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Family Labor, Enforcement, and Product Quality: Evidence from the Lao textile industry*

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Abstract

In developing economies where business owners suffer from agency problems with workers, kinship may serve as an enforcement device for producing high-quality products. Using unique data collected from handwoven textile micro-enterprises in Lao PDR, we examine the effect of family workforce size-the number of the owner's relatives who can work for the business-on business performance. For identification, we exploit an exogenous variation in the gender composition of the owner's relatives, which determines family workforce size. We confirm that a larger family workforce significantly increases the share of family workers in the business, positively affecting labor productivity and value-added per product. As a potential channel, having a larger family workforce seems to enable owners to produce high-price products that they design by themselves rather than low-price products with standard designs, owing to strong trust between family workers and owners. This supports the hypothesis that working with family labor helps owners overcome design infringements. We also obtained suggestive experimental evidence that owners who design products by themselves have a lower labor demand for external workers.

Keywords: Family labor, Quality, Productivity, Agency problems, Trust, Micro-enterprises
JEL classification: D22, J2, O12

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1 Introduction

One of the most notable features of micro-enterprises in developing economies is the significant number of business owners collaborating with their family members. Family worker share in total employment is much higher in developing countries with 24% in low-income countries and 10% in high-income countries (International Labour Organization, 2019). The prevalence of family labor in developing countries may be attributed to the weakness of institutions, where working with external workers becomes costly because of various agency problems. For instance, when producing high-quality products requires innovative ideas or valuable resources, business owners are exposed to the risk that their employees may misappropriate them for their personal benefit. It has been well-documented that, in an environment with imperfect contract enforcement, trading parties often rely on their long-term informal relationship based on reputation and social networks to prevent agents' opportunistic behaviors (Greif, 1993; Aoki and Hayami, 2001; Fafchamps, 2010; Macchiavello and Morjaria, 2015; Chandrasekhar et al., 2018). Even within firms, the relationship between employers and workers plays a crucial role in business performance, serving to prevent opportunistic behaviors among the workforce as explored in the fields of organizational and personnel economics (Williamson, 2002; Lazear and Shaw, 2007; Caria and Falco, forthcoming).

In this study, we empirically and experimentally examine the role of the most primitive and potentially the strongest form of social ties, kinship networks, as a source of labor for micro-enterprise performance. Family and relatives have been the core of social and economic structures in many societies (Moscona et al., 2017). Working with family members may allow small business owners to produce high-quality innovative products, possibly through long-term reciprocal relationships and informal profit sharing. By contrast, working with family members may have drawbacks, such as a limited pool of highly skilled labor, potentially hindering opportunities for quality enhancements.

Our study setting is the handwoven industry in Lao PDR, in which agency problems appear to be prevalent mainly in the forms of 1) appropriation of innovative designs, 2) moral hazard issues in product quality, and 3) material embezzlement. Three main anal-

yses are undertaken based on our own survey combined with field experiments. First, we examine the effect of family workforce size, defined as the number of the owner's family members and relatives having weaving skills, on business performance. The Lao handwoven industry offers a suitable setting to investigate the causal effect. The industry's producers are predominantly women since only girls traditionally receive weaving training within most households. Therefore, an owner's family workforce is strongly determined by the number of women among their family and relatives. Based on this feature, we use the proportion of females among the owner's family members and relatives, arguably randomly assigned by nature, as an instrumental variable. We first confirm that owners with more women than men amongst their relatives employ more family and relatives as the share of workers. We then show that these businesses with larger family workforces have larger sales and value-added. We find that this is not because they employ more workers, but because workers in such businesses produce high-quality products that can be sold at higher prices at markets.

One potential explanation is that family is an essential source of workforce for business owners in overcoming agency problems. In particular, we find that owners with a larger family workforce are more likely to produce high-price products that they design by themselves rather than low-price standard designs. In addition, the effect of family workforce size on product quality (price) is positive and large only among owners designing their own products but not for the other owners. This evidence supports the hypothesis that working with family labor helps owners overcome design infringement. In addition, we find evidence supporting that family workers communicate with the owner during production relatively more than non-family workers. This is possibly because of their stronger connections, which may improve quality through better production monitoring within the workplace. On the possibility of overcoming material embezzlement, we only find a statistically insignificant effect of a larger family workforce on the quality of material used.

We also explored other potential channels and confirmed that our empirical results are inconsistent with them. First, we examine whether the results are driven by the differences between family and non-family workers in work locations (whether working at the owner's house), experiences and skills, and product complexity. Second, we do not find that owners with a larger family workforce obtain more business support from their family and relatives,

such as introducing customers and workers, lending money, or sharing designs.

For the second analysis, we investigate the role of trust between owners and workers in mitigating agency problems, corresponding to the findings in the first analysis. Specifically, we conducted incentivized trust games between business owners and their workers and measured trustworthiness and trust between them. We find that kinship emerges as a strong predictor of trustworthiness, whereas the duration of the work relationship does not correlate with increased trustworthiness. Long-term reciprocal relationships and informally shared profit (through shared income and gift exchange) between owners and family workers can be channels for higher trustworthiness that can resolve agency problems.

In the third analysis, we explore how the agency problem affects labor demand for external workers. We conducted a small-scale field experiment by introducing weavers looking for jobs to business owners looking for workers. Although this experiment facilitated some job contacts among owners and introduced workers, it resulted in only a very few successful hires. This result suggests that providing information about external workers does not encourage owners to hire them. Intriguingly, owners who design products by themselves were less likely to contact an introduced worker than owners who used standard designs. This result is consistent with the main finding on the importance of trustworthy family workers in avoiding design infringement.

We believe that our study contributes to several strands of literature. The first is the literature linking trust and informal relationships between employers and workers to firm performance.[1] Based on a field experiment in Ghana, Caria and Falco (forthcoming) find that employers tend to have overly pessimistic expectations about the trustworthiness of workers, leading to lower employment and profit loss. In addition, Bloom et al. (2013) and Cingano and Pinotti (2016) suggest that higher trust within a firm allows more decision-making delegation, which can, in turn, improve productivity, resulting in larger firm size.[2]

[1]More generally, this study is also related to the extensive literature focusing on the role of long-term informal relationships between trading parties in enforcing cooperation, referred to as relational contract (see Macchiavello (2022) for a review). These studies prove that, even in environments where formal contracts are not enforceable, long-term relationships between firms based on reputation and social networks can prevent agents' opportunistic behaviors.

[2]Related to this literature, there are studies exploring how relationships among workers in a workplace affect productivity. Ashraf and Bandiera (2018) document that workplace relationships of individuals matter for workers' behaviors and productivity. In a Kenyan flower-picking firm, Hjort (2014) finds that ethnic

We contribute empirical evidence that employing trustworthy family workers improves productivity, possibly by preventing workers' opportunistic behavior.

This study is also related to recent studies examining labor market frictions in developing countries.[3] De Mel et al. (2010, 2019) examine the effect of short-term wage subsidies to randomly chosen microenterprise owners in Sri Lanka, finding that some of the eligible owners hired a worker, mainly through personal connections, but the effect did not last after the end of the subsidy period. By contrast, Hardy and McCasland (2023) introduced randomly chosen apprentices to small firms in Ghana, which resulted in increased employment and profit among the treated firms.

Lastly, this study is connected to the empirical studies that investigate the causes and consequences of "family firms" that are owned and controlled by a family (Bertrand and Schoar, 2006; Bennedsen et al., 2007; Scur, 2018). Using gender preference for CEOs, Bennedsen et al. (2007) use the gender of a CEO's firstborn child as an instrumental variable for family succession, finding that family succession has a large negative causal effect on firm performance. We use a similar identification strategy as these previous studies and employ the gender composition of owners' families as an exogenous variation to examine the causal effects of family workforce.[4]

The rest of the paper proceeds as follows. Section 2 explains our study setting and survey, followed by Section 3, which describes the empirical strategy to examine the size effect of the family workforce on business performance, together with the baseline empirical results. Section 4 explores possible channels. In section 5, we explain the results of trust games, followed by the results of our experiment of matching weavers in section 6. Section 7 provides concluding remarks.

heterogeneity among upstream and downstream workers lowers productivity.

[3]Another line of related literature examines agricultural households' decisions on labor supply of family members and hiring of non-family workers (e.g., Bardhan, 1973; Rosenzweig, 1980; Benjamin, 1992). Our empirical design is close to that of Benjamin (1992), who examines the relationships between household demographic composition and labor demand (employment) of agricultural households to test the separability of consumption and production.

[4]Note that all the firms in our study sample are "family firms" in the above definition.

2 Data and setting

2.1 Survey

We surveyed business owners of the handwoven silk textile industry in the Xaythany district, a suburban area of Vientiane, the capital of Lao PDR. The industry produces a traditional Lao textile called *Sinh*, which is mainly used as local women's skirts and scarves. The products are mostly sold in local markets for both daily use and special occasions like weddings. Designs of the patterns vary across producers and over time. The design trends change quickly over years and seasons and are considered to be an important determinant of prices.

In our study area, producers in this industry are classified into two types by ownership of the material. Some producers purchase material yarn at wholesale markets or from traders. We call them *business owners* or simply *owners*. Owners usually weave themselves and also provide material to other producers (*weavers* hereafter) and pay for the final products by piece rate. Some weavers work at the owner's house, whereas others take the material to their own houses and return the final products to the owners. The latter case is a typical example of putting-out, an outsourcing system observed in a variety of historical and modern contexts (in the United Kingdom, Pollard, 1964; in India, Kranton and Swamy, 2008; in Japan, Nakabayashi, 2016; and in China, Ruan and Zhang, 2009). The putting-out system allows owners to work with weavers living in other villages. However, this system is relatively minor in our setting: the average share of "putting-out" weavers per owner is approximately 18% in our data.

We conducted our surveys and experiments in the following manner. First, we made phone calls to all village offices in the district to obtain information about the number of households engaged in hand-weaving *Sinh* in each village. Accordingly, we identified 21 villages where we found relatively large numbers of hand-weaving households.

