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# The Role of Family Ties in Mitigating Moral Hazard

Firm-Level Evidence from Tamil Nadu, India

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Abstract: Drawing on firm-level data from the district of Coimbatore in Tamil Nadu, India, this study explores the role of family ties as a means to counteract potential moral hazard concerns. It is shown that firms will be more likely to employ family relations when faced with a higher hidden context for moral hazard. Specifically, the analysis finds that the presence of family members within the firm is higher when the firm provides general training and that firms that are more likely to do external business with family relations when it is believed that the legal system is not effective. Additionally, the results suggest that there may be other factors that are equally or more influential in predicting a reliance on family relations, such as prior experience and profitability.

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## 1. Introduction

The recent development of information economics in the past few decades highlights a growing desire to better understand the importance of the role of information – a role whose implications have more or less been overlooked by traditional economic theory. Recognizing that agents may have limited and different information is rather consequential, especially in regards to the economic decision-making related to contracts and transactions (Commons 1934; Alchian and Demsetz 1972). Particularly interesting is the ability of this asymmetric information to act as a basis for moral hazard (Williamson 1975), a form of opportunism characterized by an informed agent's ability and incentive to take advantage of a less-informed agent through an unobserved action (Arros 1974). This paper explores the extent to which an agent takes actions to lessen or moderate the potential for moral hazard from a firm unit perspective.

It can be reasonably argued that the ability of the potential for moral hazard to significantly influence firm behavior is most evident in countries or regions where labor markets are imperfect and inefficient, and where formal institutions are not strong (often, but not limited to, developing countries). After all, these markets are more likely to lack fluidity, transparency, and third party enforcement – three traits that significantly lessen information asymmetry for firms. Moreover, within these 'weaker' markets, it is the smaller and oftentimes informal firms which face even higher moral hazard concerns; they lack the resources, ability, or influence to combat potential informational problems.

Interestingly, empirical findings show that family ties (i.e. hiring family labor or contracting outside of the firm to a relative) in business are significantly more prevalent in developing countries (Madura et.al 1996 and Burkart et. al 2003) and in smaller firms (Ben-Porath 1980 and Mueller 2011). Much research has been conducted in an attempt to better understand this phenomenon; for example, there has been significant research in the differing productivity (Anderson and Reeb 2003), longevity (Donnelly 1964), and motivations (Becker 1974) of family firms. On the external side, many have looked at family or network relational contracting as a method of informal market intermediation (Kranton 1996; Woodruff 1998). Yet due to the unavoidably intermingled nature of the ever-changing features of a firm, it has been extremely difficult to come to any general conclusions to why a firm initially or persistently leverages family relations. Instead of trying to explain resulting differences (i.e. more/less productive, profitable, etc.) between firms that rely on family and those that do not, this paper attempts to explore why firms decide to employ family

relations in the first place. This distinction in motivation may be slight, yet it is important because it engenders a novel framework with which to investigate and explain the occurrence of family relations in firms. Initial findings by other researchers seem to support this investigation, such as the decreased use of internal monitoring systems by family firms (Daily and Dollinger 1992) as well as the abovementioned work on informal enforcement by Woodruff.

This paper seeks to explicitly connect the increased potential for moral hazard in firms to the increased prevalence of family ‘employment’ by such firms; specifically, it shall argue that firms will be more likely to employ family (either as internal labor or as an external business partner) when faced with a higher potential for moral hazard. In order to test this theory, we outline one specific moral hazard consideration within the firm as well as one outside the firm. Internally, we speculate that the presence of family members within the firm will be higher when the training and experience provided by the firm is general (as opposed to specific). Externally, firms will be more likely to do business with family relatives when they do not believe that the legal system is effective (i.e. they will use family as informal contract enforcement).

## **2. Related Literature**

Firms make critical decisions that affect their development both internally and externally; therefore, it is helpful to explore this separation, especially in the context of moral hazard considerations. A core framework to understanding the ‘firm’ is the splitting of economic organization; specifically, are the gains from specialization and cooperative production better obtained within an organization (i.e. a firm) or across markets? And, after this ‘split’ is made, what are the real differences between operating within a firm or across markets (i.e. externally, with another firm)? A common view is that in the firm, there is superior power to settle issues (i.e. an internal ‘supervisor’ can motivate or discipline more effectively than an external agent). On the other hand, in their seminal paper on economic organization, Alchian and Demsetz (1972) argue strongly against this view:

This is delusion. The firm does not own all its inputs. It has no power of fiat, no authority, no disciplinary action any different in the slightest degree from ordinary market contracting between any two people. I can "punish" you only by withholding future business or by seeking redress in the courts for any failure to honor our exchange agreement. That is exactly all that any employer can do.

In this context, the essence of a firm is **not** characterized by long-term contracts between employer and employee. Alchian and Demsetz argue instead that a firm is characterized by a ‘centralized contractual agent’ in a team productive process, where this agent (usually the owner and/or manager) monitors and meters the productivities of each input owner to costs of joint inputs. In this way, the agent is able to reduce shirking (i.e. minimizing effort) within a firm. Thus, what distinguishes and ‘makes’ a firm is this contractual structure which more efficiently reduces shirking compared to across market (external) negotiations. Such a view introduces and illustrates the importance of moral hazard considerations (in general terms, the possibility that the behavior of one party may change to the detriment of the other) in both the formation and maintenance of a firm. However, the potential for moral hazard goes beyond shirking.

Hennart (1993) argues that analogous to ‘shirking’ inside the firm, there is ‘cheating’ outside the firm. Hennart contends that there will be strong potential for moral hazard in **both** internal and external systems. Specifically, within the firm, individuals are rewarded (often with a fixed sum) for following directives – therefore they will have incentive to shirk but not to cheat. Conversely, the market uses the price system to reward an individual on the ‘pure’ basis of output – therefore these individuals will have incentive to cheat (inflate price or reduce quality of their output) but not shirk. We thus see that a firm faces moral hazard considerations both internally and externally, no matter how it is structured.

In theorizing the response of firms to the potential for moral hazard, several strains of literature provide an interesting and appropriate foundation. First, it is helpful to review the overarching theory and issues of moral hazard most often encountered by firms. These include the issues of transaction costs, information asymmetry, trust, and risk. Next, I look specifically at intra-firm moral hazard and thus issues of shirking, monitoring, principal-agent dilemma, and employee skills/training/turnover. There is also insight to be gleaned from the rather numerous and varied literature on family firms. To understand the potential for moral hazard externally, I review the inter-firm relationships literature with a particular focus on the dynamics of these relationships in the absence of strong formal contract enforcement. The existing literature fleshes out these dynamics by looking deeper at trust, reputation building, and competition.

