THE ORGANIZATION OF FIRMS ACROSS COUNTRIES

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Abstract

We collect original data on the firm organization in several thousand firms located in the US, Europe and Asia. Specifically, we focus on the autonomy of production plant managers from their Corporate Headquarters in their decisions over hiring, investment, production and sales. We find that American and Northern European firms are much more decentralized than those from Southern Europe and Asia, both domestically and as multinationals abroad. Three factors are associated with greater decentralization. First, stronger product market competition, which arguably makes manager's local knowledge more important because of greater time-sensitivity of decision-making. Second, higher trust in the plant's region of location (and multinational's home country), which may help to sustain effective delegation because of enhanced co-operation. And third, the prevalence of hierarchical religions, such as Catholicism and Islam, which may lead managers to have weaker preferences for autonomous decision making. These factors appear important across countries, across regions within countries, and for multinationals according to their country of ownership. Since information technology appears complementary with more decentralized organizations this implies Catholic countries with lower trust, like France and Italy, may benefit less from rapid technological change than Protestant countries with higher trust, like Sweden and the US.

I.   INTRODUCTION

The economic theory of organization has made great strides in the last two decades in furthering our understanding of activities within the boundary of the firm[1]. Econometric evidence on firm organization has lagged significantly behind this theoretical development, however. Much evidence comes from case studies rather than systematic empirical evidence across large numbers of firms. When evidence does exist, it will typically be from a single industry[2] or (at best) across many firms in a single country[3]. In this paper, we address the lacuna by using a new survey methodology to gather organizational data on almost 4,000 firms in twelve countries in Europe, North America and Asia.

We focus on delegation of power within the firm between the Central Head Quarters (CHQ/CEO) and plant managers, as this form of decentralization has been a central preoccupation of theoretical work[4]. From an empirical perspective, many papers have suggested that Information and Communication Technologies (ICT) may be complementary with decentralization[5]. Consequently, following a technological shock such as the post-1994 acceleration in the fall of quality-adjusted IT prices, firms who are either decentralized or able to become more decentralized quickly may be at an advantage compared to their more centralized counterparts. This could potentially explain some of the startling differences in productivity growth at the macro level in OECD countries in the last decade. Internal organization may also help to explain why we see such huge heterogeneity in performance between firms (e.g. Gibbons et al, 2008).

One factor that we find is associated with increased decentralization is the degree of *product market competition*. The intuition for this result can be thought in terms of simple principal-agent models of decentralization. The agent is the plant manager, who is better informed about local market and

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[1] For a survey see Bolton and Dewatripont (2005) or the chapters of Gibbons and Roberts (2008)
[2] See, for example Baker and Hubbard (2003, 2004) on trucks or Garicano and Hubbard (2007a,2007b) on legal services.
[3] See for example, Acemoglu et al (2007), Caroli and Van Reenen (2001) for France and the UK, Colombo and Delmastro (2004) for Italy, and Rajan and Wulf (2007) for the US.
[4] One branch of the literature investigates conditions under which delegated contracting replicates efficient centralized contracting (the revelation principle). Example of papers would include Baron and Besanko (1992) and Melumad et al (1995). However, this required complete contracts (see Mookherjee, 2006). A second branch emphasizes information processing and communication costs such as Sah and Stiglitz (1986), Genakopolos and Milgrom (1991), Radner (1993), Radner and Van Zandt (1992), Bolton and Dewatripont (1994) and Garicano (2000). A third branch, closest to our perspective, emphasizes the trade off between information and loss of control – see Aghion and Tirole (1997), Rajan and Zingales (2001), Dessein (2002), Hart and Moore (2005) and Alonso, Dessein and Matouschek (2008).
[5] For example, Bresnahan, Brynjolssen and Hitt (2002), Bloom, Sadun and Van Reenen (2007).

technological conditions. However, the plant manager's incentives may not be correctly aligned with those of the principal, who is the CEO. As a result the optimal degree of decentralization depends on the tradeoff between the information and incentives. Higher competition makes decisions more time-sensitive, thus raising the pay-off to local managerial knowledge and fostering greater decentralization. Alternatively, competition may also increase managerial effort (e.g. Vives, 2005) reducing the agency cost of decentralizing.

Another factor we find to be empirically important is *trust*. Firms in areas with high general trust (as measured by individual responses in the World Value Survey) are much more likely to be decentralized. This is robust to a wide range of controls for firm factors and industry and country dummies. This is even true for multinationals by country of origin, so for example in California a multinational from Sweden (a high trust country) would typically be more decentralized than a multinational from Portugal (a low trust country).

Trust can be seen as a mechanism for shaping decentralization in the framework of Baker, Gibbons and Murphy (1999). In their model the manager expends effort in searching for and implementing projects and the CEO then decides whether to accept or reject the proposed project. In this set-up, higher mutual trust could be a way to engender co-operation in the repeated game fostering more decentralization. A second intuitive interpretation of the trust result is that delegation is more risky in environments where the CEO believes the plant manager is not sufficiently trustworthy to behave according to the firm's interests. In this setting, trustworthiness can be interpreted as a distaste parameter of the plant manager towards inappropriate behavior – the desire not to abuse the responsibility delegated to him. This is linked to "congruence parameter" in Aghion and Tirole (1997), which is the degree to which CEO and manager prefer the same outcome. They explicitly identify this congruence parameter with trust: "we found that formal authority is more likely to be delegated for decisions (or activities)….for which the principal can trust the agent" (p.27).

Finally, we also find an important role for *religion* in shaping the extent of decentralization. In particular, in firms in areas with a high share of hierarchical religions, defined following La Porta et al. (1997) as Catholicism, Eastern Orthodoxy and Islam, we find firms are significantly less decentralized. One interpretation is that hierarchical religions reduce trust between people because they inhibit the horizontal bonds between individuals (Putnam et al, 1993, La Porta et al. 1997, Guiso et al. 2004). However, we still find some role for hierarchical religion even after controlling

for its effect in reducing trust, suggesting an additional more direct effect on decentralization. One potential interpretation is that managers who grew up in areas with a high degree of hierarchical religions become more accepting of authority, so have a lower taste for decision-making authority.

Our work also therefore links closely to recent contributions on the importance of social capital for economic outcomes. These papers tend not to focus on the mechanisms through which trust may affect economic outcomes, however. Knack and Keefer (2004), for example, show that trust is associated with economic growth across a range of countries. Our contribution is to suggest a mechanism through which social capital affects economic performance; in this case by enabling firms to obtain their optimal organizational form in some environments, which may foster firm productivity growth.

Our paper is also related to a couple of other strands of the literature. One is on multinationals and comparative advantage. A recent body of theoretical work, such as Helpman et al. (2004), Burstein and Monge (2007) and Antras et al. (2008), emphasizes the importance of firm-level comparative advantage in multinationals. In these models firms have some productivity advantage, typically deriving from a different managerial or organizational technology, which their multinationals transplant to their overseas affiliates. Our evidence on the ability of multinationals to take their domestic organizational practices abroad provides empirical support for this assumption. Second, there is the literature on the transportation of culture by individuals across countries. For example, Fisman and Miguel (2008) show that the parking fine behavior of diplomats in New York is strongly predicted by indices of corruption in their home countries. In the social domain, Fernandez and Fogli (2005) show that fertility rates among second-generation Americans are correlated with fertility in the countries of their parents. And Ichino and Maggi (2000) study absenteeism and misconduct of employees at an Italian bank, and find that region of origin within Italy predicts shirking. Our evidence suggests that firms also take parts of their culture abroad. Interestingly, we find this holds even in multinationals when all the employees come from the country of location, suggesting firms offer an additional mechanism to people for transporting culture across countries.

The paper is organized as follows. Section II sketches our models and its empirical implications, Section III details the data. The empirical results are split into basic descriptive statistics in Section IV and more detailed results in Section V. Section VI concludes.

II.   THEORETICAL CONSIDERATIONS AND EMPIRICAL IMPLICATIONS

There is a huge theoretical literature on the determinants of decentralization within organizations and we do not aim to survey the vast literature. The main contribution of the paper is to increase our knowledge of the empirical stylized facts of decentralization, something that has not been possible to do before because of the absence of internationally comparable firm-level data.

A useful distinction made in Baker, Gibbons and Murphy (1999, henceforth BGM) is between conditions under which decentralization is *efficient* and under what conditions is it *feasible*. The tradition in information-processing based approaches to organizational design is to focus on efficiency. But as BGM emphasize when delegation of authority is informal it may not be possible to attain the efficient solution because of incentive compatibility problems.

Considering the desirability of decentralization first, a number of papers such as Aghion and Tirole (1997) and Acemoglu et al (2007) consider an information-based approach. This is a useful starting point for thinking about the longer run structural factors that determine the decision to decentralize. They motivate the model with a choice a firm faces over the best way to use a new technology, which will be partly idiosyncratic for a firm. As is common in the literature they model this as a delegation decision between the Central Head Quarters/CEO (CHQ, Principal) and plant manager ("manager", Agent). The CHQ has a greater interest in maximizing the firm's value than the manager, but the manager has greater local private knowledge than the CHQ. This trade-off determines the optimal degree of decentralization. Characteristics of the environment that increase the value of local knowledge will increase the incentive to decentralize. Structural characteristics of the industry such as heterogeneity will tend to favor decentralization. This is because the CHQ will find it more difficult to learn what is best for his firm from the public experiences of other firms in the industry if firms are very heterogeneous. Choosing the right way to use a new technology, for example, is much harder if the "right" way to do it differs radically between different firms.

The degree of product market competition is also likely to matter in this framework for several reasons. First, more competitive environments put a greater emphasis on rapid reaction to events ("time based competition") because of a greater sensitivity of relative profitability to relative

differences in marginal costs/quality between firms. In these circumstances, delegating to managers with local information will be particularly beneficial. Secondly, if competition is associated with an increased number of firms it makes yardstick competition easier to implement and therefore enables the CHQ to combine decentralization with increased managerial effort. Finally, if competition increases the threat of bankruptcy then the manager is more likely to make the firm value maximizing decision if the CHQ delegates. Although on balance, this makes competition more likely to be associated with decentralization, although there are counterarguments. For example, more firms means more public knowledge so there is less need to delegate to privately knowledgeable managers. Very strong competition may reduce profit margins to close to zero, thus blunting managerial effort if remuneration has a firm performance related element. Consequently, the effect of competition on decentralization is an empirical issue.

Even if decentralization was the efficient choice due to the structural characteristics of the firm's environment, BGM emphasize that delegation is generally informal rather than formal. This is because the CHQ usually must sign-off on decisions. The issue is whether the CHQ credibly commits to allowing the plant manager to effectively make the important decisions over hiring and investment, etc. and does not override the plant manager even in circumstances when the CHQ may think the manager is making the wrong decision. The CEO will do this in order to establish his reputation not to interfere.

In BGM decentralization (or "informal delegation of authority") is modeled as a repeated game between the CHQ and manager. Assume that both parties would prefer decentralization if they could commit to the cooperative outcome. In the non-cooperative game consider trigger strategies where the punishment is a reversion to centralization forever. As usual, co-operation can be sustained for some parameter values depending on the discount rate, the one-shot benefit from defecting and utility in the cooperative and punishment regimes.

The agent's preferences (or rather the principal's beliefs about the agent's preferences) can affect the ability to sustain effective delegation. A much discussed factor in the social capital and experimental game theory literatures that could help maintain co-operation is "trust" (Putnam, 1993, Fukuyama, 1995; Glaeser et al, 2000; Guiso et al, 2004). If there are heterogeneous types in the population with some *ex ante* being more likely to co-operate than others then the co-operative outcome (decentralization) is more likely. Trust has been discussed extensively in the literatures on social

capital and experimental game theory. In the empirical sections we describe how to implement this idea by using external data on trust from the World Values Survey[6].

An alternative interpretation of "trust" in model where formal delegation is possible is that CEOs and managers in high trust areas are more likely to believe their preferences are aligned or "congruent". This was the interpretation made by Aghion and Tirole (1997).

The final aspect we focus on is religion. This may have an indirect effect on decentralization via changing trust. A recent literature[7] argues that hierarchical religions such as Catholicism reduce trust by inhibiting the formation of horizontal relations between people in favor of vertical relations with the Church. Religion may also have a *direct* link to decentralization, over and above its influence on trust, due to its association with *preferences* for autonomy. effect. To see why, consider the idea that individuals have different tastes for autonomy – i.e. some people want to make their own decisions (rather than being told to do by their boss) more than others. This taste parameter varies in the population, so that when individuals in certain regions have a stronger taste for autonomy there is more likely to be decentralization. This variation in the taste for autonomy may be linked with the prevalence of hierarchical religions, defined as Catholicism, Eastern Orthodox and Islam following La Porta et al, 1997 if, for example, areas with Protestant churches were those which rejected direct rule from the Vatican during the reformation. Alternatively, the presence of hierarchical religions could directly cause variations in the taste for autonomy, if it conditions individuals to be more accepting of authority from an early age . Whichever is the case we would expect areas with a lower intensity of hierarchical religions to be more decentralized.

In short, then we will focus on examining competition as a possible driving force for the efficiency of delegation (along with other factors). However, part of our main interest is in understanding how these efficient outcomes can be sustained by looking at cultural factors such as trust and religion.

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[6] Another factor that could facilitate co-operative outcomes is the rule of law. To the extent that contracts can be written to guard against the manager misusing his decentralized power, lack of enforceability will undermine them. By contrast, when the employer (or employee) can successfully sue for breach of contract this will make contracts easier to enforce and sustainable delegation more likely. Consequently, a stronger rule of law should make co-operation and decentralization more likely to be feasible (when it is efficient).

[7] See, for example, Putnam 1993, La Porta et al. 1997 and Guiso et al. 2004.

Based on these theoretical considerations our main econometric model of decentralization takes the following form:

$$d_{ijck} = \alpha PMC_{ikc} + \beta TRUST_{jc} + \gamma HIER_{jc} + \delta' x_{ijkc} + u_{ijkc}$$

Where the outcome of interest is the degree of decentralization of plant i in region j in industry k in country k (d_{ijck}). This is modeled as a function of three key variables of interest: product market competition (PMC_{ikc}), trust in the region j where the plant is located ($TRUST_{jc}$) and the proportion of people in "hierarchical" religions in the region j where the plant is located ($HIER_{jc}$). We also include a vector of control variables, x_{ijkc} and an error term, u_{ijkc}. The controls include plant size, firm size, skills, multinational status, listing status, regional GDP per head and regional population and a full set of country and three digit industry dummies. We also construct a large number of other controls for the measurement error in d_{ijck} including interviewer fixed effects and controls for the characteristics of the interview and interviewee.

Unfortunately, many of the interesting structural characteristics of the industry such as its heterogeneity and technological complexity are not separately identified from industry dummies, so we cannot examine them in detail here. Instead we focus on competition as an environmental factor determining the efficient degree of decentralization as this has some local variation within an industry across countries.

III. DATA

To investigate these issues we first have to construct a robust measure of organizational practices overcoming four hurdles: measuring decentralization, collecting accurate responses, ensuring international comparability and obtaining interviews with managers. We discuss these in turn. This approach develops a survey tool previously used by Bloom and Van Reenen (2007) to measure management practices.

III.A Measuring Decentralization

We asked four questions on plant manager decentralization. First, we asked how much capital investment a plant manager could undertake without prior authorization from the corporate

headquarters (CHQ). This is a continuous variable enumerated in national currency which we convert into dollars using PPPs. We also inquired on where decisions were effectively made in three other dimensions: (a) hiring a new full-time permanent shopfloor employee, (b) the introduction of a new product and (c) sales and marketing decisions. These more qualitative variables were scaled this from a score of one, defined as all decisions taken at the corporate headquarters, to a five defined as complete power ("real authority") of the plant manager. In Appendix A (Table A1) we detail the individual questions in the same order as they appeared in the survey, and three anonymized responses per practice.

These four questions are similar to others used in the past to measure decentralization. Acemoglu et al (2007) use a similar question on hiring in the British WERS data. Marin and Verdier (2007) use a count of a series of decentralization variables scaled 1 to 5. Columbo and Delmastro (2004) have a question similar to our one on investment.

Since the scaling may vary across all these questions, we converted the scores from the four decentralization questions to z-scores by normalizing by practice to mean zero and standard deviation one. In our main econometric specifications, we take the un-weighted average across all four z-scores as our primary measure of overall decentralization, but we also experiment with other weighting schemes and we also show what happens when the questions are disaggregated into their component parts.

