

MEASURING AND EXPLAINING DECENTRALIZATION ACROSS FIRMS AND COUNTRIES

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Abstract

We collect original data on the degree of decentralization in several thousand firms located in the US, Europe and Asia. Specifically, we focus on the autonomy of local 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/or 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. If - as suggested by the literature - decentralization is complementary to some forms of information and communication technology, Catholic countries with lower trust and competition, like France and Italy, may benefit less from an era of rapid technological change than Protestant countries with greater trust and competition, like Sweden and the U.S.

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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 firm¹. 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 industry² or (at best) across many firms in a single country³. In this paper, we address the lacuna by using a new survey methodology pioneered in Bloom and Van Reenen (2007) 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 work⁴. From an empirical perspective, many papers have suggested that Information and Communication Technologies (ICT) may be complementary with decentralization⁵. 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

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 e.g. Bresnahan, Brynjolfsson 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. We also investigate some of the reasons for variations in trust, which we show, are related to long-run cultural and historical reasons (such as religious composition).

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. Since authority is always informally delegated in their model, decentralization is a situation in which the CEO commits not to reject a project proposed by the manager. Even if delegation is efficient, however, it may not be feasible because of the temptation each side has to renege on the agreement to co-operate on the decentralized equilibrium. 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 keep to the contract and not to abuse the responsibility delegated to him (e.g. abusing expense accounts). 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” (Conclusions, 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, Greek 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 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.

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 it is *feasible*. The tradition in information-processing based approaches to organizational design (that we will discuss) is to focus on efficiency, but as BGM emphasizes when delegation of authority is informal, this may not be possible to attain the efficient solution because of incentive compatibility problems (which they model as the difficulty of sustaining the cooperative outcome in a repeated game).

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” (Puttnam, 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 Survey⁶.

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).

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)⁷.

The final aspect we focus on is religion. This may have an indirect effect on decentralization via changing trust but it may also have a *direct* effect. To see why, consider the plausible idea that all individuals have a taste for autonomy – i.e. they want to make their own decisions rather than being told what to do by their boss. This taste parameter varies in the population, but when individuals have a strong taste for autonomy there is more likely to be decentralization and when they have a weak preference for autonomy centralization is more common. To measure shifts in this taste parameter we use measures of the proportion of people in an area who are members of more hierarchical religious faiths (following La Porta et al, 1997). Hierarchical religious prevalence may shift preferences or simply reflect deeper cultural differences. 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.

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

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

Where the outcome of interest is the degree of decentralization of plant i in region j in industry k in country k (d_{ijk}). 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

⁷ BGM point out that there are circumstances when delegation would be better, but the CEO cannot credibly commit not to renege. For example if the difference in welfare between renegeing and co-operating is small then CEO is likely to renege as cost of doing so is not great. But this will be the case if congruence between parties is high (as manager will do what CEO wants anyway). In this case higher congruence can actually make delegation *less* likely

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_{ijkc} 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 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 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 three hurdles: measuring decentralization, collecting accurate responses, 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 decentralization. First, we asked how much capital investment a plant manager could undertake without prior authorization from the corporate headquarters. 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 and 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 have been 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 final issue is that in 4.9% of our interviews the CEO and the plant manager were the same person, making the measurement of the degree of decentralization between them impossible. 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

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.

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. These (standard errors in parentheses): 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).

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 population databases. Also, from the population 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.⁹ 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 be given?"* with the response *"Always, it is never refused"* scoring a 4 and the response *"Typically agreed in about 80% or 90% of the case"* scoring a 3.

⁹ This survey tool has been passed by Stanford's Human Subjects Committee. The deception involved was deemed acceptable because it is: (i) necessary to get unbiased responses; (ii) minimized to the management practice questions and is temporary (we send managers debriefing packs afterwards); and (iii) presents no risk 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 or interpretation issues with 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.

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.¹⁰ As a result the median number of countries that each interviewer scored was three¹¹, 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 44%, 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

¹⁰ Occasionally managers in Indian would request English language interviews. But in these cases the Indian accent and the sporadic use of local language words meant these could only be run by Indian interviewers. In every other country interviews were run in the local language, although in some countries (such as Greece) interview scheduling was sometimes carried out in English to confirm the official international nature of the work.

¹¹ UK and US interviewers typically had no second language so could only interview firms in these two countries many European interviewers spoke several languages, so could interview firms in up to seven different countries.

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. The best description we found was that we were doing “a piece of work”.

there are potentially several managers per firm who could be contacted¹³. Fourth, the written endorsement of many official institutions¹⁴ 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 interviewers¹⁵, 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).

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 directly 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 (Italy), National Bank of Poland, Peoples Bank of China, Polish Treasury, Reserve Bank of India, Shenzhen Development Bank (China), Sveriges Riksbank (Sweden), 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

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 attitudes¹⁶. 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 answering “yes” to the trust question within the region where the plant is located¹⁷.

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 country aggregates hide a substantial

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

¹⁷ Glaeser et al. (2000) question the validity of this measure of trust, arguing that the WVS question is a measure of trustworthiness and not of trust. In a recent paper, however, Sapienza et al (2007) argue that the trust question it reflects correctly the trustworthiness expected from other parties in economically-relevant situations.

within country and cross-regional variation. This is apparent from Figure 1, which plots the minimum and maximum of the regional levels of trust, together with the average country level of trust for the countries and regions included in our regression sample. 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 analysis¹⁸.

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 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.

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 for regional GDP per capita and population.

¹⁸ 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

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 autonomy).

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 decentralization distribution, ranging between -1.30 and -0.50) 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 0.43 and 1.75), 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 2 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 3 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 overall very little autonomy, with the exception of capital expenditures, where they show a budgetary freedom very similar to that of most European countries.

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. A way to externally validate our results, is to compare our country level aggregates of the decentralization measure with 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 approximatively 50 countries in the early 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 meaning that the difference between the extent to which the boss can determine the behavior of the subordinate, and the extent to which the subordinate can determine the behavior of the boss is lower.

Figure 4 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 “deep” and

economy-wide organizational traits, rather than specific characteristics of the firms included in our sample.

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 period 1999-2003 to remove any potential contemporaneous feedback. The second is the country by three digit industry Lerner index of competition, which is $(1 - \text{profits/sales})$, calculated as the average across the entire firm level database (excluding the firms in the survey). Again, this is constructed for the period 2000-2004¹⁹ to remove any potential contemporaneous feedback. 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 0.085, standard error 0.032). 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 0.125, standard error 0.046). In terms of our 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

¹⁹ 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.

