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This business is mine! Individual property rights and intra-household relationships *

Victor Pouliquen (University of Oxford)

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Abstract

This paper studies how stronger property rights on a micro-business affect entrepreneurs intra-household bargaining power, investment decisions and the extent to which they are constrained by their household in Benin. A randomized experiment on firm formalization - which in this context clarifies the legal business owner within the household - is used as exogenous source of variation in property rights. Entrepreneurs (both female and male) who become formal gain more control over household revenue, consistent with higher bargaining power. Female entrepreneurs also invest more in their business and are much more likely to pay to hide a windfall transfer from their spouse (a measure of intra-household constraints). For male entrepreneurs, formalization has no effect on investment but leads to more separation between personal and business resources, which potentially allows them to better resist the pressure to share resources. Consistently, they are also less likely to pay to hide a windfall transfer to their partner. Overall, the results are consistent with female entrepreneurs (but not male) being constrained by their spouse in their investment decisions, especially when they have stronger formal rights on their business.

Keywords: Property Rights, Intra-Household Bargaining, Micro-entrepreneurs, Informality.

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1 Introduction

Many productive assets, such as land or businesses, are embedded within a household. Property rights on such assets and the revenue they generate are often imperfectly defined. They depend on formal and informal norms that determine who gets what today and if the household dissolves. These norms often favor men over women who might lose the land they cultivate or the business they manage if they divorce or if their husband dies. This is particularly the case in contexts where the legal framework does not sufficiently protect women, and where a high level of informality makes it hard to enforce property rights, especially within the family. In this paper, I examine how stronger individual property rights on micro-businesses affect entrepreneurs' bargaining power within the household, investment decisions, and the extent to which they are constrained by their household.

I shed light on this question using an experiment on firm formalization implemented in Cotonou, the economic capital of Benin. This experiment provides an ideal setting because informality is widespread in Cotonou (88 percent of firms are unregistered according to national firm census data, [INSAE, 2009](#)) and because formalization in this context clearly identifies one sole individual as the legal business owner. 2,000 informal entrepreneurs (with a spouse or partner) were randomly allocated to a control group and a treatment group receiving information and incentives to register with a new legal regime called the *Entreprenant* status¹. Being assigned to the treatment group increased the formalization rate by 14 percentage points for female entrepreneurs and by 22 percentage points for males, relative to the control group. Importantly, we find in [Benhassine et al. \(2018\)](#) that formalization in this context and time frame has no or limited effects on taxes paid, access to credit and firm performances². It

¹The *Entreprenant* status is a simplified regime adopted in 2014 in Benin and 16 other African countries to make registration easier for small informal firms. Incentives received by the treatment group included in-person visits providing information on the new status and its benefits, registration assistance, access to business training, and bank and tax mediation services.

²With the caveat that estimates of the impact of formalization on firm profits and sales are imprecise

means that this experiment on formalization provides a shock on individual property rights in a context where it has limited effect on other firm outcomes. I measure intra-household outcomes using survey data and incentivized questions based on [Jakiela and Ozier \(2016\)](#) measuring the willingness to pay to hide a windfall transfer from the spouse. These questions provide a measure of the intra-household constraints faced by entrepreneurs. Specifically, how much they are willing to pay to get more control on the transfer and reduce the constraints.

I find two main results. First, entrepreneurs (both female and male) who get stronger property rights through the formalization program gain more control on household revenue. They contribute less to the personal expenses of their partner and to household expenditure (although these results are only marginally significant for women). Second, I find strong gender differential effects on investment decisions and on the probability that entrepreneurs pay to hide a windfall transfer from their spouse. Women who become formal, invest more in the business using their personal savings, and are 50 percentage points more likely to pay to hide a transfer from their partner, suggesting that they cannot invest as much as they want without hiding. Despite this lack of agency, women entrepreneur report higher well-being suggesting that they are all-in-all better-off with stronger property rights. For male entrepreneurs, there is no detectable effect on investment, and the impact on the willingness to pay to hide a transfer from the spouse goes in opposite direction (-27 percentage points). This last result is likely coming from higher separation between personal and business resources allowing them to better resist the pressure to share the transfer with their partner.

Overall, these results are consistent with an extended version of the standard collective model of the household ([Chiappori, 1988](#)) in which stronger individual property right on a business increase the value of the entrepreneur's outside option in case of divorce. This in turns increases bargaining power and individual incentives to invest in the business (to further improve the outside option). The difference between men and thus that meaningful effects cannot be completely ruled out.

and women in investment and hiding behaviors comes from the fact that only women entrepreneurs are constrained in their investment decisions.

This paper is to my knowledge the first to study the causal impact of micro-entrepreneurs' formalization, within the household. My results show that individual property rights on firms have important but complex implications on intra-household relationships. While formalization increases control over household revenue for both female and male entrepreneurs, my results suggest that women are also constrained in their investment decisions which can limit the potential benefits of formalization and contribute to the gender gap in micro-enterprises profit documented in the literature ([Jayachandran, 2021](#)).

This paper makes three additional contributions. First, it contributes to the empirical literature studying how formal institutions affect family systems, women's empowerment and the gender gap ([World Bank, 2011](#), [Duflo, 2012](#), [Aldashev et al. 2012](#), [Platteau and Wahhaj, 2014](#), [Guirkingner and Platteau, 2016](#), [O'Sullivan, 2017](#)). This literature focuses on the impact of family law and inheritance or property rights reforms and finds positive impacts on women's empowerment in different contexts.³ While this paper shows that formalization has some positive impact on women bargaining power, it emphasizes that additional rights might not be sufficient if husbands are able to limit investments in their wives' businesses when they become formal. This result resonates with recent findings from [Bernhardt et al. \(2019\)](#) showing that cash grants given to women entrepreneurs are often invested in their husband's activity, offering an explanation for the large gender gap in returns to capital found in several cash drop experiments ([de Mel et al., 2008](#), [de Mel et al., 2009](#), [Fafchamps et al., 2014](#)). However, [Bernhardt et al. \(2019\)](#) cannot assess whether it is a voluntary decision or not. This paper pushes this literature a step further by showing that many female entrepreneurs, especially when they have formal rights on their business, are willing to pay to get

³[Stevenson and Wolfers \(2006\)](#) and [Voena \(2015\)](#) in the United States, [Hallward-Driemeier and Gajigo \(2015\)](#) in Ethiopia, [Deininger et al. \(2013\)](#) and [Roy \(2015\)](#) in India, [Goldstein et al. \(2018\)](#) in Benin and [Harari \(2019\)](#) in Kenya.

more control on this type of cash grant. It suggests that these women are constrained in their investment decisions and that when they invest cash grants in their husband's activity (as found in [Bernhardt et al. 2019](#)), it is not a personal choice.

Second, this paper contributes to the family economics literature that studies intra-household bargaining processes. In many economic models, individual property rights are a key parameter for bargaining powers because they determine outside options of household members ([Chiappori, 1988](#), [Browning et al., 2014](#)). This paper contributes to the literature that provides empirical tests of these models and highlights the role of individual income and asset ownership on bargaining power and revenue allocation ([Lundberg et al., 1997](#), [Fafchamps and Quisumbing, 2002](#), [Duflo, 2003](#), [Doss, 2006](#), [Anderson and Mukesh, 2009](#), [Wang, 2014](#), [Almas et al., 2018](#)). My result that formalization increases entrepreneurs' control over household revenue is consistent with this literature and in particular with [Wang \(2014\)](#) who in a related paper finds that increasing individual property rights on housing assets in China increases individual bargaining power measured by household consumption of male or female preferred goods. However, these models do not explain my second result that women entrepreneurs who became formal have both more bargaining power on revenue and higher willingness to pay to hide income. I'm able to reconcile this finding using an extended version of the collective household model in which men have more agency regarding investment decisions. Formalization makes hiding more attractive for women because stronger property makes investment in the business more attractive.

Finally, this paper adds to a large body of work that studies intra-household inefficiencies. This work identifies reasons why household decisions can be inefficient ([Browning et al., 2014](#), [Baland and Ziparo, 2018](#)). A first reason is described in theoretical work such as [Lundberg and Pollak \(2003\)](#), [Chen and Woolley \(2001\)](#) and [Basu \(2006\)](#) who show that non-cooperative behaviors and endogenous bargaining powers can generate inefficiencies when spouses cannot coordinate (for example because they cannot commit to staying together). [Walther \(2018\)](#) provides some empirical support

for these theories by showing, using variation in land rights in Malawi, that individuals allocate more time to agricultural work when household land is their own, even if it lowers overall household consumption. This is consistent with the positive impact of formalization on investment that I find for female entrepreneurs. A second type of inefficiency can arise from social norms such as norms that prevent women from earning higher revenue than their husband (Bertrand et al., 2015), norms that determine gender specific activities (Udry, 1996) and norms that “force” people to redistribute more income than they would like (Platteau, 2000, 2014, Grimm et al., 2016). Norms of redistribution are especially important in developing contexts and a recent literature shows that many individuals and entrepreneurs are willing to undertake costly strategies to escape it. This includes pretending to be poor by contracting unnecessary loans (Baland et al., 2011), investing in non-sharable assets (Falco and Bulte, 2011) or hiding income (Ashraf, 2009, Jakiela and Ozier, 2016, Boltz et al., 2019, Beekman et al., 2015, Squires, 2018, Almas et al., 2018). Consistent with this literature, I find that many entrepreneurs in Benin (a quarter in my sample in the control group) are willing to pay to hide resources from their household, suggesting important inefficiencies. A contribution of this paper is to show that formal property right institutions such as firms’ legal status have a large impact on income hiding and intra-household inefficiencies. This paper is among the first to study what can (causally) determine income hiding (to my knowledge, Almas et al. (2018) which studies the effect of targeting women with a cash transfer program on their willingness to pay to hide is the only exception⁴).

The rest of this paper proceeds as follows. Section 2 provides background on intra-household relationships, entrepreneurship and firm formalization in Benin. Section 3 outlines a model describing how formalization and stronger property rights can affect investment decisions and bargaining power within the household. Section 4 provides

⁴Other papers using the willingness to pay to hide income as a measure of intra-household inefficiencies take different approaches. Jakiela and Ozier (2016) and Beekman et al., 2015 analyze the correlates of intra-household inefficiencies, Boltz et al. (2019) study how individuals use their revenue when they are able to hide it, and Squires (2018) looks at the effect of intra-household inefficiencies on firm productivity.

details on the experiment design and program implementation while Section 5 describes the data and empirical specification. Section 6 presents the empirical findings and robustness checks. Section 7 concludes and outlines avenues for future research.

2 Context

2.1 Gender Norms and Intra-Household Relationships in Benin

This study takes place in Cotonou the economic capital of Benin⁵. The existing anthropological and economic literature in Benin suggests that the unitary model of the household is not likely to be adapted to this context. [Falen \(2011\)](#), who studies family relationships among the Fon, the dominant ethnic group in Cotonou, describes an important competition between spouses: "while men invoke their customary rights as authorities, women skillfully manipulate cultural norms, kin networks, and supernatural resources to win arguments". [Lemay-Boucher and Dagnelie \(2014\)](#) also find evidence of non-cooperative behaviors among couples living in Cotonou. They show that husband and wife's financial spheres are largely disconnected and that spouses are secretive about their personal resources. This evidence applies to a large extent to other African countries. In a closely related context, [Friedson-Ridenour and Pierotti \(2019\)](#) provide qualitative evidence that women entrepreneurs in urban Ghana hide income and savings in order to reinforce their husband responsibility as a primary provider of household needs.

Traditional norms define roles and duties of husbands and wives in Benin. Husbands have more agency with respect to household economic decisions, but they also have to

⁵Benin is a low income country in West Africa with a per capita GDP of USD 1,979 in 2011 (UNDP, 2014). Benin ranks 166th out of 187 countries in the Human Development Index (UNDP, 2014) and 155th out of 199 countries on the World Bank Doing Business ranking in 2017. In 2013, Cotonou, had a total population of 680,000 inhabitants (2013 national population census, INSAE). According to Demographic and Health survey data, in 2013, 48.5 percent of the population was Christian, 27.7 percent Muslim, 11.6 percent Vodun and 12.2 percent had another or no religion. 20 percent of Beninese couples were also living in polygamous unions.

provide for the family and should contribute more to household expenses. Women are expected to bring a secondary source of income and to pay for some specific expenses like water or food. [Falen \(2011\)](#) also describes in details how "people are generally willing to take, borrow, beg or in any way extract money from one another".

Another important characteristics of Benin (and many sub-Saharan countries) is that the threat of divorce or separation is important in this context. [Clark and Braumer-Otto \(2015\)](#) use Demographic and Health Survey data to estimate trends in divorce rates in sub-Saharan Africa (for both formal and traditional marriages). They estimate the probability of divorce for a couple within 15 years of the wedding to be 14.3 percent in Benin in 2012⁶.

Formal legal norms in Benin are considered as been more favorable to women than in other countries in West-Africa ([Hallward-Driemeier, 2013](#)). The Family Code adopted in 2004 significantly improved the legal situation of women by defining equal rights for men and women relative to parental authority and inheritance, by suppressing polygamy and levirat (obligation for a widow to marry her brother-in-law) and by increasing women legal age for marriage to 18 years old. The default marital property regime is the separation of property: all property acquired during and prior to the marriage are individually owned by one spouse. In case of divorce, spouses keep individually all assets if she can prove her ownership. However, these formal norms are difficult to enforce due to the lack of formal property title, in particular on businesses, land or other important assets. Formalization could be useful in case of divorce because it gives to entrepreneurs a way to formally prove their ownership of the business.

2.2 Entrepreneurship and Firm Formalization in Benin

In Benin, a large majority of micro, small and medium firms operate in the informal sector which represented up to 70 percent of GDP and 95 percent of employment in

⁶This rate is lower than the sub-Saharan average (24.8 percent), but comparable to other countries in West-Africa such as Nigeria (12 percent), Burkina Faso (11 percent), and Ivory Coast (22 percent) ([Clark and Braumer-Otto, 2015](#))

2009 (INSAE, 2009). In Cotonou, 59 percent of women between 15 and 49 years old are working. This is relatively high compared to similar countries but still lower than men labor force participation at 70 percent. Self-employment is a dominant form of employment and 90 percent of the labor force is self-employed in Cotonou (DHS, 2013).

