We study the impact of demands for financial support from family members on entrepreneurial activity in a field and real effort experiment in Burkina Faso, West Africa. 154 tailors accepted a lucrative job opportunity and we measured their productivity in two distinct treatments where the tailors’ solidarity network was either informed or not informed about the prospective income. Our results show that implicit and explicit solidarity obligations as well as the expectation of future claims for financial support lead to a significant reduction in productivity. The results provide evidence that solidarity networks hinder entrepreneurial activity. We further find that tailors expectation of future claims for financial support are as high as real demand from their family. Furthermore, tailors who migrated to the capital in order to open a business most strongly reacted to our peer-information treatment. This has important implications on individual investment decisions and therefore long-term economic growth.

The Dark Side of Solidarity

Myriam Hadnes
Björn Vollan
Michael Kosfeld
THE DARK SIDE OF SOLIDARITY

Myriam Hadnes, a* Björn Vollan, b Michael Kosfeld c

First draft: September 2011 --- This version: February 2013

We study the impact of demands for financial support from family members on entrepreneurial activity in a field and real effort experiment in Burkina Faso, West Africa. 154 tailors accepted a lucrative job opportunity and we measured their productivity in two distinct treatments where the tailors’ solidarity network was either informed or not informed about the prospective income. Our results show that implicit and explicit solidarity obligations as well as the expectation of future claims for financial support lead to a significant reduction in productivity. The results provide evidence that solidarity networks hinder entrepreneurial activity. We further find that tailors expectation of future claims for financial support are as high as real demand from their family. Furthermore, tailors who migrated to the capital in order to open a business most strongly reacted to our peer-information treatment. This has important implications on individual investment decisions and therefore long-term economic growth.

Keywords: Field Experiment, Real Effort Experiment, Obliged Solidarity, Informal Sector, sub-Saharan Africa.

JEL codes: C93, D03, D13, D22, D64, D85, O43.

---

a Goethe University Frankfurt Department of Economics, Frankfurt, Germany and Vietnamese German University, Ho Chi Minh City, Vietnam
b Universität Innsbruck, Innsbruck, Austria
c Goethe University Frankfurt Department of Economics, Frankfurt

* Corresponding author: Myriam Hadnes, email: myriam.hadnes@vgu.edu.vn
ACKNOWLEDGEMENTS

This research is part of a project entitled “Unlocking potential: Tackling economic, institutional and social constraints of informal entrepreneurship in Sub-Saharan Africa” (http://www.iss.nl/informality) funded by the Austrian, German, Norwegian, Korean and Swiss Government through the World Bank’s Multi Donor Trust Fund Project: “Labor Markets, Job Creation, and Economic Growth, Scaling up Research, Capacity Building, and Action on the Ground”. The financial support is gratefully acknowledged. The project is led by the International Institute of Social Studies of Erasmus University Rotterdam, The Hague, The Netherlands. The other members of the research consortium are: AFRISTAT, Bamako, Mali, DIAL-IRD, Paris, France, the German Institute of Global and Area Studies, Hamburg, Germany and the Kiel Institute for the World Economy, Kiel, Germany.

DISCLAIMER

This is work in progress. Its dissemination should encourage the exchange of ideas about issues related to entrepreneurship and informality. The findings, interpretations and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the World Bank, the donors supporting the Trust Fund or those of the institutions that are part of the research consortium.

We guarantee that the experiment described in this paper has been conducted within the ethical guidelines of the Goethe University Frankfurt.
INTRODUCTION

"Where the extended family exists, any member of the family whose income increases may be besieged by correspondingly increased demands for support from a large number of distant relations. This it at any time a deterrent to making superior effort, [...]" Lewis (1955)

An individual’s decision is often shaped by its social environment, the latter being ruled by a complex system of cultural norms and institutions. Social interactions and networks together with their impact on economic decisions and outcomes have been studied in many different contexts. Examples include students’ educational outcomes (Sacerdote 2001) as well as enrollment decisions (Bobonis and Finan 2007), alcohol abuse (Kremer and Levy 2008), obesity (Christakis and Fowler 2007), welfare participation (Bertrand, Luttmer and Mullainathan 2000), crime rates (Glaeser, Sacerdote and Scheinkman 1996), and technology adoption (Bandiera and Rasul 2006). Granovetter (2005) argues that group norms and social relations also affect productivity. This has been confirmed across different contexts, with Falk and Ichino (2009) finding a rise in productivity when individuals work in pairs, Mas and Moretti (2009) identifying positive spillovers from productive co-workers, and Bandiera, Barankay and Rasul (2010) reporting positive externalities of friendship networks at the workplace.

