

**MANAGING FIRMS IN AN EMERGING ECONOMY:
EVIDENCE FROM THE TIME USE OF INDIAN CEOS**

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PRELIMINARY AND INCOMPLETE

Abstract:

The success or failure of a company is often ascribed to the behavior of its CEO. Yet little is known about what top managers actually do, whether this matters for firm performance, and why it differs across firms. We provide some answers by developing a new survey instrument to collect data on CEO time use in the Indian manufacturing sector, where the productivity dispersion across firms is substantial. Time use analysis of 354 CEOs of listed firms yields three sets of findings. First, there is substantial heterogeneity in total hours worked (“labor supply”) and the allocation of time across different activities, constituencies, and modes of interaction (“style”). Second, both labor supply and style are strongly correlated with firm productivity and profitability. Third, controlling for state and industry traits, family CEOs work fewer hours and adopt a less productive style. Using differences in exposure to competition and weather shocks, we argue that the behavioral differences between family and professional CEOs are easier to explain as differences in the preferences or skills of CEOs rather than optimal responses to different organizational structures.

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I. INTRODUCTION

Differences in firm productivity account for a large share of within and cross-country income differences (Klenow & Rodriguez Claire, 1997, Hall and Jones, 1999) and firm productivity is strongly affected by the identity of their CEOs (Bertrand and Schoar 2003, Perez Gonzales 2006, Bennedsen et al. 2007). This notwithstanding, and despite considerable attention by management scholars and the popular press, systematic evidence on what CEOs actually do is limited.

In this paper we develop a new survey instrument to measure CEO time use in large samples to provide quantitative evidence on what CEOs actually do, whether it correlates with firm performance and whether (and why) it differs across firms. The underlying idea is that attention is a scarce resource and particularly so at the top of the organization. The allocation of time reflects the allocation of attention, which in turns depends on the strategic priorities of the CEO. The importance for effective corporate leaders of aligning their own time management to their goals has been a cornerstone of leadership theories for many years (Drucker 1966). It is also a key theme in organization theory. According to Simon (1973), “attention is the chief bottleneck in organizational activity, and the bottleneck becomes narrower and narrower as we move to the tops of organizations.” Attention constraints lie at the core of a number of economic models of organizational hierarchies, which study how managers should allocate this resource optimally.¹

In this paper we collect data on the time use of 354 CEOs of listed Indian manufacturing firms over the course of one randomly chosen work week. India is an interesting context for this exercise because its manufacturing is characterized by large TFP dispersion across firms (Hsieh and Klenow 2009) and a long thick tail of low TFP firms who use poor managerial practices (Bloom and van

¹ Attention constraints can be generated by different cognitive limits. For instance, attention relates to information acquisition in Geanakoplos and Milgrom (1990), information processing in Radner and Van Zandt (1993), communication in Bolton and Dewatripont (1994), and problem solving in Garicano (2000). See Garicano and Prat (2012) for a survey.

Reenen 2010). Identifying differences in CEOs' management style via their time use might provide new insights on the observed heterogeneity across firms.

To measure time use we reconstruct the CEOs time diary via daily phone interviews with their personal assistants. We ask respondents to use their actual diaries to list sequentially all activities that lasted longer than fifteen minutes, and for each activity we enquire about its type (meeting, phone call etc.), the type and number of people involved, the location, the start and end time, and scheduling horizon. This allows us to build an accurate bottom-up estimate of how much time the CEO devotes to structured business activities and how he or she allocates it to different activities, different constituencies, and different styles of interaction.

We complement the time use data with information about the CEOs' and firms characteristics and we match these to external balance sheet data to assess the extent to which time use vary across CEOs, whether this is correlated with firm performance and if so, what drives these differences. The analysis yields three sets of findings.

First, CEOs differ substantially both on their labor supply and management style. The median CEO in our sample works 7 hours a day (net of commuting and personal activities), but labor supply is just 6 hours a day at the 25th percentile and 8 hours a day at the 75th percentile. We also find that CEOs differ remarkably in their style, namely their time allocation conditional on total hours worked. In particular, CEOs differ in the extent they plan in advance, the time they devote to face-to-face meetings, the composition of people at those meetings, the time devoted to outsiders vs. employees of the firm, and, among these, the time devoted to direct reports. To combine these differences in a single measure we use standard clustering procedures. These reveal that CEOs in our sample display two distinct patterns of time allocation, which we label "Styles". Style 1 CEOs show a higher propensity to engage in activities that are planned in advance, have a multi-participant and cross-functional component, are directed at their own employees, especially in production, and involve exclusively their direct reports. In contrast, Style 2 CEOs spend more time in unplanned activities, meet fewer people in any given interaction, and are more likely to interact with outsiders rather than firm employees. In our sample, 37% of CEOs adopt Style 1.

Second, these differences in labor supply and style are strongly correlated with external measures of firm productivity and profitability: a 1% increase in the weekly hours worked by the CEO is associated with a 0.89% increase in firm productivity, and firms led by Style 1 CEOs are on average 34% more productive. While we do not observe exogenous variation in time use that would allow us to establish its causal impact on performance, a placebo test reassuringly shows that the observed correlation is not driven by time invariant firm traits. Indeed, firm performance *prior* to the appointment of the current CEO, which captures time invariant firm traits, is not correlated with the labor supply and style of the CEO *during* his tenure.

Third, we show that the external environment in which the firm operates, namely the specific industry and a several measure of state policies and infrastructure, does not explain much of the variation in time use we observe in the data. Instead, we find that family CEOs - executives belonging to the family who owns the firm- work 7% fewer hours than other managers and have a 13% lower probability of adopting Style 1. The relation we find suggests a possible explanation for the well-documented underperformance of family-run firms (see references below).

To conclude, having observed that family CEOs behave in systematically different ways, we investigate whether this difference is an optimal response to differences in organizational structure correlated with ownership (for instance, it may be optimal for a family CEO to spend less hours in structured business activities and more hours in unrecorded informal business interactions with family members) or to differences in CEO characteristics, like preferences or ability. We develop a simple model of CEO labor supply, which suggests a two-pronged strategy. First, we test whether the difference between family and professional CEOs is sensitive to the level of competitive pressure the firm is exposed to. If CEOs are already doing their best, the presence of competitive pressure should not have a differential effect. If instead family CEOs are either slacking or less efficient, the discipline and selection effects created by competition will reduce the gap between family and non-family firms. In line with this we find that the differences in labor supply and style are driven entirely by family CEOs employed in firms that are less exposed to foreign or domestic competition: family CEOs in highly competitive industries behave just like professional CEOs. Second, we exploit a natural experiment, the variation in monsoon rainfall within the survey week, and compare the *change* in

time use of family CEOs to that of professional CEOs. Under the assumption that bad weather increases the marginal cost of effort for all CEOs equally regardless of firm ownership, this strategy allows us to shed light whether family and professional managers put different weight on firm performance. Extreme rainfall is associated with a 10% decrease in daily hours worked for family CEOs, but has no significant impact on other CEOs. Moreover, we show that the differential reaction to the external shocks is entirely driven by family CEOs who lead firms that are less exposed to competition.

Our methodology is inspired by Mintzberg's (1973) celebrated analysis of a week of work of five CEOs. While his observational study was more in-depth, we have the advantage of a much larger and randomly drawn sample.² The focus of our analysis is also quite different as we are interested in relating time use to standard economic variables, such as governance and performance.

The present finding that different CEOs have markedly different styles contributes to explain why they have an impact on firm performance (Bertrand and Schoar 2003, Kaplan et al 2008, Malmendier and Tate 2005, 2008, Schoar and Zuo 2011). Our study of behavior at the top of the hierarchy complements the analysis of management practices at lower levels of the organization (Bloom and Van Reenen 2007). Finally, our finding that family CEOs work fewer hours and adopt a less productive style can provide a possible explanation for the finding that firms led by family CEOs generally underperform (Bennedsen et al. 2007, Perez-Gonzalez 2006, and survey by Bertrand 2010), and complements the observation that they adopt worse managerial practices (Bloom and Van Reenen 2009).

The paper is organized as follows. Section II describes our sampling and data collection methodology, together with the characteristics of CEOs and their firms. Section III describes the basic patterns of

² "Shadowing" exercises are common in the management literature but typically cover a handful of observations. To the best of our knowledge, the most extensive CEO time use study is still Mintzberg's (1973) seminal work, which comprises five CEOs. The largest observational dataset on top executives known to us – Kotter (1999) – includes 15 general managers. The largest time use study of managerial personnel we are aware of is Luthans (1988), which covers 44 mostly middle managers. None of them are CEOs. Some surveys ask large numbers of CEOs general questions about their aggregate time use (e.g. McKinsey 2013), but they are not based on an analysis of their agendas for a specific time period. It is well known that time use perception and recollection can be completely different from actual time use.

time use, showing that CEOs exhibit considerable variation on several dimensions, from total hours worked, to overall style. Section IV provides evidence on the relationship between time use and firm performance. Section V analyzes the drivers of the heterogeneity in labor supply and style across CEOs. Section VI investigates the possible reasons behind the observed differences between Family CEOs and professional managers. Section VII concludes.

II. SAMPLE SELECTION AND SURVEY METHODOLOGY

II.A Sample Selection

The sampling frame is based on 8,000 listed manufacturing firms based in India and reporting their data on ORBIS, an extensive commercial data set providing company level accounts and additional information on more than 100 million firms in the world. We restricted the sample to firms that appeared to be still active in 2011 and reported at least some accounting data since 2006. Finally, we decided to focus only on firms headquartered in Indian states that accounted for at least 3% of overall GDP in 2009³ and with at least \$2 million in sales in their latest available year with accounting information. These conditions restricted our sample to approximately 3,500 firms. We then gathered detailed contact information on the CEOs of the sample companies. This included verifying their names, finding their phone numbers and emails, and establishing a first contact with their PAs. This restricted the sample to 1,955 companies for which we could find contact details. Of these, 368 later resulted not to be eligible for the interviews (the reasons for non eligibility included recent bankruptcy, the company not being in manufacturing or being listed anymore), and 158 were never contacted because the project ended before this was possible.

Out of the 1,429 eligible CEOs, 364 agreed to participate in the study, a response rate of 26%.⁴ This figure is higher than standard CEO surveys, which range between 9% and 16% (Graham et al 2012). The boost our response rate we actively monitored and coached the interviewers throughout the

³ This excluded firms located in Assam, Bihar, Chandigarh, Chhattisgarh, Dadra, Daman and Diu, Goa, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Orissa and Uttarakhand.

⁴ Of these interviews, 10 were deemed to be of poor quality by the project managers and thus removed from the sample before the analysis was conducted.

project, which intensified their persistence in chasing the CEOs and getting them to participate. We also offered the CEOs a personalized analysis of their use of time (which was provided in January 2012) to give them the ability to monitor their time allocation, and compare it with peers in the industry. The selection analysis in Table A1 shows that firms in the final sample have on average slightly lower sales (a difference of 1.8%, significant at the 1% level). However, we do not find any significant selection effect on performance variables, such as return on capital employed (ROCE) return on assets (ROA) and profits.⁵

II.B The CEO Time Use Survey

Each CEO who agreed to participate was assigned a randomly selected week between May 1st 2011 and July 31st 2011 during which time use data would be collected. This avoids biases arising from endogenous week choice, for instance due to the fact that CEOs might prefer to report time use during atypical weeks.⁶

To measure time use follow time-diary approach whereby respondents were asked to enumerate on a daily basis (in the order in which they were undertaken) all the activities lasting more than 15 minutes and to report detailed information about each. Project analysts collected this information through daily phone conversations with the Personal Assistant (PA) of the CEO.⁷ On the first day of the week, the analyst would call the PA in the morning, in order to gather detailed information on all the activities planned in the agenda of the CEO for the day. The analyst would call again in the evening, to gather information on the actual activities undertaken by the CEO during the day (hence checking off activities that were planned but did not happen), and the activities planned for the following day. The second day, the analyst would call the PA only in the evening, again to collect data

⁵ We cannot run this type of comparison using productivity data since the vast majority of firms in our sampling frame do not report employment numbers.

⁶ One possible worry in randomizing the data collection week across CEOs is that that we might miss the fact that CEOs might change their normal behavior depending on the proximity of the end of the fiscal year. We can measure this directly thanks to the information provided in the company accounts. This shows that the vast majority (95%) of the sample reports to end the fiscal year in March (i.e. two months before our data collection), while the remaining 5% is allocated between June (2.3%), September (0.3%) and December (2.6%). Controlling for these differences does not alter any of the results presented in the paper.

⁷ Time use data was collected by a team of fifteen MBA students recruited specifically for this project from leading business schools in Mumbai. Each analyst was allocated a random list of about 70 companies, and was in charge of calling up the numbers of his or her list to convince the CEO to participate in the survey, and to collect the time use data in the week allocated to the CEO. One project manager, two full time supervisors (one hired from a local consultancy, IPSOS) and one additional manager working on a part time basis led the survey team.

on the actual activities undertaken during the day, and the planned agenda for the next day. This pattern would continue until the end of the week. Compared to the alternative recall method where individuals are asked to estimate their time at work and its allocation across activities, the time-diary approach reduces the impact of recollection biases that have been shown to be relevant in other surveys (Robinson et al 2012).⁸ On the last day of the data collection, the analysts were instructed to talk directly with the CEO for about 30 minutes to make sure that the activity data collected through the PA was accurate.⁹

For each activity we collect information on starting and ending time, type of activity (e.g. meeting, work alone, attending a public event, traveling etc.), location, number and type of participants involved. The participants are classified according to their relationship to the firm (insiders or outsiders), their function (e.g. production or finance for insiders, suppliers or banks for outsiders). For activities involving insiders, we also know whether the activity included only people reporting directly to the CEO, or if it included employees across lower levels of the firm's hierarchy. Finally, we also enquire about the planning horizon of the activity: whether it was planned in advance and, if so, how long in advance, and if it was undertaken due to an emergency.

