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Does forced solidarity hamper investment in small and micro enterprises?

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ABSTRACT

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Summary: Previous research has shown that small firms in poor countries achieve high marginal returns to capital but show low reinvestment rates. We investigate whether transfers motivated by risk sharing and forced redistribution can explain this pattern and may therefore hamper private sector development. The idea is that the more redistribution distorts the fairness of insurance, the more potentially successful entrepreneurs may be hindered to undertake profitable investments. The empirical results based on a sample of small firms operating in Burkina Faso support the main propositions of this paper. *Journal of Comparative Economics* **45** (2017) 827–846. University of Passau, Department of Economics, Innstrasse 29, 94032 Passau, Germany; University of Namur, Faculty of Economics / CRED, Rempart de la Vierge 8, 5000 Namur, Belgium; GIGA, Neuer Jungfernstieg 21, 20354 Hamburg, Germany; Erasmus University Rotterdam, Burgemeester Oudlaan 50, 3062 PA Rotterdam, Netherlands and IZA, Schaumburg-Lippe-Straße 5-9, 53113 Bonn, Germany.

1. Introduction

Previous research has shown that micro and small entrepreneurs in poor countries achieve relatively high marginal returns to capital but show very low reinvestment rates (see e.g. McKenzie and Woodruff, 2006; 2008; De Mel et al., 2008; Grimm et al., 2011; Fafchamps et al., 2014). The literature is rather inconclusive on the possible causes of the observed pattern. While capital market imperfections have been shown to be related to high marginal returns (McKenzie and Woodruff, 2006; De Mel et al., 2008), they do not explain why these returns are not retained and reinvested. Banerjee and Duflo (2011) argue that an overall low profitability may prevent many entrepreneurs to further increase the size of their firm. Risk, as another factor, has also been associated with high returns, whereby low reinvestment rates are explained by households being required to hold on to cash if investments are largely irreversible (see e.g. Fafchamps and Pender, 1997, Rijkers

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and Söderbom, 2013). One aspect which has received less attention so far is whether obligations to share constitute an important cause of low reinvestment rates.

In a context where people are frequently exposed to severe shocks but where the possibilities to smooth consumption through formal insurance, savings and credit are limited, sharing might be necessary to secure subsistence at all times (see, for example, Townsend, 1994; Kocherlakota, 1996). At the same time if social norms are in place that try to overcome participation constraints (Stark and Lucas, 1988; Coate and Ravallion, 1993; Attanasio and Rios-Rull, 2000; Foster and Rosenzweig, 2001; Ligon et al., 2002; Genicot and Ray, 2003) and add a redistributive role to transfers (Gubert, 2002; Fafchamps, 2003; Azam and Gubert, 2006) transfers may become excessive. In this case, it may be difficult to save and invest in which case sharing obligations can become an important deterrent to economic growth and development.

The idea that family and kinship ties may be an obstacle to economic activity is relatively old in particular in the context of Africa. It is, for example, often mentioned in the anthropological literature (see e.g. Barth, 1967) and was emphasized by modernisation theorists but with very different nuances and clearly distinguished conclusions (see e.g. Lewis, 1955; Meier and Baldwin, 1957; Bauer and Yamey, 1957; Hirschman, 1958; Rostow, 1960). Such negative effects are also discussed in the field of economic sociology and social network analysis as the downside of 'strong ties', which are often also referred to as 'bonding ties' (Granovetter, 1973; 1983; 1985; Barr, 2002).

More recently, the topic has been taken up again by economists (see, for example, Platteau, 2000; 2014; Hoff and Sen, 2006; Alger and Weibull, 2008; 2010; Haagsma and Mouche, 2013). While acknowledging that family and kinship ties can be a vehicle for mutual insurance in contexts where formal insurance markets do not exist, these authors also argue that these ties may become an important obstacle in the process of economic transition when economically successful members within the kin may be confronted with sharing obligations by less successful ones. These obligations may require successful members to remit money, find jobs or host relatives in the city home (see e.g. Hoff and Sen, 2006). The main hypothesis that can be derived from these considerations is that these demands can adversely affect the ability of otherwise successful relatives to pursue and develop their economic activity. While opting out of the kinship network and refusing to comply with sharing obligations is possible, it may result in sanctions and high psychological costs, such as guilt, shame or ridicule or the fear of witchcraft (Platteau, 2000).

To date, there has been very little empirical backup for the existence of negative effects associated with family and kinship ties though there is some evidence that successful individuals do indeed tend to use various strategies to hide their income. Di Falco and Bulte (2011), for instance, find evidence that kinship size is associated with higher budget shares for non-shareable goods. In another paper both authors find that compulsory sharing invites free riding and attenuates incentives for self-protection against weather shocks (Di Falco and Bulte, 2013). Baland et al. (2011) analyze borrowing behaviour and find that some people take up credits even when they don't suffer from a liquidity constraint just to signal to their kin that they are unable to provide financial assistance. Brune et al. (2011) arrive at similar conclusions concerning saving, whereby commitment saving arrangements are found to lead to larger savings than ordinary saving arrangements (see also Anderson and Baland, 2002). The authors explain the positive impact of commitment saving also with the desire to keep funds from being shared with one's kin. Adverse incentive effects due to redistributive pressure are also identified by Jakiela and Ozier (2012). They conducted lab-experiments in rural Kenyan villages in which they randomly vary the observability of investment returns to test whether subjects decide to hide income under certain conditions and indeed find that at least female participants who know that the outcome of their investment will be made public, make decisions that are expected to be less profitable. Baland et al. (2014) reveal a system of reciprocal credit within extended families in Cameroon and find some evidence that this has negative effects on labour market outcomes. Duflo et al. (2011) point to sharing obligations as one explanation why impatient Kenyan farmers forgo highly profitable investments in fertilizer. They argue that the impatience is partly rooted in the difficulty of protecting savings from consumption demands. Finally, Fafchamps (2002) also finds a negative association between perceived 'fear of predation by relatives' and value added among agricultural traders in Madagascar.

Against this background, the purpose of this paper is to empirically investigate whether family and kinship ties used for redistribution and mutual assistance reduce the ability to invest in enterprise capital. To guide the empirical analysis, we start from a theoretical model in which entrepreneurs have to decide whether they want to invest and rely on themselves or whether they share their income with their family and kin, hence forgo investment opportunities, but are insured against business and household-related shocks. A sanction that is imposed if sharing is refused, may force entrepreneurs to comply even if from their individual perspective investing would be the better alternative. In other words, sharing becomes the norm and can be interpreted as compulsory informal insurance; non-compliance with which is costly. Predictions derived from that model are then tested empirically using data from small and micro entrepreneurs in Burkina Faso. Sharing norms are generally strong in the Burkinabè context, in particular within the dominant ethnic group of the Mossi (Fiske, 1990; Englebert, 1996).

We find empirical support for our theoretical model. Redistributive pressure and risk aversion increase the probability of staying in the risk sharing network and this is associated with significantly lower investment as pressure increases. In contrast less risk averse entrepreneurs that step out of such networks show clearly higher investment levels and have substantially larger stocks of capital. Family pressure does not affect their investment decisions.

It is important to note that in this paper we focus on family and kinship ties as opposed to social networks. The main difference between family and kinship ties, on the one hand, and the social network as a generic set of individuals who interact, on the other, is that family and kinship ties can be seen as largely exogenous and cannot be changed freely or only at high psychological costs. There are different types of ties and the family and kinship network can be considered an important sub-network of the larger social network (see also Alesina and Giuliano, 2013; Berrou and Combarnous, 2012). This distinction largely overlaps with the distinction made in the field of economic sociology and social network analysis referring to 'weak' and 'strong ties' (Granovetter, 1973; 1983) whereby strong ties describe those links to the immediate family and kin and refer to rather closed networks.

The remainder of this paper is organized as follows. In Section 2 we propose a simple theoretical model of investment and transfers in a context of strong sharing obligations. In Section 3 we present the data and key variables. In Section 4 we translate the theoretical model into a set of structural equations to be estimated econometrically. In Section 5 we discuss the results and in Section 6 we conclude.

2. A model of investment under risk sharing and informal taxation

Although our model is intended to have broader relevance, we call, in what follows, entrepreneurs simply 'tailors', as this group of entrepreneurs will be the subject of the empirical analysis later in the paper. The tailor operates in an urban setting. It is assumed that the tailor maximizes the present value of expected utility over two consecutive periods. At the beginning of the first period, the tailor has to decide if he/she wants to stay in his/her kinship network ($q = 1$). The network provides him/her with perfect insurance against a catastrophic shock S that can occur in the second period. S takes the value s (with $s > 0$) with the probability π (with $0 < \pi < 1$) and 0 otherwise.[1] The loss S and the distribution of π is known to the tailor. In turn, the tailor has to pay remittances, R, to the kin at the end of period 1. If the tailor decides to step out of the kinship network ($q = 0$), he/she has no insurance, does not have to pay R, but bears a disutility, D, in the first period. The disutility results from sanctions imposed on him/her because of the refused solidarity with the kin. Such sanctions may imply a loss of social status, harassment or the exclusion from ceremonies.

The tailor's expected welfare, W, is given by:

$$W = \sum_{t=1}^{2} \beta^{t-1}[E(U(C_t))] - (1-q)D. \tag{1}$$

We assume that the underlying utility function is of the CRRA[2] type which, in its most general form, can be written as follows:

$$U = \frac{C^{(1-\theta)}}{1-\theta} \quad \text{with } 0 < \theta < 1, \tag{2}$$

where the parameter θ measures the degree of the tailor's risk aversion.