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 1.592 and the standard error 0.531 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 0.053 and the standard error 0.022 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 0.09, 14% 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 0.846, standard error 0.283). 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 Bank²⁰. The Rule of Law variable has a positive and

²⁰ 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).

significant coefficient and reduces the coefficient on trust from 0.85 to 0.54. 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)²¹. We find that the coefficient on trust falls slightly to 0.57, 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. Consistently with the results shown in Table 2, competition is significantly associated with higher decentralization, but the trust coefficient is essentially unchanged²². 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 literature²³, 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.

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 0.228, over 1/3 of a standard deviation.²⁴

²¹ The results are unchanged when we include measures of regional skills, which is positive but insignificant.

²² 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.

²³ 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.

²⁴ Using the coefficient in column (3) and the average regional trust in Sweden and Portugal.

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.²⁵ 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 0.469, standard error 0.203). 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 level of trust in the country where the headquarters of the firm owning the plant are located.²⁶ 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 0.648, standard error 0.221). Working with the trust variable measured in the country of origin allows us to include as

²⁵ See, for example, Antras et al. (2008).

²⁶ Note that the clustering is now based on region-country or origin pairings.

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 0.651, standard error 0.248). Finally, in column (5) we include the Rule of Law index in the multinational's home country, and find that this variable is insignificant. 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.²⁷

V.C Decentralization and Hierarchical Religions

As discussed in the theory section religion could play a role in shaping the decentralization of firms due to either its indirect impact on trust, or more directly by affecting the managerial “taste” for autonomy. In order to explore the role of religion for decentralization, we use the information provided by the World Value Survey regarding the religious denominations of the respondents, and measure the relative importance of different religions in the country or region of interest. 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 Orthodox²⁸. 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 -0.366, standard error 0.108). 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 -0.185, standard error 0.079). 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 -0.279, standard error 0.136). So variations in the density of hierarchical religions across regions within the

²⁷ There are of course many other factors apart from trust and rule of law in the affiliate's country of origin that may be important. We experimented with several and found them to be insignificant. For example, including a measure of skills proxied by the proportion with college degrees took a coefficient of 0.007 with a standard error of 0.101.

²⁸ The average value of HIER in the sample is 34%, with a minimum of 1.4% in China, to a maximum of 94% in Poland. The correlation between HIER and Trust is 0.67, significant at the 1% level.

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.²⁹

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. In general the point estimates of the coefficients of the key competition, trust and religion variables are robust across sub-samples.

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, so that every country has the same underlying sampling frame³⁰, 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

²⁹ If we follow Table 3 and condition on the sub-sample of foreign multinational subsidiaries we 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 -0.277, standard error 0.104). This suggests that the mechanism through which religion effects the organizational structure of firms is transplanted by multinationals abroad. We also 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 -0.383 (standard error of 0.168). We also regressed decentralization on the shares for individual religious blocks (with atheist as the baseline) and found coefficient (standard errors) of -0.231 (0.143), -2.312 (0.268) and -1.193 (0.713) on the share of Catholics, Orthodox and Muslims in the region.

³⁰ As discussed in Appendix A the Chinese and Japanese population of firms from which the sampling frame was constructed had no firms with less than 150 employees.

countries, again finding very similar results³¹. Column (9) shows that the results are unchanged once we include a control for the average quality of the management practices adopted by the firms. Finally, column (10) 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.

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 controls³², and find these account for around 4.6% of the total sample variation in decentralization. Adding a full set of 11 country controls increases the R^2 to 19.2%, suggesting that country effects can account for an additional 14.6% 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 11.7% of the residual variation. Hence, basic firm characteristics and industry effects can account for around 20% (calculated as $(0.146-0.117)/0.146$) of the cross- country variation in decentralization.

After controlling for potential sampling differences, industry composition and survey noise, we find in column (3) that competition can account for an additional 4% (calculated as $(0.117-0.111)/0.146$) of the cross country variation. In column (4) we then add in the trust variable and find this accounts for another 7.5% (calculated as $(0.111-0.100)/0.146$) of the cross-country variation. Columns (6) then adds in the religion term and finds this accounts for a further 8.9% (calculated as $(0.100-0.087)/0.146$) of the cross country variation. Hence, taken together competition, trust and religion can account for about 21% (calculated as $(0.117-0.087)/0.146$) of the cross-country variation in decentralization.

In column (6) 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

³¹ 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.

³² 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.

substantial 29.4% (calculated as $(0.087-0.044)/0.146$) 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 simple control for the level of development. Thus, in summary the results in column (6) are consistent with for an important role of the rule of law in determining the decentralization of firms across countries.

In column (7) 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 1.4% (calculated as $(0.044-0.042)/0.146$) of the cross-country variation. Finally, in column (8) we also add in the survey measure of management practices, which Bloom and Van Reenen (2007) show are strongly associated with higher firm-level productivity, finding this explains about another 0.7% of the cross-country variation in decentralization. Interestingly, we also find the management variable is strongly associated with more decentralization, consistent with the idea firms can decentralization decision making more easily if they are well managed in terms of information processing, target setting and employee incentives.

Finally, Figure 5 plots the country level raw decentralization levels, plus the predicted values from the final column of Table 6 plus the 95% confidence intervals for these. 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 survey³³, which promotes working practices such as worker *autonomation* (limited worker self-management), the involvement

³³ 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.

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.³⁴ So decision making rights in Japan appear more concentrated at the top and bottom of the firm, and not in the hand of middle managers like 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 over 20% 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.

³⁴ 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 much less frequently.

BIBLIOGRAPHY

Acemoglu Daron, Philippe Aghion, Claire Lelarge, John Van Reenen, and Fabrizio Zilibotti “Technology, Information and the Decentralization of the Firm” (2007) NBER Working Paper 12206, forthcoming Quarterly Journal of Economics

Acemoglu, Daron, and Fabrizio Zilibotti, “Information Accumulation in Development,” Journal of Economic Growth, IV (1999), 5-38.

Aghion, Philippe, Nick Bloom, Richard Blundell, Rachel Griffith and Peter Howitt (2005), “Competition and Innovation: An inverted U relationship”, Quarterly Journal of Economics, CXX (2), 701-728.

Aghion, Philippe, and Jean Tirole, “Formal and Real Authority in Organizations,” Journal of Political Economy, CV (1997), 1-29.

Alonso, Ricardo, Dessein, Wouter and Matouschek, Niko “When Does Coordination Require Centralization” forthcoming American Economic Review, March (2008).

Antras, Pol, Garicano, Luis and Esteban Rossi-Hansberg, “Organizing Offshoring: Middle Managers and Communication Costs”, Forthcoming in Helpman, E., D. Marin, and T. Verdier, The Organization of Firms in a Global Economy, Harvard University Press, (2008).

Baker, George, Robert Gibbons, and Kevin Murphy, “Informal Authority in Organizations,” Journal of Law, Economics, and Organization, XV (1999), 56-73.

Baker, George, and Thomas Hubbard, “Make Versus Buy in Trucking: Asset Ownership, Job Design and Information”, American Economic Review, XCIII (2003), 551-72.