A reasonable concern is that a week of detailed activity data might not be enough to capture typical CEO behavior. For example, one might argue that the allocation of time across activities might just be a reflection of high frequency shocks to the marginal cost or marginal product of time across CEOs. In this case, the time use data would merely capture the relevance of these shocks, and have very little to say about explicit managerial choices. If that were true, we would observe either very little variation in time use across CEOs, or variation that is not systematically linked to specific firm

⁸ Robinson et al (2012) compare the time use estimates obtained by ex-post time-use survey questions in the CPS with time diaries from the American Time Use Survey, and conclude that ex-post recollection methods tend to generate over-estimates of the time at work, especially in subjects who tend to work longer hours.

⁹ To ensure comparability across analysts, all interviews were conducted from a single location (an office in the Mumbai suburb of Andheri), and all analysts were subject to a common intensive training on the survey methodology for three days at the beginning of the project, plus weekly team progress reviews and one to one conversations with their supervisors to discuss possible uncertainties with respect to the classification of the time use data. Each interview was checked off at the end of the week by one supervisor, who would make sure that the data was complete in every field, and that the analysts had codified all the activities according to the survey protocol. Each analyst ran on average 24 interviews across 9 states, which allows us to include analysts fixed effects and control for potential unobserved differences in the compilation of the time diaries across interviewers.

characteristics (e.g., firm size). Furthermore we would expect little similarity in the way the time is allocated within the week of observation for the same CEO (no autocorrelation in CEO time use). In fact, as we report below, we see that CEOs vary significantly in both their labor supply and allocation across activities, that these differences are correlated with observable firm characteristics, and that there is a high degree of autocorrelation in CEO choices over the week of observation. Furthermore, at the end of the survey week, we also ask the CEOs to rank whether the week could be considered “representative” in a scale 1-10. Reassuringly, differences across CEOs are not due to those reporting the week being not representative. To be precise, we observe substantial heterogeneity in time use even if we restrict the sample to the 60% of CEOs who score the survey week as highly representative (9 or 10 out of 10). This is at odds with the hypothesis that all observed variation is due to shocks rather actual differences in style.

II.C Other Data and Sample Description

Together with the time use data we collected information on the CEO (e.g. tenure in company and as a CEO, whether part of the controlling family for family-owned firms, gender, nationality, skills, presence on other boards or active managerial positions in other companies), and on the PA (tenure and skills). We match these with firm accounts data from ORBIS, which contain information on employees, inputs, sales, profits and other performance measures such as ROCE.

Table 1 reports means and standard deviations on a number of key characteristics of the firms and their CEOs in our sample. The average firm in our sample has 1,220 employees, but the distribution is skewed to the left, as the median firm has 450, and the firm at the 75th percentile has 1000. 76% of the firms in the sample are owned by direct descendants of the original founder (2nd generation onwards), and in 70% of the cases the firm is also managed by a member of the founding family. The managers of these firms are labeled as Family CEOs. Eighty percent export their products and sixteen percent are subsidiaries of foreign multinationals. The sample firms are located in fifteen different states. Among these, Maharashtra has the highest concentration (36%) followed by Gujarat (15%). Figure 1 illustrates the distribution of firms by state.

Turning to CEOs, Table 1 Panel B shows that the average CEO is 50 years old and has been holding the same position for 13 years, and working for the same firm for 19. Compared to their counterparts from the UK and US, Indian CEOs thus have remarkably long tenures and job stability. This is partly determined by the fact that as we saw in Panel A 70% of CEOs belong to the family who owns the firm, and most firms are family owned, and these have longer tenures (15 years). The average tenure of non-family CEOs is however also very long by Anglo-Saxon standards. The non-family CEOs in our sample have an average tenure of 8 years and have been with the firm for 15. Several of the sample CEOs hold an MBA (41%) and have experience working or studying abroad (37%). A sizeable minority also holds positions in other firms (29%) or sits on other firms' boards (43%). Finally, our sample includes only 5 women and two non-Indian CEOs.

III. A WEEK IN THE LIFE OF A CEO

To look at differences in labor supply across CEOs we aggregate the activity level data at the CEO-week level, weighting each activity by its duration in minutes. We use the data to build two types of variables. First, we build an estimate of the CEO weekly labor supply by summing the duration of all work activities undertaken by the CEO during the week. Second, we build the share of time spent across different types of activities or with different participants by summing the total duration of the activities falling in the different classifications, and dividing this sum by the total work time (e.g. the total time spent in planned activities is a sum of the duration of all work activities reported to be planned in advance, divided by total work time).

III.A Labor supply

Table 2, Panel A, illustrates that the average CEO reports activities for a total of 46 hours in the sample week. Of these, 43.4 hours are spent in activities that last longer than 15 minutes each and are thus recorded by our analysts. Ten percent of these activities are classified as "personal", or non-business related. Excluding the time spent traveling, the average CEO works 36 recorded hours per

week. This amounts to about 7 hours of work per day, since some CEOs work more than 5 days a week.

Figure 2 illustrates that there is considerable variation in hours worked. Executives in the bottom quartile of the labor supply distribution work for up to 6 hours per day while executives in the top quartile work for over 8 hours a day. The data also reveals that the distribution of work hours is balanced across business days. The average number of hours spent at work is slightly higher on Monday and Tuesday (7.2 each), decreasing gradually on Wednesday, Thursday and Friday (6.93, 6.91, and 6.72, respectively). Just over one fifth of the executives interviewed indicated work activities during the weekend, spending an average of 5.73 hours at work on Saturday and/or Sunday.

There is a high degree of autocorrelation in the average number of hours worked during the week by the CEOs. A simple regression of the number of log(hours worked) on day t on the same variable measured on day $t-1$ delivers a coefficient of .30, statistically significant at the 1% level.¹⁰ Therefore, while there is day-by-day variation in the number of hours worked by the CEO (which we will exploit in Section VI), the data also shows a high degree of consistency in the level of effort chosen by the CEO within the survey week.

III.B Style

The granularity of the time use data also allows us to look at differences in the allocation of time across different activities and function, conditional on the total number of hours worked by the CEO during the week. We focus on three specific aspects of the time allocation: a) the type of activity (e.g. meeting or work alone); b) features of the activity, and namely its planning horizon and, for interactions, the number of participants and number of functions participants belong to; and c) the type of participants included in the activity (employees of the firm or outsiders, type of function, and reporting relationship to the CEO). The data is summarized in Table 2, Panel B.

¹⁰ Another way to evaluate the autocorrelation of CEO choices during the week is to look at the fraction of the variation in the daily CEO averages of the time use data accounted for by CEO fixed effects. We find that CEO fixed effects account for about 24% of the variation in the data vs. 4% when only state and industry fixed effects are included.

Type of activities

We distinguish between three broad types of activities: i) business interactions (which include face to face meetings, phone calls, teleconferences, emails, shop floor visits); ii) informal interactions (public events, business meals); and iii) work alone. The majority of CEO time (80%) is spent in business interactions, in line with earlier studies of managerial behavior (Mintzberg, 1973). Working alone and informal interactions account for a much smaller share of CEO time (13% and 7% respectively). Figure 3 shows that the mean values hide a substantial amount of heterogeneity; for instance, the bottom quartile of CEOs spends up to 47% of their time in meetings and the top quartile 68% or more. Yet, the distribution of the share of time spent in meetings lies almost entirely to the right of the other types of informal interactions and work alone.

Planning horizons, Cross Functionality and Number of Participants

Another dimension of style is the extent to which CEOs are engaged in planned activities, i.e. activities that were scheduled at least one day in advance, and activities involving several participants and/or functions at a time. This allows us to study the ability of the CEO to organize his time via advance planning, and to engage in “complex” (as measured by the number and type of people involved) interactions. We find that the average CEO spends one in three hours in activities that were not planned in advance. The percentage is the same for activities that involve the CEO alone or with other people, suggesting that a sizeable share of meetings is not pre-planned. Neither the mean nor the variation is due to CEOs whom we interview in an “unusual” week. The 60% of CEOs who score the survey week as highly representative spend a sizeable 30% of their time in unplanned activities and the share increases to 36% those who score the week as not perfectly representative. Figure 4 illustrates that different CEOs plan to different extents. At the extremes, 10% of the CEOs spend over 90% of their time in planned activities, whereas 10% of them spend over 60% of their time on activities not scheduled ahead of time. CEOs are also very different in their propensity to involve multiple functions and participants in their interactions. 65% of the meetings involves just another participant, and 77% just another function, but similarly to other aspect of CEO time use, we report significant variation across CEOs along these dimensions (Figure 4).

Participants

Besides obtaining information on the typology of activities undertaken by CEOs, we also measured in detail the participants involved in them. For each activity involving an interaction with other parties, we also measured whether the participants were employees of the firm (insiders), or not (outsiders). For both insiders and outsiders, we also collected detail on their function, e.g. marketing directors or clients. Finally, to measure the hierarchical level of the insiders involved in the activity, we asked whether the meeting involved exclusively people reporting directly to the CEO, or whether participants below the direct reports were also included. Table 2, Panel B shows that the average CEOs spends 58% of his time with employees of the company, 13% alone and 29% just with outsiders but time allocation along this dimension also varies substantially across CEOs (Figure 5). Finally, a large share of CEO time involves exclusively people reporting directly to him. The share of time spent with direct reports is 34%, and again we find significant heterogeneity across CEOs (Figure 5).

Not surprisingly for manufacturing firms, the largest share of CEOs time, 19% on average, is dedicated to production followed by sales and finance. Figure 6 shows that the share of time that CEOs dedicate to these different functions exhibits considerable variation. For instance CEOs in the bottom quartile spend a fifth of their time with representative of production, CEOs in the top quartile almost one half. Figure 6 also show that the densities of the time shares for the three most important functions (production, sale and finance) overlap over a sizeable chunk of the support, suggesting that despite being in the same broad sectors, CEOs in our sample give different priorities to different functional areas.

Measuring style

A key question is whether different aspects of time use can be traced back to systematic differences in “style” across CEOs. In particular, we are interested in establishing whether differences along the dimensions described above are systematically correlated, for instance if CEOs who plan more also meet more with direct reports and so on. Table 2B shows that several dimensions are indeed correlated. To summarize these correlations in a unique measure of style we employ a simple k-

cluster analysis that allows us to categorize CEOs in two groups¹¹ chosen to minimize the within group differences and on the vector of the seven dimensions of time use: 1) the share of time spent in meetings (vs. working alone or in informal interactions); 2) the share of time spent in activities planned in advance; 3) the share of time spent in interactions involving multiple participants; 4) the share of time spent in interactions involving multiple functions; 5) the share of time spent with insiders; 6) the share of time spent with people belonging to production; 7) the share of time spent in meetings involving exclusively direct reports. We use these categories as a way to portray CEO style in terms of *what* he does (1), and *how* he interacts (2, 3 and 4); *who* he meets (5, 6, and 7).

The cluster analysis reveals two distinct patterns of time use, which we label Style 1 and Style 2, and describe in Table 2C and Figure 7. Style 1 CEOs (130, or 37% of the sample) tend to spend a significantly higher proportion of their time in business meetings relative to Style 2 CEOs (224, or 63% of the sample). We also find significant differences in terms of planning, and the overall typology of the meetings. Style 1 CEOs are more likely to be engaged in activities planned in advance, and to participate in meeting involving more than one additional participant and more than one function at a time. They also tend to be more inward oriented, spending a higher fraction of time with insiders, especially with production. This does not necessarily imply micromanagement: Style 1 CEOs also tend to spend a much higher fraction of their time in meetings involving exclusively their direct reports. Among the seven dimensions, the ones that are more markedly different are the time spent in multi-function, multi-participant meetings (42% vs 17% and 48% vs. 27% respectively) and the time spent with firm employees (75% vs. 49%), especially direct reports (46% vs. 27%).

Similarly to labor supply, also style shows a high degree of autocorrelation within the survey week. One way to evaluate this is to compare whether the classification of the CEOs across the two clusters varies once we use the time use data aggregated at the daily level, rather than at the week level. In

¹¹ While we see the arbitrary restriction to two possible clusters as the simplest way to reduce the multidimensionality of the time use data, we also explored the sensitivity of the categorization to choices of a higher number of clusters. Interestingly, going from 2 to 3 clusters does not substantially change the fraction of CEOs classified as Style 1, but merely redistributes the number of CEOs classified as Style 2 in two subgroups. We focus on the Style 1 CEOs in the remainder of the analysis.

the majority of cases (1322 over 1837 CEO-day observations) the classification across the two clusters does not change with the frequency of the data. In the cases where we do observe a discrepancy between the two definitions (i.e. a CEO is classified as a Style 1 using weekly data, but behaves as a Style 2 CEO when we look at the daily data), this is mostly limited to one or two days out of the potential 7 that we survey.

Finally, we note that CEOs who work longer hours are more likely to adopt Style 1, but the two measures exhibit independent variation. The correlation between the log of weekly hours worked and the dummy denoting Style 1 CEOs is 0.12, and the p-value on the correlation is 0.03.