## 2.1 Moral Hazard Theory

Moral hazard can be understood as the opportunism characterized by an informed agent's ability and incentive to take advantage of a less-informed agent through an unobserved action. Each transaction between two or more parties implies a contract (whether or not it is formalized), and risk is inherent in each contract (since the behavior of parties can never be perfectly guaranteed). The moral hazard faced by a firm is best understood through the context of transaction costs, contracts, information asymmetry, trust, and risk.

Commons (1934) introduced the idea that transactions are the true unit for economic analysis, as opposed to commodities or individuals. He argued that transactions were the "alienation and acquisition, between individuals, of the rights of property and liberty created by society, which must therefore be negotiated between the parties concerned before labor can produce, or consumers can consume, or commodities be physically exchanged." Coase (1937) argued that along with these transactions came transaction costs – that the cost of obtaining a good or service is actually more than just the price of the good. Coase argued that these transaction costs could be quite significant, and categorized these into search and information costs, bargaining costs, and policing/enforcement costs. These transaction costs arise fundamentally from the potential for moral hazard. Williamson (1975) is widely known for extending as well as advancing the theory on transaction costs. Pertinently, Williamson explored the major component of asymmetric information inherent in many transactions – "true underlying circumstances relevant to the transaction... are known to one or more parties but cannot be costlessly discerned by or displayed for others." By recognizing that firm agents often have limited and imperfect information, we can better understand why their individual incentives may not necessarily align (Arrow 1974). This potential misalignment of firm agents' incentives in transactions is what drives the potential for moral hazard for a firm.

The above shows that the potential of moral hazard increases transaction costs for firms. In general, how do firms deal with these moral hazard issues? It seems that a rather large coalition of noted theorists have explored the role of trust in mitigating moral hazard issues and thus reducing the transaction costs of firms both internally and externally (Arrow 1974; Bromiley and Cummings 1996; Granovetter 1985; Williamson 1993). Trust, of course, is a rather imprecise and elusive concept; in fact, I do not find it prudent to delve into the similarly abstract literature on the concept (discussed heavily in both the psychological literature as well as in the inter-organizational

relationship literature). However I do find it necessary to bring up trust in order to explain another popular and arguably less abstract moral hazard alleviator for firms: the reputation of agents.

Reputation is used by stakeholders to assess the trustworthiness of an agent/entity, along with other aspects such as value, ethics, and efficacy (Granovetter 1985; Bromley 1993). Schelling (1960) used a game-theoretic framework to introduce the idea that reputation is 'built' through repeated interactions (information feedback). Kreps and Wilson (1982) formalized and extended upon this concept in their own game theoretic models. Recently, researchers have explicitly linked reputation to risk. Raub and Weesie (1990) use variation in "imperfect information" to proxy for reputational knowledge in order to model risk trade-offs by actors. Kewell (2006) finds that reputation is a major factor in risk, especially in the context of organizations. I will look specifically at the reputation of the firm, especially in my discussion of interfirm moral hazard considerations.

There is of course quite a broad and varied literature on moral hazard, even when we only focus on the core findings which relate to firms. Relevant concepts have been gathered from multiple families of literature, including industrial organization, game theory, sociology, information economics, behavioral economics and new institutional economics. Next, we will apply these concepts more specifically as we review the literature on moral hazard inside and outside the firm, respectively. In addition, this paper will review what this literature says regarding the response of firms in the face of moral hazard, especially honing in on a firm's 'choice' of labor and business partners as a method of mitigation.

## **2.2 Moral Hazard in the Firm**

There are two main strains of interrelated literature which provide the best context for looking at moral hazard within the firm. I will first discuss relevant concepts from the micro-level labor economics literature and next review the varied literature on family firms. As discussed earlier, the issue of moral hazard within the firm is fundamentally one of shirking: information asymmetries (such as an employee having more information about his own actions than his employer) can cause incentive misalignment between the manager and his employee (principal and agent), and thus the employee may behave 'inappropriately' from the viewpoint of the employer (Grossman and Hart, 1980). Akerlof and Yellen (1990) have presented a very interesting concept in their rather famous 'fair-wage-effort hypothesis' to explain how and when an employee decides to shirk. They based their model on the argument that the effort of employees depends on their perception of fairness

regarding their compensation. Intuitively, workers not only have a good idea of what wage is ‘fair,’ but also will work less if they feel they are being underpaid. Nevertheless, the issue of inefficient (i.e. not maximized) effort can still be thought of as an issue no matter what the pay, as long as there is any chance that an employee can underperform without being discovered. Consequently, the conventional and simple solution to this is strict monitoring of an agent’s behavior.

Unfortunately and obviously, perfect monitoring is not only expensive, but near impossible. As posited by Arrow (1974), by definition, the agent has been selected for his specialized knowledge and therefore the principal can never hope to completely ‘check’ the agent’s performance. Holmstrom’s (1982) theoretical work on moral hazard in teams argues that it may be optimal to have the overlapping of tasks and less specialization of agents (against the traditional ‘efficient’ motivations) to better monitor performance and reduce moral hazard costs since such activities provide for better risk sharing. On the other hand, Osterman (2000) and Arocena (2010) have argued that the attempt to reduce moral hazard through excessive monitoring is damaging for the productivity and innovation of firms.

In addition to the intrafirm mechanisms behind shirking, monitoring, and fair wages, the labor economics literature also provide some relevant implications when it comes to employee training, investment, and turnover. These implications are best seen in Gary Becker’s (1962) work on the investment in human capital. Becker, in seeking to explain the curious differences in ‘investing in people’ based his theory on two types of on-the-job training (investment): general and specific. General training increases the marginal product of a worker by the same amount both inside and outside the firm, but specific training increases the marginal product of a worker within the firm more than it does outside it. Thus, in the presence of high attrition, employers are incentivized against investing in workers (general training) since they will not be able to capture the benefit if and when workers leave. In the context of family firms and moral hazard, we can speculate that family members might be more likely to be trained since ‘the family’ will still capture benefits of the training even if the family employee leaves.

In fact, Becker’s later work (1974) on the economic theory implications of social interactions and income specifically focused on such intra-family utility functions. He theorized that a member of the family (i.e. ‘the head’) would maximize a utility function that depended on the consumption of all family members, subject to a budget constraint determined by family income and family consumption. Further extending this line of thought is the family firms research which argues that family firms differ from non-family firms in that they seek to maximize utility instead of profit

(Feinberg 1975; Abowd et. al 1982). Arregle et al. (2007) also explored the social interactions implications – by using the framework of family firms, they link the creation of social capital within a firm to the social capital inherent within a family, but also argue that such reasoning can be applied to other types of social groups, as long as the group has a strong commitment to the firm.