C_t stands for consumption, derived from income from productive activity, Y_t, minus investment, I. In those cases in which the tailor remains in the kinship network ($q = 1$), he/she remits R and is not affected by the shock S. We refrain from any moral hazard considerations. If he/she opts out, no remittances are made but the tailor may incur the financial loss related to a shock in period 2. In period 1, the tailor's consumption is hence:

$$C_1 = Y_1 - I - qR, \tag{3}$$

and in period 2 the (expected) consumption is:

$$E(C_2) = Y_2 - (1-q)S. \tag{4}$$

Output is produced using only capital, K. To keep the model simple, we focus on capital inputs although we acknowledge that the allocation of other inputs, in particular labor, may also be affected by kinship pressure.[3] So one may also think of capital as being broader than just physical capital, also including labor or human capital. This would not change the main implications of our model as long as labor is easily available, which we think is a plausible assumption in urban Burkina Faso. The tailor produces according to a standard neoclassical production function with standard properties, i.e. $f'(K_t) > 0$, $f''(K_t) < 0$, $\lim_{K_t \to \infty} f'(K_t) = 0$ and $\lim_{K_t \to 0} f'(K_t) = \infty$. Income is then given by:

$$Y_t = f(K_t). \tag{5}$$

The price of the goods produced by tailors is the numéraire and hence equal to one.

At the beginning of period 1 the tailor has a capital stock K_1. K_1 is exogenous and may differ across tailors. K_1 can only be used for production. It cannot be depleted or rented out. After period 1, the tailor can use his/her income to finance additional investment to adjust his/her capital stock in the second period, i.e.

$$K_2 = K_1 + I. \tag{6}$$

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[1] We think in particular of idiosyncratic shocks, such as catastrophic health expenditures, and ignore covariate shocks within the kin, which is plausible if the kinship network is geographically dispersed. Empirical evidence suggests that in reality insurance is rarely perfect (see e.g. Townsend, 1994; Foster and Rosenzweig, 2001), hence we discuss below the implications for our model.

[2] Constant Relative Risk Aversion.

[3] For instance, an entrepreneur might be forced to employ (less productive) members of the kin. In our data we find indeed evidence consistent with this hypothesis, but this is not the focus of this paper.

We make the strong, but not necessarily implausible, assumption that all tailors are credit constrained, i.e. do not have access to credit. Hence, any investment at the end of period 1 needs to be financed out of earnings, i.e. savings built up in the previous period. As will be shown below in our sample of tailors only 2.6% used indeed a micro-finance or formal bank credit to finance investment. Even informal loans, loans by family members and transfers (which may have an implicit element of reciprocity) are not very common sources of finance in our sample. Savings play the dominant role, i.e. other sources rather complement.

The tailor's income in the first period is, however, not only the source of liquidity for investment, but also subject to remittances extracted by the kin. One can think of these remittances as of a 'tax' that is imposed on the tailor's income. The tax rate, t, is assumed to depend on the pressure for redistribution, N, which is in turn determined by the size of the kin that potentially seeks support. Pressure for redistribution may also be influenced by the intensity of sharing norms prevailing in the tailor's kin, the extent to which potential recipients behave as free-riders and the costs of observing the tailor's income. These factors are not explicitly modelled. It is important to note that the tax rate t is not a function of income, as it would probably be in a formal insurance system and it is exogenous for the tailor.[4] The remittances, R, that have to be paid if the tailor stays within the kinship network are hence given by:

$$R = t(N)Y_1 \quad \text{with } \frac{\partial t}{\partial N} > 0,\ t(N) > 0 \text{ and } t(N) < 1 - \frac{Y^{Sub}}{Y_1} \quad \forall N. \tag{7}$$

As the tax rate t is determined only by the pressure for redistribution, N, the remittances paid to the kin are very unlikely to be an actuarially fair premium for the insurance against shocks. Rather, the 'informal tax' comprises both an insurance premium and an element of redistribution. The redistributive element can be seen as an additional cost of the insurance and hence affects the decision to participate. We abstract from the potential social prestige that might result from remittances (Platteau, 2000) and explicitly deviate from models that assume joint utility maximisation within extended families of migrants and the family behind (Stark and Bloom, 1985).

The fact that the 'tax rate' does not take account of the network's welfare implies that improvements in the tailor's welfare and in the network may be possible. Imposed remittances may prevent the tailor from undertaking investments that in the long run would allow for higher transfers. We think that allowing for such inefficiencies is plausible in the context that we are considering. First, the kin in the village may, in particular, need assistance to cope with short-term shocks. Second, the network may have a different discount rate, as transfers in this context typically go from younger to older cohorts.

We impose that t must be such that remittances always ensure that the tailor still has at least a subsistence income, Y^{Sub}. The 'tax rate', t, is known to the tailor. The fact that the 'tax' is paid out of first-period income translates the idea that participation reduces the liquidity available for investment, but not the incentive to invest.

The sanction, D, imposed on the tailor in case of non-compliance with the risk-sharing network is also assumed to depend on the pressure for redistribution, N, thus:

$$D = \gamma(N) \quad \text{with } \frac{\partial \gamma}{\partial N} > 0, \gamma(N) > 0\ \forall N \text{ and hence } D > 0. \tag{8}$$

This is motivated by insights from the literature on social norms (see e.g. Platteau, 2000; Cox and Fafchamps, 2008).

Hence, the tailor maximizes welfare, W, over periods 1 and 2 choosing q and the optimal size of I given the credit constraint and the tax that needs to be paid under $q = 1$:

$$\begin{aligned} \text{Max}_{q,I} W &= U(C_1) + \beta E[U(C_2)] - (1-q)D \\ &= U(Y_1 - I - qR) + \beta E[U(Y_2 - (1-q)S)] - (1-q)D \end{aligned} \tag{9}$$

s.t. Eqs. (5) to (8) and with $S = s$ where $s > 0$ with the probability π and 0 otherwise.

As illustrated below, optimal choices for capital stocks differ between exiting ($q = 0$) and staying in ($q = 1$) the kinship network. These optimal choices will be denoted * for $q = 0$ and ** for $q = 1$. The tailor will thus stay in the network if the difference, ΔW, between given optimal choices under each regime is positive.[5]

$$\begin{aligned} \Delta W &= W^{**} - W^{*} \\ &= U(Y_1 - I^{**} - R) + \beta U(f(K_1 + I^{**})) \\ &\quad -\Big(U(Y_1 - I^{*}) + \beta E[U(f(K_1 + I^{*}) - S)] - D\Big). \end{aligned} \tag{10}$$

We can now also examine the optimal conditions for investment under the two regimes, i.e. the growth and insurance regimes (we write the utility function in full to better illustrate the role of θ). If the tailor opts out of the kinship network ($q = 0$), his/her decision on capital stocks under the growth regime will follow standard intertemporal decision rules equating the expected marginal rate of substitution between present and (discounted) future consumption to the marginal

[4] In reality of course entrepreneurs may have some room to negotiate this rate, but there will be clear boundaries in which this rate will be depending on the norms the tailor is exposed to.

[5] This is in line with insights from limited commitment models, i.e. full risk sharing under participation constraints (see e.g. Coate and Ravallion, 1993; Ligon et al., 2002; Genicot and Ray, 2003).

rate of transformation between present and future production. In the growth regime ($q = 0$) maximising W according to Eq. (9) with regard to I then yields:

$$\frac{1}{\beta(Y_1 - I^*)^\theta}\left(\frac{(f(K_1+I^*)-s)^\theta (f(K_1+I^*))^\theta}{\pi(f(K_1+I^*))^\theta + (1-\pi)(f(K_1+I^*)-s)^\theta}\right) = f'(K_1+I^*) \tag{11}$$

The optimality condition under the insurance regime ($q = 1$) reads:

$$\frac{1}{\beta}\left(\frac{f(K_1+I^{**})}{(1-t)Y_1 - I^{**}}\right)^\theta = f'(K_1+I^{**}). \tag{12}$$

This latter condition shows that the tailor's investment decision - if he/she chooses to stay in the network - is distorted by the 'tax' levied on income from his/her entrepreneurial activity.

Each of these conditions imply optimal investment amounts, I^* and I^{**}, respectively, for a given set of parameters. These optimal amounts can be substituted into Eq. (10) and then provide the optimal welfare levels, W^* and W^{**}, that will be compared by the tailor to decide whether to stay in the network. I, and thus W, are functions of the various exogenous variables, θ, N, s and K_1. In what follows we comment on some comparative static results.

With respect to the choice of q, a not so risk averse tailor (i.e. small θ) with a given initial capital stock K_1 would be indifferent between the two regimes if the sanction that applies if the tailor leaves the network (D) together with the expected losses due to possible shocks (S) exactly outweigh remittances (R). At this indifference threshold a (more) risk averse tailor will *ceteris paribus* opt for staying in the kinship network; so will a tailor with a lower initial capital stock and a tailor facing a higher expected loss, S. The maximization problem is more complicated if pressure for redistribution, N, varies, as N affects both R and D. In this case, optimal investment (in the insurance regime) and the choice of staying in the network depend on the exact parametrization of the model.

In the following we consider the investment decision conditional on having chosen a specific regime. The above conditions show that the tailor's investment decision – if he/she chooses to stay in the network – is distorted by the 'tax' levied on the income from the entrepreneurial activity. This distortion increases with N: the denominator on the left hand side of Eq. (12) will be smaller, the marginal product of capital hence larger, i.e. the capital stock, K_1, and investment, I, smaller, *ceteris paribus*. The investment decision by the entrepreneur outside the network is not affected by N. The choice of the utility function implies that investment by more risk averse entrepreneurs will be lower. Finally, the size and the probability of the shock will positively affect investment by the tailor who opted out of the network as more resources need to be invested and thus shifted to the second period to cope with the shock.

Within each regime and for small enough θ and high enough β our problem hence implies the following signs of the partial derivatives of the optimal amounts of investment I^* and I^{**} (see Appendix A).