The relevance of social networks seems particularly important in the absence of formal institutions where the former substitute for the structured environment of explicit rules induced by the latter. In the context of developing economies where formal institutions are either lacking or inefficient, much attention has been paid to risk sharing networks mitigating the effect of negative income shocks (Cox, Hansen and Jimenez 2004, Murdoch 1999, Rosenzweig and Stark 1989, Townsend 1994), and micro credit schemes where group lending leads to lower default rates compared to individual lending (Carpenter and Williams 2010). However, Giné and Karlan (2011) find that in the Philippines individual loans lead to same default than group loans. Further, they find that once individual loans become available take up rates increase for those who have not borrowed money before. This suggests that people fear to be indebted to their families or try to prevent their family to be involved in their small businesses.

The impact of social interaction on productivity within an imperfect institutional environment has attracted far less attention although the topic has been discussed since the 1950s. Bauer and Yamey (1957) state that peer interdependencies thwart dynamic individuals in their economic success. Mutual insurance through the solidarity network becomes a binding commitment and therefore affects expectations and incentives and consequently, economic behavior. There is a growing theoretical (Alger and Weibull 2010, Hoff and Sen 2006, Portes 1998, Platteau 2000) and empirical (Grimm et al. 2011, Jakiela and Ozier 2011) literature stating that solidarity transfers are far from being voluntary but often demanded. Strong social norms retain individuals from leaving the solidarity network where nonconformity to the peer group carries costs in terms of lost legitimation and risks, such as witchcraft accusations (Gates 1993, Geertz 1967, Hadnes and Schumacher 2012, Oxfeld 1993, Watson 1985). Given that the informal code of community behaviour prevents individuals from leaving the solidarity network they need to find alternatives enabling them
to reinvest profits in their businesses. This would be overall beneficial since returns to capital are expected to be considerably high in micro enterprises in developing countries (cf. de Mel et al. 2007 and the literature cited therein, Banerjee and Duflo 2005). Consequently, dynamic individuals find strategies to hide income and resist pressures to support their peer group (Belshaw 1965, Bloch 1973, Hart 1975, Holy 1996, Nafziger 1969, Whyte 1996). There is evidence that especially women are willing to put money on a savings account with low, no or even negative interest in order to secure it from peer demands (Dupas and Robinson 2009, Ashraf, Karlan, and Yin 2006).

In a recent lab experiment in Kenyan villages, Jakiela and Ozier (2011) showed that (mostly female) participants would forego investments if their relatives attended the session and were able to observe earnings. While Jakiela and Ozier focus on the peer effect on investment decisions in the controlled environment of a lab experiment we suggest that the involvement of the family and solidarity network impacts entrepreneurial activity in terms of productivity. Investment decisions involve risk regarding the effective earnings and uncertainty regarding the peers’ claims. In contrast, the decision to lower productivity implies the willingness to forego almost certain income opportunities and therefore signals a stronger constraint to economic growth.

With our experimental setup we can provide evidence for the immediate negative impact of solidarity networks. Further, by implementing a real effort experiment, we can show that the expectation of future claims (solidarity obligations) already impact the willingness to increase productivity. Our observation that participants who migrated to the capital city with the aim to open a business reduce productivity to an even larger extent once their relatives got involved in the business provides further support to the hypothesis that peer effects reduce entrepreneurial activity and therefore reduce the prospect of economic growth.

This paper is organized as follows. Section 2 describes the experimental design, the sample collection and our hypotheses. Section 3 resumes the results. Section 4 concludes.

**EXPERIMENTAL DESIGN**

The aim of this project was to identify causal effects of solidarity networks on entrepreneurial activity and thus productivity. Therefore we conducted a field and a real effort experiment that enabled us to compare productivity of two distinct groups of entrepreneurs where one group was confronted to obligations to share income and the other one was not.

