^2	*p*
	.89		.94		.89		.92		.90		.72	
CEO	.89	.65	.94	.63	.88	1.00	.91	1.00	.90	.36	.71	1.00
COO	.89	.71	.94	.00***	.89	.74	.91	1.00	.90	.99	.71	1.00
Ops	.89	.99	.94	.05*	.89	.00***	.92	.77	.91	.00***	.72	.98
All	.90	.00***	.95	.00***	.91	.00***	.93	.00***	.90	.83	.71	.96
	Emp		**Rent**		**Rent 1 yr**		**Rent 5 yrs**					
	.95		.96		.58		.66					
CEO	.95	.87	.96	.72	.72	.00***	.80	.00***				
COO	.95	.69	.97	.00***	.56	1.00	.64	1.00				
Ops	.95	.43	.96	.00***	.57	1.00	.65	1.00				
All	.96	.00***	.97	.00***	.71	.00***	.78	.00***				

Panel (b) – Line Balancing

All dependent variables are in log form. Backlog is the backlog of orders. "Invent r. mat" is raw materials. Lead time in days is measured as in Netessine and Roumiantsev (2005), as the log of a multiple: payables (COMPUSTAT item data70) times 365 divided by cost of goods sold (item 41). Order backlog (item data98) is scaled by sales (data12). The inventory variables, in log form, include those for total, raw materials, work in progress, and finished goods. Regressions using inventory variables as dependent variables have the following as control variables: log of cost of goods sold, log gross margin, log lead time, log sigma sales, sales growth, log of the one-month T-bill rate, and an indicator variable for sales surprise. Sigma sales is a proxy for demand uncertainty, and is calculated by first regressing sales on five trend terms (t to t5) and taking the root-mean-squared error of the regressions. The sales surprise indicator is 1 if sales surprise, defined as the median of the First Call analyst forecasts for sales at the fiscal year end date, is greater than the actual announced sales; it is 0 otherwise.

	Lead time		**Back log**		**Invent total**		**Invent r mat**		**Invent WIP**		**Invent goods**	
	R^2	*p*	R^2	*p*	R^2	*p*	R^2	*p*	R^2	*p*	R^2	*p*
	.79		.97		.39		.06		.26		.02	
CEO	.81	.00***	.99	.00***	.41	.04**	.11	.03**	.21	.93	.02	.95
COO	.79	.30			.36	.33	.07	.89	.23	.60	.02	1.00
Ops	.79	.22			.39	.94						
All	.81	.00***	.99	.00***	.35	.00***	.07	.07*	.24	.96	.06	1.00

Panel (c) – Cash Conversion Cycle

Receivables (rec, COMPUSTAT item 2) and payables (pay, COMPUSTAT item 70) are in log form. Operating cash flow is defined as sales less SGA plus depreciation and amortization, scaled by market value of assets, defined as market capitalization plus carrying value of preferred stock, long-term debt, and debt in current liabilities.

	Rec		**Pay**		**Op CF**		**ΔCOGS**	
	R^2	*p*	R^2	*p*	R^2	*p*	R^2	*p*
	.95		.96		.69		.11	
CEO	.95	.02**	.96	.00***	.69	.942	.18	.00***
COO	.95	.91	.96	.34	.69	.997	.06	1.00
Ops	.95	.00***	.96	.11	.69	.603	.10	1.00
All	.96	.00***	.97	.00***	.69	.812	.09	.69

Table 3 – Size Distribution of Executive Fixed Effects

InterQ is the inter-quartile range of the effects, to be compared with *μ(DV)*, the mean of the dependent variables (e.g., PPE net in the first sub-panel).