IV. TIME USE AND FIRM PERFORMANCE

Having established that CEOs differ both in terms of their labor supply and management style, the key question is whether either or both dimensions are correlated with external measures of firm performance from public account data. While in the absence of exogenous variation in time use we cannot identify its causal impact on performance, establishing whether the two are correlated is a powerful mean to validate whether our time use data capture meaningful differences (as opposed to noise) across CEOs, and to establish the practical relevance of CEOs time use for studies of organizations.

IV.A. Econometric model

We use panel data at the firm-year level to estimate a basic production function of the form:

$$(1) \quad y_{it} = \alpha^l l_{it} + \alpha^k k_{it} + \beta^h h_i + \beta^{Style1} D_i^{Style1} + \gamma' Z_{it} + u_{it}$$

Where Y = firm sales, L =labor, K =capital of firm i at time t and lower case letters denote natural logarithms. The accounting data are extracted from public accounts published on ORBIS. We restrict the analysis to the years in which the manager we interviewed actually had the role of CEO, and for

each firm we keep the three most recent years in the data to avoid selection on CEOs with longer tenure. In our basic specification we will control a full set of year and two digits industry dummies and cluster the standard errors at the firm level.¹²

We are interested in estimating the association between performance and the two main variables describing CEO labor supply (log of average daily hours worked, denoted by h) and management style (captured by the dummy D that equals 1 for Style 1 CEO). We assume that these are partly driven by CEO specific and time invariant traits, so that measures of CEOs labor supply and style from our random workweek can be used as proxy for CEOs time-invariant management style. To the extent that our measures also reflect time use shocks that hit in that particular week and are orthogonal to yearly firm outcomes, the estimated coefficients will be biased towards zero.

In what follows we report OLS estimates of equation (1) with standard errors clustered at the firm level to account for correlated shocks within the same firm through time.

IV.B Results

The results of the analysis are presented in Table 3. We start in column (1) with a basic specification where we regress firm level sales on our two measures of CEO time use – log of average daily hours worked in the week and the Style 1 dummy – including only labor and year dummies as additional controls. Both hours worked and style are significantly and positively associated with firm level productivity. A 1% increase in the number of average daily hours worked by the CEO is associated with a 1.78% increase in productivity, while Style 1 CEOs lead firms that are on average 72% more productive than those lead by Style 2 CEOs.¹³ In column (2) we augment the specification with capital. Not surprisingly, this has a large effect on the time use variables as these partly reflect differences in other inputs: the magnitude of the coefficients on the time use variables is reduced by approximately 50%, but they remain significant at the 5%. In column (3) we add a full set of two digit industry

¹² We face two main data constraints in the productivity analysis. First, employment data is not reported in the accounts for the vast majority of the firms included in our sample. We thus have to rely in our productivity and subsequent regressions on employment figures that we obtained during our end-of-week interview with the CEO. We also have a similar data availability problem for materials, which would typically be included as an additional factor of production in a TFP. We are currently extending the accounting data via manual searches to collect additional data and address this issue.

¹³ Results are very similar if we include the CEO time use variables one at the time rather than simultaneously.

dummies, and additional firm level variables (log of firm age and a consolidation code for the accounts). This has a much smaller effect on the time use variables, leaving the coefficient on hours worked practically unchanged, and reducing the Style 1 dummy by a further 20%. Finally, in column (4) we include a full battery of noise controls to address the possible heterogeneity in the data collected across interviewers.¹⁴ As expected, this marginally increases the coefficient on both labor supply and Style 1 by reducing sample variation due to noise.

The estimated coefficients of time use are of both statistical and economic significance. Using the estimates in Column 4, the elasticity of productivity with respect to the CEOs' labor supply is 29% larger than the capital elasticity (p-value .70) and 4.5 times larger than the labor elasticity (p-value .14). The estimates also imply that a standard deviation increase in CEO log average hours worked (0.22, or 1.24 hours per week) is associated with an increase in productivity of $0.89 * 0.22 = 20\%$ (taking the coefficient from column 4), which amounts to approximately 19% of a standard deviation in the distribution of firm level TFP observed in our data. The correlation between productivity and style is even stronger, as Style 1 CEOs lead firms that are on average 72% more productive than those lead by Style 2 CEOs.

To unpack the effect of the different components of style, Table A2 replicates column (4) using the each individual components separately. Not surprisingly all of these are generally positively correlated with productivity and the correlation is larger and precisely estimated for the components over which the difference between the two styles is starker: the share of time with insiders, with direct reports and in multi-function interactions.

To probe robustness to alternative measures of performance, columns (5) and (6) repeat the same specification using profits per employee, and returns on capital employed (ROCE), including the same set of controls as in column (4). The results confirm the presence of a positive and statistically significant association between profitability and CEO time use.

¹⁴ These are dummy to denote if the time use data was recorded through the PA or by the CEO himself, 15 interviewer dummies, a dummy to denote CEOs who formally report to an executive Chairman, and a control for the number of days recorded in the time use data.

IV.C Interpretation

The results above show a strong correlation between CEOs time use and firm performance. As the correlation is identified from the cross-sectional variation in CEOs style and labor supply, it does not measure the causal impact of CEOs time use on productivity.

Even if CEOs time use did not affect productivity, the observed correlation could emerge for two reasons. First, firm productivity could affect CEOs time use. However, we note that the sign of the reverse causality bias is a priori ambiguous. For example, a positive productivity shock might increase the returns to CEO labor supply, and reduce the need for the CEO to firefight emergencies, thus allowing him to engage in more planning and focus on his own employees. At the same time, the time use variables would suffer from a downward bias if a positive productivity shock generates free cash flow and allows managers to substitute work for leisure, and allows the CEO to spend more time in less structured activities with outsiders. In line with this, Malmendier and Tate (2009) show that CEOs who win a prestigious professional award (which is arguably related to managing a successful firm) tend to engage in more leisurely activities (as proxied by book writing and improvement in golf handicaps). Second, there might be time invariant firm characteristics that determine productivity and either (i) attract CEOs with individual traits that make them work longer hours or adopt a specific style (ii) make the environment more conducive for any given CEO to work longer hours or adopt a specific style.

While our data does not contain any exogenous source of variation that can be used to rule out reverse causality or the presence of correlated unobservables, we can provide some evidence that neither can these fully explain the observed correlation between productivity and time use by implementing a simple placebo test. The logic of the test is that if the correlation between productivity and CEO time use is driven by time-invariant firm specific traits, firm productivity *before* the CEO was appointed should also be correlated with these traits and this in turn would determine CEO time use while in office. To implement this test we match the data on time use with measures of firm performance that pre-date the appointment of the current CEO. Due to the to the long tenure of the CEOs in our sample and the short length of the panel of the accounting panel (2001-2010), the placebo test can be implemented for a subset of the firms only. As a measure of performance we use

ROCE, which does not require employment data that do not exist for past years. Overall, these constraints limit the sample to 40 firms. We find that CEO labor supply and style are strongly and significantly correlated to firm ROCE during their tenure even in this smaller subset of firms. The coefficient (standard error) on log hours worked is 7.246 (4.134) and the coefficient on the Style 1 dummy is 5.477 (2.698), compared respectively to 5.065 (2.435) and 1.845 (1.059) in the larger sample of Table 3, column (6). However, we find no evidence of an association with the firm performance *prior* to the tenure of the CEO, and the labor supply and the style of the CEO measured *during* his tenure: in this case the coefficient (standard error) on log hours worked is 2.198 (3.021) and on the Style 1 dummy is 1.718 (4.890).¹⁵ Bearing the data limitations discussed above in mind, this result does not lend support to the idea that CEO time use is a mere reflection of long-term productivity differences across firms, rather that they are correlated to events which are contemporaneous to the CEO tenure.

V. WHY DOES TIME USE DIFFER ACROSS CEOS?

The final step of our analysis aims to identify the correlates of time use. Part of the observed variation is bound to be due to differences in the external environment that shapes the objectives and constraints of the CEOs. As Indian states exhibit considerable variation in infrastructure and policies that might affect time use, we collect information on a rich set of state characteristics ranging from road coverage to industrial policy. The external environment is also determined by industry characteristics that we control for using 2-digit dummies.

The other leading candidate to explain differences in time use is differences in the objective function of the CEO. For instance, stronger accountability and incentives should lead to use time more productively. One key distinction in this respect is that between CEOs that are affiliated to the family owning the firm (“Family CEOs”) and other managers (“professional managers”). A priori incentive differences are ambiguous. On the one hand, family CEOs can appropriate a larger share of the surplus they generate, as they co-own the firm, hence should have a stronger interest in profit

¹⁵ The firm*year number of observations used for this exercise are 99 for the period while the CEO is in office and 104 for the placebo.

maximization. On the other, family CEOs are likely to have more job security and more wealth (as they co-own the firm), both factors leading to flatter incentives. The existing evidence indicates that family CEOs have generally been found to underperform compared to professional managers, both in terms of financial performance (Perez-Gonzalez 2006) and managerial capabilities (Bloom and Van Reenen, 2007). We contribute to this debate by showing whether they choose a pattern of time use that is associated with lower productivity.

To this end, we estimate a simple regression model of the form:

$$(2) \quad x_i = \eta^{FCEO} D_i^{FCEO} + \eta^F F_i + \eta^M M_i + \eta^S S_i + \eta^I I_i + \varepsilon_i$$

Where $x(i)$ represents CEO labor supply (log of daily average hours worked) or the Style 1 dummy, and $D(FCEO)$, F , M , S and I stand respectively for a dummy denoting Family CEOs, and firm, manager, state and industry characteristics. As a first step, we focus on the distinction among ownership types to the simple categorization between Family CEOs and professional managers, as measured by the values and significance of the coefficient $\eta(FCEO)$.¹⁶

V.A Family CEOs and Labor supply

Table 4a looks at the factors correlated with the CEO labor supply (log of total average daily hours worked). The data reveals a very sharp contrast between Family CEOs, i.e. CEOs running family firms (2nd generation onward) and who are also affiliated to the founding family. In the simplest specification reported in column (1), where we regress the log of average hours worked on a dummy denoting Family CEOs, we find that the difference with other managers is of about 10% fewer hours worked. One possibility is that the fewer hours worked by Family CEOs would reflect differences in firm characteristics, i.e. since family firms are on average smaller and less complex organizations, this might imply a lower workload for the CEO. To look at this directly, in column (2) we introduce two firm level characteristics: size (log of employees) and firm age (since older firms in general tend to be larger). Interestingly, although we find that CEO labor supply is strongly correlated with firm size and

¹⁶ While ideally we would want to also look separately at family firms ran by professional managers, in practice we are limited by the fact that we have only 22 of them in our sample.

negatively correlated with firm age, this hardly changes the significance and the strength of the difference between Family CEOs and others.

In column (3) we move on to examine whether Family CEOs work fewer hours because they have different demographic characteristics. We focus in particular on variables related to the age and tenure of the CEO, since these might be correlated with the cost of providing effort. We also consider variables related to the professional engagement of the CEO outside the firm (having a managerial position elsewhere or sitting on the board of another company) as these have a direct effect on the time budget available to the CEO. We find that older and established (as measured by their tenure) CEOs tend to work significantly fewer hours on average (coefficient $-.157$, standard error 0.060), while CEOs who also sit on other boards work marginally more than other CEOs. However, we find that this also has a very small effect on the significance of the Family CEO dummy, which remains large and statistically significant at the 1% level.

Another possibility that we explored is whether the choice of CEO labor supply – and in particular the difference between Family CEOs and others - was related to differences in the external environment in which the firm operates. We first analyzed a set of key variables measuring generic level of development (log population, log GDP per capita, log average wages, log length of surfaced roads measured in Km), and variables related to the rigidity of labor market regulation (as measured by OECD, 2011) and the level of financial development (measured by the log of the number of offices of commercial banks in the state), but found them to be all individually and jointly uncorrelated with the number of hours worked by the CEO. To test the relevance of state level characteristics on CEO labor supply more generally, in column (4) we include state level fixed effects, which turn out to be jointly significant at the 1% level. It is worth noting, however, that the vast majority (80%) of the heterogeneity in CEO labor supply is *within* states, rather than *between* them. Therefore, although the data seems to suggest that labor supply is to some extent related to external conditions as proxied by the state dummies, it is far from being entirely determined by them. In line with this result, in column (5) we also find that industry dummies – though jointly significant - play a marginal role in explaining the overall variance in labor supply as measured by the adjusted R squared. More

importantly, the inclusion of state and industry dummies cannot account for the difference between Family CEOs and other, which remains similar in magnitude and significance.

Finally, we considered whether the difference between Family CEOs and others could be accounted for by measurement error: since the family affiliation might increase the level of informality in the organization, this could reduce the possibility to track with precision the CEO activities in our preset time diary. To investigate this hypothesis directly, in column (7) we included in the regressions a vector of noise control variables. This reduces the coefficient of the Family CEO dummy by one percentage point to 6.6%, but does not account fully for the difference with other managers.

In summary, we find that Family CEOs tend to have a lower labor supply than professional managers, even controlling for a host of firm, manager, industry, state and measurement variables. This difference is statistically significant and large in magnitude: the difference is -6.6% in the most conservative estimate of column (6), which amounts to about 1.13 fewer average daily hours worked compared to professional managers.

V.B Family CEOs and Style

We follow the same structure of Table 4a and continue by looking at the correlates of the Style 1 dummy. The results of this analysis are reported in Table 4b, and we use throughout a linear probability model. Family CEOs are also much less likely to fall in the category Style 1 (-.178, standard error 0.057). In line with the findings of Table 4a, the differences between Family CEOs and other managers are not accounted for by differences in firm size and age (column 2). Although we do find that CEOs of larger firms are more likely to be categorized in the Style 1 cluster, and this reduces the coefficient on the Family CEO dummy to some extent, the differences remains significant at the 1% level and similar in magnitude (-.165).