Second, in each village, we went door-to-door to survey all textile business owners. Because of the limited administrative capacities, the survey covered 21 villages in two waves: 308 textile business owners in 12 villages were surveyed from July to September 2016, and an additional 200 owners in 9 other villages were surveyed in October 2017. As for the respondents in the 12 villages surveyed for the first time in 2016, we conducted a follow-up

survey in February and March 2017, receiving interviews from 227 owners.[5]

Third, we conducted two lab-in-the-field experiments, trust game and labor matching experiments. The former was implemented in January 2018 with the owners residing in the three villages we surveyed in 2016. We conducted the labor matching experiment over the period from October 2016 until January-February 2018. For this experiment, we also conducted a survey of weavers in 9 villages in 2016. A summary of the timeline and sampling of surveys and experiments is presented in Appendix Figure A.1.

All the interviews and experiments were conducted face-to-face in the local language. The survey was conducted in collaboration with the National University of Laos, with which most locals are familiar. In the surveys, we collected detailed information on products that the owner sold in the preceding seven days. This information includes revenue, material costs, payment to the weavers, and number of production pieces[6] by product design.[7] We also asked about the characteristics of weavers, including the number of weavers who are the owner's family members or relatives and the number of putting-out weavers who weave separately at their own houses.

The survey also gathered detailed information about each owner's family composition. In particular, we asked about the size of the first-degree relatives, that is, the number of the owner's siblings, her spouse's siblings, and children above 15 years old by gender. In addition, we asked how many of them could weave *Sinh*, which is the measure of the potential number of family workforce in this study. From the information on family composition, we define *female share of the owner's relatives* as the fraction of women among the owner's first-degree relatives.

Table A.1 in the Appendix shows the other basic statistics of the survey sample. Owners

[5]We conducted a follow-up survey in 2017 of a subset of villages because we conducted a labor matching experiment only with this group of owners. See section 6 for this experiment. In the 2017 follow-up survey, we are missing responses from 27% of the owners because of 1) non-response to our phone calls (16%), 2) switching to a weaver (6%), 3) stopping production (4%), and other reasons including refusals (1%). We provide a robustness check against possible selection biases because of this attrition.

[6]We asked about the number of production pieces in the last seven days instead of the number of pieces sold because some of the owners had sold a large number of products collected and stocked for more than one month.

[7]We collected the same information in both the 2016 and 2017 surveys except for a few modifications: 1) information on the share of self-designed products was collected only in the 2017 surveys, and 2) information on the number of days for producing a piece was not collected in the 2017 follow-up survey.

have, on average, 1.9 weavers, and approximately one-third of these weavers are relatives of the owner. This is comparable to overall statistics covering all industries; the average share of family workers in employees is 25% in Lao PDR (2019, International Labor Organization).[8]

2.2 Agency problems

It is worth noting that people in our study area consist mostly of migrants from other villages: according to our survey data, 91% of textile business owners in the area had migrated from other districts. This suburban setting may explain the overall low trust level in the area. For instance, our survey asked a modified version of the General Social Survey (GSS) type question, "Generally speaking, would you say that most people in other villages in this district can be trusted or you can't be too careful in dealing with people?"[9] Only 7% of the owners answered "can be trusted", and the others answered "can't be too careful dealing with these people."

Through our field interviews and review of previous regional studies, we find three specific types of agency problems between owners and weavers in the industry. First, weavers may steal product designs. Product designs change frequently within a year and are critical determinants of demand and market price in the industry. Not all of the owners in our sample create their own designs: only 27% of the owners in our sample design some of their products themselves. When owners create product designs, they often design based on unique antiques that they own. Others use common designs prevailing in the markets or designs requested by wholesalers.[10] According to our survey data in 2017 collected at the product level, market prices are on average 15% higher for products that are designed by the owner, after controlling for material and labor costs, product type, village fixed effects, and whether it was produced under the putting-out system (see Table A.2 in the Appendix for

[8]There is a large variation in business size across owners. This is because there are a few owners who employ many putting-out weavers working outside of their house.

[9]This question follows a more general question in GSS asking "Generally speaking, would you say that most people can be trusted or you can't be too careful in dealing with people?", on which around one-third of respondents answer "can be trusted" around the world. (Glaeser et al., 2000) show that the GSS measures of trusts are correlated with experimental measures from trust games. We also confirmed that the answers to the following questions are highly correlated with our trust game measure based on the sample of weavers. See Appendix Table A.9.

[10]We do not have explicit information to distinguish these two cases.

the results). This implies that these self-designed products will likely exhibit more innovative designs that are valued highly in the market.

Under this setting, design infringement is a critical issue in this industry. Ohno (2017) provides specific cases in which weavers imitated a design created by an owner and produced and sold it by themselves without permission from the owner. This narrative is consistent with our field observations, which show that 64% of self-designing owners explicitly tell workers not to share designs with others. In addition, shops at wholesale markets often do not allow customers to take pictures. It also appears easy for a weaver to become an owner: approximately 10% of weavers we surveyed in 2016 had become owners within seven months.

The second problem is the embezzlement of material by weavers. A common drawback of the putting-out system is that it allows weavers to steal material and arbitrarily reuse it to produce their own goods. Textile owners seem to be aware of this problem. According to our survey data, 93% of owners who employed putting-out weavers stated that they measured and checked the amount of material provided for every piece. Even so, nearly 40% of owners experienced cases in which a putting-out weaver requested more material than they expected.

Lastly, there is potentially the standard moral hazard problem regarding the unobserved effort of weavers in producing high-quality products. The product quality of final goods is jointly determined by various factors including those that owners do not directly observe. For example, when we asked owners about possible reasons for poor-quality products, they cited a lack of skill or experience, time, effort, and health problems. Although the owners pay piece rates, these rates do not always reflect the item's quality. According to our survey, approximately 30–40% of owners experienced cases in which quality was worse than expected during the preceding 12 months. Yet, among these owners, nearly 40% did not reduce the piece-rate payment. A possible explanation for this seemingly puzzling behavior is risk sharing between owners and weavers against shocks to weavers' production.[11]

[11]Such relational contracts are observed as a mechanism that shields workers from various risks (Nakabayashi, 2016).

3 Business performance and family weavers

3.1 Empirical specification

Our main goal is to examine the effect of family workforce size on business performance. In particular, we are interested in evaluating the following causal relationship between family workforce and business performance.

$$Y_i = \beta \ \ln(\text{Family workforce}_i) + \theta X_i + \epsilon_i \tag{1}$$

where Y_i is the business performance of owner i, captured by log values of revenue, productivity, or average product price. The main independent variable, $\ln(\text{Family workforce}_i)$, is the log of the number of persons who can weave among owner i's family and relatives, defined by her siblings, her spouse's siblings, and children above 15 years old. X_i is a set of control variables. If we estimate this equation by OLS, various potential endogeneity problems may introduce biases in either direction. For instance, owners of underperforming businesses may opt for a small business scale employing only family members.[12] Such owners may choose to train their children or relatives to assist their business, in which case, the OLS estimate is likely to be negatively biased. Alternatively, families that traditionally possess valuable antique designs or high skills, contributing to better outcomes, may be more inclined to train additional family members to become weavers. Furthermore, unobserved factors related to households' assets and credit constraints may be correlated with the family workforce's size and business performance. These factors may lead to positive biases in the OLS estimates.

To tackle these potential endogenous biases, we employ an instrumental variable (IV) approach. Considering that weavers in the Lao textile industry are predominantly women and, in the Lao tradition, weaving skills are transferred from mothers to daughters,[13] the number of the female family members will be a suitable IV. Indeed, in our data, 99% of weavers, including both owners and weavers, are female. Therefore, we use the proportion of

[12]For owners without experience in hiring external workers, there could be a fixed cost to newly hire an external worker.

[13]Another reason could be that the features of flexible production styles, such as production at home and using piece rates, may be suitable for women.

women among the owner's family members and relatives, which is arguably beyond human control, as an exogenous variation determining the size of the owner's family workforce. This identification strategy exploiting exogenous variations in birth is in line with previous studies evaluating the effects of family ownership of firms on the firms' performance using the gender of the first child (Bennedsen et al., 2007) and the effect of the birth of a boy relative to the birth of a girl (i.e., the "gender shock") on household decisions (Rose, 2000).

More concretely, the first stage equation in our IV estimation can be written as follows:

$$\begin{aligned} &\ln(\text{Family workforce}_i) \\ =&\alpha \ln(\text{No. of females in family \& relatives}_i) + u_i \\ =&\alpha \ln(\text{Female share in family \& relatives}_i) + \alpha \ln(\text{No. of family \& relatives}_i) + u_i. \end{aligned} \tag{2}$$

The share of women among family and relatives is considered to be fairly exogenously determined by biological factors, although we still need to consider a few issues. One potential problem is that female share could be endogenously determined through fertility choice or selective abortion. However, this is unlikely to be a serious concern in our setting because selective abortion is apparently highly uncommon in the region.[14] Indeed, the gender ratio is consistent with the biological ratio and is well-balanced: the percentage of women in the population of Vientiane was 50.45% in 2017 (Lao Statistics Bureau 2018). Another potential concern is the sample selection bias of becoming a textile owner based on the proportion of women among relatives. However, this is also unlikely an issue here because the average share of female relatives in our sample of textile owners, which is 52.19% with a standard deviation of 15.08%, is only slightly higher than the population average in Vientiane.

Using our sample of business owners, we confirm that the share of female relatives is not systematically correlated with various observed demographic characteristics of the owners including family size, number of children and siblings, and owner's age and education as shown in columns (1)–(5) of Table 1.[15] In particular, if some families had attempted to

[14]In addition, the Lao Penal Code of 2017 explicitly specifies that any person performing an unlawful abortion, that is, an abortion not authorized by a medical doctor's commission, shall be sentenced to imprisonment and a large amount of fine. This penal code disincentivizes selective abortions.

[15]In these regressions, we pool all observations of owners in the 21 villages, among which 12 villages were surveyed twice and the other villages were only surveyed once. We choose this specification for reducing measurement errors for equations of our main interests, such as revenues and productivity, and we follow the

adjust the female share through their fertility decisions because of a preference for male or female children, the female share should be correlated with the number of children. However, we confirm that the correlation between the proportion of women in a family and family size is small and insignificant. In addition, the proportion of women is not correlated with whether the owner was born outside Vientiane or the owner's general trust in neighbors and the people in the district (columns (6)–(8) of Table 1). Thus, it would be reasonable to conclude that it is unlikely that some families have attempted to adjust the female share to secure a trustworthy workforce.

In columns (9)-(10) of Table 1, we report the estimated results of the first stage IV equation. As predicted, the proportion of women among family and relatives strongly positively affects the size of the family workforce or the number of persons who can weave among the owner's family and relatives (F statistics=26). The result remains the same qualitatively even after controlling for the owner's demographic characteristics: number of relatives, age, age squared, completion of secondary education, and a survey year dummy for 2017.