Baker, George, and Thomas Hubbard, “Contractibility and Asset Ownership: On Board Computers and Governance in US Trucking,” Quarterly Journal of Economics, CXIX (2004), 1443-79.

Baron, David, and David Besanko, “Information, Control, and Organizational Structure”, Journal of Economics and Management Strategy, I (1992), 237-275.

Bloom, Nicholas, and Van Reenen, John, “Measuring and Explaining Management Practices across Firms and Countries”, Quarterly Journal of Economics, CXXII (2007), 1341-1408.

Bloom, Nicholas, Sadun, Raffaella and John Van Reenen (2007) “Americans do IT Better: American Multinationals and the Productivity Miracle”, NBER wp 13085.

Bolton, Patrick, and Mathias Dewatripont, “The Firm as a Communication Network,” Quarterly Journal of Economics, CIX (1994), 809-839.

Bolton, Patrick, and Mathias Dewatripont, “Contract Theory”, (2005), MIT Press.

Bresnahan, Timothy, Erik Brynjolfsson, and Lorin Hitt, "Information Technology, Workplace Organization and the Demand for Skilled Labor: Firm-level Evidence," *Quarterly Journal of Economics*, CXVII (2002), 339-376.

Caroli, Eve, and John Van Reenen, "Skill Biased Organizational Change," *Quarterly Journal of Economics*, CXVI (2001), 1448-1492.

Colombo, Massimo, and Marco Delmastro, "Delegation of Authority in business organizations: An empirical test," *Journal of Industrial Economics*, LII (2004), 53-80.

Dessein, Wouter, "Authority and Communication in Organizations," *Review of Economic Studies*, LXIX (2002), 811-838.

Fukuyama, Francis "Trust: the social virtues and the creation of prosperity", (1995) New York: Free Press

Garicano, Luis, "Hierarchies and the Organization of Knowledge in Production," *Journal of Political Economy*, CVIII (2000), 874-904.

Garicano, Luis, and Tomas Hubbard, "Managerial Leverage Is Limited by the Extent of the Market: Hierarchies, Specialization, and the Utilization of Lawyers' Human Capital.," *Journal of Law and Economics* (2007a) 50(1), pp. 1 – 43

Garicano, Luis, and Tomas Hubbard, "The Return to Knowledge Hierarchies", (2007b) NBER wp no. 12815

Geanakoplos, John, and Paul Milgrom, "A Theory of Hierarchies Based on Limited Managerial Attention," *Journal of the Japanese and International Economies*, V (1991), 205-225.

Gibbons, Robert and Roberts, John (2008) *The Handbook of the Organizational Economics*, Princeton: Princeton University Press

Gibbons, R., Henderson, R., Repenning and Sberman, J. (2008) "Suggestive Evidence and Potential Theories about Building Relationships" in Gibbons, Robert and Roberts, John (eds) *The Handbook of the Economics Organization*

Glaeser, Edward, Laibson, David, Scheinkman, Jose and Soutter, Christine (2000) "Measuring Trust" *Quarterly Journal of Economics*, 3, 811-846

Guadalupe, Maria and Wulf, Julie (2007) "The Flattening Firms and Product Market Competition: The effects of trade costs and liberalization", mimeo, Columbia University

Guiso, Sapienza and Zingales (2004) "The Role of Social Capital in Financial Development" *American Economic Review*, 94(3), 526-554

Hart, Oliver, and John Moore, "On the Design of Hierarchies: Coordination versus Specialization," *Journal of Political Economy*, CXIII (2005), 675-702.

Garicano, L. and Hubbard, T. (2006) "Managerial Leverage is limited by the extent of the market: Hierarchies, Specialization and the Utilization of Lawyers", *Journal of Law and Economics*, 50(1), 1-44

Garicano, L. and Hubbard, T. (2007) "Earnings Inequality and Coordination Costs: Evidence from US Law Firms" London School of Economics, mimeo

Glaeser, Edward, La Porta, Rafael, Lopez-de-Silanes, Florencio and Andrei Shleifer, 2004. "Do Institutions Cause Growth?" *Journal of Economic Growth*, Springer, vol. 9(3), pages 271-303.

Hofstede, G, "Culture's Consequences", 2001, Sage Publications.

Kaufmann, Danny, Kraay, A. and M. Mastruzzi "Governance Matters V: Governance Indicators for 1996–2005", World Bank

Knack, S. and Keefer, P. (1997) "Does Social Capital have an Economy Payoff? A cross-country investigation", *Quarterly Journal of Economics* CXII, 1251-1288

La Porta, R., Lopez-de-Silanes, A., Schleifer, A. and Vishny, R. (1997) "Trust in Large Organizations", *American Economic Review*, LXXXVII, 333-338

Manski, Charles (2004), "Measuring expectations", *Econometrica*, LXXII (5), 1329-1376.

Marin, Dalia and Verdier, Thierry (2006) "Corporate Hierachies and the Size of nations: Theory and Evidence", Paris School of Economics mimeo

McKinsey Global Institute, "Reaching Higher Productivity Growth in France and Germany," MGI Reports, <http://www.mckinsey.com/knowledge/mgi/europe/index.asp>, 2002.

Melumad, Nahum, Dilip Mookherjee, and Stefan Reichelstein, "Hierarchical Decentralization of Incentive Contracts," *Rand Journal of Economics*, XXVI (1995), 654-672.

Milgrom, Paul, and John Roberts, *Economics, Organization and Management*, (New Jersey: Prentice Hall, 1992).

Mookherjee, Dilip, "Decentralization, Hierarchies and Incentives: A Mechanism Design Approach," *Journal of Economic Literature*, LXIV (2006), 367-390.

Nickell, Stephen, Daphne Nicolitsas, and Malcolm Patterson, "Does Doing Badly Encourage Managerial Innovation?," *Oxford Bulletin of Economics and Statistics*, III (2001), 5-28.

Putnam (1993), "Making democracy work: Civic Traditions in modern Italy" Princeton NJ: Princeton University Press

Radner, Roy, "The Organization of Decentralized Information Processing," *Econometrica*, LXI (1993), 1109-1146.

Radner, Roy, and Timothy Van Zandt, "Information Processing in Firms and Returns to Scale," *Annales d'Economie et de Statistique*, XXV/XXVI (1992), 265-298.

Rajan, Raghuram, and Luigi Zingales, "The Firm as a Dedicated Hierarchy: A Theory of the Origin and Growth of Firms," *Quarterly Journal of Economics*, CXVI (2001), 805-851.