Though the literature on family firms is quite extensive, the literature is primarily focuses on the characteristics of family firms, and how they differ from non-family firms. In other words, the focus is more on the effects of being a family firm, as opposed to why a firm is or becomes a family firm in the first place. My research is more aligned with the latter; nevertheless, existing research on family firms does provide relevant implications for this paper.

Daily and Dollinger (1992) surveyed firms regarding their use of “formal control systems” such as quality control, cost control, and information systems. They found that family-run firms used significantly fewer formal internal control systems, but conceded that part of this result could have been due firm size. Daily and Dollinger argue that these findings are due to the fact that in family-managed firm, there is no need to account for the actions of a ‘disinterested owner,’ recalling the Jensen and Meckling (1976) assumption that the blurring of the boundary between principal and agent in family contracting would make moral hazard largely inconsequential. This exemption from the problems of agency is reiterated by Parsons (1986) as well as Eisenhardt (1989), who argues that family provides goal congruence and thus the reduced need to monitor behavior or outcomes since motivation issues disappear. Unsurprisingly, many researchers have found this line of thinking to be a little bit of an oversimplification. After all, a family is not a monolithic of homogenous group of people with congruent interests (Sharma, Chrisman, and Chua 1997); specifically, Bergstrom (1989) argues that Becker’s idea of intra-family altruism cannot hold up against conditions of information asymmetry. Taken to the other end, La Porta, Lopez-de-Silanes and Shleifer (1999) look at firms globally and posit that family firms are actually predisposed to internal dysfunction for this reason, since the risk of getting caught and being punished for opportunistic actions is reduced with the control and power that is associated with family-influenced governance.

Notably, Daily and Dollinger’s work is especially relevant to our research because it is one of the only frequently cited papers which looks not only at smaller firms, but smaller firms in a single sector – this is rare in the firms literature, especially within the contexts of family firms and moral hazard. Yet, it is important to note that they interpret their results through the lens of the separation or merging of ownership and control; to be sure, this is how agency models of the firm have most frequently been explored. Again, this is due the traditional focus on larger and/or publically traded

firms, where business schools often are keen to dissect the relationship between shareholders and the appointment of CEOs, or the performance of likely ‘heirs’ to family-based conglomerates. Oviatt (1988) criticizes the reliance on large-firm data, arguing that the firms’ complexity makes interpretation of firm governance and performance difficult. Alcorn (1982) argues that it is the small firm, particularly the family-affiliated firm, which is more likely to have a single owner-operator who can accurately assess firm processes, providing for a cleaner and more robust investigation.

Nevertheless, the existing research which has explored and attempted to explain the intricacies of the relationship between owner (principal) and manager (agent) in firms has parallel implications and contains similar caveats to the relationship between owner and workers in small firms. These findings give support, at least in the arena of larger firms, to the idea that firms ‘use’ family to mitigate moral hazard concerns.

### **2.3 Moral Hazard Outside of the Firm**

Earlier the importance of trust (and thus reputation) in transactions was discussed. We can clearly see this concept play out when we look at firm to firm exchanges. This has even been illustrated historically by both Greif (1989, 1993) who looked at 11<sup>th</sup> century trade in the Mediterranean and Clay (1993) who studied trade in 19<sup>th</sup> century Mexican California. Both researchers found that coalitions of traders ensured the honesty of agents in distant cities by sharing information and punishing “cheaters” – clearly a reputation mechanism.

Kranton’s research on buyer-seller networks introduces the notion of ‘links’ to facilitate business transactions. With both empirical backing and formal modeling, Kranton argues that these links are leveraged to strategically to supplant anonymous market exchange (1996, 2001). Kranton also argues that the notion of reciprocity as well as the size of the market underlies the use and effectiveness of these links, especially in the absence of well-functioning legal systems (1996). When looking at the potential for moral hazard externally, it makes sense to look at the impact of the presence (or lack of) strong formal enforcement mechanisms; after all, for markets to work, there needs to be some means of assuring or guaranteeing promises.

Interestingly, much literature focuses on transition economies to look at relational contracting as a substitute to formal enforcement. This makes sense – in these countries the governments are building up legal systems but this happens slowly; thus, in the meantime, firms enter and develop new relationships among themselves, creating more or less, an informal system of

enforcement (Blanchard and Kremer, 1997). Woodruff and Johnson (1998) lay out the ways in which interfirm relationships substitute for absent market infrastructure by serving information provision and contract-enforcement purposes in Vietnam (1998). They also find that a firm tends to grant more trade credit to its customer when the customer has no alternate supplier, when the firm has more information about the customer's reliability, and when the supplier belongs to a business or social network that makes more information available and/or makes it easier to enforce sanctions. Along with McMillan (1999), they also find that relational contracting and courts are substitutes in the former Soviet Union and that belief in the effectiveness of courts has a positive effect on the level of trust in relationships between firms and their customers (2001).

Banerjee and Duflo (1999) also explored the dynamics of incomplete contracts between firms by looking at the customized software industry in India. Due to the extensive customization of the products, both overruns and renegotiation are common. Banerjee and Duflo find that the client is 'more accepting' in these renegotiations when facing an older firm – especially if the client has a past relationship with that firm. Using this result, they argue for reputation effects as a key influencer of interfirm contracting dynamics.

Though the above literature touches upon relational contracting, the literature does not distinguish between types of relationships – instead, it simply discuss contracts that are based on relationships (i.e. repeat customers). Luo and Chung (2005) specifically argue that family and prior social ties can improve performance by providing informal norms that strengthen the intermediation within business groups. Their results also suggest that social ties have a significantly different effect than family ties (specifically, family ties have declining returns on group performance).

## **2.4 Implications of the Literature**

The literature discussed above provides an excellent foundation with which to understand the sources and manifestations of moral hazard that a firm may face. Yet, the extent to which we understand a firm's response to such moral hazard has not yet been fully explored. Promisingly, findings in both the family firms literature and the relational contracting literature seem to support the idea that firms specifically 'use' family or relatives to mitigate such moral hazard. Specifically, Becker has postulated that firm-specific training and investment is a major determinant for turnover (moral hazard) while multiple researchers have found that relational contracting serves as informal enforcement in environments which lack strong formal enforcement.

This paper seeks to confirm these theories within its data set. In addition to testing these major theories, the present study makes three important contributions to the firm governance literature. First, prior firms research exploring moral hazard and family relations have not explored this issue holistically; that is to say, previous research seems to explore the internal or external mechanism separately. Therefore, the present study advances our understanding of family relational contracts by looking at both internal and external moral hazard mitigation by the same firms. Secondly, this research contributes to the literature on contracting by more deeply exploring the structure of the contracting relationship (i.e. length of relationship, proportion of output, nature of relationship) – this gives important implications on how the nature of the contracting relationship may affect the growth and productivity of small firms. Lastly, in a broader sense (and discussed above), this research makes a contribution to the moral hazard firms literature by focusing on micro and small firms in a specific industry since most of such research has been disproportionately based upon large firms and/or datasets which included multiple and wide ranging industries.

