# Worker (dis)trust in management and the delegation of real authority*

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**Abstract**

Using a unique employee-establishment matched survey, we find a causal relationship between an individual employee's distrust of management and the delegation of real authority. We utilize both fixed effects and instrumental variables to control for unobserved factors: establishment-level fixed effects control for management quality, practices, culture and other characteristics; our instrument of inherited distrust in management addresses the possible endogeneity of employee distrust. Across all specifications, we find that delegation of real authority is less likely if an employee distrusts management. Our results are consistent with the theoretical literature on delegation; in particular, when contracts are incomplete distrust between a principal and an agent prevents delegation that could have been sustained as part of an implicit agreement.

*Key words*: trust, real authority, delegation, relational contracts.
*JEL classifications*: D23, L22, L23.

## 1 Introduction

Firms exist in large part to replace market transactions with (bureaucratic) authority relations with employees (Williamson, 1985; Grossman and Hart, 1986). The resulting scale, specialization and division of labour inside modern firms, however, invariably means that valuable information is distributed across many agents at different levels in an organization's hierarchy. Furthermore, often these agents are unable – or unwilling – to fully share this information in a cogent and timely way (Stinchcombe, 1990; Radner, 1993; Aghion and Tirole, 1997; Jensen and Meckling, 1998; Prendergast, 2002; Dessein, 2002; Meagher et al., 2004). Delegation of decision-making rights is one way to make use of agents' information and know-how. As a result, managers do not just supervise employees; a key task of a manager is to exercise oversight of the delegation of real authority in the face of non-contractible actions and information.[1]

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[1] As outlined in Aghion and Tirole (1997), the primary economic issue of authority inside a firm is who makes a decision (real authority) as opposed to who has legal authority. Empirically, real authority is not about the formal rules and processes of an organization but the fuzzy and subjective way in which decision making actually occurs.

Delegation, however, is not a panacea for a firm's contracting problems, as agents must be encouraged to make appropriate decisions on the basis of their private, non-contractible information. How well firms are able to encourage agents to take profit-enhancing non-contractible actions is at the heart of contemporary explanations of "persistent performance differences between seemingly similar firms" (Gibbons and Henderson, 2013), because an inability to delegate limits a firm's value and its potential to grow (Boedker et al., 2011; Bloom et al., 2012).[2] Similar ideas are common in the popular business literature, see for example Williams (2013) and Shockley-Zalabak et al. (2010, p. 22-23).

One solution to non-contractability could be a relationship in which each party *trusts* the other to do the "right" thing.[3] In a trusting relationship employees will not (excessively) exploit their individual authority for their private gain and, in return, management will reward employees appropriately even if they are not legally obliged to do so.

One solution to non-contractability could be a relationship in which the first party *trusts* the second party to honour a non-contractible agreement. Specifically, a trust based employment relationship could be one in which employees will take appropriate actions (rather than exploit their individual authority for their private gain) and, in return, management will reward employees appropriately even if they are not legally obliged to do so.[4]

The Oxford English Dictionary defines trust as a "firm belief in the reliability, truth, or ability of someone or something". This highlights the fact that if a person is to fulfill an obligation they must have both the *intention* (honesty) and the *ability* to do so.

A key contribution of this paper is to conduct the first individual-level empirical analysis of trust (or its absence) and the delegation of real authority. We use uniquely detailed and matched employee-establishment data to control for both individual and establishment effects on delegation. One of our novel results uses an instrumental-variable approach to demonstrate a causal link between *employee (dis)trust in management* and the *delegation of real decision-making authority*.[5]

Trust might arise from a number of sources. Culture and social norms affect an individual's trust in others. At the personal level, the social capital of the individuals involved in the relationship has also been shown to contribute to the level of trust (Glaeser et al., 2000). The tacit cooperative equilibria in the relational-contracting models of Baker et al. (1999, 2002), Levin (2003) and Li et al. (2017) have been interpreted as trust in a repeated relationship (see Gibbons and Henderson (2013) for example).[6] More behavioral aspects could also play a role, such as the reference points of Hart and Moore (2008). While theory is framed in the positive – the existence of trust – our empirical analysis describes the relationship between management and an employee in terms of the employee's

[2]Gibbons and Henderson (2013) argue that one driver of performance differences is that better performers manage to develop organizations in which relational contracts flourish. This, in turn, creates a more efficient organization and higher productivity. Consistent with this, Boedker et al. (2011) find that of 32 management practices, a measure of delegation has the highest correlation with their High Performing Workplace Index. Bloom et al. (2012) suggest that failure to delegate restricts a firm's ability to grow; they find supporting empirical evidence in a range of manufacturing firms across a number of countries.

[3]See the survey by Gibbons (1998) or Malcomson (2013) for a discussion in the context of between-firm behavior.

[4]The converse could also be a trust based relationship: payment is fixed but the employer trusts the employee to honour an agreement to do the right thing.

[5]The theoretical motivations underlying delegation include: a trade-off between costly communication and a loss of control delegating to a biased agent (Dessein, 2002; Alonso et al., 2008); more effective processing of information by using agents throughout the organization (Radner, 1993; Bolton and Dewatripont, 1994; Van Zandt, 1999; Garicano, 2000; Meagher, 2003; Rossi-Hansberg and Garicano, 2012); and the incentive effects of providing agents decision-making powers (Aghion and Tirole, 1997; Zabojnik, 2002; Bester, 2009; Acemoglu et al., 2007).

[6]See also the trust game of Kreps (1990).

distrust in management – that is the absence of trust. While conceptually one naturally excludes the other, at the level of survey design distrust is, as we discuss below, a better measure.

More broadly, Arrow (1972) views the issue of trust as pervasive in economic transactions and its absence as a major cause of poor economic performance. It is now well established empirically that general trust in society[7] is a keystone of economic development, institutional performance and growth (Greif, 1993; Knack and Keefer, 1997; Algan and Cahuc, 2010; Tabellini, 2010). With regard to firms, higher national/regional levels of general trust in a society are associated with larger corporations (La Porta et al., 1997) and more delegation across plants (Bloom et al., 2012). Gulati and Nickerson (2008) find that preexisting trust between organizations leads to less formal governance structures and to better performance outcomes in a buyer-seller relationship.[8]

Micro-founded work on trust and firms is quite rare due to the difficulty of obtaining data. In a recent study, Macchiavello and Morjaria (2015) find that an ongoing relationship between firms is important for understanding why supply shocks in the Kenyan rose market are not always exploited. Within firms, Guiso et al. (2015) and Brown et al. (2015) find a positive relationship between a firm's financial performance and the average trustworthiness of its managers as assessed by employees, but they are unable to identify a mechanism for how trust impacts performance.

Similarly, to date, the empirical literature on decision making has largely sidestepped analyzing the impact of trust, due mainly to the absence of individual-level data on authority in general, and trust in particular. The focus has instead been on the business environment. Empirically, Colombo and Delmastro (2004) find that decisions relating to labor (as compared with capital decisions) are more likely to be delegated. Acemoglu et al. (2007) find that decentralization is more likely the closer a firm is to the technology frontier. Bloom et al. (2012) investigate delegation from head office to a plant using regional measures of trust in general society and societal trust of foreigners. McElheran (2014) examines the trade-off between delegation (allowing for adaption) and centralization (aiding coordination) of IT purchases within US manufacturing firms. Bloom et al. (2010) find a positive relationship between competition and delegation.[9] Similarly, Meagher and Wait (2014) emphasize the relationship between delegation and external factors, such as product-market uncertainty, competition and participation in export markets. Several recent papers examine the complementarity between delegation and other internal practices of an organization. Barrenechea-Mèndez et al. (2016) find a positive relationship between autonomy for blue-collar workers and monitoring of their activities. Flores-Fillol et al. (2017) find a positive relationship between the delegation of strategic decisions and teamwork. Hong et al. (2017) that the use of performance pay is associated with the delegation of authority from the principal/owner to managers, but also the centralization of authority away from non-managerial employees.[10]

Our focus on trust, and its absence, at the level of the individual employee has several advantages. First, theoretical models typically focus on individual principal-agent relationships, not aggregate relationships between a principal and a work group, or between divisions or establishments in an

[7] Typically measured with something like the general trust in other people or public institutions questions from the World Values Survey.

[8] Using European data, Butler et al. (2016) show that individual trust in others – "[g]enerally speaking, would you say that most people can be trusted, or that you cant be too careful in dealing with people? – has an inverted U-shaped relationship to economic performance, as measured by net household income.

[9] Also see Aghion et al. (2017) for a study relating certain types of delegation to the plant manager from HQ to better performance during the Great Recession.

[10] A closely related literature looks at hierarchical structure and reporting (Rajan and Wulf, 2006; Guadalupe and Wulf, 2010; Guadalupe et al., 2014; Rossi-Hansberg et al., 2014).

organization. This means that our empirical study is closely related to the existing theoretical literature, and in fact we confirm its main prediction: we find a positive relationship between delegation of real authority to an employee and that employee's trust of management. Or more precisely, we find a positive relationship between centralization and distrust of management. Second, by focusing on individuals, we are able to extend beyond firm-level analysis to examine how outcomes differ with individual characteristics like tenure, education and gender. Indeed, our results show that a significant proportion of the observed variation is not explained by establishment (fixed) effects and that there is sizable and statistically significant within-establishment effect from individual employee trust.

The instrumental-variable approach we use is based on the following exogenous factor: average distrust in management by the employee's country of origin. This instrument relates to the transmission of social norms[11] for trust through inheritance. The transmission and persistence of social norms is itself currently an active area of research. Experiments on the trust game of Berg et al. (1995) have repeatedly shown participants in the lab follow strategies in one-shot interactions that cannot have positive payoffs if their opponents maximize monetary payoffs (Camerer, 2003). Furthermore, the presence of trust measured in these games varies significantly across countries (Camerer, 2003, p. 87) and on the nationalities of the participants (Glaeser et al., 2000).