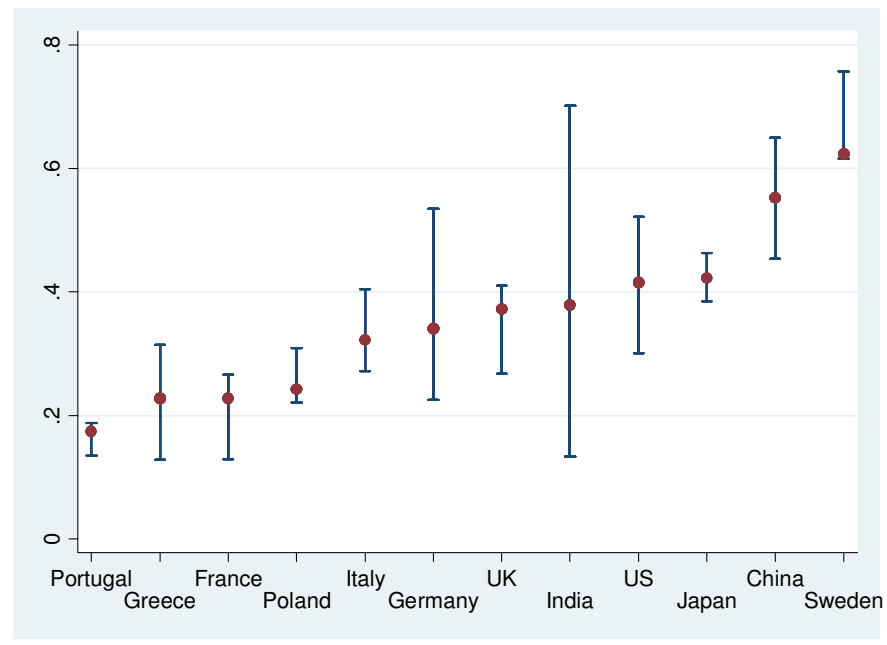
Rajan, Raghuram, and Julie Wulf, "The Flattening Firm: Evidence from Panel Data on the Changing Nature of Corporate Hierarchies," *Review of Economics and Statistics*, (2006), 88 (4), pp 759-773.

Sah, Raaj, and Joseph Stiglitz, "The Architecture of Economic Systems: Hierarchies and Polyarchies," *American Economic Review*, LXXVI (1986), 716-727.

Sapienza, Paola, Toldra, Anna and Luigi Zingales, "Understanding Trust", NBER working paper 13387.

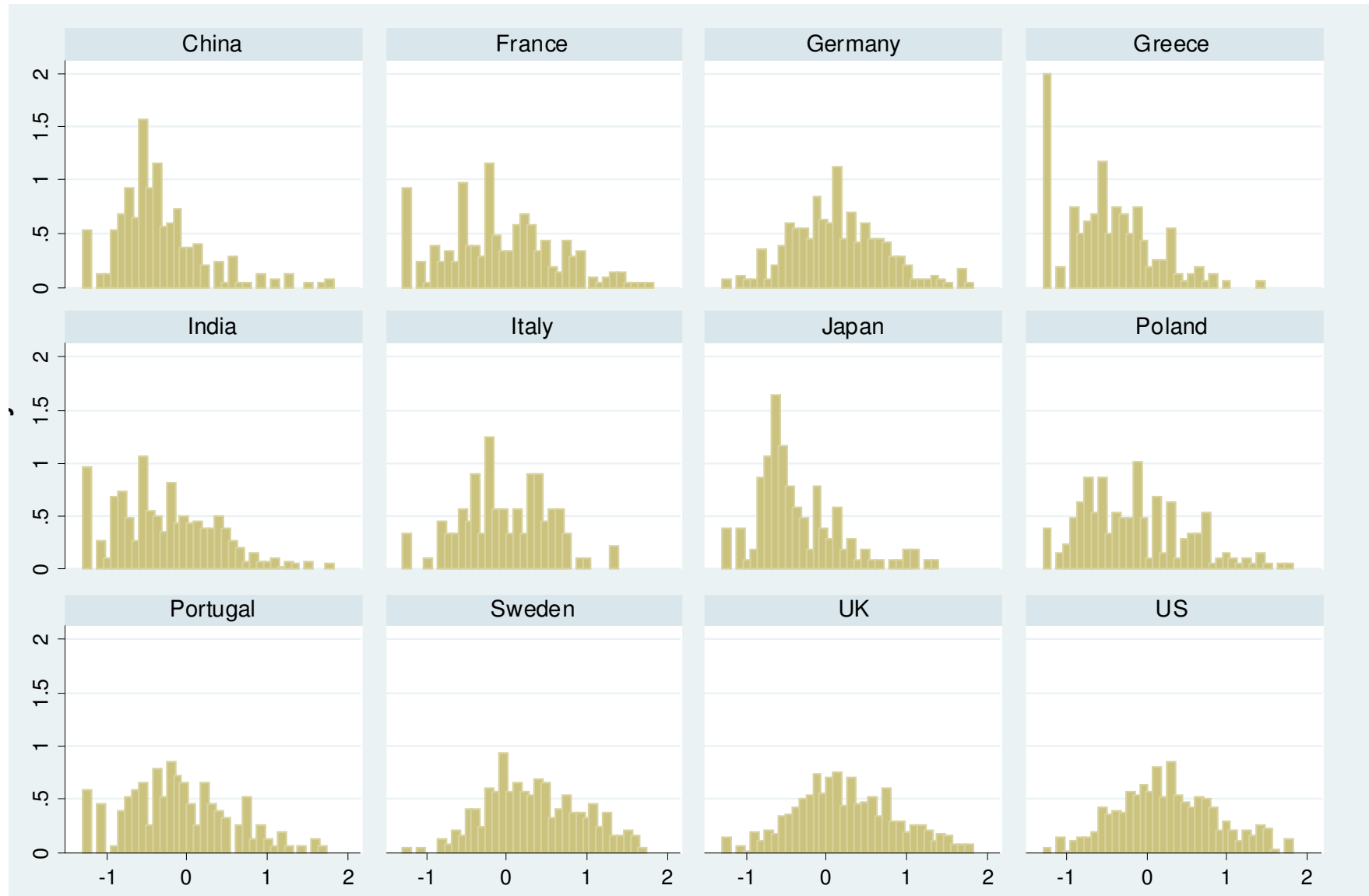
Vives, Xavier (2005), "Innovation and competitive pressure", CEPR discussion paper DP4369.