3.2 Baseline results

In Table 2, we estimate equation (1) for business size and labor productivity by using female share in relatives as our instrumental variable. These variables are measured twice for owners in nine villages because of a resurvey. To reduce the effects of measurement errors, we include the resurvey data and weight the samples in the villages that were surveyed only once by two. Standard errors are clustered at the level of owners. Panel A shows the 2SLS estimates for sales, value added (defined by revenue less material costs), and the number of workers (including owners themselves), all in logarithms.[16] For sales and value-added, the estimated coefficients of the family workforce are positive, significant, and large. For example, the

same specification to conduct this balancing test. To reduce possible sampling biases, we weight the sample by the inverse of the number of times that the owner is observed. Standard errors are clustered at the level of owners. Running similar regressions after taking averages within owners or limiting the sample to the baseline surveys produces a similar result, as shown in the robustness check section.

[16]In five observations of owners, the owners report no production in the preceding week, while they produced some amount in other weeks. We treat the log values of sales, quantity, and value-added as 0 for these observations in our main specifications, although excluding these observations does not change the qualitative result. We exclude these observations in the analysis of price, material price per piece, and value-added per piece.

estimates suggest that having a larger family workforce by 1 percent positively affects sales and value-added by 0.8 percent on average. The estimates change only slightly after adding demographic control variables.

The coefficient of the family workforce for the number of workers is positive but statistically insignificant. This may be potentially because of other capacity constraints, such as cash constraints to purchase material or space constraints for production. Indeed, during our field interviews, cash and capacity constraints often came up as reasons for not expanding the business. In any case, this suggests that the higher sales and value-added of owners with a larger family workforce cannot be explained by the larger number of workers that the owner can hire.

In Panel B of Table 2, we examine the effects of a larger family workforce on value-added-based labor productivity (measured by the log of value added per workers) and quantity-based labor productivity (measured by the log of the number of products per worker).[17] The coefficients of the family workforce are positive and significant for value-added-based labor productivity. The coefficients imply that having a larger family workforce by 1 percent positively affects value-added-based labor productivity by 0.6 percent. However, the family workforce has only a small and insignificant effect on quantity-based labor productivity. This result suggests that product quality is an important channel explaining the results on sales and value-added.

Panel C of Table 2 shows the effects on product quality. In columns (1)–(2), we use average product price, defined by total sales divided by total production pieces. The results indicate that having a larger family workforce leads to higher average prices.We further decompose the average product price to the average material price per piece and value-added per product, and examine the effect on each. The results in columns (3)–(6) show that all coefficients are positive, but significant only for value added per piece. These results suggest that owners with a large family workforce earn more by producing products with a higher-value added.

[17]Here, we count the owner as a worker if she/he also produces.

3.3 Robustness checks

We confirm that the results indicated in the section above are robust to several alternative specifications. First, in our baseline specification, we define the owner's relatives as her siblings, her spouse's siblings, and children. Both female share in relatives and family workforce are measured based on this definition. One possible concern is that marriage partners might be endogenously determined by potential or pre-existing production networks, in which case, the inclusion of the spouse's siblings in the definition of relatives may bias the results. Another related concern is that owners who are eager to work with their family members may keep trying to give birth until a girl is born, in which case, the inclusion of children may bias the results.

To examine the significance of these concerns, we exclude each category of relatives mentioned above from the definition of relatives in Table A.3 in the Appendix. Specifically, in both female share and family workforce measures, Panel A of the table excludes spouse's siblings, and Panel B excludes children. We find that, although some of the coefficients become insignificant, partly because of larger standard errors, the magnitudes are similar to the baseline results.

Second, to further examine the robustness of the main specification, we include additional control variables possibly related to the owner's willingness to work with family members. These variables are the number of the owner's children, years of doing business, the owner's general trust in people in the district, the owner's general trust in neighbors, and an indicator that the owner was born outside Vientiane. Panel A of Table A.4 in the Appendix shows that the results are qualitatively unchanged after controlling for these variables.

Third, in the baseline specification, we pool all observations of owners in the 21 villages, among which 12 villages were surveyed twice and the other villages were surveyed once, and weight the sample by the inverse of the number of times that the owner is observed. Even though we cluster standard errors at the level of owners, this specification may potentially inflate the sample size. Another potential concern is the sample attrition issue arising from non-responses by some owners in the follow-up survey. Regarding these concerns, we show that running similar regressions after taking averages of variables within owners produces

a similar result (see Panel B of Table A.4 in the Appendix). Furthermore, using only the data of the initial survey round for each owner gives a similar result (as shown in Panel C of Table A.4).

Fourth, to check the robustness against the weak instrument problem, we followed Andrews et al. (2007), adjusting for the critical values so that the tests are asymptotically valid even when the instruments are weak. According to the limited information maximum likelihood estimate of Andrews et al. (2007), the coefficient of the log of the family workforce for the log of value added per worker is 0.67 and statistically significant with a p-value of 0.0145, based on the conditional likelihood ratio method.[18]

Fifth, while we use the log of female share as an instrument following the implication of equation (2), alternatively using female share without taking the log provides similar results (see Panel D of Table A.4 in the Appendix).

Lastly, we also estimate the equation by OLS in Table A.5 in the Appendix. Similarly to the IV estimates, the coefficients are positive and statistically significant. The magnitudes are smaller than the IV estimates, possibly because of negative biases in the OLS estimates.

4 Possible channels

4.1 Labor vs. other channels

Which channels explain these observed patterns? First, a natural conjecture is that having a larger family workforce allows owners to work with their family members. Consistent with this prediction, column (1) in Table 3 shows that having a larger family workforce increases the share of family and relatives among producers in the owner's business.

Another possible channel is that the female relatives of the owners support the owners in ways other than providing labor, such as lending money or providing information. However, we find that having a larger family workforce does not necessarily help ease cash constraints. For the dependent variable in column (2), we use an indicator that takes one if the owner purchases material on credit at the wholesale market, which implies that the owner is likely

[18]In this estimation, we use only the data of the initial survey round for each owner (as in Panel C of Table A.4) since the method of Andrews et al. (2007) does not allow weights and clustering standard errors.

to be cash-constrained. We find the estimated coefficient is statistically insignificant.

More broadly, to test the possibility that female relatives help each other, we use the following specific survey questions in the 2018 survey wave that targeted textile business owners in the three villages surveyed in the 2016 survey wave: We asked the owners whether anyone (including their relatives) had ever helped their business by introducing weavers, customers, lending money, or sharing design. We do not find that the female share in relatives significantly or systematically predicts a higher likelihood of these kinds of assistance from others (the results are shown in Table A.6 in the Appendix).

4.2 Why family workers improve product quality

Having established that family workforce affects quality through providing labor, not through other channels, we explore several possible channels through which working with family workers improves product quality.

Agency problem 1: Design infringement

One potential benefit of working with family workers is the facilitation of investment in product innovations because they have less fear of their ideas being stolen. Consistent with this prediction, as shown in column (3) of Table 3, we find that having a larger family workforce increases the share of products designed by the owner, which can be viewed as an extensive margin effect in product innovation.[19]

To investigate the intensive margin of this channel, we divide the sample of owners by whether the owner designs any products or not. In Table 4, we employ the same regressions specifications as in Table 2 Panel C for each subsample, finding that family workforce size affects product prices only for owners making their own product designs, but not for other owners, who typically use standard designs found in the markets. This result suggests that a possible mechanism through which a large family workforce affects product prices is the owner's investment in making innovative designs.

[19]This variable's sample size is smaller because this question was asked only once for each owner.

Agency problem 2: Production monitoring

As discussed in section 2.2, the owners in this industry are likely to face a standard moral hazard problem regarding weavers' unobserved effort in producing high-quality products. Monitoring quality during production may be effective for mitigating this problem, and the extent of monitoring can differ depending on whether workers are family or not. We consider two dimensions of monitoring intensity: across workplaces and within workplaces.

First, if family workers are more likely to work at the owners' house (rather than at their own houses) relative to non-family members, family workers may be better monitored by the owner during production. To examine this channel, we examine the effect of a larger family workforce on the share of producers producing at the owner's house. The coefficient presented in column (4) of Table 3 is small and insignificant, implying that whether working at the owner's house is not likely to be the main channel.

Second, family workers may communicate more with the owner, possibly due to their stronger connections, which may improve production monitoring within workplaces. In addition, since owners working with family workers are more likely to engage in unique designs produced by the owners as shown above, their production may require more frequent monitoring so that the weavers can deal with the unfamiliar designs. These hypotheses are partly supported by the data from a survey of weavers in 2016 (in section 6 we call these villages as weaver villages). The survey sampled all weavers identified in the nine villages who were working for an owner. Although the sample size is small, this data enables us to examine the differences in various characteristics between family and non-family weavers as presented in Table A.7 in the Appendix. Column (6) of Panels B and C of this table shows that family weavers are more likely to indicate that their owners check quality during production than non-family weavers (even after controlling for working outside the owner's house). [20]

[20]In the wage regression of Table A.7, one possible reason for the positive and significant coefficient of the putting-out variable might be the efficiency-wage type mechanism. If this is the case, wages need to be higher for non-family workers under the putting-out arrangement where design infringement becomes the most serious concern. Yet, including a cross-term for the family worker and the putting-out variables in the wage equation shows a negative but insignificant coefficient for the cross-term, indicating that such a hypothesis is not strongly supported. On the other hand, the coefficient for the putting-out variable remains positive and significant. Based on information from qualitative interviews, it seems more reasonable to believe that wages appear higher for the outside workers not because of efficiency wages but simply because their wages include lodging and meal costs, compared with the live-in workers who receive lodging and meals for free.

Agency problem 3: Material embezzlement

Strong trust and connections between owners and their families may reduce the chances of material embezzlement, another agency problem as discussed in section 2.2. If this is the case, working with family members may help owners to use higher-quality materials. However, we do not find that a family workforce affects material prices significantly (Table 2, Panel C).

Product specifications

It is also possible that working with family members enables owners to produce products that are more complex, requiring more effort, which may need more robust controls and monitoring by the owner. To investigate this angle, we use the average number of days for producing one product for a producer. As shown in column (5) of Table 3, the coefficient is positive but statistically insignificant, suggesting that this is not likely to be the case. We find similar evidence from the data from the weaver survey. As presented in Table A.7 in the Appendix, we do not find a statistically significant difference between family and non-family weavers in piece rate, the number of pieces produced in a week, the number of days required for producing one product, or the number of months making the same product.