Theoretical models, such as Bisin and Verdier (2001), posit the transmission of social norms or culture both from parents and through contemporaneous external factors such as institutions and socialization.[12] This gives rise to the persistence of group social norms across time, as observed empirically by Uslaner (2008), Nunn and Wantchekon (2011) and in the papers surveyed in Bisin and Verdier (2010). One consequence of this persistence is that immigrants will have trust determined partly by local experiences and partly by inherited trust from their home country. Algan and Cahuc (2010) use this fact to generate an exogenous measure of general trust in society; we follow a similar method to generate our instrument. To the best of our knowledge, our results are the first examination of incorporating inherited characteristics in a study of employee trust of their workplace managers. In doing so, we identify a mechanism by which trust affects individual-level economic activities.

Some of the key results in the paper are as follows. First, from the data is it evident that there is considerable variation between employees in the real authority they enjoy, both within an establishment and across the economy. Second, distrust in management also varies substantially between individuals, even within the same establishment. Taken together, this suggests that both real decision-making authority and trust relate to the individual, rather than to the establishment or the firm, validating our approach. Third, as noted above, we find that employee distrust in management is positively and significantly associated with centralization of real decision-making authority. Moreover, the magnitude of this relationship is economically important. Finally, this result continues to hold when we account for: (i) establishment-level fixed effects; and (ii) potential endogeneity using an instrumental-variable approach.

[11] We use the term "social norms" broadly to cover the closely related ideas of culture and social capital also discussed in the literature.

[12] Similarly, Guiso et al. (2008) use an overlapping-generations model to suggest that, while they update from their real-world experience, children strongly rely on their parents in formulating their priors regarding the trustworthiness of others. They also present evidence consistent with their inter-generational transmission prediction. Also see Dohmen et al. (2012), who find that parental willingness to trust others is correlated with their children's attitudes to trust.

# 2 Conceptual framework

In this Section we discuss the key terms of 'trust' and 'delegation', and outline a simple theoretical framework that highlights the key empirical question we wish to address.

## 2.1 What is 'trust'?

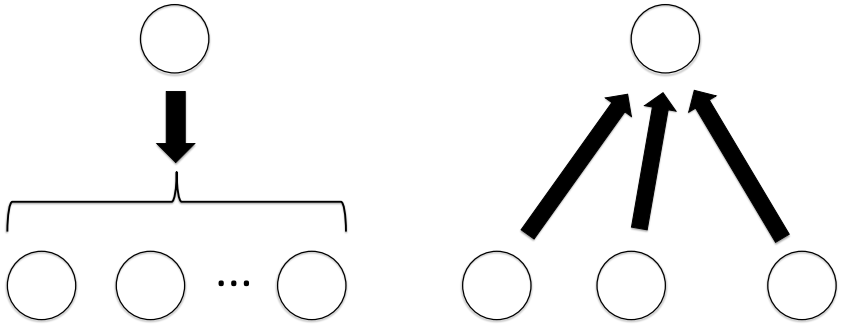
As argued by Rousseau et al. (1998), there is no universal definition of trust, but they suggest that '[t]rust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another' Rousseau et al. (1998, p. 395).[13] Thorelli (1986, p. 40) defines trust as 'an assumption on the part of A that if either A or B encounters a problem in the fulfillment of his implicit or explicit transactional obligations, B may be counted on to do what A would do if B's resources would be at A's disposal'. That is, A trusts B if A expects B to carry out what they have promised they would do, even in the absence of a formal legal obligation. Critically, trust is unidirectional because it is a belief about the actions of another party. According to Sako and Helper (1998), trust can emanate from different underlying sources, such as: confidence that a party will carry out a formal contractual agreement; that a party is sufficiently competent that they will be able to complete what was promised; and goodwill that the other party be willing to undertake mutually beneficial activities and not to take unfair advantage. In many ways, goodwill could reflect a situation when both parties adhere to a relational contract, as in the trust game of Kreps (1990), in which parties 'trust' one another to fulfill their implicit obligations given their ongoing relationship and the potential for sufficiently onerous future sanctions. Others consider trust (or being trustworthy) related to a characteristic, or personality type.

Further diversity of the definition of trust arises in the empirical research. In their survey article, McEvily and Tortoriello (2011) find 129 different empirical measures of trust (from 179 papers) this should not be surprising from a game theoretic perspective because beliefs about the actions of other players/parties are naturally context specific. Our paper is about a particular type of trust; the trust that a worker has in the statements made by management. Without an enforceable contract it is this trust – or its absence (distrust) – that will influence the choices a worker makes in response to a promise (or a threat) by management. As a consequence, trust determines the credibility of implicit incentives and punishments and henceforth the attractiveness and feasibility of delegating authority. This worker trust of management relies on several key elements: (i) clarity – the parties involved must be able to clearly communicate (and understand) what each party is promising to undertake; and (ii) commitment – if an implicit agreement is to be believed, any promises made must be credible. This does not necessarily require mutual respect (sometimes emphasized in the business literature) or even that the transacting parties like one another[14]; it merely requires that one party believes that the other will do what they say they will do.[15]

[13] In the context of an organization, Mayer et al. (1995) emphasize that there is a trusting party (a *trustor*) and a party to be trusted (*trustee*). The adopt a very similar definition that trust is 'the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other part'.

[14] Although of course, at the psychological level it is harder for us to trust when our experiences are negative. This effects goes beyond the obvious Bayesian conclusions about a person's character from their actions. The 'halo' effect means that we tend to want our views of people to be consistent in all dimensions even if there is no logical reason to connect the dimensions; an example of this would be thinking of physically attractive people as more talented.

[15] As the Cuban Missile Crisis so starkly illustrates, alignment of interests is not necessary in order to trust what someone says. Trusting another person requires that you believe what they say (and believing that what they say



(a) General trust by management (b) Individual trust of management

Figure 1: Trust in organizations

As noted above, to frame our empirical study, we sketch a reduced-form relational contracting framework in Section 2.3 to help capture the key relationship between a worker's trust and the increased scope for delegation of decision-making authority. Figure 1 further clarifies the type of trust we focus on. Management might trust (or distrust) workers, as illustrated on the left-hand side, in Figure 1a – and this will not doubt be important as to whether a principal will want to delegate to an agent in her organization.[16] In this way, Bloom et al. (2012) investigate the relation between average regional trust – a proxy for individual trust – and delegation from head office to an establishment. They find that delegation is more likely when the head quarters is in a region with higher average levels of trust. They also find delegation is more likely to subsidiaries that are based in highly trusted countries. Rather than management's trust of workers, our focus in on *worker trust* of management; this key difference is illustrated in the right-hand panel in Figure 1b. Concentrating on individual level trust has several advantages. First, theoretical models typically focus on individual principal-agent relationships, not aggregated relationships between a principal and a work group, or between divisions or establishments in an organization. This means that our empirical study is closely related to the existing theoretical literature. Second, by focusing on individuals, we are able to examine how outcomes differ between individuals in a particular establishment, extending the establishment-level analysis of Bloom et al. (2012). Indeed, our results suggest that both delegated decision-making rights and (dis)trust of management are individual characteristics.

## 2.2 Real authority and delegated worker autonomy

As pointed out by Aghion and Tirole (1997), formal organizational structures and legal decision-making rights do not necessarily coincide with actual decision-making practices inside organizations. For a variety of reasons, very often the person actually making a decision in a firm is not the one with the formal (legal) right to decide; it is this *real authority* that we are interested in, and that we are able to capture in our data, described below.

As noted in the Introduction, many of the previous studies on decision-making rights have focused

they will do); importantly, it does not require that you to like either message or the messenger. If trust exists, people's actions can be directed to more positive equilibria, even in the absence of formal commitments.

[16] From a revealed preference perspective, delegation to an agent reveals at least some minimum level of trust in the agent by the principal.

on profit-versus-cost centres (Acemoglu et al., 2007) or the delegation of significant decisions between a higher levels of management and an establishment (Colombo and Delmastro, 2004; Bloom et al., 2012; Meagher and Wait, 2014; McElheran, 2014). Here we have a complementary focus – we study how much delegated real authority workers have relating to their work and the work environment (detailed below in Section 3). Hong et al. (2017) and Flores-Fillol et al. (2017) have a similar focus, concentrating on these aspects of individual autonomy and influence. Several points are worth noting here. Firstly, the choice to delegate these decisions to a worker (or not as the case may be) is a choice of importance for a firm; moreover, the data reveals that there is considerable variation in the delegated autonomy/decision-making authority workers have, even within the same establishment. Secondly, the choice regarding delegated autonomy typically relates to a worker's informal authority; worker autonomy is most likely to be supported by informal agreements rather than by formal or legal contracts. This makes trust and distrust potentially very important when it comes to choices regarding delegation of real authority to workers relating to issues of autonomy. Thirdly, while these decisions are different from the questions about major changes or procurement studied in Meagher and Wait (2014) and McElheran (2014) respectively, for example, these aspects of decision-making authority/autonomy capture some of the essence of what goes on in firms on a day-to-day basis. In that way, these decisions that we study are very likely to be important, and a likely to have an impact on the way an establishment operates and performs.

### 2.3 Some simple formalism

Here we outline a simple reduced-form relational-contracting framework to clarify the economic issues relating to an individual's trust/distrust of management, and its implication for the allocation of decision-making rights. This simple formalism is not intended as a formal theory to test, but rather clarifies why worker beliefs about management can be important.