FIGURE 1 – TRUST BY COUNTRY, REGIONAL DISPERSION



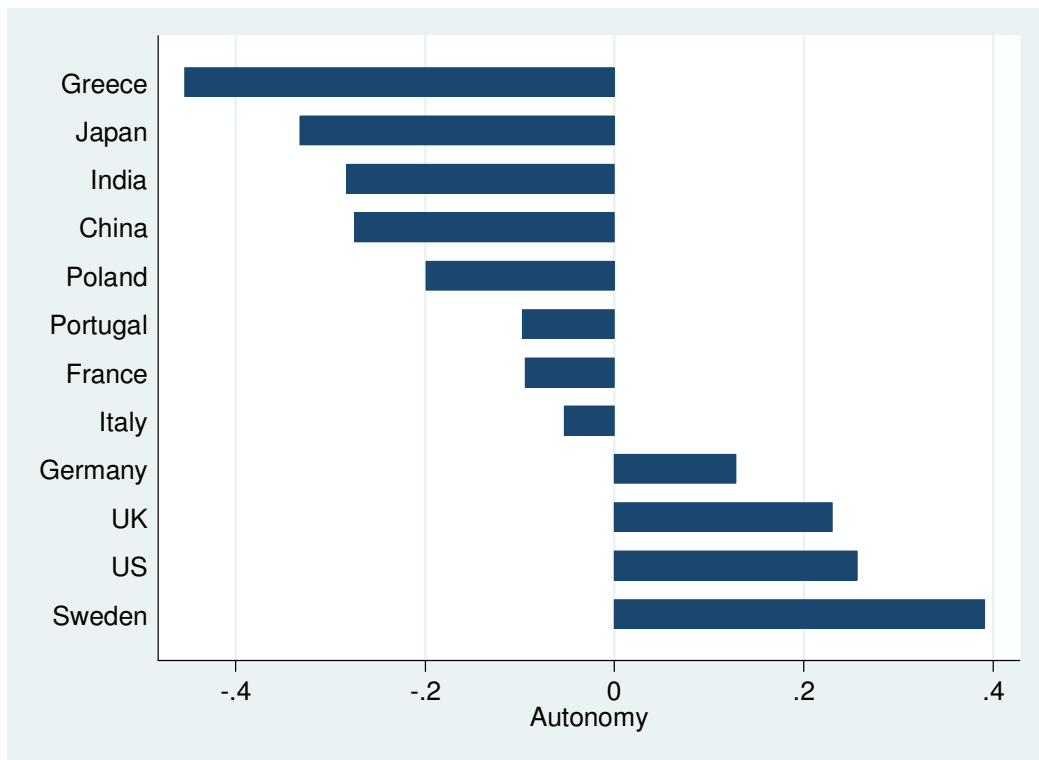
Notes: The graph shows the average level of trust (red dots), and the minimum and maximum levels of trust by country.
N=3380

FIGURE 2 – DISTRIBUTION OF THE DECENTRALIZATION VARIABLE BY COUNTRY



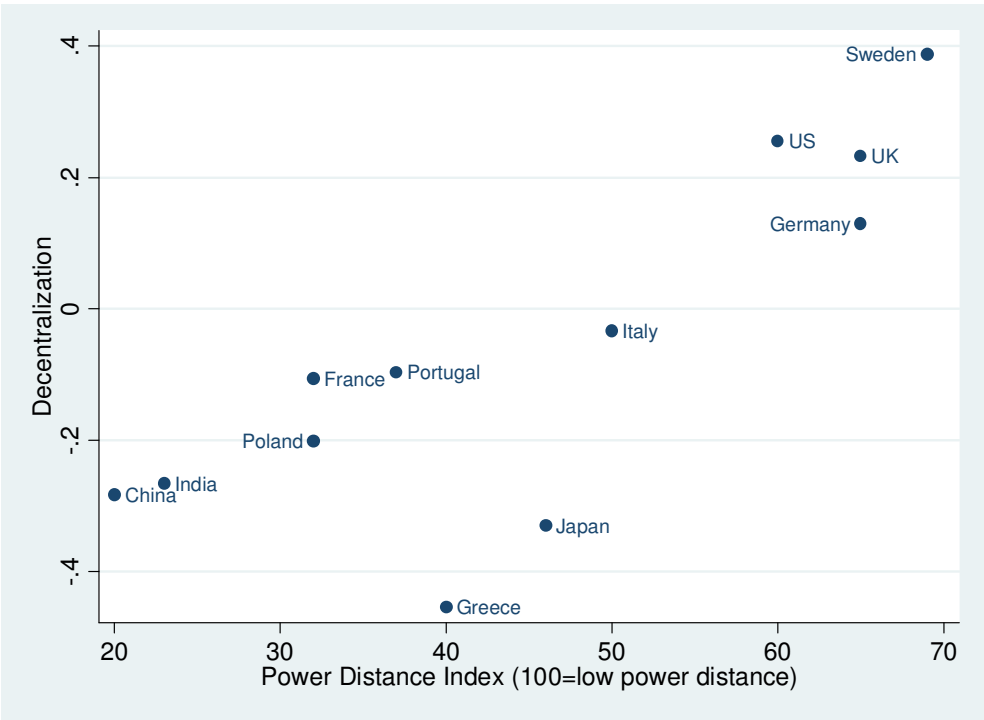
NOTES: These are the distributions of the standardized decentralization scores (averages across 4 decentralization questions for each firm). N=3380.

FIGURE 3 - AVERAGE DECENTRALIZATION BY COUNTRY



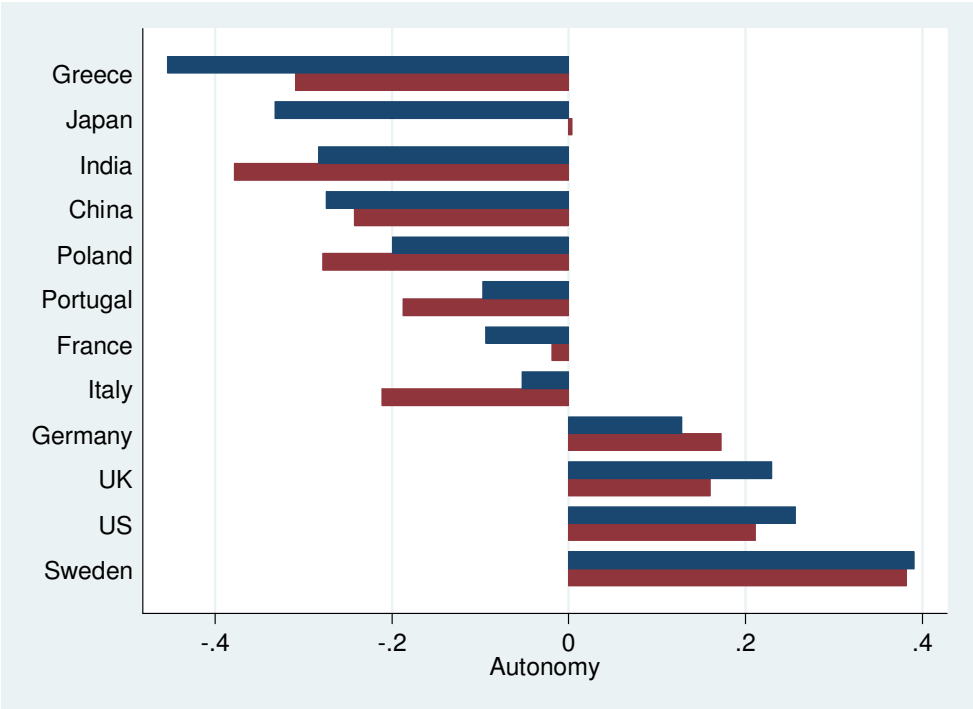
Notes: The graph plots average decentralization by country. N=3380.