Panel (a) – Capacity and Growth

	PPE net			**PPE land**			**PPE bldgs**			**PPE mach**		
	Mean	*InterQ*	*μ(DV)*	*Mean*	*InterQ*	*μ(DV)*	*Mean*	*InterQ*	*μ(DV)*	*Mean*	*InterQ*	*μ(DV)*
CEO	.002	.029	.333	.001	.002	.028	.001	.019	.145	.001	.024	.367
COO	.000	.035	.333	-.004	.003	.028	-.010	.018	.145	.006	.038	.367
CFO	-.012	.035	.333	.000	.004	.028	-.011	.028	.145	-.038	.059	.367
Ops	-.006	.022	.333	.002	.015	.028	.008	.070	.145	.040	.065	.367
	PPE leases			**PPE constr**			**Emp**			**Rent**		
CEO	-.005	.007	.062	-.001	.003	.020	.000	.001	.333	.000	.003	.060
COO	-.001	.007	.062	.001	.006	.020	.001	.001	.333	.003	.002	.060
CFO	.002	.014	.062	-.001	.005	.020	-.001	.002	.333	.000	.002	.060
Ops	.027	.006	.062	.000	.007	.020	.001	.002	.333	-.002	.015	.060
	Rent 1 yr			**Rent 5 yrs**								
CEO	-.122	.045	.852	-.574	.291	3.305						
COO	.003	.117	.852	.015	.396	3.305						
CFO	-.006	.048	.852	.010	.356	3.305						
Ops	.020	.083	.852	.163	.325	3.305						

Panel (b) – Line Balancing

	Mean	*InterQ*	*μ(DV)*	*Mean*	*InterQ*	*μ(DV)*	*Mean*	*InterQ*	*μ(DV)*	*Mean*	*InterQ*	*μ(DV)*
	Lead time			**Back log**			**Invent total**			**Invent r mat**		
CEO	-.070	.141	3.66	.374	.553	4.58	-.018	.147	1.71	-.081	.160	2.71
COO	.063	.122	3.66			4.58	-.016	.151	1.71	.075	.150	2.71
CFO	.044	.087	3.66			4.58	.013	.234	1.71	.135	.211	2.71
Ops	-.168	.057	3.66			4.58	.028	.054	1.71			2.71
	Invent WIP			**Invent goods**								
CEO	-.045	.477	3.67	-.097	.227	2.28						
COO	-.290	.448	3.67	-.032	.168	2.28						
CFO	.037	.190	3.67	-.074	.148	2.28						
Ops			3.67			2.28						

Panel (c) – Cash Conversion Cycle

	Mean	*InterQ*	*μ(DV)*	*Mean*	*InterQ*	*μ(DV)*	*Mean*	*InterQ*	*μ(DV)*	*Mean*	*InterQ*	*μ(DV)*
	Rec			**Pay**			**Op CF**			**Δ COGS**		
CEO	-.006	.132	5.24	-.029	.170	5.19	2.208	9.922	158.	.063	.082	.088
COO	-.027	.203	5.24	.043	.174	5.19	1.976	15.132	158.	-.024	.075	.088
CFO	.074	.253	5.24	.033	.166	5.19	-32.59	40.216	158.	.012	.091	.088
Ops	-.179	.371	5.24	-.138	.133	5.19	56.390	85.569	158.	-.055	.146	.088

Table 4 – Persistence of Executive Fixed Effects

In the "treatment" test, we regress the after-firm effects on the before-firm effects. The figures are estimated coefficients of the before-firm effect, with standard errors in brackets. In the "control" test, we regress the after-firm effects (estimated using the control 3-year shifted transition) on the before-firm effects. Specifically, the "treatment" tests use actual data, while the "control" tests run the same estimations using executive transitions 3 years ahead of their actual transitions. In both cases, we first create firm-year residuals by regressing our operational decision variables on firm and year fixed effects, and time-varying firm controls. These residuals are collapsed by executive-firm periods, by taking either the median of the residuals. The executive fixed effects are then estimated using these residuals.
*** = significant at 1%, ** at 5%, * at 10%.