Assume a principal $P$ wishes to delegate action $a \in \mathcal{A}$ to agent $A$. The payoffs for each individual are $\pi^i$, $i \in \{P, A\}$. We assume the action involves no effort cost but the agent's private benefit is $b(a)$. Thus $b(a)$ summarizes the incentive conflict between the principal and the agent.

Given this potential incentive conflict, the principal would like to choose an explicit menu $m(a)$ that compensates/rewards the agent for taking an appropriate action. We assume that, while the action and any reward schedule are observable to the two parties, they are non-contractible (as are the payoffs).[17]

As a reduced form for a relational contract we assume the agent's *trust* in the principal to honestly tell things as they are is $\tau \in \{0, 1\}$, so that $\tau = 1$ is trust in the principal and $\tau = 0$ is distrust in the principal. In this case, the agent's optimization problem becomes

$$\arg\max_{a \in \mathcal{A}} \pi^A = \tau(m(a) + b(a)) + (1 - \tau)(0 + b(a)), \tag{1}$$

whereas the principal's problem is

$$\max_{m(\cdot)} \pi^p(a^*(m, \tau)) - m(a). \tag{2}$$

[17] By not contractible we also exclude the various mechanisms that might be employed to circumvent the contracting problem. Recent experimental and theoretical research indicates that these mechanisms are not robust and tend not to work in practice. See Aghion and Holden (2011) and Aghion et al. (2012), for example.

In this non-contractible setting, the principal is able to influence the agent only if the agent trusts (and understands) the reward schedule announced by the principal.[18]

Now extend the framework to think of the agent being better informed than the principal about the payoffs of the action (as in Prendergast (2002) and Dessein (2002)). In this case, the principal has to choose between taking the action herself with poor information (centralization) versus delegating the action to the better informed agent. If the principal can influence the agent's choice of action through the menu $m$, delegation becomes relatively more attractive. *Thus, if a worker trusts (and understands) the payoff relevant statements by management, delegation is relatively more attractive.* That is, other things equal, worker trust of management allows for delegation to be sustained as part of a relational contract where it would otherwise not be possible. This gives us the following empirical prediction: distrust of management by an individual worker is associated with a lower probability of delegation of decision-making rights to that worker (i.e. a higher probability of centralization).

This very simple framework could be generalized following the modern contracting literature to include effort, risk aversion and most importantly some equilibrium enforcement measure for the 'trust' based on repeated interaction. Presumably a repeated game structure with imperfect monitoring could lead to a breakdown in trust along the equilibrium path, just as price wars occur under tacit collusion, as in Green and Porter (1984)

An alternative perspective on trust in an organization might be to consider whether a principal can trust an agent to take the 'right' action. This has been formalized through payment congruence and has generated a large literature (see Aghion and Tirole (1997), for example). Reinterpreting this literature in terms of trust yields the key insight that the delegation of real authority will only occur if the principal trusts the agent (has the incentives) to make the 'right' choice. However, the main point we want to make with this simple framework would remain; 'trust' that an implicit agreement will be adhered to by a principal allows for greater delegation of decision-making rights than would otherwise be feasible.

# 3 Data Set and Variables

We use the Australian Workplace Industrial Relations Survey 1995 (AWIRS 95) to investigate the relationship between the delegation of decision-making rights and employee distrust of management. AWIRS 95 consists of a sample 2001 establishments with 20 or more employees covering all major industry groups, with the exception of agriculture, forestry, fishing and defence. It also includes a sample of 19155 employees, randomly selected from the establishments surveyed.[19] This data was collected by the Australian Government Department of Employment and Workplace Relations (formerly the Department of Industrial Relations).

This paper utilizes data from the General Management Questionnaire, conducted by personal interview and completed by the most senior manager at the establishment, and the Employee Questionnaire, administered to a randomly selected sample of employees from the surveyed establish-

[18] Mayer et al. (1995) emphasize that there is a *trustor* and a *trustee* in a relationship in an organization – here the worker is the trustor who can (potentially) trust management to fulfill its non-contractible promises. In reality there could also be a second trust relationship with regard to whether management trusts workers to fulfill their (non-contractible) obligations under delegation.

[19] AWIRS was a government run survey so establishments were randomly selected from the Australian Bureau of Statistics Business Register. 2547 establishments were identified to give the 2001 responses. The survey and the data are described in detail in Morehead et al. (1997).

ments. As noted above in the Introduction and detailed below, AWIRS95 has several compelling attributes. This data set provides a rich description of workers real authority over a range of decisions, and their trust of management. Consequently, this matched employee-establishment data allows for the first employee-level analysis of trust and delegation. This level of detail regarding worker autonomy and trust is not available elsewhere, including in the updated version of AWIRS itself (the Australian Workplace Relations Study). As a consequence, this data source remains relevant, despite its age, as it allows us here to produce new empirical results and insights. Another advantage of the AWIRS95 data is that it was a carefully designed and implemented survey to reflect the structure of the broader economy conducted by a government department; the response rates for the main survey were 80% (Morehead et al., 1997). Furthermore, like the United States, Australia has a flexible labor market and relatively little interference from unions in the way firms are managed. This means that the observed allocation of decision making is (more) likely to arise from the optimizing choices of firms, as opposed to being externally imposed by labor-market institutions.

### 3.1 Centralization of decision-making: dependent variables

Employees were asked '[i]n general, how much influence or input do you have about the following? The type of work you do; How you do your work; When you start and finish work; The pace at which you do your job; The way the workplace is managed or organised; Decisions which affect you at this workplace. For each of the six questions, employees can respond: (1) a lot; (2) some; (3) a little; or (4) none.[20]

Each of these questions captures related, but different, aspects of the decentralization of decision authority. Figure 2 shows the influence employees have over these various aspects of their work. In general, employees have more influence over how they do their job and the pace of work than the way the establishment is organized or about establishment decisions that affect them.[21]

To make use of this information, we generate a variable *Centralization*, by summing the scores across all six questions and creating a $Z$-score with a mean of 0 and a standard deviation of 1; lower values of this variable indicate greater decentralization or employee influence. The recent study of Flores-Fillol et al. (2017) combine various aspects of worker autonomy and decision authority into a $Z$-score. Bloom et al. (2012) also utilize a $Z$-score index of decentralization. Hong et al. (2017) consider the allocation of decision-making rights between principals, senior managers and non-managerial employees relating to 12 operating tasks with some similarities to those considered here. Further to this, and as noted above, our measure of real authority regarding worker autonomy complements the focus on the allocation of decision-making rights between higher management levels and establishments studied in Colombo and Delmastro (2004), Acemoglu et al. (2007), Bloom et al. (2012) and McElheran (2014).[22]

[20]There was also another possible answer of 'Don't know', but only 0.1 percent of employees gave this response.

[21]The first four questions have their origin in Hackman and Oldham (1975) and have been extensively used over the last four decades. The statistical validation of these questions as a single measure (of authority), and their distinctness from empowerment, is covered in Spreitzer (1995). See Thomas (1990) for a discussion of why delegation of decisions more generally, questions five and six, are also an important component of what economists call authority (and which he refers to as 'locus of causality').

[22]While there is some subjectivity in these questions, previous studies have also relied on surveys with subjective questions. For example, Acemoglu et al. (2007) use subjective answers on establishment's autonomy regarding investment, and on manager's autonomy/authority regarding employment decisions. Similarly, the measure of delegation in Colombo and Delmastro (2004) is based on subjective answers from the establishment manager.

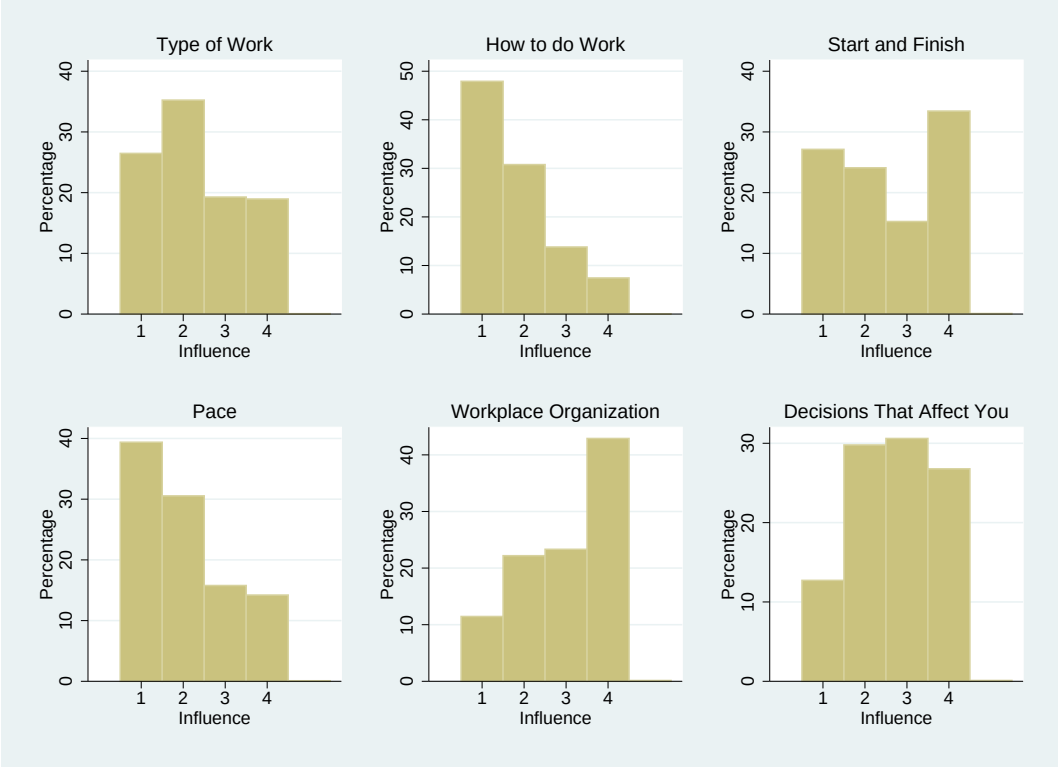



Figure 2: Delegation of decision authority. Key: 1 - A lot, 2 - Some, 3 - A little, 4 - None

As an alternative measure of our dependent variable, we undertake factor analysis of the six aspects of decision-making autonomy; the first factor has an Eigen value of 2.986, whereas the other factors have Eigen values of 0.303 or less. We retain the first factor, denoted as *Centralization(Factor)*, and use it as a dependent variable for centralization of decision making. The pairwise correlation between *Centralization* and *Centralization(Factor)* is .995.