### **3. Empirical Methodology**

#### **3.1 Research Setting and Data Sampling**

This research is based on primary field-level data collected from approximately 400 small and micro enterprises (SMEs) within the machine-parts manufacturing sector in the industrial and entrepreneurial hub city of Coimbatore, India. To give a better idea of the city, Coimbatore is often referred to as the ‘Detroit of South India,’ for its industrial nature. Coimbatore is estimated to be home to tens of thousands of SMEs, with textiles and machining making the largest sectors. The data collected for this research is solely comprised of machining firms.

Each survey interview was moderated by both a team member and a trained local enumerator, and was conducted verbally. Each interview lasted approximately 25-45 minutes in length and had approximately 175 questions. Each question was printed in both Tamil and English and firm owners were given the option to pick whichever language they felt most comfortable with. A majority of the interviews were conducted in Tamil. There were 12 major sections to our survey: Enumerators, Basic Information, Electricity Supply, Generators, Electricity Demand, Output, Suppliers and Buyers, Organized and Unorganized Sector, Ownership and Employment, Owner

Experience, Founder Characteristics, and Firm Outlook. This study contains data from almost all of these sections. The wording and design of the survey questions followed (and in some relevant cases exactly mirrored) both the standards of the World Bank Enterprise Surveys as well as the NSSO's Unorganized Manufacturing Surveys of India.

The survey was implemented in June and July 2011 in 11 districts within Coimbatore. The original survey implementation design attempted to randomly sample every third firm from an alphabetic list in randomly selected districts. However once surveying began it became clear that there were a number of issues with the sampling method. One issue that arose is that Coimbatore's addresses are not easily locatable and identifiable. The second issue that arose was that the list of firms we were utilizing did not contain a representative sample of non-registered firms. Because so many of the firms in the district are not registered this issue created the potential for bias. The sampling method was re-evaluated and it was determined that the most realistic sampling method was to identify several districts and attempt to survey every firm within the district. If a firm owner was not available at a certain time, we made sure to re-visit at another time, often by appointment.

We extensively surveyed the 11 different districts. These were the districts which contained the largest clusters of machining firms, based on the registries and directories we obtained from multiple local business associations. Although we were able to survey a large number of firms within each district there is no way to know for certain if we were able to survey every single firm. The reason for this is because most firms work in very small shops that are easily hidden in the area. Furthermore, no district has a complete list of all SME firms in the district. However, given the parameters of the sampling method and the attempt to survey every firm within randomly selected districts we believe we were able to capture a representative sample of the sector.

### **3.2 Descriptive Statistics**

Table 1 provides a broad snapshot of the collected data. As illustrated, relevant data were collected regarding both the firm and the firm owner. 97% of the firm owners surveyed were male, and 94% of the firm owners founded the firm (in line with our anecdotal expectations regarding the 'entrepreneurial affinity' of Coimbatore. Most of the owners (76%) were local, and most (82%) had experience as a salaried employee before owning the firm. The average education level of our respondents was in between secondary school completion and tertiary school completion.

In terms of the firm-unit, the average firm age was 12 years and the average number of total employees was 5.69. The data also shows that most firms only have a few buyers, with the average proportion of output bought by the primary buyer at approximately 56%.

Regarding the variables of interest, approximately 31% of firms primarily produced specialized output and approximately 36% of firm owners did not believe the legal system was effective in enforcing contracts. In terms of family relations (my dependent variables), approximately 27% of firms employed family labor within the firm and approximately 29% of firms worked externally with family relations.

Table 2 and 3 seek to illustrate interesting statistical differences in the characteristics of firm subgroups delineated by our theorized moral hazard framework. In line with my hypothesis, we do see that firms which face a higher moral hazard context are more likely to employ family labor; additionally, it is also more likely that a firm's primary buyer is a family member or relative. At first glance, it is interesting that there does not seem to be much difference in firm age, locality, business borrowing, length of relationship with buyer, or profitability between firms that face higher moral hazard and those that face lower moral hazard.

### 3.3 Model Specification

General hypothesis: Firms will be more likely to employ family (either as internal labor or as an external business partner) when faced with a higher potential for moral hazard:

Hypothesis A (intrafirm): *When firms primarily make standard products (where associated training and experience are therefore general and not specific), the presence of family members within the firm will be higher than firms which primarily make specialized products.*

$$\text{Model: Internal Family Labor} = \beta_0 + \beta_1(\text{Specialized Output}) + \beta_2\text{Controls} + \epsilon_i$$

Hypothesis B (interfirm): *When firm owners do not believe that the legal system is effective in enforcing contracts, they will be more likely to sell their output to family relatives.*

$$\text{Model: External Family Buyer} = \beta_0 + \beta_1(\text{Ineffective Legal System}) + \beta_2\text{Controls} + \epsilon_i$$

### 3.4 Model Specification - Notes

Due to the binary nature of both dependent variables in the above models, this study uses the logit binary response model to estimate the relationship between the specified moral hazard context and the employment of family relations, both internally and externally. Multiple specifications were run with varying controls which included related firm and firm owner characteristics.

Several controls are specific to each model, based on both the theoretical intuitions as well as actual statistical results. For example, I use *delayed payments* as a control for the *external family buyer* model but do not include it as a control for *internal family labor*. On the other hand, several variables were included as controls for both models, such as firm age or district dummies.

Marginal effects were estimated on all our logit regressions in order to provide a clear interpretation of our results. Due to the discrete and binary nature of our independent variables in both models, we chose to look at average partial effect as opposed to partial effect at the average.

### 3.5 Variables of Interest

**Family labor** (dependent variable): This dummy variable was created for the employment of family labor within the firm. The firm owner was asked to list out all his workers – both temporary and permanent, and both family and non-family. For family labor, firm owners were told to include extended family as well (i.e. nephews, cousins, etc.)

\*In an alternate model specification, family labor level (i.e. actual number of family labor employees, as opposed to this simplified binary variable) is analyzed as the dependent variable.

**Specialized output** (independent variable): This is a dummy variable which takes on the value of 1 if the firm owner answered yes to the question: is the output you provide for this client different from output you might provide on the open market?

**Family buyer** (dependent variable): This is a dummy variable which takes on the value of 1 if the primary buyer of output of the firm is a family or relative member. The firm owner was asked how his relationship with his largest client was established, and chose between family/relative relationship, geography, employee connection, introduction by another client, or none of the above.

\*In an alternative model specification, this paper also looks at this client establishment method

variable as an ordered discrete response in terms of ‘relationship level’: family/friend/relative, employee connection, introduction by another firm, or none.