	Treatment	*Control*
Capacity and Growth		
PPE net	0.68 (.19)	0.24 (.23)
PPE land	0.96 (.04)**	0.20 (.15)
PPE bldgs	0.95 (.06)*	0.63 (.14)
PPE machinery	0.82 (.13)	0.34 (.22)
PPE leases	0.98 (.02)**	0.88 (.13)
PPE construction	0.90 (.06)*	0.62 (.22)
Employees	0.86 (.11)	0.44 (.20)
Rent	0.98 (.03)**	0.60 (.24)
Rent commitment 1 year	0.58 (.24)	0.82 (.13)
Rent commitment 5 years	0.89 (.07)*	0.72 (.13)
Line Balancing		
Lead time	0.84 (.10)	0.54 (.15)
Back log	1.00 (.00)***	0.00 (.00)***
Inventory, total	0.90 (.07)*	0.71 (.18)
Inventory, raw materials	1.00 (.00)***	0.95 (.06)*
Inventory, WIP	0.93 (.09)*	0.94 (.08)*
Inventory, finished goods	0.71 (.24)	0.37 (.28)
Cash Conversion Cycle		
Receivables	0.76 (.20)	0.48 (.32)
Payables	0.94 (.03)**	0.66 (.17)
Operating cash flow	0.15 (.18)	0.71 (.18)
Change in COGS	0.51 (.25)	0.60 (.22)

Table 5 – Themes Among Executive Fixed Effects

The factor loadings for the orthogonal solution are shown in the middle 3 columns. Loadings 0.5 or more in absolute value are in bold. Uniqueness is the proportion of the common variance of the variable not associated with the factors. A uniqueness is equal to 1 means complete communality.

	Factor1 "Build"	**Factor2 "People"**	**Factor3 "?"**	Uniqueness
Q	**-.74**	.06	.20	.40
Capex	**.79**	.06	.18	.34
SGA	-.46	**.58**	.07	.45
Ad	-.34	-.10	-.04	.87
Cash flow margin on sales	-.46	.06	.49	.55
ROA	**-.55**	-.06	**.56**	.38
Capacity and Growth				
PPE net	**.63**	-.33	.49	.25
PPE land	**.51**	.04	.24	.68
PPE bldgs	.20	.05	.13	.94
PPE machinery	.14	**-.60**	.43	.44
PPE leases	.27	**.56**	.19	.58
PPE construction	.46	-.40	-.07	.63
Employees	**.51**	**.63**	.25	.28
Rent	.47	**.50**	.13	.51
Rent commitment 1 year	-.01	.37	-.28	.79
Rent commitment 5 years	.06	**.50**	-.22	.70
Line Balancing				
Lead time	**-.64**	.04	-.02	.59
Back log	-.13	.24	-.05	.92
Inventory, total	.35	-.24	-.16	.79
Inventory, raw materials	.31	-.18	-.06	.87
Inventory, WIP	.37	-.25	.02	.80
Inventory, finished goods	.17	-.08	-.17	.93
Cash Conversion Cycle				
Receivables	**-.65**	-.40	-.16	.39
Payables	-.43	.31	-.20	.67
Operating cash flow	.04	.14	-.30	.89
Change in COGS	-.33	.18	-.13	.84

Table 6 – Executive Fixed Effects and Governance, Compensation

Tobin's Q is calculated total assets plus market cap less common equity and deferred taxes, divided by total assets. Correlation with Q is obtained by first regressing the operations decision variables on the set of firm and year fixed effects as well as time-varying firm effects. In the second stage, we regress the residuals from these regressions on executive fixed effects, without a constant. In the third stage, we estimate the correlations between the predicted values of Q and executive fixed effects from the second stage regressions, using GLS (generalized least squares) with the known standard errors of the first stage as weights.

Coefficients in the second column, "G index," are obtained by regressing executive fixed effects obtained from Table 2 on the G index, obtained from I/B/E/S and created by Gompers, et al. (2003). The rightmost two columns are obtained as follows. First, regress the log of total compensation and log salary on firm and year fixed effects and time-varying firm controls: lagged log assets, lagged log sales. ROA, the G index, tenure of the executive in the firm, and indicator variables for the position of the executive (CEO, CFO, etc.) . We then regress the compensation residuals from the first-stage estimations on the executive fixed effects. We use GLS weights as before to minimize measurement error. *** = significant at 1%.