Differently from labor supply, CEO characteristics (column 3) and state dummies (column 4) do not appear to be systematically correlated with the choice of managerial style. Furthermore, their inclusion actually increases the coefficient of the Family CEO dummy, similarly to the inclusion of a full set of two digits industry controls (column 5). In column (7) we evaluate the effect of including a

full set of noise controls, as we are concerned that even the allocation of time across activities might be noisier in firms ran by Family CEOs, due to the possibility that the managerial activity might be more informal and difficult to measure with our time diary approach. While we find that the inclusion of the noise variables almost halves the magnitude of the Family CEO dummy, this remains large (-.129) and statistically significant at the 10% level.

To summarize, we find evidence of stark differences between Family CEOs and professional managers in terms of managerial style, even controlling for a wide range of firm, manager, and state and industry characteristics. Interestingly, unlike labor supply, we also find little correlation between CEO style and other firm and CEO characteristics beyond firm size

VI. WHY ARE FAMILY CEOS DIFFERENT?

VI.A Alternative interpretations

The analysis reveals that family CEOs work fewer hours and have a different style relative to professional managers. In particular, they plan less, they do fewer meetings, they are more likely to interact with outsiders, and to engage in one-to-one meetings. A possible explanation is that these differences are optimal responses to differences in organization between firms ran by family CEOs and others that arise naturally because of family ownership. Most notably, if all the top managers are members of the same family, meetings need not be planned and many meetings with firm employees (brothers and other relatives of the CEO) will not be recorded if they happen serendipitously within the household. These differences would result in the observed differences in style and hours worked. An alternative hypothesis for the lower labor supply and the choice of the “less productive” managerial style is that the difference between Family CEOs and professional managers reflects different degrees of CEO accountability (which could be linked to suboptimal CEO selection criteria, such as in Bloom and Van Reenen, 2007) or, more generally, the lower weight attributed to firm performance relative to other objectives in the utility function of the CEO (Bandiera et al, 2012).

To shed light on the practical relevance of these hypotheses, we use a two-pronged strategy. In the next section we investigate whether the difference between family and professional CEOs is sensitive

to the level of competitive pressure the firm is exposed to. In section VI.C we study whether family and professional CEOs respond differently to shocks that should affect their cost of effort in the same way.

VI.B A model of CEO labor supply

We now introduce a simple model where the labor supply of the CEO is endogenously determined. The goal of the model is not to do justice to the literature on managerial incentives in corporate governance (e.g., Tirole 2006), but to supply a parsimonious set-up to discuss some of the identification strategies we face when we try to understand why labor supply differs in family vs. non-family firms.

The model contains two main elements: a production function that depends on CEO labor supply in ways that depend on the characteristics of the CEO and the firm and a specification of the CEO preferences, which may depend on a number of other factors.

Starting with technology, the productivity of a CEO of a firm with governance $g \in \{F, N\}$ is

$$y = \bar{y}_g - \frac{1}{2} a_g (\bar{h}_g - h)^2,$$

meaning that – not considering the cost of work – there exists an optimal number of hours that a CEO should work: $h = \bar{h}_g$ (possibly dependent on governance), after which he is too tired and his marginal product is negative. Also the CEO of a family firm may have an intrinsically higher or lower marginal time productivity than the CEO of a non-family firm ($a_g > 0$). In the extreme, a CEO with $a_g = 0$ is useless to the firm, while one with $a_g \rightarrow \infty$ is irreplaceable.¹⁷

The CEO preferences comprise firm performance and disutility of labor. The cost of going to work is $c_w h$, where w captures mutable environmental characteristics. For concreteness, let c_s be the

¹⁷ The parameter a_g captures the marginal effect of an extra hour of work. In this specification, the total effect of a_g on y is negative, but note that \bar{y}_g could depend on in a positive way (the only restriction is that it does not depend on the number of hours worked)

parameter value when it is sunny and $c_R > c_S$ is the value when it rains. The CEO puts relative weight b_g on firm performance as opposed to labor cost. His utility is therefore

$$u = b_g y - c_w h,$$

The parameter b_g captures a number of possible differences between family and non-family CEOs. The former may be more performance-driven because they own a large share of the company or they feel a non-monetary stake in the firm. However, it could also be the case that non-family CEOs have a greater b_g because of wealth effects as they are not independently wealthy and leisure time may be a superior good. Or it might be simply be that non-family CEOs are selected from a population of types who have a stronger work ethics.

The solution to the CEO's problem is:

$$h = \bar{h}_g - \frac{c_w}{b_g a_g}$$

Hence, for given weather, the difference between a family CEO and a non-family CEO is

$$h_{Fw} - h_{Nw} = \bar{h}_F - \frac{c_w}{b_F a_F} - \bar{h}_N + \frac{c_w}{b_N a_N}$$

This is a formal re-statement of a point made in the beginning of this section. An observed difference in labor supply between family and non-family CEOs may be due to the characteristics of the CEOs or the characteristics of the firms. In particular, we cannot exclude that CEOs have similar abilities/preferences ($b_N a_N = b_F a_F$) and that the difference is due exclusively to technology. For instance, it may be that family firms require less CEO labor because other family members occupy C-suite positions and they require less monitoring. In summary:

Proposition 1 *A simple difference in hours worked between family and non-family CEOs does not identify $b_g a_g$ because of a potential difference in \bar{h}_g .*

However, we can try to identify $b_g a_g$ through a difference-in-difference approach. To see this, note that the difference-in-difference coefficient for governance and weather is

$$\begin{aligned}
(h_{FS} - h_{FR}) - (h_{NS} - h_{NR}) &= -\frac{c_S}{b_F a_F} + \frac{c_R}{b_F a_F} + \frac{c_S}{b_N a_N} - \frac{c_R}{b_N a_N} \\
&= (c_R - c_S) \left(\frac{1}{b_F a_F} - \frac{1}{b_N a_N} \right)
\end{aligned}$$

Given that $c_R - c_S$ is positive by assumption,

$$(h_{FS} - h_{FR}) - (h_{NS} - h_{NR}) > 0 \text{ if and only if } b_N a_N > b_F a_F$$

Hence,

Proposition 2 *When it rains, if family CEOs reduce hours worked more than non-family CEOs, then it must be that the product of motivation and productivity is greater for non-family CEOs, namely:*

$$b_N a_N > b_F a_F.$$

Finally, let us examine the effect of competition. Suppose that moving from low competition to high competition has a Darwinian effect on CEOs. The ones with an insufficiently low motivation-ability product $b_g a_g$ are wiped, or they shape up and manage to increase it. Only firms whose CEOs are sufficiently good survive: $b_g a_g \geq B$. Assume that one type of governance (say g_1) was further away on average from the new threshold, while the other type (g_2) was closer: $b_{g_1} a_{g_1} < b_{g_2} a_{g_2} < B$.

Let h_g and \tilde{h}_g denote, respectively, the number of hours worked in low-competition and high-competition industries in a firm with governance g . The value of the difference in difference is then:

$$(\tilde{h}_{g_1} - h_{g_1}) - (\tilde{h}_{g_2} - h_{g_2}) = -\frac{c}{B} + \frac{c}{b_{g_1} a_{g_1}} + \frac{c}{B} - \frac{c}{b_{g_2} a_{g_2}} = \frac{c}{b_{g_1} a_{g_1}} - \frac{c}{b_{g_2} a_{g_2}} > 0,$$

which implies that the sign of the difference-in-difference in hours identifies the sign of the difference $b_{g_1} a_{g_1} - b_{g_2} a_{g_2}$. We have that

$$(\tilde{h}_F - h_F) - (\tilde{h}_G - h_G) > 0 \text{ if and only if } b_N a_N > b_F a_F.$$

To summarize:

Proposition 3 *The relative effect on CEO labor supply of an increase in competition is greater in family firms than in non-family firms if and only if $b_N a_N > b_F a_F$.*

It is possible that all CEOs work longer hours in high-competition industries than in low-competition industries. However, if the relative increase is larger for family CEOs, this is an indication that there was more ‘slack’ before, which in turn indicates that the motivation and productivity factors, captured here by $b_g a_g$, is smaller for family CEOs.

What cannot be identified with this data is the separate effect of ability a_g and motivation b_g . We can ascribe the sign of the difference-in-difference coefficient to intrinsic differences between CEOs rather than optimal responses to the business environment, but we cannot say whether such differences have to do with family CEOs being less productive or less motivated.

VI.C Exposure to competition

The rationale behind this test is that if the observed differences are due to measurement error correlated with ownership (e.g. family CEOs meet their brother CFO at home and this is not recorded in our data), they should be independent of competitive pressure. If, on the other hand, finding that exposure to competition reduces the difference would lend support to the idea that this depends at least in part on the different set of incentives faced by the CEO. For example, competition can induce more managerial effort by the heightened threat of bankruptcy (Schmidt 1997). Furthermore, competition might increase the returns to managerial effort by increasing the sensitivity of market share to marginal cost differences (Bloom and Van Reenen, 2007). To this end, we estimate a regression of the form:

(3)

$$x_i = \eta^{FCEO,HC} D_i^{FCEO,HC} + \eta^{FCEO,LC} D_i^{FCEO,LC} + \eta^{PCEO,LC} D_i^{PCEO,LC} + \eta^F F_i + \eta^M M_i + \eta^S S_i + \eta^I I_i + \varepsilon_i$$

Where $x(i)$ represents CEO labor supply (log of daily average hours worked) or the Style 1 dummy, and the variables $D(FCEO,HC)$, $D(FCEO,LC)$, $D(PCEO,LC)$ denote, respectively, Family CEOs exposed to a

high degree of competition, Family CEOs exposed to a low degree of competition and Professional CEOs exposed to a low degree of competition, with the omitted category being the group of firms ran by professional managers and exposed to high degree of competition. We are interested in evaluating the difference between the two types of Family CEOs with professional managers, as measured by the significance of the coefficients $\eta(FCEO, HC)$ and $\eta(FCEO, LC)$, respectively. We will also evaluate the difference among different types of Family CEOs, i.e. the sign and significance of $\eta(FCEO, HC) - \eta(FCEO, LC)$.

We operationalize this idea by looking at two empirical proxies for competitive pressure. First, we distinguish between firms that are exposed to foreign competition via exporting activities and/or by being part of a multinational. Second, following Aghion et al (2005), we use the Lerner index of competition, which is $1 - (\text{profits}/\text{sales})$, calculated as the average across the entire population of manufacturing firms published in ORBIS. This is aggregated up to the three digit SIC industry level, and averaged across the 2005-2010 period.

We report the result of this analysis in Tables 5a and 5b. Column (1) reports the baseline specification of Table 4a, column (7). Column (2) includes in the regression a dummy denoting firms that report not to be part of a multinational corporation and not to export (66 in total, of which 51 classified as Family CEO firms). We find that a higher exposure to competition via foreign markets is associated to higher CEO labor supply, but it does not alter much the magnitude and the coefficient on the Family CEO dummy. In column (3) we look more closely at whether competition can account for differences within Family CEOs, with the specification presented in equation (3). This shows that the difference between Family CEOs and professional managers is much smaller if the firm is exposed to foreign competition (-6.5% compared to 12.5% for Family CEOs not exposed to competition, difference significant at the 10% level).

We follow a similar structure in columns 4-6, this time using as a indicator for exposure to competition a dummy denoting firms whose industry is in the bottom two terciles of the distribution

of the Lerner index (109 firms in total, of which 79 are Family CEOs).¹⁸ Since the matching with industry level data reduces the sample to 331 firms, in column (4) we simply repeat the baseline specification and find a coefficient of similar magnitude on the Family CEO dummy. In line with the earlier results, in column (5) we show that low competition is associated with fewer CEO hours, while column (6) shows that, once more, the difference between Family CEOs exposed to competition and professional managers is almost half of that of Family CEOs that are less exposed to competition, with the difference between the two significant at the 13% level.

We find similar results for the CEO Style dummy (Table 5a). The difference between Family CEOs and others is entirely driven by Family CEOs who are not exposed to competition as measured by export of MNE affiliation (column 3) but, in contrast with differences in labor supply, the interaction of family CEO and the Lerner index is not significant.

Taken together the evidence in this section suggests that time use differences between family CEOs and professional managers are driven by family CEOs who are exposed to less competitive pressure. This casts doubt on the interpretation that the observed differences are due to optimal responses to organizational differences related to the informality (or blurred firm boundaries) of running a family business, unless these organizational differences are themselves a function of the competitiveness of the environment. To address this issue, the next section exploits a natural experiment that affects the CEOs' cost of effort only during part of the week and compares the *change* in time use of family CEOs to that of professional CEOs.

VI.D Shocks to Effort Costs: Monsoons

We now use day-CEO level data to exploit exogenous daily shocks that affect the disutility of work *during* our sample week. Under the assumption that we can find shocks that affect the marginal disutility of work (or the marginal product of CEOs' efforts) to the same extent regardless of ownership, differences in the responses to these shocks identify differences in the utility weight given to firm performance vs. leisure.

¹⁸ In the specifications using the Lerner index we cluster the standard errors by firm and three digit SIC industry

To implement this strategy we collect information on extreme rain. Intuitively, going to work with extreme rain is more costly because of time-consuming traffic jams. The test can only be implemented to study labor supply responses, as hours worked vary daily whereas, by definition, “style” is a long-term choice that does not vary much within CEO across days.