FIGURE 4 - AVERAGE DECENTRALIZATION AND THE POWER DISTANCE INDEX BY COUNTRY



Notes: The graph plots the average level of decentralization by country (built on 3380 observations) against the Power Distance Index (Hofstede, 1980).

FIGURE 5 - 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	-0.79	-1.30	-0.50	0.23	1.84	1.14	1.35	0
2nd Quartile	-0.26	-0.50	-0.05	0.13	2.90	1.41	1.75	2,000
3rd Quartile	0.19	-0.05	0.43	0.14	3.73	1.92	2.47	6,900
4th Quartile	0.88	0.43	1.75	0.34	4.18	3.66	3.80	16,350
All	0.00	-1.30	1.75	0.66	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 from 1 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)	0.085*** (0.032)	0.125*** (0.046)				
Industry Lerner index of Competition (3 years lagged)			3.807*** (0.494)	1.592*** (0.531)		
Number of Competitors (0=none, 1=between 1 and 4, 2=more than 4)					0.093*** (0.023)	0.053** (0.022)
Plant Skills % Plant employees with a College degree		0.052*** (0.012)		0.057*** (0.011)		0.060*** (0.011)
Ln(Firm N) Firm Size		0.042** (0.016)		0.035*** (0.013)		0.035*** (0.012)
Ln(Plant N) Plant employees as a % of firm		0.079*** (0.015)		0.065*** (0.016)		0.063*** (0.015)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational		0.085** (0.033)		0.064** (0.027)		0.070** (0.028)
Domestic MNE Dummy=1 if firm belongs to a domestic multinational Omitted base is purely domestic firms		0.015 (0.038)		0.001 (0.034)		0.001 (0.030)
Observations	2464	2464	3419	3419	3386	3386
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 *Sic	Country *Sic	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	0.846*** (0.283)	0.536*** (0.193)	0.457** (0.201)	0.469** (0.201)	0.473** (0.202)
Rule of law (country) (-2.5=low, 2.5=high)		0.305*** (0.069)			
Number of Competitors (0=none, 1=between 1 and 4, 2=5 or more)				0.055*** (0.020)	0.056*** (0.021)
Civic (region) (5=high civic sense 50=low civic sense)					0.004 (0.016)
Plant Skills % Plant employees with a College degree			0.057*** (0.010)	0.056*** (0.010)	0.057*** (0.010)
Ln(Firm N) Firm Size			0.024* (0.013)	0.024* (0.013)	0.024* (0.013)
Ln(Plant N) Plant employees as a % of firm			0.060*** (0.019)	0.059*** (0.019)	0.059*** (0.019)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational			0.103*** (0.037)	0.106*** (0.038)	0.106*** (0.037)
Domestic MNE Dummy=1 if firm belongs to a domestic multinational Omitted base is purely domestic firms			0.020 (0.030)	0.021 (0.031)	0.021 (0.031)
Observations	3380	3380	3380	3380	3380
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
Weights	yes	yes	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 behaviour was never justified and a 10 indicating that the behaviour was always justified. The five behaviours 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. The weight is the share of World Values Survey respondents in the region in the country.

TABLE 4
DECENTRALIZATION AND TRUST IN THE COUNTRY OF ORIGIN

Sample	All Firms	Foreign Multinationals			
	(1)	(2)	(3)	(4)	(5)
Trust (region) Trust measured in firm's region of location	0.469** (0.203)	0.427 (0.433)	0.347 (0.574)		
Trust (country of origin) Trust measured in firm's country of origin			0.648*** (0.221)	0.651** (0.248)	0.743** (0.279)
Rule of law (country of origin) (-2.5=low, 2.5=high)					-0.086 (0.067)
Plant Skills % Plant employees with a College degree	0.054*** (0.011)	0.118*** (0.019)	0.120*** (0.023)	0.129*** (0.025)	0.130*** (0.024)
Ln(Firm N) Firm Size	0.030** (0.014)	0.009 (0.022)	0.008 (0.022)	0.008 (0.022)	0.008 (0.022)
Ln(Plant N) Plant employees as a % of firm	0.071*** (0.018)	0.062 (0.044)	0.059** (0.023)	0.070** (0.026)	0.071** (0.026)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational	0.101*** (0.034)				
Domestic MNE Dummy=1 if firm belongs to a domestic multinational Omitted base is purely domestic firms	0.017 (0.027)				
Observations	3380	837	837	837	837
Regional controls (2)	yes	yes	yes	yes	yes
Industry dummies (21)	yes	yes	yes	yes	yes
Country dummies (12)	yes	yes	yes	yes	yes
Other controls (60)	yes	yes	yes	yes	yes
Country of origin controls (2)	no	no	yes	yes	yes
Regional dummies (105)	no	no	no	yes	yes
Weights	yes	yes	yes	yes	yes
Clustering	Region	Region	Country of origin	Country of origin	Country of origin

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Column 1 includes all firms, Columns 2-5 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. 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 origin. The index is compiled by the World Bank (Kauffman et al, 2007), and ranges between -2.5 and 2.5. “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. The weight is the share of World Values Survey respondents in the region in the country.

TABLE 5
DECENTRALIZATION AND RELIGION

	(1)	(2)	(3)
Hierarchical (region) % of Catholics, Muslims and Orthodox in firm's region of location	-0.366*** (0.108)	-0.185** (0.079)	-0.279** (0.136)
Rule of law (country) (-2.5=low, 2.5=high)		0.207*** (0.047)	
Hierarchical (country of origin) % of Catholics, Muslims and Orthodox in firm's country of origin			
Trust (region) Trust measured in firm's region of location			0.539*** (0.201)
Number of Competitors (0=none, 1=between 1 and 4, 2=5 or more)			0.057*** (0.021)
Plant Skills % Plant employees with a College degree			0.057*** (0.010)
Ln(Firm N) Firm Size			0.024* (0.013)
Ln(Plant N) Plant employees as a % of firm			0.060*** (0.019)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational			0.105*** (0.037)
Domestic MNE Dummy=1 if firm belongs to a domestic multinational			0.023 (0.031)
Omitted base is purely domestic firms			
Observations	3380	3380	3380
Regional controls (2)	yes	yes	yes
Industry dummies (112)	no	no	yes
Country dummies (12)	no	no	yes
Other controls (60)	no	no	yes
Country of origin controls (2)	no	no	no
Regional dummies (105)	no	no	no
Weights	yes	yes	yes
Clustering	Region	Region	Region

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 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. The weight is the share of World Values Survey respondents in the region in the country.