	Corr with Q	G index	Total compensation	Salary compensation
Capacity and Growth				
PPE net	-0.047	-.0014***	.0432	.0215
PPE land	-0.008	-.0011***	.7709	.3512
PPE bldgs	-0.015	-.0036***	.1075	.0881
PPE machinery	0.015***	.0049***	.0261	.0208*
PPE leases	-0.002	.0008***	-.0105	-.0436
PPE construction	-0.01	-.0004***	.4591	-.0014
Employees	-0.002	-.0002***	.1946	.1776
Rent	-0.012	.0003***	-.0031	.0886
Rent commitment 1 year	0.005	.0051***	-.0178	-.0074*
Rent commitment 5 years	-0.026	.03086**	-.00374**	-.00094**
Line Balancing				
Lead time	0.364***	.0309***	-.0041*	-.0063**
Back log	0.039***	.0045***	-.0401*	-.0147**
Inventory, total	-0.16	-.0114***	.0225*	.0099**
Inventory, raw materials	-0.164	.0051***	-.0148*	-.0223*
Inventory, WIP	-0.239	-.0239***	.0307**	.0403**
Inventory, finished goods	-0.094	.0014***	.0114*	.0033**
Cash Conversion Cycle				
Receivables	0.49***	.0461**	.0013*	-.0084**
Payables	0.204***	.0003***	-.0046*	-.0066**
Operating cash flow	-46.3	-5.8372	.0000***	.0000***
Change in COGS	1.32	-.0004***	.0015	-.0022*

Table 7 – Executive Fixed Effects and Executive Characteristics

We use the following specification:

$$EXEC\_FE_{eft} = f(AGE_{et}, TENURE_{eft}, NUM\_DIRECTORSHIPS_{eft}, BBusiness?_e, BEng?_e, BSc?_e, MBA?_e)$$

where AGE_{et} is the age of the executive at year t, $TENURE_{eft}$ the executive's years with firm f at year t, $NUM\_DIRECTORSHIPS_{eft}$ the executive's number of directorships outside firm f in year t, $BBusiness?_e$ an indicator for whether the executive has a bachelor's degree in business, $BEng?_e$ for a bachelor's degree in engineering, $BSc?_e$ for a degree in science, and $MBA?_e$ if the executive has an MBA. The bachelor's degree in the arts is used as a baseline. Correlation with Q is taken from panel (b) of Table 6. These regressions are clustered at the firm level. *** = significant at 1%, ** at 5%, * at 10%.

			Observable executive characteristics						
	Corr with Q	Mean of variable	Age	Tenure	Num. of directorships	Bachelors' (base=BA) Bus.	Eng.	Sc.	MBA?
Capacity and Growth									
PPE net	-0.047	.33	-0.007	-0.087**	-0.001	0.011**	0.039	-0.03	-0.04
PPE land	-0.008	.03	-0.001	-0.007*	0	0.001**	0.009*	0.003	0.007*
PPE bldgs	-0.015	.15	0.013	-0.054*	-0.002	0.003	0.033	0	0.005
PPE machinery	0.015***	.37	-0.003	-0.102*	-0.002	0.007	-0.024	-0.107**	-0.118**
PPE leases	-0.002	.06	-0.003	0.006	0.002**	0.001	0.012	-0.014*	-0.051***
PPE construction	-0.01	.02	-0.003	-0.013**	0	0.001**	0.011*	0.006	0.010**
Employees	-0.002	.01	0	0.001	0.000**	0.000*	0.001	-0.001	-0.005***
Rent	-0.012	.06	-0.001	-0.001	0.002**	0.001*	0.014***	0.005	-0.007*
Rent commitment 1 year	0.005	.85	0.039	0.085*	0.011**	-0.004	-0.154**	0.061	-0.021
Rent commitment 5 years	-0.026	3.31	0.092	0.620**	0.064**	0.022	-0.655*	-0.033	-0.754***
Line Balancing									
Lead time	0.364***	3.66	0.041	0.665***	-0.016**	-0.01	-0.537***	-0.400***	-0.302**
Back log	0.039***	4.58	-	-	-	-	-	-	-
Inventory, total	-0.16	1.72	-0.142**	-0.472***	-0.016**	0.01	0.495***	0.304**	0.617***
Inventory, raw materials	-0.164	2.71	-0.043	-0.590***	0	-0.001	0.476***	0.460***	0.419***
Inventory, WIP	-0.239	3.68	-0.159**	-0.763***	-0.009	0.005	0.939***	0.500***	0.390***
Inventory, finished goods	-0.094	2.29	-0.011	-0.445***	0.001	0.004	0.423***	0.418***	0.613***
Cash Conversion Cycle									
Receivables	0.49***	5.24	0.081	-0.094	-0.037**	-0.061**	-0.328	0.127	0.464***
Payables	0.204***	5.19	0.138*	-0.025	-0.002	-0.037*	-0.371*	0.042	0.22
Operating cash flow	-46.3	.06	-18.974	2.032	-0.538	0.773	23.568	21.217	98.814**
Change in COGS	1.32	.08	-0.007**	-0.000	-0.001	-0.005	-0.014	0.065	-0.069**