Growth regime ($q = 0$)*:*

$$\frac{\partial I^*}{\partial N} = 0,\ \frac{\partial I^*}{\partial K_1} < 0,\ \frac{\partial I^*}{\partial \theta} < 0,\ \frac{\partial I^*}{\partial s} > 0.$$

Insurance regime ($q = 1$)*:*

$$\frac{\partial I^{**}}{\partial N} < 0,\ \frac{\partial I^{**}}{\partial K_1} < 0,\ \frac{\partial I^{**}}{\partial \theta} < 0,\ \frac{\partial I^{**}}{\partial s} = 0.$$

To analyze and illustrate how variations in the relevant parameters affect the regime choice, we calibrated this model using the data presented below. For instance to analyze the effect of the degree of risk aversion on regime choice we calculated the optimal investment level and the corresponding welfare in each regime for a varying θ. This is graphically illustrated in Appendix B. It can be seen that as risk aversion increases a tailor tends to switch from the growth to the insurance regime. An increase in the initial stock of capital allows tailors to invest more in the first period and therefore to shift more resources to the second period so that the tailor is less dependent on his or her extended family and hence tends to opt for the growth regime. As the size of the loss increases, the attractiveness of the insurance regime obviously increases. The effect of redistributive pressure is difficult to calculate as the outcome depends on the assumptions on how pressure influences the 'tax rate' and the 'sanction' imposed in case of non-compliance. The data does not allow to obtain reliable estimates for these two parameters, hence whether overall pressure increases or decreases the probability to opt for the growth regime remains an empirical question that we will address below.

More precisely, in our empirical analysis we will on the one hand test some of our key assumptions, first of all, whether the data supports the assumptions of two distinct regimes and, if this is indeed supported, whether in the insurance regime, redistributive pressure reduces investment, and whether there is no informal taxation in the growth regime and in consequence in this regime redistributive pressure does not affect investment. Moreover, the empirical analysis serves to test some of the results derived above, in particular whether indeed staying in the network and sharing is more attractive for more risk-averse tailors. The empirical analysis will then also allow to see whether redistributive pressure rather pushes tailors out of the network or keeps them in. Again, in our model the role of pressure is ambiguous regarding the regime choice as pressure increases remittances, but also increases the social costs of opting out.

Finally, the model above makes a number of simplifying assumptions in particular that insurance through the family network is complete and that there is no credit market. While relaxing both assumptions is beyond the scope of this paper, we briefly comment on (i) how relaxing the assumption of perfect insurance and permitting precautionary savings and (ii) how allowing for credit markets would affect our results. Incomplete insurance would reduce the attractiveness of the insurance regime.[6] The need for precautionary savings would further increase the cost of insurance by either reducing the capacity to invest or reducing expected consumption in period 2 (assuming plausibly that the return to savings is lower than the return to investment). Hence, if insurance is incomplete and precautionary savings are possible, the model predicts more tailors to opt for the growth regime. If we introduced credit markets in our model staying in the insurance network would be less costly, as the informal tax the tailor has to pay would not reduce the capacity to invest. However, the strength of this effect will depend on lending costs and how they compare to the return on investment. Again, in our sample of tailors credit plays only a very minor role for investment implying that lending costs are rather high.

3. Data

3.1. General description of the data

In January 2011 we interviewed 380 tailors in Ouagadougou with a focus on their kinship networks and their business. The same tailors were re-visited in January 2012 to collect supplementary information. We selected tailors as the target group, as this is a very well defined profession and thus relatively homogeneous group. Most tailors employ some physical capital, most importantly one or more sewing machines; hence investment decisions are an important part of their economic activity.

The questionnaire used was organized around 17 modules covering the following areas: characteristics of the entrepreneur; his/her firm and his/her household including questions about his/her origins and links to that origin; household assets; a module on the structure of the kinship network including transfers sent and received; a module about the start-up phase of the firm; the employed labor force; production; expenditures and fees; savings; physical capital; investment and sources of finance; plans for the future; a module on problems and perspectives; a module on abilities and risk attitudes; the family background; and a module on attitudes toward sharing norms and obligations.

The survey was implemented using a two-stage random sampling procedure selecting 400 tailors in 10 out of the 30 sectors of Ouagadougou. The response rate to the survey was 95%. Of the interviewed tailors, 321 reported that they came from a village or another town in Burkina Faso to the capital. Of this group 278 could be re-interviewed in 2012.[7] In our empirical analysis, we focus on these entrepreneurs since we are particularly interested in the link that these urban tailors have with their family and kin in their village of origin.

Table 1 shows some key characteristics of these tailors. On average, the tailors remit to about 2.4 persons, either in cash or in kind, mainly to relatives, in particular parents and siblings, and to people in the village of their origin. The average value of these remittances amounts to about 305 US$ (1 US$ = 512 CFAF) per year. Most of the remittances are given for food, education and other items including health care, typically following shocks the receiving households could not cope with alone. Remittances to co-finance investment other than education are relatively rare. Remittances for ceremonies are frequent, but in terms of their total amount they are rather unimportant. 16% of the tailors remit nothing at all.

When the tailors were asked whether they experienced a shock (up to three could be reported), almost 80% reported that a shock had occurred in the 12 months preceding the survey, mostly health shocks and other household related shocks. Customers not paying their bills accounted for about 25% of all reported shocks. These shocks are all idiosyncratic in nature and can in principle be insured through informal insurance networks. When asked about their coping devices (again up to three were asked for), 21% reported that they received some help from relatives or friends. Given that the migrant tailors can be assumed to be much richer than their rural families and given that, as we argued above, some will on purpose have decided to stay outside risk sharing networks, these 21% do not contradict the existence of informal insurance.

With respect to their entrepreneurial activities, the average monthly turnover (derived from their reported sales) amounts to about 288 US$. The sampled tailors report having an average physical capital of about 851 US$ (valued at replacement costs). However, the variance is quite pronounced. Physical capital comprises tools, machines, furniture and the workshop. 76% of the tailors invested an average amount of 285 US$ in the past 12 months, an amount close to remittances. 97% of all investment items were financed out of own savings. Neither transfers from relatives or friends nor credit are a prominent source of finance. This also holds for start-up investment which is also mainly financed out of savings. Reason for this low use of credit may not only be the limited availability of micro-finance institutions and the difficult access to these institutions but also the rather high risk involved in borrowing from informal money lenders who may insist on repayments even when the business is bad.

3.2. Measures of pressure for redistribution

To establish a link between the pressure for redistribution and our main outcome of interest – investment – we need to find exogenous measures for redistributive pressure. These measures should not be affected by the tailor's reaction to

[6] See, for example, Ligon (1998) for a model of risk sharing with savings.

[7] We tested whether attrition is related to our main variables of interest such as investment, transfers and family network characteristics, but we did not find any systematic relationship.

Table 1
Descriptive statistics ($N = 278$).

	Mean	S.D.
Owner characteristics		
Male (= 1)	0.81	
Age	34.8	9.3
Household head (= 1)	0.75	
Primary school completed (= 1)	0.33	
Mossi (= 1)	0.75	
Muslim (= 1)	0.55	
Number of persons remitted to (past 12 months)		
Siblings	0.9	1.1
Any direct family member (in or outside village)	1.9	1.3
Any person from village of origin (incl. family in that village)	1.2	1.4
Any person (i.e. all persons remitted to)	2.4	1.4
Tailor has paid no remittances at all (= 1)	0.16	
Amounts remitted in US$ (past 12 months)		
Siblings	99.6	329.3
Any direct family member	209.1	422.8
Any person from village (incl. family in that village)	101.9	170.0
Any person (i.e. all persons remitted to)	304.8	1,165.3
Share of total remittances given for		
Food	0.48	0.40
Education	0.15	0.21
Investment	0.06	0.21
Drugs	0.03	0.13
Ceremonies	0.02	0.11
Other (incl. health care other than drugs)	0.26	0.33
Tailor reported shock that occurred to him/her (= 1)	0.79	
Type of problem for three most important shocks (shares)		
Medical problem with high financial costs	0.29	
Death of a household member	0.12	
Wedding, baptism, other ceremony	0.13	
Customer didn't pay	0.24	
Other	0.21	
Households receiving help following a shock (= 1)	0.21	
Firm characteristics		
Age of firm	7.4	6.7
Firm is registered (= 1)	0.31	
Has a workshop (= 1)	0.84	
Has access to electricity (= 1)	0.85	
Has electric sewing machine (= 1)	0.68	
Monthly turnover in US$	288.6	827.1
Physical capital in US$	851.0	1,692.3
Firms size (staff, incl. owner and fam. helpers)	3.8	1.8
Total monthly hours	868.9	457.4
Invested past 12 months (= 1)	0.76	
If invested, financed through savings (= 1)	0.97	
Investment past 12 months in US$	285.1	554.7
Current owner set up the enterprise (= 1)	96.8	
For those, most important source of finance (shares)		
Savings	0.86	
Donation	0.11	
Heritage	0	
Family loan	0.02	
Other	0.01	
... second most important source of finance (shares)		
Savings	0.04	
Donation	0.28	
Heritage	0.01	
Family loan	0.03	
Other	0.64	
Help from others, those still paying back (= 1)	0.11	

Source: Own data, collected in January 2011 and 2012 in Ouagadougou, Burkina Faso.

kinship pressure. Neither observed transfers to the kin nor the number of people seeking (or receiving) transfers are thus appropriate indicators. Instead, we use the number of living siblings of the tailor, assuming that the pressure for redistribution increases with their number. We have selected this indicator for several reasons. First, it is relatively straightforward to report and measurement error should not be a problem. The question was well explained and respondents understood that cousins and any other relative does not count as brother or sister. Second, siblings are, as Table 1 shows, indeed an important recipient of remittances. About halve of all remittances paid to family members go to siblings. Assuming that the

Table 2
Measures of the pressure for redistribution ($N = 278$).