The arrival of the monsoons is one of the most important weather phenomena of the Indian subcontinent. The expected arrival of the monsoon is around June 1st, starting from the southwestern coast of Kerala, and gradually covering the entirety of India by July 15th, although the precise date of arrival varies somewhat across years. The intense rainfall associated with the monsoon is notoriously unpredictable, and has very heterogeneous effect across different sectors of the economy and the country. While it is widely recognized to be an important determinant of the economic performance of the agricultural sector in India, the intense rainfall is also associated with significant problems for communities (especially in urban areas), such as travel delays, floods and electric shortages.

Approximately 70% of the time use data was collected during the monsoon season, measured as the official date in which the monsoon rainfall started in the state where the headquarters of the firm are located. This allows us to exploit the arrival of the monsoon as an exogenous shock to test how CEOs reacted to the intense rainfall in terms of their labor supply. Extreme monsoon rainfall typically disrupts local transportation in urban areas (where most of the CEOs in our sample are located), adding delays to local transportation. Assuming that all CEOs would commute from home to the office on a normal working day, we see rainfall as a factor that exogenously affects their cost of providing effort by increasing the probability of time-consuming traffic jams.

To operationalize this idea, we proceeded in four steps. First, we obtained rainfall data for all the major weather stations in India starting in May through the end of July 2011. Second, we used this data to compute the average station level rainfall in the pre-monsoon period in May, and for each station level observation in June and July we computed the percentage difference in rainfall with respect to the pre-monsoon period. Third, we defined to be of extreme rain if its deviation from the May benchmark falls in the upper tercile of the station level distribution of the same variable. Fourth, we matched the CEO time use information with the rainfall data of the closest weather station by

using the modal (manually collected) zip code of the activities undertaken by the CEO during the week.

As expected, the stations included in our dataset experienced a significant increase in rainfall in the weeks following the onset of the monsoon in their respective state. Average weekly rainfall increased on average by 15% in the two weeks following the onset of the monsoon, and that this trend tapered down in subsequent weeks. We also observe variation in extreme rainfall within the week of observation. Although weeks closer to the onset of the monsoon experienced a higher fraction of extreme rainfall days during the week, this fraction is only close to 40% when at peak levels.

Table 6 shows how CEOs react to the monsoons using the activity data aggregated at the day-CEO level to exploit the variation of extreme rainfall within the observation week, and clustering the standard errors at the CEO level. All the regressions include the same set of firm, industry, state, CEO and noise controls used in earlier specifications. We start in column (1) by investigating whether CEO labor supply is affected by the rain shock. Interestingly, the average effect of extreme rainfall on daily hours worked is very small and statistically insignificant (coefficient -0.015, standard error 0.020). In column (2) we test whether the effect of rainfall is heterogeneous across managers by interacting the rain dummy with the family CEO dummy. This reveals that family CEOs tend to reduce their labor supply by approximately 5% (0.044-0.094) as a consequence of extreme rainfall,¹⁹ while professional managers show a positive and marginally significant *increase* in labor supply. Overall, the difference in the reaction to the rain shock between Family CEOs and professional CEOs is 10% and is significant at the 1% level.

The identifying assumptions discussed above fail if other factors correlated with family ownership affect the effect of rain shocks on the marginal disutility of work or the marginal product of CEO time. For example, firms ran by Family CEOs might be more prevalent in industries or states that are more susceptible to the disruption caused by the arrival of the Monsoons. To look directly at this, in columns 3-6 we augment the specification with other rain interactions. In column (3) we examine whether the rain shock has differential effects according to observable CEO characteristics (age,

¹⁹ The overall reduction in the labour supply of Family CEOs associated with extreme rainfall is significant at the 5% level.

tenure and outside activities in firms or boards) since this might increase the sensitivity to bad weather conditions. However, we do not find any evidence for this hypothesis, and the family CEO*rain interaction actually increases to 0.107 (from 0.100 in the baseline specification) and is significant at the 1% level once these differences are taken into account.

Another possible explanation for the fact that family CEOs seem to be much more reactive to bad weather shocks is that the firms they run might simply be more prone to be disrupted by rain (for example, due to the presence of old machinery or bad maintenance processes). In extreme cases, this would again inhibit the ability of the CEO to work from his office. To investigate this idea, in column (4) we augment the specification with the interaction of the rain dummy with a measure of firm age and firm size (log employment), but their inclusion hardly affects the family CEO*rain interaction.

Finally, the monsoon might have heterogeneous effects depending on the specific context in which the firm operates. For example, family CEOs might be more prevalent in industries where the effect of intense rainfall is so intense to induce plant closures, which would force the CEO to reduce the number of hours worked. To test the relevance of this hypothesis, in column (5) we add a full set of two digits SIC industry dummies interacted with the rain shock. Reassuringly, although we find evidence that rain does indeed have a differential impact across sectors (the interactions are jointly significant, p-value 0.00), this hardly changes the magnitude and the significance of the family CEO*rain interaction. In a similar spirit we tested the robustness of our result to the inclusion of adding a full set of state*rain interactions in the baseline specification (column 6). The state*rain interactions are jointly insignificant (p-value 0.1282), and their inclusion does not affect the magnitude and the significance of the family CEO*rain interaction.

Overall, we find that the differential reduction in hours worked associated to rain shocks between family CEOs and other managers cannot be attributed to differences in industry, state of location, CEO or firm characteristics. However, there might still be unobserved heterogeneity that cannot be proxied by the variables we consider above. For instance, if family firms are located closer to the family home, the effect of the rain shock on travel time would be lower for family CEOs. Likewise, if

all of the top managers live in the same household, the effect of rain on the marginal product of the CEO's time would be lower for family CEOs who can meet with their CFO at home.

To account for unobservables correlated with ownership we once more exploit the heterogeneity observed within Family CEOs according to their exposure to foreign or domestic competition, as measured by their activity in foreign markets via exporting or affiliation with a multinational subsidiary, or the intensity of competition in their industry. The result of this analysis is shown in Table 7. Column (1) simply replicates the finding that the difference between Family CEOs and professional managers is largely driven by Family CEOs that are not exposed to foreign competitive pressures. Column (2) introduces the interactions between the different types of Family CEOs and the dummy denoting extreme rain. This shows that also the *reaction* to the rain shock is much larger and almost double for Family CEOs classified as "non MNE/Exporting", relative to the other types of Family CEOs, although this difference is not significant at conventional levels (p -value=0.16). Columns 3 and 4 follow the same structure, this time using the dummy derived from the industry level Lerner index to distinguish between High and Low competitive industries. Column (4) shows that the Family CEOs active in less competitive industries are much more elastic to rain shocks, while the reaction of Family CEOs active in more competitive industries is not statistically different from that of professional managers. Overall, the difference in difference between the two types of Family CEOs (low and high competition) is significant at the 5% level.

VII. CONCLUSION

Using a novel survey instrument, we provide the first measure of CEOs' attention allocation based on time use data. We find that CEOs of Indian manufacturing firms differ in how much they work (labor supply) and how they allocate their time (style). Both labor supply and style are strongly correlated with firm performance, but neither is correlated with the external environment the firm faces, as measured by industry, infrastructure and state policies. CEOs who belong to the owning family work fewer hours and adopt a less productive style. Using differences in exposure to competition and shocks to the cost of effort we argue that differences between family and professional CEOs are due

to differences in preferences or incentives rather than optimal responses to different organizational structures.

One important question is to what extent our findings about India are relevant to other countries. In a previous study (Bandiera et al 2011), we collected time use information from 94 CEOs of top-600 Italian non-banking firms. Like in India, we found that CEOs of family firms spent systematically less time at work. The only management style dimension analyzed with Italian data was the share of time spent with insiders as opposed to outsiders, and – like in India – it was lower in family firms. So, while the Italian dataset is not as rich and large as the Indian one, the patterns that emerge are consistent.

References (incomplete list)

- Bennedsen, Morten, Kasper Meisner Nielsen, Francisco Perez-Gonzalez and Daniel Wolfenzon, "Inside the Family Firm: The Role of Families in Succession Decisions and Performance," *Quarterly Journal of Economics*, 122 (2007), 647-691.
- Bandiera, Oriana, Luigi Guiso, Andrea Prat, and Raffaella Sadun. What Do CEOs Do? CEPR Discussion Paper 8235, 2011.
- Bandiera, Oriana, Andrea Prat, Raffaella Sadun, and Julie Wulf. Span of Control and Span of Activity. Harvard Business School, Working Paper 12-053, February 2012.
- Marianne Bertrand. "CEOs." *Annual Review of Economics*, 2009, 1(1), pp. 121-50.
- Bertrand, Marianne and Antoinette Schoar, "Managing with Style: The Effect of Managers on Firm Policies," *Quarterly Journal of Economics*, 118 (2003), 1169-1208.
- Nicholas Bloom & John Van Reenen, 2007. "Measuring and Explaining Management Practices across Firms and Countries", *Quarterly Journal of Economics*.
- Nicholas Bloom & John Van Reenen, 2010. "Why Do Management Practices Differ across Firms and Countries?," *Journal of Economic Perspectives*, American Economic Association, vol. 24(1), pages 203-24, Winter.
- Bloom, Nicholas, Benn Eifert, Aprajit Mahajan, David McKenzie and John Roberts, 2011. "Does Management Matter? Evidence from India," NBER Working Papers 16658, National Bureau of Economic Research, Inc.
- Bloom, Nicholas, Christos Genakos, Raffaella Sadun, John Van Reenen, 2012. "Management Practices Across Firms and Countries," NBER Working Papers 17850, National Bureau of Economic Research, Inc.
- Bolton, Patrick and Dewatripont, Mathias. 1994. "The Firm as a Communication Network." *The Quarterly Journal of Economics*, 109 (4):809-39.
- Drucker, Peter F. 1966. *The Effective Executive*. New York,: Harper & Row.
- Garicano, Luis. 2000. "Hierarchies and the Organization of Knowledge in Production." *Journal of Political Economy*, 108 (5):874-904.
- Garicano, Luis and Andrea Prat. "Organizational Economics with Cognitive Costs," *Advances in Economics and Econometrics: Theory and Applications*, Proceedings of the Tenth World Congress of the Econometric Society, forthcoming.

Geanakoplos, John & Milgrom, Paul, 1991. "A theory of hierarchies based on limited managerial attention," *Journal of the Japanese and International Economies*, Elsevier, vol. 5(3), pages 205-225, September.

Hall, Robert E. and Charles I. Jones, 1999. "Why Do Some Countries Produce So Much More Output Per Worker Than Others?," *The Quarterly Journal of Economics*, MIT Press, vol. 114(1), pages 83-116, February.

Kaplan, Steven N., Mark M. Klebanov and Morten Sorensen, "Which CEO Characteristics and Abilities Matter?" *Journal of Finance*, forthcoming.

Kotter, John P. "What Effective General Managers Really Do." *Harvard Business Review*, March-April 1999, p. 145-159.

Malmendier, Ulrike and Geoffrey Tate, "CEO Overconfidence and Corporate Investment," *Journal of Finance*, 60 (2005), 2660-2700.

"Who Makes Acquisitions? CEO Overconfidence and the Market's Reaction," *Journal of Financial Economics*, 89 (2008), 20-43.

Malmendier, Ulrike and Geoffrey Tate. Superstar CEOs. *Quarterly Journal of Economics*, November 2009, vol. 124(4), pp. 1593-1638.

Mintzberg, Henry. 1973. *The nature of managerial work*. New York,: Harper & Row.

Mintzberg, H., The fall and rise of strategic planning. *Harvard Business Review*, (1994, January-February), 107-114.

Mullins, William and Antoinette Schoar. A Continuum of Leadership Structures: How do CEOs see their role?. MIT mimeo.

Perez-Gonzalez, Francisco, "Inherited Control and Firm Performance," *American Economic Review*, 96 (2006), 1559-1588.

Radner, Roy and Timothy Van Zandt. "Information Processing in Firms and Returns to Scale." *Annales d'Economie et Statistique*. No. 25/26:265-298. 1992.