This study is based around the introduction of the *entreprenant* status in Cotonou. This status was adopted in 2011 and made available to entrepreneurs in April 2014 when this study started. Formalization with the *entreprenant* status can be done in one business day at no direct cost and is available to all business with a limited turnover⁷. Businesses can also use other formal status with no limitation on turnover such as *individual enterprise* or *limited liability company*. These status are also available in one business day but at some cost (CFAF 5,000 to 17,000 or USD 8 to 29). Firm registration is done at the *GUFE* ("*Guichet Unique de Formalisation des Entreprises*"), the one-stop-shop office in Cotonou that gathers services of the tax administration and of the chamber of commerce. When a business becomes formal a card with the name of the owner (with the *entreprenant* status it is limited to one person), her picture, her tax unique identifier and the address of the business is issued. This card is a legal document equivalent to a property title and constitutes the ID card of the business. Figure 1 shows an example of an *entreprenant* card.

As described extensively in Benhassine et al. (2018), the relationship between tax and formalization in Benin is complex. However, it has no or limited impact within the time frame of this study due to a two-years tax exemption for newly formalized firms. Then, when the tax exemption is over, most firms will pay higher taxes⁸

Another implication of formalization in Benin is that firms are expected to do some basic accounting. Firms are informed of that obligation when they register with the

⁷CFAF 30 million for traders. CFAF 20 million for craftsmen, CFAF 10 million for services.

⁸This is mainly due to the fact that it is easier for the tax administration to collect taxes on formal firms because they can use additional information on business location that are not available for informal firms. In practices most formal firms receive tax notifications and go to the tax office by themselves to pay tax while informal firms only pay taxes if they are visited by a tax inspector and are open during this visit. Conditional on paying any tax, tax rate are also higher for formal firms.

administration. A reason for that is that the tax system applicable to small business (including *entreprenant*) is based on firm turnover which requires some basic accounting to be calculated. In practices, this obligation is not enforced and doing some accounting is more an individual decision of the entrepreneur. The likelihood of being fined for not doing accounting is very low for small firms and tax inspectors can approximate turnovers when accounting records are not available. Doing some accounting might be advantageous for formal firms if it is a way to make sure the amount of tax paid is not based on an approximation.

Figure 1: The *Entreprenant* Card Identifying a (Unique) Business Owner



2.3 Formalization has Limited Effects on Business Outcomes in this Context and Time Frame

The main hypothesized advantages of formalization in Benin are related to access to the banking system (formal credit and possibility to open a bank account for the business),

access to new markets (large formal firms and government contracts), access to export license and access (usually at some cost) to government programs providing business training and services. However, we show in [Benhassine et al. \(2018\)](#) that in this context and time frame, formalization had no or limited impact on access to credit, access to new markets, business practices, firm profits and sales and number of employees. In the appendix table A1, I show that it is also the case in my sample restricted to entrepreneurs who have a partner, and for both female and male entrepreneurs.⁹ These results allow me to interpret formalization as a shock on individual property rights in a context where other business outcomes are not affected.

3 Theoretical Framework

I use a model to describe investment decisions and bargaining within the household. This model extends the standard collective model of the household ([Chiappori, 1988](#)) in two directions : first, it allows investment decisions to affect future bargaining power by changing the value of outside options (as in [Walther, 2018](#)) ; second, it allows each spouse to hide a windfall transfer from their partner, mimicking the incentivized questions implemented in the survey.¹⁰

3.1 General Setup

Consider a female entrepreneur A and her husband B also entrepreneur. Each spouse maximizes (non-cooperatively) her own utility derived from the consumption of x_A for A and x_B for B . The female entrepreneur uses capital K_A as input to produce an output valued at $f(K_A)$. Her husband produces $g(K_B)$ using K_B . f and g are increasing and concave functions of K_A and K_B respectively.

This model has four steps:

⁹There is a negative impact on tax paid (significant only for men) due to the two-years tax exemption that newly formalized firms can get.

¹⁰Note that the goal of this section is to provide a conceptual framework compatible with my main empirical results rather than to develop a new theory.

- **Step 1 - Hiding decisions:** each entrepreneur receives a windfall transfer G_i ($i = A, B$) that she can hide to her partner ($\pi_i = 1$, $i = A, B$) or not ($\pi_i = 0$). Hiding the transfer is costly and implies receiving a smaller amount $G_i(1 - p)$ ($i = A, B$), with $p \in 0, 1$. Hiding is not observed by the other spouse.
- **Step 2 - Investment decisions:** I assume that the husband decides completely how the available household capital $((1 - \pi_A)G_A + (1 - \pi_B)G_B)$ is allocated between the two businesses in K_A and K_B ¹¹. This assumption is based on the idea that in this context (as in many contexts), men are more likely to take productive decisions while women have more responsibility within the household.¹² A women entrepreneur who chose to hide can invest secretly a share ϕ of the transfer in her own business. For the husband, this makes no sense because he decides investment levels.
- **Step 3 - Production and income allocation:** each entrepreneur produces an output using the capital received at step 2. Production levels are perfectly observable. Total household revenue $Y = f(K_A) + g(K_B)$ is then allocated through an efficient bargaining process.¹³ The husband receives a share $\sigma(z)$ of total revenue and the wife a share $(1 - \sigma(z))$, with $d\sigma/dz > 0$. z , the distribution factor, is defined as the relative share of total household revenue kept by the husband in case of separation. That is $z = [\alpha f(K_A) + \lambda g(K_B)]/Y$, with α and λ being respectively the shares of $f(K_A)$ and $g(K_B)$ that he would keep, and which depends on formal and informal norms governing divorce. A similar assumption

¹¹While in the interest of simplicity I take here an "extreme" case in which the husband decides alone investments, I get similar results when I take a less extreme assumption and only assume that he has more agency than his wife regarding investment decisions. This would be the case for example if investment decisions were also determined through a bargaining process depending on initial endowments (assuming that men have on average larger endowments).

¹²This idea is empirically supported by the anthropological literature on Benin described previously which suggests that men have more responsibility in productive decisions (or at least more than women). It is also consistent with [Bernhardt et al. \(2019\)](#) who find evidence that cash grants given to female entrepreneurs are often invested in their husband's activity.

¹³In this case, efficient means that there is no "waste" of resource during the bargaining process. See [Browning et al., 2014](#) for a review of the literature on efficient bargaining and non-cooperative models.

is made in [Browning et al. \(1994\)](#), [Hoddinott and Haddad \(1995\)](#) and [Walther \(2018\)](#).

- **Step 4 - Consumption:** each entrepreneur consumes her respective share of household revenue, as well as the amount they chose to hide that was not invested previously (the full transfer for the husband and a share $(1 - \phi)$ for the wife).

The women entrepreneur maximizes her utility by first choosing whether or not to hide the transfer (π_A), and second, by choosing how to use the hidden transfer (ϕ for investment and $(1-\phi)$ for consumption). Her problem consists of:

$$\max_{\pi_A=0,1,\phi} U_A(x_A)$$

s.t.

$$x_A = (1 - \sigma(z_A)) \left(f(K_A + \phi\pi_A G_A(1 - p)) + g(K_B) \right) + (1 - \phi)\pi_A G_A(1 - p) \quad (1)$$

$$z_A = \frac{\alpha f(K_A + \phi\pi_A G_A(1 - p)) + \lambda g(K_B)}{f(K_A + \phi\pi_A G_A(1 - p)) + g(K_B)} \quad (2)$$

The husband maximizes his utility by allocating available capital in the two businesses (K_A and K_B) and by choosing whether to hide his transfer or not (π_B). His problem is:

$$\max_{K_A, K_B, \pi_B=0,1} U_B(x_B)$$

s.t.

$$x_B = \sigma(z_B) \left(f(K_A) + g(K_B) \right) + \pi_B G_B(1 - p) \quad (3)$$

$$K_A + K_B = (1 - \pi_B)\theta_B G_B + (1 - \pi)G_A \quad (4)$$

$$z_B = \frac{\alpha f(K_A) + \lambda g(K_B)}{f(K_A) + g(K_B)} \quad (5)$$

Importantly, both spouses take into account the effects of their decisions on investment levels on their future outside option and bargaining power. As a result, z can be different from z_A and z_B depending on each spouse's hiding strategy. This adjustment

is done ex-post when the entrepreneurs observe realized production levels. Since the model is static, there is no effect of hiding on the future relationship. This assumption is made to keep the model simple, but the results are very similar when I introduce some uncertainty about the windfall transfer (each spouse receives a transfer with a certain probability) and when I allow the husband to form expectations about whether his wife is hiding or not based on observed capital.¹⁴

3.2 Direct Effect of Formalization

As seen in section (2.3), formalization in this context and time framed has limited impact on business economic outcomes such as profits, sales or number of employees. In this model, I therefore consider that the business production functions f and g are not impacted by formalization and I only focus on the impact within the household. I assume that firm formalization is to strengthen formal individual property rights on the business, increasing the share of the business she would keep in case of divorce.¹⁵ In the model, formalization therefore impacts the parameters α and λ :

- When the **wife becomes formal**, α **decreases**
- When the **husband becomes formal**, λ **increases**.

This model is solved by backward induction. I first derive the husband’s optimal choices and discuss how these choices are impacted by formalization, before doing the same for the wife.

3.3 Impact of Formalization on Husband’s Optimal Decisions

The husband chooses investment levels K_A^* and K_B^* that satisfy his first order conditions:

¹⁴The husband expected value of z would be $E(z) = E(z/hiding).Proba(hiding) + E(z/not.hiding).Proba(not.hiding)$ which would be higher than z_B is the simple case. This would imply that ex-post the difference between z_A and z_B would be smaller.

¹⁵Note that even if divorce laws are not perfectly enforced in practice, formalization could still impact effective property rights on business capital and profits through behavioral mechanisms like labeling or mental accounting (Thaler, 1992, Duflo and Udry, 2004).

$$\begin{aligned}
f'(K_A) &= g'(K_B) + \left(\frac{dz_B}{dK_B} - \frac{dz_B}{dK_A} \right) Y \frac{\sigma'(z_B)}{\sigma(z_B)} \\
\Leftrightarrow f'(K_A) &= g'(K_B) + (\lambda - \alpha) \left(g'(K_B) f(K_A) + f'(K_A) g(K_B) \right) \frac{\sigma'(z_B)}{Y \sigma(z_B)} \quad (6)
\end{aligned}$$

A first key result of this model is that when λ is different from α , there is a wedge that keeps us away from the optimal investment levels in which household revenue is maximized and $f'(K_A^*) = g'(K_B^*)$.¹⁶ When $\lambda > \alpha$ (ie. the husband has more property rights on his business than on the business of his wife), $f'(K_A^*) > g'(K_B^*)$ and the husband over-invests in his own business.

Taking into account the impact of his decisions on future bargaining power, the male entrepreneur chooses π_B by comparing his consumption levels if he hides (x_B^H) and if he does not (x_B^N):

- If he chooses to hide: $K_A + K_B = G_A$ and he invests K_A^H and K_B^H that satisfy the first order conditions. $z = z^H$ and $x_B^H = \sigma(z^H)Y^H + G_B(1 - p)$.
- If he doesn't hide: $K_A + K_B = G_A + G_B$ and investment is equal to $K_A^N > K_A^H$ and $K_B^N > K_B^H$. $z = z^N > z^H$ and $x_B^N = \sigma(z^N)Y^N$.

Hiding is more attractive if:

$$\begin{aligned}
x_B^H > x_B^N &\Leftrightarrow \sigma(z^H)Y^H + G_B(1 - p) > \sigma(z^N)Y^N \\
&\Leftrightarrow p < 1 + \frac{\sigma(z^H)Y^H - \sigma(z^N)Y^N}{G_B} \quad (7)
\end{aligned}$$

The husband chooses to hide when the direct cost of hiding is smaller than the direct benefits in term of consumption adjusted by the potential loss of total household revenue due to lower investment levels when the husband is hiding.

¹⁶ $f'(K_A^*) = g'(K_B^*)$ is the outcome of a cooperative model in which the household maximizes total profits (Chiappori, 1988, 1997).

If the male entrepreneur becomes formal, his property rights becomes more effective and λ is higher. I derive formally the relationship between λ and the decision of hiding by looking at $d\bar{p}/d\lambda$. With \bar{p} defined as the maximum value of p such that the male entrepreneur prefers to hide (equation (7) holds). In other words, \bar{p} is the maximum willingness to pay to hide a windfall transfer to the spouse. It is similar to the incentivized questions I use in my empirical survey. From equation (7), I can derive:

$$\frac{d\bar{p}}{d\lambda} = \frac{\sigma'(z^H)g(K_B^H) - \sigma'(z^N)g(K_B^N)}{G_B} \quad (8)$$

$d\bar{p}/d\lambda$ is **negative** if $\sigma'(z^N)g(K_B^N) > \sigma'(z^H)g(K_B^H)$. Since $g(K_B^N) > g(K_B^H)$ and $z^N > z^H$, it is the case if $\sigma(z)$ is convex (and so $\sigma'(z^H) > \sigma'(z^N)$) or if it is concave but not sufficiently to overcome the difference between $g(K_B^N)$ and $f(K_B^H)$. Intuitively, formalization increases the value of the husband's outside option and his bargaining power. The share of total revenue that the husband gets if he invests the transfer increases which makes hiding less attractive.

3.4 Impact of Formalization on Wife's Optimal Decisions

To better isolate main mechanisms, I first assume that the wife can only hide for investment purposes ($\phi = 1$). I will relax this assumption later and detail the more general case in which ϕ can be lower than 1.