	Mean	S.D.
Number of siblings alive (shares of tailors)		
No siblings	0.04	
1 to 3	0.27	
4 to 7	0.57	
8 and more	0.12	
Average number of siblings alive	4.77	2.50
Av. no. of siblings remitting to your family in the village of origin	1.77	2.36
Number of visits in village of origin last year (shares of tailors)		
No visit	0.16	
1 visit	0.50	
2 visits	0.10	
3 visits and more	0.24	
Number of visitors from village of origin last year (shares of tailors)		
No visitors	0.17	
1 to 4	0.38	
5 to 9	0.24	
10 to 19	0.13	
20 and more	0.08	

Source: Own data, collected in January 2011 and 2012 in Ouagadougou, Burkina Faso.

number of parental households does not vary much, typically two in case of married tailors, conditioning on the tailor's marital status, the number of siblings should also be a good proxy for the pressure from the immediate family as a whole. Third, parents that have many children may themselves have been born into large families hence it may also well reflect pressure from the larger family network. Fourth, institutionally, solidarity between siblings plays a particularly important role in the Burkinabè context (see e.g. Roth, 2010; Akresh, 2005; 2009).

One may argue that siblings per se rather reduce than increase redistributive pressure as the tailor could share the burden of remittances with them. However, this does not seem to be the case. According to the survey respondents, more than half of their siblings are still in the village of origin, most of them do not remit but are among the most often-cited recipients of remittances. Kazianga (2006) also shows that in Burkina Faso, as in many other contexts, urban households, like our tailors, are net payers and rural households net receivers of remittances. Yet, to reduce any potential bias in our analysis below, we always control for the fraction of sisters and brothers outside the household of origin when we use the number of living siblings as a proxy for pressure. Moreover, since the number of living siblings might be correlated with other household background characteristics, we also control for a whole range of such characteristics including parental education and parental socio-economic status.

Table 2 presents the descriptive statistics of the indicators used. On average, the sampled tailors have 4.8 siblings who are still alive with a standard deviation of 2.5. 4% have no living siblings, 57% have between 4 and 7 living siblings, and 12% have 8 or more siblings. According to the tailors, 1.8 out of the 4.8 also remit to the family.

3.3. Measures of risk aversion

Given the central role of insurance, risk and risk aversion in our theoretical model, we included a module on risk taking behaviour in the survey. Tailors were asked whether they would conduct the following six actions: (i) drink heavily and ride a motorbike; (ii) use a day's income for gambling; (iii) be in disagreement with an authority on a major issue; (iv) execute an order for a client without asking for an advance; (v) quote far too high a price when negotiating with a new client; and (vi) invest all savings in a new enterprise provided that 'you have a good idea'. Possible answers were 'very likely' (1), 'likely' (2), 'unlikely' (3) and 'very unlikely' (4). Based on the answers to these six actions, we ran a factor analysis to build an index of risk aversion. Our chosen risk aversion measure is motivated by recent insights from this field. Dohmen et al. (2011) and Hardeweg et al. (2013) for instance use German and Thai data respectively and find experimental evidence suggesting that self-assessed risk aversion measures perform quite well. Table 3 shows the answer pattern given by the tailors. While they appear to be quite risk-averse with respect to the first three actions, they are prepared to take some risk with regard to business-related decisions.[8] The unique variance of the variables entering the risk aversion index varies between 0.33 and 0.46 and implies that all variables considered are of relevance for the factor model estimated. To test the robustness of our results we will also use an alternative risk aversion index that accounts only for the business-related decisions. However, this is not our preferred measure, as it might be endogenous to business success.

[8] The factor analysis yielded three factors with an eigenvalue larger than one, which we combined after rotation to create an index. The three factors together explain 61% of the total variance. Factor 1 is mainly determined by the 5th and 6th variable in Table 3 ('opportunism'), factor 2 by the first three variables ('hazard and gamble') and factor 3 by the 3rd and 4th variable ('client/product').

Table 3
Descriptive statistics of variables that enter risk aversion index ($N = 278$).

Action	Very likely	Likely	Unlikely	Very unlikely
Drinking heavily and driving a motorbike	0.01	0.00	0.04	0.95
Using the daily income for gambling	0.01	0.03	0.11	0.85
Being in disagreement with an authority	0.13	0.17	0.13	0.57
Exec. an order without asking any advance	0.52	0.22	0.12	0.14
Asking a far too high price while negot. with new client	0.35	0.15	0.24	0.26
Investing all your savings in a new enterprise	0.21	0.15	0.27	0.36

Source: Own data, collected in January 2011 and 2012 in Ouagadougou. Burkina Faso.

Table 4
Marginal effects (ME) of number of siblings on probability to agree with the statement "Requests from the family or friends can be so constraining that it is better not to develop the business".

	(1)	(2)	(3)
Number of siblings alive	0.032***	0.032***	0.032***
	(0.011)	(0.012)	(0.012)
Controls	None	Own characteristics	Own and family characteristics
N	278	278	278

Note: Robust standard errors in parentheses. $^{*}p < 0.10$. $^{**}p < 0.05$. $^{***}p < 0.01$. These marginal effects are derived from an ordered probit model. Agreement means both "fully" or "with some hesitation" (as opposed to not agreeing with hesitation or not agreeing at all). Sample mean: 45.7% do fully agree or with some hesitation. Own characteristics include: Age of tailor (years), tailor is household head (= 1), primary completed (= 1) and Mossi (= 1). Family characteristics include: Share of brothers and sisters outside the household of origin, father primary completed (= 1), mother primary completed (= 1), father is/was a farmer (= 1), father is/was independent non-agricultural worker (= 1).
Source: Own data, collected in January 2011 and 2012 in Ouagadougou. Burkina Faso.

3.4. *Perceptions about pressure for redistribution*

Before we empirically test the major predictions of our theoretical model, we briefly discuss what the tailors think of sharing obligations when they are directly asked about them. Our survey included a module on norms and obligations in which we asked the tailors to indicate to what extent they agree or disagree with a specific statement. The responses given (see Fig. 1 below) provide supportive evidence on one of the main propositions of this paper: The majority of respondents agree that the pressure for redistribution increases with business success. 27% perceive it as a distinct obstacle to business development. The share of those who strongly agree among the Mossi is even 7.3 percentage points higher than among the other groups (not shown in Figure). Comparing the characteristics of those entrepreneurs that perceive family requests as constraint to those that do not, our data shows that the former have, on average, more living siblings and are hence potentially exposed to more pressure from the kin; they are slightly more risk averse and exhibit significantly lower investment levels but transfer about twice as much to their village of origin as compared to entrepreneurs that do not perceive family demands as constraint. These findings are in line with our expectations giving us further comfort in the argumentation presented.

The probability that the respondent agrees (fully or with some hesitation) with the statement that "Requests from the family or friends can be so constraining that it is better not to develop the business" (Fig. 1) increases by 3 percentage points with each sibling alive. This effect is based on regressions that relate perceived pressure to the number of siblings controlling for a whole set of other variables including family background (Table 4). This further supports our assumption that the number of siblings is a good measure of redistributive pressure.

4. Empirical specification

To test the four hypotheses described above, we first estimate simple investment functions and focus on the role played by redistributive pressure and risk aversion. Second, we take our theoretical model literally and investigate the simultaneous decisions of staying in or opting out of the kinship network and of investing.

The investment equation relates the log of the value of total investment in the twelve months preceding the survey, I_i, of entrepreneur i to the pressure for redistribution, N_i, the (log) value of the capital stock in the previous period (to capture convergence), $KL1_i$, and risk aversion, θ_i. N_i can be considered exogenous, as it does measure potential, but not actual redistribution. The equation to be estimated reads as follows:

$$\ln I_i = \beta_0 + \beta_1 \ln KL1_i + \beta_2 N_i + \beta_3 \theta_i + \beta_4 \ln H_i + X'_{ij}\beta_{5j} + u_i. \tag{13}$$

We include the owner's wealth, H_i, since wealth is an important source of finance for investment in a context of severe capital market constraints. Wealth includes only household assets, such as ownership of a television, a radio, a bicycle

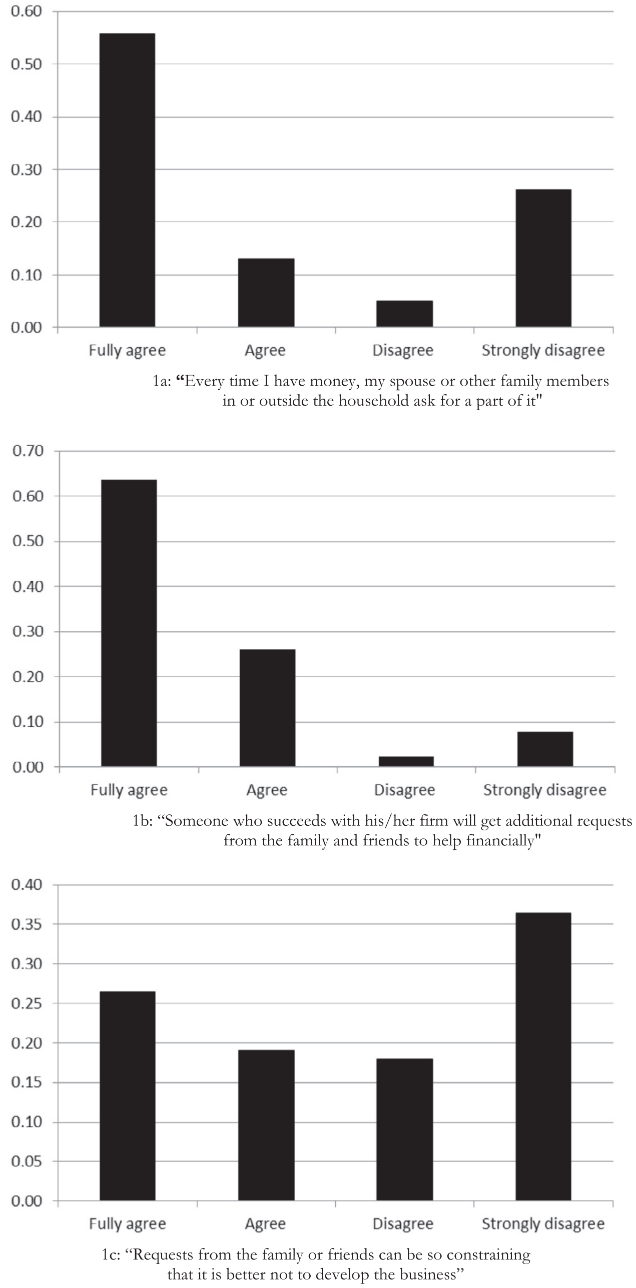

Fig. 1. Perceptions about pressure for redistribution (share of respondents).

and so on, but no business-related capital goods. As for risk aversion, we use the index explained above. The vector X_{ij} stands for a set of j control variables, including age, education and the ethnic affiliation of the entrepreneur, the age of the firm, whether the firm is formal, i.e. formally registered with the tax administration, and whether the entrepreneur is the household head.[9] These variables may all directly or indirectly determine the ability or capacity to invest and, hence, we want to avoid that their omission biases the effect of our main variables of interest. The vector X_{ij} also includes the share of sisters and brothers outside their household of origin, parental education and the father's (former) occupation. These latter controls will reduce any potential unobservable variable bias, i.e. ensure that the number of siblings only captures redistributive pressure and not other family background effects.