Unlike the previous studies described above, we have sufficient power/sample size to repeat our analysis for each of the individual questions separately as a robustness check in Section 4.4.

## 3.2 Explanatory variables

Table 1 provides summary statistics for the main variables of interest, including the dependent variables *Centralization* and *Centralization(Factor)*. Table 2 outlines the pairwise correlations between the key variables.

*Employee characteristics.* Employees were asked whether '[m]anagement at this workplace can be trusted to tell things the way they are'. Using this information, we generate a measure of *Distrust* equal to 1 if the employee disagrees with the statement and 0 otherwise. We focus on distrust because the well established *negativity dominance* (Baumeister et al., 2001; Rozin and Royzman, 2001) in evaluations means that among symmetric good and bad events the bad events dominate psychologically. As a result more cognitive attention is paid to negative information and behaviors (Fiske, 1980; Pratto and John, 1991) and learning from/recall of negative events is stronger (Dreben et al., 1979; Skowronski and Carlston, 1987).

Table 1: Summary statistics of basic sample (N = 16922)

| Variable | Mean | Std Dev. |
|---|---|---|
| Dependent variable | | |
| Centralization | -0.018 | 0.997 |
| Centralization (Factor) | -0.017 | 0.922 |
| Type of work | 2.293 | 1.052 |
| How do work | 1.795 | 0.929 |
| Start/finish time | 2.542 | 1.208 |
| Pace of work | 2.039 | 1.053 |
| Establishment organization | 2.965 | 1.054 |
| Decisions that affects you | 2.698 | 0.998 |
| Key explanatory variables | | |
| Distrust | 0.336 | 0.472 |
| Male | 0.563 | 0.496 |
| Tenure | 6.285 | 6.849 |
| $Tenure^2$ | 86.401 | 182.825 |
| Instrument | | |
| Inherited distrust | 0.333 | 0.025 |

Notes: a. Source AWIRS 95.

Table 2: Correlations between key variables (N = 16922)

| Variable | Centralization | Distrust | Male | Tenure | Inherited distrust |
|---|---|---|---|---|---|
| Centralization | 1.000 | | | | |
| Centralization (Factor) | 0.995 | 0.257 | | | |
| Distrust | 0.253 | 1.000 | | | |
| Male | -0.032 | 0.075 | 1.000 | | |
| Tenure | -0.026 | .109 | 0.160 | 1.000 | |
| Inherited distrust | 0.023 | 0.038 | 0.019 | -0.002 | 1.000 |
| Type of work | 0.794 | 0.193 | -0.027 | -0.037 | 0.022 |
| How do work | 0.770 | 0.151 | -0.010 | -0.019 | -0.013 |
| Start/finish time | 0.735 | 0.145 | -0.015 | 0.001 | 0.038 |
| Pace of work | 0.740 | 0.159 | 0.016 | -0.006 | 0.004 |
| Establishment organization | 0.770 | 0.241 | -0.074 | -0.046 | 0.041 |
| Decisions that affects you | 0.767 | 0.275 | -0.036 | -0.017 | 0.007 |

Notes: a. Source AWIRS 95.

We create a dummy variable if an employee is *Male* (1) or otherwise (0). Variables were created indicating each employee's *Tenure* and their tenure squared ($Tenure^2$) at the establishment. Similarly, a series of dummies are generated for the employee's age and their highest level of education. Dummy variables for the employee's occupational group were also constructed. These three sets of dummy variables are included in most of the estimates below. The pairwise correlations between *Centralization* and *Distrust* and the education variables (Table 9) and the occupation dummy variables (Table 10) are provided in Appendix A.

# 4 Empirical results

The key relationship we examine is between employee distrust of management and the allocation of decision-making authority. Figure 3 highlights some of the important features of *Distrust* and of our dependent variable *Centralization*. The top left-hand panel in the figure plots the distribution of *Centralization* with the Normal distribution overlaid. This, along with Figure 2, shows there is substantial variation in decision-making authority across employees.

The second panel, in the top right-hand corner, plots the distribution of average establishment-level *Distrust*. Since *Distrust* is a binary variable, the average of *Distrust* within a establishment is the proportion of employees who distrust management. From this, it is evident that within most establishments there is considerable diversity in employee distrust of management, suggesting distrust is an individual, not an establishment, characteristic. This highlights a significant advantage of our approach: we explore (dis)trust and its relationship to delegation at the employee level.

The lower left-hand panel of Figure 3 shows the kernel-density plots of the within-establishment variation (the dotted line) and the between-establishment variation (the black line) of *Centralization*.[23] While both densities are centred around 0, the within-establishment distribution has a greater variance than the between-establishment distribution. This suggests there are not simply decentralized or centralized establishments in the economy. Rather, there are important differences in decision-making authority/autonomy within establishments.[24]

The final panel in the figure, in the bottom right-hand corner, shows the relationship between *Centralization* and employee *Distrust* of management. It shows the kernel-density of *Centralization* for employees who distrust management (indicated by the blue line) and for employees who do not distrust management (the red line). This show there is less delegation to employees who distrust management. We analyze this key relationship further below.

## 4.1 Distrust and delegation within establishments: Fixed-effects estimation

To explore the relationship between an employee's distrust of management and delegation, we estimate both pooled OLS and establishment fixed-effects (FE) models. The OLS estimating equation is

$$c_i = \beta_1 d_i + \beta X_i + \varepsilon_i, \tag{3}$$

where $c_i$ is the centralization index, $d_i$ is *Distrust* and $X_i$ is a vector of individual characteristics and controls as described previously. The fixed-effects specification adds a constant $u_{j[i]}$ for each establishment $j$, where the function $j[i]$ identifies the establishment $j$ of which person $i$ is an employee:[25]

$$c_i = \beta_1 d_i + \beta X_i + u_{j[i]} + \varepsilon_i. \tag{4}$$

Table 3 displays the estimated coefficients for *Distrust* and the other key explanatory variables of interest. While not implying causality, these results provide insight into the relationship between

[23] The within-establishment densities are calculated after subtracting the establishment mean. The between-establishment density compares establishment means.

[24] A range of levels of autonomy/empowerment among similar workers doing similar jobs in the same organization has been observed elsewhere, notably by Spreitzer (1995). Also see Hackman and Oldham (1975).

[25] This is equivalent, but more concise, than the double-index notation: $c_{ij} = \beta_1 d_{ij} + \beta X_{ij} + u_j + \varepsilon_{ij}$

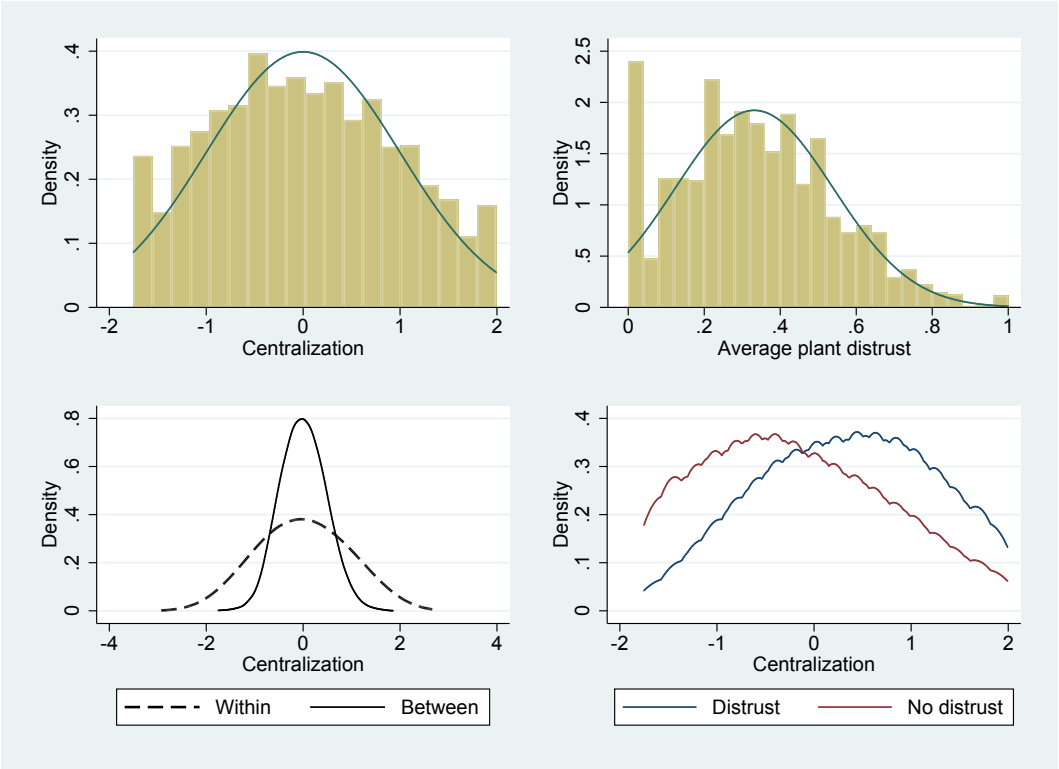



Figure 3: Centralization of decision authority and employee trust

distrust and delegation.