One issue is over measurement of decentralization across different organizational structures. Figure 2 provides four examples to help explain how we did this. Example A shows the classic case, where the firm has one CHQ in New York and one production site in Phoenix. The plant manager is defined as the most senior manager at the Phoenix site, with our decentralization measure evaluating how much autonomy he has from his managers in New York. In Example B we depict a firm with multiple plants, in which we would usually survey one plant and assumed this represented the degree of decentralization for the firm (section III.F discusses how we tested this assumption). In Example C we have a firm with the production facilities and CHQ on the same site. In this case if the plant manager was the CEO – which occurred in 4.9% of our interviews – we could not define decentralization. These were typically smaller firms (a mean firm employment of 159 for the CEO plant manager firms versus 843 for the rest of the sample), with an insignificant correlation between

the share of firms dropped in each country and its average decentralization measure.[8] If the plant manager and CEO were different people we would define decentralization as usual, but we also confirm in Appendix A that our results are robust to dropping these "same-site" observations.[9] Finally, in Example D we show a multinational subsidiary, which we treat the same as domestic firms, defining decentralization as the autonomy of the plant from the domestic CHQ. But, we also confirm robustness of our results to dropping these multinational subsidiaries in Appendix A.

We also asked two questions on workers decentralization over their allocation of tasks across teams and the determination of pace on the shop-floor. The scaling on both questions went from 1 denoting managers take all decisions up to 5 denoting workers make all decisions. These two questions were used previously in Bresnahan et al. (2002) as part of their index of firm organizational capital, and are written in full in Appendix A.

Management Practices

We also collected management practices in the survey. These were scored following the methodology of Bloom and Van Reenen (2007), with practices grouped into four areas: *operations* (three practices), *monitoring* (five practices), *targets* (five practices) and *incentives* (five practices). The shop-floor operations section focuses on the introduction of lean manufacturing techniques, the documentation of processes improvements and the rationale behind introductions of improvements. The monitoring section focuses on the tracking of performance of individuals, reviewing performance, and consequence management. The targets section examines the type of targets, the realism of the targets, the transparency of targets and the range and interconnection of targets. Finally, the incentives section includes promotion criteria, pay and bonuses, and fixing or firing bad performers, where best practice is deemed the approach that gives strong rewards for those with both ability and effort. Our management measure uses the un-weighted average of the z-scores of all 18 dimensions.

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[8] The country level correlation was 0.345 (p-value of 0.272). Regressing a dummy equal to one if the plant manager is the CEO against country dummies (with the US as the baseline) we have 5 countries which are significantly more likely to have owner-managers. The coefficients (standard errors) are: France 0.076 (0.016), India 0.052 (0.013), Poland 0.056 (0.016), Portugal 0.159 (0.018) and Sweden 0.231 (0.015).
[9] Empirically, while plant managers with CEOs on site typically have less autonomy (something we control for empirically) it is not the case they have no autonomy. The CEO will typically be involved in a nuimber of other tasks such as finance, strategy and sales (which could involve other non-production sites), while the plant manager runs the daily production process.

Other firm-level Data

We collected a large amount of additional data from the survey to use as controls. On the human resource side, we have information on the proportion of the workforce with degrees, average hours worked and the gender and age breakdown. We collected ownership information both from the managers we interviewed and the external sample databases (see section III.E for details). Also, from the sample databases we have information on firm size, whether the firm was listed on the stock exchange and standard accounting information on sales, capital, etc.

III.B Collecting Accurate Responses

With this evaluation tool, we can provide some quantification of firms' organizational practices. However, an important issue is the extent to which we can obtain unbiased responses to our questions from firms. In particular, will respondents provide accurate responses? As is well known in the surveying literature a respondent's answer to survey questions is typically biased by the scoring grid, anchored towards those answers that they expect the interviewer thinks is correct. More generally, a range of background characteristics, potentially correlated with organizational structure may generate some kinds of systematic bias in the survey data.

To try to address these issues we took a range of steps to obtain accurate data. First, the survey was conducted by telephone without telling the managers they were being scored on organizational or management practices.[10] This enabled scoring to be based on the interviewer's evaluation of the firm's actual practices, rather than their aspirations, the manager's perceptions or the interviewer's impressions. To run this "blind" scoring we used open questions (i.e. "*To hire a full-time permanent shop-floor worker what agreement would your plant need from corporate headquarters*"?), rather than closed questions (i.e. "*Can you hire workers without authority from corporate headquarters*?"[yes/no]). Following the initial question the discussion would continue until the interviewer can make an accurate assessment of the firm's typical practices. For example, if the plant manager responded "*It is my decision, but I need sign-off from corporate HQ.*" the interviewer would ask "*How often would sign-off typically be given?*" with the response "*So far it has never been refused*" scoring a 4 and the response "*Typically agreed in about 80% or 90% of the case*" scoring a 3.

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[10] This survey tool has been passed by Stanford's Human Subjects Committee. The deception involved was deemed acceptable because it is: (i) <u>necessary</u> to get unbiased responses; (ii) <u>minimized</u> to the management practice questions and is temporary (we send managers debriefing packs afterwards); and (iii) <u>presents no risk</u> as the data is confidential.

Second, the interviewers did not know anything about the firm's financial information or performance in advance of the interview. This was achieved by selecting medium sized manufacturing firms and by providing only firm names and contact details to the interviewers (but no financial details). Consequently, the survey tool is "double blind" – managers do not know they are being scored and interviewers do not know the performance of the firm. The interviewers were incentivized on the number of interviews they ran and so had no interest in spending time researching the companies in advance of running the interview. These smaller firms (the median size was 270 employees) would not be known by name and are rarely reported in the business media. The interviewers were specially trained graduate students from top European and U.S. business schools. All interviews were conducted in the manager's native language.

Third, each interviewer ran 85 interviews on average, allowing us to remove interviewer fixed effects from all empirical specifications. This helps to address concerns over inconsistent interpretation of categorical responses (see Manski, 2004), standardizing the scoring system.

Fourth, the survey instrument was targeted at plant managers, who are typically senior enough to have an overview of organizational practices but not so senior as to be detached from day-to-day operations of the enterprise.

Fifth, we collected a detailed set of information on the interview process itself (number and type of prior contacts before obtaining the interviews, duration, local time-of-day, date and day-of-the week), on the manager (gender, seniority, nationality, company and job tenure, internal and external employment experience, and location), and on the interviewer (we can include individual interviewer-fixed effects, time-of-day and subjective reliability score). Some of these survey controls are significantly informative about the organizational practices and are used as "noise controls" to help reduce residual variation.

III.C Ensuring International Comparability
In comparing organizational and management surveys across countries we have to be extremely careful to ensure comparability of responses. To maximize comparability we undertook three steps. First, every interviewer had the same initial three days of interview training, provided jointly by the Centre for Economic Performance and our partnering international consultancy firm. This training

included three role-play calibration exercises, where the group would all score a role-played interview and then discuss scoring together of each question. This was aimed at ensuring every interviewer had a common interpretation of the scoring grid. In addition every Friday afternoon throughout the survey period the group met for 90 minutes for training and to discuss any problems with interpretation of the survey.

Second, the team operated from one location, the Centre for Economic Performance at the LSE, using two large survey rooms. The different national survey teams were thus listening in on each others surveys on a daily basis, were organized and managed in the same way, and ran the surveys using exactly the same telephone, computer and software technology.[11]

Third, the individual interviewers interviewed firms in multiple countries. The team language was English, with every interviewer able to complete English language interviews, so that interviewers were able to interview firms from their own country plus the UK and US. As a result the median number of countries that each interviewer scored was three, enabling us to remove interviewer fixed effects in the cross-country analysis.

III.D Obtaining Interviews with Managers

Each interview took on average fifty minutes and was run in the Summer of 2006. Overall, we obtained a relatively high response rate of 45%, which was achieved through four steps. First, the interview was introduced as "a piece of work"[12] without discussion of the firm's financial position or its company accounts, making it relatively uncontroversial for managers to participate. Interviewers did not discuss financials in the interviews, both to maximize the participation of firms and to ensure our interviewers were truly "blind" on the firm's financial position. Second, the survey was ordered to lead with the least controversial questions on (shop-floor operations management), leading on to monitoring, incentives and organizational structure. Third, interviewers' performance was monitored, as was the proportion of interviews achieved, so they were persistent in chasing firms. The questions are also about practices within the firm so any plant managers can respond, so

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[11] See http://www.youtube.com/watch?v=HgJXt8KwhA8 for video footage of the survey team.
[12] We avoided using the words "research" or "survey" as many firms link these to market research surveys, which they often refuse to be involved with.

there are potentially several managers per firm who could be contacted[13]. Fourth, the written endorsement of many official institutions[14] helped demonstrate to managers this was an important academic exercise with official support. Fifth, the involvement of Cambridge, LSE and Stanford Universities, along with the institution of the interviewers[15], provided a signal of the research focus of the work.

III.E Sampling Frame and Additional Data

Since our aim is to compare across countries we decided to focus on the manufacturing sector where productivity is easier to measure than in the non-manufacturing sector. We also focused on medium sized firms selecting a sample of firms with predicted employment of between 100 and 5,000 workers (with a median of 270). Very small firms have little publicly available data. Very large firms are likely to be more heterogeneous across plants, and so it would be more difficult to get a picture of organization in the firm as a whole from one or two plant interviews. We drew a sampling frame from each country to be representative of medium sized manufacturing firms and then randomly chose the order of which firms to contact (see Appendix B for details). Since we use different databases in Europe (Amadeus), the U.S. (Icarus), China and Japan (Oriana) and India (Firstsource) we had concerns regarding the cross-country comparisons so we include country dummies in all of preferred specifications.

Comparing the responding firms with those in the sampling frame, we found no evidence that the responders were systematically different on any of the performance measures to the non-responders. They were also statistically similar on all the other observables in our dataset. The only exception was on size and multinational status, where our firms were slightly larger than average than those in the sampling frame and slightly more likely to be a multinational subsidiary (details in Appendix B).

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[13] We found no significant correlation between the number, type and time-span of contacts before an interview is conducted and the management score. This suggests while different managers may respond differently to the interview proposition this does not appear to be correlated with their responses or the average management practices of the firm.

[14] The Banque de France, Bank of Greece, Bank of Japan, Bank of Portugal, Beijing University, Bundesbank, Confederation of Indian Industry, European Central Bank, European Commission, Greek Employers Federation, IUI Sweden, Ministero delle Finanze, National Bank of Poland, Peoples Bank of China, Polish Treasury, Reserve Bank of India, Shenzhen Development Bank, Sveriges Riksbank, U.K. Treasury and Warsaw Stock Exchange

[15] Interviewers were drawn from the following universities: Berkeley, City of London, Columbia, Harvard, HEC, IESE, Imperial, Insead, Kellogg, LBS, LSE, Lund, MIT, Nova de Lisbon, Oxford, Stanford and Yale.

III.F Evaluating and Controlling for Measurement Error

The data potentially suffers from several types of measurement error. First, we could have measurement error in the organizational practice scores obtained using our survey tool. To quantify this we performed repeat interviews on 72 firms, contacting different managers in the firm, typically at different plants, using different interviewers. To the extent that our organizational measure is truly picking up general company-wide practices these two scores should be correlated, while to the extent the measure is driven by noise the measures should be independent.

The correlation of the first interview against the second interviews was strongly positive (a correlation coefficient of 0.513 with a p-value of 0.000). Furthermore, there is no obvious (or statistically significant) relationship between the degree of measurement error and the absolute score. That is to say, high and low scores appear to be as well measured as average scores, and firms that have high (or low) scores on the first interview tend to have high (or low) scores on the second interview. Thus, firms that reported very low or high decentralization scores appeared to be genuinely very centralized or decentralized, rather than extreme draws of sampling measurement error.

III.F Trust and Hierarchical Religions

We build trust measures using the World Values Survey (WVS), a collection of surveys administered to representative samples of individuals in 66 countries between 1981 and 2004. These questionnaires contain information on several social, religious and political attitudes[16]. The World Values Survey aims at measuring generalized trust, namely the expectation of the respondent regarding the trustworthiness of other individuals. The wording of this question is "*Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?*". The variable that we use in the econometric regression is the percentage of people choosing the first option in the trust question within the region where the plant is located.

This is the most common measure of trust used in the literature, and appears to be correlated with trusting and/or trustworthy behavior. Glaeser et al (2000), for example, ran a series of experiments using Harvard undergraduate students to see if individual subject's answers to the WVS trust questions are correlated with their trusting or trustworthy behavior. They find significance evidence

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[16] See Appendix B for details on the World Values Survey.

that this WVS trust question is significantly correlated with the trustworthiness of subjects, even though they are not very good at predicting trusting behavior. They conclude that "While attitudinal trust surveys at best weakly predict any individual's level of trust, they may be good at predicting the overall level of trustworthiness in society". Sapienza et al. (2007) run another series of experiments using Chicago MBA students and find again this WVS question is correlated with individual behavior, although in their case significantly more with trusting behavior rather than trustworthiness. Since we are using these answers grouped to the level of the community as a whole, it is exactly the "society level" variation that we are using, so these papers are reassuring that this WVS trust question does appear to pick up variation in trust.

The average level of trust in the sample is 38%. The lowest trust country in the sample is Portugal, with an average trust of 16%, while the highest level of trust is recorded in the Sweden, where about 66% of the population answered yes to the trust question. The average percentage of Hierarchical religions in the sample is 34%, with a minimum of 1.4% in China, to a maximum of 94% in Poland. Trust tends to be associated with better government performance, participation in civic and professional societies, and overall economic performance (Knack and Keefer, 1997). Furthermore, in high trust countries large firms are more prevalent (La Porta et al, 1997). Hence, in order to isolate the effect of trust on decentralization from the generalized impact of economic development, we include in our controls in various specifications regional GDP per capita and population, measures of civic participation and firm-size.

A second measure of trust we use is the bilateral trust measure from a series of surveys conducted for the European Commission. The surveys were designed to measure public attitudes across European countries towards each other, to help the Commission design policy initiatives such as the Common Market. These surveys asked around 1000 individuals in each country the following question "*I would like to ask you a question about how much trust you have in people from various countries. For each, please tell me whether you have a lot of trust, some trust, not very much trust, or no trust at all*". This question was asked about all other EU countries a number of non-EU countries like the US, Japan and Canada. These bilateral trust measures have been previously used by Guiso et al. (2004) who show the are strongly correlated to measures of genetic similarity between countries (measured using DNA distance), cultural similarity between countries (measured using religious distance) and previous military engagements (measured by years at war since 1000). For example, the French and the British have very low bilateral trust measures, reflecting their 198

years of warfare since year 1,000 and Catholic versus Protestant religious majorities, while the French and Belgians have very high bilateral trust.

We use the World Values Survey also to measure the relative importance of different religions in the country or region of interest, using the information provided on the religious denominations of the respondents. Following La Porta et al (1997), the main variable of interest HIER is the percentage of the population belonging to a "hierarchical religion", defined as Catholic, Islamic or Eastern Orthodox.

The correlation between HIER and Trust is 0.67, significant at the 1% level. These country aggregates hide a substantial within country and cross-regional variation. This is apparent from Figure 1, which plots the median, minimum and maximum of the regional levels of trust and hierarchical religions. In order to exploit this within country variation for identification, we allocate each plant to a well specified geographical region, and use the relevant WVS aggregate for our analysis[17].

IV. DESCRIPTIVE STATISTICS

IV. A Decentralization

Our preferred measure of decentralization is an average across four standardized measures of plant manager autonomy related to hiring decisions, capital expenditures, marketing initiatives and product innovations. The resulting variable is what we define as decentralization (or autonomy of the plant manager).

Table 1 summarizes the distribution of decentralization across the sample, reporting the average levels of the four variables contributing to our decentralization measure at different points of the distribution. For example, in the most centralized firms (the ones at the lowest quartile of the

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[17] The precision of the WVS variables is dictated by the level or regional detail provided in the survey. This varies somewhat across countries. For example, in the US, China and India a region is a group of states, while in Europe a region is a much narrower geographical entity, coinciding with a NUTS2 or NUTS3 region. To correct for these cross country differences in the regional definition, we weight each regression by the ratio between the number of respondents in the region and the overall number of respondents in the country. The regional breakdown is satisfactory in most countries, except for Greece, where the regions provided in the WVS would leave about 50% of our Greek sample out of the analysis. For this reason in Greece we derive the trust measure from the European Social Survey, (ESS) which has a very similar measure of trust and a much richer regional breakdown. See Appendix B for details

decentralization distribution, ranging between -2.01 and -0.77) the plant manager has very little influence on hiring decisions (even for simple replacements), does not contribute to production introduction decisions, does not participate to the marketing activity of the plant and – at the median – has zero autonomy on investment decisions. For the plants in the top quartile of the decentralization distribution (ranging between 0.65 and 2.68), the plant manager is able to hire employees without any intervention from the central headquarters, has some role (although this is almost never exclusive) in both new product introductions and marketing decisions, and has a median investment autonomy of $16,350.

Figure 3 shows the distribution of the decentralization variable across countries. It is clear that there is a huge amount of heterogeneity, even within countries. About 15% of the overall variance in firms' average decentralization is across countries, 55% is across countries by three-digit industry, and the remaining 45% is within country and industry.