[9] We do not introduce 'gender' as a additional control variable, as it is highly collinear with household head status.

We use two different specifications to estimate Eq. (13): First, a simple linear regression model; and, second, a Tobit model, since for about a quarter of all tailors investment in the previous period was zero.

Based on Eqs. (11) and (12), we then investigate the simultaneous decisions to stay in (insurance regime) or opt out of (growth regime) the kinship network and to invest. We interpret this simultaneous decision as a problem of sample selection and heterogeneity. This suggests using an endogenous switching regression model (Maddala, 1983) that can jointly estimate the decision about compliance and the decision on how much to invest. We assume that the decision about compliance can be modelled through the following criterion function:

$$Q^* = \gamma_0 + \gamma_1 N_i + \gamma_2 \theta_i + X'_{ij}\gamma_{3j} + \epsilon_i \tag{14}$$

where Q^* describes the latent probability of being in the growth regime (note $Q = 1 - q$), i.e. of not complying with the sharing norms and opting out of the kinship network. This probability is modelled as a function of redistributive pressure, risk aversion and other household and family background characteristics (with the variables defined as described above). The tailor opts for the growth regime

$$Q_i = 1 \text{ if } \gamma_0 + \gamma_1 N_i + \gamma_2 \theta_i + X'_{ij}\gamma_{3j} + \epsilon_i > 0$$

and for the insurance regime

$$Q_i = 0 \text{ if } \gamma_0 + \gamma_1 N_i + \gamma_2 \theta_i + X'_{ij}\gamma_{3j} + \epsilon_i \leq 0.$$

Obviously, working with this model requires us to determine the status $Q_i = 1$. We arbitrarily define this status by a threshold at which tailors neither make transfers nor receive transfers in the current period. Since, a tailor may for various reasons not have made and received transfers in a specific period, but may have made and received transfers in previous periods, we check the robustness of our estimates by using an alternative threshold defining $Q_i = 1$ as having not made and received transfers in the current and the previous period. As a third alternative we determine those tailors of being in the status $Q_i = 1$ who report not having visited their village of origin in the 12 months preceding the survey.

Next we define an investment equation for each possible state: compliance (or 'insurance regime', S) and non-compliance (or 'growth regime', G).

$$\ln I_i^G = \beta_0^G + \beta_1^G \ln KL1_i + \beta_2^G \ln H_i + X'_{ij}\beta_{3j}^G + \beta_4^G N_i + \beta_5^G \theta_i + u_i^G \text{ if } Q_i = 1 \tag{15}$$

$$\ln I_i^S = \beta_0^S + \beta_1^S \ln KL1_i + \beta_2^S \ln H_i + X'_{ij}\beta_{3j}^S + \beta_4^S N_i + \beta_5^S \theta_i + u_i^S \text{ if } Q_i = 0. \tag{16}$$

It is assumed that ϵ_i, u_i^G and u_i^S follow a trivariate normal distribution. The covariance between u_i^G and u_i^S is not defined as I_i^G and I_i^S are never observed simultaneously. The model is identified by construction through non-linearities. Following Lokshin and Sajaia (2004), we estimate this endogenous switching regression model using the full information maximum likelihood (FIML) method. The FIML method estimates the selection equation and the investment equations simultaneously yielding consistent standard errors. For $Q_i = 1$ we expect β_4^G to be not significantly different from zero.

5. Test of hypotheses and discussion of results

5.1. Redistributive pressure, risk aversion and investment

Table 5 shows the results for the investment model (Eq. (13)). In the first column we show the simple OLS model and in columns (2) to (6) we show the tobit model. Marginal effects are shown in Table C1. In column (1) and (2) the number of siblings, our measure of redistributive pressure, is significantly and negatively associated with investment. The marginal effects derived from the tobit model are a bit lower than in the OLS model but qualitatively similar. It can be seen that the absolute magnitude of the effect associated with the siblings variables increases in the number of siblings. A different way of accounting for this non-linearity is to introduce the number of siblings and the squared number of siblings as explanatory variables. This is done in column (5). The estimated coefficients suggest that investment decreases with the number of siblings but at a decreasing rate. Going from 2 to 3 siblings for instance decreases investment by about 39%, going from 3 to 4 by 23%. With respect to risk-aversion, we also find a pronounced negative effect. The computed marginal effects (cf. Table C1), imply that an increase in the risk aversion index by one standard deviation (0.75) reduces investment by about 25%.

Quite interestingly, we also find a robust negative effect associated with belonging to the Mossi ethnic group. As mentioned in the introduction, the Mossi are known for pronounced solidarity with their kin and strong egalitarian norms (Fiske, 1990; Englebert, 1996). According to Fiske (1990) '*in work, transfers and consumption, the Mossi function as a collective "we", not as individuals*' (p. 185). On average the Mossi invest about 50% less than other groups. If we estimate the model for the sub-sample of Mossi only (column (3) and (6)) we see indeed that the effects associated with the number of siblings are a bit larger than in column (2), but this difference is not statistically significant (the marginal effects are larger by about 15% to 20%). The effects of all other control variables (not reported in the table, but included in the online appendix (Table S1)) are also in line with expectations, giving us confidence in the data and formulated model. In column (4) we also tested whether the results are robust to the exclusion of the capital stock in $t-1$, as this variable may cause an endogeneity problem. Although it lowers the effects associated with the number of siblings somewhat, it does not substantially affect the

Table 5
The effect of redistributive pressure and risk aversion on investment.

	(1) OLS	(2) Tobit	(3) Tobit (Mossi only)	(4) Tobit	(5) Tobit	(6) Tobit (Mossi only)
Ln capital stock in t−1	-0.384***	−0.492***	−0.490***		−0.494***	−0.495***
	(0.048)	(0.062)	(0.071)		(0.061)	(0.070)
No siblings alive	Ref.	Ref.	Ref.	Ref.		
1 to 3 siblings alive	−0.806	−1.139	−1.380	−0.870		
	(0.696)	(0.781)	(0.841)	(0.775)		
4 to 7 siblings alive	−1.529**	−2.035***	−2.425***	−1.659**		
	(0.666)	(0.745)	(0.786)	(0.734)		
8 and more siblings alive	−1.648**	−2.165**	−2.486***	−1.877**		
	(0.734)	(0.844)	(0.893)	(0.850)		
Number of siblings alive					−0.521***	−0.642**
					(0.195)	(0.250)
Number of sibl. (squared)					0.035**	0.041*
					(0.017)	(0.022)
Risk aversion index	−0.495***	−0.620***	−0.643***	−0.643***	−0.630***	−0.665***
	(0.167)	(0.199)	(0.235)	(0.222)	(0.199)	(0.237)
Mossi (= 1)	−0.741**	−0.959***		−0.614	−0.978***	
	(0.299)	(0.365)		(0.392)	(0.370)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.305					
N	278	278	206	278	278	206
Censored N		68	54	68	68	54

Note: Robust standard errors in parentheses. *$p < 0.10$. **$p<0.05$. ***$p<0.01$. Control variables included are: Asset index, age of firm (years), firm is formal (= 1), age of tailor (years), tailor is household head (= 1), tailor is married (= 1), primary completed (= 1), fraction of siblings outside the household of origin, father primary completed (= 1), mother primary completed (= 1), father is/was a farmer (= 1), father is/was independent non-agricultural worker (= 1).
Source: Own data, collected in January 2011 and 2012 in Ouagadougou. Burkina Faso.

results. Overall, the specified model is able to explain quite a lot of the variance in investment, as indicated by an R-squared of about 30% in the OLS specification.

We also estimated models with transfers made (and the number of people tailors remit to) as dependent variable and the same set of individual and household covariates as used above (Tables included in the online appendix). Here redistributive pressure comes out with a significant positive sign, suggesting that redistributive pressure increases the amount of transfers made. Risk aversion has now also a significant positive effect, in fact very similar to the effect above, just of the opposite sign. A one standard deviation increase in risk aversion, raises transfers made by 23%. All this suggests that redistributive pressure is effective by enhancing transfers and that risk-averse tailors are more inclined to deliver these transfers to get insurance in return. We tested reciprocity by running a probit model of having received help on a variable indicating to how many people the tailor remitted to, provided the tailor has experienced a negative shock (binary outcome, y/n). We find that the probability of having received help from others increases significantly with the amount of transfers made and the number of people remitted to (Tables included in the online appendix).