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The following tables are not meant to be included in the paper proper, but are details for reference by referees. The numbering of the tables following those in the paper, with an "a" suffix.

Table 8a – Executive Fixed Effects

Panel (a) – Capacity and Growth

	R^2	*F*	*P*	*#c*	*N*	R^2	*F*	*P*	*#c*	*N*
	PPE (net)					**PPE land**				
	.89					.94				
CEO	.89	.91	.65	51	836	.94	.92	.63	44	705
COO	.89	.86	.71	42	836	.94	2.08	.00***	36	705
CFO	.89	1.37	.09*	30	836	.94	2.25	.00***	28	705
Ops execs	.89	.21	.99	8	836	.94	2.10	.05*	6	705
Other execs	.90	2.50	.00***	49	836	.94	2.07	.00***	40	705
COO, ops execs	.89	.76	.89	50	836	.94	2.13	.00***	42	705
All	.90	1.59	.00***	137	836	.95	2.03	.00***	119	705
	PPE bldgs					**PPE mach**				
	.89					.92				
CEO	.88	.41	1.00	44	705	.91	.52	1.00	43	726
COO	.89	.83	.74	36	705	.91	.34	1.00	37	726
CFO	.89	1.67	.02**	28	705	.92	2.32	.00***	28	726
Ops execs	.89	3.83	.00***	6	705	.92	.51	.77	5	726
Other execs	.91	4.02	.00***	40	705	.93	4.10	.00***	41	726
COO, ops execs	.89	1.28	.12	42	705	.91	.36	1.00	42	726
All	.91	2.31	.00***	119	705	.93	1.88	.00***	116	726
	PPE leases					**PPE constr**				
	.90					.72				
CEO	.90	1.07	.36	38	605	.71	.35	1.00	48	780
COO	.90	.49	.99	30	605	.71	.26	1.00	41	780
CFO	.90	1.31	.15	23	605	.73	1.30	.14	30	780
Ops execs	.91	4.57	.00***	8	605	.72	.25	.98	8	780
Other execs	.90	.57	.99	40	605	.72	.91	.63	43	780
COO, ops execs	.90	1.32	.10	38	605	.71	.25	1.00	49	780
All	.90	.86	.83	104	605	.71	.78	.96	131	780
	Emp					**Rent**				
	.95					.96				
CEO	.95	.78	.87	51	834	.96	.87	.72	49	767
COO	.95	.88	.69	42	834	.97	3.96	.00***	42	767
CFO	.95	2.51	.00***	30	834	.96	.40	1.00	28	767
Ops execs	.95	1.00	.43	8	834	.96	8.38	.00***	8	767
Other execs	.96	4.71	.00***	49	834	.97	4.13	.00***	47	767
COO, ops execs	.95	.89	.69	50	834	.97	5.43	.00***	50	767
All	.96	2.64	.00***	137	834	.97	2.41	.00***	131	767
	Rent 1 yr					**Rent 5 yrs**				
	.58					.66				
CEO	.72	7.47	.00***	45	711	.80	9.82	.00***	44	703
COO	.56	.20	1.00	35	711	.64	.12	1.00	34	703
CFO	.57	.32	1.00	26	711	.64	.29	1.00	26	703
Ops execs	.57	.04	1.00	8	711	.65	.12	1.00	8	703
Other execs	.74	8.69	.00***	45	711	.80	9.84	.00***	46	703
COO, ops execs	.55	.17	1.00	43	711	.63	.11	1.00	42	703
All	.71	3.22	.00***	115	711	.78	3.74	.00***	114	703