The cross country averages of decentralization shown in Figure 4 reveal some interesting patterns. Firms located in Asia (China, Japan and India) tend to be much more centralized than firms located in Anglo-Saxon (Germany, UK and US) and Scandinavian (Sweden) countries. The rest of Europe tends to be in the middle of the decentralization ranking – with the exception of firms located in Greece, which appear to be very centralized. The differences between the three groups of countries are statistically significant at the 1% level, even when we include the firms' and measurement error controls. Table A.2 in Appendix provides more details behind these cross-country comparisons and reveals that, while Sweden, the UK and the US are at the top of the decentralization distribution across all four dimensions, for the rest of the countries the ranking varies. For example, Germany tends to be closer to the other European countries included in our sample (i.e. less decentralized) with regards to the hiring and firing autonomy of the plant manager. On the other hand, plant managers working in Japan have limited autonomy. This is particularly true for the hiring of new workers, which is highly centralized in Japanese firms. Japanese firms, however, do provide much more autonomy over capital expenditures, which is similar to European countries, and Japanese workers also have high levels of autonomy.

IV. B External Validation

A possible concern is that the cross country differences in decentralization emerging from our study may reflect the specific characteristics of the firms which participated in the survey (e.g.

manufacturing, small and medium size firms etc), rather than more general organizational features. So to validate our decentralization measures we compared it the two other cross-country decentralization indices that exist in the literature.

The first is the Power Distance rankings created by Hofstede (2001). The Power Distance Index (PDI) is a measure of interpersonal power or influence between a boss and its subordinate, built out of successive attitudinal surveys conducted on more than 70,000 IBM employees across approximately 50 countries in the 1970s. Where our decentralization variable provides a factual description of the average autonomy allocated to the plant-managers, the PDI measures the subjective perceptions and the *preference* for hierarchical vs. consultative approaches in the exercise of power among non-managerial IBM employees which took part in the survey. More specifically, the concept of Power Distance is based on the employees' answers to specific questions related to a) Non-managerial employees' perception that employees are afraid to disagree with their managers; b) Subordinates' perception that their boss tends to take decisions in an autocratic or paternalistic way; c) Subordinates' preference for anything but a consultative style of decision making (i.e. autocratic, paternalistic or democratic). These three questions are aggregated up into a single measure to create the PDI, where high values reflect non-managerial employees perceptions of and preferences for a greater degree of self-determination.

Figure 5 shows that the correlation between country level averages of the Power Distance Index and our decentralization measure is extremely high (correlation 0.80, significant at the 1% level). This is reassuring since it suggests that – on average - our decentralization variable captures long-lived organizational traits, varying across countries within the same firm, rather than specific characteristics of the firms included in our sample.

The second cross-country decentralization indices are those created by Arzaghi and Henderson (2005) to evaluate fiscal decentralization across countries. They generated an index on a 0 to 4 scale that averaged over scores for decentralization of Government structure (unitary versus federal) and the degree of autonomy and democratization of state/province and municipal government over taxation, education, infrastructure and policing. Values of 0 denotes the country is fully centralized across every dimension, while a value of 4 denotes a highly decentralized fiscal structure. This measure was calculated for every country with 10 million or more employees in 1995, which includes all of our twelve countries except Portugal and Sweden.

Figure 6 shows this fiscal decentralization index plotted against our firm-level decentralization measure, where these are clearly highly correlated (correlation of 0.827, significant at the 1% level). Thus, countries in our sample with decentralized firms also tend to have decentralized Governments.

V. ECONOMETRIC RESULTS

V.A Decentralization and Product Market Competition

As discussed in the theory section, many authors have speculated that competition may have stimulated decentralization, perhaps because of the greater time sensitivity of decisions and therefore the greater implied value of the manager's local knowledge. Table 2 examines this for the first time on cross country micro-data with exactly comparable measures of decentralization. We use three broad measures of product market competition following Nickell (1996) and Aghion et al. (2005). The first measure is the degree of import penetration in the country by two-digit industry measured as the share of total imports over domestic production. This is constructed for the 5-year period 1999-2003 to remove any potential contemporaneous feedback. The second is the country by three digit industry Lerner index of competition, which is (1 – profits/sales), calculated as the average across the entire firm level database (excluding the firms in the survey). Again, this is constructed for the 5-year period 2000-2004 to remove any potential contemporaneous feedback. [18] The third measure of competition is the manager's response to the survey question on the number of competitors a firm faces (see Appendix A3), valued zero for "non competitors", one for "less than 5 competitors", and two for "5 or more competitors".

In column (1), we see that greater import competition is positively and significantly associated with greater decentralization (coefficient 0.131, standard error 0.050). In column (2), we re-estimate the same specification but now include a full set of controls including skills, size, multinational status, a full set of country and three-digit industry dummies. Even after conditioning on these additional covariates we find that the more competitive country-industry pairings contain firms that are on average significantly more decentralised (coefficient 0.184, standard error 0.073). In terms of our

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[18] The 1999 data was not available in the Oriana accounting database for China and Japan, so we kept to a common set of years for all countries.

key covariates, larger firms tend to be more decentralized, as do larger plants within a firm: this probably reflects a greater complexity in managing large-scale organizations. We also find that foreign multinationals are more decentralized relative to both home country multinationals and purely domestic firms. Again this could reflect complexity, and we will examine the multinational relationship with decentralization in more detail below. Finally, more skilled firms are more likely to be decentralized which is consistent with the idea that higher human capital workers will find it easier to deal with decision making.

In columns (3) and (4) of Table 2, we run two identical specifications but use the lagged industry-level (inverse) Lerner index as an alternative measure of competition. We again find a significant and positive association between competition and decentralization (the coefficient on the Lerner index is 2.265 and the standard error 1.081 in the specification with the full set of controls). In columns (5) and (6), we run two further similar specifications using the plant manager's own self reported measure of the number of competitors he perceived he faces. Again we find a positive and significant association: the more rivals a firm perceives it faces the more decentralised it appears to be (the coefficient on the number of competitors is 0.094 and the standard error 0.034 in the specification with the full set of controls).

The magnitude of the competition effect on average decentralisation scores is of economic as well as statistical significance. For example in column (6) increasing the number of competitors from zero to five is associated with an increase in the decentralization index of 0.184, 18.4% of a standard deviation.

V.B Decentralization and Trust

Although competition is associated with more decentralization, the desired organizational form may be infeasible in low trust environments as discussed in Section III. Column (1) of Table 3 presents the results of regressing our decentralization measure against average trust in the region of the country where the plant is located, with no other controls. The relationship between decentralization and trust is positive and highly significant (coefficient 1.196, standard error 0.429). A possible concern is that high levels of trust could simply proxy for better law enforcement, which in turn may facilitate decentralization even in low trust areas. Therefore, in column (2) we include "Rule of

Law" an indicator developed by the World Bank[19]. The Rule of Law variable has a positive and significant coefficient and reduces the coefficient on trust from 1.196 to 0.825. Nevertheless, the trust variable remains significant at the 1% level.

Country level indices such as the rule of law are problematic because they could be correlated with many omitted unobserved country-level factors. In column (3) we include country level fixed effects to control for these, so that the trust coefficient is identified only from within country across region variation. We also control for the same set of firm controls in Table 2 and also for regional-level observables that could be correlated with both trust and decentralization (GDP per capita and population)[20]. We find that the coefficient on trust falls slightly to 0.732, but remains positive and significant at the 5% level. In column (4) we show that the association between trust and decentralization is robust to the introduction of the product market competition variables discussed in the previous table. Consistent with the results shown in Table 2, competition is significantly associated with higher decentralization, but the trust coefficient is essentially unchanged[21]. Finally, in column (5) we check whether the trust result may simply capture generalized social capital effects. In order to test this hypothesis, we look at the relationship between decentralization and "CIVIC", a variable constructed from the World Value Survey and widely adopted in the Social Capital literature[22], with higher values signifying a higher leniency towards "uncivil" behaviors. We can see that the relationship between CIVIC and decentralization is insignificant, and leaves the coefficient on trust practically unchanged.

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[19] This measures "the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence" (Kaufmann et al, 2007).

[20] The results are unchanged when we include measures of regional skills, which is positive but insignificant.

[21] The trust coefficient is positive and significant even when we use the alternative measures of competition, The coefficient is 0.603 (standard error 0.253) when we use the import penetration measure, and 0.417 (standard error 0.193) when we use the Lerner index.

[22] Respondents were asked to assign a score between one and ten as to whether they agreed that certain behaviors were justified, with a one indicating the behavior was never justified and a ten indicating that the behavior was always justified. The five behaviors are (1) claiming a government benefit to which you are not entitled, (2) avoiding a fare on public transport, (3) cheating on taxes if you have the chance, (4) buying something that you knew was stolen and (5) accepting a bribe in the course of one's duties. The CIVIC variable is the sum across the five different questions and may range between 5 and 50. The average value of CIVIC in the regression sample is 9.60, and the correlation of the variable with trust is -0.56, significant at the 1% level.

The size of the trust association is substantial – for example moving from Sweden to Portugal, the highest and lower average trust countries respectively, would be associated with a decrease in the decentralization score of 0.249, 1/4 of the cross-firm standard deviation.[23]

Multinationals

Our sample covers public and private firms across all 12 countries, so it includes a number of multinational subsidiaries. Looking more closely at the multinational subsidiaries is interesting for two reasons. First, we are interested in whether characteristics (like trust) in the multinational's country of origin have an association with the organizational structure in the multinational's foreign affiliate. This has long been a pre-occupation of business case studies, and the more recent trade literature on the organization of multinationals.[24] Second, we can include regional fixed effects when conducting this type of analysis, thereby removing any bias associated with other regional characteristics correlated with local trust that could be driving decentralization. This also includes any potential language or national bias in the interview process, since multinationals are always interviewed in the local language, with the question on the ownership of the firm only asked at the end of the interview.

The key hypothesis that we want to study is whether the organization of these types of plants is influenced by the level of trust prevailing in their country of origin (i.e. where the headquarters of the multinationals are located). The results of this analysis are shown in Table 4. These regressions are based on the specification of column (3) in Table 3, where we test the relationship between decentralization and trust (measured in the region of the plant's location), except for the inclusion of two digit rather than three digit industry controls due to the much smaller sample size we obtain when conditioning solely on the population of multinational firms. Column (1) shows that in the overall sample, the trust variable remains positive and significant, even with this slightly different specification (coefficient 0.672, standard error 0.295). In column (2) we repeat the specification constraining the sample to be only foreign affiliates of multinationals. Although the magnitude of the coefficient on trust is comparable to column (1), the variable is not significant at conventional levels. To examine whether the organizational structure of foreign subsidiaries is influenced by the level of trust prevailing in their country of origin, we add to the baseline specification the average

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[23] Using the coefficient in column (3) and the average trust in Sweden and Portugal.
[24] See, for example, Antras et al. (2008) or Burstein and Monge (2008).

level of trust in the country where the headquarters of the firm owning the plant are located.[25] Column (3) shows that subsidiaries of firms headquartered in high-trust countries tend to be significantly more decentralized, and that the magnitude of trust variable measured in the country of origin is very similar to that in the region where the plant is located (coefficient 0.749, standard error 0.301). Working with the trust variable measured in the country of origin allows us to include as additional controls a full set of regional dummies. By doing this, we can examine the association between decentralization and trust abstracting for all the time-invariant characteristics of the region of location. In column (4), we see that the inclusion of the regional dummies does not affect the significance and the magnitude of the trust coefficient, which remains significant at the 5% level (coefficient 0.698, standard error 0.331).[26]

In column (5) we restrict the sample to European multinationals for which the have the bilateral trust data for their country of origin towards their country of location. These results are similar to those in column (3), suggesting that this sub-sample of European multinationals is representative of the larger sample. In column (6) we also include the bilateral trust measures. For each multinational this is the trust score of its origin country towards its location country as described in section III. Interestingly, this is significantly associated with decentralization – subsidiaries of firms in countries the multinational's parent country tends to trust (like French subsidiaries in Belgium) are typically more decentralized than subsidiaries in countries the multinational's parent country does not trust (like French subsidiaries in Britain). Finally, in column (7) we include both a full set of country location and origin dummies, so that we are only identifying the trust effect of the pair wise variation in trust. Even in this exacting specification higher trust is associated with significantly more decentralization.

V.C Decentralization and Hierarchical Religions

As discussed in the theory section religion could be linked to the decentralization of firms due to either its indirect impact on trust, or more directly through it links with a managerial "taste" for autonomy. Following La Porta et al (1997), the main variable of interest is the percentage of the population belonging to a "hierarchical religion", defined as Catholic, Islamic or Eastern Orthodox.

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[25] Note that the clustering is now based on region-country or origin pairings.
[26] We experimented by including the Rule of Law index from the multinational's home country, and find that this variable is insignificant (point estimate -0.112 and standard-error 0.106). This suggests that not every factor in the multinational's home country is important for local decentralization, but only those that are likely to be transplanted abroad in the multinational's managerial and organizational structure.

The results of the analysis are shown in Table 5. Column (1) starts by regressing the decentralization variable against the religion measure relative to the region where the plant is located, with no extra controls except for GDP per capita and population in the country of location. Firms located in regions with a high share of hierarchical religions tend to be significantly less decentralized than others (coefficient -0.560, standard error 0.161). Column (2) shows that the hierarchical religion effect is robust to the inclusion of the rule of law index, although since these are negatively correlated, this does substantially reduce the point estimate on hierarchical religions, which falls to -0.302, standard error 0.119). Column (3) show that the hierarchical religion effect is also robust to the inclusion of a full set of country, noise, industry, firm and regional controls, plus our measures for trust and competition (in this specification the coefficient on the hierarchical religion variable is -0.552, standard error 0.205). So variations in the density of hierarchical religions across regions within the same country appear significantly correlated with more centralized production even after controlling for trust, suggesting that the role of hierarchical religion goes beyond the trust effect highlighted in the prior literature. [27] In Column (4) we use the sub-sample of foreign multinational subsidiaries and find that – similarly to trust – subsidiaries of firms headquartered in countries with a high share of hierarchical religions tend to be significantly less decentralized than others (coefficient -0.368, standard error 0.149). This suggests the mechanism linking religion with decentralization is transplanted abroad by multinationals.

The size of this relationship is reasonably large, so for example based on the column (3) specification going from Sweden to Greece is associated with a reduction in decentralization of -0.261, about 1/3 of a standard deviation.

V.D Extensions and Robustness

To investigate the robustness of these results, Table A1 in Appendix A re-estimates the specification from column (3) in Table 5 on various sub-samples and different measures of decentralization. In general the point estimates of the coefficients of the key competition, trust and religion variables are robust across sub-samples.

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[27] We ran a series of robustness tests, for example dropping the US where religious affiliation is primarily correlated with recent immigration patterns rather than historic variation, and found the point estimate on HIER rises to -0.612 (standard error of 0.178) in the basic column (1) specification. We also regressed decentralization on the shares for individual religious blocks (with atheist as the baseline) and found coefficient (standard errors) of -0.452 (0.218), -3.707 (0.438) and -2.158 (1.107) on the share of Catholics, Orthodox and Muslims in the region respectively.

The first column of Table A1 simply reproduces the results from column (3) in Table 5 for ease of comparability. The second and third columns re-estimate this on the sub-sample of firms with only one production plant and those with multiple production plants respectively. The coefficients on the key competition trust and religion variables all have the same signs, and while being somewhat larger and more significant in the multi-plant firm sample are not significantly different from the full sample in either sub-sample. In columns (4) and (5) we split by whether the CEO is on the production site being interviewed. Interestingly, these two samples have similar coefficients on competition and religion, but for the sites where the CEO is not on-site the trust variable is notably higher, consistent with the idea of trust being more important for longer distance relationships. In column (6) we restrict the sample to firms with 250 to 5000 employees, to restrict to the larger firms in our sample without any notable change in key coefficients. In column (7) we restrict the analysis to privately held firms to control for potential sampling bias with publicly listed firms, and again find similar results on the key variables. Column (8) looks at the ten OECD countries, again finding very similar results[28].