5.2. Compliance with sharing norms and investment

In the following we present the results of the endogenous switching regression model. Table 6 reports two sets of results: first, the results from simultaneously estimating a switching regression model, including a regime choice equation (column (3)) and an investment equation for each regime (column (1) for the growth and column (2) for the insurance regime); and, second, an investment equation for each regime splitting the sample using the alternative thresholds defined above (columns (4) and (5)). In columns (1) and (2) we have omitted redistributive pressure and risk aversion from the set of variables. We first turn to part (a) of Table 6 where we classify those tailors as being in the growth regime that have not made and received any transfers in the current period. The switching regression shows that redistributive pressure is a significant determinant of the allocation of tailors across the two regimes. Our theoretical model implied an ambiguous effect of redistributive pressure. On the one hand, it increases the share of income that has to be remitted; on the other hand it increases the disutility associated with the sanction. If these forces are indeed at work, the data suggests that the latter effect indeed dominates: higher pressure reduces the probability of being in the growth regime. This is also consistent with the results above, which suggested that kinship size is on average associated with lower investment and higher transfers made. Risk aversion, in line with our hypothesis, also reduces the probability of being in the growth regime. The likelihood-ratio test for joint independence of the three equations reported in the last row of Table 6 shows that these three equations are not jointly independent and should hence not be estimated separately. This lends support to the hypothesis that regime choice and investment decisions are indeed simultaneous, as postulated by our theoretical model.

When we estimate the investment equation for the split sample (columns (4) and (5)) and introduce redistributive pressure and risk aversion, we find, again in line with our hypotheses, that the number of siblings reduces investment only

Table 6
Mixture model–Growth vs. insurance regime.

	(1) Growth regime	(2) Insurance regime	(3) Switching regression	(4) Growth regime	(5) Insurance regime
PART (a)					
Ln capital stock in t−1	−0.287**	−0.288**	−0.044	−0.360***	−0.429***
	(0.120)	(0.115)	(0.042)	(0.075)	(0.073)
No siblings alive			Ref.	Ref.	Ref.
1 to 3 siblings alive			−0.801*	−0.470	−1.758
			(0.433)	(1.026)	(1.390)
4 to 7 siblings alive			−0.929**	−1.435	−2.132
			(0.426)	(0.939)	(1.338)
8 and more siblings alive			−0.968**	−0.323	−3.460**
			(0.410)	(1.022)	(1.384)
Risk aversion index			−0.202**	−0.519**	−0.314
			(0.086)	(0.244)	(0.273)
Mossi (= 1)			−0.238	−0.989**	−0.688
			(0.150)	(0.397)	(0.460)
Controls	Yes	Yes	Yes	Yes	Yes
LR test of joint independence					
of both equations	Chi2 = 211.3				
R-squared				0.303	0.186
N			278	127	151
PART (b)					
Ln capital stock in t−1	−0.255	−0.280***	−0.038	−0.303***	−0.411***
	(0.157)	(0.097)	(0.041	(0.108)	(0.061)
No siblings alive			Ref.	Ref.	Ref.
1 to 3 siblings alive			−0.917**	−0.119	−1.367
			(0.432)	(1.466)	(0.895)
4 to 7 siblings alive			−1.016**	−1.193	−1.886**
			(0.424)	(1.383)	(0.850)
8 and more siblings alive			−1.033**	0.229	−2.936***
			(0.414)	(1.300)	(0.896)
Risk aversion index			−0.176*	−0.525	−0.389*
			(0.095)	(0.358)	(0.222)
Mossi (= 1)			−0.246	−0.619	−0.802**
				(0.171)(0.581)	(0.378)
Controls	Yes	Yes	Yes	Yes	Yes
LR test of joint independence					
of both equations	Chi2 = 208.2				
R-squared				0.265	0.237
N			278	85	193
PART (c)					
Ln capital stock in t−1	−0.093	−0.351***	0.002	−0.251	−0.424***
	(0.195)	(0.093)	(0.048)	(0.199)	(0.051)
No siblings alive			Ref.	Ref.	Ref.
1 to 3 siblings alive			−1.285***	0.014	−1.786
			(0.463)	(0.990)	(1.094)
4 to 7 siblings alive		−1.425***	−1.112	−2.465**	
			(0.452)	(1.115)	(1.082)
8 and more siblings alive			−1.412***	−0.989	−2.545**
			(0.500)	(1.695)	(1.119)
Risk aversion index			−0.389**	−0.030	−0.447**
			(0.198)	(0.475)	(0.176)
Mossi (= 1)			−0.657**	0.680	−1.122***
			(0.262)	(0.725)	(0.356)
Controls	Yes	Yes	Yes	Yes	Yes
LR test of joint independence					
of both equations	Chi2 = 220.5				
R-squared				0.200	0.268
N			278	48	230

Note: Robust standard errors in parentheses. $^{*}p < 0.10$. $^{**}p < 0.05$. $^{***}p < 0.01$. Control variables included are: Asset index, age of firm (years), firm is formal (= 1), age of tailor (years), tailor is household head (= 1), primary completed (= 1), married (= 1), fraction of brothers and sisters outside the household of origin, father primary completed (= 1), mother primary completed (= 1), father is/was a farmer (= 1), father is/was independent non-agricultural worker (= 1).
Source: Own data, collected in January 2011 and 2012 in Ouagadougou. Burkina Faso.

Table 7
Ln capital stock (replacement value) by probability of being in growth regime.

	Specification		
	Table 6(a) (1)	Table 6(b) (2)	Table 6(c) (3)
Predicted probability of being in growth regime	1.065*	1.043*	2.486***
	(0.580)	(0.633)	(0.530)
N	278	278	278

Note: Robust standard errors in parentheses. $^{*}p < 0.10$. $^{**}p < 0.05$. $^{***}p < 0.01$. Probabilities are predicted based on the switching regressions shown in Table 6, column (3), Parts (a) to (c).
Source: Own data, collected in January 2011 and 2012 in Ouagadougou. Burkina Faso.

for tailors in the insurance regime, but not for those in the growth regime. The 'Mossi effect' is negative in both regimes, but only significant in the growth regime. We would have expected the Mossi effect to be rather relevant in the insurance regime and indeed in our alternative specifications presented below this is the case. These results again support the idea that tailors in the growth regime have left their sharing network and are no longer subject to redistributive demands. Because they have left, kinship characteristics no longer affect investment. Risk-aversion is only significant in the growth regime but not in the insurance regime. This would suggest that risk aversion does not matter in the insurance regime, as tailors are fully insured. However, it can be seen below that even in the insurance regime it may matter to some extent.

Part (b) of Table 6 shows the same set of estimates, but now using the information on transfers over two consecutive periods to separate the growth from the insurance regime. The number of observations classified as being in the growth regime is now smaller by 42 observations. The results are fully in line with those shown in part (a), in particular is the number of siblings positively associated with remaining in the insurance regime. Yet two effects are different from those in part (a). Risk aversion is now significant in the insurance regime, but only weakly and being a Mossi has now, as one would expect, a significant negative effect on investment in the insurance regime, but an insignificant effect in the growth regime.

Finally, in part (c) of Table 6 we use the information of the number of the tailor's visits to the village of origin as classifying variable. Again, we assume that tailors who have not visited their village in the 12 months preceding the survey are more likely to have opted out of their network and to be in the growth regime. The results are consistent with those shown in parts (a) and (b). Higher redistributive pressure, including being in the Mossi group, and higher risk aversion are associated with a higher probability of being in the insurance regime. In the growth regime, network characteristics do not matter for investment. As above, it seems that the 'sanction effect' of more redistributive pressure dominates the effect of higher transfers.

To further validate our findings we now check whether being in the growth regime is not only associated with higher investment in our observation window, but is also associated with a higher capital stock. We regress the logarithm of the replacement value of the capital stock on the predicted probability of being in the growth regime. The predicted probabilities are derived from the switching regressions in column (3) of Table 6. Table 7 shows the results. It can be noted that indeed in each classification of regime choice a higher predicted probability of being in the growth regime is associated with a higher capital stock. The estimates in columns (1) and (2) suggest that an increase of the predicted probability by 10 percentage points is associated with an increase in the capital stock of roughly 10%. In column (3) this estimated elasticity is even around 25%.

We also tested whether our results are robust to the use of alternative proxies of redistributive pressure. Hence, we re-estimated the investment equation (Table 5) and the switching model (Table 6) using (i) the number of persons from the village of origin that visited the tailor during the past twelve months and (ii) the number of visits the tailor made to his village of origin as proxies (cf. Table 2). We briefly comment on the findings but do not show the corresponding tables as these variables have serious disadvantages compared to the number of siblings alive. In contrast to the siblings variable they are much more vulnerable to an endogeneity problem, as receiving visitors or visiting the family may already be the consequence of a certain regime choice and hence cannot be seen as a truly exogenous variation in redistributive pressure.

In the investment equation the number of visitors variables have almost all a negative sign, but are not statistically significant. In the switching regression pressure measured by this variable is also associated with a lower probability of choosing the growth regime, but also not statistically significant. Risk aversion, in turn, has, as expected, a significant negative effect. Within the growth regime the effects are also consistent with those obtained with the siblings variable. Only within the insurance regime, pressure has, in contrast to what the theoretical framework predicts, a positive effect, although the effect is not significant. The results for the number of the tailors visits in his/her village of origin are very similar to those just explained. Again, we find it likely that the observed ambiguities can be explained by the potential endogeneity of these alternative pressure variables.

We also re-estimated the model using as a proxy of the variables underlying Fig. 1. We coded a dummy variable equal to one, if a tailor responded that he/she fully agrees or agrees with the statement that "Requests from the family or friends can be so constraining that it is better not to develop the business" and zero if he/she disagreed or strongly disagreed. Again, we don't think that this proxy is better than the siblings variable, since someone who decided to step out of the network to escape the pressure may answer to this question differently than someone who decided to stay in even if both persons are exposed to the same potential pressure to redistribute, i.e. people's actions might be subject to ex-post rationalization. Yet, the results using this perception proxy are also fully in line, both in terms of significance and direction, with the estimates we obtain using the siblings variable. The only effect which is different is the effect on investment associated with pressure in the growth regime, although it is only borderline significant.