TABLE 6 - QUANTIFICATION

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Publicly traded		-0.097*** (0.037)	-0.095*** (0.037)	-0.097** (0.038)	-0.118*** (0.038)	-0.089** (0.037)	-0.062* (0.035)	-0.071** (0.034)
Ln(Firm N)		0.060*** (0.014)	0.056*** (0.014)	0.043*** (0.015)	0.058*** (0.015)	0.049*** (0.014)	0.035*** (0.013)	0.013 (0.016)
Firm Size								
Ln(Plant N)		0.053*** (0.018)	0.048*** (0.017)	0.045** (0.022)	0.061*** (0.022)	0.074*** (0.021)	0.063*** (0.021)	0.050** (0.021)
Plant employees as a % of firm								
Number of Competitors (0=none, 1=between 1 and 4, 2=5 or more)			0.117*** (0.026)	0.099*** (0.035)	0.087*** (0.030)	0.080*** (0.026)	0.086*** (0.026)	0.064*** (0.023)
Trust (region) Trust measured in firm's region of location				0.663*** (0.239)	0.354 (0.287)	0.566*** (0.215)	0.512** (0.215)	0.438** (0.208)
Hierarchical (region) % of Catholics, Muslims and Orthodox in firm's region of location					-0.240** (0.099)	0.063 (0.089)	0.044 (0.087)	0.018 (0.087)
Rule of law (country) (-2.5=low, 2.5=high)						0.325*** (0.028)	0.315*** (0.026)	0.282*** (0.027)
Plant Skills % Plant employees with a College degree							0.045*** (0.011)	0.037*** (0.011)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational							0.174*** (0.039)	0.131*** (0.037)
Domestic MNE Dummy=1 if firm belongs to a domestic multinational							0.044 (0.034)	0.031 (0.036)
Management Management practice score								0.121*** (0.031)
Observations	3380	3380	3380	3380	3380	3380	3380	3380
Industry dummies (112)	no	yes	yes	yes	yes	yes	yes	yes
Clustering	Company	Company	Company	Region	Region	Region	Region	Region
R-squared without country controls (results above)	0.046	0.139	0.146	0.157	0.169	0.216	0.232	0.242
R-squared with country controls (results above plus country controls)	0.192	0.256	0.257	0.257	0.256	0.26	0.274	0.283
Additional R-squared from adding country controls	0.146	0.117	0.111	0.100	0.087	0.044	0.042	0.041
P-value on country controls	0.000	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>

Decentralization Questions:

For Score 1 to 5 questions any number 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)?”

	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 O2: “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. >\$½m 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?”

	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*)?”

	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 *CHQ* on the site being interviewed?”

TABLE A.1 - ROBUSTNESS RESULTS

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	Include Management	Exclude Investment Question
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Number of Competitors (0=none, 1=between 1 and 4, 2=5 or more)	0.057*** (0.021)	0.015 (0.039)	0.097*** (0.031)	0.061** (0.030)	0.054 (0.037)	0.066* (0.038)	0.054** (0.023)	0.055** (0.023)	0.041** (0.019)	0.048** (0.023)
Trust (region) Trust measured in firm's region of location	0.539*** (0.201)	0.304 (0.327)	0.750*** (0.268)	0.291 (0.264)	0.706** (0.347)	0.442* (0.265)	0.659*** (0.224)	0.842*** (0.268)	0.518** (0.199)	0.616*** (0.221)
Hierarchical (region) % of Catholics, Muslims and Orthodox in firm's region of location	-0.279** (0.136)	-0.286 (0.302)	-0.347*** (0.124)	-0.243 (0.160)	-0.278 (0.215)	-0.323** (0.161)	-0.290 (0.198)	-0.296** (0.143)	-0.252* (0.131)	-0.333* (0.177)
Plant Skills % Plant employees with a College degree	0.057*** (0.010)	0.057*** (0.019)	0.049*** (0.012)	0.046*** (0.016)	0.089*** (0.013)	0.055*** (0.016)	0.053*** (0.011)	0.056*** (0.012)	0.046*** (0.010)	0.060*** (0.012)
Ln(Firm N) Firm Size	0.024* (0.013)	0.046** (0.021)	0.009 (0.020)	0.017 (0.019)	0.026 (0.024)	-0.000 (0.025)	0.017 (0.014)	0.028* (0.016)	0.007 (0.015)	0.005 (0.015)
Ln(Plant N) Plant employees as a % of firm	0.060*** (0.019)	-0.001 (0.031)	0.077*** (0.027)	0.054* (0.028)	0.070** (0.028)	0.056*** (0.019)	0.066*** (0.023)	0.067*** (0.020)	0.048** (0.019)	0.055** (0.022)
Foreign MNE Dummy=1 if firm belongs to a foreign multinational	0.105*** (0.037)	0.128* (0.067)	0.080** (0.034)	0.078 (0.056)	0.089 (0.054)	0.141*** (0.047)	0.096** (0.041)	0.124*** (0.041)	0.069** (0.033)	0.072* (0.038)
Domestic MNE Dummy=1 if firm belongs to a domestic multinational	0.023 (0.031)	-0.032 (0.090)	0.041 (0.035)	0.031 (0.045)	-0.010 (0.049)	0.014 (0.045)	0.009 (0.041)	0.028 (0.032)	0.011 (0.031)	0.034 (0.034)
Observations	3380	1312	2068	2066	1314	1885	2870	2685	3380	3380
Regional controls (2)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry dummies (112)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Country dummies (12)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Other controls (69)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Weights	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Clusters	Region	Region	Region	Region	Region	Region	Region	Region	Region	Region

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. Notes: “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 % of employees with a college degree, 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”) 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)

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 $\log(\text{employees})$ on $\log(\text{assets})$ 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.³⁵ 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,

³⁵ 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 fewest³⁶. 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 than 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 Survey Response Rate

As shown in Table B2 of the firms we contacted 44% 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 39.2% 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 through 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.

³⁶ The size of the manufacturing sector can be obtained from <http://laborsta.ilo.org/>, a database maintained by ILO. Indian data can be obtained from Indiastat, from the "Employment in Industry" table.

³⁷ After two weeks of the Japanese team working midnight to 8am it became clear this schedule was not sustainable due to unsociability of the hours, with one of the Japanese interviewers quitting. The rest of the team then switched to working 4am until noon.

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 B3, column (1), evaluates the decision to accept the interview proposition. 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.

Table B3 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 interviewed 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 $(1 - \text{profit}/\text{sales})$ 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 from 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 B4.