Panel (b) – Line Balancing

	R^2	*F*	*P*	*#c*	*N*	R^2	*F*	*P*	*#c*	*N*
	Lead time					**Back log**				
	.79					.97				
CEO	.81	2.24	.00***	53	900	.99	8.44	.00***	3	54
COO	.79	1.10	.30	49	900					
CFO	.78	.24	1.00	30	900					
Ops execs	.79	1.32	.22	9	900					
Other execs	.81	2.89	.00***	50	900	.99	7.44	.00***	4	54
COO, ops execs	.79	1.14	.23	58	900					
All	.81	1.62	.00***	148	900	.99	7.44	.00***	4	54
	Invent total					**Invent r mat**				
	.39					.06				
CEO	.41	1.41	.04**	49	841	.11	1.70	.03**	22	299
COO	.36	1.08	.33	44	841	.07	.57	.89	15	299
CFO	.36	1.62	.03**	27	841	.06	1.98	.03**	12	299
Ops execs	.39	.36	.94	8	841					
Other execs	.41	1.82	.00***	47	841	.09	.89	.60	19	299
COO, ops execs	.37	.97	.53	52	841	.07	.57	.89	15	299
All	.35	1.60	.00***	136	841	.07	1.36	.07*	50	299
	Invent WIP					**Invent goods**				
	.26					.02				
CEO	.21	.48	.93	13	193	.02	.57	.95	23	335
COO	.23	.83	.60	10	193	.02	.09	1.00	12	335
CFO	.26	.78	.64	9	193	.02	.16	1.00	12	335
Ops execs										
Other execs	.26	.42	.97	15	193	.06	.40	.99	18	335
COO, ops execs	.23	.83	.60	10	193	.02	.09	1.00	12	335
All	.24	.57	.96	31	193	.06	.38	1.00	48	335

Panel (c) – Cash Conversion Cycle

	R^2	*F*	*P*	*#c*	*N*	R^2	*F*	*P*	*#c*	*N*
	Rec					**Pay**				
	.95					.96				
CEO	.95	1.48	.02**	51	848	.96	1.80	.00***	53	900
COO	.95	.72	.91	43	848	.96	1.07	.34	49	900
CFO	.95	1.29	.14	29	848	.96	1.00	.46	30	900
Ops execs	.95	5.61	.00***	9	848	.96	1.62	.11	9	900
Other execs	.95	1.55	.01**	47	848	.96	2.97	.00***	50	900
COO, ops execs	.95	1.57	.01***	52	848	.96	1.16	.20	58	900
All	.96	1.44	.00***	139	848	.97	2.02	.00***	148	900
	Op CF					**Δ COGS**				
	.69					.11				
CEO	.69	0.70	.942	51	832	.18	2.26	.00***	51	836
COO	.69	0.50	.997	42	832	.06	.15	1.00	42	836
CFO	.70	1.72	.010	30	832	.08	.33	1.00	30	836
Ops execs	.69	0.80	.603	8	832	.10	.12	1.00	8	836
Other execs	.69	0.84	.778	49	832	.19	2.50	.00***	49	836
COO, ops execs	.68	0.54	.996	50	832	.05	.14	1.00	50	836
All	.69	0.88	.812	137	832	.09	.93	.69	137	836

Table 9a – Size Distribution of Executive Fixed Effects

The first two column headers in each sub-panel are the mean and standard deviation of these effects. *ΔSD*(*DV*) is the change in the standard deviation of the dependent variable with one standard deviation change in executive fixed effects. InterQ is the inter-quartile range of the effects, to be compared with *μ(DV)*, the mean of the dependent variables (e.g., PPE net in the first sub-panel).

Panel (a) – Capacity and Growth

Rental expense is scaled by sales, rental commitments by rental expense, and others by assets. "Rent in 1 yr" and "Rent in 5 yrs" mean rental commitments 1 and 5 years ahead, and "PPE constr" is property, plant and equipment under construction. The COMPUSTAT item numbers for PPE are data8, data260, data263, data264, data265, and data266; employees is data29, rent data47, and rental commitments data95 and data96.