Our Bloom and Van Reenen (2007) management practices measure is included in Column (10), which is highly significant suggesting (not surprisingly) that better runs firms tend to be more decentralized. We also find again that the key results on trust, competition and hierarchy are broadly unchanged. Column (11) shows that the results are robust when we build the decentralization measure without the continuous variable expressing the maximum investment autonomy enjoyed by the plant manager, while column (12) shows the results of the regression once the decentralization variable is built exclusively from the investment autonomy question. Columns (13) and (14) illustrate the results across the domestic and Foreign Multinationals sample, while columns (15) and (16) look at the sub-sample of firms where the percentage of employees is below and above the sample median (11%). Columns (17) and (18) run robustness tests on the multinationals results. Column (17) displays the results from re-running our baseline specification of column (3) in Table (4), but restricted to the sub-sample of multinational subsidiaries for which we have the global assets, a measure of the multinational groups overall size. Column (18) includes this global assets measure, which is significant suggesting larger multinationals tend to decentralized more, although this does not impact the key result on trust. Column (19) re-runs our baseline specification of

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[28] In China and India despite the much smaller sample size (487 firms), the competition and religion variables are still significant. In the China and India sample, however, the trust term falls substantially suggesting this may be measured with more error and/or play a lesser role in China and India.

column (3) in Table (4), but restricted only to firms who reported having no managers from the multinationals home country.[29] As can be the trust by country of origin is still statistically significant, suggesting even multinationals who hire domestic employees adopt some organizational practices of their country of origin. Column (20) drops the Muslims from the definition of a hierarchical religion and finds very similar results, reflecting in part the very low share of Muslims in our sample countries.[30]

Finally, in column (21) we use our alternative worker autonomy measure, based on questions D6 and D7 in Appendix A, which evaluate the extent to which workers (rather than managers) control the allocation of tasks and the pace of work in the factory. We find the worker autonomy is also significantly increased by higher competition and greater trust. The hierarchy variable is still negative but its point estimate for the worker autonomy measure is about one third that for the standard (plant-manager) decentralization measure.

V.E Quantification of cross-country differences in decentralization

To evaluate the role of our competition, trust and religion terms we undertake a quantification of these in terms of their ability to account for the cross-country variation in decentralization. The results of this exercise are shown in Table 6. We start in column (1) by regressing the sample against the survey noise controls[31], and find these account for around 5.5% of the total sample variation in decentralization. Adding a full set of 11 country controls increases the R^2 to 19.1%, suggesting that country effects can account for an additional 13.6% of the variation in decentralization after controlling for sampling noise. In column (2) we include controls for public listing, firm and plant size and 132 three digit industry dummies, and find the country controls now account for only 10.6% of the residual variation. Hence, basic firm characteristics and industry effects can account for around 22% (calculated as (0.136-0.106)/0.136) of the cross- country variation in decentralization.

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[29] In our sample we found that multinationals had on average 93.8% of managers from the location country, 4.1% from the source country and 2.1% from all other countries. Hence, medium sized manufacturing firms appear to typically employ domestic managers in their overseas subsidiaries.

[30] Only India has a significant share of Muslims. We undertake this robustness test because Sunni Muslims (the predominant group in India) do have the same type of hierachical religious structure and orthodoxy as Catholicism and Christian Orthodoxy (see Allen, 1995) so their inclusion within the hierachy measure could be disputed.

[31] The noise controls here exclude the interviewer dummies. The reason is these are heavily correlated with the country dummies (as interviewers tended to focus on one country), so including these makes it hard to separately identify the additional explanatory power of country dummies.

After controlling for potential sampling differences, industry composition and survey noise, we find in column (3) that competition can account for an additional 4.8% (calculated as (0.106-0.099)/0.136) of the cross country variation. In column (4) we then add in the trust variable and find this accounts for another 7.4% (calculated as (0.099-0.089)/0.136) of the cross-country variation. Columns (6) then adds in the religion term and finds this accounts for a further 10.3% (calculated as (0.089-0.075)/0.136) of the cross country variation. Hence, taken together competition, trust and religion can account for about 23% of the cross-country variation in decentralization.

In column (6) we control for the additional firm level skill and multinational ownership factors that were significant in Tables 2 to 5 and find these are again highly significant, but together only account for another 2.9% (calculated as (0.075-0.071)/0.136) of the cross-country variation

Finally, in column (7) we add in the rule of law variable, which we know from Tables 3 and 5 is significantly correlated with decentralization across the 12 countries. We see this accounts for a further 21.3% (calculated as (0.071-0.042)/0.136) of the residual cross-country variation in decentralization. One tricky issue in interpreting the rule of law measure index is this is well known to be strongly correlated with, and potentially driven by, income (see, for example, La Porta et al. 1997 and Glaeser et al. 2004), which hazards against a causal interpretation. However, in Tables 3 and 5 we found that the rule of law index was significantly correlated with decentralization even after controlling for regional GDP, with a very similar point estimate, suggesting its effect is not primarily as a control for the level of development.

Figure 7 plots the country level raw decentralization levels, plus the predicted values from the final column of Table 6. Across countries the predicted fit for decentralization is reasonably good. For example, Sweden has a high predicted level of decentralization due to its high trust, Protestant religious mix and relatively high levels of competition. At the other extreme Greece has centralized firms due to its low trust, high share of Orthodox Christians and low competition.

The notable outlier on this plot is Japan, which is predicted to have a level of decentralization around the sample mean but actually displays very centralized production. One puzzling fact is that we find

Japanese firms are extremely good at adopting Lean manufacturing in our survey[32]. Lean manufacturing includes practices such as worker *autonomation* (limited worker self-management), the involvement of workers in continuous improvement and the ability of workers to stop the production line. What the survey suggests is that plant managers in Japan do not enjoy the same relatively high level of autonomy as their workers do from the plant managers.[33] So decision making rights in Japan appear more concentrated at the top and bottom of the firm, and not in the hand of the plant managers.

VI. CONCLUSIONS

Despite many theoretical advances the empirical literature on organizational economics lacks comparable measures of firms' internal organization across many countries. We collect original data on decentralization across many thousands of firms in twelve countries to address this lacuna.

Three factors stand out as important in determining decentralization. First, stronger product market competition, measured in a variety of ways is associated with greater decentralization. This is consistent with the idea that time based competition makes local managerial knowledge more important increasing the efficiency of decentralization. However, efficient decentralization may be infeasible. We argue that firms located in high trust areas will find it easier to reach the co-operative outcome of decentralization. We find persuasive evidence that high trust regions tend to have more decentralized organizations, even after controlling for size and a range of other factors. Finally, we show that hierarchical religions appear to have an independent influence, reducing the degree of decentralization. These three factors – competition, trust and hierarchical religions – appear to account for almost 25% of the cross country variation in decentralization, suggesting they are also quantitatively important. We suggest that environments where competition and trust are higher may, in recent years, have enjoyed higher productivity growth since information technology is complementary with more decentralized organizations.

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[32] In the management component of the survey we have two questions on Lean manufacturing processes, with Japanese firms having the highest average scores for the adoption on Lean manufacturing by domestic firms.

[33] Anecdotally this was consistent with the experience of the interviewers in Japan, who reported that Japanese plant managers would frequently contact their Corporate Head Quarters to request permission to take part in the interview. In Europe, and especially the US, this happened less frequently with managers typically deciding on the spot whether to accept the interview propostion.

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FIGURE 1A – TRUST BY COUNTRY AND REGIONAL DISPERSION
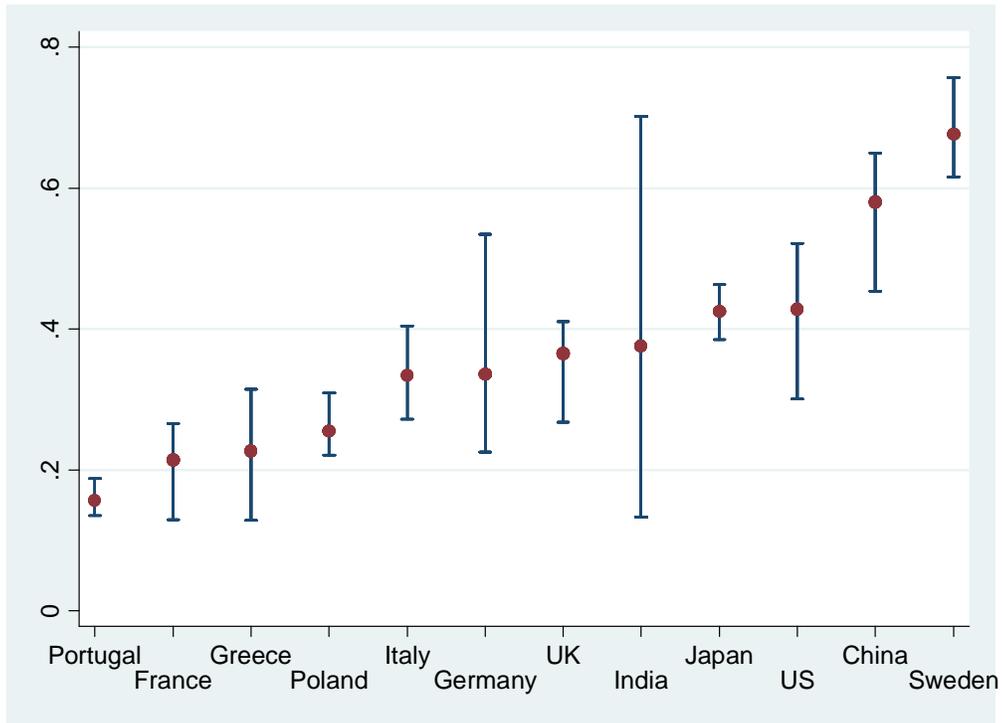
Notes: The graph shows median level of trust. The vertical bars denote minimum and maximum levels.

FIGURE 1B – HIERARCHICAL RELIGION COUNTRY AND REGIONAL DISPERSION
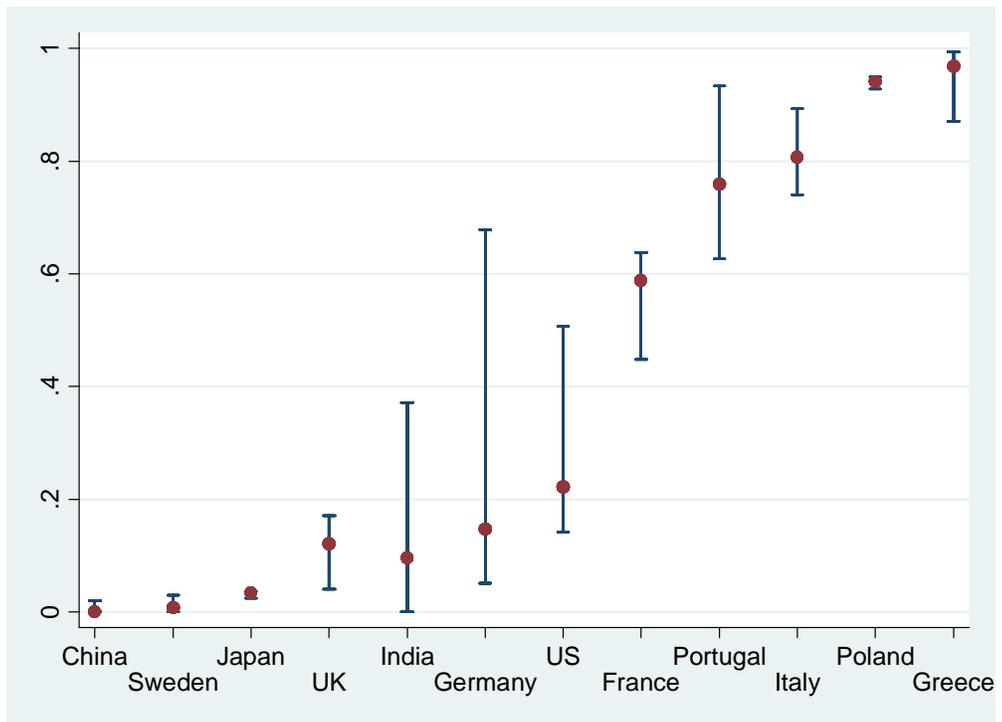
Notes: The graph shows median level of hierarchical religion. The vertical bars denote minimum and maximum levels.

FIGURE 2 – EXAMPLES OF FIRM ORGANIZATIONAL STRUCTURES

Example A:
US Domestic Firm
2 Sites, Single Plant

Central HQ
(New York Site)

D, Decentralization

Plant
(Phoenix Site)

A classic case

Example B:
US Domestic Firm
Multi-Site, Multi-Plants

Central HQ
(New York Site)

D1   D2   D3

Plant 1   **Plant 2**   **Plant 3**
(Detroit Site)   **(Phoenix Site)**   **(Scranton Site)**

We typically observe just one plant per firm & assume this is representative, but sometimes we sample more than 1 plant

Example C:
US Domestic Firm
Single site, Single plant

Central HQ   D   **Plant 1**
(Phoenix Site)   **(Phoenix Site)**

Some firms have a site with multiple "buildings", such as a CHQ and production plants. We only keep these if the plant manager is <u>not</u> the CEO, as decentralization is still possible even if the CEO is on-site (think of Universities, which typically have one-site but Departmental Heads have some autonomy from the Dean). We also test robustness to this assumption in Appendix A.

Example D
Japanese MNE

We have affiliates of multinationals if they are under 5000 workers. We Measure D between the domestic CHQ and the plant manager.

Global HQ
(Tokyo Site)

Do not observe D

French CHQ   **Sweden CHQ**
(Paris Site)   **(Stockholm Site)**

Do observe D   Do observe D

Plant 2   **Plant 1**
(Lyon Site)   **(Lund Site)**

FIGURE 3 – DISTRIBUTION OF THE DECENTRALIZATION VARIABLE BY COUNTRY
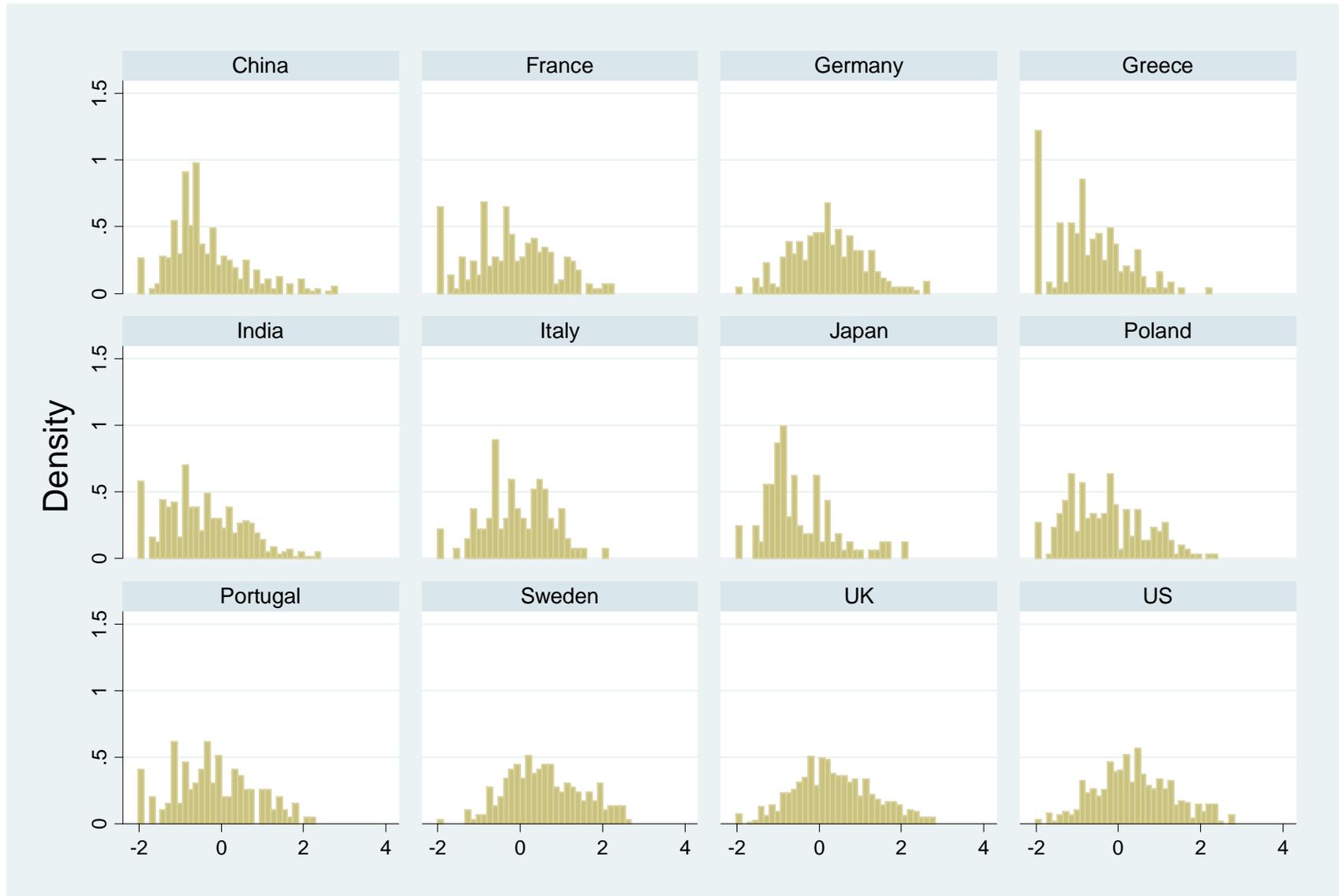
NOTES: These are the distributions of the standardized decentralization scores (averages across 4 decentralization questions for each firm). N=3549.