Model (1) shows the estimated OLS coefficients for our key explanatory variables, using *Centralization* as a dependent variable, without any other controls. Model (2) shows the pooled OLS estimation results (no establishment-level fixed effects) with the addition of education, employee age and occupation controls. The results show *Distrust* associated with less delegation (higher values of *Centralization*). This is consistent with the predictions of the relational-contracting literature. Introducing individual-level characteristics (gender, tenure, education, age and occupation) does not change the basic insight from Figure 3 – individuals who *Distrust* management have on average fewer decision-making rights.

The estimated coefficient for *Male* is negative and significant – males are more likely to be delegated decision-making rights, other things equal. In addition, the estimated coefficients for *Tenure* and $Tenure^2$ show it has a negative, convex and significant relationship with centralization. Tenure is typically interpreted as a proxy for the accumulation of an employee's firm-specific human capital; tenure allows an employee to accumulate the requisite specific information to make effective decisions.

Individual establishment managers no doubt have their own style; it is possible, for example, that some managers will have a greater propensity to delegate than others. They will also differ in their abilities and in the other work practices they adopt.[26] Consequently, it is important to account for omitted establishment characteristics. To do this we estimate establishment-level fixed-effect

[26]For example, McElheran (2014) finds differences in the delegation of purchasing authority to different establishments, even within the same organization.

models, as shown in Models (3) and (4).

The overall $R^2$ reported for Model (3) indicates that the observed characteristics of individual employees explain approximately 20.7% of the variation in *Centralization*. The remaining 79.3% of the variation is a residual attributed to the fixed effects and the idiosyncratic error term. The reported $\rho$ shows that the fixed effects account for approximately 19.1% of the residual 79.3% variation, that is 15.1% of the total variation. Thus for the within-establishment model the observed employee variables make a moderately larger contribution, approximately one third larger, in explaining the variation of *Centralization*, than the fixed effects.

Overall these results show that both establishment and individual employee characteristics are important for understanding delegation. Thus it is imperative to extend the existing establishment-level models to include information on employees and their relationship with management.

The estimates from Model (3) show a strong and significant positive relationship between *Centralization* and employee *Distrust* of management. This is an important empirical finding; controlling for establishment-level fixed-effects, there is a significant relationship between *Distrust* and the allocation of decision authority *within* an establishment. The estimated impact of distrust is large: almost three-times the magnitude of having an postgraduate degree (compared with not finishing high school) but only three quarters of the impact of being a professional vis-a-vis a laborer (Table 3, discussed further below).

Furthermore, using establishment-level fixed effects have a modest impact on the estimated coefficients for *Distrust*, *Male* and *Tenure* both in terms of their magnitude and significance. The coefficients for *Tenure* and $Tenure^2$ increase in magnitude upon the inclusion of establishment-level fixed effects. These results suggest that while managerial ability and establishment practices are important, the relationship between employee distrust and delegation remains – if an employee trusts management, there is a higher probability of delegation to that individual.

As a robustness check, Model (4), also in Table 3, uses the alternative dependent variable of the first factor, *Centralization(Factor)*. These estimates again include the establishment fixed effects. The results are very similar to the estimated coefficients in the first two models; crucially, the relationship between *Distrust* and delegation remains significant.

Table 3 also reports the estimated coefficients for education, occupation and age for Models (2), (3) and (4). The impact of the establishment level fixed effects on the estimated coefficients for the education, occupation and age categories can be seen by comparing the results in Models (2) and (3).

The probability of delegation increases strongly, on average, with highest educational attainment of the employee (Table 3, Model 2), however this effect is substantially smaller within an establishment (Model 3). This suggests that the differences in delegation across educational levels in the labor market are in part due to sorting: establishments with more highly educated employees are more decentralized on average. Including establishment fixed effects also reduces the size of the estimated coefficients for the age dummy variables (Table 3, Models 3 and 4).

Table 3: Centralization of decision-making (standard errors in parentheses)[a]

| | (1) OLS | | (2) OLS | | (3) ESTABLISHMENT FE | | (4) ESTABLISHMENT FE | |
|---|---|---|---|---|---|---|---|---|
| Dep. variable | *Centralization* | | *Centralization* | | *Centralization* | | *Centralization(Factor)* | |
| Distrust | 0.556*** | (0.017) | 0.511*** | (0.016) | 0.484*** | (0.016) | 0.459*** | (0.015) |
| Male | -0.089*** | (0.017) | -0.065*** | (0.017) | -0.047*** | (0.018) | -0.045*** | (0.017) |
| Tenure | -0.013*** | (0.003) | -0.011*** | (0.003) | -0.016*** | (0.003) | -0.015*** | (0.003) |
| Tenure$^2$/1000 | 0.256** | (0.107) | 0.175* | (0.099) | 0.292*** | (0.105) | 0.274*** | (0.099) |
| Education | | | | | | | | |
| Year 10 | | | -0.105* | (0.055) | -0.103* | (0.058) | -0.101* | (0.054) |
| High School | | | -0.152*** | (0.058) | -0.122** | (0.060) | -0.116** | (0.056) |
| Basic vocational | | | -0.127** | (0.065) | -0.105 | (0.068) | -0.098 | (0.063) |
| Skilled vocational | | | -0.135** | (0.059) | -0.123** | (0.062) | -0.124** | (0.057) |
| Assoc. diploma | | | -0.219*** | (0.060) | -0.144** | (0.063) | -0.135** | (0.059) |
| Undergraduate | | | -0.179*** | (0.060) | -0.126** | (0.064) | -0.118** | (0.059) |
| Postgraduate | | | -0.206*** | (0.063) | -0.168** | (0.066) | -0.156** | (0.061) |
| Other | | | -0.143* | (0.076) | -0.123 | (0.078) | -0.125* | (0.073) |
| Age (Years) | | | | | | | | |
| 21 - 24 | | | -0.093** | (0.038) | 0.002 | (0.041) | -0.007 | (0.038) |
| 25 - 29 | | | -0.198*** | (0.037) | -0.090** | (0.040) | -0.092** | (0.037) |
| 30 - 34 | | | -0.225*** | (0.038) | -0.100** | (0.042) | -0.094** | (0.039) |
| 35 - 39 | | | -0.203*** | (0.038) | -0.087** | (0.042) | -0.081** | (0.039) |
| 40 - 44 | | | -0.192*** | (0.039) | -0.076* | (0.042) | -0.071* | (0.039) |
| 45 - 49 | | | -0.194*** | (0.039) | -0.090** | (0.043) | -0.083** | (0.040) |
| 50 - 54 | | | -0.142*** | (0.043) | -0.035 | (0.048) | -0.031 | (0.044) |
| 55+ | | | -0.168*** | (0.047) | -0.093* | (0.051) | -0.078* | (0.047) |
| Occupation | | | | | | | | |
| Machine operators | | | -0.051 | (0.036) | 0.009 | (0.037) | -0.006 | (0.035) |
| Sales & personal service | | | -0.173*** | (0.033) | -0.213*** | (0.037) | -0.198*** | (0.034) |
| Clerks | | | -0.405*** | (0.030) | -0.342*** | (0.034) | -0.306*** | (0.032) |
| Tradespersons | | | -0.225*** | (0.036) | -0.209*** | (0.039) | -0.211*** | (0.035) |
| Para-professionals | | | -0.354*** | (0.035) | -0.420*** | (0.038) | -0.396*** | (0.035) |
| Professionals | | | -0.639*** | (0.036) | -0.627*** | (0.039) | -0.580*** | (0.036) |
| Managers | | | -1.269*** | (0.032) | -1.197*** | (0.037) | -1.112*** | (0.034) |
| Other | | | -0.454*** | (0.098) | -0.496*** | (0.089) | -0.464*** | (0.084) |
| $R^2$ | 0.069 | | 0.210 | | 0.207 | | 0.206 | |
| $\sigma_{u_i}$ | | | | | 0.417 | | 0.379 | |
| $\rho$ | | | | | 0.191 | | 0.185 | |

[a] No. of observation = 16922. Clustered standard errors for 1773 establishments. *** significant at 1% level, ** significant at 5% level, * significant at 10% level. $\rho = (\sigma_{u_{j[i]}})^2/[(\sigma_{u_{j[i]}})^2 + (\sigma_{\varepsilon_i})^2]$ where $\sigma_{\varepsilon_i}$ is the standard deviation of residuals of the overall error term $\varepsilon_i$. $\sigma_{u_{j[i]}}$ is the standard deviation of the group residuals $u_{j[i]}$. For Models (3) and (4) the overall $R^2$ is reported, which excludes the effect of the fixed effects. Omitted categories: Highest level of education less than Year 10; Age between 15 and 20; and Occupational group Laborer (and related).

As one might expect, occupations such as manager and professional have, ceteris paribus, the strongest link with delegation. Furthermore, the relationships between occupations and delegation are largely unaffected by establishment fixed effects.

While the motives for delegation are not observed in our data, these results are consistent with the theory that any advantages from decentralization can be more readily realized when there is trust between an employee and management. Of course, while our estimates are broadly consistent with these theoretical predictions, our results are not a full test of any specific theory; in particular, these empirical results do not describe the underlying conditions that help facilitate a 'trust'-based equilibrium. Furthermore, we are yet to account for the potential endogeneity between delegation and distrust – we turn to this issue now.