GDP per Capita and Population

The regional GDP per capita and population variables are drawn from the following sources: Europe: Eurostat, Regional Statistics³⁸; United States: Bureau of Economic Analysis, regional Statistics³⁹; Japan: Japan Statistic Bureau, Prefectural Statistics⁴⁰; China: Province data from Chinadataonline.org⁴¹; India: State level data from the Central Statistical Organisation (CSO)⁴². The data refers to 2006.

Rule of Law

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 B4. We have 3601 firms with 3737 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.

³⁸ http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136162,0_45572076&_dad=portal&_schema=PORTAL

³⁹ <http://www.bea.gov/regional/gsp/>

⁴⁰ <http://www.stat.go.jp>

⁴¹ <http://chinadataonline.org/member/macroyr/macroyrtshow.asp?code=A0101>

⁴² http://mospi.nic.in/cso_test1.htm

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
Firm age (median, years)	11	33	26	29	37	30	53	34	31	40	32	30

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). **Firm median age** is the median number of years since the firm was incorporated. [§] Indian employment numbers predicted from balance sheet information for privately held firms. Indian ages for publicly listed firms only

TABLE B2: THE SURVEY RESPONSE RATE

	All	CN	FR	GE	GR	IN	IT	JP	PO	PT	SW	UK	US
Interviews completed (%)	44.0	16.8	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	12.2	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 (%)	39.2	71.0	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 (#)	8,733	262	541	604	382	784	296	711	659	304	444	2,060	1960

Notes to Table B2: 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 B3: THE SURVEY RESPONSE PROBIT

Dependent Variable	(1) Interview completed	(2) Interview Completed	(4) Interview completed	(5) Interview Completed
Sample	Firms with interviews completed or refused	All firms contacted	All firms contacted	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* (0.110)	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	3635	6275	4327	4129

Notes to Table B3: All columns estimated by OLS with robust standard errors in parentheses. A single cross section of data used. All columns include a full set of 44 interviewer dummies, and 142 SIC 3-digit industry dummies. Column (1) uses only firms which were either 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. Note in column (3) India and the US are dropped because no sales growth data is available. In column (4) the India, Japan and the US are dropped because there is no Return of Capital Employed data available. [§] Coefficient and standard-errors multiplied by 100 for scaling purposes.

TABLE B4 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
Average hours per week, all employees	43.5	48	37.1	40.0	41.7	51.8	41.8	47.2	41.9	42.8	40.7	41.7	45.6	234
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	0.20	0.46	0.31	0.19	0.10	0.25	0.03	0.35	0.18	0.44	0.38	0.14	0.25	0
% of Domestic MNE's	0.01	0.34	0.36	0.13	0.02	0.22	0.32	0.04	0.20	0.39	0.25	0.33	0.22	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

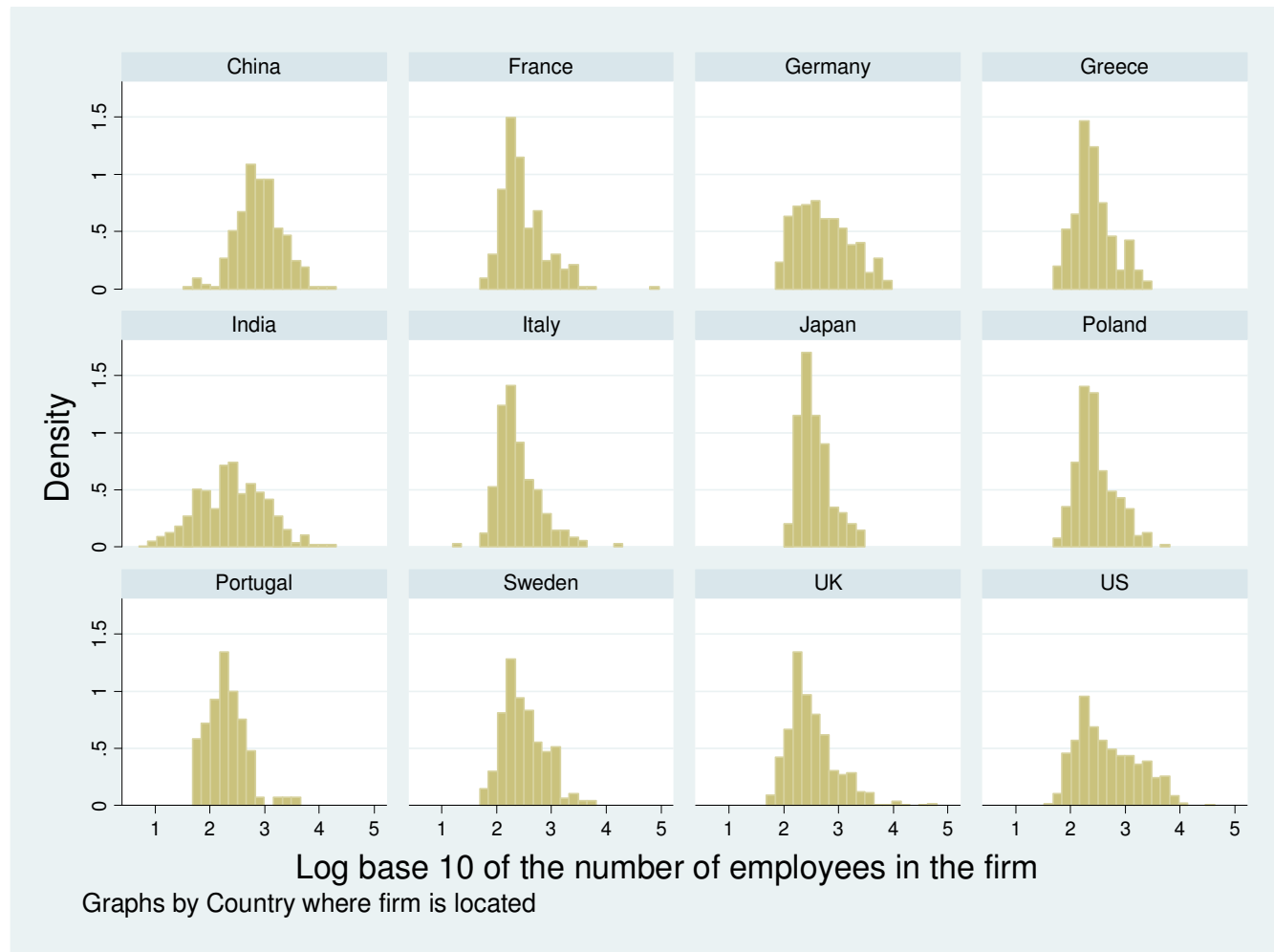
Notes to Table B4: All=All countries combined, CN=China, FR=France, GE=Germany, GR=Greece, IN=India, IT=Italy, JP=Japan, PO=Poland, PT=Portugal, SW=Sweden, UK=United Kingdom, US=United States.

TABLE B5 - 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: 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)