Taking into account her husband's optimal strategy, the woman entrepreneur chooses π by comparing her consumption levels if she hides (x_A^h) and if she does not (x_A^n):

- If she hides ($\pi = 1$), she invests secretly her transfer $G_A(1 - p)$ in her business. She assumes that her husband will allocate his capital G_B in the two businesses, and that he will choose K_A^* and K_B^* such that the first order conditions are satisfied. Total household production is given by $Y^h = f(K_A^h) + g(K_B^*)$ with $K_A^h = K_A^* + G_A(1 - p)$. The distribution factor z is equal to $z^h = [\alpha f(K_A^h) + \lambda g(K_B^*)] / Y^h$ and $x_A^h = (1 - \sigma(z^h))Y^h$.

- If she does not hide ($\pi = 0$), $K_A + K_B = G_B + G_A$ and she assumes that her husband will choose K_A^{**} and K_B^{**} that satisfy his first order conditions. Total production is equal to $Y^n = f(K_A^{**}) + g(K_B^{**})$, the distribution factor z to $z^n = [\alpha f(K_A^{**}) + \lambda g(K_B^{**})]/Y^n$ and $x_A^n = (1 - \sigma(z^n))Y^n$.

The female entrepreneur chooses to hide if $x_A^h > x_A^n$ or if:

$$(1 - \sigma(z^h))Y^h > (1 - \sigma(z^n))Y^n \quad (9)$$

Note that when p and G_A are small (and G_B sufficiently large), hiding is always better. Indeed, we know from the first order conditions that the husband "over-invests" capital in his own business ($f'(K_A^*) > g'(K_B^*)$), and therefore that at the margin, total production is higher when the wife hides and invests in her own business ($Y^h > Y^n$).

For women entrepreneurs, the impact of formalization is to decrease α . From the husband's first order conditions (equation 6), we see that when α decreases, husband's incentive to over-invest in his own business also increases. Intuitively, it suggests that women should also be more willing to pay to hide (to invest) to compensate for the increased inefficiency.

I derive formally the relationship between α and the decision of hiding (for investment purposes) by looking at $d\bar{p}/d\alpha$. When $p = \bar{p}$, I have:

$$D(\bar{p}, \alpha) = (1 - \sigma(z^h))Y^h - (1 - \sigma(z^n))Y^n = 0$$

Differentiating $D(\bar{p}, \alpha)$, I get :

$$\frac{d\bar{p}}{d\alpha} = \frac{D'(\alpha)}{D'(\bar{p})} = \frac{[\sigma'(z^n)f(K_A^*) - \sigma'(z^h)f(K_A^h)]Y^h}{(\lambda - \alpha)G(1 - p)f'(K_A^h)g(K_B^{**})\sigma'(z^h)} \quad (10)$$

$d\bar{p}/d\alpha$ is **negative** if $\sigma'(z^h)f(K_A^h) - \sigma'(z^n)f(K_A^*) < 0$. Since $f(K_A^h) > f(K_A^*)$ and $\sigma'(z) > 0$ and $z^h > z^n$, it is the case under reasonable assumptions regarding the functional form of $\sigma(z)$. Specifically, $d\bar{p}/d\alpha < 0$ if $\sigma(z)$ is convex (and so $\sigma'(z^h) > \sigma'(z^n)$)

or if it is concave, but not sufficiently to overcome the difference between $f(K_A^h)$ and $f(K_A^*)$.

I can now allow the female entrepreneur to also hide for consumption purposes. If she chooses to hide ($\pi = 1$), she can invest a share ϕ in her business and consume a share $(1 - \phi)$ without having to share with her partner. Using the same notations, the female entrepreneur chooses to hide if $x_A^h > x_A^n$ or if:

$$(1 - \sigma(z^h))Y^h + (1 - \phi)G_A(1 - p) > (1 - \sigma(z^n))Y^n \quad (11)$$

When $p = \bar{p}$, I have :

$$D(\bar{p}, \alpha) = (1 - \sigma(z^h))Y^h + (1 - \phi)G_A(1 - p) - (1 - \sigma(z^n))Y^n = 0$$

Differentiating $D(\bar{p}, \alpha)$, I get :

$$\frac{d\bar{p}}{d\alpha} = \frac{D'(\alpha)}{D'(\bar{p})} = \frac{[\sigma'(z^n)f(K_A^*) - \sigma'(z^h)f(K_A^h)]Y^h}{(\lambda - \alpha)G(1 - p)f'(K_A^h)g(K_B^{**})\sigma'(z^h) - (1 - \phi)G_A} \quad (12)$$

The sign of $d\bar{p}/d\alpha$ also depends on the sign of the denominator of equation (12). There are now two effects going in opposite directions. On the one hand, formalization by reducing α makes investment in the business more attractive and has a positive effect on \bar{p} . On the other hand, formalization also increases bargaining power by raising the value of the outside option. This second effect makes hiding less attractive because the wife gets a larger share of total household revenue (which drives \bar{p} toward zero).

3.5 Summary of Model Results

I use a bargaining model in which investment decisions determine the outside option of each spouse and their future bargaining power in the allocation of household revenue. In this model, the husband has more control on household investment which leads to

over-investment in his own activity. Indirectly, it also creates incentives for his wife to hide capital and invest secretly in her own business. In this framework, formalization increases property rights and the share of the business that the entrepreneur would keep in case of separation. It has the following predicted effects:

- Formalization raises the value of the entrepreneur’s outside option and increases his or her share of household’s revenue ($\sigma(z)$ for the husband and $(1 - \sigma(z))$ for the wife).
- Formalization raises individual incentives to invest in the business newly formalized to further increase the value of future outside option.
- For male entrepreneurs who control investment decisions in their household, formalization should reduce the willingness to pay to hide the windfall transfer (\bar{p}). They hide less because they have more control on revenue.
- For female entrepreneurs, the overall effect of formalization on the willingness to pay to hide (\bar{p}) depends on which effect dominates. If the effect on household revenue share dominates, then formalization should reduce \bar{p} . If the effect on investment dominates, formalization should increase \bar{p} . Importantly, this would imply that female entrepreneurs are constrained in their investment decisions. If they are able to hide capital in the "real life" (or to find alternative strategies to overcome this constraint), investment in the business should increase.

While the main purpose of this model is to better interpret empirical findings from the incentivized windfall transfer game described below, it is important to note that hiding in the model is conceptually not very far from typical decisions that many entrepreneurs regularly take. Strong empirical evidence, especially in Africa, shows that many entrepreneurs undertake costly behaviors (like hiding in the model) to get more control on their decision and reduce informal taxation from relatives ([Baland et al., 2011](#), [Falco and Bulte, 2011](#), [Ashraf, 2009](#), [Jakiela and Ozier, 2016](#), [Boltz et al., 2019](#), [Beekman et al., 2015](#), [Squires, 2018](#) [Almas et al., 2018](#)).

4 Experimental Design and Data

4.1 The *Entreprenant* Study

The *entreprenant* status was introduced in Cotonou in April 2014. While this status was made available to any firm operating in Cotonou, very few firms were aware of its creation at that time. Instead of informing the general public of the creation of this status, the Government of Benin decided instead to implement a randomized experiment to learn how to best incentivized firms to become formal¹⁷. Different combinations of the following three packages of incentives were tested¹⁸.

Package A of incentives included information on the new *entreprenant* status and help in the registration process. This information and assistance was provided in-person and in the firm premise by trained program officers working for the CGA (“*Centre de Gestion Agréés*”), a semi-public organization specialized in micro-business counseling. Entrepreneurs received detailed information about the benefits of formalization and program leaflets on the *entreprenant* status, the tax regime applicable to *entreprenants* and the registration process.

Package B of incentives included additional business and bank services. Firms who choose to become formal also benefited from free business training and counseling services also provided by the CGA. This included a one-hour in-person personalized training provided in the firm premise (and not conditional on formalization) and additional in-class business training designed for *entreprenants*. In-class trainings included four 1.5 days workshops on basic accounting, initiation to tax obligations, financial education and micro-business management. In addition, firms who decided to become formal were also offered support to open a bank account at better conditions than the

¹⁷Indeed, at that time, existing evidence from Latin America and Asia suggested that introducing this type of status had only limited impact on formalization and that additional incentives might be necessary (Bruhn and McKenzie, 2014).

¹⁸Benhassine et al. (2018) describe in more details how the program was designed and implemented.

market in two commercial banks participating in the project.¹⁹

Finally, Package C of incentives included tax mediation services. This package was designed to address the potential concerns related to taxes. It included information on the tax system applicable to *entreprenants*, assistance in filing tax forms if needed and mediation services in case of problem with the tax administration.

3,596 informal businesses (I describe in details the sample selection below) were randomly allocated into a control group and three treatment groups receiving different combinations of the three packages.²⁰ In order to get more statistical power, and because this paper focuses on the impact of formalization on other outcomes (rather than on the impact of the different types of incentives), I'm pooling all treatment groups together for most of the analysis (I look at the impact separately by initial treatment groups as a robustness check). The randomization was conducted in office using STATA and was stratified on key firm characteristics: business owner gender, business operating in Dantokpa market (the largest market of Cotonou), trader, business owns a bank account, and a Z-score averaging standardized profits, turnover and number of employees. In total, 2,399 informal firms were allocated to one of the treatment groups and 1,197 to the control group.

Between April 2014 and January 2015, CGA advisers conducted in-person visits to all the firms in the treatment group to inform them about the program, to describe the benefits of the *Entreprenant* status and explain the additional incentives. They were able to reach out successfully with 98 percent of the targeted firms. Firm owners had then to decide whether or not to become formal. Firms who became formal were next eligible to additional benefits (packages B and C). Additional benefits were provided between September 2014 and May 2016. 62 percent of firm owners who registered in the treatment group also participated to at least one group training session with the

¹⁹The *entreprenant* bank accounts designed by the two banks are cheaper than usual business bank accounts (CFAF 1,000 per month, or USD 1.7, against CFAF 2,000, or USD 3.4) and did not require initial deposit.

²⁰The group 1 (300 entrepreneurs) received package A of incentives, the group 2 (800 entrepreneurs) packages A and B, and the group 3 (1200 entrepreneurs) packages A, B and C.

CGA (14 percent of the total sample). In addition, 30 percent of them (6.2 percent of total) also opened an *Entreprenant* bank account at the partner banks. However, we show in [Benhassine et al. \(2018\)](#) that these bank accounts simply replaced other types of bank account already available to entrepreneurs and that there was on average no impact of the program on bank account ownership.

These results on the take-up rates on different component of the program are important for the interpretation of the results as it means that formalization in this context comes with some additional benefits (mainly in-class group business training on accounting). I discuss in the robustness section to what extent this is important and show that my results are not driven by these additional incentives.

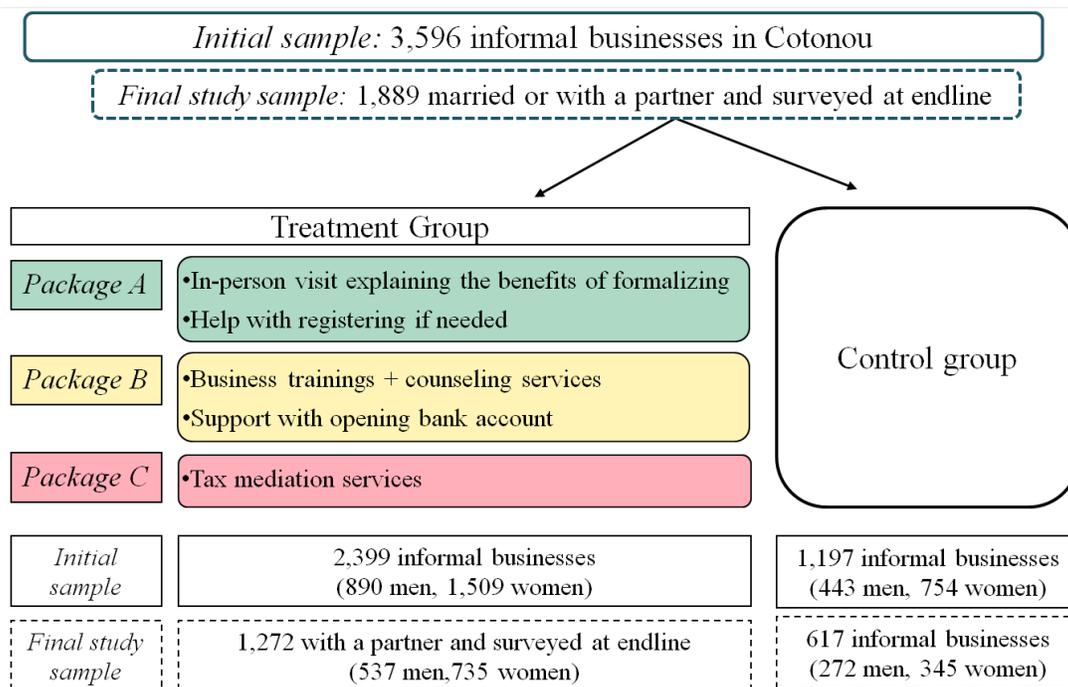
4.2 Sample Characteristics and External Validity

The *entreprenant* study population was identified through a listing survey conducted in March and April 2014. This survey is representative of all informal entrepreneurs operating in Cotonou with a fixed location (except liberal professions and international and nationwide companies). During this survey, 19,246 businesses were listed and 7,945 surveyed with a short baseline survey. Then, firms with very high or low level of profits and sales and firms already formal (608 firms or 7.6 percent of total) were dropped in order to get the original *entreprenant* study sample of 3,596 firms. Because this paper focuses on intra-household relationships, I further restrained the original *entreprenant* sample to entrepreneurs who are married or have a partner (73 percent of the initial sample), and were successfully surveyed and still operating at the endline survey.²¹ I end up with a final study sample of 1,889 informal firms, 1,272 in a treatment group and 617 in the control group. Figure 2 summarizes the study design and the sample sizes.