## 4.2 Instrumental-variable approach

Our estimates in the previous section show a statistically significant and economically important relationship between employee distrust and delegation. This relationship remains after controlling for establishment-level fixed effects that could include factors such as managerial quality, management practices or culture. However, there is still the potential for the endogeneity of employee's distrust.

As is typical, three types of endogeneity are of potential concern: measurement error; omitted-variable bias; and simultaneity. Below we follow the standard approach (Angrist and Pischke, 2008) and use an instrumental-variables (IV) approach to address endogeneity. The possible omitted variable bias and the simultaneity of *Distrust* and *Centralization* follow well documented patterns and can be resolved by finding appropriate instruments (Gujarati, 2005; Wooldridge, 2000). The possibility of measurement error, which are more closely related to the details of our data, merits further discussion.

Measurement error could impact our estimated results in several ways. First, there could be noise in the reporting of the questions making up *Centralization*, our decision-making allocation measure. This noise will be mitigated to some degree by averaging the six questions.[27] The impact of the residual noise in the dependent variable is to decrease the goodness of fit in our estimation, biasing us against finding statistically significant results. Second, any noise in the reporting of *Distrust* would produce attenuation, biasing the coefficient on *Distrust* towards zero. Thus in both of these cases the potential bias works against finding a significant relationship between (de)centralization and trust.

A measurement-error issue that could arise from our subjective variables is common-methods or survey bias. Survey bias could occur if there exists a common factor $s_i$ that distorts individual responses to the key subjective questions in the survey. This might be due to the survey itself (an individual is more positive in answering questions face-to-face) or due to idiosyncratic factors like feeling tired/sick or individuals may exhibit the psychology trait of making their responses unrealistically consistent. This last effect is often referred to as the 'halo effect' because positive assessments of one characteristic typically spill over into positive assessments of unrelated characteristics (Kahneman, 2011).

We develop the following model, based on *classical errors-in-variables (CEV)* framework, as in Wooldridge (2000), but extended to a common factor for the error, in order to explore our survey

[27] See Section 4.4 below for a robustness check relating to the construction of our decision-authority variable.

bias issue. Specifically assume that both 'true' distrust, $d_i^*$, and true 'centralization' $c_i^*$ are mismeasured due to a common factor (mean zero) survey effect $s_i$ so that we actually observed $d_i$ and $c_i$:

$$d_i = d_i^* + \alpha_1 s_i \text{ and } c_i = c_i^* + \alpha_2 s_i. \tag{5}$$

The standard CEV assumption gives $\text{corr}(d_i^*, s_i) = 0$ and $\text{corr}(c_i^*, s_i) = 0$, and the true relationship (omitting establishment fixed effects for convenience) is

$$c_i^* = \beta_1 d_i^* + \beta X_i + \epsilon_i, \tag{6}$$

where $X$ is the vector of variables unaffected by measurement error. Except for the measurement error we assume that the standard regression assumptions are satisfied: in particular $\epsilon$ is uncorrelated with $c^*, d^*, X$ and $s$. Substituting for the observed variables gives

$$c_i - \alpha_2 s_i = \beta_1 (d_i - \alpha_1 s_i) + \beta X_i + \epsilon_i. \tag{7}$$

Rearranging we get

$$c_i = \beta_1 d_i + \beta X_i + (\alpha_2 - \beta_1 \alpha_1) s_i + \epsilon_i = \beta_1 d_i + \beta X_i + e_i, \tag{8}$$

where $\gamma = \alpha_2 - \beta_1 \alpha_1$ and $e_i = \gamma s_i + \epsilon_i$. In our case $\alpha_1$ and $\alpha_2$ plausibly have the opposite sign, and thus the sign of the bias arising from the common factor survey bias would be negative. Thus, common factor survey bias is a particular form of omitted variable bias.

We use an IV approach to account for endogeneity, including omitted variable bias. Our candidate instrument is distrust of management by country of birth.

An employee's country of origin potentially affects their distrust in management due to the social reproduction of norms as described by Bisin and Verdier (2001). That is, the institutions, and culture of where someone was born could help shape their trust in others and their overall attitude to authority – see Bidner and Francois (2011) and Bloom et al. (2012), for example.[28] We calculate the average level of distrust for employees from each country of birth, excluding all observations from each employee's own establishment or establishment.[29] The variable – *Inherited Distrust* – is used as our instrument for an employee's distrust in management. A key advantage of this instrument is that potential endogeneity between employee distrust and delegation within an establishment is ruled out because an employee's own establishment is excluded by definition. Thus, there are strong theoretical reasons to believe *Inherited Trust* is exogenous in the second-stage regression.[30]

*Instrumental Validity and Identification*

The IV estimates are reported in Table 4 (first-stage) and Table 5 (second-stage). In both Mod-

[28] In a different context, Blau et al. (2013) and Fernández and Fogli (2009) use country of origin as a proxy for gender role attitudes.

[29] Due to degrees of freedom issues, countries from the same region with small numbers of employees in the sample are pooled.

[30] One might be concerned that *Inherited Distrust* is in someway a proxy for employer racism. This seems unlikely since groups typically discriminated against under the White Australia policy (Asians, Africans and people from the Middle East) have lower rates of distrust than those who the race based policies favoured (UK, NZ and USA).

Table 4: IV First-Stage results Centralization of decision-making: OLS and establishment fixed-effects estimation coefficients (standard errors in parentheses)[a]

| | (5) OLS-IV | | (6) ESTABLISHMENT FE-IV | |
|---|---|---|---|---|
| Dep. Variable | *Distrust* | | *Distrust* | |
| Inherited distrust | 0.837*** | (0.144) | 0.970*** | (0.151) |
| Male | 0.041*** | (0.009) | 0.025*** | (0.009) |
| Tenure | 0.021*** | (0.001) | 0.017*** | (0.001) |
| Tenure$^2$/1000 | -0.501*** | (0.052) | -0.425*** | (0.053) |
| Education | | | | |
| Year 10 | -0.009 | (0.025) | -0.007 | (0.025) |
| High School | 0.035 | (0.025) | 0.034 | (0.025) |
| Basic vocational | 0.044 | (0.030) | 0.034 | (0.031) |
| Skilled vocational | 0.069** | (0.027) | 0.059** | (0.028) |
| Assoc. diploma | 0.041 | (0.028) | 0.041 | (0.028) |
| Undergraduate | 0.041 | (0.027) | 0.029 | (0.028) |
| Postgraduate | 0.071** | (0.029) | 0.053* | (0.029) |
| Other | 0.036 | (0.035) | 0.039 | (0.035) |
| Age (Years) | | | | |
| 21 - 24 | 0.098*** | (0.017) | 0.077*** | (0.019) |
| 25 - 29 | 0.132*** | (0.017) | 0.100*** | (0.019) |
| 30 - 34 | 0.139*** | (0.017) | 0.096*** | (0.019) |
| 35 - 39 | 0.122*** | (0.018) | 0.086*** | (0.019) |
| 40 - 44 | 0.097*** | (0.017) | 0.057*** | (0.019) |
| 45 - 49 | 0.062*** | (0.018) | 0.021 | (0.020) |
| 50 - 54 | 0.054*** | (0.019) | 0.008 | (0.021) |
| 55+ | -0.020 | (0.021) | -0.048** | (0.022) |
| Occupation | | | | |
| Machine operators | 0.050*** | (0.018) | 0.038** | (0.019) |
| Sales & personal service | -0.060*** | (0.015) | -0.044*** | (0.017) |
| Clerks | -0.010 | (0.015) | -0.061*** | (0.016) |
| Tradespersons | 0.051** | (0.020) | 0.048** | (0.021) |
| Para-professionals | 0.052*** | (0.018) | 0.004 | (0.018) |
| Professionals | -0.036** | (0.018) | -0.053*** | (0.019) |
| Managers | -0.177*** | (0.017) | -0.182*** | (0.018) |
| Other | -0.040 | (0.039) | -0.045 | (0.042) |
| Kleibergen-Paap F-statistic[c] | 33.888** | | 41.023** | |
| 5% Critical values ($r = 10\%$) | 16.38 | | 16.38 | |
| No. of obs. | 16922 | | 16922 | |

[a] *** significant at 1% level, ** significant at 5% level, * significant at 10% level. Clustered standard errors in parentheses for 1773 establishments.

[b] The second-stage IV estimates for *Centralization*, the dependent variable in both models, are shown in Table 5.

[c] Weak instruments test: Kleibergen-Paap rk Wald F statistic, $H_0$ = weak instruments. Critical values from (Stock and Yogo, 2005, Table 2).