Skill difference

An alternative explanation of the main results might be that family labor has higher skills than non-family labor. For instance, a weaver whose mother is a textile business owner may be better trained than a weaver whose mother is not, which may potentially affect our results because the latter case is likely to be hired by an unrelated owner. To examine this possibility, we again use data from the survey of weavers in 2016.

First, we examine the differences in experience and tenure between family and non-family weavers. As shown in Panel A of Table A.7 in the Appendix, the differences in age, years of experience in weaving, whether they received training from the current owner, and whether they finished middle school are small and insignificant.

Second, to measure the level of skills and experience, two products were shown to each

weaver during the survey, and then they were asked to rate the difficulty for them in weaving each of the products by choosing either 1 (easy), 2 (a little difficult), or 3 (very difficult). The first product had a relatively simple design and the second was more complex (see Appendix Figure A.2 for the pictures). The weavers were also asked "How many days would you take to produce this product for the first time?" for each product.

In Table A.8 in the Appendix, we test whether the skill level of the weavers differs by whether they work for a relative or not. The difference in the perceived difficulty level between family and non-family workers is small and statistically insignificant for each product. The coefficients of family weavers for the expected number of days are positive, which implies family workers expect to take more time to produce the product, but insignificant. Even after controlling for the years of experience in weaving, the coefficients of the family workforce variable remain positive. Despite the small sample size, we may conclude that these results do not support the hypothesis that family workers have higher skills or more experience than non-family workers.[21]

Search frictions

Lastly, search friction is another potential explanation. Imagine that owners have limited information about the whereabouts of likely workers. In this setting, owners having a larger family workforce would know more potential family and non-family workers to choose from to fill in vacancies. This can explain why such owners simultaneously obtain high-productivity workers and a higher fraction of family workers. However, as we show in section 6 when we introduced a list of new potential workers to these owners, the intervention rarely resulted in new hiring. Based on this finding, this channel is not likely to explain our results.

[21] Another caveat of this exercise is that these skill levels are measured by subjective questions, which could introduce non-classical measurement errors. While the more ideal measures could have been obtained for example by experts' evaluation of a certain type of actual products produced by weavers, such exercise was infeasiblely costly to be implemented in our setting.

5 Trust between owners and weavers

In the previous sections we have shown that working with family members improves product quality mainly through mitigating agency problems such as design infringement. There are various potential reasons why working with family workers mitigates agency problems.

Theoretically speaking, prosocial behavior such as trust and incentive problems are closely related (Itoh, 2004; Koszegi, 2014). Recent advancements in behavioral contract theory highlight that optimal incentive schemes often hinge on "intrinsic motivation" — actions undertaken without financial rewards (Koszegi, 2014). Unlike traditional contract theories, which assume individuals are motivated to exert effort only when explicitly incentivized, these modern theories propose that people within a specific network can be "trustworthy," willing to put forth effort without explicit incentives. Contractual incompleteness may naturally emerge as a mechanism to signal trust (Herold, 2010; Sliwka, 2007).

Family may refrain from opportunistic behaviors because of long-standing relationships with the owner, intrinsic motivation attached to the family members, and implicit profit sharing of the business in various ways. As a motivating fact, family-weavers are more likely to answer "yes" to our question asking whether the weaver can borrow money (300,000kip) from the current owner without interest when she needs to (as indicated in Panel A of Table A.7 in the Appendix), suggesting that the relationships between an owner and family and non-family weavers differ significantly.

Here, we attempt to explicitly measure one aspect of owner-worker bilateral relationships through workplace trust games with monetary incentives. The results described in this section suggest that the relationships between owners and family workers do differ from those between owners and non-family workers in a way consistent with the main findings above.

We conducted two kinds of trust game experiments played by pairs of an owner and a weaver.[22] In January 2018, we revisited the owners in the three villages we surveyed in 2016. We follow the standard protocol of previous studies that run the trust game in university

[22]We follow Glaeser et al. (2000), Karlan (2005), Heyes and List (2016), and Castilla (2015) in setting up the games so that the subjects can observe the identity of their partner, but they do not have the opportunity to communicate during the experiment, nor do they know which pairs are randomly selected for payments.

laboratories and in developing countries (for example, Glaeser et al., 2000 and Karlan, 2005). In our setting, the owner was paired with one of her weavers, and they played two kinds of games: an owner-sending game and a weaver-sending game. In the owner-sending game, the owners played the sender role, and the weaver played the receiver role. In these games, the owner was first given 30,000 Kip, and provided with an opportunity to send a portion of it to the receiver. The owner was told that we would triple the amount she sent before it was passed on to the receiver and that the receiver had the option of returning any portion of this tripled amount to the sender. The owner played this game with each weaver who was present at the workplace on the day. The receiver, a weaver, was also asked how much they would like to return to the sender, given the amount they would have received. In the weaver-sending game, the roles of the sender and receiver were reversed. According to their answers, we actually paid money for a randomly chosen game and pair, which was not revealed to the participants.[23] The more detailed sampling and instruction procedures are documented in Appendix A.1.

Following the literature, we measure the owner's and weaver's degrees of *trust*ing the partner by the share of the amount that she sent in the owner-sending game and weaver-sending game, respectively. To measure *trustworthiness*, we also follow the literature and use the return ratio defined by the amount returned divided by the amount available to return. In our sample, the average degree of *trust*ing is 0.37 (0.4), and the average of *trustworthiness* is 0.28 (0.32) for the owner-sender (weaver-sender) game. Appendix A.1 provides a more detailed description of these measures.

The trustworthiness of both weavers and owners turns out to be consistently higher among family and relatives, whereas *trust*ing does not. Columns (1)–(3) of Table 5 Panel A show the regression results of the owner's degree of *trust*ing from the owner-sending game on various characteristics. The coefficient of the family dummy that indicates that the paired weaver is a family member or relative of the owner is small and insignificant. The only characteristic that we find to be a significant determinant is the length of the work relationship, which influences the measure of *trust*ing positively. Controlling for owner-fixed effects and other

[23]To make it more difficult for the participants to know which game and pair was chosen, we also paired them with an anonymous "Someone in the same village" by finding unrelated participants from the village.

observable characteristics does not change the qualitative results.

In columns (4)–(6) of Table 5 Panel A, we examine the same equation for the measure of *trustworthiness* of the weaver in the owner-sending game. The coefficient of the family dummy positively and significantly predicts this outcome at the 5 percent level. The association is even stronger when we control for owner-fixed effects and compare differences in weavers working for the same owner. For the other explanatory variables, the coefficients are small and insignificant, even for work-related years.

Panel B shows the results of the games under the weaver-sending game, where weavers are the senders and owners are the receivers. Here, we do not find significant predictors of weavers identified as trusting. However, we find that relatives are a strong predictor of the employers' trustworthiness by a sizable magnitude, compared with the mean of each variable. Again, these results hold even after controlling for the owners' unobserved characteristics of owners by including owner-fixed effects.

The results imply that bilateral trustworthiness is, on average, higher among family members and relatives within workplaces. This evidence adds a possible explanation for our results in the earlier section, namely that working with trustworthy family workers improves productivity, particularly through enabling owners to overcome agency problems.

6 Evidence from Labor Matching Experiment

To assess the viability of non-family members as substitutes for family members, we designed and executed a straightforward labor matching experiment. If business owners suffer from agency problems with external workers (who are hired outside of their kinship network), is their demand for external labor very low? Is it related to the owner's concern for design infringement? To examine these questions, we look at the outcomes of a small-scale labor matching experiment we conducted with some of the textile business owners and workers after the baseline survey.[24]

We divided the 12 villages surveyed at the baseline survey in 2016 into three owner villages

[24]This experiment was conducted in a small scale because initially, it was considered as a pilot for a possible larger-scale experiment in the future.

and nine weaver villages. The weaver villages are located at approximately 15 kilometers away (about 30 minutes by motor vehicle) from the owner villages. In the owner villages, during the baseline survey, we asked whether the owner was interested in participating in the matching project. That is, we asked whether the owners were interested in 1) receiving information about weavers in the district who were looking for employers and 2) being listed as one of the owners potentially available for employing these weavers. In the weaver villages, in the baseline survey we asked whether each of the weavers was interested in participating in the matching project as a weaver. The questions we asked are similar to those for the owners. See Appendix Section A.2 for more details on the protocol and sampling.

In each owner village, among those who were interested in both getting a list and being listed, we randomly divided them into three groups. The first is the "list" group that we provided with a list of weavers and who were introduced to these weavers. The second is the "list and subsidy" group that we provided with a list of weavers and a transportation subsidy and who were introduced to these weavers. The transportation subsidy amounts to the fuel costs between the villages and was provided upon the claim of visiting the weaver villages. The last one is the control group who were given nothing. Accordingly, we divided the workers' villages into two groups, "list" and "list and subsidy," to be introduced to the respective groups of owners in owner villages.

We made two lists of owners, for the "list" and "list and subsidy" groups, in the three owner villages. Each list contained the name, village, phone number, number of weavers working at the owner's house, number of weavers working outside the house, number of looms, product characteristics and wages, and production season of participating owners. Similarly, we made the two lists of weavers, for the "list" and "list and subsidy" villages. Each list of weavers contains the name, village, phone number, current product types and wages, production season, and availability of each weaver. In October 2016, we revisited them and exchanged the lists within the "list" and "list and subsidy" groups. We also attached maps showing the location of villages and the location of weavers within each village. We told the owners that they were free to contact any of the weavers on the list to ask for more information and get in touch.

In January-February 2017, three months after the start of the experiment, we conducted

the first follow-up survey in the villages. Then, in January-February 2018, we revisited only the owners in owner villages as a part of the second follow-up survey to examine a longer-run effect. Table A.10 in the Appendix summarizes the outcome of the matching experiment for the treated groups of owners.[25] In the first follow-up survey, 26% of the owners said that they had contacted weavers on the list we had provided, and 14% also said that they had met with the weavers. However, none of them had started to work together. We also asked the same owners whether they were contacted by any of the weavers on the list, and if so, whether they had met the weaver; 15% had been contacted, 3% had met with these weavers, and there were two owners who were actually working with them at that time. Overall, it resulted in very few hirings in the short run. After one year, we asked the same questions in the second follow-up survey. These numbers were mostly similar to those of the first follow-up survey. As we expect from these numbers, a difference-in-difference estimation of the impact of labor matching intervention does not reveal any effect on employment size and composition of relatives among workers (for the results, see Appendix Table A.11).