FIGURE 4 - AVERAGE DECENTRALIZATION BY COUNTRY
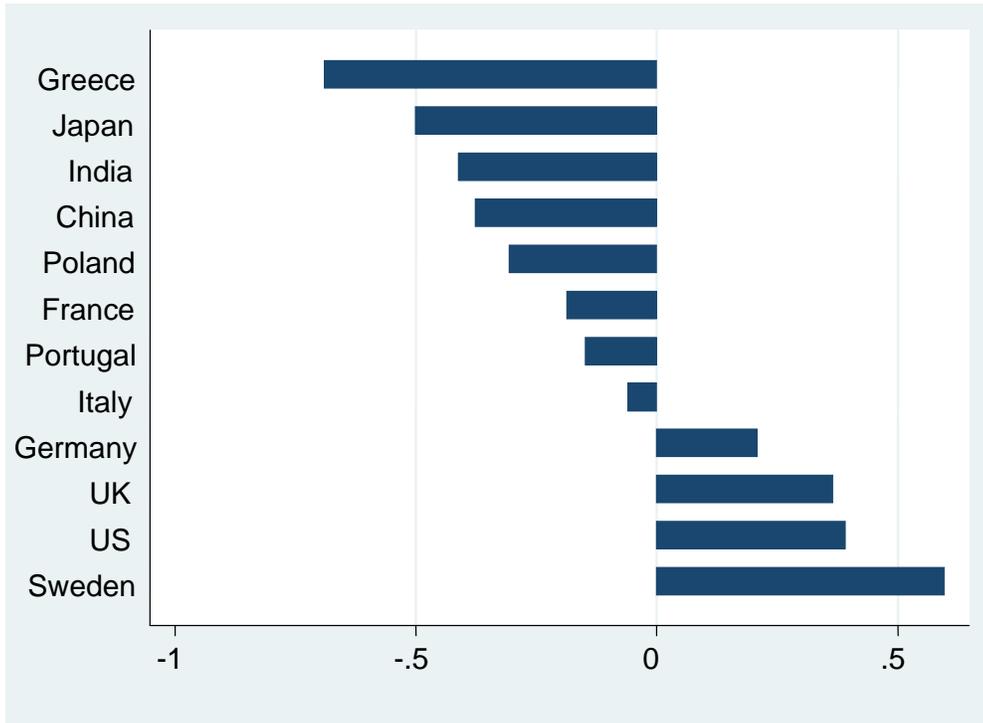
Notes: The graph plots average decentralization by country. N=3549.

FIGURE 5 - DECENTRALIZATION AND POWER DISTANCE INDEX BY COUNTRY
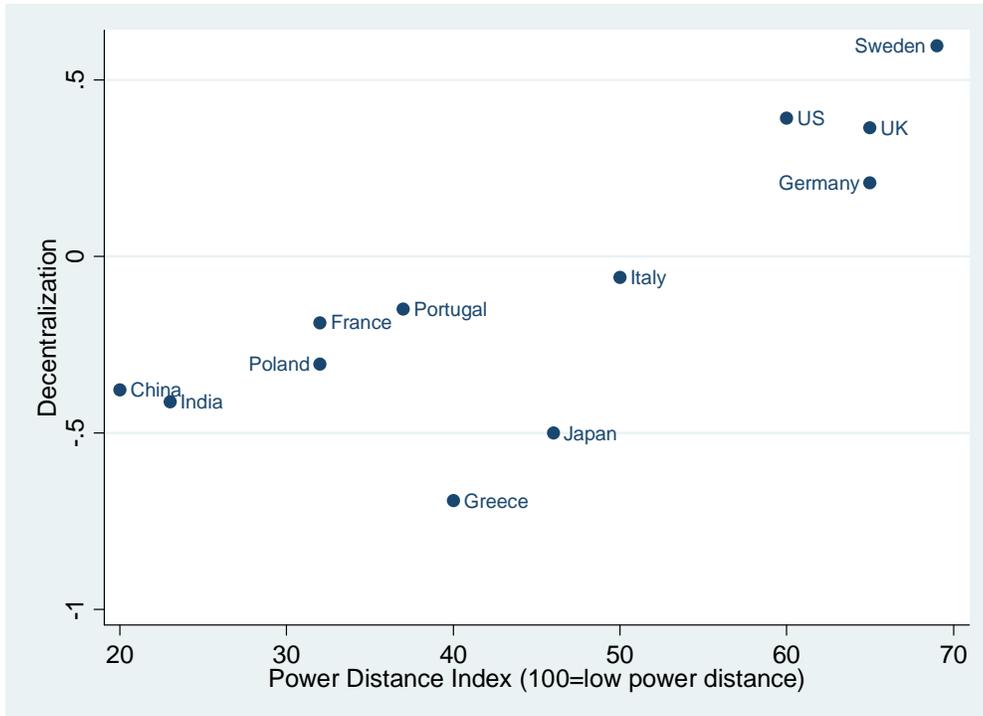
Notes: The graph plots the average level of decentralization by country (built on 3559 observations) against the Power Distance Index (Hofstede, 1980).

FIGURE 6 – FIRM AND FISCAL DECENTRALIZATION BY COUNTRY
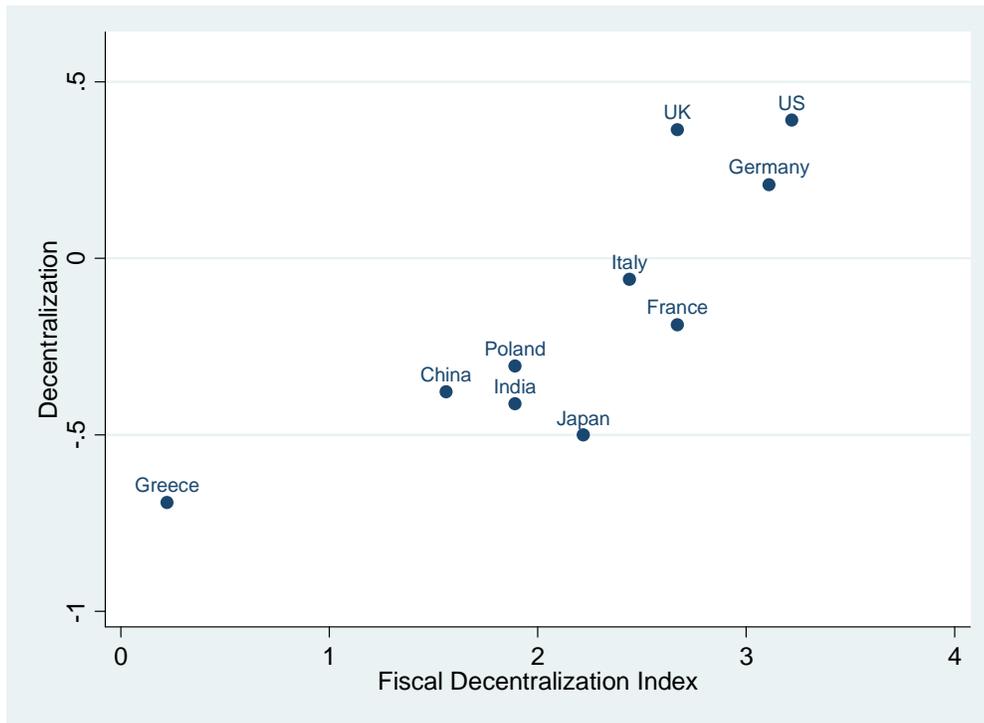
Notes: The graph plots the average level of decentralization by country (built on 3237 observations) against the Fiscal Decenrtralization Index (Arzaghi and Henderson, 2003).

FIGURE 7 - QUANTIFICATION
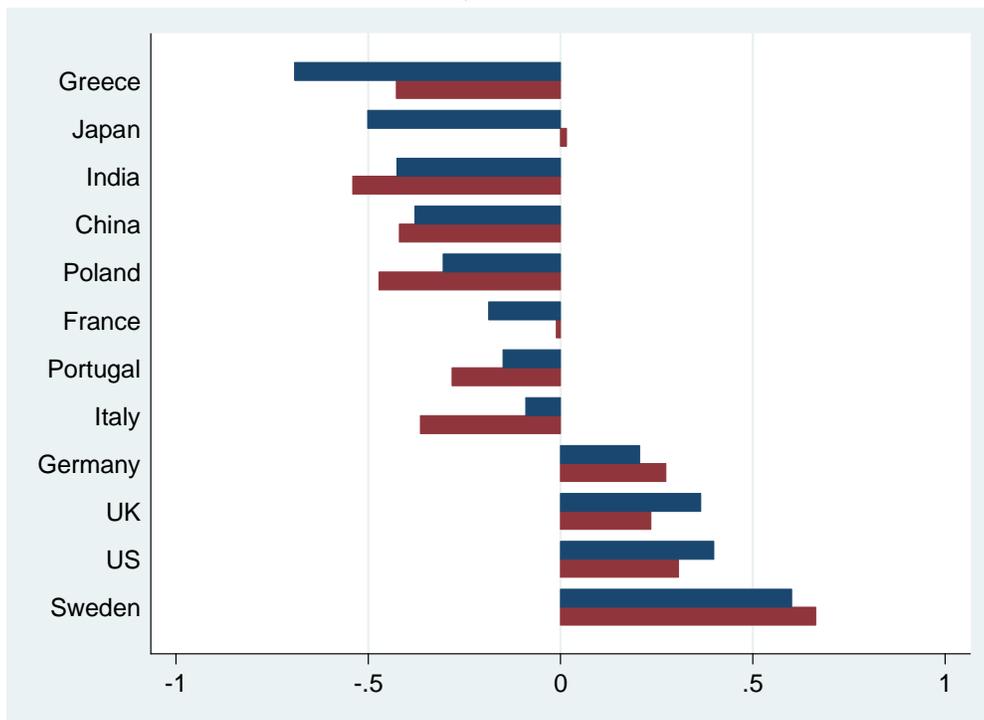
Notes: The raw average of decentralization is in the upper dark blue bar for each country level, while the predicted level based on column (8) in Table 6 is the lower red bar

TABLE 1
INTERPRETING THE DECENTRALIZATION VARIABLE

	Summary Statistics by Quartiles				Means of Individual Decentralization Components by Quartiles			
	Mean	Min	Max	Standard Deviation	Hiring (1 to 5)	Marketing (1 to 5)	Product Introduction (1 to 5)	Investment (Median, in $)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1st Quartile	-1.22	-2.01	-0.77	0.36	1.84	1.14	1.35	0
2nd Quartile	-0.40	-0.76	-0.08	0.20	2.90	1.41	1.75	2,000
3rd Quartile	0.20	-0.07	0.65	0.20	3.73	1.92	2.47	6,900
4th Quartile	1.33	0.65	2.68	0.52	4.18	3.66	3.80	16,350
All	0.00	-2.01	2.68	1.00	3.16	2.03	2.34	3,300

Notes: Columns 1-4 contain, respectively, the mean, minimum, maximum and standard deviation of the decentralization variable for different quartiles of its distribution. Columns 5-8 show the means of the individual components of the decentralization variable (hiring, marketing, product introduction autonomy on a scale from1 to 5, and the maximum investment that can be made by the plant manager without prior authorization from the Central Headquarter) according to the different quartiles of its distribution.

TABLE 2
DECENTRALIZATION AND COMPETITION

	(1)	(2)	(3)	(4)	(5)	(6)
Import Penetration (3 years lagged)	0.131*** (0.050)	0.184** (0.073)				
Industry Lerner index of Competition (3 years lagged)			6.537*** (1.176)	2.265** (1.081)		
Number of Competitors (0=none, 1=between 1 and 4, 2=more than 4)					0.134*** (0.036)	0.094*** (0.034)
Plant Skills % Plant employees with a College degree		0.081*** (0.018)		0.090*** (0.016)		0.090*** (0.016)
Ln(Firm N) Firm Size		0.076*** (0.026)		0.068*** (0.017)		0.066*** (0.018)
Ln(Plant N) Plant employees as a % of firm		0.119*** (0.024)		0.091*** (0.022)		0.090*** (0.022)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational		0.128*** (0.048)		0.099*** (0.038)		0.107** (0.042)
Domestic MNE Dummy=1 if firm belongs to a domestic multinational Omitted base is purely domestic firms		0.013 (0.058)		-0.003 (0.049)		-0.000 (0.044)
Observations	2497	2497	3587	3587	3587	3587
Industry dummies (112)	No	yes	no	yes	no	Yes
Country dummies (12)	No	yes	no	yes	no	Yes
Other controls (60)	No	yes	no	yes	no	Yes
Clustering	Country *Isic2	Country *Isic2	Country *Sic3	Country *Sic3	None	None

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Estimation by OLS with robust standard errors in parentheses. Standard errors are clustered at the same level as the relevant competition measure (as noted in the table). "Lerner" is the median of 1-(profit/sales) in the three digit industry in the country of location averaged between 2000 and 2003 (computed from Amadeus and Oriana). Import Penetration is the ratio of imports over production in the two digit industry (ISIC) in the country of location averaged between 1999 and 2003 (computed from OECD STAN Database). "Number of competitors" is taken from the survey and is the number of rivals the manager perceives he faces. "Other controls" include a dummy for whether the firm is publicly listed, a dummy for whether the CEO is on the same site as the plant ("CEO onsite") and "Noise controls" (these include 44 interviewer dummies, 6 dummies to control for the day of the week the interview took place, an interview reliability score, the manager's seniority and tenure, the duration of the interview, and 4 dummies for missing values in seniority, tenure, duration and reliability).

TABLE 3
DECENTRALIZATION AND TRUST

	(1)	(2)	(3)	(4)	(5)
Trust (region) Trust measured in firm's region of location	1.196*** (0.429)	0.825*** (0.290)	0.732** (0.298)	0.751** (0.299)	0.749** (0.301)
Rule of law (country) (-2.5=low, 2.5=high)		0.473*** (0.102)			
Number of Competitors (0=none, 1=between 1 and 4, 2=5 or more)				0.097*** (0.031)	0.098*** (0.031)
Civic (region) (5=high civic sense 50=low civic sense)					0.010 (0.023)
Plant Skills % Plant employees with a College degree			0.094*** (0.016)	0.093*** (0.016)	0.093*** (0.016)
Ln(Firm N) Firm Size			0.044** (0.021)	0.043** (0.021)	0.043** (0.021)
Ln(Plant N) Plant employees as a % of firm			0.091*** (0.029)	0.088*** (0.029)	0.089*** (0.029)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational			0.165*** (0.057)	0.169*** (0.057)	0.170*** (0.057)
Domestic MNE Dummy=1 if firm belongs to a domestic multinational Omitted base is purely domestic firms			0.027 (0.043)	0.028 (0.044)	0.029 (0.043)
Observations	3549	3549	3549	3549	3549
Country controls (2)	no	Yes	yes	yes	yes
Regional controls (2)	no	No	yes	yes	yes
Industry dummies (112)	no	No	yes	yes	yes
Country dummies (12)	no	No	yes	yes	yes
Other controls (60)	no	No	yes	yes	yes

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Estimation by OLS with robust standard errors in parentheses. Standard errors clustered by the firm's region of location. TRUST measures the percentage of individuals who agreed with the statement "most people can be trusted" in the firm's region of location. RULE OF LAW measures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence. The index is compiled by the World Bank (Kauffman et al, 2007), and ranges between -2.5 and 2.5. "Number of competitors" is taken from the survey and is the number of rivals the manager perceives he faces. CIVIC is an index which ranges from 5 to 50, where respondents were asked to assign a score between 1 and 10 as to whether they agreed that certain behaviors were justified, with a 1 indicating the behavior was never justified and a 10 indicating that the behavior was always justified. The five behaviors are (1) claiming a government benefit to which you are not entitled, (2) avoiding a fare on public transport, (3) cheating on taxes if you have the chance, (4) buying something that you knew was stolen and (5) accepting a bribe in the course of one's duties. "Other controls" include a dummy for whether the firm is publicly listed, a dummy for whether the CEO is on the same site as the plant ("CEO onsite") and "Noise controls" (these include 44 interviewer dummies, 6 dummies to control for the day of the week the interview took place, an interview reliability score, the manager's seniority and tenure, the duration of the interview, and 4 dummies for missing values in seniority, tenure, duration and reliability). Country controls are GDP per capita and population. Regional controls are GDP per capita and population in the region. Regressions weighted by the share of World Values Survey respondents in the region in the country.