**Ineffective legal system** (independent variable): This dummy variable was created to take on the value of 1 if the firm owner answered ‘ineffective’ to the question: how effective do you believe the legal system is in ensuring that contracts are enforced?

### 3.6 Specialized Output variable – Extended Discussion

Due to the importance of *specialized output* as my internal model’s independent variable as well as the arguably imprecise nature of manufacturing a product that is “different from output you might provide on the open market,” this section hopes to provide a foundation for the use of this variable in terms of providing an acceptable moral hazard context. I have run a logit regression on *specialized output* which can be seen in Table 4, for purely descriptive purposes. As can be seen in the table, the products that are of higher quality, customized, or unique to client are all positively correlated with *specialized output* at the 1% significance level, in multiple specifications, and with the addition of controls. The regression also indicates that several product categories (i.e. dies and pumps in column 3) and machining activities (grinding and turning in column 4) are more strongly associated with *specialized output* than others. The firm owner’s experience in the machining industry (in years) is also strongly positively related to *specialized output* production at a highly significant level.

The above findings give good backing that *specialized output* is an appropriate variable for measuring internal moral hazard in our context of general vs. specialized training and experience. Experience and training in making products that are of higher quality, customized, and unique can definitely be thought of as non-general. Similarly, the fact that *specialized output* is associated more with only some forms of manufacturing activities and product categories speaks to the specialized nature of the experience gained. Lastly, that the owner is more likely to have more industry experience further supports this paper’s contention that firms that sell *specialized output* have a lower context for moral hazard (vs. firms that sell non-specialized output), as workers are gaining less transferable non-general experience and training. In other words, firms are more able to capture and maintain their investments (training workers) in this case.

### 3.7 Controls

**Firm Age:** firm age was calculated based 2011 – year that enterprise began operations

**Total number of employees:** total labor for the past month, included temporary workers and owner; variable was transformed to a log variable due to skewness

**Borrowed funds in the past year:** dummy for borrowing money for business purposes

**Bank account:** dummy for the firm having a current and/or saving account

**Member of a trade or producer association:** dummy for being a member

**Average monthly profit (percentage):**  $(\text{revenue} - \text{expenses}) / \text{revenue}$ ; negative profits were set at 0

**Output produced per 8-hr shift (100 units):** to roughly account for output variation

**Raised in Coimbatore:** dummy for local versus migrant owners

**Prior salaried experience:** dummy for salaried experience

**Years with primary buyer:** # of years that firm has been selling to their current primary buyer

**Proportion of output bought by primary buyer:** proportion of total output sold to primary buyer

**Percentage of payments which are delayed:** percentage of delayed payments in the last year

**Units per shift:** log variable of units of product in 8-hr shift, as an industry control

**Districts:** multiple dummies for all the districts where we surveyed over 10 firms (industrial zones)

## 4. Empirical Results and Discussion

### 4.1 Main Results

Overall, the results do suggest that family relations are more likely to be leveraged by a firm in the face of higher moral hazard. However, it seems that other factors may be equally or more influential towards the likelihood by a firm to use/maintain family, especially in the case of external interfirm relationships.

Table 5 summarizes the logistic regressions used to test both our hypothesis. Table 6 relates the corresponding average partial effects of each variable. Columns (1)-(3) test our intrafirm hypothesis, so the dependent variable is internal family labor. Columns (4)-(6) relate to our interfirm hypothesis, so the dependent variable is having an external family buyer.

As seen in Table 5, we see that *specialized output* is statistically significant at the 5% level in predicting *family labor* within the firm in all three specifications. From column (1), this implies that the production of specialized output by a firm reduces  $\Pr(\text{internal labor})$  by 12.9 percent. The data shows that this drops to 10.7 percent with the inclusion of district and industry controls in column (2); furthermore, the significance level drops to a 10% level. With the inclusion of firm operation characteristics such as firm loans, being a part of a trade association, and firm profit, the coefficient on *specialized output* stays significant at -9.3 percent in column (3).

On the external side, if the firm owner *believes legal system is not effective*, they are 8.8 percent more likely (at a 10 percent significance level) to sell primarily to a family relation, as seen in column (4). However, column (5) and (6) are interesting because the inclusion of additional variables gives us a result where our independent variable regarding the legal system is no longer significant; furthermore, in specification (6) three of our other variables **are** significant and at nontrivial values. Most notably, firms where the owner had prior salaried experience are 19.6% less likely to sell to a family relative (significant to the 1% level). Intuitively it makes sense that those firm owners who have worked at other firms are quite likely to have spun off their into own businesses with the explicit intention and expectation of serving (supplying to) the original firm; thus in this case, such a firm owner would already have a close-knit relationship and not need to ‘rely’ on family to mitigate moral hazard. Also in column 6, it is also worth noting that we have included our independent variable from our internal model, *specialized output*, in our external model and have found it to be both very significant as well as substantial (above and beyond our tested variable of an ineffective legal system). From Table 4 we know that *specialized output* is associated with output of higher quality and customization; thus, it is likely that a higher level of trust is needed, which may come through a family buyer as opposed to a non-family buyer. Even though this is a different explanatory variable than was initially expected, such a result is in line with the external model hypothesis that family may be used as a substitute for formal contract enforcement.

This paper therefore shows that other variables also appear to significantly affect the likelihood of family relations employment by firms. These effects, as reflected in the data, confirm other empirical and theoretical work and/or make sense intuitively. More profitable firms are less likely to use family labor (a higher monthly profit of 1 percentage point decreases the probability of internal labor by 18.0 percent) – this is in line with the abovementioned research which associates family businesses with being less purely motivated by short-term profit than non-family businesses.

Though this is a bigger effect on internal family labor than *specialized output*, and is more statistically significant (5 percent level).

#### 4.2 Alternative Model Specifications (Robustness Checks)

The main results as summarized above do seem to generally confirm the use of family labor and buyers in the face of moral hazard (albeit, to different degrees), in line with our hypothesis. However, due to both the ‘fragility’ of regression coefficient estimates in empirical results generally and the relatively rich data set available, it was prudent to analyze several key alternative model specifications in the interest of examining the robustness of our findings. The findings in this section are consistent with our main results.

Table 7 illustrates four regressions further testing the intrafirm model on internal family labor. My core logit marginal effects model (Table 6) found the independent variable of *specialized output* to be significant and substantial through multiple specifications (containing various controls). In the first regression of Table 7, I keep the same logit marginal effects model but have included a different set of controls: *registered* to account for informality, *expenditures on assets* to proxy for capital use, and *buyer type/size*. In addition, I have included the independent variable from our external model, *legal system is ineffective*. The coefficient on *specialized output* remains significant and at -10.8% is very close to my previous findings.