	Mean	*SD*	*ΔSD(DV)*	*InterQ*	*μ(DV)*	*Mean*	*SD*	*ΔSD(DV)*	*InterQ*	*μ(DV)*
	PPE net					**PPE land**				
CEO	.002	.046	.001	.029	.333	.001	.010	.000	.002	.028
COO	.000	.045	.000	.035	.333	-.004	.014	-.001	.003	.028
CFO	-.012	.055	-.004	.035	.333	.000	.013	.000	.004	.028
Ops	-.006	.023	-.001	.022	.333	.002	.011	.001	.015	.028
Other	.007	.084	.004	.068	.333	-.002	.014	-.001	.007	.028
COO, ops	-.001	.042	.000	.038	.333	-.003	.014	-.001	.004	.028
All	-.016	.087	-.008	.069	.333	.000	.014	.000	.009	.028
	PPE bldgs					**PPE mach**				
CEO	.001	.026	.000	.019	.145	.001	.043	.000	.024	.367
COO	-.010	.035	-.003	.018	.145	.006	.034	.001	.038	.367
CFO	-.011	.051	-.004	.028	.145	-.038	.082	-.012	.059	.367
Ops	.008	.068	.004	.070	.145	.040	.049	.007	.065	.367
Other	.010	.090	.007	.044	.145	.021	.117	.009	.106	.367
COO, ops	-.008	.041	-.002	.020	.145	.010	.037	.001	.036	.367
All	-.031	.117	-.027	.063	.145	-.002	.096	-.001	.083	.367
	PPE leases					**PPE constr**				
CEO	-.005	.037	-.001	.007	.062	-.001	.006	.000	.003	.020
COO	-.001	.024	.000	.007	.062	.001	.005	.000	.006	.020
CFO	.002	.023	.000	.014	.062	-.001	.012	-.001	.005	.020
Ops	.027	.076	.022	.006	.062	.000	.007	.000	.007	.020
Other	-.002	.019	.000	.011	.062	.002	.013	.001	.009	.020
COO, ops	.005	.040	.002	.006	.062	.001	.006	.000	.006	.020
All	-.004	.037	-.001	.013	.062	-.003	.020	-.002	.011	.020
	Emp					**Rent**				
CEO	.000	.002	.000	.001	.333	.000	.007	.000	.003	.060
COO	.001	.002	.000	.001	.333	.003	.015	.000	.002	.060
CFO	-.001	.003	.000	.002	.333	.000	.004	.000	.002	.060
Ops	.001	.002	.000	.002	.333	-.002	.019	.000	.015	.060
Other	.000	.004	.000	.002	.333	-.002	.015	.000	.004	.060
COO, ops	.001	.002	.000	.001	.333	.002	.016	.000	.003	.060
All	.001	.004	.000	.003	.333	.003	.011	.000	.006	.060
	Rent 1 yr					**Rent 5 yrs**				
CEO	-.122	.917	-.678	.045	.852	-.574	4.104	-14.268	.291	3.305
COO	.003	.151	.001	.117	.852	.015	.517	.003	.396	3.305
CFO	-.006	.154	-.002	.048	.852	.010	.585	.003	.356	3.305
Ops	.020	.058	.002	.083	.852	.163	.521	.037	.325	3.305
Other	.154	.925	.290	.131	.852	.630	4.029	1.121	.527	3.305
COO, ops	.006	.137	.002	.103	.852	.043	.502	.010	.397	3.305
All	.045	.608	.055	.166	.852	-.137	2.633	-.160	.535	3.305

Panel (b) – Line Balancing

All dependent variables are in log form. Backlog is the backlog of orders. "Invent r. mat" is raw materials. Lead time in days is measured as in Netessine and Roumiantsev (2005), as the log of a multiple: payables (COMPUSTAT item data70) times 365 divided by cost of goods sold (item 41). Order backlog (item data98) is scaled by sales (data12). The inventory variables, in log form, include those for total, raw materials, work in progress, and finished goods.