Table 5: Second-stage IV results Centralization of decision-making: OLS and establishment fixed-effects estimation coefficients (standard errors in parentheses)[a]

| | (5) OLS-IV | | (6) ESTABLISHMENT FE-IV | |
|---|---|---|---|---|
| Dep. Variable | *Centralization* | | *Centralization* | |
| Distrust | 1.743*** | (0.424) | 1.323*** | (0.361) |
| Male | -0.116*** | (0.027) | -0.069*** | (0.023) |
| Tenure | -0.037*** | (0.009) | -0.030*** | (0.007) |
| Tenure$^2$/1000 | 0.790*** | (0.248) | 0.647*** | (0.196) |
| Education | | | | |
| Year 10 | -0.110* | (0.062) | -0.107* | (0.061) |
| High School | -0.205*** | (0.067) | -0.157** | (0.065) |
| Basic vocational | -0.194** | (0.078) | -0.142* | (0.075) |
| Skilled vocational | -0.232*** | (0.075) | -0.180** | (0.071) |
| Assoc. diploma | -0.277*** | (0.071) | -0.183*** | (0.070) |
| Undergraduate | -0.234*** | (0.071) | -0.153** | (0.070) |
| Postgraduate | -0.296*** | (0.078) | -0.212*** | (0.074) |
| Other | -0.188** | (0.091) | -0.155* | (0.087) |
| Age (Years) | | | | |
| 21 - 24 | -0.213*** | (0.062) | -0.062 | (0.053) |
| 25 - 29 | -0.355*** | (0.067) | -0.170*** | (0.054) |
| 30 - 34 | -0.390*** | (0.071) | -0.175*** | (0.056) |
| 35 - 39 | -0.346*** | (0.065) | -0.154*** | (0.054) |
| 40 - 44 | -0.304*** | (0.057) | -0.117** | (0.048) |
| 45 - 49 | -0.261*** | (0.050) | -0.101** | (0.047) |
| 50 - 54 | -0.202*** | (0.052) | -0.036 | (0.051) |
| 55+ | -0.135** | (0.056) | -0.046 | (0.059) |
| Occupation | | | | |
| Machine operators | -0.115** | (0.047) | -0.024 | (0.043) |
| Sales & personal service | -0.107** | (0.044) | -0.180*** | (0.041) |
| Clerks | -0.399*** | (0.036) | -0.294*** | (0.041) |
| Tradespersons | -0.294*** | (0.048) | -0.252*** | (0.045) |
| Para-professionals | -0.429*** | (0.049) | -0.429*** | (0.040) |
| Professionals | -0.608*** | (0.045) | -0.590*** | (0.045) |
| Managers | -1.063*** | (0.079) | -1.054*** | (0.072) |
| Other | -0.408*** | (0.107) | -0.460*** | (0.095) |
| Observations | 16922 | | 16922 | |

[a] Clustered standard errors for 1773 establishments estimated in parentheses. *** significant at 1% level, ** significant at 5% level, * significant at 10 % level. First-stage estimates shown in Table 4.

els 5 and 6 the (endogenous) dependent variable in the first stage is *Distrust* and the dependent variable in the second stage is *Centralization*. Model 6 reports the IV results accounting for establishment fixed effects. Statistical tests on the appropriateness of the IV approach are given at the bottom of Table 4.

The instrument performs well; it is significant in the first-stage regressions for both the IV and fixed-effects-IV specifications. The coefficient sign accords with the theories presented above: higher *Inherited Distrust* is associated with higher individual distrust.

The validity of inference on the *Distrust* coefficient in the second-stage IV regressions requires sufficiently 'strong' identification (not weak instruments). For clustered standard errors the appropriate first stage $F$-test for the significance of the instruments is the Kleibergen-Paap rk Wald F statistic (Kleibergen and Paap, 2006) since it allows for heteroskedasticity in calculating the matrix rank. The corresponding critical values, given at the bottom of Table 4 are from Stock and Yogo (2005).[31] For both models, (5) and (6), the hypothesis of weak identification/weak instruments is strongly rejected at the 5% level of significance with an $r$ of 10%, implying that the standard causal inference on the coefficient for *Distrust* should be valid.

*Estimation Results*

The first-stage results for the other controls in Table 4 are economically interesting in their own right. There are gender differences in distrust (males distrust more) and while these are reduced by about 40% when we include establishment fixed effects they are still significant. Tenure has a concave relationship with distrust and is positive and increasing for most employees.[32] Thus it appears that, on average, employees' trust of management is eroded rather than built over time.[33]

While distrust increases with tenure it decreases strongly with age between 21 years and retirement. Since this is a cross sectional data set we cannot separate the effects and aging from birth cohort effects.

The second-stage IV estimates indicate a negative and highly significant relationship between *Distrust* and delegation. The estimated coefficient increases in absolute size compared with the estimated *Distrust* coefficients in Table 5. The *Distrust* coefficient is larger than the effects for most of the other employee characteristics but it is a similar magnitude to some of the inter occupational differences in *Distrust*.

The change in the *Trust* coefficients between Table 3 and 5 indicates the importance of addressing endogeneity. Of course, we do not know the specific form of the endogeneity, however, as discussed above one potential candidate is behavioral: a 'halo' effect could produce common factor survey bias. Nevertheless, across all specifications, distrust is significantly negatively related to delegation.

The key question from the various perspectives on trust and delegation discussed previously, such as the the relational-contracting literature, is whether the *Distrust* coefficient is positive. The

[31] The critical value is a function of the number of included endogenous regressors ($n = 1$), the number of instrumental variables ($K_2 = 1$), and the desired maximal size ($r$) of a 5% Wald test of $\beta = \beta_0$. An $r$ of 10% is the strictest level of $r$ reported in Stock and Yogo (2005). The test has a null hypothesis of weak instruments, see Kleibergen and Schaffer (2007) regarding implementation.

[32] In Model (6), for example, the turning point of the quadratic for tenure is around 20 years. And about 5% of the estimation sample have more the 20 years of tenure.

[33] It is tempting to try and build a better instrument by interacting inherited distrust with tenure to capture the fact that the impact of exogenous inherited distrust is weakest when individuals' initially join a firm and subsequently evolves over time as the first stage estimates indicate. The problem with this approach is that as the second stage estimates indicated time/tenure also has a significant correlation with centralization so the exclusion restriction would fail to hold for an instrument made by the interaction.

instrumental variable approach has a number of well known issues, including the increase in the standard error around the estimate of the endogenous coefficient (Wooldridge, 2000). In addition, taking the heterogenous treatment effects perspective (Stock and Watson, 2015) the IV estimate is the Local Average Treatment Effect (LATE) rather than the Average Treatment Effect (ATE). The LATE estimate of the *Distrust* coefficient is a weighted average of the individual effect of distrust on delegation, with more weight attached to those most affected by the instrument *Inherited Distrust*, that is for who past experiences most impact their current (dis)trust. The determinants of trust in economic contexts is an ongoing area of research but this could plausibly lead to a LATE estimate greater than the ATE estimate.

In all, however, the critical question we address in the paper is not the point estimate of *Disrust*, but rather the probability that the estimated coefficient is positive and bounded away from zero. Indeed, we find the estimated coefficient is statistically significantly positive in all of our specifications, including our pooled and fixed-effects estimates, IV models and even when we use alternative ordinal measures of centralization (below in Section 4.4).

## 4.3 Robustness of results

As shown above, across a range of specifications we find a significant and economically important negative relationship between distrust and the delegation of decision-making authority to individual employees. Here we present two more robustness checks: (i) an examination of the relationship between trust and delegation for non-managers only; (ii) re-examining the relationship between trust and decision authority in the services sector only; and (iii) estimating the trust/delegation relationship for each of our six measures of autonomy separately.

### 4.3.1 Real authority and trust for non-managers and in the services sector

The estimates above include all occupational groups surveyed, including managers. While these managers surveyed in the employee questionnaire of AWIRS are lower-level managers – they are not the general manager of the establishment or head of employment relations for example – as a robustness check we re-estimate our preferred establishment fixed-effects instrumental-variables model excluding all employees who nominated themselves as being part of the manager occupation group.[34] As shown in Model (7), Table 6, our key results hold; there remains a strong negative relationship between worker distrust and delegation.

AWIRS is a cross-industry survey that includes establishments from mining, manufacturing and the services sector. While we have included fixed effects to control for establishment effects, no doubt technical requirements will differ across different industries; for example, technical reasons might dictate that someone working in manufacturing has less autonomy over the pace of work or the time they start than an employee in some roles in the services sector. To account for these possible issues, we re-estimate Model (6) for only the services-sector establishments (excluding any establishment from the mining and manufacturing sectors). These results – Model (8) in Table 6 – are very similar to the estimates obtained using the full sample, reaffirming the statistically significant and economically important relationship between distrust and decision-making allocation.

[34] As Table 10 shows managers have higher distrust than every other occupation except for professionals.

Table 6: Decision making and *Distrust* for subsamples, selected IV estimates with establishment fixed effects (Clustered standard error in parentheses)[a]

| Subsample | (7) Non-managers only[b] | | (8) Service sector only[c] | |
|---|---|---|---|---|
| | Coeff | (SE) | Coeff | (SE) |
| First-stage Estimates (Distrust) | | | | |
| Instrument | | | | |
| Inherited Distrust | $0.945^{***}$ | (.161) | $0.865^{***}$ | (.183) |
| Weak Instrument Test | | | | |
| Kleibergen-Paap F-statistic[d] | $34.26^{**}$ | | $22.44^{**}$ | |
| 5% Critical values ($r = 10\%$) | 16.38 | | 16.38 | |
| Second-stage estimates (Centralization) | | | | |
| Distrust | $1.555^{***}$ | (.416) | $1.103^{**}$ | (.466) |
| No. of obs. | 15415 | | 12930 | |

[a] *** Significant at 1% level, ** significant at 5% level, * significant at 10 % level. Models (7) and (8) are equivalent to fixed-effects IV Model (6) with a full set of education, age and occupational controls.
[b] Excluding individuals whose occupation is manager. Clustered standard errors for 1762 establishments shown in parentheses.
[c] Excluding establishments in the mining and manufacturing industries. Clustered standard errors for 1437 establishments shown in parentheses.
[d] Weak instruments test: Kleibergen-Paap rk Wald F statistic, $H_0$ = weak instruments. Critical values from (Stock and Yogo, 2005, Table 2).

## 4.4 Robustness of decision-authority measure: an ordinal approach

As described above in Section 3, our main dependent variable is a composite of six separate aspects of an employee's decision-making authority: type of work; how to do the work; start and finish times; pace of work; influence regarding workplace organization; and influence on decisions in the firm that affect the employee. Here, we explore how the estimated relationship between distrust and decision-making authority is driven by each one of these six measures separately.