Columns (2), (3), and (4) of Table 7 uses the level of family labor as the dependent variable and therefore uses Tobit estimation with the same set of covariates. Again, the results show statistically significant and negative coefficients on our independent variable of interest *specialized output* through multiple iterations. This shows that our use of a binary variable for family labor in our main model is not problematic. Furthermore, a Heckman two-stage model was run (Table 8) on the data. It was found that the explanatory variable of interest *specialized output* (as well as a few other variables) is significant on selection (i.e. whether a firm has family labor or not) but none were found to be significant on magnitude (i.e. actual number of family labor members). Thus, the original model seems to have stood up to robustness checks on both the choice of covariates as well as the use of a binary dependent variable and its corresponding econometric model.

The dependent variable in the original interfirm (external) model was also binary (i.e. family buyer or not). In Table 9, this study analyzes the hypothesis by using an ordered response logit model on the data. Thus, the dependent variable is no longer strictly a family buyer choice, but

ranges in terms of ‘closeness of relationship’ or ‘potential level of trust/sanctions.’ Specifically, the response to the question “What best describes how your relationship with your primary buyer was established?” is coded in the following highest-lowest order: geographical location, family/relative/friend relationship, employee connection, introduction by another firm, or none of the given choices. Therefore this specification still tests the theory of mitigation of moral hazard in terms of ineffective legal systems but does not specifically test family; instead, it tests varying levels of ‘closeness.’ To be sure, this cannot be considered a purely clean or natural order, but its implications are still interesting. Using the similar iterations of covariates, the ordered logit finds a positive and significant effect of *ineffective legal system* on a higher level of relationship.

## 5. Limitations

A clear limitation to this research is that it is unable to provide a clear causal relationship between moral hazard and the use of family by the firm. The difficulty lies in the endogenous nature of my chosen independent variable – the varying context of moral hazard, and specifically our chosen proxies of specialized vs. standardized output and whether or not the owner believes the legal system is effective in enforcing contracts. Firstly, from a static viewpoint, our model may have omitted variable bias. For example, as commonly noted in the firms literature, unobservable traits such as risk-taking or loyalty by the firm owner would be a confounding variable affecting both use of family as well as moral hazard.

Yet even if this research was able to consider its independent variables as exogenous within a certain time period, such variables are absolutely likely to be endogenous over time; thus, since I seek to draw conclusions based on a sample of firms at varying periods of their life cycle, I am further unable to evade endogeneity. In other words, it is probably close to impossible to be able to say that moral hazard definitively causes family relations usage because not only can I not be certain that a moral hazard context comes first, but additionally there can be simultaneity where both the dependent and independent variables constantly affect each other throughout time. Specific to this research, it is easily imaginable that a firm owner specifically decides to primarily make specialized output because he thinks it will minimize turnover of his non-family labor; subsequently, he could start to trust this non-family labor enough to then transition to standardized output.

Another limitation is that it is hard to make a conclusion regarding moral hazard because I am only able to test for specific moral hazard considerations that has been quasi-arbitrarily selected. It is possible that there are other moral hazard concerns that could speak to this research better – for example, stealing of materials or shirking by internal labor or being given an unfair price (i.e. being ripped off) by external buyers. Additionally there may be pre-emptive or retaliatory behaviors on the part of internal labor or external buyers that could confound the results based on moral hazard considerations towards the firm; for example, internal labor members may be worried about getting laid off and external buyers could be expecting delayed delivery of items.

These limitations speak to the difficulty of producing concrete causal conclusions regarding how firms deal with moral hazard. It is hard to imagine a feasible randomized control trial that could be implemented on firms, especially when the variable of interest is moral hazard. A natural experiment would probably be a little more likely – for example, if a certain district in the same city arbitrarily was going to have better contract enforcement (perhaps a government test scheme for a certain period of time where firm owners are able to write in complaints, and were notified ahead of time). Even in this case, a viable study probably would need panel data to make a better causal argument. The use of an instrumental variable is also difficult due to the time varying nature as mentioned above – it is very difficult to find a variable which is exogenous, affects moral hazard context, and takes place before all firm decisions are made.

## **6. Concluding Remarks**

The results found in this study suggest that small firms do leverage their family ties, both internally and externally, in the face of moral hazard considerations. Based on the use of non-specialized output and the belief of an ineffective legal system in contract enforcement as potential moral hazards, the findings support the idea that firms utilize family ties to mitigate moral hazard. However, the findings for internal family labor utilization seem to be stronger than the findings for external family buyer utilization. In addition, it seems that other factors are heavily influential in predicting internal and external family ties in business; specifically, the profitability of a firm (in line with the broader literature on family firms) and the experience level of the firm owner. In addition, the production of specialized output was a strong predictor for both internal and external family ties.

Such findings have implications both for the understanding of family firms as well as the understanding of moral hazard mitigation.

In terms of external validity, it may seem initially that this data is rather unique for its focus on small firms in one [manufacturing] sector as well as one city, and in the transitional backdrop of the post-1991 remnants of the rather heavy-handed Indian industrial and labor policies. Yet many developing cities find themselves to be not only be disproportionately high in small, manufacturing, and family businesses. In addition, they also often also find their business environment to be lacking strong formal enforcement and flexible labor markets. Thus, this research has much to offer, particularly when a majority of the research on firm dynamics is derived from data on larger firms across more heavily industrialized countries. More research should continue to be conducted on micro, small, and medium-sized firms as these are the firms that provide the majority of employment in developing countries.

Further research in the realm of moral hazard and family in the firm could look closer at both informal and formal mechanisms and their effectiveness. For example, it would be interesting to look at the potential efficacy of business associations or rating agencies. Additionally, it would be important analyze exactly which facet of a formal mechanism is most crucial in regions lacking such formality; for example, could it be the bureaucratic protracted nature of legal proceedings or a general belief of corruption of higher powers that underlies the notion of an ineffective legal system? In terms of intrafirm moral hazard, this research also suggests that it is important to better understand exactly what type of training and experience workers are gaining, and at what levels, for it is likely to translate heavily into the characteristics of firm labor.