Why did the experiment result in so few hirings? One may think that they might have already known each other, so the information was not new to them. However, we argue that this is not likely to be the case because these villages are not adjacent to each other, and they are not likely to know each other unless there is a special connection. The transportation cost to meet and work with these weavers could be a reason. However, if this were so, we would expect to see a difference in the outcomes between the "list" and "list and subsidy" groups. Another potential reason is the small sample size since the number of successful hirings could have been larger if the sample size was larger. Still, the result suggests that only less than 1.8% of owners actually hired a weaver, which is a fairly small fraction.

A possible explanation is that, after contacting workers, the owners found other workers' skill sets needed to match their requirements. While we gave products and wage information to the owners, the owners may have learned more about the workers after contacting them such as their product quality and soft skills. This may explain why 22% of owners contacted

[25]In the baseline survey, we initially had the total of 110 owners equally divided into "list" and "list and subsidy" groups. Among them, 14 owners were not working or out of the village at the time when we revisited them in the first follow-up survey. In the second follow-up survey, the number of such owners increased to 33. However, the numbers were mostly balanced across these groups.

a worker, but most of them did not hire them in the end. Another plausible explanation may be that many of the owners were not interested in hiring the introduced workers, even though they expressed interest in obtaining the list. This is consistent with the fact that around 78% of owners did not contact any workers. In any case, the result of our intervention implies that simple labor-matching opportunities to introduce external workers rarely resulted in actual hiring in our study setting.

Lastly, we examine which owners have a higher demand for external workers, using the indicator of whether the owner contacted any introduced worker. As shown in Table 6, after controlling for the basic features of the business, the share of the owner's self-designed products negatively predicts contacting workers. This is consistent with our hypothesis built on earlier results that self-designing owners care more about the trustworthiness of workers, so they have less demand for external workers. In addition, owners born outside Vientiane Capital were more likely to contact an introduced worker, which makes sense because they were likely to know fewer workers to hire in the areas.

7 Concluding remarks

Producing high-quality products often requires innovative ideas, workers' efforts, and high-quality materials. However, the weakness of the rule of law and institutions in developing countries might make it difficult to enforce contracts between business owners and workers, putting owners at risk of having ideas and inputs stolen by workers. Therefore, firms in such economies might need more support in hiring trustworthy workers outside of family members.

In this study, we examine the role of family workers - trustworthy workers for business owners - for micro-enterprises in a developing country. We conducted surveys and experiments with producers in Lao's handwoven silk textile industry, where agency problems are potentially prevalent. For testing the hypothesis, we use the fact that most weavers in the industry are female, implying that an owner's family workforce is strongly determined by the share of women among owners' family members. Our empirical results suggest that this has significant positive effects on sales, as well as on the share of family members among all

workers of the owner. We also find that owners with a higher share of women in the family produce considerably more value-added per worker and higher quality products measured by prices and value-added per product.

One potential explanation for these results is that working with families enables business owners to overcome agency problems with workers. In particular, we find that owners with a larger family workforce are more likely to produce high-price products that they design by themselves rather than low-price products of standard designs. In addition, the effect of family workforce size on product quality (price) is positive and significant only among owners designing their own products but not for the other owners. These findings support the hypothesis that working with family labor enables owners to overcome design infringement. Furthermore, with a smaller sample of weavers, we find that family weavers are more likely to indicate that their owners check quality during production than non-family weavers. This finding suggests that better production monitoring, through better communication among family members, could be an additional reason for enhanced product quality.

Lastly, although this study empirically highlights trustworthiness as a potential channel to explain the importance of family labor for product quality, there could be other potential explanations. For instance, family members may share the profit from business in informal ways other than wage payments. If the profit is completely shared, incentive conflicts are internalized. Another question is which agency problem is more important, design infringement or the quality moral hazard. We leave these issues open for future investigations.

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Table 1: Balance Test and First Stage Results

	Ln(No. Family Relatives)	No. Children	No. Siblings	Age	Finished Middle School	Born Outside Vientiane	Trust Neighbors	Trust People in District	Ln(Family Workforce)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ln(Female Share)	-0.164	-0.591	-0.104	-1.625	-0.0358	0.0412	-0.0700	-0.0136	0.397***	0.424***
	(0.294)	(0.635)	(0.0693)	(1.851)	(0.0695)	(0.0598)	(0.0645)	(0.0369)	(0.0775)	(0.0738)
Controls	No	No	No	No	No	No	No	No	No	Yes
Mean (Dep. var.)	1.632	10.280	2.494	38.709	0.392	0.740	0.574	0.078	1.156	1.156
Observations	735	735	735	735	735	735	735	735	735	735

Notes: Demographic control variables are the log of the number of relatives, age, age squared, a dummy variable indicating completion of secondary education, and a dummy variable indicating that the survey was conducted in the year 2017. The sample is weighted by the inverse of the number of times that the owner is observed in the data. Standard errors are clustered at the level of owners.

Table 2: Family Workforce Size and Business Performance (2SLS)

Panel A: Business Size

	Ln(Sales)		Ln(Value-added)		Ln(No. Workers)	
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Family Workforce)	0.991**	0.925**	0.887**	0.821**	0.203	0.187
	(0.413)	(0.386)	(0.399)	(0.374)	(0.245)	(0.221)
Controls	No	Yes	No	Yes	No	Yes
Mean (Dep. var.)	4.267	4.267	4.026	4.026	0.507	0.507
F-statistic	26.20	32.99	26.20	32.99	26.20	32.99
Observations	735	735	735	735	735	735

Panel B: Labor Productivity

	Ln(Value-added/No. Workers)		Ln(Quantity/No. Workers)	
	(1)	(2)	(3)	(4)
Ln(Family Workforce)	0.687**	0.636**	0.115	0.125
	(0.295)	(0.282)	(0.170)	(0.158)
Controls	No	Yes	No	Yes
Mean (Dep. var.)	3.529	3.529	1.196	1.196
F-statistic	26.20	32.99	26.20	32.99
Observations	735	735	735	735

Panel C: Price

	Ln(Price)		Ln(Material Price)		Ln(Value-added per Piece)	
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Family Workforce)	0.656**	0.574**	0.653	0.548	0.561*	0.476*
	(0.309)	(0.290)	(0.450)	(0.424)	(0.292)	(0.277)
Controls	No	Yes	No	Yes	No	Yes
Mean (Dep. var.)	3.011	3.011	0.912	0.912	2.761	2.761
F-statistic	25.03	31.25	25.03	31.25	25.03	31.25
Observations	730	730	730	730	730	730

Notes: "Ln(Family Workforce)" is the log of the number of the owner's relatives who can weave. This table shows IV estimates using the log of the female share of the owner's relatives as an instrumental variable. Control variables are the log of the number of relatives, age, age squared, a dummy variable indicating completion of secondary education, and a dummy variable indicating that the survey was conducted in year 2017. The sample is weighted by the inverse of the number of times that the owner is observed in the data. Standard errors are clustered at the level of owners.

Table 3: Pathways

	Share of relatives in workers	Purchase material on credit	Share of self-designed products	Share of in-house workers	No. days for producing a piece
	(1)	(2)	(3)	(4)	(5)
Ln(Family Workforce)	0.165**	-0.0712	0.272*	0.0495	0.387
	(0.0733)	(0.138)	(0.147)	(0.0664)	(0.533)
Controls	Yes	Yes	Yes	Yes	Yes
Mean (Dep. var.)	0.176	0.434	0.279	0.925	2.051
F-statistic	32.99	32.99	26.36	32.99	28.77
Observations	735	735	424	735	505

Notes: Control variables are the log of the number of relatives, age, age squared, a dummy variable indicating completion of secondary education, and a dummy variable indicating that the survey was conducted in year 2017. In columns (1)-(2) and (4), the sample is weighted by the inverse of the number of times that the owner is observed in the data, and standard errors are clustered at the level of owners. In columns (3) and (5), each owner is observed only once for these dependent variables, therefore, no weight is used, and robust standard errors are estimated.

Table 4: Heterogeneity by Design Ownership

	Ln(Price)		Ln(Value-added per Piece)	
	(1)	(2)	(3)	(4)
Ln(Family Workforce)	1.410*	0.647	1.262*	0.540
	(0.750)	(0.419)	(0.665)	(0.401)
Controls	Self design	Common design	Self design	Common design
Mean (Dep. var.)	3.184	2.926	2.782	2.623
F-statistic	7.51	15.79	7.51	15.79
Observations	132	292	132	292

Notes: Control variables are the log of the number of relatives, age, age squared, and a dummy variable indicating completion of secondary education. Robust standard errors are shown in parentheses.

Table 5: Trust game outcomes

	Trusting			Trustworthiness		
	(1)	(2)	(3)	(4)	(5)	(6)
Family/Relative	-0.00964	0.00397	0.0210	0.125**	0.166**	0.140**
	(0.0564)	(0.0462)	(0.0460)	(0.0490)	(0.0666)	(0.0623)
Log(Years of work relation)	0.0377**	0.0261*	0.0312*	0.00374	-0.0107	-0.0130
	(0.0161)	(0.0136)	(0.0166)	(0.0133)	(0.0136)	(0.0144)
Owner FE	No	Yes	Yes	No	Yes	Yes
Additional controls	No	No	Yes	No	No	Yes
Mean (Dep. var.)	0.373	0.373	0.373	0.283	0.283	0.283
Observations	178	178	178	178	178	178
	Trusting			Trustworthiness		
	(1)	(2)	(3)	(4)	(5)	(6)
Family/Relative	0.0708*	0.0993	0.0826	0.0771**	0.243***	0.218***
	(0.0394)	(0.0746)	(0.0881)	(0.0363)	(0.0631)	(0.0503)
Log(Years of work relation)	0.00394	-0.0112	-0.0117	0.0132	0.00260	0.00173
	(0.0119)	(0.0201)	(0.0225)	(0.0101)	(0.0149)	(0.0168)
Owner FE	No	Yes	Yes	No	Yes	Yes
Additional controls	No	No	Yes	No	No	Yes
Mean (Dep. var.)	0.399	0.399	0.399	0.315	0.315	0.315
Observations	177	177	177	177	177	177

Notes: We use the sample of 178 (177) pairs of owners and their weavers for the owner-sending game (for the weaver-sending game). In columns (2)–(3) and (5)–(6), fixed effects of owners are controlled. In columns (3) and (6), we additionally control for the weaver's general trust in people (GSS), the amount of production pieces, and dummy variables indicating whether the owner ever delayed payment to the weaver, whether the weaver has another job, whether the weaver is attending a school, and whether the weaver has a child. Standard errors are clustered at the level of owners.