TABLE 4
DECENTRALIZATION AND TRUST IN THE COUNTRY OF ORIGIN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample	**All firms**	**Foreign Multinationals**					
Trust (region) Trust measured in firm's region of location	0.672** (0.295)	0.609 (0.592)	0.563 (0.843)		-0.086 (1.952)	0.466 (1.908)	
Trust (country of origin) Trust measured in firm's country of origin			0.749** (0.301)	0.698** (0.331)	0.981** (0.470)	0.152 (0.557)	
Bilateral trust Trust of people from country of origin for people in country of location						1.809** (0.768)	2.101** (1.035)
Plant Skills % Plant employees with a College degree	0.090*** (0.017)	0.188*** (0.029)	0.187*** (0.034)	0.195*** (0.035)	0.153** (0.072)	0.157** (0.074)	0.209* (0.109)
Ln(Firm N) Firm Size	0.049** (0.021)	0.023 (0.032)	0.022 (0.033)	0.022 (0.034)	0.077 (0.108)	0.076 (0.106)	0.067 (0.126)
Ln(Plant N) Plant employees as a % of firm	0.104*** (0.028)	0.091 (0.065)	0.088** (0.032)	0.111*** (0.039)	0.125 (0.091)	0.140 (0.092)	0.159 (0.111)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational	0.161*** (0.051)						
Domestic MNE Dummy=1 if firm belongs to a domestic multinational	0.024 (0.040)						
Omitted base is purely domestic firms							
Observations	3549	867	867	867	280	280	280
Regional controls (2)	yes	yes	yes	yes	yes	yes	yes
Industry dummies (21)	yes	yes	yes	yes	yes	yes	yes
Country dummies (12)	yes	yes	yes	yes	yes	yes	yes
Other controls (60)	yes	yes	yes	yes	yes	yes	yes
Country of origin controls (2)	No	no	yes	yes	yes	yes	yes
Regional dummies (105)	No	no	no	yes	no	no	yes
Country of origin dummies (25)	No	no	no	no	no	no	yes
Clustering	Region	Region	Cty origin	Cty origin	Cty origin & location	Cty origin & location	Cty origin & location

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Column 1 includes all firms, Columns 2-7 include only foreign multinationals. Estimation by OLS with robust standard errors in parentheses. Standard errors are clustered as noted in the table. TRUST measures the percentage of individuals who agreed with the statement "most people can be trusted" in the region of firm's location or country of origin. BILATERAL TRUST measures the percentage of people from country of origin who report to "trust a lot" people living in the country of firm's location. "Other controls" include a dummy for whether the firm is publicly listed, a dummy for whether the CEO is on the same site as the plant ("CEO onsite") and "Noise controls" (these include 44 interviewer dummies, 6 dummies to control for the day of the week the interview took place, an interview reliability score, the manager's seniority and tenure, the duration of the interview, and 4 dummies for missing values in seniority, tenure, duration and reliability). Regional controls are GDP per capita and population in the region. Country of origin controls are GDP per capita and population. Weighted by the share of World Values Survey respondents in the region in the country.

TABLE 5
DECENTRALIZATION AND RELIGION

Sample	All Firms			Foreign Multinationals
	(1)	**(2)**	**(3)**	**(4)**
Hierarchical (region) % of Catholics, Muslims and Orthodox in firm's region of location	-0.560*** (0.161)	-0.302** (0.119)	-0.552*** (0.205)	
Rule of law (country) (-2.5=low, 2.5=high)		0.309*** (0.065)		
Hierarchical (country of origin) % of Catholics, Muslims and Orthodox in firm's country of origin				-0.368** (0.149)
Trust (region) Trust measured in firm's region of location			0.866*** (0.305)	
Number of Competitors (0=none, 1=between 1 and 4, 2=5 or more)			0.100*** (0.031)	
Plant Skills % Plant employees with a College degree			0.093*** (0.016)	0.199*** (0.036)
Ln(Firm N) Firm Size			0.043** (0.021)	0.018 (0.033)
Ln(Plant N) Plant employees as a % of firm			0.090*** (0.029)	0.105*** (0.037)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational			0.168*** (0.056)	
Domestic MNE Dummy=1 if firm belongs to a domestic multinational			0.032 (0.044)	
Observations	3549	3549	3549	867
Regional controls (2)	yes	yes	yes	Yes
Industry dummies (112)	no	no	yes	yes (21)
Country dummies (12)	no	no	yes	Yes
Other controls (60)	no	no	yes	Yes
Country of origin controls (2)	no	no	no	Yes
Regional dummies (105)	no	no	no	Yes
Clustering	Region	Region	Region	Country of origin

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Estimation by OLS with robust standard errors in parentheses. Standard errors are clustered as noted in the table. HIERARCHICAL is the percentage of Catholics, Muslims and Orthodox living in the firm's region of location, or in the country of origin. RULE OF LAW measures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence in the firm's country of location. The index is compiled by the World Bank (Kauffman et al, 2007), and ranges between -2.5 and 2.5. TRUST measures the percentage of individuals who agreed with the statement "most people can be trusted" in the firm's region of location. "Number of competitors" is taken from the survey and is the number of rivals the manager perceives he faces. "Other controls" include a dummy for whether the firm is publicly listed, a dummy for whether the CEO is on the same site as the plant ("CEO onsite") and "Noise controls" (these include 44 interviewer dummies, 6 dummies to control for the day of the week the interview took place, an interview reliability score, the manager's seniority and tenure, the duration of the interview, and 4 dummies for missing values n seniority, tenure, duration and reliability). Regional controls are GDP per capita and population in the region. Country of origin controls are GDP per capita and population. Weighted by the share of World Values Survey respondents in the region in the country.

TABLE 6 - QUANTIFICATION

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Publicly traded		0.002	0.002*	0.003	0.003	0.003*	-0.000
		(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Ln(Firm N) Firm Size		0.084***	0.076***	0.056**	0.081***	0.054**	0.060***
		(0.020)	(0.020)	(0.022)	(0.023)	(0.022)	(0.020)
Ln(Plant N) Plant employees as a % of firm		0.087***	0.079***	0.072**	0.103***	0.085***	0.095***
		(0.026)	(0.026)	(0.033)	(0.032)	(0.031)	(0.030)
Number of Competitors (0=none, 1=between 1 and 4, 2=5 or more)			0.186***	0.158***	0.139***	0.147***	0.142***
			(0.040)	(0.054)	(0.044)	(0.043)	(0.038)
Trust (region) Trust measured in firm's region of location				0.964***	0.430	0.373	0.842**
				(0.336)	(0.380)	(0.375)	(0.336)
Hierarchical (region) % of Catholics, Muslims and Orthodox in firm's region of location					-0.469***	-0.471***	0.134
					(0.161)	(0.158)	(0.175)
Plant Skills % Plant employees with a College degree						0.064***	0.071***
						(0.017)	(0.016)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational						0.328***	0.296***
						(0.065)	(0.060)
Domestic MNE Dummy=1 if firm belongs to a domestic multinational						0.146***	0.063
						(0.051)	(0.051)
Rule of law (country) (-2.5=low, 2.5=high)							0.515***
							(0.070)
Observations	3549	3549	3549	3549	3549	3549	3549
Noise controls	yes	yes	yes	yes	yes	yes	yes
Industry dummies (112)	no	yes	yes	yes	yes	yes	Yes
Clustering	Company	Company	Company	Region	Region	Region	Region
R-squared without country controls (results above)	0.055	0.144	0.152	0.163	0.180	0.201	0.229
R-squared with country controls (results above plus country controls)	0.191	0.250	0.251	0.251	0.255	0.271	0.271
Additional R-squared from adding country controls	0.136	0.106	0.099	0.089	0.075	0.071	0.042
P-value on country controls	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Estimation by OLS with robust standard errors in parentheses. TRUST measures the percentage of individuals in the region's country of location who agreed with the statement "most people can be trusted". HIERARCHICAL is the percentage of Catholics, Muslims and Orthodoxes living in the firm's region of location. Standard errors are clustered as detailed in the table. RULE OF LAW measures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence in the firm's country of location. The index is compiled by the World Bank (Kauffman et al, 2007), and ranges between -2.5 and 2.5. "Noise controls" include the day of the week the interview took place, an interview reliability score, the manager's seniority and tenure, the duration of the interview, and 4 dummies for missing values in seniority, tenure, duration and reliability). Standard errors are clustered as noted in the table. All columns weighted by the share of World Values Survey respondents in the region in the country.

APPENDIX A: DETAILS OF THE DECENTRALIZATION SURVEY QUESTIONS

The electronic survey, training materials and survey video footage are available on http://cep.lse.ac.uk/management/default.asp

For Questions D1, D3 and D4 any score can be given, but the scoring guide is only provided for scores of 1, 3 and 5.			

Question D1: "*To hire a FULL-TIME PERMANENT SHOPFLOOR worker what agreement would your plant need from CHQ (Central Head Quarters)?*"

Probe until you can accurately score the question – for example if they say "*It is my decision, but I need sign-off from corporate HQ.*" ask "*How often would sign-off be given?*"

	Score 1	Score 3	Score 5
Scoring grid:	No authority – even for replacement hires	Requires sign-off from CHQ based on the business case. Typically agreed (i.e. about 80% or 90% of the time).	Complete authority – it is my decision entirely

Question D2: "*What is the largest CAPITAL INVESTMENT your plant could make without prior authorization from CHQ?*"

Notes: (a) Ignore form-filling
    (b) Please cross check any zero response by asking "*What about buying a new computer – would that be possible?*", and then probe….
    (c) Challenge any very large numbers (e.g. >$¼m in US) by asking "*To confirm your plant could spend $X on a new piece of equipment without prior clearance from CHQ?*"
    (d) Use the national currency and do not omit zeros (i.e. for a US firm twenty thousand dollars would be 20000).

Question D3: "*Where are decisions taken on new product introductions – at the plant, at the CHQ or both*"?

Probe until you can accurately score the question – for example if they say "*It is complex, we both play a role* "ask "*Could you talk me through the process for a recent product innovation?*"

	Score 1	Score 3	Score 5
Scoring grid:	All new product introduction decisions are taken at the CHQ	New product introductions are jointly determined by the plant and CHQ	All new product introduction decisions taken at the plant level

Question D4: "*How much of sales and marketing is carried out at the plant level (rather than at the CHQ)*"?

Probe until you can accurately score the question. Also take an average score for sales and marketing if they are taken at different levels.

	Score 1	Score 3	Score 5
Scoring grid:	None – sales and marketing is all run by CHQ	Sales and marketing decisions are split between the plant and CHQ	The plant runs all sales and marketing

Question D5: "*Is the CHQ on the site being interviewed*"?

Question D6: "How much do managers decide how tasks are allocated across workers in their teams"

Interviewers are read out the following five options, with our scoring for these note above:	Score 1	Score 2	Score 3	Score 4	Score 5
	All managers	Mostly managers	About equal	Mostly workers	All workers

Question D7: "Who decides the pace of work on the shopfloor"

Interviewers are read out the following five options, with "customer demand" an additional not read-out option	Score 1	Score 2	Score 3	Score 4	Score 5
	All managers	Mostly managers	About equal	Mostly workers	All workers

TABLE A1. DECENTRALIZATION REGRESSION ROBUSTNESS CHECKS

Sample/Experiment	All	Single Plant Firms	Multi Plant Firms	CEO on site	CEO not on site	Between 250 and 5000 employees	Privately held firms	OECD countries	Non OECD countries
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Number of Competitors (0=none, 1=between 1 and 4, 2=5 or more)	0.100*** (0.031)	0.038 (0.057)	0.166*** (0.045)	0.105** (0.046)	0.110** (0.055)	0.133** (0.054)	0.095*** (0.035)	0.094*** (0.035)	0.171*** (0.044)
Trust (region) Trust measured in firm's region of location	0.867*** (0.305)	0.290 (0.479)	1.194*** (0.389)	0.347 (0.395)	1.334** (0.517)	0.735* (0.407)	1.217*** (0.401)	1.353*** (0.401)	-0.201 (0.367)
Hierarchical (region) % of Catholics, Muslims and Orthodox in firm's region of location	-0.551*** (0.205)	-0.510 (0.476)	-0.605*** (0.177)	-0.455* (0.246)	-0.627** (0.298)	-0.615*** (0.229)	-0.546* (0.307)	-0.580*** (0.217)	-1.570*** (0.485)
Plant Skills % Plant employees with a College degree	0.093*** (0.016)	0.094*** (0.029)	0.077*** (0.020)	0.070*** (0.024)	0.147*** (0.024)	0.091*** (0.025)	0.083*** (0.017)	0.092*** (0.018)	0.094*** (0.029)
Ln(Firm N) Firm Size	0.043** (0.021)	0.078** (0.033)	0.032 (0.031)	0.042 (0.032)	0.031 (0.036)	0.032 (0.035)	0.033 (0.026)	0.047* (0.026)	0.033 (0.034)
Ln(Plant N) Plant employees as a % of firm	0.090*** (0.029)	-0.010 (0.044)	0.111*** (0.040)	0.081* (0.041)	0.095** (0.044)	0.090*** (0.028)	0.086** (0.038)	0.103*** (0.032)	-0.014 (0.062)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational	0.168*** (0.056)	0.211** (0.100)	0.129** (0.050)	0.121 (0.085)	0.165** (0.075)	0.246*** (0.069)	0.164** (0.066)	0.195*** (0.065)	0.052 (0.066)
Domestic MNE Dummy=1 if firm belongs to a domestic multinational	0.032 (0.044)	-0.065 (0.134)	0.042 (0.053)	0.030 (0.061)	0.034 (0.071)	0.032 (0.066)	-0.002 (0.061)	0.040 (0.047)	0.157 (0.326)
Observations	3549	1399	2150	2185	1364	2002	2698	2725	824
Regional controls (2)	yes	yes	yes	yes	Yes	yes	yes	yes	yes
Industry dummies (112)	yes	yes	yes	yes	Yes	yes	yes	yes	yes
Country dummies (12)	yes	yes	yes	yes	yes	yes	yes	yes	yes
Other controls (69)	yes	yes	yes	yes	yes	yes	yes	yes	yes
Weights	yes	yes	yes	yes	yes	yes	yes	yes	yes
Clusters	Region	Region	Region	Region	Region	Region	Region	Region	Region

Robust standard errors in parentheses. Dependent variable is decentralization. * significant at 10%; ** significant at 5%; *** significant at 1%. "Number of competitors" is taken from the survey and is the number of rivals the manager perceives he faces. HIERARCHICAL is the percentage of Catholics, Muslims and Orthodox Christians living in the country, region of country of origin. TRUST measures the percentage of individuals in the firm's country of location who agreed with the statement "most people can be trusted". Other controls include a dummy for whether the firm is publicly listed, a dummy for whether the CEO is on the same site as the plant ("CEO onsite") and "Noise controls" (these include 44 interviewer dummies, 6 dummies to control for the day of the week the interview took place, an interview reliability score, the manager's seniority and tenure, the duration of the interview, and 4 dummies for missing values in seniority, tenure, duration and reliability). Regional controls are GDP per capita and population in the region. Standard errors are clustered as detailed in the table. All columns weighted by the share of World Values Survey respondents in the region in the country

Sample/Experiment	Controlling for Management	Decentralization Excluding Investment Question	Decentralization based only on Investment Question	Domestic Firms	Multinationals	Below Skills Median	Above Skills Median
	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Number of Competitors (0=none, 1=between 1 and 4, 2=5 or more)	0.073*** (0.028)	0.056** (0.023)	0.083* (0.046)	0.099* (0.053)	0.105** (0.049)	0.092 (0.062)	0.120** (0.056)
Trust (region) Trust measured in firm's region of location	0.829*** (0.301)	0.610*** (0.217)	0.235 (0.370)	0.776* (0.403)	1.147** (0.509)	0.760* (0.451)	0.711 (0.431)
Hierarchical (region) % of Catholics, Muslims and Orthodox in firm's region of location	-0.504** (0.200)	-0.409** (0.168)	-0.265 (0.182)	-0.508* (0.297)	-0.608*** (0.220)	-0.388 (0.355)	-0.437* (0.241)
Plant Skills % Plant employees with a College degree	0.076*** (0.015)	0.063*** (0.013)	0.063*** (0.019)	0.062*** (0.019)	0.142*** (0.030)	0.136*** (0.034)	0.102* (0.052)
Ln(Firm N) Firm Size	0.015 (0.024)	0.009 (0.015)	0.077*** (0.023)	0.044* (0.026)	0.038 (0.038)	0.049 (0.036)	0.044* (0.025)
Ln(Plant N) Plant employees as a % of firm	0.072** (0.029)	0.054** (0.021)	0.062** (0.029)	0.081** (0.036)	0.088* (0.051)	0.081* (0.041)	0.085* (0.043)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational	0.111** (0.050)	0.076** (0.036)	0.229*** (0.057)			0.082 (0.085)	0.296*** (0.070)
Domestic MNE Dummy=1 if firm belongs to a domestic multinational	0.014 (0.044)	0.032 (0.031)	0.009 (0.062)		-0.180*** (0.064)	0.042 (0.062)	0.074 (0.078)
Management Management score based on 18 questions	0.171*** (0.040)						
Observations	3548	3549	3280	1892	1657	1641	1607
Regional controls (2)	yes	yes	yes	yes	yes	yes	yes
Industry dummies (112)	yes	yes	yes	yes	yes	yes	yes
Country dummies (12)	yes	yes	yes	yes	yes	yes	yes
Other controls (69)	yes	yes	yes	yes	yes	yes	yes
Weights	yes	yes	yes	yes	yes	yes	yes
Clusters	Region	Region	Region	Region	Region	Region	Region