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## Appendix

**Table 1: Summary Statistics**

<b>Firm Characteristics</b>	<b># of Obs.</b>	<b>Mean</b>	<b>Std Dev.</b>	<b>Min</b>	<b>Max</b>
Firm Age	396	12.05	8.72	1	47
Total number of employees, including owner	396	5.74	6.46	1	50
Borrowed funds in the past year	394	0.31	0.46	0	1
Member of a trade or producer association	395	0.40	0.49	0	1
Bank account	395	0.89	0.32	0	1
Average monthly profit (percentage)	391	0.35	0.27	0	1
Average monthly revenue (1000 Rs.)	391	225.65	708.42	2	7,500
Output produced per 8-hr shift (100 units)	378	7.09	49.08	0	640
Proportion of output bought by primary buyer	382	56.10	31.08	2	100
<b>Firm Owner Characteristics</b>					
Age	346	40.10	9.73	20	70
Education	393	5.44	1.20	1	8
Gender (is male)	387	0.97	0.17	0	1
From the city of Coimbatore	352	0.76	0.43	0	1
Salaried employee experience	369	0.82	0.38	0	1
Founded the firm	392	0.94	0.24	0	1
Has formal training	392	0.27	0.44	0	1
<b>Internal Model Key Variables</b>					
Dependent: Family Labor	396	0.27	0.44	0	1
Independent: Specialized Output	374	0.31	0.46	0	1
<b>External Model Key Variables</b>					
Dependent: Family as primary buyer	396	0.29	0.45	0	1
Independent: Believes legal system is not effective	396	0.36	0.48	0	1

**Table 2: Summary Statistics by Internal Moral Hazard**

Variables	Firms with specialized output <i>Lower moral hazard context</i> (n=115)		Firms with standard output <i>Higher moral hazard context</i> (n=259)	
	Mean	Std Dev.	Mean	Std Dev.
Family Labor	0.17	0.38	0.30	0.46
Firm Age	12.21	8.96	11.80	8.60
Total number of employees, including owner	6.07	6.67	5.37	6.27
Borrowed funds in the past year	0.32	0.47	0.29	0.45
Member of a trade or producer association	0.44	0.50	0.38	0.49
Bank account	0.91	0.28	0.89	0.32
Average monthly profit (percentage)	0.36	0.30	0.35	0.26
Average monthly revenue (1000 Rs.)	302.00	763.41	153.24	508.18
Output produced per 8-hr shift (100 units)	8.20	62.19	6.96	44.42

**Table 3: Summary Statistics by External Moral Hazard**

Variables	'Legal system is effective' <i>Lower moral hazard context</i> (n=253)		'Legal system is not effective' <i>Higher moral hazard context</i> (n=143)	
	Mean	Std Dev.	Mean	Std Dev.
Family as primary buyer	0.26	0.44	0.34	0.47
Firm Age	11.98	8.60	12.18	8.95
Borrowed funds in the past year	0.33	0.47	0.27	0.44
Member of a trade or producer association	0.43	0.50	0.34	0.48
Raised in Coimbatore	0.76	0.43	0.76	0.43
Salaried employee experience	0.79	0.41	0.88	0.33
Average monthly profit (percentage)	0.33	0.28	0.38	0.27
Average monthly revenue (1000 Rs.)	222.22	660.25	231.66	788.25
Years with primary buyer	7.19	5.41	7.43	6.58
Proportion of output bought by primary buyer	51.84	27.36	63.56	35.59
Percentage of payments which are delayed	12.91	22.55	10.84	19.20

**Table 4: Determinants of *Specialized Output***

	(1)	(2)	(3)	(4)
	<i>Dep. Variable: Specialized Output</i>			
Constant	-3.596*** (0.384)	-6.202*** (1.661)	-3.080*** (0.555)	-6.705*** (1.573)
<b>Product Differentiation</b>				
Higher Quality	6.487*** (1.098)	6.749*** (1.114)		7.838*** (1.602)
Customized and/or Made to Specs	7.770*** (1.079)	8.046*** (0.994)		8.453*** (2.053)
Unique to Client Only	4.849*** (0.889)	5.097*** (0.934)		5.380*** (1.002)
<b>Firm and Owner Characteristics</b>				
Firm Age		-0.036 (0.032)		-0.017 (0.045)
Industry Experience (Owner)		0.064** (-0.030)		0.064** (-0.027)
Education (Owner)		0.283 (-0.225)		0.288 (-0.204)
<b>End Products</b>				
Machine Parts			0.474 (0.414)	-1.746 (1.658)
Dies			1.348** (0.658)	-1.886 (1.827)
Motor Vehicle Parts			-0.162 (0.509)	-0.734 (1.949)
Screws, Nuts, or Bolts			0.588 (1.189)	-0.918 (1.483)
Pumps			0.846* (0.440)	0.024 (1.920)
<b>Manufacturing Activities</b>				
Milling			0.171 (0.312)	0.099 (0.695)
Drilling			0.491* (0.296)	-0.109 (0.764)
Turning			0.498 (0.309)	1.116* (0.659)
Grinding			1.306*** (0.276)	2.323** (1.026)
Tool and Die Works			0.943** (0.403)	0.761 (0.945)
<b>District and Industry Controls:</b>				
	No	Yes	Yes	Yes
# of Observations:	374	368	374	370
Pseudo R <sup>2</sup> :	0.800	0.819	0.187	0.837

**Table 5: Results - Logistic Regressions**

	(1)	(2)	(3)	(4)	(5)	(6)
	Internal			External		
<i>Dep. Variable:</i>	Family Labor	Family Labor	Family Labor	Family Buyer	Family Buyer	Family Buyer
Constant	-1.326*** (0.343)	-0.392 (0.497)	0.088 (0.561)	-0.979*** (0.325)	-1.304** (0.597)	-0.378 (0.696)
<b>Moral Hazard Variables:</b>						
Specialized output	-0.700** (0.300)	-0.630* (0.335)	-0.552* (0.337)			-0.952*** (0.343)
Believes legal system is 'ineffective'				0.449* (0.246)	0.221 (0.260)	-0.037 (0.294)
<b>Firm Characteristics:</b>						
Firm Age	-0.012 (0.016)	-0.008 (0.016)	-0.007 (0.017)	-0.013 (0.016)	-0.009 (0.017)	-0.062** (0.027)
Total # of employees, incl. owner	0.160 (0.130)	0.195 (0.144)	0.170 (0.154)	-0.111 (0.142)	0.032 (0.152)	0.104 (0.170)
Local owner	0.462 (0.320)	0.457 (0.342)	0.501 (0.344)	0.169 (0.288)	0.111 (0.300)	0.179 (0.318)
<b>Firm Operation Characteristics:</b>						
Borrowed funds in the past year			-0.298 (0.312)		-0.259 (0.296)	-0.113 (0.325)
Member of a trade or producer association			-0.2 (0.297)		-0.404 (0.283)	-0.171 (0.300)
Average monthly profit (percentage)			-1.067** (0.524)		0.863* (0.474)	0.746 (0.515)
<b>Interfirm Characteristics:</b>						
Prior external salaried experience						-1.100*** (0.372)
Years with primary buyer						0.039 (0.036)
Proportion of output bought by primary buyer						0.008 (0.005)
Percentage of payments which are delayed						0.001 (0.007)
<b>District and Industry Controls:</b>						
	No	Yes	Yes	No	Yes	Yes
# of Observations:	339	337	334	352	344	310
Pseudo R <sup>2</sup> :	0.025	0.083	0.100	0.013	0.053	0.108