Table 6: Demand for external labor

	Contacted any worker		
	(1)	(2)	(3)
Share of self-designed products	-0.135*	-0.137*	-0.157*
	(0.0807)	(0.0808)	(0.0810)
Ln(Value-added)	0.116**	0.115**	0.0916
	(0.0557)	(0.0561)	(0.0609)
Ln(No. Workers)	-0.0694	-0.0538	-0.0595
	(0.0772)	(0.0860)	(0.0873)
Share of putting-out workers	0.0952	0.0415	0.104
	(0.208)	(0.247)	(0.264)
No. workers who contacted the owner	0.0421*	0.0413	0.0331
	(0.0253)	(0.0253)	(0.0275)
Born outside Vientiane Capital	0.270***	0.266***	0.381***
	(0.0751)	(0.0761)	(0.0986)
Share of relatives in workers		-0.0604	-0.0809
		(0.127)	(0.135)
Additional control	No	No	Yes
Mean (Dep. var.)	0.240	0.240	0.240
Observations	171	171	171

Notes: This table uses the sample of owners who are in treatment arms of the labor matching experiment. The follow-up survey data collected in 2017 and 2018 are pooled. "No. of workers who contacted the owner" is the number of weavers who contacted the owner among weavers in the experimental arms. In all equations, we control for year fixed effects, village fixed effects, and an indicator for the list-and-subsidy experimental arm. In column (3), we additionally control for the number of children and indicators for graduating a middle school, risk aversion, general trust in neighbors, and general trust in people in the district.

A Materials for Online Appendix

A.1 Trust Game Experiment

We conducted two trust game experiments played by pairs of an owner and a weaver. In January 2018, we revisited the owners in the three villages we surveyed in 2016.

Sampling

Each owner was invited to trust game experiments if she had at least one weaver who was present at the owner's house at the time of the interview. Moreover, the weavers who played the game with the owners were limited to the weavers who were present at the owner's house at the time of the interview. The game was conducted after the interviews with the owner about the business.

Instruction

We follow the standard procedure of previous studies that have run the trust games in university laboratories and in developing countries (for example, Glaeser et al., 2000 and Karlan, 2005). In our setting, the owner and weavers played two games, called owner-sending and weaver-sending games. If the weavers were around the owner close enough to hear or see them, we moved the weavers to a location where they could not communicate with the owner. Before starting the game, we announced that "If you follow the rules, we will give each one of you 10,000 Kip at the end of all experiments. This is additional to what you earn in the game. However, if you do not follow the rules, we will not pay the 10,000 Kip at the end." After all the relevant participants had determined answers for the two games, we randomly chose one of the games and paid out of the result of that game.

In the owner-sending game, the owners played the role of the sender. Each owner was paired with one of her weavers or an anonymous person from the same village. We did not tell this person that he or she was playing this game with the owner. This person only knew that he or she was playing this game with someone from this village. We used slides to show examples. We also made a list of participating weavers and the anonymous "someone in the village" and showed it to the owners when we explained the game. The instructions to the owners was made as follows.

> Imagine that you are playing the game with receiver A. You can consider the receiver A to be either one of your weavers on the list or the person in this village. We will first give

you 30,000Kip.[26] Then, you have the opportunity to send a portion of your 30,000Kip to the receiver. You can give 10,000Kip, 20,000Kip, 30,000Kip, or can choose to send nothing. We will triple whatever amount you decide to give to your partner before it is passed on to her/him. The remaining amount is not tripled. For example, [an example follows]. The receiver has the option of returning any portion of this tripled amount to you. For example, [an example follows].

We explained that the receiver would be chosen randomly, and that we would transfer the money according to the commitment in the answers. We also told them that we would not tell them or any potential receiver who exactly had been randomly chosen and which of the two games had been chosen. In this way, we aimed to keep answers confidential. We then asked the owner to decide what amount to send to each weaver that was participating in the game.

In the weaver-sending game, the weavers played the role of sender and the owner was the receiver. Each weaver was paired with her employer or an anonymous person in the same village. The following are the instructions to the owner, which proceeded after the owner had provided her response in the owner-sending game.

Imagine that you are playing the game with weaver X [Insert the name]. We will first give the weaver 30,000Kip. Then, the weaver has the opportunity to send a portion of the 30,000Kip to you. The weaver can send 10,000Kip, 20,000Kip, 30,000Kip, or can choose to send nothing. We will triple whatever amount the weaver decides to give to you before it is passed on to you. The remaining amount is not tripled.

We then asked the owner to decide what amounts to return for each participating weaver under each scenario with the possible different amounts sent by the weaver. If there were more than one participating weavers for this owner, a sender-receiver pair for the actual payment of the game is chosen randomly.

The corresponding questions were asked of the weavers simultaneously by other survey staff at different locations. Communication was not allowed between weavers and owners until everyone had finished answering.

Descriptive statistics of trust(-ing) and trustworthiness measures

[26] This is approximately 3.6 USD when the games were conducted.

Distributions of the trust and trustworthiness in the two games are summarized in Figure 1. While the correlation of the measure of *trusting* in the owner- and weaver-sending games is weak, the measures of *trustworthiness* in the two games are positively correlated. Regressing trustworthiness from the owner-sending game on that of the weaver-sending game, we find that the estimated coefficient is 0.46 with standard error 0.089. In our setting, one explanation of the high correlation of trustworthiness between the owner- and weaver-sending games is the presence of strong reciprocal relationships among some pairs of owners and weavers, in particular among relatives. Previous studies that link the trust game measures with real life outcomes show that the measure of trustworthiness (rather than the measure of trusting) is relevant to contractual outcomes. For example, Karlan (2005) conducts the game with borrowers in a Peruvian microcredit program, finding that those identified as trustworthy are less likely to default, not those who are trusting.

A.2 Labor Matching Experiment

In this section, we provide a more detailed description of our labor-matching experiment.

We divided the 12 villages surveyed at the baseline survey in 2016 to the three owner villages and the nine weaver villages. The weaver villages are located at around 15 kilometers away (about 30 minutes by motor vehicle) from the owner villages. Due to this distance, we expected that they may work based on the putting-out system. The weaver villages are farther away from the downtown wholesale market and have more people working in agriculture than the owner villages.

In the owner villages, during the baseline survey, we asked whether the owners were interested in participating in the matching project. More precisely, we asked them the following two questions to the owners

1. As a potential future project, we plan to collect information on weavers in another village in Xaythany district looking for employers. If we produce a list of such weavers with names, phone numbers, village, and product expertise, would you be interested in obtaining such a list?

2. As another potential future project, we are planning to make a list of people in this village who are willing to hire more weavers and provide this list to weavers in another village in Xaythany district. If we produce a list, would you be interested in being on such a list? 164

owners out of 207 owners answered "yes" to both questions.

In the weaver villages, in the baseline survey we asked whether each of them was interested in participating in the matching project as a weaver. The questions we asked are similar to those for the owners. More specifically, we asked the wavers the following two questions to the weavers

1. As a potential future project, we are planning to collect information of employers in another village in Xaythany district who are looking for weavers. If we produce a list of such employers with name, phone numbers, village and product expertise, would you be interested in obtaining such a list?

2. As another potential future project, we are planning to make a list of weavers in this village who are willing to work for another employer and provide this list to employers in another village in Xaythany district. If we produce a list, would you be interested in being on such a list?

We asked these questions to not only the weavers who were already working for an owner but also to those who were currently owners but working by themselves without a weaver. For the latter group, we anticipated they may be interested in working as a weaver instead.

For each owner village, among those who were interested in both getting a list and being listed, we randomly divided them into three groups. The first is the "list" group (55 owners) which we provided with a list of weavers and who were introduced to these weavers. The second one is the "list and subsidy" group (55 owners) which we provided with a list of weavers with transportation subsidy and who were introduced to these weavers. The transportation subsidy amounting to the fuel costs between the villages was provided upon the claim of visiting the weaver villages. We explained that we would pay for each photo taken in the village (with the owner's and weaver's faces) during the three months following the start of the experiment. The last one is the control group (55 owners) who were given nothing. Accordingly, we divided the workers' villages into three groups, the 'list" (52 workers) and "list and subsidy" (56 workers), to be introduced to the respective groups of owners in owner villages, and the control group (55 workers).

We made the two lists of owners, for the "list"and "list and subsidy" groups, in the three owner villages. Each list contained the name, village, phone number, number of weavers working at the owner's house, number of weavers working outside the house, number of looms, product characteristics and wages, and production season of participating owners. Similarly, we made

the two lists of the weavers, for the "list" and "list and subsidy" villages. Each list of weavers contains the name, village, phone number, current product types and wages, production season, and availability of each weaver. We asked the participants not to share the list with any other people to honor information confidentiality because the list is disclosed under an information consent agreement with the weavers to be used only for this purpose.

In October 2016, we revisited them and exchanged the lists within the "list" and "list and subsidy" groups. We also attached maps showing the location of villages and the location of the weavers within each village. We told the owners that they were free to contact any of the weavers on the list to ask for more information and to get in touch. At the same time, to reduce the risk of disrupting current work arrangements, we added that if they start working with a worker who is currently employed by another person, they should make sure that they hire her after the worker finishes work for the current employer.

In January-February 2017, three months after the start of experiment, we conducted the first follow up survey in the villages. Then in January-February 2018, we revisited only the owners in owner villages as the second follow-up survey to examine the longer-run effect.