Table 1 (columns 1 to 4) shows baseline characteristics of female and male business

²¹Since information on the marital status of respondents was only available at endline, I can only restrain the sample ex-post using post-attrition endline survey data

Figure 2: Experimental Design



Notes: The initial sample corresponds to the sample used for the randomization in the initial *entrepreneur* study. The final study sample corresponds to the sample used in this paper (entrepreneurs married or with a partner who were surveyed at endline)

owners for the final sample used for this paper (informal entrepreneurs with a fixed location who have a partner and where surveyed at endline). Business owners are on average 40 years old, have monthly profits close to CFAF 50,000 (USD 84) and some level of formal education for 67 percent of women and 80 percent of men. The main difference between female and male entrepreneurs is the sector of activity. Women are much more likely to do trade (68 percent against 24 percent) while men are more likely to operate in craft (37 percent against 8 percent). Female business owners are also slightly less likely to do some form of accounting (15 percent against 21 percent) and to pay any tax (50 percent against 64 percent).

To get a sense of the external validity of this sample, Table 1 also shows characteristics of all informal (columns 2 and 5) and formal businesses (columns 3 and 6) in Cotonou. Overall, both female and male entrepreneurs in the study population have

characteristics that are similar to those of the whole population of informal firms. It suggests a good external validity of the study sample relative to the whole informal sector. As expected, formal firms are much larger than informal ones. They have twice as many employees on average, make several times more profits and sales, and are more likely to pay taxes and to do accounting.

Table 1: Sample Characteristics and External Validity

	(1)	(2)	(3)	(4)	(5)	(6)
	Female Business owners			Male Business owners		
	All			All		
	Study Sample ^a	informal businesses	Formal businesses	Study Sample ^a	informal businesses	Formal businesses
	Mean [SD]	Mean [SD]	Mean [SD]	Mean [SD]	Mean [SD]	Mean [SD]
Age of the owner	40.3	40.9	45.9	37.3	36.9	42
Owner has some formal education	0.665	0.656	0.863	0.82	0.796	0.9
At least some secondary education	0.357	0.355	0.706	0.468	0.424	0.765
Operates in Trade	0.681	0.681	0.761	0.237	0.239	0.456
Operates in Services	0.227	0.229	0.188	0.33	0.358	0.312
Operates in Craft	0.088	0.082	0.039	0.365	0.321	0.127
Firm area in m ²	14 [12.8]	13.7 [17.9]	29 [63.2]	31.9 [79.2]	26.3 [79.8]	69.5 [126.5]
Connected to electricity network	0.587	0.571	0.878	0.695	0.662	0.912
Number of employees (including the owner)	1.091 [1.645]	0.851 [1.434]	1.996 [3.471]	1.708 [1.885]	1.337 [1.816]	3.657 [5.145]
Number of non-paid family help	0.594 [0.994]	0.504 [0.935]	0.6 [0.899]	0.22 [0.59]	0.203 [0.565]	0.224 [0.625]
The firm does any form of accounting	0.151	0.145	0.577	0.21	0.175	0.689
Amount of sales in an average week (in cfaf)	65,916 [59,448]	88,499 [264,365]	811,592 [6,721,361]	50,640 [50,623]	72,558 [349,875]	343,643 [931,639]
Amount of profits in the last month (in cfaf)	47,375 [50,401]	48,588 [168,561]	165,230 [396,064]	47,929 [44,037]	42,750 [74,376]	268,239 [902,023]
Firm owner has a bank account	0.18	0.166	0.722	0.299	0.242	0.838
Firm pays taxes	0.505	0.42	0.868	0.647	0.545	0.813
Amount of taxes paid in the previous year (in cfaf)	15,519 [25,467]	12,863 [24,375]	86,127 [345,975]	26,204 [30,211]	23,282 [38,579]	486,328 [3,393,508]
Observations	1,080	4,478	255	809	2,611	352

Notes: Sources: listing-baseline survey March 2014. Standard deviations presented in brackets. ^a : Post-attrition study sample (informal businesses married or with a partner).

Since the baseline survey did not include any information on entrepreneur's house-

hold characteristics, I use endline survey data to describe household composition and intra-household relationships in the sample. I restrain the sample to the control group to avoid potential issues of endogeneity. On average, entrepreneurs have 3.5 children and live in households with slightly less than 6 members (see appendix Table A2). 12 percent of male entrepreneurs are polygamous while 24 percent of female entrepreneurs have a partner who is polygamous. There are important differences between male and female entrepreneurs. Men entrepreneurs declare contributing to around 90 percent of the household expenditures and to 45 percent of the personal expenditure of their wife. Female entrepreneurs declare contributing to a smaller but significant part of household expenditure (between 23 percent for housing expenditure to 46 percent for food), and to a small part of their husband’s expenditure (8 percent).

Differences between male and female entrepreneurs are difficult to interpret as they could reflect different selection processes into entrepreneurship. Moreover, they could also come from differences in declaration bias. If the declaration bias follows the overall gender norms (that men should be the main provider of their household), men would over-declare their contributions while it would be the opposite for women. For these reasons, I look separately at men and women and refrain from interpreting too much gender differences in this paper. In the robustness checks section, I discuss to what extent my results can be explained by other differences between male and female entrepreneurs.

4.3 Data and Outcomes

I use two main sources of quantitative data: administrative data on firm registration and surveys with business owners.

4.3.1 Administrative Data on Firm Formalization

To measure formalization, I follow [Benhassine et al. \(2018\)](#) and use monthly administrative data on firm registrations provided by the GUFÉ and matched with survey

data.²² I construct a variable equal to one if the firm became formal during the study period (April 2014 to June 2016) according to the GUFÉ and using any type of formal status. I include all types of formal status because firms in the control group were less likely to use the *entreprenant* status to register (most of them were not aware of its introduction). A key advantage of this measure of formalization is that it is not subject to declaration bias (firms in the treatment group being more willing to say that they are formal even if it is not true).

4.3.2 Survey Data

Baseline survey data were collected during the listing survey in March-April 2014 before the program started. The baseline questionnaire was relatively small and focuses on few key firm characteristics. Endline survey data were collected in May-June 2016. Attrition rate (entrepreneurs not found or refusing to do be surveyed) at this survey was 15.5 percent. In addition, 24 percent of women and 12 percent of male were excluded because they don't have a partner,²³ 8.5 percent of women and 7.4 percent of men because their business shut down and 1.3 percent of women and 1 percent of men because the business owner died. Attrition rates as well as rates of inclusion in the final study sample are not correlated with treatment status. Appendix Table A3 provides details on survey completion rates, reasons for attrition and tests for differential attrition. Importantly, baseline firm characteristics of the final post-attrition study sample are well balanced across treatment and control groups. None of the 15 baseline variables presented in Table 1 presents any statistically significant difference by treatment status. This is true for both female and male samples. Results from these regressions are presented in the appendix Table A4.

²²GUFÉ and survey data were matched using names, addresses and phone numbers of entrepreneurs. This matching process is describe in details in the appendix 4 of [Benhassine et al. \(2018\)](#)

²³The difference between female and male business owner comes from a larger share of women who are widows, divorced or separated (see Appendix Table A2).

The endline survey data was designed to measure business performances as well as relationships between entrepreneurs and their household. To measure intra-household bargaining power and the relative share of household revenue received by the entrepreneur ($\sigma(z)$), I use the relative contributions made to partner’s personal expenses and to household food expenditure. I use incentivized games described in the next subsection to elicit the entrepreneur’s willingness to pay to hide income (\bar{p}). Investment in the business is measured using questions on investment in assets, furniture, machinery, inventories and raw materials. In addition, I also use questions on access (and willingness to access) to credit. Finally, I also measure other intermediaries outcomes such as alternative utilization of available capital (personal savings and transfers made outside the household), the degree of separation between the business and the household, and self-assessed well-being.

To reduce potential issues with multiple hypothesis testing and in order to draw more general conclusion on the program impact, I construct summary indexes by averaging standardized z-scores (using control means and standard deviations) of multiple questions in a particular dimension. The appendix A provides the exact definition of all outcomes and indexes used in this paper.

4.3.3 Incentivized Questions to Elicit the Willingness to Pay to Hide a Windfall Transfer

At the end of the endline survey, each respondent received two lottery tickets to thank her for participating in the study and for responding to surveys. Each lottery ticket was giving a chance to win a cash prize of CFAF 40,000 (USD 80) with a probability of approximately one percent.²⁴

The first lottery question was designed to elicit respondent’s maximum willingness to pay to hide income. Respondents were explained that if they win this lottery, the cash

²⁴25 prizes distributed among 2,585 respondents for each lottery, so overall around a 2 percent chance of winning a prize.

prize will (only) be paid in front of their spouse (or partner). Then, they were asked whether they would prefer to receive the money anonymously instead of receiving it in front of their spouse. Respondents who answered positively were subsequently asked to choose between receiving smaller amounts of money anonymously or the full amount (CFAF 40,000) in front of their spouse. The maximum willingness to pay is elicited by progressively increasing the amount that the respondent could “pay” to hide, from 5 percent to 50 percent of the cash prize²⁵.

It is important to note that in practice only two options were potentially implemented: receiving the full amount in front of the spouse, or receiving 50% of the amount privately. If respondents understood and anticipated this feature, then it means that the comparison between these two options is the only question that is really incentivized.²⁶

The second lottery was designed to elicit the maximum willingness to pay to get full control over the cash prize. Respondents were explained that if they win this lottery, the cash prize would be shared between their partner and themselves (FCFA 20,000 each). Next, they were asked whether they would prefer to receive all the money themselves (anonymously) instead of receiving it in front of their partner. Like in the first lottery, the maximum willingness to pay is elicited by progressively increasing the amount that the respondent could “pay” to keep the money for themselves from 5 percent to 45 percent of the cash prize²⁷.

Both lotteries were carefully explained to the respondents, and it was made clear that the answers provided will have an impact on how the money will be disbursed and on the amount received. To make it credible, respondents were told that if the

²⁵ Respondents were asked if they would prefer CFAF 38,000 anonymously or 40,000 in front of their spouse. The amount that could be received privately was then decreased to CFAF 35,000, 30,000, and 20,000.

²⁶ A strategy to ensure that all options are incentivized would have been to first ask the respondent to answer to all the questions and second to randomly select the answer that will be implemented. Unfortunately, survey piloting revealed that this strategy was too complex and too time consuming to implement in this context.

²⁷ Respondents were asked if they would prefer CFAF 38,000 anonymously or 20,000 for them and 20,000 for their spouse. This amount was then decreased to CFAF 35,000, 30,000, and 22,000

non-private option was chosen, the prize would be only given in the presence of their partner. The name and phone number of the partner were also collected.

The cash prize amount used for these questions is quite large and represents 87 percent of baseline average monthly profits of firm in my sample (the median is CFAF 30,000). This is much larger than typical amounts offered in other studies measuring the willingness to pay to hide income. This amount was equal to USD 2.35 In [Jakiela and Ozier \(2016\)](#), to USD 15 in [Boltz et al. \(2017\)](#), to USD 5 in [Squires \(2017\)](#) and to USD 17 in [Almas et al. \(2018\)](#). However, this amount is comparable to amounts given to firms in cash-drop experiments such as [de Mel et al. \(2008 and 2009\)](#) in Sri Lanka (grants of USD 100 and USD 200) and [Fafchamps et al. \(2014\)](#) in Ghana (grants of USD 120)²⁸.

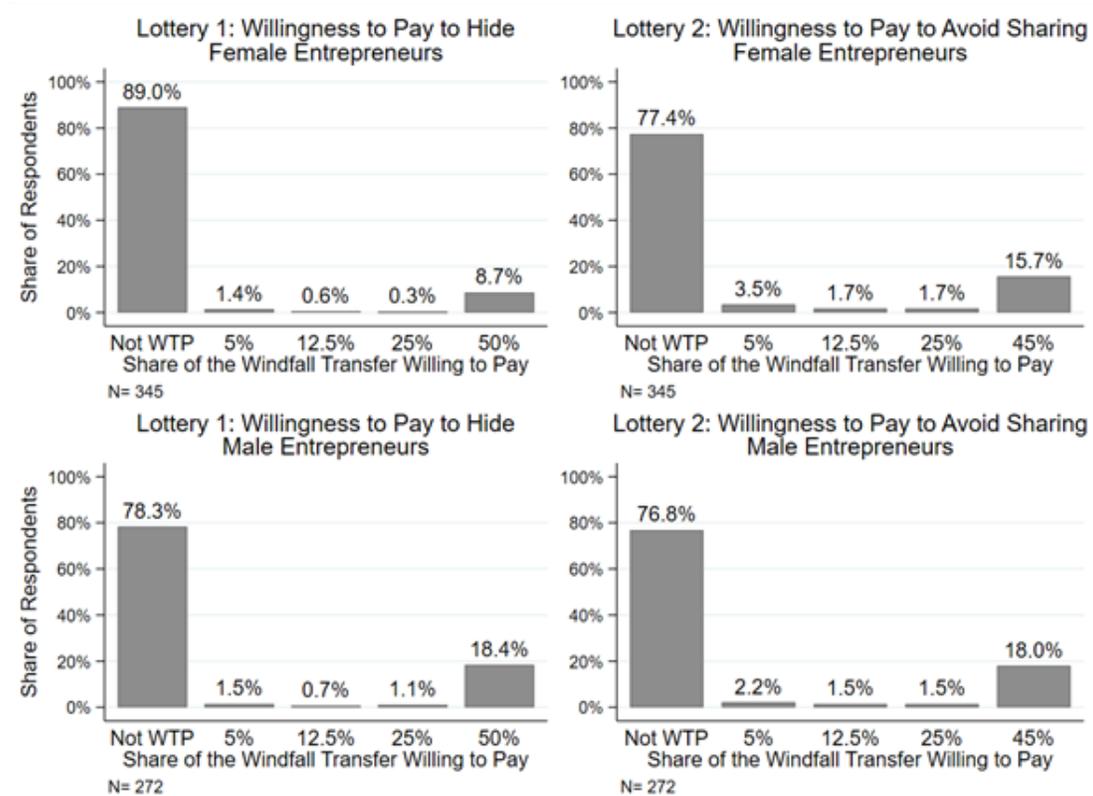
My main measure of willingness to pay to hide a windfall transfer (\bar{p}) is a variable equal to 1 if the respondent is willing to pay a positive price to at least one lottery question. This is the case for 24 percent of women entrepreneurs and 28 percent of male entrepreneurs in the control group. I chose to combine the two lottery questions instead of using only the first one (which is maybe closer to the definition of \bar{p} in the model), because I did not pre-specified this decision. Since I only implemented two incentivized questions in my survey, it seems natural to combine them. I also show the results of each lottery question separately, which gives similar results.