Statistically significant at the 10 (\*), 5 (\*\*), and 1 (\*\*\*) level; Robust SEs in parantheses

**Table 6: Results - Logistic Regressions (Marginal Effects)**

	(1)	(2)	(3)	(4)	(5)	(6)
	Internal			External		
<i>Dep. Variable:</i>	Family Labor	Family Labor	Family Labor	Family Buyer	Family Buyer	Family Buyer
<b>Moral Hazard Variables:</b>						
Specialized output	-0.129**	-0.107*	-0.093*			-0.169***
	(0.054)	(0.056)	(0.056)			(0.059)
Believes legal system is 'ineffective'				0.088*	0.042	-0.007
				(0.047)	(0.049)	(0.052)
<b>Firm Characteristics:</b>						
Firm Age	-0.002	-0.001	-0.001	-0.003	-0.002	-0.011**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)
Total # of employees, incl. owner	0.030	0.033	0.029	-0.022	0.006	0.019
	(0.024)	(0.024)	(0.026)	(0.028)	(0.029)	(0.030)
Local owner	0.085	0.078	0.085	0.033	0.021	0.032
	(0.058)	(0.058)	(0.058)	(0.056)	(0.057)	(0.057)
<b>Firm Operation Characteristics:</b>						
Borrowed funds in the past year			-0.050		-0.049	-0.02
			(0.053)		(0.056)	(0.058)
Member of a trade or producer association			-0.034		-0.077	-0.031
			(0.050)		(0.053)	(0.053)
Average monthly profit (percentage)			-0.180**		0.164*	0.133
			(0.087)		(0.088)	(0.090)
<b>Interfirm Characteristics:</b>						
Prior external salaried experience						-0.196***
						(0.063)
Years with primary buyer						0.007
						(0.006)
Proportion of output bought by primary buyer						0.001*
						(0.001)
Percentage of payments which are delayed						0.000
						(0.001)
<b>District and Industry Controls:</b>						
	No	Yes	Yes	No	Yes	Yes
# of Observations:	339	337	334	352	344	310

Statistically significant at the 10 (\*), 5 (\*\*), and 1 (\*\*\*) level; Robust SEs in parantheses

**Table 7: Alternate Specifications - Internal Model (Marginal Effects)**

	(1)	(2)	(3)	(4)
<i>Econometric Model:</i>	Logit	Tobit	Tobit	Tobit
<i>Dep. Variable:</i>	Family Labor	Family Labor #	Family Labor #	Family Labor #
<b>Moral Hazard Variables:</b>				
Specialized output	-0.108** (0.054)	-1.085** (0.491)	-0.955** (0.487)	-0.934* (0.487)
Believes legal system is 'ineffective'	0.045 (0.049)			0.549 (0.468)
<b>Firm Characteristics:</b>				
Firm Age	0.000 (0.003)	-0.008 (0.023)	-0.004 (0.024)	-0.002 (0.023)
Total # of employees, incl. owner	0.012 (0.029)	0.554** (0.249)	0.504* (0.275)	0.337 (0.279)
Registered	0.028 (0.062)			0.257 (0.542)
Borrowed funds in the past year	-0.106** (0.052)		-0.718 (0.487)	-0.646 (0.482)
Monthly expenditures (assets)	0.000 (0.000)		0.000 (0.000)	0.000 (0.000)
Average monthly profit (percentage)	-0.190** (0.081)		-1.820** (0.770)	-1.922** (0.794)
<b>Buyer Characteristics:</b>				
Type of Buyer	-0.044* (0.024)			-0.379* (0.222)
Size of Buyer	0.070* (0.039)			0.448** (0.191)
<b>District and Industry Controls:</b>				
	Yes	Yes	Yes	Yes
# of Observations:	365	371	367	365

Statistically significant at the 10 (\*), 5 (\*\*), and 1 (\*\*\*) level; Robust SEs in parantheses

**Table 8: Alternate Specifications - Internal Model (Heckman Selection)**

	(1)	(2)	(3)
<i>Dep. Variable:</i>	Family Labor #	Family Labor #	Family Labor #
<b>Moral Hazard Variable:</b>			
Specialized output	-0.398** (0.169)	-0.398** (0.169)	-0.383** (0.178)
<b>Firm Characteristics:</b>			
Firm Age	-0.003 (0.009)	-0.003 (0.009)	-0.001 (0.009)
Total # of employees, incl. owner	0.114 (0.088)	0.114 (0.088)	0.059 (0.105)
Registered			0.066 (0.200)
Borrowed funds in the past year			-0.359** (0.178)
Monthly expenditures (assets)			0.000 (0.000)
Average monthly profit (percentage)			-0.609** (0.293)
<b>Buyer Characteristics:</b>			
Type of Buyer			-0.131 (0.083)
Size of Buyer			0.246 (0.153)
<b>District and Industry Controls:</b>			
	Yes	Yes	Yes
# of Observations:	365	367	365

Statistically significant at the 10 (\*), 5 (\*\*), and 1 (\*\*\*) level; Robust SEs in parentheses

Note: This study performed the Heckman two-stage method on the data. The above table summarizes the obtained coefficients from probit regressions on selection (having family labor) in line with the three Tobit regressions from Table 7. All the obtained coefficients on level of family labor (via OLS) were found to be not statistically significant in any of the three iterations, thus the results are not shown.

**Table 9: Alternative Specifications - Ordered Logit (Marginal Effects)**

	(1)	(2)	(3)
	<i>Dep. Variable: Relationship Type</i>		
<b>Moral Hazard Variables:</b>			
Specialized output			0.126** (0.051)
Believes legal system is 'ineffective'	0.0917** (0.043)	0.113** (0.044)	0.142*** (0.043)
<b>Firm Characteristics:</b>			
Firm Age	0.001 (0.002)	0.001 (0.002)	0.006** (0.002)
Total # of employees, incl. owner	0.019 (0.023)	-0.006 (0.027)	0.002 (0.026)
<b>Firm Operation Characteristics:</b>			
Borrowed funds in the past year		0.055 (0.048)	0.022 (0.047)
Member of a trade or producer association		0.004 (0.039)	-0.015 (0.038)
Average monthly profit (percentage)		-0.165** (0.076)	-0.0891 (0.076)
<b>Interfirm Characteristics:</b>			
Prior external salaried experience			0.093 (0.062)
Years with primary buyer			-0.004 (0.004)
Proportion of output bought by primary buyer			0.000 (0.001)
Percentage of payments which are delayed			-0.001 (0.001)
<b>District and Industry Controls:</b>			
	No	Yes	Yes
# of Observations:	304	296	261
Pseudo R <sup>2</sup> :	0.008	0.021	0.045

Statistically significant at the 10 (\*), 5 (\*\*), and 1 (\*\*\*) level; Robust SEs in parantheses