Schoar, Antoinette and Luo Zuo. Shaped by Boom and Busts: How the Economy Impacts CEO Careers and Management Style. NBER Working Paper, 2012

Figure 1: Geographical Coverage

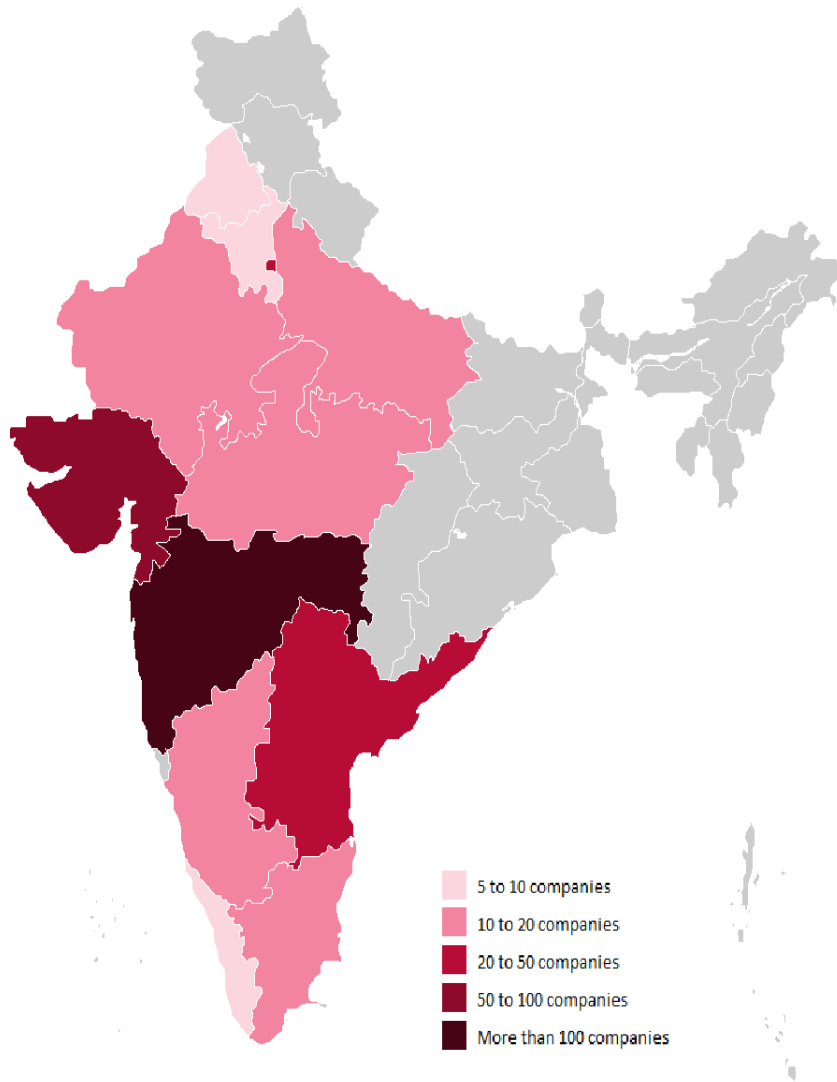


Figure 2 - Average Weekly Hours Worked

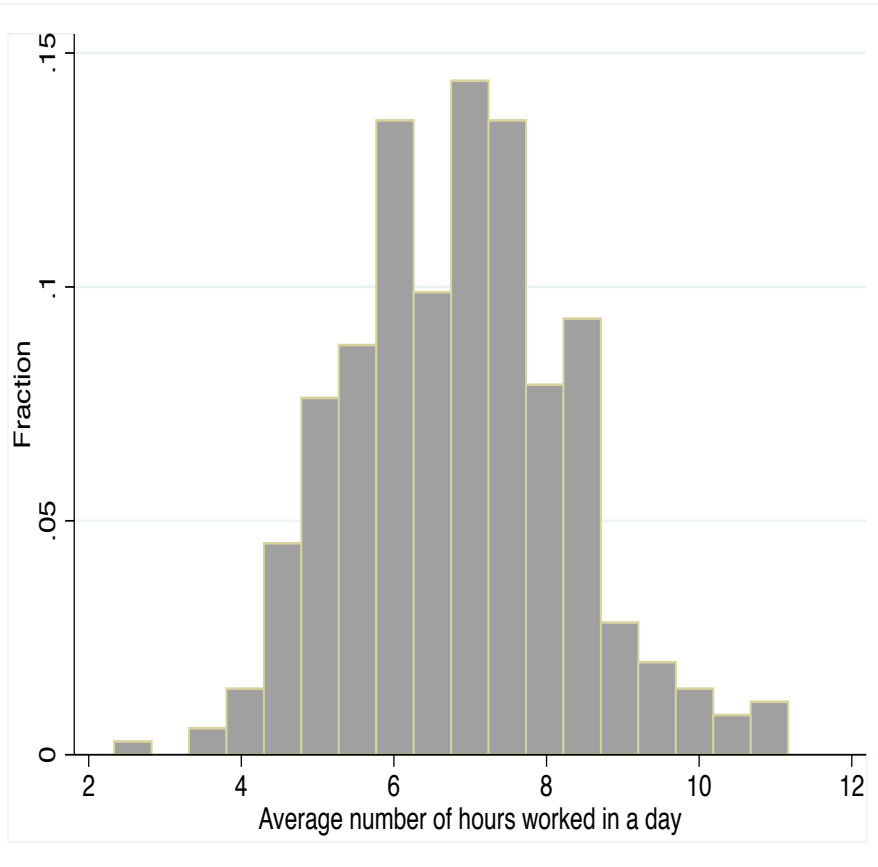


Figure 3 : Share of time by type of activity

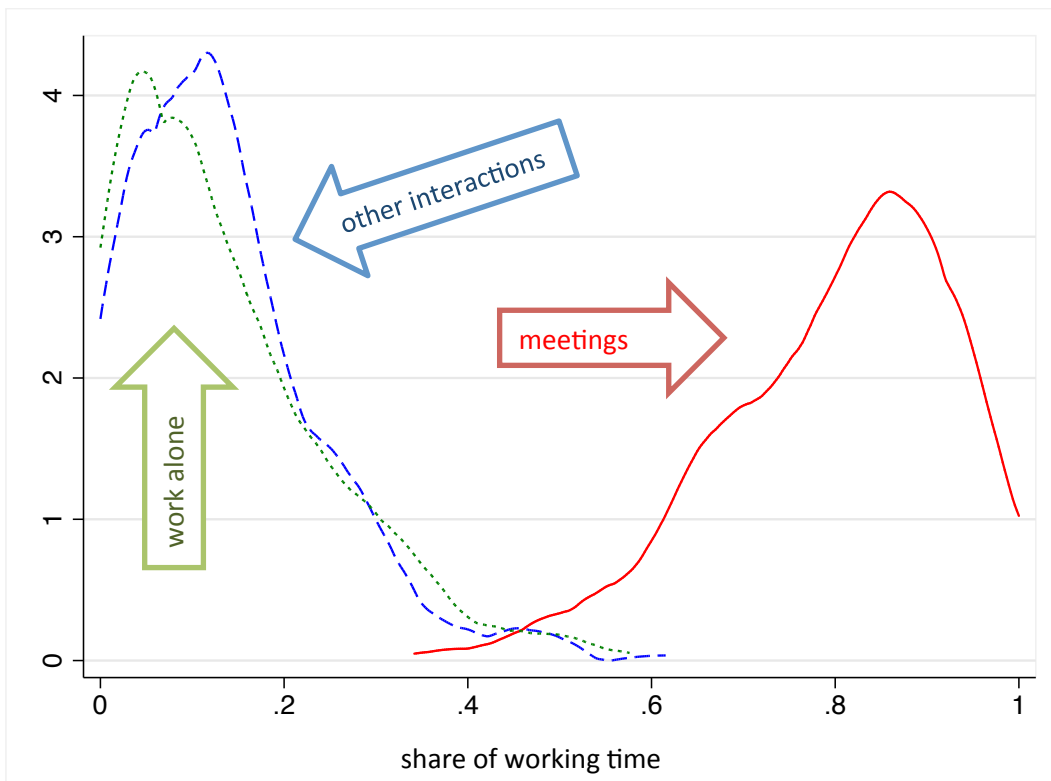


Figure 4: Share of time by type of activity

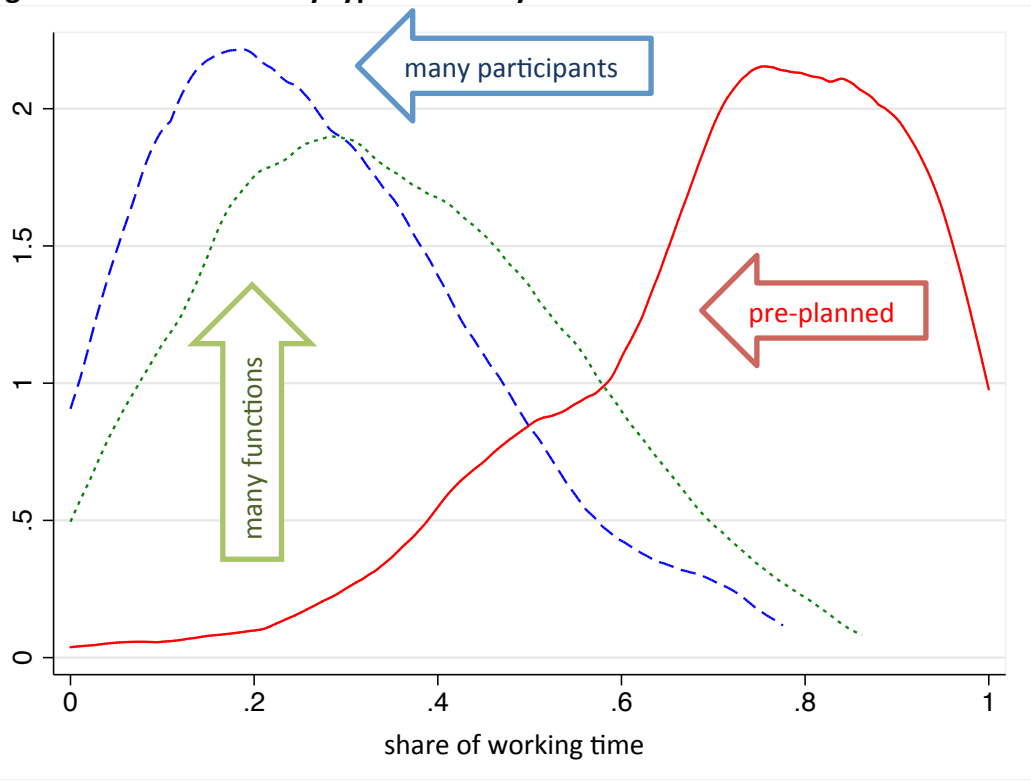


Figure 5: Share of time across insiders and direct reports

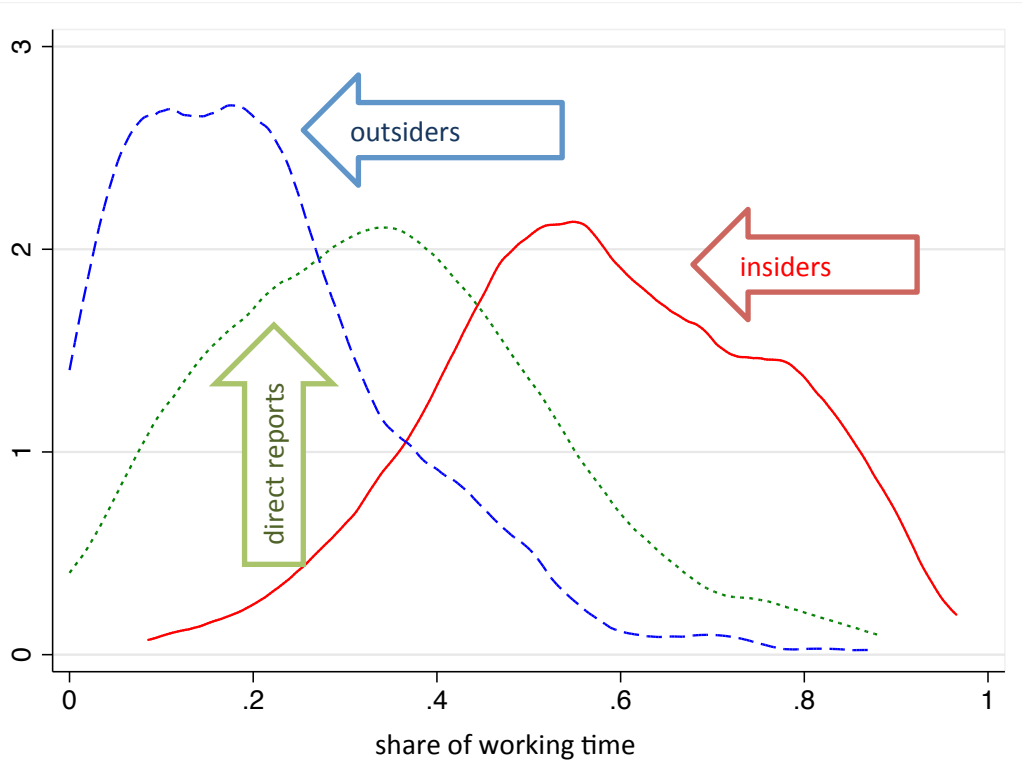


Figure 6: Share of time across functions

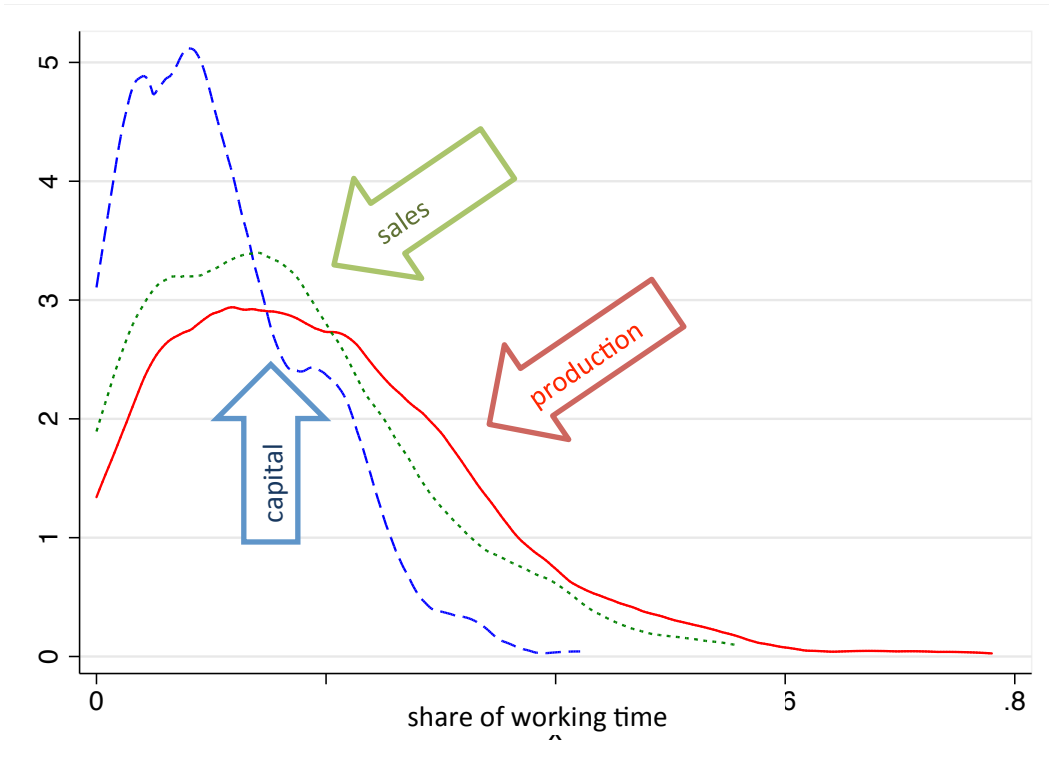


Figure 7: Share of time in activities

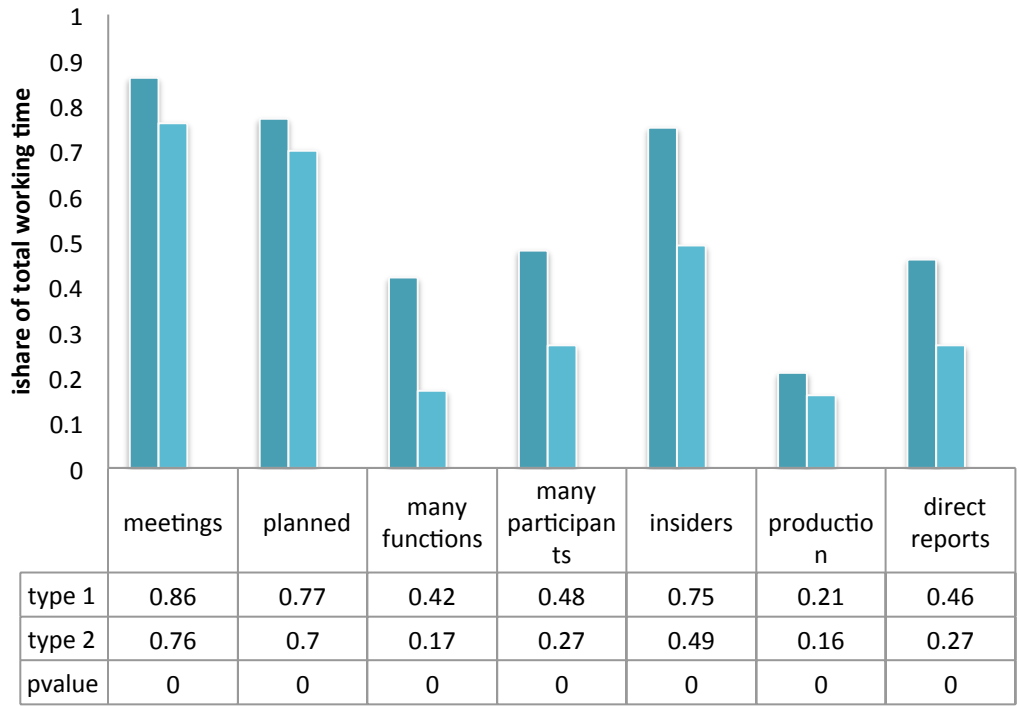


Table 1: Firm and CEO characteristics (N=354)

Panel A: Firm		Panel B: CEO	
Number of employees	1220 (4240)	Age	50.6 (9.6)
Family owned	.76 (.43)	Tenure as CEO	12.8 (9.7)
Family owned & Family CEO	.70 (.46)	Tenure in firm	19.1 (10.6)
Export	.81 (.39)	MBA	.41 (.49)
Multinational	.16 (.37)	Experience abroad	.37 (.47)
<i>Headquarters in (top 5):</i>		Holds position in other firms	.29 (.45)
Maharashtra	36%	Sits on other boards	.43 (.50)
Gujarat	15%		
Dehli	8%		
West Bengal	7%		
Andhra Pradesh	7%		

Table 2: Time Use Descriptives**A. Labor Supply**

	Mean	Std. Dev.	Min	Max	Obs
Total Hours	46.20	9.51	24.25	88.25	354
Number of days at work	5.26	0.51	4.00	7.00	354
Total Hours recorded	43.40	8.90	17.00	76.25	354
Total Hours spent in personal activities	4.38	4.27	0.00	25.25	354
Total Hours spent traveling	3.05	4.21	0.00	23.73	354
Total Hours spent working	35.96	8.21	14.00	63.75	354

B. Style

	Total	Style 1	Style 2	Difference	p-value
Share of time spent in business interactions	0.80	0.86	0.77	0.10	0.00
Share of time spent in planned activities	0.73	0.77	0.70	0.06	0.00
Share of time spent with multiple functions	0.27	0.42	0.18	0.25	0.00
Share of time spent with many participants	0.35	0.48	0.27	0.21	0.00
Share of time spent with insiders	0.58	0.75	0.49	0.26	0.00
Share of time spent with production	0.19	0.23	0.17	0.05	0.00
Share of time spent with direct reports	0.34	0.46	0.27	0.18	0.00

Table 3: CEO Labor Supply, Style and Firm Performance

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
	ln(Sales)				ln(Profits)	ROCE
ln(CEO Hours)	1.773*** (0.575)	0.875** (0.375)	0.833** (0.404)	0.890** (0.427)	1.347*** (0.419)	5.065** (2.435)
CEO Style 1	0.717*** (0.233)	0.332** (0.149)	0.307** (0.153)	0.343** (0.159)	0.373** (0.186)	1.845* (1.059)
ln(Employment)	0.041 (0.027)	0.021*** (0.006)	0.246*** (0.085)	0.197** (0.086)	0.267** (0.106)	0.028 (0.583)
ln(Capital)		0.738*** (0.044)	0.665*** (0.053)	0.695*** (0.057)	0.659*** (0.059)	-0.260 (0.331)
Constant	-2.557** (0.987)	-5.666*** (0.693)	1.025 (0.989)	1.281 (1.252)	-4.685*** (1.315)	2.549 (8.478)
R-squared	0.158	0.649	0.680	0.701	0.686	0.151
Observations	753	753	753	753	617	669
Number of firms	281	281	281	281	258	267
Year dummies	y	y	y	y	y	y
Firm controls			y	y	y	y
Industry dummies			y	y	y	y
State dummies				y	y	y
Noise controls				y	y	y

Notes: *significant at 10%; ** significant at 5%; *** significant at 1%. All columns estimated by OLS. In all columns standard errors under coefficient are clustered by firm. The variable "CEO Hours" is the log of the average hours worked by the CEO during the survey week. The variable "Style 1" is a dummy equal to 1 if the CEO is classified in cluster 1 based on his allocation of time across activities and participants over the survey week. Accounting data run between 2003 and 2010. We include only years in which the CEO was in office, and allow for a maximum of three years of accounts for each firm (3 most recent years with non missing data in ORBIS). Firm controls include: log(firm age) and a dummy for consolidated accounts. Industry dummies are 28 two digits SIC codes. State dummies are 15 indicators denoting the state in which the firm is headquartered. Noise controls include: a dummy to denote if the time use data was recorded through the PA or by the CEO himself; 15 interviewer dummies; a dummy to denote CEOs who formally report to an executive Chairman; and a control for the number of days recorded in the time use data.

Table 4a: Drivers of CEO Labor Supply