A.3 Appendix Figures

Figure A.1: Sample and Timeline of Surveys and Experiments

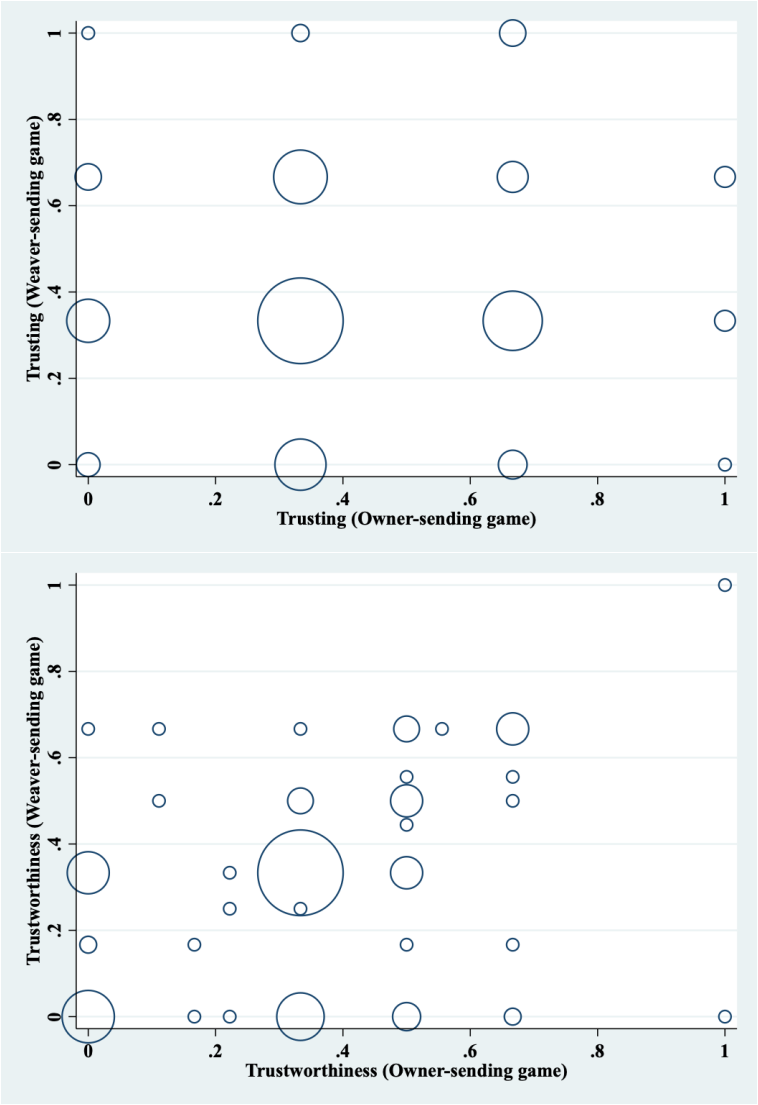
<table>
<tr><td></td><td colspan="2">12 villages, divided into 3 owner villages and 9 weaver villages</td><td>9 villages</td></tr>
<tr><td></td><td>Name of 3 owner villages: Nonsart, Nonbokeo, Oudompon</td><td>Name of 9 weaver villages: Phongham, Thadkham, Phonton, Nathe, Dong Bang, Parksarp Mai, Somsavan, Phonkhor, Thongmung</td><td>Name of villages: Douangboutdi, Veunthen, Bolek, Nangon-Kao, Phonkham, Hatviangkham, Thangon, Tha-Champa</td></tr>
<tr><td rowspan="3">July-September 2016</td><td colspan="2">2016 Baseline owner survey
The survey targeted all owners identified in the 12 villages. Responses were obtained from 308 owners.</td><td rowspan="5"></td></tr>
<tr><td></td><td>2016 Baseline weaver survey
The survey targeted all weavers identified in the 9 weaver villages.</td></tr>
<tr><td>October 2016</td><td>Labor matching (owners)</td><td>Labor matching (only weavers)</td></tr>
<tr><td rowspan="2">February-March 2017</td><td colspan="2">2017 follow-up owner survey
The survey targeted all owners surveyed in the 2016 Baseline survey. Responses were obtaind from 227 owners.</td></tr>
<tr><td></td><td>2017 Follow-up weaver survey
The survey targeted all weavers identified in 9 weaver villages.</td></tr>
<tr><td>September-October 2017</td><td colspan="2"></td><td>2017 Baseilne owner survey
The survey targeted all owners identified in 9 villages. Responses were obtained from 200 owners.</td></tr>
<tr><td>January-February 2018</td><td>2018 follow-up owner survey & trust game experiment
The survey and experiment targeted all owners in 3 owner villages surveyed in the 2016 baseline survey and their weavers. Responses were obtained from 156 owners.</td><td colspan="2"></td></tr>
</table>

Notes: Within Xaythany district, a suburban area of Vientiane, the survey team first identified 21 villages that hosted relatively large numbers of hand-weaving producers. Because of budgetary and capacity constraints, the team divided these villages into 2 groups: 12 villages, in which the baseline survey was conducted in 2016 ("2016 Baseline owner survey"), and the remaining nine villages, to which the baseline survey was conducted in 2017 ("2017 Baseline owner survey"). For the purpose of conducting a labor matching experiment, we divided the 12 villages targeted for the 2016 Baseline owner survey into three owner villages and nine weaver villages. In the nine weaver Villages, we additionally surveyed weavers in July-September 2016 ("2016 Baseline weaver survey"). Then, in the labor matching experiment, the team exchanged the information between the owners in the three owner villages and the weavers in the nine weaver villages. In February-March 2017, the team conducted follow-up surveys of the owners and weavers who were surveyed in 2016 ("2017 Follow-up owner survey" and "2017 Follow-up weaver survey"). In January-February 2018, the team conducted an additional follow-up survey combined with a trust game experiment with the owners in the owner villages ("2018 follow-up owner survey & trust game experiment").

Figure A.2: Products shown to weavers to measure skills

Notes: The weavers were presented with two products, each available in four color variations, and were subsequently asked to assess the difficulty of weaving each item. The left and right images correspond to the first and second products, respectively.

Figure A.3: Distributions of the measures for trusting and trustworthiness



Notes: The upper figure shows the distribution of the measures of trusting in the owner- and weaver-sending games. The lower figure shows the distribution of the measures of trustworthienss in both games. The size of the circle indicates the size of the fraction of observations in the plot.

A.4 Appendix Tables

Table A.1: Basic statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Business characteristics					
No. weavers	1.88	8.54	0	203	735
No. weavers who are owner's family/relatives	0.64	1.54	0	30	735
Sales (USD, week)	220.14	1479.05	0	42206.67	735
Value added (USD, week)	166.98	1038.92	0	26751.11	735
Value added per worker (USD, week)	46.09	47.98	0	776.79	735
No. production pieces per worker (week)	3.05	3.6	0	30	735
Average product price (USD)	33.47	49.1	2.22	577.78	730
Average material price per piece (USD)	7.03	17.24	0.02	216.13	730
Average value added per piece (USD)	24.94	34.56	0.86	509.88	730
Purchase material on credit	0.43	0.5	0	1	735
Share of putting-out weavers	0.18	0.28	0	1	735
No. days for producing a piece	1.68	2.41	0	22.33	505
Share of self-designed products	0.24	0.42	0	1	424
Demographics of business owners					
No. family/relatives (children and siblings)	11.91	4.25	1	29	735
Family workforce	2.82	2.45	0	14	735
Female share in family/relatives	0.52	0.15	0.13	1	735
Age	38.71	12.16	15	90	735
Female	1	0.06	0	1	735
No. children	1.63	2.09	0	12	735
No. own siblings	5.45	2.31	0	21	735
No. spouse's siblings	4.83	2.85	0	15	735
Completed middle school education	0.39	0.49	0	1	735
Born outside Vientiane	0.74	0.44	0	1	735
Trust neighbors	0.57	0.49	0	1	735
Trust people in the District	0.08	0.27	0	1	735
Trust game					
Trust (owner-sending game)	0.37	0.25	0	1	178
Trustworthy (owner-sending game)	0.28	0.21	0	1	178
Trust (weaver-sending game)	0.4	0.24	0	1	177
Trustworthy (weaver-sending game)	0.32	0.21	0	1	177

Notes: Samples of 508 textile owners in 21 villages. Variables in monetary values are measured in USD using the average USD and Lao Kip exchange rates in October 2016. The sample is weighted by the inverse of the number of times that the owner is observed in the data. Information on the share of self-designed products was not collected in the 2016 baseline survey. Information on the days taken to produce a piece was not collected in follow-up surveys.

Table A.2: Determinants of product prices

	Ln(Product Price)	
	(1)	(2)
Self-designed product	0.127***	0.158***
	(0.0373)	(0.0376)
Log(Material cost)	0.757***	0.694***
	(0.0237)	(0.0286)
Log(Labor cost)	0.136***	0.134***
	(0.0237)	(0.0229)
Produced outside owner's house	-0.00301	-0.0346
	(0.0567)	(0.0572)
Product Type FE	Yes	Yes
Village FE	No	Yes
Mean (Dep. var.)	3.245	3.245
Observations	604	604
No. Owners	421	421

Notes: This table uses product-level data that we collected from 421 owners in 2017. From each owner, the survey collected information about the products sold in the past seven days. Products with different prices are recognized as different products. "Self-designed product" indicates products that are designed by the owner. "Ln(Material cost)" and "Ln(Labor cost)" are the cost of material per product and the cost of labor per product, respectively. "Produced outside owner's house" indicates the product was produced outside of the owner's house, typically at the weaver's house. We control for four categories of product type. Standard errors are clustered at the level of owners.

Table A.3: Robustness checks: Alternative definitions of relatives

Panel A: Excluding spouse's siblings		
	Ln(Value-added per worker)	Ln(Price)
	(1)	(2)
Ln(Family Workforce)	0.593**	0.405
	(0.300)	(0.347)
Controls	Yes	Yes
Mean (Dep. var.)	3.529	3.011
F-statistic	25.07	23.18
Observations	735	730
Panel B: Excluding children		
	Ln(Value-added per worker)	Ln(Price)
	(1)	(2)
Ln(Family Workforce)	0.495	0.560*
	(0.304)	(0.322)
Controls	Yes	Yes
Mean (Dep. var.)	3.532	3.012
F-statistic	22.73	22.08
Observations	734	729

Notes: This table uses the same data and specifications as in Table 2, except for changing the definition of the relatives as follows. In Panel A, family workforce and female share are measured among the owner's relatives defined as her children and her siblings, excluding her spouse's siblings. In Panel B, family workforce and female share are measured among the owner's family defined as her siblings and her spouse's siblings, excluding her children. The same control variables as in Table 2 are included. The log of the number of relatives, which is one of the control variables, is measured accordingly in each panel.