For the first lottery question, 11 percent of women and 22 percents of male entrepreneurs in the control group are willing to pay to hide the windfall transfer to their partner (Figure 3). Answers to the second lottery question are very similar for male entrepreneurs (23 percent are willing to pay a positive price). Women entrepreneurs are however more willing to pay to the second lottery and catch-up with male entrepreneurs (22 percent of women are willing to pay to the second lottery). Conditional on being

²⁸In the Sri Lanka experiment, the USD 100 grants represented 87 percent of firms' average monthly profits. In the Ghana experiment, the USD 120 grants represented 117 percent of firms' average monthly profits

willing to pay a positive price, both female and male entrepreneurs are willing to forgo a large share of the windfall transfer in order to receive it privately. This is also consistent with the fact that in practice, only the two extreme answers were truly incentivized (receiving the full transfer in front of the spouse or receiving 50% privately). Overall, these results suggest that many entrepreneurs in the sample (about a quarter) are constrained by their household and are willing to pay a high price to get more agency.

Figure 3: Answers to Incentivized Lottery Questions in Control Group



5 Empirical Specification

I first estimate the impact of treatment assignment on firm formalization (the “*first-stage*”) and the intend-to-treat impacts on other outcomes. I use the following entrepreneur-level empirical specification:

$$Y_i = \alpha_0 + \alpha_1 T_i + X'_{k,i} + \epsilon_i \quad (13)$$

Where Y_i is the outcome variable for entrepreneur i , T_i is an indicator for being assigned to the treatment group, and ϵ_i is the error term. $X'_{k,i}$ is a vector of baseline control variables which includes strata dummy variables and variables selected using the post-double selection lasso approach of [Belloni et al \(2014\)](#) from all the variables presented in Table 1.²⁹ α_1 is the coefficient of interest and provides the effect of being assigned to the treatment group relative to the control group.

Second, I estimate the impact of firm formalization on other outcomes by instrumenting firm formalization with treatment assignment. I rely on the following specification:

$$Y_i = \beta_0 + \beta_1 \widehat{Formal}_i + X'_{k,i} + \epsilon_i \quad (14)$$

Where \widehat{Formal} is an indicator equal to 1 if the entrepreneur became formal, instrumented by treatment assignment (T_i). β_1 , the coefficient of interest, provides the local average treatment effect (LATE) of firm formalization on the outcome Y . It measures the impact of formalization on entrepreneurs who registered because they were assigned to the treatment group.

As discussed previously, I estimate separately equations (13) and (14) for female and male entrepreneurs.

²⁹This approach is a disciplined way of selecting baseline control variables that are strong predictors of treatment status and future outcomes. It can improve precision and help account for imbalances caused by selective attrition or chance.

6 Results

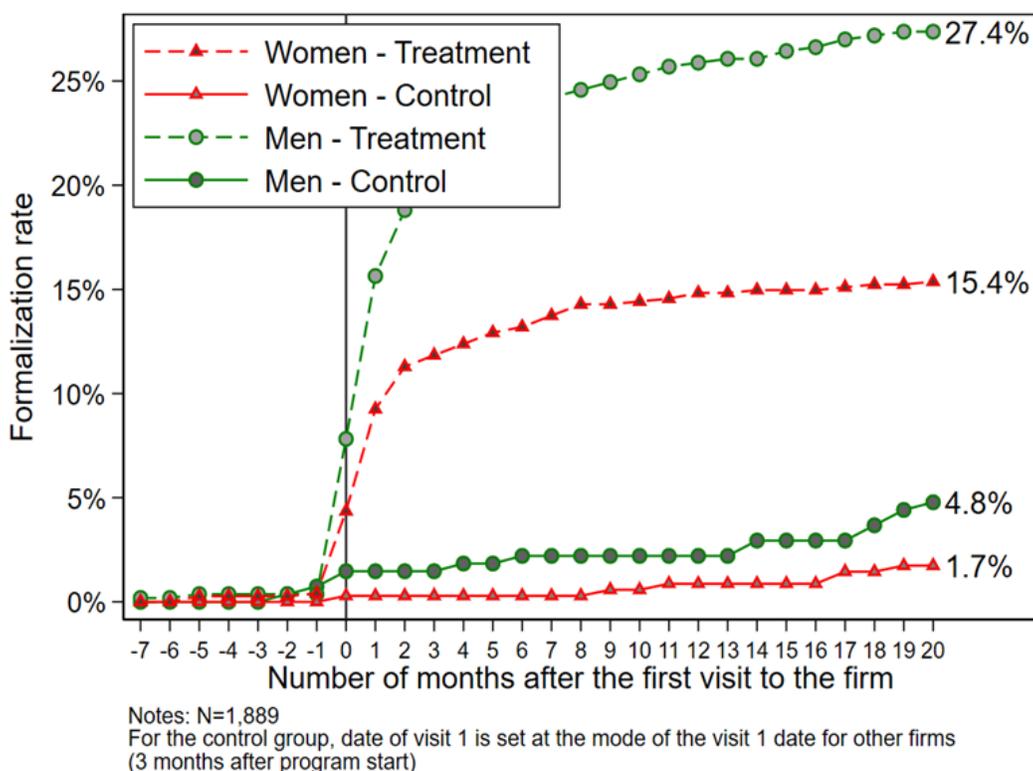
6.1 First Stage Impact on Firm Formalization

Using administrative data on firm registration, I find that firms in the treatment group are more likely to become formal. The figure 4 shows the evolution of formalization rates in time in treatment and control groups by gender of the owner. 20 months after the program started, 15.4 percent of female entrepreneurs and 27.4 percent of male entrepreneurs were registered in the treatment group. In the control group, only 1.7 percent of female and 4.8 percent of male were registered. It shows that the program had a large impact on both female and male entrepreneurs and that in the absence of any intervention, very few entrepreneurs in this sample become formal. Most entrepreneurs who registered did it in the few weeks that followed the first visit they received from a program officer.

Entrepreneurs who became formal because of the program are not very different from those who remained informal. They have the same number of employees, similar amounts of profits and sales (sales are slightly lower for female entrepreneurs who formalized), and same household size. The main differences is that those who became formal are more educated (around 10 percentage points more likely to have some secondary education), were paying higher taxes at baseline, and were more likely to do some accounting, to have a bank account and to be connected to the electricity grid to begin with. Female entrepreneurs who became formal are also less likely to be in a polygamous union (15 percent versus 22 percent, p-value=0.108). Appendix Table A5 provides more details on correlates of formalization in the treatment group.

In the first row of Table 2, I estimate the program impact on firm registration using equations (13). Being assigned to the treatment group increases the likelihood that a firm becomes formal by 14 percentage points for female business owners and 22

Figure 4: Impact on Firm Formalization (First Stage)



percentage points for male. I use this difference as a “*first stage*” and instrument firm formalization by assignment to treatment group. I interpret formalization as a shock on individual property right on the businesses.

6.2 Impact of Stronger Property Rights

A first key result (Table 2) is that formalization reduces contributions to partner’s and household’s expenses (a measure of $\sigma(z)$ in the model). Female entrepreneurs in the treatment group contribute 2.1 percentage points less to their husband’s expenditure (only marginally significant, p-value = 0.107) and 2.9 percentage points less to household’s food expenditure (only marginally significant, p-value = 0.109). Similarly, male entrepreneurs contribute 5.8 percentage points less to their wives’ expenses (p-value = 0.03) and 2.9 percentage points less to household’s food expenditure (p-value = 0.05).

It suggests that, stronger property rights increases bargaining power and gives more control on household revenue.

A second key result is that formalization has strong gender differential effects on investment (K_A) in the business and on the willingness to pay to get more control on a windfall transfer (\hat{p}). Female entrepreneurs in the treatment group invest significantly more in their business (0.136 standard deviation on a summary index of investment in the business, p-value = 0.025). They are also 6.8 percentage points more likely to be willing to pay a positive price to at least one lottery question (p-value = 0.018). The local average treatment effect of formalization is close to 50 percentage points.

In lights of the model described in Section 3, these results suggest that lack of property rights on the business constrains investment of women informal entrepreneurs. It also suggests that newly formalized women entrepreneurs still cannot invest as much as they want without hiding to their partner (at least for this type of windfall transfer). This behavior represents an important loss for them (and for their household) as conditional on a positive willingness to pay, they forgo on average 35 percent of the total amount to get more control on the transfer. It is consistent with formalization increasing the burden of the constraints imposed on women entrepreneur by their husband.

For male entrepreneurs, being assigned to treatment group reduces the likelihood of being willing to pay a positive price to at least one lottery question by 6.3 percentage points (p-value = 0.052) and the local average treatment effect of formalization is equal to -28 percentage points. The results are consistent with formalization increasing bargaining power on household revenue which reduce the benefits of hiding. Male entrepreneurs hide less because they are happier with the way revenue (at least this type of windfall transfer) is allocated within their household. This is also consistent with property rights not being a binding constrain on investment for them.

Table 2: Impact of Formalization on Main Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
	Female Business owners			Male Business owners		
	Mean in Control group [SD]	Diff. with Treatment group (ITT)	Impact of formalization (LATE)	Mean in Control group [SD]	Diff. with Treatment group (ITT)	Impact of formalization (LATE)
<i>Dependent variables:</i>						
<i>First stage: treatment impact on firm formalization:</i>						
Formalized (Gufe administrative data)	0.017 [0.131]	0.14*** (0.015)		0.048 [0.214]	0.224*** (0.023)	
<i>Impact on contributions to partner's and household's expenses:</i>						
Share of partner's personal expenditures paid by the respondent (in %)	7.529 [21.811]	-2.165 (1.345)	-15.337 (9.677)	45.515 [36.989]	-5.713** (2.626)	-25.607** (12.032)
Share of household's food expenditures paid by the respondent (in %)	46.299 [28.066]	-2.969 (1.851)	-20.798 (13.384)	83.739 [19.018]	-2.85* (1.455)	-12.767* (6.677)
<i>Impact on Investment</i>						
Index of investment and willingness to invest in the business	0 [1]	0.15** (0.062)	1.075** (0.444)	0 [1]	-0.039 (0.068)	-0.176 (0.306)
<i>Impact on willingness to pay to get more control on a windfall transfer</i>						
Positive willingness to pay to get more control on a windfall transfer (at least to one lottery)	0.241 [0.428]	0.068** (0.029)	0.488** (0.21)	0.279 [0.45]	-0.063* (0.032)	-0.282* (0.147)
Positive willingness to pay to hide a cash transfer to partner (lottery 1)	0.11 [0.314]	0.07*** (0.022)	0.496*** (0.163)	0.217 [0.413]	-0.047 (0.03)	-0.21 (0.134)
Positive willingness to pay to avoid sharing a cash transfer with partner (lottery 2)	0.226 [0.419]	0.066** (0.028)	0.475** (0.205)	0.232 [0.423]	-0.07** (0.03)	-0.315** (0.138)
Observations	1,080			809		

Notes: Administrative data on formalization and Endline survey data (May 2016). Columns 2 and 5: coefficient and robust standard error (in parentheses) from an OLS regression of the firm owner characteristic on a treatment dummy, controlling for strata dummies and variables selected using double Lasso. Columns 3 and 6: coefficient and robust standard error (in parentheses) from a 2SLS regression controlling for strata dummies and variables selected using double Lasso and with formalization instrumented by treatment dummy. ***, **, * indicate statistical significance at 1, 5 and 10%.

6.3 Mechanisms

The effect on the summary investment index for newly formalized female entrepreneurs is driven by additional investments in inventories and raw materials (Table 3). There is no significantly impact on other types of investments such as machines, equipment, tools or furniture. This is not totally surprising given the fact that most women entrepreneurs are traders. The fact that I find positive effects on investment in the business but not on business profits, sales or number of employees (see appendix table A1) suggests

Table 3: Impact of Formalization on Secondary Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
	Female Business owners			Male Business owners		
	Mean in Control group [SD]	Diff. with Treatment (ITT)	Impact of formalization (LATE)	Mean in Control group [SD]	Diff. with Treatment (ITT)	Impact of formalization (LATE)
<i>Dependent variables:</i>						
Index of investment and willingness to invest in the business	0 [1]	0.136** (0.061)	0.979** (0.439)	0 [1]	-0.066 (0.068)	-0.293 (0.308)
<i>Variables included in the index:</i>						
Value of equipment, furniture and tools ^a (in cfaf)	399,068 [830,562]	-9,489 (47,790)	-60,765 (341,840)	859,001 [1,341,088]	-113,048 (85,948)	-505,292 (391,341)
Value of inventories and raw materials ^a	796,719 [1,914,578]	246,784** (114,004)	1,806,864** (825,951)	631,442 [1,908,373]	-53,866 (124,164)	-239,956 (555,480)
Amount spent on inventories and raw materials in the previous month ^a	450,107 [883,369]	64,009 (54,249)	433,813 (382,698)	307,310 [703,274]	-14,898 (49,245)	-67,653 (223,828)
Contracted a loan in 2014-16	0.449 [0.498]	0.033 (0.032)	0.241 (0.229)	0.283 [0.451]	-0.039 (0.032)	-0.174 (0.144)
Interested in a bank loan	0.735 [0.442]	0.044 (0.028)	0.306 (0.202)	0.801 [0.4]	0.03 (0.029)	0.133 (0.129)
Index of savings and transfers	0 [1]	-0.142** (0.063)	-1.013** (0.465)	0 [1]	-0.064 (0.074)	-0.288 (0.333)
<i>Variables included in the index:</i>						
Often saving money in case of an unanticipated event	0.453 [0.499]	-0.053* (0.032)	-0.388* (0.231)	0.439 [0.497]	-0.019 (0.037)	-0.087 (0.167)
Often sends money outside household	0.4 [0.491]	-0.053* (0.031)	-0.391* (0.228)	0.537 [0.5]	-0.03 (0.037)	-0.133 (0.166)
Often receives money from outside household [<i>Not in the index</i>]	0.125 [0.331]	-0.016 (0.021)	-0.111 (0.149)	0.077 [0.267]	0.005 (0.02)	0.025 (0.091)
Index of separation of business and household	0 [1]	-0.055 (0.062)	-0.387 (0.442)	0 [1]	0.173** (0.073)	0.769** (0.321)
<i>Variables included in the index:</i>						
Owner separates business and personal resources	0.302 [0.46]	-0.032 (0.029)	-0.215 (0.21)	0.203 [0.403]	0.058* (0.031)	0.261* (0.138)
The firm does any form of accounting	0.246 [0.432]	-0.006 (0.026)	-0.051 (0.186)	0.279 [0.45]	0.06* (0.032)	0.265* (0.141)
Index of subjective standard of living	0 [1]	0.118* (0.065)	0.815* (0.467)	0 [1]	0.093 (0.076)	0.417 (0.338)
<i>Variables included in the index:</i>						
Subjective standard of living on a Cantril ladder ^λ	5.092 [2.021]	0.201 (0.135)	1.39 (0.987)	4.509 [1.952]	0.231 (0.145)	1.034 (0.651)
Anticipated subjective standard of living in 5 years on a Cantril ladder ^λ	9.021 [1.513]	0.19** (0.096)	1.321* (0.689)	8.798 [1.603]	0.073 (0.124)	0.309 (0.526)
Observations		1,080		809		