Robust standard errors in parentheses. Dependent variable is decentralization. * significant at 10%; ** significant at 5%; *** significant at 1%. "Number of competitors" is taken from the survey and is the number of rivals the manager perceives he faces. HIERARCHICAL is the percentage of Catholics, Muslims and Orthodox Christians living in the country, region of country of origin. TRUST measures the percentage of individuals in the firm's country of location who agreed with the statement "most people can be trusted". Other controls include a dummy for whether the firm is publicly listed, a dummy for whether the CEO is on the same site as the plant ("CEO onsite") and "Noise controls" (these include 44 interviewer dummies, 6 dummies to control for the day of the week the interview took place, an interview reliability score, the manager's seniority and tenure, the duration of the interview, and 4 dummies for missing values in seniority, tenure, duration and reliability). Regional controls are GDP per capita and population in the region. Standard errors are clustered as detailed in the table. All columns weighted by the share of World Values Survey respondents in the region in the country

TABLE A1. DECENTRALIZATION REGRESSION ROBUSTNESS CHECKS (CONTINUED)

Sample/Experiment	Foreign MNEs	Foreign MNEs	Foreign MNEs, all managers local	Drop muslims from hierarchical religion group	Dependent variable is worker autonomy
	(17)	(18)	(19)	(20)	(21)
Global assets of the ultimate owner		0.060**			
		(0.021)			
World Bank rigidity index cty origin					
Trust (country of origin) Trust measured in firm's country of origin	1.597***	1.807***	1.147***		
	(0.548)	(0.518)	(0.508)		
Trust (region) Trust measured in firm's region of location	0.488	0.235	1.065	0.878***	0.568*
	(1.100)	(1.204)	(1.109)	(0.307)	(0.341)
Number of Competitors (0=none, 1=between 1 and 4, 2=5 or more)					0.080**
					(0.031)
Hierarchical (region) % of Catholics and Orthodox in firm's region of location				-0.556***	-0.194
				(0.208)	(0.209)
Plant Skills % Plant employees with a College degree	0.163***	0.165***	0.174***	0.093***	0.079***
	(0.050)	(0.046)	(0.034)	(0.016)	(0.020)
Ln(Firm N) Firm Size	0.051	0.013	0.050	0.043**	0.036
	(0.047)	(0.049)	(0.058)	(0.021)	(0.026)
Ln(Plant N) Plant employees as a % of firm	0.047	0.033	0.043	0.089***	0.035
	(0.101)	(0.098)	(0.055)	(0.029)	(0.022)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational				0.169***	0.087
				(0.056)	(0.054)
Domestic MNE Dummy=1 if firm belongs to a domestic multinational				0.032	0.006
				(0.044)	(0.056)
Observations	323	323	439	3549	3456
R-squared	0.52	0.53	0.39	0.32	0.24

Robust standard errors in parentheses. Dependent variable is decentralization in columns (17) to (20) and worker autonomy in column (20). * significant at 10%; ** significant at 5%; *** significant at 1%. "Number of competitors" is taken from the survey and is the number of rivals the manager perceives he faces. HIERARCHICAL is the percentage of Catholics, Muslims and Orthodox Christians living in the country, region of country of origin. TRUST measures the percentage of individuals in the firm's country of location who agreed with the statement "most people can be trusted". Other controls include a dummy for whether the firm is publicly listed, a dummy for whether the CEO is on the same site as the plant ("CEO onsite") and "Noise controls" (these include 44 interviewer dummies, 6 dummies to control for the day of the week the interview took place, an interview reliability score, the manager's seniority and tenure, the duration of the interview, and 4 dummies for missing values in seniority, tenure, duration and reliability). Regional controls are GDP per capita and population in the region. Standard errors are clustered as detailed in the table. All columns weighted by the share of World Values Survey respondents in the region in the country.

TABLE A.2
DECENTRALIZATION: INDIVIDUAL COMPONENTS BY COUNTRY

	Hiring (1 to 5)	Marketing (1 to 5)	Product Introduction (1 to 5)	Investment (Median, in $)
	(1)	(2)	(3)	(4)
China	3.20	1.43	1.75	604
France	2.80	1.98	2.21	9,375
Germany	2.93	2.17	2.57	12,500
Greece	2.44	1.39	1.80	1,250
India	2.77	1.79	2.16	220
Italy	2.84	1.93	2.38	6,250
Japan	1.96	1.70	1.91	1,720
Poland	2.86	2.04	2.30	310
Portugal	3.03	1.76	2.37	3,125
Sweden	3.57	2.47	2.83	13,800
UK	3.46	2.53	2.53	9,150
US	3.86	2.17	2.58	7,500

Notes: Averages of the individual components of the decentralization variable by country (N=3380)

	Decent.	Bonus	Promotion	Ln(Layers)	Plant Skills	Management
Decentralization	1					
Bonus Manager's Bonus as a % of Salary	0.0767*** (0.00)	1				
Promotion % Salary Increase on Promotion	0.0634*** (0.005)	0.071*** (0.002)	1			
Ln(Layers) Layers between CEO and Plant Manager	-0.0336* (0.052)	0.0166 (0.373)	0.0347 (0.128)	1		
Plant Skills % Plant employees with a College degree	0.074*** (0.000)	0.0677*** (0.000)	0.0301 (0.199)	0.0161 (0.373)	1	
Management	0.1261*** (0.000)	0.1255*** (0.000)	0.0853*** (0.000)	0.0038 (0.823)	0.1968*** (0.000)	1

Notes: The table reports pair wise correlations. Values in brackets are p-values. The variables are residuals from regressions including the following controls: firm size, plant share of firm's employment, multinational status (domestic/foreign MNE), a dummy for whether the firm is publicly listed, a dummy for whether the CEO is on the same site as the plant ("CEO onsite"), 44 interviewer dummies, 6 dummies to control for the day of the week the interview took place, an interview reliability score, the manager's seniority and tenure, the duration of the interview, and 4 dummies for missing values in seniority, tenure, duration and reliability)

APPENDIX B: DATA

B.1 Survey Data

The Survey Sampling Frame
Our sampling frame was based on the Bureau van Dijk (BVD) Amadeus dataset for Europe (France, Germany, Greece, Italy, Poland, Portugal and the U.K.), on Bureau van Dijk Icarus for the US, on CMIE Firstsource dataset for India, and on the Bureau van Dijk Oriana dataset for China and Japan. These databases all provide sufficient information on companies to conduct a stratified telephone survey (company name, address and a size indicator). These databases also typically have some accounting information, such employment, sales of capital assets. Apart from size, we did not insist on having accounting information to form the sampling population, however.

Amadeus and Firstsource are constructed from a range of sources, primarily the National registries of companies (such as Companies House in the UK and the Registry of Companies in India). Icarus is constructed from the Dunn & Bradstreet database, which is a private database of over 5 million US trading locations built up from credit records, business telephone directories and direct research. Oriana is constructed from Huaxia credit in China and Teikoku Database in Japan, covering all public and all private firms with one of the following: 150 or more employees, 10 million US$ of sales or 20 million US$ of assets.

In every country the sampling frame was all firms with a manufacturing primary industry code with 100 to 5000 employees on average over the most recent three years of data (typically 2002 to 2004). In the US only the most recent year of employment is provided. In India employment is not reported for private firms, so for these companies we used forecast employment, predicted from their total assets (which are reported) using the coefficients from regressing log(employees) on log (assets) for public firms. In Japan and China we used all manufacturing firms with 150 to 5000 employees since Oriana only samples firms with over 150 employees.[34] In Portugal the population of firms with 100 to 5000 employees was only 242, so we supplemented this with the 72 firms with 75 to 100 employees. We checked the results by conditioning on common size bands (above 150 in all countries).

Interviewers were each given a randomly selected list of firms from the sampling frame. This should therefore be representative of medium sized manufacturing firms. The size of this sampling frame by country is shown in Table B1, along with some basic statistics on firm size and public listing status.

Looking at Table B1 three points are worth highlighting on the sampling frame. First, the size of the sampling frame appears broadly proportional to the absolute size of each country's manufacturing base, with China, the US, India and Japan having the most firms and Sweden,

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[34] Note that the ORIANA database does include firms with less than 150 employees if they meet the sales or assets criteria, but we excluded this to avoid using a selected sample.

Greece and Portugal the fewest[35]. Second, China has the largest firms on average, presumably reflecting both the higher size cut-off for its sampling frame (150 employees versus 100 employees for other countries) and also the presence of many current and ex state-owned enterprises (11% in the survey are still Government owned). Figure B1 shows the histogram of firms' sizes by country, with China having a much smaller share of the smallest firms. Third, Greece, India and Japan have a much higher share of publicly quoted firms then the other countries, with this presumably reflecting their more limited provision of data on privately held firms. Because of this potential bias across countries will control for firm size and listing status in all the main regressions.

In addition to randomly surveying from the sampling frame described above we also tried to resurvey the firms we interviewed in the 2004 survey wave used in Bloom and Van Reenen (2007). This was a sample of 732 firms from France, Germany, the UK and the US, with a manufacturing primary industry code and 50 to 10,000 employees (on average between 2000 and 2003). This sample was drawn from the Amadeus dataset for Europe and the Compustat dataset for the U.S. Only companies with accounting data were selected. So, for the UK and France this sampling frame was very similar to the 2006 sampling frame. For Germany it is more heavily skewed towards publicly quoted firms since smaller privately held firms do not report balance sheet information. For the US it comprised only publicly quoted firms. As a result when we present results we always include controls for firm size, or drop the firms that were resurveyed from 2004. These resurveyed firms were randomly distributed among the relevant country interviewers.

The Sample Representativeness
Table B2 compares the number of employees for different size bands from our sample with the figures for the corresponding manufacturing populations in each of the twelve countries obtain from national census data. Since figures for the population distributions are not available from every country in the same format from the Census data, we present a variety of statistics.

The broad picture that arises is that in nine countries the sample broadly matches up with the population of medium sized manufacturing firms. This suggests our sampling frame covers the population of all firms. In three countries the coverage is less complete – China, Germany and Portugal - where the sample appears to cover around a third of manufacturing employees. This will be a problem if our sampling frame is non-randomly omitting firms – for example under-representing smaller firms – because it would bias our cross-country comparisons. We try a couple of approach to try and address this. First, in almost all the tables of results we include country fixed-effects to try to control for any differences across countries in sample selection bias. Hence, are key results are identified by within country and region variation. Second, in our quantification table when we compare across countries we control for size, public listing status and industry. This should help to condition on the types of factors that lead to under/over sampling of firms. Since

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[35] The size of the manufacturing sector can be obtained from http://laborsta.ilo.org/, a database maintained by ILO. Indian data con be obtained from Indiastat, from the "Employment in Industry" table.

these factors explain only a limited share of cross country variation in decentralization this suggests this differential sampling bias is not likely to be particularly severe.[36]

The Survey Response Rate
As shown in Table B3 of the firms we contacted 44.9% took part in the survey: a high success rate given the voluntary nature of participation. Of the remaining firms 16.8% refused to be surveyed, while the remaining 38.3% were in the process of being scheduled when the survey ended.

The reason for this high share of 'scheduling in progress' firms was the need for interviewers to keep a portfolio of firms who they cycle though when trying to set up interviews. Since interviewers only ran an average of 2.8 interviews a day the majority of their time was spent trying to contact managers to schedule future interviews. For scheduling it was efficient for interviewers to keep a stock of between 100 to 500 firms to cycle through. The optimal level of this stock varied by the country – in the US and UK many managers operated voicemail, so that large stocks of firms were needed. In Japan after two weeks the team switched from working Japanese hours (midnight to 8am) to Japanese afternoons and UK morning (4am till midday), which left large stocks of contacted firms in Japan.[37] In Europe, in contrast, managers typically had personnel assistants rather than voicemail, who wanted to see Government endorsement materials before connecting with the managers. So each approach was more time consuming, requiring a smaller stock of firms.

The ratio of successful interviews to rejections (ignoring 'scheduling in progress') is above 1 in every country. Hence, managers typically agreed to the survey proposition when interviewers were able to connect with them. This agreement ratio is lowest in China and Japan. There were two reasons for this: first, the Chinese and Japanese firms did appear to be genuinely more willing to refuse to be interviewed; and second, the time-zone meant that our interviewers could not run talk during the Chinese or Japanese morning; which sometimes led to rejections if managers were too busy to talk in the afternoon.

Table B4, column (1), evaluates the decision to accept the interview proposition.[38] The decisions to reject the interview are the baseline, with all 'scheduling in progress' interviews dropped. The decision to accept is uncorrelated with revenues per worker, listing status of the firm or firm age. Large firms and multinationals did appear to be more predisposed to accepting interview proposition, although the size of this effect if not large – multinationals were about 7 percentage points more likely to agree to the interview and firms about 4 percentage points more likely for a doubling in size. The likelihood of managers accepting the interview proposition did not rise significantly through the survey. Finally, compared to the US only four countries had a significantly higher conditional acceptance rate – France, Greece, Italy and Poland – while none had a significantly lower acceptance rate.

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[36] We found a similar result in Bloom and Van Reenen (2007), when we include size and public listing status as controls in evaluating cross-country management practice differences and found these played almost no role.
[37] After two weeks of the Japanese team working midnight to 8am it became clear this schedule was not sustainable due to the unsociability of the hours, with one of the Japanese interviewers quitting. The rest of the team then switched to working 4am until noon.
[38] Note this sample is smaller than the total survey sample because some firms do not report data for certain explanatory variables, for example US private firms do not report sales.

Table B4 column (2), compares the probability of running an interview conditional on contacting the firm, so including rejections and 'scheduling in progress' firms in the baseline. This interview probability is also uncorrelated with revenues per worker, listing status or the firm age. Large firms and multinational subsidiaries were more likely to have a completed interview after being contacted. Firms that were contacted earlier on in the survey were also significantly more likely to end up being interviewed. The size of time effect is quantitatively large – firms contacted at the beginning of the survey were over 20 percentage points more likely to be interviewer than those contacted towards the end (3 months later). The reason is that firms contacted early on in the survey were subsequently contacted many more times as interviewers cycled through their stocks of 'scheduling in progress firms'. Finally, columns (3) and (4) show that the likelihood of a contacted firm eventually being interviewed is also uncorrelated with firm growth rates and return on capital employed, a basic profits measure.

So, in summary, respondents were not significantly more productive, profitable or fast growing than non-responders. Respondents did tend to be slightly larger and more likely to be a multinational subsidiary, but were not more likely to be stock-market listed or older. Chinese and Japanese firms less likely to respond and European firms more likely to respond. Firms contacted earlier on in the survey process were more likely to end up being interviewed.

B.2 Firm level data
Our firm accounting data on sales, employment, capital, profits, shareholder equity, long-term debt, market values (for quoted firms) and wages (where available) came from Amadeus dataset for Europe (France, Germany, Greece, Italy, Poland, Portugal and the U.K.), on Bureau van Dijk Icarus for the US, on CMIE Firstsource dataset for India, and on the Bureau van Dijk Oriana dataset for China and Japan.

B.3 Industries and Industry level data
Our basic industry code is the U.S. SIC (1997) three digit level - which is our common industry definition in all four countries. We allocate each firm to its main three digit sector (based on sales). For the 3601 firms in the sample we have 134 unique three-digit industries. There are at least ten sampled firms in each industry for 96.9% of the sample.

The "Lerner index of competition" constructed, as in Aghion et al. [2005], as the mean of (1 - profit/sales) in the entire database (excluding the surveyed firms themselves) for every country industry pair. Profits are defined as EBIT (earning before interest and taxation) to include the costs of labor, materials and capital but exclude any financing or tax costs. The five year period 2000 to 2004 is used in every country to ensure comparability across countries (since earlier data is not available in Oriana). In the US and India private firms do not provide profits data so the index was constructed f7rom the population of all publicly listed firms, obtained from Compustat for the US and the CMIE Prowess dataset for India.

B.4 Regional and National Data

World Values Survey

The regional trust and religion variables have been calculated from the World Values Survey (WVS). The WVS is the a cross-country project coordinated by the Institute for Social Research of the University of Michigan, under the direction of Ronald Inglehart. Each wave carries out representative surveys of the basic values and beliefs of individuals in a large cross-section of countries. The questionnaire contains answers to specific questions about religion and social attitudes, including several question on generalized and specific trust (e.g. trust in the family, government etc.), as well as detailed information on the social and education background of the respondents (age, income, education).