Table A.4: Robustness checks: Alternative specifications

Panel A: Additional control variables		
	Ln(Value-added per worker)	Ln(Price)
	(1)	(2)
Ln(Family Workforce)	0.593**	0.488*
	(0.274)	(0.280)
Controls	Yes	Yes
Mean (Dep. var.)	3.529	3.011
F-statistic	30.18	28.57
Observations	735	730
Panel B: Averaged owner-level data		
	Ln(Value-added per worker)	Ln(Price)
	(1)	(2)
Ln(Family Workforce)	0.687**	0.633**
	(0.295)	(0.308)
Controls	Yes	Yes
Mean (Dep. var.)	3.529	3.008
F-statistic	26.19	25.35
Observations	508	507
Panel C: Using only the first survey for each owner		
	Ln(Value-added per worker)	Ln(Price)
	(1)	(2)
Ln(Family Workforce)	0.812**	0.603*
	(0.319)	(0.317)
Controls	Yes	Yes
Mean (Dep. var.)	3.592	3.017
F-statistic	26.19	25.34
Observations	508	506
Panel D: Female share without taking log		
	Ln(Value-added per worker)	Ln(Price)
	(1)	(2)
Ln(Family Workforce)	0.663**	0.666**
	(0.296)	(0.306)
Controls	Yes	Yes
Mean (Dep. var.)	3.529	3.011
F-statistic	24.37	23.27
Observations	735	730

Notes: This table uses the same data and specifications as in Table 2, except for the following modifications. Panel A adds control variables to the baseline control variables indicated in Table 2. The additional control variables are the number of children, years of doing business, general trust in people in the district, general trust to neighbors, and an indicator of being born outside Vientiane. Panel B uses the data in which all variables are collapsed to the mean at the level of owners and estimates the equations without weights. Panel C uses only data collected during the first survey for each owner. In Panel D, the female share is measured by the share of females among the owner's children, her siblings, and her spouse's siblings, without taking the logarithm.

Table A.5: OLS estimate

	Ln(Value-added per worker)	Ln(Price)
	(1)	(2)
Ln(Family Workforce)	0.175***	0.334***
	(0.0563)	(0.0668)
Controls	Yes	Yes
Mean (Dep. var.)	3.529	3.011
F-statistic	10.04	17.86
Observations	735	730

Notes: This table shows OLS estimates controlling for the log of the number of relatives, age, age squared, a dummy variable indicating completion of secondary education, and a dummy variable indicating that the survey was conducted in year 2017. The sample is weighted by the inverse of the number of times that the owner is observed in the data. Standard errors are clustered at the level of owners.

Table A.6: Female share and business performance: other channels

	(1)	(2)	(3)	(4)
	Introduce weavers	Introduce customers	Lend money	Share designs
Ln(Female Share)	0.093	0.036	0.031	-0.168
	(0.127)	(0.126)	(0.103)	(0.106)
Observations	154	154	154	154
Mean dep var	0.286	0.377	0.208	0.195

Notes: This table uses the data that we collected in the 2018 follow-up owner survey that asked the owners whether their family and relatives help their business in various ways. Each indicator variable representing a certain type of support by family and relatives is regressed on the log of female share among the owner's family and relatives, which is used as an instrumental variable for the main analysis. Standard errors are clustered at the level of owners.

Table A.7: Differences between family and non-family weavers

Panel A: Experience and relationship with owner

	Age	Years of experience in weaving	Received training from current owner	Finished middle school	Can borrow money from current owner
	(1)	(2)	(3)	(4)	(5)
Family worker	1.253	0.976	0.0643	-0.0629	0.290***
	(4.463)	(4.411)	(0.116)	(0.138)	(0.0458)
Mean (Dep.)	36.544	20.930	0.158	0.412	0.746
Observations	114	114	114	114	114

Panel B: Production and payment (without control)

	Ln(Piece-rate)	No. pieces	No. days	No. months	Owner checks quality during production
	(1)	(2)	(3)	(4)	(5)
Family worker	-0.267	1.195	0.527	1.770	0.159*
	(0.182)	(1.853)	(0.662)	(6.754)	(0.0814)
Product FE	Yes	Yes	Yes	Yes	No
Mean (Dep.)	11.590	2.904	3.799	8.569	0.789
Observations	114	114	114	113	114

Panel C: Production and payment (controlling for putting out)

	Ln(Piece-rate)	No. pieces	No. days	No. months	Owner checks quality during production
	(1)	(2)	(3)	(4)	(5)
Family worker	-0.142	0.366	0.790	1.721	0.138*
	(0.160)	(1.093)	(0.642)	(7.157)	(0.0830)
Putting Out	1.070***	-7.077*	2.243**	-0.414	-0.180***
	(0.281)	(4.095)	(0.957)	(7.771)	(0.0506)
Product FE	Yes	Yes	Yes	Yes	No
Mean (Dep.)	11.590	2.904	3.799	8.569	0.789
Observations	114	114	114	113	114

Notes: This analysis uses the sample of weavers interviewed in the baseline weaver survey in 2016. "Family worker" is a variable indicating that the owner is a family or a relative of the weaver. In Panel A column (7), "Can borrow money from current owner" means that the weaver can borrow 300,000kip from the owner without interest. In Panels B and C, dependent variables in columns (1)–(4) are about the main product (from which the weaver earned the largest payment) in the preceding seven days. "Ln(Piece-rate)" is the log of the piece-rate wage per piece. "No. pieces" is the number of pieces produced in the preceding seven days. "No. days" is the number of days it takes to produce one piece. "No. month" is the number of months that the weaver has produced the product. "Ln(Payment)" is the log of total payment to the weaver in the preceding seven days. "Putting Out" indicates whether the weaver works outside owner's house. Robust standard errors are shown in parentheses.

Table A.8: Skill differences between family and non-family weavers

	Product 1				Product 2			
	Difficulty		Expected no. of days		Difficulty		Expected no. of days	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family worker	-0.221	-0.264	2.679	2.516	0.0600	0.0101	3.979	3.762
	(0.198)	(0.176)	(1.824)	(1.666)	(0.190)	(0.193)	(2.839)	(2.601)
Ln(Yrs. Experience)		-0.248***		-0.952*		-0.291***		-1.268*
		(0.0518)		(0.491)		(0.0626)		(0.755)
Mean (Dep. var.)	2.123	2.123	4.579	4.579	1.947	1.947	4.224	4.224
Observations	114	114	114	114	114	114	114	114

Notes: This analysis uses the sample of weavers interviewed in the baseline weaver survey in 2016."Family/Relative" is a variable indicating that the owner is a family member or a relative of the weaver. Two products were shown to the weaver, and the weaver was asked to rate the difficulty for her to weave each of the styles by choosing either 1 (easy), 2 (a little difficult), or 3 (very difficult). "Difficulty" in columns (1) and (4) is the difficulty rate for products 1 and 2, respectively. Ln(Yrs. Experience) is the log of the years of experience in weaving. Robust standard errors are shown in parentheses.

Table A.9: Trust game and GSS-trust measure

Weaver sending game	(1) Trust someone in the village	(2) Trust someone in the village	(3) Expected return from someone	(4) Expected return from someone
Weaver GSS-Trust	0.141***	0.139***	-0.0200	-0.0102
	(0.0446)	(0.0450)	(0.0197)	(0.0206)
Weaver finished secondary education		-0.00749		0.0184
		(0.0379)		(0.0204)
Weaver age		-0.000857		0.00350**
		(0.00274)		(0.00169)
Observations	177	177	172	172

Notes: This table examines the consistency between trust games and the answers to GSS type question. We use the outcomes of the weaver-sending game played with an anonymous person in the village. "Trust someone in the village" is the proportion of money that the weaver sent to someone in the village in the weaver-sending game. "Expected return from someone" is the weaver's expectation about the proportion of money that someone in the village will return. "Weaver GSS-Trust" indicates that the weaver responded "most people can be trusted" to the question asking "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" Robust standard errors are shown in parentheses.

Table A.10: Outcomes of labor matching intervention

	(1) "list" group	(2) "list & subsidy" group	(3) All treated owners
N Observations			
Baseline survey (Oct 2016)	55	55	110
Follow-up survey (Feb 2017)	49	47	96
Follow-up survey (Feb 2018)	37	40	77
Feb 2017 outcomes			
No. owners who contacted a weaver on the list	13	12	25 (26%)
No. owners who met with a weaver whom she contacted	5	8	13 (14%)
No. owners working with a weaver whom she contacted	0	0	0 (0%)
No. owners who were contacted by a weaver on the list	7	7	14 (15%)
No. owners who met with a weaver who contacted them	2	1	3 (3%)
No. owners working with a weaver who contacted them	1	1	2 (2%)
Feb 2018 outcomes			
No. owners who contacted a weaver on the list	8	8	16 (21%)
No. owners who met with a weaver whom she contacted	2	1	3 (4%)
No. owners working with a weaver whom she contacted	0	0	0 (0%)
No. owners who were contacted by a weaver on the list	8	9	17 (22%)
No. owners who met with a weaver who contacted them	2	4	6 (8%)
No. owners working with a weaver who contacted them	1	0	1 (1%)

Notes: The control groups are excluded from the table. In column (3), we show the fraction in the sample in the parentheses.

Table A.11: Impact of labor matching intervention

	Ln(No. Workers)	Share of relatives among workers	Ln(Sales)
	(1)	(2)	(3)
Treatment group (List) × After	-0.0782	-0.0399	-0.245
	(0.102)	(0.0616)	(0.173)
Treatment group (List and Subsidy) × After	0.0330	-0.0112	-0.372*
	(0.123)	(0.0657)	(0.190)
Treatment group (List)	0.0134	0.0172	0.0546
	(0.177)	(0.0564)	(0.223)
Treatment group (List and Subsidy)	0.112	0.0379	0.231
	(0.184)	(0.0579)	(0.227)
Year FE	Yes	Yes	Yes
Mean (Dep. var.)	1.001	0.313	5.208
Observations	432	427	432

Notes: This analysis uses the sample of 164 textile business owners in owner villages who showed interest in participating in the labor matching intervention. They were randomly allocated to "List" treatment (55 owners), "List& Subsidy" treatment (55 owners), and control (54 owners) groups. The data includes the baseline survey in September 2016 and follow-up surveys in February 2017 and February 2018. "After" indicates the observations in follow-up surveys. Year fixed effects are controlled in the regressions. Standard errors are clustered at the level of owners.