	Mean	*SD*	*ΔSD(DV)*	*InterQ*	*μ(DV)*	*Mean*	*SD*	*ΔSD(DV)*	*InterQ*	*μ(DV)*
	Lead time					**Back log**				
CEO	-.070	.345	-.146	.141	3.66	.374	.585	1.324	.553	4.58
COO	.063	.270	.025	.122	3.66					4.58
CFO	.044	.097	.006	.087	3.66					4.58
Ops	-.168	.386	-.096	.057	3.66					4.58
Other	-.054	.409	-.033	.219	3.66	-.361	.502	-.128	.541	4.58
COO, ops	.028	.297	.013	.118	3.66					4.58
All	.093	.460	.064	.300	3.66	.433	.464	.142	.328	4.58
	Invent total					**Invent r mat**				
CEO	-.018	.184	-.020	.147	1.71	-.081	.226	-.111	.160	2.71
COO	-.016	.194	-.004	.151	1.71	.075	.164	.016	.150	2.71
CFO	.013	.213	.003	.234	1.71	.135	.389	.070	.211	2.71
Ops	.028	.134	.004	.054	1.71					2.71
Other	.001	.241	.000	.193	1.71	.024	.240	.008	.313	2.71
COO, ops	-.011	.187	-.002	.141	1.71	.075	.164	.016	.150	2.71
All	-.037	.325	-.014	.239	1.71	-.175	.510	-.119	.548	2.71
	Invent WIP					**Invent goods**				
CEO	-.045	.314	-.086	.477	3.67	-.097	.397	-.233	.227	2.28
COO	-.290	.436	-.083	.448	3.67	-.032	.186	-.005	.168	2.28
CFO	.037	.496	.012	.190	3.67	-.074	.346	-.021	.148	2.28
Ops					3.67					2.28
Other	.238	.225	.035	.342	3.67	.146	.414	.048	.163	2.28
COO, ops	-.290	.436	-.083	.448	3.67	-.032	.186	-.005	.168	2.28
All	.185	.691	.084	.641	3.67	-.049	.437	-.017	.188	2.28

Panel (c) – Cash Conversion Cycle

Receivables (rec, COMPUSTAT item 2) and payables (pay, COMPUSTAT item 70) are in log form. Operating cash flow is defined as sales less SGA plus depreciation and amortization, scaled by market value of assets, defined as market capitalization plus carrying value of preferred stock, long-term debt, and debt in current liabilities.

	Mean	*SD*	*ΔSD(DV)*	*InterQ*	*μ(DV)*	*Mean*	*SD*	*ΔSD(DV)*	*InterQ*	*μ(DV)*
	Rec					**Pay**				
CEO	-.006	.471	-.016	.132	5.24	-.029	.319	-.057	.170	5.19
COO	-.027	.366	-.005	.203	5.24	.043	.250	.006	.174	5.19
CFO	.074	.314	.012	.253	5.24	.033	.205	.004	.166	5.19
Ops	-.179	1.050	-.098	.371	5.24	-.138	.396	-.033	.133	5.19
Other	.061	.461	.015	.259	5.24	-.069	.396	-.016	.292	5.19
COO, ops	-.047	.526	-.013	.223	5.24	.016	.281	.003	.170	5.19
All	-.012	.539	-.003	.328	5.24	.125	.499	.038	.348	5.19
	Op CF					**Δ COGS**				
CEO	2.208	109.315	1462.461	9.922	158.	.063	.347	.132	.082	.088
COO	1.976	97.119	.687	15.132	158.	-.024	.110	-.016	.075	.088
CFO	-32.59	117.646	-13.729	40.216	158.	.012	.151	.011	.091	.088
Ops	56.390	119.413	24.112	85.569	158.	-.055	.112	-.037	.146	.088
Other	36.807	112.932	14.884	45.839	158.	-.046	.368	-.103	.144	.088
COO, ops	10.215	101.660	3.719	16.305	158.	-.029	.109	-.019	.081	.088
All	-6.409	128.109	-2.940	36.272	158.	.054	.266	.087	.167	.088