Notes: Administrative data on formalization and Endline survey data (May 2016). Columns 2 and 5: coefficient and robust standard error (in parentheses) from an OLS regression of the firm owner characteristic on a treatment dummy, controlling for strata dummies and variables selected using double Lasso. Columns 3 and 6: coefficient and robust standard error (in parentheses) from a 2SLS regression controlling for strata dummies and variables selected using double Lasso and with formalization instrumented by treatment dummy. ^a: top-coded at the 99th percentile. ^λ: Cantril ladder from 0 to 10 with 10 being the best situation possible. ***, **, * indicate statistical significance at 1, 5 and 10%.

that this behavior is costly (although, our estimates of the impact of formalization on profits and sales are imprecise). Alternatively, it is also consistent with the business being used as a saving device.

Interestingly, the money used to buy new inventories and raw materials is coming from reductions in private savings and in the amount of transfers made outside the household (-0.146 percent on a summary index of savings and transfers, p-value=0.025). Women in the treatment group are 5.5 percentage points less likely to report keeping savings in case of emergency (p-value = 0.098), suggesting that the business represents a better (or safer) investment. I find a similar reduction in the share who are sending transfers to relatives outside their household (p-value = 0.089). This last result is consistent with stronger property rights reducing the need to contribute to informal insurance networks.

Male entrepreneurs in the treatment group are 6 percentage points more likely to separate business from personal resources (p-value = 0.058) and to do some form of accounting (p-value = 0.062). This could potentially help them resist the pressure to share business resources with their household, and explain why they gain more control on household revenue and are less likely to pay to get more control on a windfall transfer when they become formal.

Finally, there is evidence that stronger property rights increased self-reported well-being for women entrepreneurs. Women who become formal report scores that are 0.2 points higher (p=0.049) on average on a Cantril ladder going from 0 to 10, with 10 being the best possible situation in 5 years. For men entrepreneurs, the impact is positive but the magnitude is smaller and not significant.

6.4 Robustness Checks and Alternative Interpretations

6.4.1 Are the Results driven by Other Differences Between Male and Female Business Owners?

As discussed previously, the gender of the business owner is correlated with important characteristics like education, sector of activity and number of employees (Table 1). It could be an issue for the interpretation of my result if the impacts of formalization are heterogeneous across these characteristics. For example, suppose that formalization has a greater impact on entrepreneurs operating in the trade sector and results in those entrepreneurs being more likely to hide the cash transfer in the lottery questions. The fact that female entrepreneurs are more likely to operate in the trade sector could then drive the heterogeneous results I find by gender. To check whether it is the case, I allow the effect of formalization to vary with other characteristics of entrepreneurs. I do that by estimating the following equation for a set of H entrepreneur's characteristics E_h :³⁰

$$\begin{aligned}
 Y_i = & \gamma_0 + \gamma_1 \widehat{Formal * Female} + \gamma_2 \widehat{Formal * Male} + \sum_{h=1}^H \eta_h \widehat{Formal * Female} * E_{h,i} \\
 & + \sum_{h=1}^H \mu_h \widehat{Formal * Male} * E_{h,i} + \sum_{h=1}^H \varphi_h E_{h,i} + \rho Female + X'_k + \epsilon_i
 \end{aligned}
 \tag{15}$$

$\widehat{Formal * Female}$ is instrumented by treatment assignment interacted with *Female* (and similarly for the other interaction terms). For the variables E_h , I use variables measured at baseline that are highly correlated with gender and across which the effects of formalization could plausibly be heterogeneous. I use the following variables: “*at least secondary education*”, “*Operates in trade*”, “*Connected to electricity*”, “*Does any form of accounting*”, “*At least one employee*”, and “*Firm area greater than 10m2*”. All variables E_h are demeaned so γ_1 and γ_2 can be interpreted as the impact of formaliza-

³⁰This strategy is similar to the one presented in [De Mel et al. \(2009\)](#).

tion on female and male entrepreneurs respectively, measured at the mean of the other variables.

Table 4: Heterogeneous Impact by Gender Including Additional Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Dependent variable:</i> Willing to pay to get more control over a windfall transfer (at least to one lottery)							
Formalization impact (IV) for female entrepreneurs	0.495** (0.210)	0.522** (0.218)	0.539*** (0.209)	0.544** (0.228)	0.496** (0.216)	0.460** (0.214)	0.591** (0.235)
Formalization impact (IV) for male entrepreneurs	-0.282* (0.147)	-0.285* (0.165)	-0.200 (0.178)	-0.311* (0.173)	-0.269* (0.152)	-0.329** (0.154)	-0.230 (0.210)
P-val difference (female / male):	0.002	0.003	0.007	0.002	0.004	0.003	0.008
Controlling for heterogeneity of formalization impact with variable:	At least secondary education	Operates in Trade	Connect. to electric. grid	Does any accounting	At least one employee	Firm area > 10m2	All variables together
Observations	1,889	1,889	1,889	1,888	1,888	1,889	1,889

Note: 2SLS regressions measuring the heterogeneous impact of formalization adoption (instrumented by assignment to treatment) by gender of the business owner. Robust standard errors in parentheses. All regressions include control dummies for strata. ***, **, * indicate significance at 1, 5 and 10%.

Results presented in Table 4 show that γ_1 and γ_2 coefficients have similar magnitude and statistical significance as in Table 2. My main results are therefore robust to the introduction of these additional controls.

6.4.2 Are the Results Driven by the Incentives Provided to Firms for Formalization?

Another potential concern in the interpretation of the results is the extent to which the effects can be attributed to formalization itself rather than to the additional incentives provided to firms. Indeed, 62% of firm that registered in the treatment group also participated in at least one group training (mainly to study basic accounting). If the main driver of the impact was the participation in this training, then the “exclusion

restriction” would be violated and the interpretation of the results would change.

I provide two pieces of evidence supporting the “exclusion restriction”. First, I show that the main results hold when entrepreneurs who took up additional incentives (ie. participated in at least one business training) are excluded from the analysis (Table A6). An important limitation of such analysis is that entrepreneurs who received additional benefits are self-selected and excluding them could re-introduce some bias. It however provides suggesting supporting evidence for the exclusion restriction.

Second, I use available random variations in the intensity of the incentives provided to the treatment group to show that the results are similar for different levels of incentives. The treatment group is divided into three subgroups: group 1 received only the package A of incentives (information and assistance to registration only), group 2 received packages A and B (information, registration assistance, business trainings and bank services) and group 3 received packages A, B and C (Tax mediation services). Appendix Table A7 shows the results of regressions on the main outcomes with a separate dummy for each treatment group. Unfortunately, the group that only received Package A of incentives is too small (76 women and 81 men in total) to be compared to the other groups (only few firms registered in that group in total). While overall, the results look similar for all the groups (and we cannot reject that all groups have similar results), standard errors are large for the group 1 and it is difficult to conclude anything for that group. Reassuringly, group 2 and group 3 have similar results.

7 Conclusion

This paper presents experimental evidence on the impact of firm formalization on intra-household dynamics in Benin. In this context, firm formalization provides individual formal property rights on the business and clarifies who in the household is the legal owner (today and in case of divorce). I find that entrepreneurs who gain stronger property rights through the formalization program increases control over household

resources (measured by contribution to household's and partner's expenses). This result is true for both male and female (although it is marginally significant for female). I also find large gender differential effects on investment and on entrepreneurs' willingness to pay to hide a windfall transfer from their spouse. Female entrepreneurs who become formal invest more in their business using money from their personal savings and from a reduction of transfers made outside the household. They are also much more likely to pay to get more control on a windfall transfer. In contrast, male entrepreneurs who become formal do not invest more in the business, and are less likely to hide a windfall transfer from their spouse. More separation between personal and household resources is a likely mechanism at play.

These results are consistent with a bargaining model in which men have more control on household investment decisions but women can implement costly strategies to get more agency. Stronger property rights raise the value of the entrepreneur's outside option which increases control over household revenue and incentives to invest in the business. For women entrepreneurs who lack control on investment, the effect on investment dominates. They hide more because they want to invest more in their business but lack agency. The price they are willing to pay to get more control on a windfall transfer is large, suggesting that this lack of agency is costly. Despite this investment constraint, women report higher well-being suggesting that the program was all-in-all welfare improving. For male entrepreneurs who have more control on investment to begin with, the effect on household revenue dominates. They hide less because they will have to share less with their spouse.

This study prompts several avenues for future research. First, measuring the overall effect of formalization on other household members and not only on the entrepreneur as I do would be interesting. Indeed, my results suggest that formalization can change bargaining powers within the household which could impact intra-household inequality. If male entrepreneurs benefit more than female entrepreneurs, public policies promoting formalization might exacerbate gender inequalities (this is especially true as male

business owners are also more likely to take up on formalization). Second, understanding whether my results hold beyond the two years of this study looks like an important question. Formalization might indeed have long term consequences on intra-household bargaining power and gender norms. It might also take some time for women entrepreneurs to adapt to their new status and to overcome potential constraints on investment. Finally, more work is needed to better understand how and under which circumstances, women entrepreneurs are constrained by their household, and how to design effective policies to help them overcome these constraints.

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Table A1 : Impact of Formalization on Business Performance, Access to Credit and Taxation

	(1)	(2)	(3)	(4)	(5)	(6)
	Female Business owners			Male Business owners		
	Mean in Control group [SD]	Diff. with Treatment group (ITT)	Impact of formalization (LATE)	Mean in Control group [SD]	Diff. with Treatment group (ITT)	Impact of formalization (LATE)
<i>Dependent variables:</i>						
Summary index of profit and sales	0 [1]	0.009 (0.066)	0.063 (0.473)	0 [1]	0.128 (0.088)	0.578 (0.401)
<i>Variables included in the index:</i>						
Total sales in the last day ^a (CFAF)	26,716 [46,435]	-529 (3,155)	-3,798 (22,668)	12,934 [32,819]	7,865** (3,309)	36,340** (15,882)
Total sales in the last week ^a (CFAF)	143,190 [228,484]	5,364 (15,458)	38,535 (110,926)	95,777 [200,314]	9,935 (14,838)	45,389 (67,806)
Last month profits ^a (CFAF)	63,133 [89,487]	23 (5,686)	166 (40,969)	70,994 [95,248]	143 (7,188)	665 (33,434)
<i>Other measures of profit and sales:</i>						
Inverse hyperbolic of sales in the last day	7.785 [4.682]	-0.028 (0.297)	-0.203 (2.13)	6.087 [4.887]	0.118 (0.36)	0.546 (1.668)
Inverse hyperbolic of sales in the last week	11.111 [3.148]	-0.106 (0.205)	-0.76 (1.481)	10.211 [3.64]	0.119 (0.259)	0.542 (1.183)
Inverse hyperbolic of last month profits	10.854 [2.068]	-0.339* (0.182)	-2.439* (1.361)	10.484 [3.526]	-0.061 (0.276)	-0.285 (1.283)
Sales > predicted sales ^δ	0.372 [0.484]	0.014 (0.032)	0.104 (0.228)	0.346 [0.476]	-0.013 (0.035)	-0.061 (0.161)
Profits > predicted profits ^δ	0.231 [0.422]	-0.011 (0.027)	-0.08 (0.196)	0.369 [0.483]	-0.047 (0.035)	-0.216 (0.166)
Sales > baseline sales	0.537 [0.499]	0.006 (0.032)	0.046 (0.232)	0.491 [0.501]	-0.013 (0.037)	-0.059 (0.17)
Profits > baseline profits	0.459 [0.499]	0.012 (0.033)	0.088 (0.238)	0.506 [0.501]	0.015 (0.038)	0.069 (0.177)
<i>Other Outcomes:</i>						
Number of employee	1.197 [1.749]	0.04 (0.107)	0.283 (0.757)	1.956 [2.34]	0.039 (0.162)	0.176 (0.722)
Hired someone in the last 6 months	0.093 [0.291]	0.008 (0.018)	0.055 (0.131)	0.191 [0.394]	0.024 (0.029)	0.108 (0.132)
Number of hours worked in the business last week by the owner	65.826 [20.729]	0.647 (1.298)	4.591 (9.228)	66.941 [20.165]	-1.306 (1.509)	-5.841 (6.761)
Total amount of tax paid in the last year	13,710 [23,377]	-509 (1,447)	-3,562 (10,156)	21,841 [32,962]	-5,268** (2,129)	-23,379** (9,734)
Contracted a loan in 2014-16 (any type)	0.449 [0.498]	0.034 (0.032)	0.241 (0.231)	0.283 [0.451]	-0.037 (0.032)	-0.167 (0.146)
Share of business practises implemented (26 questions) ^η	0.297 [0.153]	-0.011 (0.01)	-0.078 (0.073)	0.307 [0.181]	0.009 (0.013)	0.039 (0.059)
Has gained a new regular customer in the past 3 months	0.853 [0.354]	-0.013 (0.024)	-0.094 (0.17)	0.742 [0.439]	0.014 (0.032)	0.06 (0.144)
Observations		1,080			809	

Notes: Administrative data on formalization and Endline survey data (May 2016). Column 1 and 4: Standard deviations presented in brackets. Columns 2 and 5: coefficient and robust standard error (in parentheses) from an OLS regression of the firm owner/firm characteristic on a treatment dummy, controlling for strata dummies. Columns 3 and 6: coefficient and robust standard error (in parentheses) from a 2SLS regression controlling for strata dummies with formalization instrumented by treatment dummy. α : top-coded at the 99th percentile. δ : Profits/sales predicted using the command "predict" in Stata and OLS regressions of profits/sales on baseline characteristics (from Table 1). η : see appendix 1 for the list of questions. λ : The Cantril ladder goes from 0 to 10 with 10 for the best situation possible ***, **, * indicate statistical significance at 1, 5 and 10%.