We also checked the robustness of our results with respect to the measure of risk-aversion using a risk index based only on the three business-related attitudes (cf. Table 3). Again, we just briefly comment on the main findings. Our key results are fairly robust. In the investment equations the coefficients associated with risk aversion have the same sign and almost the same order of magnitude. In the switching regression the sign is also robust, but the size of the coefficient is somewhat smaller and hence only significant at a level of 13%. In the growth and insurance regime the coefficients are again very similar to the findings with the more comprehensive index. In line with the theoretical framework, in the growth regime risk aversion has a significant negative effect on investment; in the insurance regime risk aversion has no significant effect.

Finally, we also investigated whether self-control rather than external pressure could drive investment decisions. However, we find little support for this alternative hypothesis. It would not explain why we find a strong effect of risk aversion on regime choice and in turn no correlation between investment and proxies for altruistic behavior. The tailors had been asked what they would do with a lottery gain of CFAF 30,000, assuming the gain would remain unnoticed by the family: consuming, sharing or investing. We considered those tailors who reported that they would share it as more altruistic. Moreover, if altruistic behavior was the main motivation for transfers within the family network, we would expect entrepreneurs still to invest optimal amounts and wait for their investments to pay off.[10] This should allow them to better satisfy their altruistic cause. The lack of self-control hypothesis is also inconsistent with the broad agreement that pressure to share is a problem and that demands from the family network can be quite excessive and constraining (see Fig. 1 above).

6. Conclusion

For a long time, the anthropological literature has suggested that sharing norms may imply adverse incentive effects which hamper investment in productive activities. However, the empirical evidence for such effects is still scarce. Studies on the topic have often addressed the issue of forced solidarity in isolation, neglecting the interplay with risk, which may also pose a major constraint to entrepreneurs.

The results of our empirical analysis support the hypothesis that there is forced and exogenous redistributive pressure from the kin. The norms underlying this pressure produce empirically distinguishable types of entrepreneurs with clearly distinct economic behavior. Some entrepreneurs opt for what we call the 'insurance regime', i.e. they comply with the sharing norms, get insurance, but forego future earnings because of lower investment. Others opt for what we call the 'growth regime', i.e. they step out of sharing networks (or at least take some distance), are no longer insured but build up capital in their firm. The regime choice is to a large extent driven by the level of observed risk aversion of the entrepreneur. For tailors in the insurance regime investment declines with the pressure for redistribution. This is not the case for tailors in the growth regime whose investment decision is not affected by kinship pressure and whose capital stocks are larger. Obviously, the variation in the data also suggests that there is room for arrangements that are situated between these two extreme cases, i.e. not every tailor can be unambiguously put in one of the two regimes.

We do also not deny the positive aspects of family and kinship ties, which can be an important form of social capital in contexts where market mechanisms are non-existent or fail. Our aim is to highlight the possible trade-off faced by entrepreneurs due to the coexistence of modern economic activities and traditional norms and institutions. Although we do not explicitly address the issue of efficiency, it is likely that the distortive effects of kinship pressure on investment decisions imply opportunities for pareto-improvements, i.e. both the kinship network and the entrepreneur could be better off if the entrepreneur could realize his/her investment plans and make lump-sum payments to compensate his/her social network. Prevailing sharing norms and the associated insurance schemes may not (yet) have adapted to the presence of modern economic activities and the related growth processes that rely on savings and investment. In a context of such norms and institutions, providing formal risk management devices to entrepreneurs and their kin might be an effective means of spurring investment in small and micro enterprises as it would soften sharing obligations which may disproportionally harm those who are economically successful. Obviously the introduction of insurance, possibly along with credit, does create its own problems in a setting where institutional capacity and trust in formal institutions is weak.

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[10] However, our data shows that remittances to individuals outside the closer family network *are* correlated with altruistic behavior. Probably these cannot be enforced through norms.

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Appendix A. First- and second-order conditions and cross-derivatives

This appendix shows how optimal investment varies with the exogenous parameters (initial capital stock, K_1, redistributive pressure, N, risk aversion, θ, and the cost of a shock, s) in our model within each regime.

The general approach we follow in the remainder of the appendix is as follows: We maximise the welfare function $W(I; x)$ with respect to investment, I, and some given parameter x (such as redistributive pressure and so on). The first-order condition for a maximum is $\frac{\partial W}{\partial I} = 0$. The second-order condition is $\frac{\partial^2 W}{\partial I^2} < 0$. Deriving how optimal investment, I^* or I^{**} (depending on the regime), changes with some exogenous change in x requires to calculate: $\frac{\partial I^*}{\partial x} = -\frac{\frac{\partial^2 W}{\partial I \partial x}}{\frac{\partial^2 W}{\partial I^2}}$ or $\frac{\partial I^{**}}{\partial x} = -\frac{\frac{\partial^2 W}{\partial I \partial x}}{\frac{\partial^2 W}{\partial I^2}}$. Since the second-order condition must be negative for a maximum, the sign of $\frac{\partial I^*}{\partial x}$ or $\frac{\partial I^{**}}{\partial x}$ respectively must be equal to the sign of $\frac{\partial^2 W}{\partial I \partial x}$. Hence, in order to arrive at the results shown in Section 2 we need to verify the sign of the second-order condition in each regime and then to derive all cross derivatives and comment on their signs.

Growth regime (q = 0)

First- and second-order condition

By rearranging Eq. (11) we find for the growth regime ($q = 0$) the following first-order condition

$$\frac{\partial W}{\partial I} = \beta\pi(f(K_1+I^*)-s)^{-\theta}f'(K_1+I^*) + \beta(1-\pi)f(K_1+I^*)^{-\theta}f'(K_1+I^*) - (f(K_1)-I^*)^{-\theta} = 0. \tag{17}$$

The corresponding second-order condition is

$$\begin{aligned}\frac{\partial^2 W}{\partial I^2} = &-\beta\pi\theta(f(K_1+I^*)-s)^{-\theta-1}f'(K_1+I^*)f'(K_1+I^*)\\ &+\beta\pi(f(K_1+I^*)-s)^{-\theta}f''(K_1+I^*)\\ &-\beta(1-\pi)\theta f(K_1+I^*)^{-\theta-1}f'(K_1+I^*)f'(K_1+I^*)\\ &+\beta(1-\pi)f(K_1+I^*)^{-\theta}f''(K_1+I^*) - \theta(f(K_1)-I^*)^{-\theta-1}.\end{aligned} \tag{18}$$

Since $f' > 0$ and $f'' < 0$, all five summands of Eq. (18) are negative and hence $\frac{\partial^2 W}{\partial I^2} < 0$, i.e. we have a maximum. To derive the sign of $\frac{\partial I^*}{\partial x}$ we now assess the cross-derivative for each x of interest.

Initial capital stock

$$\begin{aligned}\frac{\partial^2 W}{\partial I \partial K_1} = &-\theta\beta\pi(f(K_1+I^*)-s)^{-\theta-1}f'_{I^*}(K_1+I^*)f'_{K_1}(K_1+I^*)\\ &+\beta\pi(f(K_1+I^*)-s)^{-\theta}f''_{I^*,K_1}(K_1+I^*)\\ &-\theta\beta(1-\pi)f(K_1+I^*)^{-\theta-1}f'_{K_1}(K_1+I^*)f'_{I^*}(K_1+I^*)\\ &+\beta(1-\pi)f(K_1+I^*)^{-\theta}f''_{I^*,K_1}(K_1+I^*)\\ &+\theta(f(K_1)-I^*)^{-\theta-1}f'(K_1).\end{aligned} \tag{19}$$

Since each summand of Eq. (19), except the last is negative, we have $\frac{\partial^2 W}{\partial I \partial K_1} < 0$ as long as θ is sufficiently small and hence, $\frac{\partial I^*}{\partial K_1} < 0$, i.e. optimal investment decreases as the initial capital stock increases.

Redistributive pressure

Since N does not appear in Eqs. (17) and (18), investment in the growth regime, I^*, does not vary with redistributive pressure, N. Thus $\frac{\partial I^*}{\partial N} = 0$.

Risk aversion

$$\begin{aligned}\frac{\partial^2 W}{\partial I \partial \theta} = &(f(K_1)-I^*)^{-\theta}\ln(f(K_1)-I^*) - \beta\pi(f(K_1+I^*)-s)^{-\theta}f'_{I^*}(K_1+I^*)\ln[f(K_1+I^*)-s]\\ &-\beta(1-\pi)f(K_1+I^*)^{-\theta}f'_{I^*}(K_1+I^*)\ln[f(K_1+I^*)].\end{aligned} \tag{20}$$

This can be rewritten as follows $\frac{\partial^2 W}{\partial I \partial \theta} = A \ln D - B \ln E - C \ln G$.

In the point of the extremum $\partial W/\partial I^* = 0$ we know from Eq. (17) that $-A + B + C = 0$. If we rewrite Eq. (20) as follows

$$\frac{\partial^2 W}{\partial I \partial \theta} = (A - B - C)\ln D + B(\ln D - \ln E) + C(\ln D - \ln G). \tag{21}$$

we see that

$$\frac{\partial^2 W}{\partial I \partial \theta} = B(\ln D - \ln E) + C(\ln D - \ln G). \tag{22}$$

or

$$\begin{aligned}\frac{\partial^2 W}{\partial I \partial \theta} &= \beta \pi (f(K_1 + I^*) - s)^{-\theta} f'(K_1 + I^*)[\ln(f(K_1) - I^*) - \ln(f(K_1 + I^*) - s)] \\ &+ \beta(1 - \pi) f(K_1 + I^*)^{-\theta} f'(K_1 + I^*)[\ln(f(K_1) - I^*) - \ln(f(K_1 + I^*))].\end{aligned} \tag{23}$$

The second summand is always negative, the first summand is negative for sufficiently small s, in this case we have $\frac{\partial^2 W}{\partial I \partial \theta} < 0$ and hence $\frac{\partial I^*}{\partial \theta} < 0$, i.e. optimal investment decreases as risk aversion increases.