Dependent variable	ln(CEO Hours)					
	(1)	(2)	(3)	(4)	(5)	(7)
Family ownership & CEO	-0.097*** -0.024	-0.090*** (0.025)	-0.088*** (0.030)	-0.077** (0.031)	-0.078** (0.033)	-0.066** (0.032)
Ln(Employment)		0.034*** (0.009)	0.035*** (0.010)	0.038*** (0.010)	0.035*** (0.011)	0.027*** (0.010)
Ln(Firm age)		-0.039* (0.021)	-0.036* (0.021)	-0.040* (0.021)	-0.042* (0.022)	-0.028 (0.022)
CEO works for other firms			-0.029 (0.030)	-0.030 (0.030)	-0.039 (0.033)	-0.044 (0.034)
CEO sits on other boards			0.048* (0.026)	0.052** (0.026)	0.066** (0.029)	0.071** (0.031)
Ln(CEO age)			-0.157*** (0.060)	-0.154** (0.061)	-0.147** (0.064)	-0.145** (0.057)
Ln(1+CEO tenure in post)			-0.014 (0.015)	-0.021 (0.015)	-0.024 (0.015)	-0.034** (0.014)
Constant	1.968*** (0.020)	1.883*** (0.088)	2.499*** (0.230)	2.618*** (0.214)	6.312*** (1.117)	5.392*** (1.071)
R-squared	0.039	0.068	0.092	0.084	0.081	0.180
Number of firms	354	354	354	354	354	354
Firm controls		Y	Y	Y	Y	Y
CEO controls			Y	Y	Y	Y
State dummies				Y	Y	Y
Industry dummies					Y	Y
Noise controls						Y
Test on joint significance of: (p-values)						
Firm characteristics		0.00	0.00	0.00	0.00	0.00
CEO characteristics			0.00	0.00	0.00	0.00
State dummies				0.01	0.03	0.13
Industry dummies					0.00	0.00
Noise controls						0.00

Notes: *significant at 10%; ** significant at 5%; *** significant at 1%. All columns estimated by OLS. In all columns standard errors under coefficient are clustered by firm. The variable "CEO Hours" is the log of the average hours worked by the CEO during the survey week. Family ownership & CEO is a dummy denoting firms owned by a family (2nd generation onwards) and where the CEO is also a member of the family. Industry dummies are 28 two digits SIC codes. State dummies are 15 indicators denoting the state in which the firm is headquartered. Noise controls include: a dummy to denote if the time use data was recorded through the PA or by the CEO himself; 15 interviewer dummies; a dummy to denote CEOs who formally report to an executive Chairman; and a control for the number of days recorded in the time use data.

Table 4b: Drivers of CEO Style

Dependent variable	Dummy Style 1					
	(1)	(2)	(3)	(4)	(5)	(7)
Family ownership & CEO	-0.178*** (0.057)	-0.165*** (0.058)	-0.172*** (0.066)	-0.178*** (0.068)	-0.194*** (0.073)	-0.129* (0.077)
Ln(Employment)		0.049** (0.022)	0.045* (0.023)	0.051** (0.023)	0.050** (0.024)	0.047** (0.024)
Ln(Firm age)		0.001 (0.050)	0.001 (0.050)	0.007 (0.054)	0.014 (0.058)	0.027 (0.055)
CEO works for other firms			0.034 (0.070)	0.024 (0.071)	0.035 (0.077)	-0.035 (0.074)
CEO sits on other boards			-0.000 (0.063)	-0.011 (0.065)	-0.008 (0.071)	0.071 (0.068)
Ln(CEO age)			0.038 (0.137)	0.035 (0.140)	0.117 (0.147)	0.107 (0.146)
Ln(1+CEO tenure in post)			0.002 (0.034)	0.010 (0.035)	0.008 (0.038)	-0.008 (0.039)
Constant	0.491*** (0.048)	0.179 (0.187)	0.041 (0.521)	-0.309 (0.486)	5.304** (2.610)	4.624* (2.535)
R-squared	0.026	0.040	0.030	0.030	0.048	0.148
Number of firms	354	354	354	354	354	354
Firm controls		y	y	y	y	y
CEO controls			y	y	y	y
State dummies				y	y	y
Industry dummies					y	y
Noise controls						y
Test on joint significance of: (p-values)						
Firm characteristics		0.00	0.00	0.00	0.01	0.02
CEO characteristics			0.00	0.00	0.00	0.00
State dummies				0.14	0.06	0.00
Industry dummies					0.00	0.00
Noise controls						0.00

Notes: *significant at 10%; ** significant at 5%; *** significant at 1%. All columns estimated by OLS. In all columns standard errors under coefficient are clustered by firm. The variable "Style 1" is a dummy equal to 1 is the CEO is classified in cluster 1 based on his allocation of time across activities and participants over the survey week. Family ownership & CEO is a dummy denoting firms owned by a family (2nd generation onwards) and where the CEO is also a member of the family. Industry dummies are 28 two digits SIC codes. State dummies are 15 indicators denoting the state in which the firm is headquartered. Noise controls include: a dummy to denote if the time use data was recorded through the PA or by the CEO himself; 15 interviewer dummies; a dummy to denote CEOs who formally report to an executive Chairman; and a control for the number of days recorded in the time use data.