Table A1 : Impact of Formalization on Business Performance, Access to Credit and Taxation

	(1)	(2)
	Female Business owners	Male Business owners
	(Control group only)	(Control group only)
	Mean [SD]	Mean [SD]
<i>Household composition:</i>		
Total number of household members (excluding respondent)	5.8 [2.086]	5.941 [2.584]
Number of household members depending financially on the respondent	3.348 [2.157]	4.603 [2.468]
Number of children	3.388 [1.642]	3.441 [2.189]
Polygamous / partner is polygamous	0.24	0.125
<i>Partner's occupation:</i>		
Taking care of the family	0.003	0.14
Working	0.924	0.783
Including self-employed informal entrepreneur	0.478	0.651
Including working in public sector or in a formal company	0.329	0.055
Earned higher revenue than partner in 2015	0.345	0.912
<i>Contribution to household expenditures in 2015 (in %):</i>		
Partner's personal expenditures	7.5	45.5
Own personal expenditures of the respondent	89.5	95.8
Food	46.3	83.7
Health	38.7	87.7
Housing	23.1	94.1
<i>Transfers outside the household:</i>		
Regularly send money outside the household	0.4	0.537
Regularly receive money from outside the household	0.125	0.077
<i>Lottery 1: Willingness to pay to hide a windfall transfer:</i>		
Willing to pay a positive price	0.11	0.217
Share of the grant willing to pay to hide income	0.046	0.096
Share conditional on positive willingness to pay	0.414	0.444
<i>Lottery 2: Willingness to pay to get full control over a transfer (instead of a 50/50 allocation):</i>		
Willing to pay a positive price	0.226	0.232
Share willing to pay to get full control over the transfer	0.079	0.088
Share conditional on positive willingness to pay	0.348	0.379
<i>Lottery 1 and lottery 2 combined:</i>		
Willing to pay a get more control over a windfall transfer (WTP >0 at any lottery)	0.241	0.279
Observations	345	272

Notes: Source: Endline survey data May 2016, control group only. Standard deviations presented in brackets.

Table A1 : Impact of Formalization on Business Performance, Access to Credit and Taxation

	(1)	(2)	(3)	(4)
	Female business owners		Male business owners	
	Mean in Control group [SD]	Difference with Treatment group	Mean in Control group [SD]	Difference with Treatment group
<i>Dependent variables:</i>				
Final study sample (surveyed at endline, still operating and married or with a partner)	0.458 [0.499]	0.031 (0.023)	0.614 [0.487]	-0.014 (0.028)
<i>Reasons for exclusion from final study sample:</i>				
Surveyed and no partner	0.243 [0.429]	-0.009 (0.019)	0.117 [0.322]	0.003 (0.019)
<i>Including single</i>	0.098 [0.298]	-0.003 (0.013)	0.097 [0.296]	0.008 (0.018)
<i>Including divorced/separated</i>	0.053 [0.224]	-0.001 (0.01)	0.011 [0.106]	0.002 (0.006)
<i>Including widow/widower</i>	0.092 [0.289]	-0.006 (0.013)	0.009 [0.095]	-0.007* (0.004)
Surveyed and business shut down	0.085 [0.279]	-0.002 (0.012)	0.074 [0.263]	0.028* (0.017)
Surveyed and business owner deceased	0.013 [0.114]	-0.003 (0.005)	0.009 [0.095]	-0.002 (0.005)
Survey Attrition (refused, not found, sickness, traveling, maternity leave...)	0.163 [0.37]	-0.014 (0.016)	0.151 [0.359]	-0.022 (0.02)
<i>Including refused to answer</i>	0.084 [0.277]	-0.007 (0.012)	0.081 [0.274]	-0.01 (0.015)
Observations: <i>entreprenant</i> study sample	2,263		1,333	
Observations: final study sample	1,080		809	

Notes: Endline survey data (June 2016). Column 1 and 3: Standard deviations presented in brackets. Columns 2 and 4: coefficients and standard errors (in parentheses) from an OLS regression of attrition variables on a treatment dummy, controlling for strata dummies. ***, **, * indicate statistical significance at 1, 5 and 10%.

Table A2: Household Characteristi Table A1 : Impact of Formalization on Business Performance, A

	(1)	(2)	(3)	(4)
	Female business owners		Male business owners	
	Mean in Control group [SD]	Difference with Treatment group	Mean in Control group [SD]	Difference with Treatment group
Age of the owner	40.11 [9.93]	0.17 (0.62)	37.18 [9.2]	0.16 (0.65)
Owner has some formal education	0.672 [0.47]	-0.006 (0.03)	0.82 [0.385]	-0.003 (0.028)
At least some secondary education	0.368 [0.483]	-0.01 (0.03)	0.478 [0.5]	-0.015 (0.036)
Operates in Trade ¹	0.684 [0.466]	- -	0.243 [0.429]	- -
Operates in Services	0.22 [0.415]	0.009 (0.017)	0.32 [0.467]	0.009 (0.032)
Operates in Craft	0.096 [0.295]	-0.013 (0.016)	0.371 [0.484]	-0.013 (0.033)
Firm area in m ²	14.68 [12.26]	-0.92 (0.79)	31.25 [78.17]	0.42 (5.87)
Business connected to electricity network	0.559 [0.497]	0.045 (0.031)	0.706 [0.456]	-0.023 (0.033)
Number of employee	1.11 [1.7]	-0.02 (0.1)	1.63 [1.72]	0.11 (0.13)
Number of non-paid family help	0.635 [1.017]	-0.057 (0.064)	0.213 [0.594]	0.019 (0.042)
The firm does any form of accounting	0.162 [0.369]	-0.012 (0.023)	0.21 [0.408]	0.003 (0.029)
Amount of sales in an average week	69,079 [63,594]	-5,472 (3,573)	49,788 [50,104]	1,898 (3,417)
Amount of profit in the last month	47,446 [48,365]	-298 (3,268)	47,182 [42,506]	1,277 (3,247)
Firm owner owns a bank account ¹	0.19 [0.393]	- -	0.298 [0.458]	- -
Firm pays taxes	0.518 [0.5]	-0.024 (0.029)	0.657 [0.476]	-0.012 (0.035)
Amount of taxes paid in the previous year	16,386 [27,668]	-1,086 (1,636)	26,433 [30,647]	-828 (2,243)
Observations	1,080		809	

Notes: Baseline survey data (March 2014). Column 1 and 4: Standard deviations presented in brackets. Columns 2 and 5: coefficients and standard errors (in parentheses) from an OLS regression of the firm owner/firm characteristic on a treatment dummy, controlling for strata dummies. 1: variables used for stratification. ***, **, * indicate statistical significance at 1, 5 and 10%.

Table A1 : Impact of Formalization on Business Performance, Access to Credit and Taxation

Table A5: Characteristics of Firms in Treatment Group by Formalization Status

	(1)	(2)	(3)	(4)	(5)	(6)
	Female business owners			Male business owners		
	Did not formalize (Treatment group)	Newly formalized (Treatment group)	P-val T-test (1)=(2)	Did not formalize (Treatment group)	Newly formalized (Treatment group)	P-val T-test (4)=(5)
<i>Panel A: Baseline survey data</i>						
Age of the owner	40,4	40	0,728	37	38	0,252
Owner has some formal education	0,636	0,807	0.000***	0,808	0,85	0,253
At least some secondary education	0,332	0,465	0.006***	0,413	0,599	0.000***
Operates in Trade	0,689	0,632	0,226	0,238	0,224	0,734
Operates in Services	0,227	0,246	0,666	0,336	0,333	0,955
Operates in Craft	0,079	0,114	0,215	0,351	0,388	0,434
Firm area in m ²	13,4	14,7	0,319	31,5	34,1	0,737
Connected to electricity network	0,577	0,719	0.004***	0,651	0,789	0.002***
Number of employee	1,061	1,193	0,425	1,679	1,939	0,173
	[1.608]	[1.693]			[2.028]	
Number of non-paid family help	0,586	0,509	0,44	0,208	0,265	0,312
	[0.984]	[0.98]			[0.634]	
The firm does any form of accounting	0,132	0,219	0.015**	0,192	0,259	0.094*
Amount of sales in an average week	66130	55175	0.061*	51028	51187	0,974
	[59,213]	[45,270]			[46,044]	
Amount of profits in the last month	48344	41879	0,217	47604	50175	0,554
	[53,633]	[36,290]			[41,695]	
Firm owner owns a bank account	0,161	0,252	0.02**	0,234	0,472	0.000***
Firm pays taxes	0,504	0,474	0,552	0,639	0,648	0,846
Amount of taxes paid in the previous year	14387	19139	0.06*	23485	32935	0.001***
	[22,898]	[31,170]			[38,175]	
<i>Panel B: Endline survey data</i>						
Total number of household members (excluding respondent)	5,662	5,752	0,721	6,154	6,054	0,731
	[2.528]	[2.115]			[2.553]	
Number of household members who depend financially on the respondent	3,116	3,221	0,657	4,836	4,565	0,344
	[2.338]	[2.223]			[2.441]	
Number of children	3,347	3,425	0,651	3,428	3,259	0,396
	[1.673]	[1.746]			[1.744]	
Polygamous / partner's polygamous	0,221	0,147	0,108	0,114	0,096	0,629
Observations	621	114		390	147	

Notes: Sources: Panel A: Post-attrition listing-baseline survey (March 2014). Panel B: Post-attrition endline survey (May 2016). Standard deviations presented in brackets.

Table A6: Robustness of the Results when Excluding Entrepreneurs Who Attended a Business Training Session in the Treatment Group

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Female Business owners					Male Business owners				
	All Sample (similar to Tables 2 and 3)			Excluding those who attended a business training		All Sample (similar to Tables 2 and 3)			Excluding those who attended a business training	
	Mean in Control group [SD]	Diff. with T. group (ITT)	Impact of formalization (LATE)	Diff. with T. group (ITT)	Impact of formalization (LATE)	Mean in Control group [SD]	Diff. with T. group (ITT)	Impact of formalization (LATE)	Diff. with T. group (ITT)	Impact of formalization (LATE)
<i>First stage: treatment impact on firm formalization:</i>										
Formalized (Gufe administrative data)	0.017 [0.131]	0.141*** (0.02)		0.048*** (0.014)		0.048 [0.214]	0.224*** (0.028)		0.084*** (0.023)	
<i>Impact on contributions to partner's and household's expenses:</i>										
Share of partner's personal expenditures paid by the respondent (in %)	7.529 [21.811]	-2.145* (1.26)	-15.41* (9.252)	-2.106* (1.274)	-45.09 (30.003)	45.515 [36.989]	-5.83** (2.721)	-26.111** (12.448)	-3.739 (2.823)	-44.207 (35.533)
Share of household's food expenditures paid by the respondent (in %)	46.299 [28.066]	-2.924 (1.862)	-20.798 (13.651)	-3.31* (1.899)	-69.326 (44.58)	83.739 [19.018]	-2.915* (1.546)	-13.042* (7.073)	-2.179 (1.591)	-25.907 (20.396)
<i>Impact on willingness to pay to get more control over a windfall transfer:</i>										
Willing to pay to get more control over a windfall transfer (at least to one lottery)	0.241 [0.428]	0.07** (0.03)	0.495** (0.221)	0.069** (0.03)	1.451* (0.756)	0.279 [0.45]	-0.063** (0.032)	-0.282* (0.146)	-0.061* (0.033)	-0.723 (0.439)
<i>Impact on other outcomes</i>										
Index of investment in the business	0 [1]	0.161** (0.065)	1.142** (0.475)	0.138** (0.066)	2.881* (1.524)	0 [1]	-0.01 (0.068)	-0.045 (0.307)	-0.02 (0.071)	-0.241 (0.853)
Index of savings and transfers	0 [1]	-0.146** (0.062)	-1.041** (0.468)	-0.153** (0.064)	-3.212* (1.652)	0 [1]	-0.064 (0.074)	-0.288 (0.336)	-0.082 (0.077)	-0.972 (0.966)
Index of separation of business and household	0 [1]	-0.065 (0.064)	-0.459 (0.466)	-0.11* (0.065)	-2.31 (1.549)	0 [1]	0.171** (0.076)	0.763** (0.333)	0.047 (0.076)	0.558 (0.9)
Observations	1,080			995		809			714	

Notes: Administrative data on formalization and Endline survey data (May 2016). Column 1 and 6: Standard deviations presented in brackets. Columns 2, 4, 7 and 9: coefficient and robust standard error (in parentheses) from an OLS regression of the firm owner/firm characteristic on a treatment dummy, controlling for strata dummies. Columns 3, 5, 8 and 9: coefficient and robust standard error (in parentheses) from a 2SLS regression controlling for strata dummies with formalization instrumented by treatment dummy. α : top-coded at the 99th percentile. ***, **, * indicate statistical significance at 1, 5 and 10%.