The WVS data can be downloaded freely from the WVS website (www.worldvaluessurvey.org). For the purposes of our analysis, we use only individual entries with information on the respondent' region of residence. We pool together data relative to four successive waves of data collection (1981-1984, 1989-1993, 1994-1999 and 1999-2004. We use the WVS for all countries with the exception of Greece, for which the regional breakdown provided by the WVS is poor. Luckily, we can build regional aggregates of trust and religion using the European Social Survey (ESS, http://www.europeansocialsurvey.org), a biennial multi-country survey covering over 30 European nations, and including questions on trust and religion. The wording of the trust question is identical to the one used by the WVS, although the answers are coded on a scale from 1 to 10, instead of the discrete 0/1 choices adopted by the WVS, To ensure comparability between countries, we convert into 1s all the answers greater than 5. The first round of the ESS was fielded in 2002/2003, the second in 2004/2005 and the third in 2006/2007. We pool across all waves of the ESS. The frequencies by country and wave are shown in Table B6.

European Commission Bilateral Trust Data

This comes directly from Table 1, panel B of Guiso et al. (2004). They averaged over multiple waves of a Eurobarometer survey carried out for the European Commission from the 1970s onwards.

GDP per Capita and Population

The regional GDP per capita and population variables are drawn from the following sources: Europe: Eurostat, Regional Statistics[39]; United States: Bureau of Economic Analysis, regional Statistics[40]; Japan: Japan Statistic Bureau, Prefectural Statistics[41]; China: Province data from Chinadataonline.org[42]; India: State level data from the Central Statistical Organisation (CSO)[43]. The data refers to 2006.

Rule of Law

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[39] http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136162,0_45572076&_dad=portal&_schema=PORTAL
[40] http://www.bea.gov/regional/gsp/
[41] http://www.stat.go.jp
[42] http://chinadataonline.org/member/macroyr/macroyrtshow.asp?code=A0101
[43] http://mospi.nic.in/cso_test1.htm

The Rule of Law variable measures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence. The index is compiled by the World Bank (Kauffman et al, 2007), and ranges between -2.5 and 2.5. The data can be downloaded from: http://info.worldbank.org/governance/wgi2007/resources.htm

B.5 Data descriptive statistics
A set of descriptive statistics broken down by country are in Table B5. We have 3902 firms with 4038 observations, since 136 firms were interviewed twice. There are also a few missing values for some control variables (e.g. percentage employees with a degree). In these cases we set the value of the control variable equal to zero when it was missing and include an additional dummy variable to indicate this. The results are robust to dropping missing values entirely, however.

TABLE B1: THE 2006 SAMPLING FRAME

	CN	FR	GE	GR	IN[§]	IT	JP	PO	PT	SW	UK	US
Sampling frame, number of firms (#)	30,125	4,716	4,659	489	15,737	4,733	14,165	2,793	304	919	5,409	30,765
Employees (median)	670	194	190	180	187	157	300	214	163	192	221	200
Publicly listed (%)	5.6	2.3	2.5	19.8	15.2	1.0	27.2	3.2	4.9	2.1	4.4	2.7

Notes to Table B1: CN=China, FR=France, GE=Germany, GR=Greece, IN=India, IT=Italy, JP=Japan, PO=Poland, PT=Portugal, SW=Sweden, UK=United Kingdom, US=United States. **Sampling frame** is the total number of eligible firms for the survey. **Employees** are the median number of employees in the firm. **Publicly listed** is the percentage of firms which are directly publicly listed (note that some firms may be privately incorporate subsidiaries of publicly listed parents). [§] Indian employment numbers predicted from balance sheet information for privately held firms.

TABLE B2: THE SAMPLING FRAME POPULATION COVERAGE

	CN	FR	GE	GR	IN	IT	JP	PO	PT	SW	UK	US
Employees in firms in sample with 100+ employees, 000's	15,165	1,640	1,636	139	4,245	1,273	7,247	942	91	305	2,224	8,941
Employees in firms with 100 to 5000 in our sample as % of Census data	30%				90%							
Employees in firms with 50+ employees in our sample as % Census data		64%	30%	87%		65%	150%	56%	22%	57%	83%	89%
Employees in firms with 250+ in our sample as % Census data		94%	43%	157%		126%	298%	98%	55%	83%	141%	

Notes to Table B2: CN=China, FR=France, GE=Germany, GR=Greece, IN=India, IT=Italy, JP=Japan, PO=Poland, PT=Portugal, SW=Sweden, UK=United Kingdom, US=United States. **Employees in firms is sample with 100+ employees, 000's** reports the number of firms in our sampling frame with 100+ employees in thousands (so for example China has 15.2 million employees in firms in our sampling frame). **Employees in firms with 100 to 5000 in our sample as % of Census data** reports the share of firms in our sample in firms with 100 to 5000 employees as a % of the values reported in national Census data (where available). **Employees in firms with 50+ in our sample as % of Census data** reports the share of firms in our sample in firms with 50+ employees as a % of the values reported in national Census data (where available). **Employees in firms with 250+ in our sample as % of Census data** reports the share of firms in our sample in firms with 250+ employees as a % of the values reported in national Census data (where available). Census data comes from Eurostat for the European countries, OECD for Japan and the US, and calculations done on the underlying Census micro data for China and India by Albert Bollard on data provided by Pete Klenow.

TABLE B3: THE SURVEY RESPONSE RATE

	All	CN	FR	GE	GR	IN	IT	JP	PO	PT	SW	UK	US
Interviews completed (%)	44.9	43.9	59.3	58.6	53.4	61.4	68.2	21.5	37.5	60.5	68.2	32.9	37.2
Interviews refused (%)	16.8	13.7	13.7	27.2	10.7	13.7	20.0	20.1	16.5	15.8	16.9	19.6	13.7
Scheduling in progress (%)	38.3	40.1	27.0	14.2	35.9	25.0	11.8	58.4	46.0	23.7	14.9	47.4	49.1
Survey sample, number firms (#)	8690	727	528	526	350	761	304	563	637	293	380	1851	1833
Interviews completed (#)	3,902	319	313	308	187	467	207	121	239	177	259	609	682

Notes to Table B3: All=All countries combined, CN=China, FR=France, GE=Germany, GR=Greece, IN=India, IT=Italy, JP=Japan, PO=Poland, PT=Portugal, SW=Sweden, UK=United Kingdom, US=United States. **Interviews completed** reports the percentage of companies contacted for which a management interview was completed. **Interviews refused** reports the percentage of companies contacted in which the manager contacted refused to take part in the interview. **Scheduling in progress** reports the percentage of companies contacted for which the scheduling was still in progress at the end of the survey period (so the firm had been contacted, with no interview run nor any manager refusing to be interviewed). **Survey sample** is the total number of firms that were randomly selected from the complete sampling frame.

TABLE B4: THE SURVEY RESPONSE PROBIT

Sample	(1) Firms with interviews completed or refused	(2) All firms contacted	(3) All firms contacted	(4) All firms contacted
Log (Sales/employee)	0.017 (0.014)	0.010 (0.011)		
Sales growth rate			-0.058 (0.082)	
Return on Capital Employed (ROCE) [§]				0.044 (0.037)
Log (employment)	0.040*** (0.011)	0.026*** (0.008)	0.012 (0.011)	0.025*** (0.010)
Listed	0.045 (0.031)	-0.020 (0.024)	-0.048 (0.033)	0.016 (0.034)
Log (Age of firm), in years	-0.002 (0.010)	0.002 (0.009)	0.001 (0.012)	0.001 (0.011)
Multinational subsidiary	0.070*** (0.020)	0.050*** (0.018)	0.066*** (0.020)	0.054*** (0.020)
Days from the start of the survey until firm contacted [§]	0.051 (0.052)	-0.214*** (0.041)	-0.239*** (0.051)	-0.208*** (0.051)
Country is China	-0.052 (0.235)	-0.195* (0.092)	-0.363*** (0.020)	n/a
Country is France	0.163** (0.062)	0.259*** (0.065)	0.230** (0.062)	0.255* (0.058)
Country is Germany	-0.081 (0.078)	0.200*** (0.058)	0.164*** (0.055)	0.332*** (0.051)
Country is Greece	0.208*** (0.045)	0.112* (0.065)	0.129** (0.066)	0.130** (0.065)
Country is India	0.222*** (0.048)	0.405*** (0.054)	n/a	n/a
Country is Italy	0.059 (0.099)	0.201** (0.089)	0.232*** (0.085)	0.223*** (0.081)
Country is Japan	-0.089 (0.107)	0.084 (0.076)	0.100 (0.071)	n/a
Country is Poland	0.207** (0.062)	0.254*** (0.078)	0.236*** (0.079)	0.250*** (0.077)
Country is Portugal	0.132 (0.101)	0.189* (0.010)	0.171** (0.111)	0.281*** (0.094)
Country is Sweden	0.115 (0.068)	0.237*** (0.066)	0.274*** (0.076)	0.246*** (0.060)
Country is UK	-0.061 (0.048)	-0.000 (0.034)	baseline	Baseline
Country is US	Baseline	Baseline	n/a	n/a
Pseudo R[2]	0.111	0.119	0.122	0.116
Number of firms	3688	6349	4364	4123

Notes to Table B4: The dependent variable is interview completed. All columns estimated by probit with robust standard errors in parentheses. All columns include a full set of 44 interviewer dummies, and 142 SIC 3-digit industry dummies. Column (1) uses only firms which were interviewed or refused to interview (dropping firms for which scheduling was still in progress as the end of the project). Columns (2), (3) and (4) use all firms contacted. In columns (2),, (3) and (4) firms are dropped if no sales, sales growth and Return on Capital Employed data is available. [§] Coefficient and standard-errors multiplied by 100 for scaling purposes.

TABLE B5 THE SURVEY SAMPLE DESCRIPTIVE STATISTICS

|	All	CN	FR	GE	GR	IN	IT	JP	PO	PT	SW	UK	US	Missing, #
Observations, #	4,038	325	323	348	187	470	204	122	239	177	286	649	694	n/a
Firms, #	3,902	319	313	308	187	467	207	121	239	177	259	609	682	n/a
Firms, excluding 2004 resurvey, #			242	225								560	535	n/a
Firm employees (median)	270	700	240	500	230	250	185	310	250	183	267	250	375	0
Firm employees excl. 2004 resurvey			200	325								250	300	n/a
Plant employees (median)	150	500	150	225	120	150	150	150	150	125	150	140	150	0
Production sites (median), #	2	1	3	2	1	1	2	2	1	1	2	2	3	94
Age of firm (median, years)	34	12	39	40	32	22	33	57	31	35	62	34	33	101
Listed firm, %	14.5	6.4	4.6	16.4	18.7	26.2	1.4	28.3	2.3	5.6	1.7	6.5	30.1	121
Share of workforce with degrees, %	17.3	8	17.3	14.9	11.9	22.0	16.3	30.9	20.0	9.6	19.8	12.9	20.1	436
Decentralization (mean z-score)	-.01	-.39	-.14	.11	-.47	-.27	-.04	-.41	-.21	-.11	-.34	-.19	.22	344
Management (mean z-score)	2.99	2.61	2.99	3.18	2.64	2.54	3.00	3.15	2.88	2.73	3.15	3.00	3.31	0
Trust (%)	38	65	17	33	15	39	40	43	31	16	72	36	42	48
Lerner index	.957	.950	.965	.949	.935	.923	.965	.966	.967	.972	.980	.968	.940	111
% of Foreign MNE's	0.25	0.20	0.46	0.31	0.19	0.10	0.25	0.03	0.35	0.18	0.44	0.38	0.14	0
% of Domestic MNE's	0.22	0.01	0.34	0.36	0.13	0.02	0.22	0.32	0.04	0.20	0.39	0.25	0.33	0
Interview duration (minutes)	47.9	48.6	46.3	44.7	49.8	59.8	46.6	58.4	47.8	54.5	56.3	43.5	46.8	34

Notes to Table B5: All=All countries combined, CN=China, FR=France, GE=Germany, GR=Greece, IN=India, IT=Italy, JP=Japan, PO=Poland, PT=Portugal, SW=Sweden, UK=United Kingdom, US=United States.

TABLE B6 - WORLD VALUES SURVEY SAMPLE

WVS Wave	1981-1984	1989-1993	1994-1999	1999-2004	Total
China	0	983	1,064	0	2,047
France	0	939	0	1,560	2,499
Germany	1,084	2,893	1,956	1,937	7,870
Greece	0	0	0	4.972	4.972
India	0	2,365	1,769	1,898	6,032
Italy	0	1,931	0	1,946	3,877
Japan	1,099	911	990	1,254	4,254
Poland	0	1,709	0	1,059	2,768
Portugal	0	1,149	0	975	2,124
Sweden	0	944	0	974	1,918
United Kingdom	0	1,440	1,073	921	3,434
United States	0	1,764	1,458	1,188	4,410
Total	2,183	17,028	8,310	13,712	41,233

Notes to Table B6: Number of respondents used to build regional trust and religion aggregates by country and World Values Survey wave. Data relative to Greece are built from the ESS, using all available waves between 2000 and 2005.

Figure B.1 – Size distribution of firms within countries
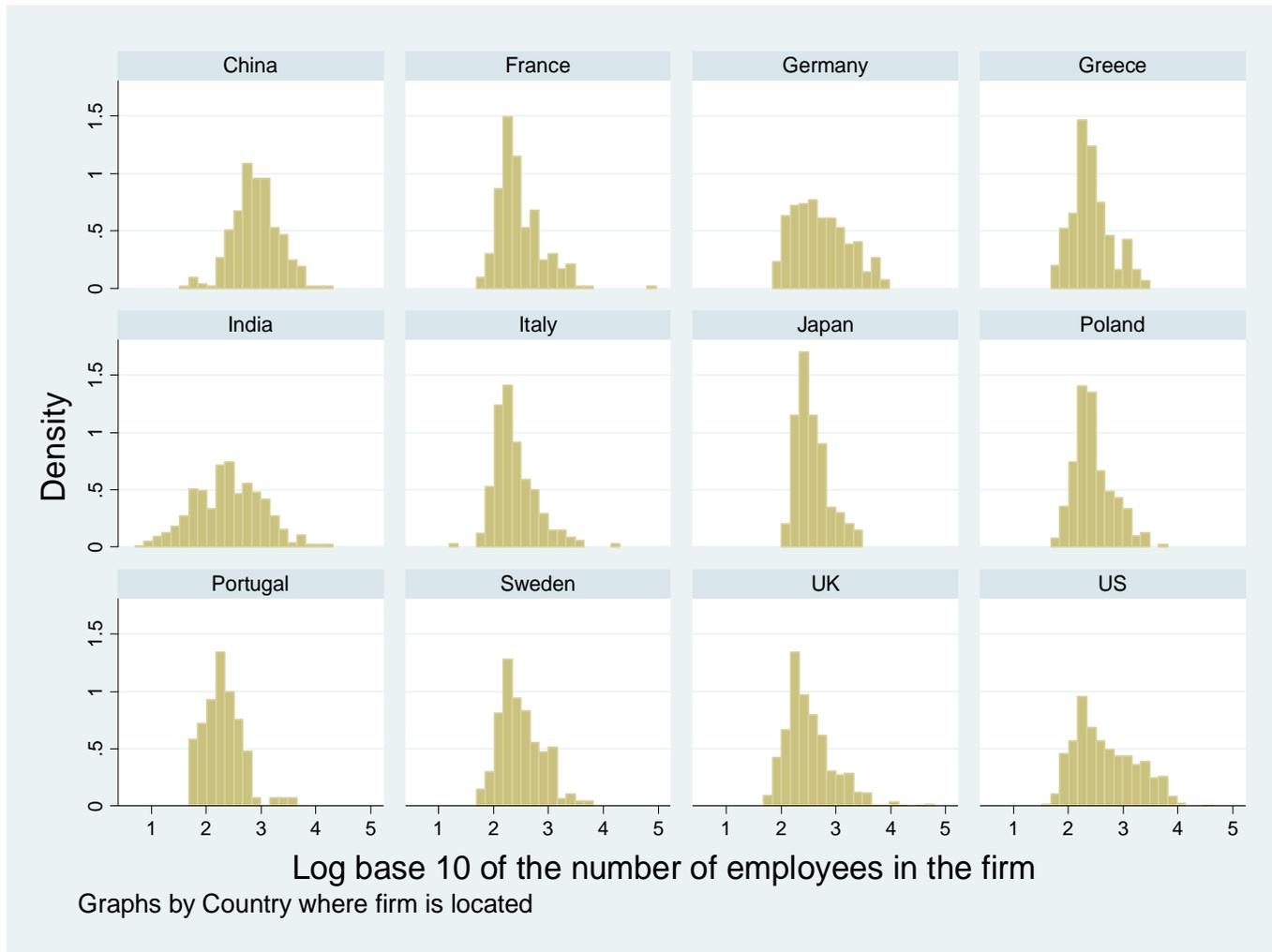
Notes: The graph shows the distribution of log firm employment across the countries in our sample (N=3380)