Table 5a: Competition and CEO Labor Supply

Dependent Variable	ln(CEO Hours)					
	(1)	(2)	(3)	(4)	(5)	(6)
Family ownership & CEO	-0.066** (0.032)	-0.068** (0.031)		-0.064** (0.027)	-0.063** (0.028)	
Ln(Employment)	0.027*** (0.010)	0.023** (0.010)	0.023** (0.010)	0.027*** (0.008)	0.026*** (0.008)	0.025*** (0.008)
No MNE/Export		-0.055* (0.032)				
Family ownership & CEO - MNE/Export			-0.065** (0.032)			
Family ownership & CEO - No MNE/Export			-0.125*** (0.045)			
Other ownership - No MNE/Export			-0.042 (0.074)			
Low competition					-0.049* (0.028)	
Family ownership & CEO - High Competition						-0.055** (0.026)
Family ownership & CEO - Low Competition						-0.113** (0.047)
Other ownership - Low Competition						-0.028 (0.036)
Constant	5.392*** (1.071)	5.050*** (1.057)	5.048*** (1.058)	2.457*** (0.303)	2.531*** (0.303)	2.527*** (0.300)
R-squared	0.180	0.186	0.183	0.345	0.352	0.353
Number of firms	354	354	354	331	331	331
Firm controls	Y	Y	Y	Y	Y	Y
CEO controls	Y	Y	Y	Y	Y	Y
State dummies	Y	Y	Y	Y	Y	Y
Industry dummies	Y	Y	Y	Y	Y	Y
Noise controls	Y	Y	Y	Y	Y	Y
Test Family CEO MNE/Exp= Family CEO no MNE/no Exp			0.10			
Test Other no MNE/noExp= Family CEO no MNE/no Exp			0.32			
Test Family CEO HC= Family CEO LC						0.13
Test Other LC= Family CEO LC						0.14

Notes: *significant at 10%; ** significant at 5%; *** significant at 1%. All columns estimated by OLS. In columns 1-3 standard errors under coefficient are clustered by firm. In columns 4-6 standard errors under coefficient are clustered by firm and three digit SIC industry. The variable "CEO Hours" is the log of the average hours worked by the CEO during the survey week. "Family ownership & CEO" dummy denotes firms owned by a family (2nd generation onwards) and where the CEO is also a member of the family. The "MNE/Export" dummy identifies firms that are part of a Multinational corporation and/or are involved in exporting activities. The "Low competition" dummy is derived from the industry level Lerner index of competition, as in Aghion et al (2005) as the mean of (1-profits/sales) in the entire accounting database of Indian firms, for every three digit SIC industry (average over 2005 and 2010). The dummy denotes firms whose industry is in the bottom two terciles of the distribution of the Lerner index. Industry dummies are 28 two digits SIC codes. State dummies are 15 indicators denoting the state in which the firm is headquartered. Noise controls include: a dummy to denote if the time use data was recorded through the PA or by the CEO himself; 15 interviewer dummies; a dummy to denote CEOs who formally report to an executive Chairman; and a control for the number of days recorded in the time use data.

Table 5b: Competition and CEO Style

Dependent Variable	Dummy Style 1					
	(1)	(2)	(3)	(4)	(5)	(6)
Family ownership & CEO	-0.129*	-0.132*		-0.123	-0.123	
	(0.077)	(0.078)		(0.082)	(0.082)	
Ln(Employment)	0.047**	0.041*	0.041*	0.042	0.043	0.042
	(0.024)	(0.024)	(0.024)	(0.028)	(0.028)	(0.029)
No MNE and no Exporting		-0.104				
		(0.064)				
Family ownership & CEO - MNE or Exporting			-0.117			
			(0.082)			
Family ownership & CEO - no MNE or Exporting			-0.251**			
			(0.103)			
Other ownership - no MNE or Exporting			-0.029			
			(0.137)			
Low competition					0.020	
					(0.071)	
Family ownership & CEO - High Competition						-0.112
						(0.097)
Family ownership & CEO - Low Competition						-0.105
						(0.115)
Other ownership - Low Competition						0.047
						(0.123)
Constant	4.624*	3.978	3.970	-0.807	-0.837	-0.843
	(2.535)	(2.508)	(2.500)	(0.525)	(0.536)	(0.543)
R-squared	0.148	0.152	0.150	0.287	0.287	0.288
Observations	354	354	354	331	331	331
Firm controls	Y	Y	Y	Y	Y	Y
CEO controls	Y	Y	Y	Y	Y	Y
State dummies	Y	Y	Y	Y	Y	Y
Industry dummies	Y	Y	Y	Y	Y	Y
Noise controls	Y	Y	Y	Y	Y	Y
Test Family CEO MNE/Exp= Family CEO no MNE/no Exp			0.06			
Test Other no MNE/noExp= Family CEO no MNE/no Exp			0.13			
Test Family CEO HC= Family CEO LC						0.92
Test Other LC= Family CEO LC						0.13

Notes: *significant at 10%; ** significant at 5%; *** significant at 1%. All columns estimated by OLS. . In columns 1-3 standard errors under coefficient are clustered by firm. In columns 4-6 standard errors under coefficient are clustered by firm and three digit SIC industry. The variable "Style 1" is a dummy equal to 1 is the CEO is classified in cluster 1 based on his allocation of time across activities and participants over the survey week. "Family ownership & CEO" dummy denotes firms owned by a family (2nd generation onwards) and where the CEO is also a member of the family. The "MNE/Export" dummy identifies firms that are part of a Multinational corporation and/or are involved in exporting activities. The "Low competition" dummy is derived from the industry level Lerner index of competition, as in Aghion et al (2005) as the mean of (1-profits/sales) in the entire accounting database of Indian firms, for every three digit SIC industry (average over 2005 and 2010). The dummy denotes firms whose industry is in the bottom two terciles of the distribution of the Lerner index. Industry dummies are 28 two digits SIC codes. State dummies are 15 indicators denoting the state in which the firm is headquartered. Noise controls include: a dummy to denote if the time use data was recorded through the PA or by the CEO himself; 15 interviewer dummies; a dummy to denote CEOs who formally report to an executive Chairman; and a control for the number of days recorded in the time use data.

Table 6: Response to Rain Shocks by Ownership type

Dependent Variable	ln(1+CEO Hours) - Day Level					
	(1)	(2)	(3)	(4)	(5)	(6)
Experiment		Baseline	Include CEO*rain interactions	Include firm*rain interactions	Include industry*rain interactions	Include state*rain interactions
Family ownership & CEO	-0.053*	-0.005	-0.005	-0.003	-0.033	-0.008
	(0.027)	(0.032)	(0.032)	(0.033)	(0.031)	(0.032)
Dummy=1 if extreme rain	-0.015	0.055*	-0.094	0.103	-0.234**	0.010
	(0.020)	(0.030)	(0.338)	(0.139)	(0.104)	(0.090)
Dummy=1 if extreme rain * Family ownership & CEO		-0.100***	-0.107**	-0.102***	-0.062*	-0.096**
		(0.037)	(0.043)	(0.038)	(0.037)	(0.038)
Dummy=1 if extreme rain * CEO works for other firms			-0.106**			
			(0.047)			
Dummy=1 if extreme rain * CEO sits on other boards			0.061			
			(0.039)			
Dummy=1 if extreme rain * Ln(CEO age)			0.030			
			(0.090)			
Dummy=1 if extreme rain * Ln(1+CEO tenure in post)			0.017			
			(0.023)			
Dummy=1 if extreme rain * Ln(Employment)				-0.010		
				(0.015)		
Dummy=1 if extreme rain * Ln(Firm age)				0.004		
				(0.030)		
Ln(Employment)	0.031***	0.032***	0.032***	0.036***	0.034***	0.032***
	(0.009)	(0.009)	(0.010)	(0.011)	(0.009)	(0.009)
Ln(Firm age)	-0.036**	-0.040**	-0.040**	-0.041*	-0.036**	-0.039**
	(0.018)	(0.018)	(0.018)	(0.021)	(0.018)	(0.018)
CEO works for other firms	-0.049	-0.053*	-0.009	-0.052*	-0.038	-0.055*
	(0.031)	(0.031)	(0.034)	(0.031)	(0.031)	(0.031)
CEO sits on other boards	0.064**	0.065**	0.038	0.066**	0.052*	0.064**
	(0.029)	(0.029)	(0.032)	(0.029)	(0.029)	(0.029)
Ln(CEO age)	-0.124**	-0.116**	-0.126*	-0.117**	-0.103*	-0.116**
	(0.052)	(0.051)	(0.066)	(0.051)	(0.053)	(0.052)
Ln(1+CEO tenure in post)	-0.031**	-0.032***	-0.040***	-0.032***	-0.024*	-0.031**
	(0.012)	(0.012)	(0.015)	(0.012)	(0.013)	(0.012)
Constant	2.688***	2.629***	2.683***	2.610***	2.473***	2.614***
	(0.243)	(0.246)	(0.294)	(0.248)	(0.238)	(0.248)
R-squared	0.116	0.120	0.122	0.120	0.120	0.118
Observations	1606	1606	1606	1606	1606	1606
Number of firms	351	351	351	351	351	351
Firm controls	y	y	y	y	y	y
CEO controls	y	y	y	y	y	y
State dummies	y	y	y	y	y	y
Industry dummies	y	y	y	y	y	y
Noise controls	y	y	y	y	y	y
Test Rain+Family CEO*Rain=0 (p-value)		0.07	0.54	0.99	0.00	0.36
Test joint significance of Rain*CEO characteristics (p-value)			0.18			
Test joint significance of Rain*other firm characteristics (p-value)				0.82		
Test joint significance of Rain*Industry interactions (p-value)					0.00	
Test joint significance of Rain*State interactions (p-value)						0.38

Notes: *significant at 10%; ** significant at 5%; *** significant at 1%. All columns estimated by OLS. In all columns standard errors under coefficient are clustered by firm. The variable "CEO Hours" is the log of the number of hours worked by the CEO during the days included in the survey week. Family ownership & CEO is a dummy denoting firms owned by a family (2nd generation onwards) and where the CEO is also a member of the family. "Extreme Rain" is a dummy denoting intense rainfall (relative to the non Monsoon period) in the area and day where the CEO is located (data measured by the closest weather station, matched to the zipcode of the CEO activities for the day). Column 5 includes a full set of industry*rain interactions. Column 6 includes a full set of state*rain interactions. Industry dummies are 28 two digits SIC codes. State dummies are 15 indicators denoting the state in which the firm is headquartered. Noise controls include: a dummy to denote if the time use data was recorded through the PA or by the CEO himself; 15 interviewer dummies; a dummy to denote CEOs who formally report to an executive Chairman; a control for the number of days recorded in the time use data, a control for the day of the week, and for the week in the year.

Table 7: Response to Rain Shocks by Ownership Types and Competition

Dependent Variable	ln(1+CEO Hours) - Day Level			
	(1)	(2)	(3)	(4)
Dummy=1 if extreme rain	-0.014 (0.020)	0.059* (0.030)	-0.020 (0.024)	0.048 (0.045)
Family ownership & CEO - MNE or Exporting	-0.053* (0.029)	-0.011 (0.034)		
Family ownership & CEO - no MNE or Exporting	-0.134*** (0.037)	-0.059 (0.042)		
Other ownership - no MNE or Exporting	-0.061 (0.058)	-0.066 (0.088)		
Dummy=1 if extreme rain * Family ownership & CEO - MNE or Exporting		-0.089** (0.039)		
Dummy=1 if extreme rain * Family ownership & CEO - no MNE or Exporting		-0.168*** (0.062)		
Dummy=1 if extreme rain * Other ownership & CEO - no MNE or Exporting		-0.004 (0.106)		
Family ownership & CEO - High Competition			-0.048** (0.023)	-0.020 (0.038)
Family ownership & CEO - Low Competition			-0.089** (0.038)	-0.006 (0.039)
Other ownership - Low Competition			-0.022 (0.029)	-0.014 (0.046)
Dummy=1 if extreme rain * Family ownership & CEO - High Competition				-0.059 (0.058)
Dummy=1 if extreme rain * Family ownership & CEO - Low Competition				-0.172*** (0.061)
Dummy=1 if extreme rain * Other ownership & CEO - Low Competition				-0.024 (0.057)
Constant	2.721*** (0.241)	2.671*** (0.243)	2.604*** (0.263)	2.541*** (0.273)
R-squared	0.122	0.126	0.167	0.174
Observations	1606	1606	1499	1499
Number of firms	351	351	332	332
Firm controls	Y	Y	Y	Y
CEO controls	Y	Y	Y	Y
State dummies	Y	Y	Y	Y
Industry dummies	Y	Y	Y	Y
Noise controls	Y	Y	Y	Y
Test Family CEO MNE/Exp= Family CEO no MNE/no Exp	0.01	0.16		
Test Rain+Family CEO MNE/Exp*Rain=0 (p-value)		0.27		
Test Rain+Family CEO no MNE/no Exp*Rain=0 (p-value)		0.05		
Test Family CEO MNE/Exp=Family CEO no MNE/no Exp		0.20		
Test Family CEO HC= Family CEO LC			0.21	0.68
Test Rain+Family CEO HC*Rain=0 (p-value)				0.70
Test Rain+Family CEO LC*Rain=0 (p-value)				0.01
Test Family CEO HC= Family CEO LC				0.04

Notes: *significant at 10%; ** significant at 5%; *** significant at 1%. All columns estimated by OLS. . In columns 1-2 standard errors under coefficient are clustered by firm. In columns 3-4 standard errors under coefficient are clustered by firm and three digit SIC industry. The variable "CEO Hours" is the log of the number of hours worked by the CEO during the days included in the survey week. Family ownership & CEO is a dummy denoting firms owned by a family (2nd generation onwards) and where the CEO is also a member of the family. "Extreme Rain" is a dummy denoting intense rainfall (relative to the non Monsoon period) in the area and day where the CEO is located (data measured by the closest weather station, matched to the zipcode of the CEO activities for the day). The "MNE/Export" dummy identifies firms that are part of a Multinational corporation and/or are involved in exporting activities. The "Low competition" dummy is derived from the industry level Lerner index of competition, as in Aghion et al (2005) as the mean of (1-profits/sales) in the entire accounting database of Indian firms, for every three digit SIC industry (average over 2005 and 2010). The dummy denotes firms whose industry is in the bottom two terciles of the distribution of the Lerner index. Industry dummies are 28 two digits SIC codes. State dummies are 15 indicators denoting the state in which the firm is headquartered. Noise controls include: a dummy to denote if the time use data was recorded through the PA or by the CEO himself; 15 interviewer dummies; a dummy to denote CEOs who formally report to an executive Chairman; a control for the number of days recorded in the time use data, a control for the day of the week, and for the week in the year.