Table A7: Main Results for All Treatment Groups

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Female Business owners							Male Business owners						
	Control group	T1 Package A only ^a	T2 Packages A and B ^b	T3 Packages A, B and C ^c	P-value of test...			Control group	T1 Package A only ^a	T2 Packages A and B ^b	T3 Packages A, B and C ^c	P-value of test...		
					T1=T2	T1=T3	T2=T3					T1=T2	T1=T3	T2=T3
<i>Dependent variables:</i>														
<i>First stage: treatment impact on firm formalization:</i>														
Formalized (Gufe administrative data)	0.017 [0.131]	0.122** (0.056)	0.161*** (0.032)	0.151*** (0.03)	0.521	0.6	0.755	0.048 [0.214]	0.193*** (0.062)	0.237*** (0.042)	0.265*** (0.037)	0.529	0.246	0.509
<i>Impact on contributions to partner's and household's expenditures:</i>														
Share of partner's personal expenditures paid by the respondent (in %)	7.529 [21.811]	-5.445 (3.717)	-4.465** (2.121)	-3.384* (1.973)	0.807	0.573	0.611	45.515 [36.989]	-4.38 (6.321)	-2.939 (4.331)	-5.83 (3.827)	0.842	0.821	0.508
Share of household's food expenditures paid by the respondent (in %)	46.299 [28.066]	-4.366 (5.113)	0.113 (2.931)	-1.634 (2.734)	0.418	0.586	0.554	83.739 [19.018]	-1.708 (3.606)	-5.271** (2.47)	-1.916 (2.183)	0.387	0.954	0.178
<i>Impact on willingness to pay to hide a windfall transfer:</i>														
Willing to pay to get more control over a windfall transfer (at least to one lottery)	0.241 [0.428]	-0.005 (0.086)	0.077 (0.049)	0.055 (0.046)	0.381	0.481	0.656	0.279 [0.45]	0.011 (0.07)	-0.029 (0.048)	-0.041 (0.042)	0.617	0.462	0.801
Positive willingness to pay to hide a cash transfer to partner (lottery 1)	0.11 [0.314]	0.021 (0.069)	0.1** (0.04)	0.081** (0.037)	0.287	0.37	0.637	0.217 [0.413]	-0.007 (0.063)	-0.036 (0.043)	-0.033 (0.038)	0.687	0.68	0.952
Positive willingness to pay to avoid sharing a cash transfer with partner (lottery 2)	0.226 [0.419]	-0.002 (0.085)	0.059 (0.049)	0.06 (0.046)	0.511	0.462	0.985	0.232 [0.423]	-0.078 (0.064)	-0.056 (0.044)	-0.037 (0.039)	0.764	0.534	0.678
<i>Impact on other outcomes</i>														
Index of investment in the business	0 [1]	0.374** (0.173)	0.155 (0.099)	0.066 (0.093)	0.243	0.07*	0.374	0 [1]	-0.05 (0.149)	0.121 (0.102)	-0.06 (0.09)	0.314	0.949	0.079*
Index of savings and transfers	0 [1]	0.128 (0.174)	-0.345*** (0.1)	-0.169* (0.093)	0.013**	0.083*	0.081*	0 [1]	-0.019 (0.164)	-0.121 (0.112)	0.022 (0.099)	0.584	0.806	0.206
Index of separation of business and household	0 [1]	0.04 (0.184)	-0.225** (0.105)	-0.012 (0.098)	0.183	0.775	0.044**	0 [1]	-0.12 (0.17)	0.25** (0.117)	0.32*** (0.103)	0.057*	0.011**	0.555
Observations	345	76	286	373				272	81	196	260			

Notes: Administrative data on formalization and Endline survey data (May 2016). Column 1 and 8: Standard deviations presented in brackets. Columns 2, 3, 4, 9, 10, 11: coefficients and standard errors (in parentheses) from an OLS regression of the firm owner/firm characteristic on treatment dummies, controlling for strata dummies. a: Package A of incentives includes information delivered in-person and registration assistance. b: Package B includes access to free business training and bank services. Package C includes tax mediation services. ***, **, * indicate statistical significance at 1, 5 and 10%.

Appendices

A Outcome definitions

This appendix presents the definition of all outcomes used in this paper, organized by Table in which they appear.

- **Formalization:** equal 1 if the business is formal according to GUFÉ data and 0 otherwise. To construct this variable, administrative data provided by the GUFÉ were used. These data were matched with the survey data using information on names, activity, address and phone number and the STATA command “reclinck” designed for fuzzy matching. This command uses record linkage methods to create matching scores. “Potential matches” (matches with a high enough score) were then manually checked and validated. The matching process and all the checks conducted to validate this process are described in more details in the appendix 4 of [Benhassine et al. \(2018\)](#).

Variables in Table 1 (measured at baseline survey):

- **Female owner:** owner of the firm is female at baseline.
- **Age of the owner:** Reported age of the owner at baseline
- **Owner has some formal education:** Firm owner ever went to school at baseline
- **At least some secondary education:** owner has at least some secondary education at baseline
- **Operates in trade:** the business operates in trade at baseline.
- **Operates in services:** the business operates in services at baseline.
- **Operates in craft:** the business operates in craft at baseline.
- **Firm area in m2:** area of firm premises estimated by the surveyor at baseline.
- **Connected to electricity network:** the firm is connected to the electricity network at baseline
- **Number of employee:** Number of employee working in the firm at baseline, including permanent and casual employees and not including the firm owner. Truncated at the 99th percentile.
- **Number of non-paid family help:** Number of family help working regularly for the firm and who are not paid at baseline
- **The firm does any form of accounting:** the owner declares keeping any form of written account at baseline.
- **Amount of sales in an average week:** Amount of sales in an average week in CFAF, reported in the baseline survey, and truncated at the 99th percentile.

- Amount of profits in the last month: the response in CFAF to the direct question “what was the total amount of your profits last month?”, and truncated at the 99th percentile.
- Firm pays taxes: equal to one if the firm paid any tax in the year before the baseline survey.
- Amount of taxes paid in the previous year: total amount of taxes paid in the year before the baseline survey, and truncated at the 99th percentile.

Variables in Table 2 (measured at endline survey):

- Share of partner’s personal expenses paid by the respondent (in %): Respondents were asked to estimate their personal contribution in percentage to the personal expenses of their partner. The following examples were provided: clothes, shoes and jewelry.
- Share of household’s food expenses paid by the respondent (in %): same question but for food expenses.
- Positive willingness to pay to get more control on a windfall transfer (at least to one lottery): equal to one if the respondent answered positively to at least one of the lottery questions and 0 otherwise.
- Index of investment in the business: a summary index averaging standardized z-scores (using control means and standard deviations) of the questions “Value of equipment, furniture and tools”, “Value of inventories and raw materials”, “Amount spent on inventories and raw materials in the previous month” , “Contracted a loan in 2014-16 (any type)” and “Interested in a bank loan”. See variables in Table 3 below for the definition of each variable.
- Lottery 1: Positive willingness to pay to hide a cash transfer to partner: equal to 1 if the respondent answered that she would prefer to receive CFAF 38,000 anonymously instead of CFAF 40,000 in front of her spouse, and 0 otherwise. CFAF 38,000 is the smallest amount that was offered to the respondent for this lottery.
- Lottery 2: Positive willingness to pay to avoid sharing a cash transfer with partner: equal to 1 if the respondent answered that she would prefer to receive CFAF 38,000 anonymously for herself in total instead of receiving CFAF 40,000 that would be split equally between her spouse and herself. CFAF 38,000 is the smallest amount that was offered to the respondent for this lottery.

Variables in Table 3 (measured at endline survey):

- Index of investment in the business: a summary index averaging standardized z-scores (using control means and standard deviations) of the questions “Value of inventories and raw materials”, “Amount spent on inventories and raw materials in the previous month”, “Value of all investments in the firm”, “Contracted a loan in 2014-16 (any type)”, “Interested in a bank loan”, and “Would want someone to invest in the business in exchange of some ownership”.
- Value of equipment, furniture and tools: Total value in CFAF and at current price of all business equipment, furniture and tools. Top-coded at the 99th percentile.
- Value of inventories and raw materials: Total value in CFAF and at current price of all business stocks, raw materials and spare parts. Top-coded at the 99th percentile.
- Amount spent on inventories and raw materials in the previous month: Total of last month expenditure in raw materials and in goods or merchandise to be sold. Top-coded at the 99th percentile.
- Contracted a loan in 2014-16 (any type): the business has received a loan from a commercial bank, a microfinance institution, or another informal institution (money lender, relative...), according to follow-up survey
- Interested in a bank loan: respondent declare that she would be interested by a loan from a commercial bank.
- Index of savings and transfers: a summary index averaging standardized z-scores (using control means and standard deviations) of the questions “Often saving money in case of an unanticipated event” and “Often sends money outside household”
- Often saving money in case of an unanticipated event: respondent declared that she is often saving money in case of an unanticipated event.
- Often sends money outside household: respondent declared that she is regularly sending money outside her household.
- Often receives money from outside household: respondent declared that she is regularly receiving money from relatives outside her household.
- Index of separation of business and household: a summary index averaging standardized z-scores (using control means and standard deviations) of the questions “Owner separates business and personal resources” and “The firm does any form of accounting”.
- Owner separates business and personal resources
- The firm does any form of accounting

- Index of subjective standard of living : a summary index averaging standardized z-scores (using control means and standard deviations) of the questions "Subjective standard of living on a Cantril ladder", and "Anticipated Subjective standard of living in 5 years on a Cantril ladder".
- Subjective standard of living on a Cantril ladder: The Cantril ladder goes from 0 to 10 with 10 for the best situation possible.
- Anticipated Subjective standard of living in 5 years on a Cantril ladder: The Cantril ladder goes from 0 to 10 with 10 for the best situation possible.

Variables in Table 4:

- Willing to pay to get more control over a windfall transfer (at least to one lottery): same as in Table 2
- Baseline variables used to control for heterogeneity of impact are similar to the variables in Table 1

Variables in Table A1:

- Index of profits and sales: a summary index averaging standardized z-scores (using control means and standard deviations) of the questions: "Total sales in the last day", "Total sales in the last week" and "Last month profits".
- Total sales in the last day (CFAF): total sales from the last day in CFAF, reported in the endline survey and truncated at the 99th percentile.
- Total sales in the last week (CFAF): total sales from the last week in CFAF, reported in the endline survey, and truncated at the 99th percentile.
- Last month profits (CFAF): the response in CFAF to the direct question "what was the total amount of your profits last month?", and truncated at the 99th percentile.
- Inverse hyperbolic of sales in the last day: Inverse hyperbolic sine transformation of sales in the last day. It is defined by $\log(y_i + (y_i^2 + 1)^{1/2})$.
- Inverse hyperbolic of sales in the last week: Inverse hyperbolic sine transformation of sales in the last week. It is defined by $\log(y_i + (y_i^2 + 1)^{1/2})$.
- Inverse hyperbolic of last month profits: Inverse hyperbolic sine transformation of last month profits. It is defined by $\log(y_i + (y_i^2 + 1)^{1/2})$.
- Sales > predicted Sales: Sales in the last week predicted using the command "predict" in Stata and OLS regressions of sales on baseline characteristics (from Table 1)

- Profits > predicted Profits: Last month profits predicted using the command "predict" in Stata and OLS regressions of profits on baseline characteristics (from Table 1)
- Sales > baseline Sales: Sales in the last week reported at endline are greater than sales in the last week reported at baseline
- Profits > baseline Profits: Last month profits reported at endline are greater than last month profits reported at baseline.
- Number of employee: number of employee working in the firm at endline, including permanent, casual work, apprentices and family helps, and excluding the firm owner.
- Hired someone in the last 6 months: including permanent, casual work, apprentices and family helps.
- Total amount of tax paid in the last year: total amount of tax paid by the entrepreneur for the firm in the last 12 months
- Contracted a loan in 2014-16 (any type): the business has received a loan from a commercial bank, a microfinance institution, or another informal institution (money lender, relative...), according to follow-up survey
- Share of business practices implemented: the proportion of 26 business practices taken from McKenzie and Woodruff (2017) that the firm is implementing at the time of the endline survey.

Variables in Table A2 (measured at endline):

- Total number of household members (excluding respondent): household members live with the respondent and regularly share meals with her.
- Number of household members depending financially on the respondent: a member is financially dependent if the respondent is paying for most of her expenses.
- Number of children: number of children who are alive.
- Polygamous / partner is polygamous: has or partner has more than one spouse or partner.
- Taking care of the family: The partner is not working, and her main activity is to take care of the family or to do household chores.
- Working: the partner of the respondent is working. It includes any type of activity, paid and not paid.
- Self-employed informal entrepreneur: partner is self employed in the informal sector (not registered with the administration with any formal status).

- Working in public sector or in a formal company: including self-employed in a formal company.
- Earned higher revenue than partner in 2015: answered that she had higher revenue than her partner in 2015. Answering that both partners had the same level of revenue was an option.
- Contribution to household expenditures in 2015 (in %): Respondents were asked to estimate their personal contribution in percentage to the total expenditure made by their household regarding different types of expenditure:
 - Own personal expenditures of the respondent: excluding gifts
 - Partner’s personal expenditures: excluding gifts
 - Food
 - Health: total expenditure for all household members.
 - Housing: including rent and water and electricity bills.

Regularly send money outside the household Regularly receive money from outside the household

- Lottery 1: Willingness to pay to hide a windfall transfer
 - Willing to pay a positive price: equal to 1 if the respondent answered that she would prefer to receive CFAF 38,000 anonymously instead of CFAF 40,000 in front of her spouse, and 0 otherwise. CFAF 38,000 is the smallest amount that was offered to the respondent for this lottery.
 - Share willing to pay to hide income: Share of the cash transfer that the respondent is willing to pay to receive privately. The maximum amount that could be hidden was 50% of the transfer. Equal to zero if the respondent is not willing to hide at any price.
 - Share conditional on positive willingness to pay: Similar to the previous variable, except that the variable is equal to missing if the respondent is not willing to pay to hide at any (positive) price
- Lottery 2: Willingness to pay to get full control over a windfall transfer (instead of a 50/50 allocation)
 - Similar to Lottery 1
- Willing to pay a get more control on a windfall transfer (WTP ≥ 0 at any lottery): equal 1 if the willingness to pay is positive to at least one lottery question.