Each of these six measures is scored on a four point scale measuring the amount of influence the employee has over that type of decision/activity: (1) A lot, (2) Some, (3) A little, and (4) None. Rather than impose a linear scale in our modeling we instead take an ordinal approach and estimate the second-stage of our instrumental-variables model as an ordered probit. Thus in the following we relax both the pooling and linearity assumptions that were employed to construct the $Z$-scores.

While the ordered probit allows us to relax the cardinality of *Centralization*, as it is a non-linear model it precludes the use of the within estimator to calculate the establishment-level fixed effects. Thus the following results reported in Table 7 are corrected for the endogenity of *Distrust* by standard instrumental-variable methods (IV) but not for establishment fixed effects. As in Models (5) and (6), this estimation includes all age, education and occupation controls, the instrument *Inherited Distrust* and clustered standard errors. For the sake of brevity, only the key estimated coefficients are reported here.

The results in Table 7 suggest that the negative relationship between *Distrust* and delegation

Table 7: Centralization of decision-making: IV Ordered Probit model of individual variables coefficients (standard errors in parentheses)[a]

| | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|
| | | | Second Stage Ordered Probit | | | |
| Dep. Variable | Type of work | How do work | Start/finish times | Pace of work | Establishment Organization | Decisions that affect you |
| Male | -0.082*** | 0.018 | -0.160*** | -0.006 | -0.155*** | -0.045* |
| | (0.022) | (0.028) | (0.022) | (0.027) | (0.020) | (0.027) |
| Tenure | -0.042*** | -0.009 | -0.031*** | -0.015* | -0.040*** | -0.011 |
| | (0.005) | (0.010) | (0.006) | (0.009) | (0.005) | (0.009) |
| Tenure$^2$/1000 | 0.981*** | 0.193 | 0.720*** | 0.272 | 0.900*** | 0.101 |
| | (0.164) | (0.257) | (0.168) | (0.235) | (0.149) | (0.248) |
| Distrust | 1.598*** | -0.046 | 1.751*** | 0.748* | 1.973*** | 0.911** |
| | (0.260) | (0.437) | (0.182) | (0.389) | (0.147) | (0.411) |
| | | | First Stage IV (*Distrust*) | | | |
| Inherited distrust | 0.837*** | 0.837*** | 0.837*** | 0.837*** | 0.837*** | 0.837*** |
| | (0.144) | (0.144) | (0.144) | (0.144) | (0.144) | (0.144) |
| Male | 0.041*** | 0.041*** | 0.041*** | 0.041*** | 0.041*** | 0.041*** |
| | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) |
| Tenure | 0.021*** | 0.021*** | 0.021*** | 0.021*** | 0.021*** | 0.021*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Tenure$^2$/1000 | -0.501*** | -0.501*** | -0.501*** | -0.501*** | -0.501*** | -0.501*** |
| | (0.052) | (0.052) | (0.052) | (0.052) | (0.052) | (0.052) |
| Cut 1 | -0.956*** | -0.893*** | -0.728*** | -0.674*** | -1.169*** | -1.431*** |
| | (0.174) | (0.079) | (0.158) | (0.107) | (0.209) | (0.115) |
| Cut 2 | -0.109 | 0.015 | -0.223** | 0.146 | -0.536*** | -0.391*** |
| | (0.096) | (0.095) | (0.102) | (0.089) | (0.135) | (0.099) |
| Cut 3 | 0.418*** | 0.714*** | 0.090 | 0.716*** | -0.053 | 0.498*** |
| | (0.073) | (0.113) | (0.078) | (0.081) | (0.089) | (0.089) |
| No. of obs. | 16922 | 16922 | 16922 | 16922 | 16922 | 16922 |

[a] *** significant at 1% level, ** significant at 5% level, * significant at 10 % level. Clustered standard errors in parentheses for 1773 establishments. All models include controls for education, age and occupation.

Table 8: Average marginal effects of one unit change in Distrust on individual centralization of decision-making variables: Ordered Probit model with IV of Distrust. (standard errors in parentheses)[a]

| | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|
| Dep. Variable | Type of work | How do work | Start/finish times | Pace of work | Establishment Organization | Decisions that affect you |
| Influence | | | | | | |
| 1. A lot | -0.429*** | 0.017 | -0.485*** | -0.264** | -0.376*** | -0.148** |
| | (0.072) | (0.162) | (0.055) | (0.128) | (0.063) | (0.064) |
| 2. Some | -0.124*** | -0.005 | -0.098*** | 0.002 | -0.191*** | -0.170** |
| | (0.007) | (0.044) | (0.008) | (0.012) | (0.021) | (0.067) |
| 3. A little | 0.059*** | -0.007 | -0.013** | 0.080*** | -0.079*** | 0.021** |
| | (0.021) | (0.062) | (0.007) | (0.029) | (0.006) | (0.008) |
| 4. None | 0.494*** | -0.006 | 0.596*** | 0.182 | 0.646*** | 0.297** |
| | (0.098) | (0.056) | (0.055) | (0.111) | (0.036) | (0.139) |
| No. of obs. | 16922 | 16922 | 16922 | 16922 | 16922 | 16922 |

[a] *** significant at 1% level, ** significant at 5% level, * significant at 10 % level. Clustered standard errors in parentheses for 1773 establishments. All models include controls for education, age and occupation.

(i.e. the positive relationship between *Distrust* and each of the individual centralization measures) holds for five of these new variables. The exception is "How you do your work", for which the relationship with *Distrust* is insignificant. The instrument *Inherited Distrust* is highly significant in the first stage, and the first stage F-test on the instrument is approximately 34, well above the 10 often used as a rule-of-thumb.

In order to capture the impact of *Distrust* on *Centralization*, we calculate the associated marginal effects for each of the four possible outcomes for each of the six dependent variables (reported in Table 8).[35] As one might expect from Table 7 the marginal effects of *Distrust* are statistically significant for all measures of autonomy, apart from "How you do your work". For the other five variables the qualitative pattern is similar: *Distrust* is related to a shift in probability from the delegated outcomes (e.g. "A lot" of influence), towards centralization ("None"). The magnitudes of the marginal effects vary markedly across the variables. *Distrust* has the strongest impact on the "type of work", "start/finish times" and "establishment organization". The marginal effects on "pace of work" and "decisions that affect you" are approximately half the absolute size of those for the prior three variables. One can ex post rationalize these results in terms of conjectured technical and coordination restrictions; it would be interesting to see these kinds of factors included in future theory to enrich its empirical scope.

# 5 Concluding Comments

If a manager is willing to delegate authority to a subordinate when contracts are incomplete, she must, in some sense, trust them to do the right thing. An employee will also, no doubt, have an

[35] These are the discrete changes in probability from a one unit change in *Distrust*, not the derivatives.

opinion about the trustworthiness of management. This is relevant to the design of an organization because if an employee trusts their superiors, management can make promises with some credibility, even in the absence of legal enforcement. Theories like relational-contracting models formalize this idea; within a repeated-game framework, trust of management by employees enables delegation. If feasible, such relationships/implicit contracts can enhance firm value by enhancing the effective use of employees' knowledge and skills.[36]

Our empirical analysis show a highly significant and positive relationship between delegation and an individual employee's trust of management. This is true for both our pooled OLS and fixed-effects estimates. The results also suggest an endogeneity between trust and delegation. Nonetheless, the trust-delegation relationship remains – indeed, becomes stronger – when we instrument for trust in our IV estimates. Third, consistent with economic models of organizations, a number of other factors are also significantly related to delegation, including employee occupation, gender and human capital.

Finally, while our results confirm a significant relationship between trust and delegation, we do not explain here which actions are most important in the evolution (or maintenance) of trust. A key practical question for managers and researchers is 'what produces the high-trust equilibrium in firms?'. Indeed, understanding the answer to this question could help explain persistent performance differences between seemingly similar firms (Gibbons and Henderson, 2013). Our results indicate that trust is better understood as an individual-level relationship between an employee and management, rather than as a group-level organizational culture. Furthermore, consistent with the burden of past promises argument[37] of Li et al. (2017), we also find trust tends to deteriorate over time. Our analysis is just a first step, and the critical mechanism linking trust, to delegation and on to better firm performance requires further research.

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[36] Trust is potentially also important in facilitating communication in the absence of formal contracts. This would be an interesting topic for future research.

[37] Intuitively, as circumstance change due to random shocks, the cost of keeping past promises goes up until eventually a firm defaults on a promise or, alternatively, random shocks themselves cause a breach of promise.

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# A Other empirical results

Table 9: Correlations between Education, Distrust and Centralization (N = 16922)

| Variable | Centralization | Distrust |
|---|---|---|
| Year 10 | 0.062 | -0.031 |
| Year 12 | 0.114 | -0.0127 |
| Vocational | 0.030 | 0.0010 |
| Skilled trade | 0.018 | 0.0763 |
| Associate Diploma | 0.045 | 0.0121 |
| Undergraduate degree | -0.038 | -0.0199 |
| Postgraduate degree | -0.109 | -0.0046 |
| Other | -0.137 | -0.0049 |

Notes: a. Source AWIRS 95.

Table 10: Correlations between Occupation, Disrust and Centralization (N = 16922)

| Variable | Centralization | Distrust |
|---|---|---|
| Laborer | 0.164 | -0.1218 |
| Machine operator | 0.114 | -0.1023 |
| Sales & Personal service | 0.088 | -0.0965 |
| Clerks | 0.003 | -0.1333 |
| Tradesperson | 0.062 | -0.1010 |
| Para-professional | 0.015 | -0.0577 |
| Professional | -0.134 | 0.4384 |
| Manager | -0.315 | 0.1355 |
| Other | -0.007 | -0.0175 |

Notes: a. Source AWIRS 95.