Cost of a shock

$$\frac{\partial^2 W}{\partial I \partial s} = \theta \beta \pi (f(K_1 + I^*) - s)^{-\theta - 1} f'(K_1 + I^*). \tag{24}$$

Since Eq. (24) is always positive, we have have $\frac{\partial^2 W}{\partial I \partial s} > 0$ and $\frac{\partial I^*}{\partial s} > 0$, i.e. investment increases as the cost of a shock increases.

Insurance regime (q = 1)

First- and second-order condition

By rearranging Eq. (12) we find for the insurance regime ($q = 1$) the following first-order condition

$$\frac{\partial W}{\partial I} = -((1 - t(N)) f(K_1) - I^{**})^{-\theta} + \beta (f(K_1 + I^{**})^{-\theta} f'(K_1 + I^{**}) = 0. \tag{25}$$

The corresponding second-order condition is

$$\begin{aligned}\frac{\partial^2 W}{\partial I^2} &= \beta f(K_1 + I^{**})^{-\theta} f''(K_1 + I^{**}) - \beta \theta f(K_1 + I^{**})^{-\theta - 1} f'(K_1 + I^{**}) f'(K_1 + I^{**}) \\ &-\theta ((1 - t(N)) f(K_1) - I^{**})^{-\theta - 1}.\end{aligned} \tag{26}$$

Since $f' > 0$ and $f'' < 0$, all three summands of Eq. (26) are negative and hence $\frac{\partial^2 W}{\partial I^2} < 0$, i.e. we have a maximum. As above, to derive the sign of $\frac{\partial I^{**}}{\partial x}$ we now assess the cross-derivative for each x of interest.

Initial capital stock

$$\begin{aligned}\frac{\partial^2 W}{\partial I \partial K_1} &= \theta ((1 - t(N)) f(K_1) - I^{**})^{-\theta - 1} (1 - t(N)) f'(K_1) \\ &-\theta \beta (f(K_1 + I^{**})^{-\theta - 1} f'_{I^{**}}(K_1 + I^{**}) f'_{K_1}(K_1 + I^{**}) \\ &+\beta (f(K_1 + I^{**})^{-\theta} f''_{I^{**}, K_1}(K_1 + I^{**}).\end{aligned} \tag{27}$$

Since each summand of Eq. (27), except the first is negative, we have $\frac{\partial^2 W}{\partial I \partial K_1} < 0$ as long as β is sufficiently large and hence, $\frac{\partial I^{**}}{\partial K_1} < 0$, i.e. optimal investment decreases as the initial stock of capital increases.

Redistributive pressure

$$\frac{\partial^2 W}{\partial I \partial N} = \theta ((1 - t(N)) Y_1 - I^{**})^{-\theta - 1} (-t'(N) f(K_1)) \tag{28}$$

Since Eq. (28) is always negative we have $\frac{\partial^2 W}{\partial I \partial N} < 0$ and $\frac{\partial I^{**}}{\partial N} < 0$, i.e. investment decreases as redistributive pressure increases.

Risk aversion

$$\begin{aligned}\frac{\partial^2 W}{\partial I \partial \theta} &= ((1 - t(N)) f(K_1) - I^{**})^{-\theta} \ln[(1 - t(N)) f(K_1) - I^{**}] \\ &-\beta (f(K_1 + I^{**})^{-\theta} f'(K_1 + I^{**}) \ln[f(K_1 + I^{**})].\end{aligned} \tag{29}$$

In the point of the extremum $\partial W/\partial I^{**} = 0$ we know from Eq. (25) that $-A + B = 0$. Hence, Eq. (29) can be rewritten as $A \ln C - B \ln D$

$$\frac{\partial^2 W}{\partial I \partial \theta} = A \ln C - B \ln D - B \ln C + B \ln C = (A - B) \ln C + B(\ln C - \ln D). \tag{30}$$

we see that

$$\frac{\partial^2 W}{\partial I \partial \theta} = B(\ln C - \ln D). \tag{31}$$

or

$$\frac{\partial^2 W}{\partial I \partial \theta} = \beta(f(K_1 + I^{**})^{-\theta} f'(K_1 + I^{**})[\ln((1 - t(N))f(K_1) - I^{**}) - \ln(f(K_1 + I^{**})]. \tag{32}$$

Since the term in brackets is always negative, we have $\frac{\partial^2 W}{\partial I \partial \theta} < 0$ and hence $\frac{\partial I^{**}}{\partial \theta} < 0$, i.e. optimal investment decreases as risk aversion increases.

Cost of a shock

Since s does not appear in Eqs. (25) and (26), investment in the insurance regime, I^{**}, does not vary with the cost of a shock, s. Thus, $\frac{\partial I^{**}}{\partial s} = 0$.

Appendix B. Simulation of theoretical model

Using the sample of tailors presented in Section 3 we calibrated our theoretical model presented in Section 2. The model can then be used to study the regime choice as risk preferences or other exogenous parameters change. In this appendix we show the results from four simulations to illustrate the effect of (i) redistributive pressure, (ii) the size of the initial capital stock, (iii) risk aversion and (iv) the magnitude of the expected shock on the choice of the optimal regime. The used parameters and exact functional forms are available in an online appendix. In these figures each curve shows the welfare levels that result from optimal investment decisions taken according to the conditions specified in Eqs. (11) and (12) as a function of the exogenous parameter. Bold lines refer to the insurance regime and dotted lines to the growth regime (Fig. B1).

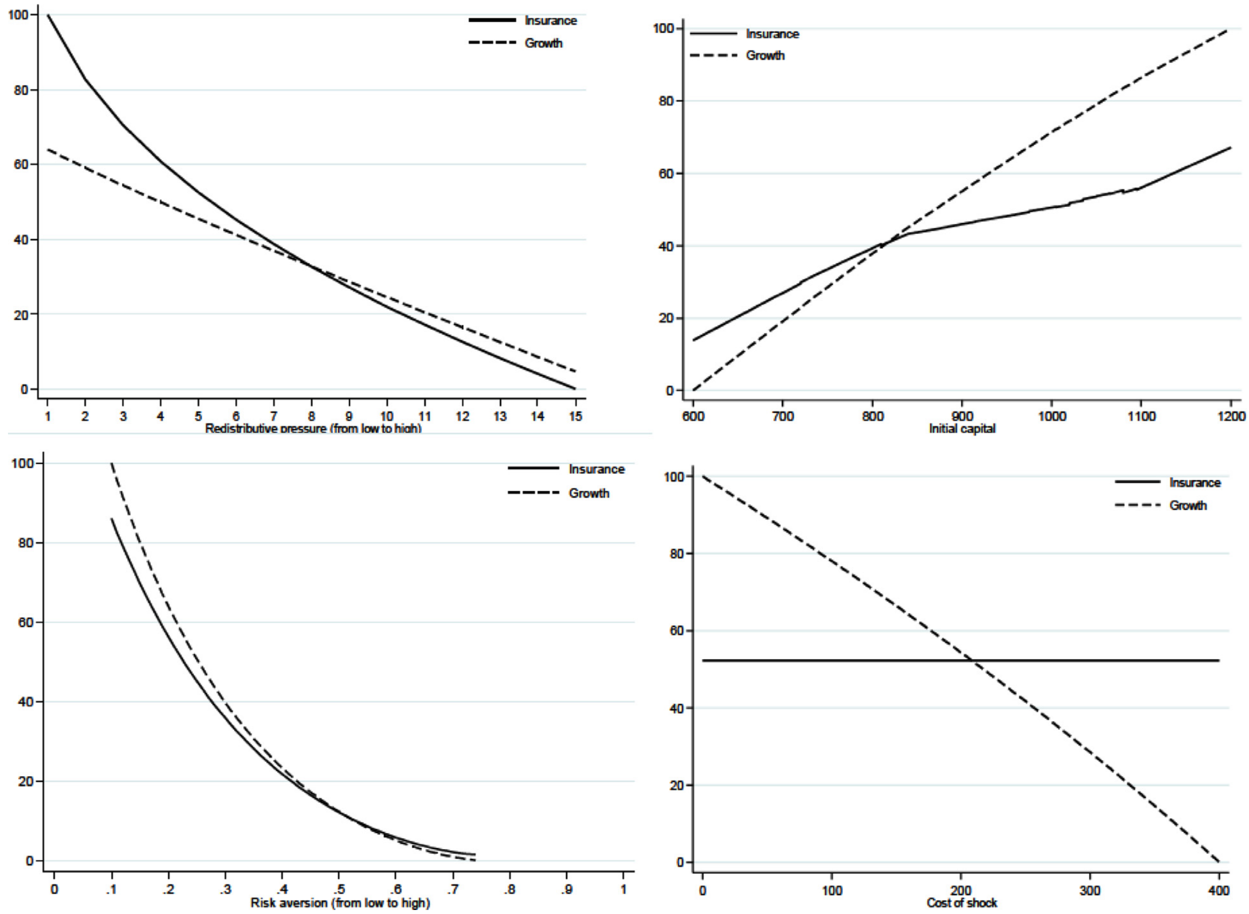

Fig. B1. Simulated welfare levels (standardized) by regime for variations in redistributive pressure (top left), initial capital (top right), risk aversion (below left) and the costs of an uninsured shock (below right).

Appendix C. Further results

Table C1
Marginal effects (ME) computed at sample means on uncensored observations (cf. Table 5).

	Column number in Table 5 to which ME refer to				
	(2)	(3)	(4)	(5)	(6)
Ln capital stock in t−1	−0.266	−0.258		−0.266	−0.259
No siblings alive	−0.617	−0.726	−0.471		
1 to 3 siblings alive	−1.101	−1.276	−0.898		
4 to 7 siblings alive	−1.172	−1.308	−1.016		
8 and more siblings alive				−0.281	−0.336
Number of siblings alive				0.019	0.022
Number of sibl. (squared)	−0.336	−0.338	−0.348	−0.340	−0.348
Risk aversion index	−0.617	−0.726	−0.471		
Mossi (= 1)	−0.519		−0.332	−0.528	

Supplementary material

Supplementary material associated with this article can be found, in the online version, at 10.1016/j.jce.2016.07.002

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