The challenges of measuring causal effects of peers on individual behavior have been extensively discussed in the aforementioned literature. Therefore we need to meet several conditions to be able to draw correct conclusions on causality instead of pure correlation between solidarity obligations and productivity. First, we need access to a sufficiently large and homogenous group of entrepreneurs that serve as our basic population. Second, to manipulate the intensity of prospective solidarity obligations we need information on the entrepreneurs’ network consisting of individuals whom they regularly support financially. Third, we need to generate an income opportunity that simultaneously reveals entrepreneurial activity. Finally, we need a control group exposed to the same income shock without being affected by potential solidarity obligations.
Therefore, we designed an approach where we combine survey data with two experimental settings, a field experiment (FEX) to measure the impact of peer information in a natural environment and a real effort experiment (REX) complementing the first by adding the opportunity to measure additional information, such as beliefs and motivations through pre and post-experimental questionnaires. While questionnaires bear the risk of reporting biases pure lab experiments seem in some environments artificial and might induce a demand effect or lack external validity. Further, the exposure to an artificial environment might alter the participants’ behavior and therefore bias the measured outcomes (Hawthorne effect). Since field experiments lack the possibility to reveal further information on subjects’ beliefs and motivation, which might restrict the amplitude of interpretation of the results, we combined the two experiments. This provides us with the opportunity to evaluate the outcomes from many different angles and permits to draw more reliable conclusions on the observed outcomes.

We conducted the experiments in Burkina Faso’s capital city Ouagadougou, West Africa. Burkina Faso is ranked among the poorest countries in terms of per capita income (GNI per capita of 1,141 $ in constant 2005 PPP-$) and human development (ranked 181 out of 187). For our subject pool we chose the confection industry where our participants were small-scale tailors. According to the National Statistics Office and the Informal Economy Survey of 2002 (Enquête 1-2-3), the confection industry constitutes with 22% and a total workforce of 12,395 individuals the biggest industrial branch in Ouagadougou. It is dominated by family businesses where the big majority of tailors are self-employed men. The average monthly income of a tailor in Ouagadougou was 34 US-$ (exchange rate, 2002) being 52% of the official minimum wage in the formal sector (65 US-$).

To identify our random sample, we conducted a census of all tailors located in 9 (out of 30) randomly chosen districts of Ouagadougou. A random sample of 383 tailors was surveyed. From the questionnaire we accessed general demographic and business data as well as information on the tailors’ solidarity network consisting of individuals living outside the household and receiving regular monetary transfers.

To generate a positive income shock we provided participating tailors a lucrative job opportunity. All tailors were offered the same job. The job consisted in the reproduction of small bags within a restricted amount of time. Tailors received a restricted amount of raw material (three rice sacs) from which they could produce as many bags as possible within 24 hours. We paid a fixed price of 4 US-$ for each bag that corresponded to predefined quality standards. If tailors accepted the job they received 4 US-$ in advance in order to purchase material such as zippers and lining. They also received an example of the bag to reproduce.

---

1 Cf. United Nations: Human Development Indicators.
2 The experiment was part of a broader research project that was conducted in collaboration with Erasmus University Rotterdam and financed by the Multi Donor Trust fund of the World Bank. The complementary paper by Grimm et al (2011) uses the survey data.
3 4 US-$ correspond to 2,000 Fcfa (the exchange rate is fixed where 1 Euro = 655 Fcfa). The legal minimum wage in the formal sector was fixed to 30,684 Fcfa in 2009. According to the Enquête 1-2-3 for Burkina Faso the mean monthly income of tailors in Ouagadougou was 16,000 Fcfa in 2002.
Tailors were randomly assigned into treatment and control groups. In the treatment groups of both experiments the tailors' social networks and families got involved in the job offer. The aim was to confront the tailors with their peers' demands for financial support. In the field experiment (FEX) this needed to be done in an implicit way. In the real effort experiment (REX) solidarity obligations became explicit. Subjects of the control groups could fulfil the job without information of their families.

We used the information on the solidarity network members from the survey in order to manipulate the effect of solidarity obligations within the treatment group of the FEX. We called a randomly chosen network member and conducted a telephone interview. The questionnaire asked for the identity and characteristics of individuals supporting the interviewee financially. The questions were identical for all individuals whether the corresponding tailor was assigned to the treatment or the control group. We did not reveal from whom we received the telephone number of the interviewee.

In the treatment group we asked a particular question at the end of the interview that we did not ask in the control group. Whenever interviewees mentioned a tailor among the supporters, we asked, after the regular set of questions, for the tailor's contact details. This question was justified by a simple explanation: A friend of the interviewer was currently working for a German organisation that needed an important amount of tailors for a lucrative job. Tailors needed to work in Ouagadougou. The interviewer then asked for the mobile phone number and address of the given tailor. Since our interviewers were not informed about any details regarding the job they were not able to give further information.

In the REX we implemented solidarity obligations in an explicit way. In the treatment group, prior to the job offer, we asked tailors about the contact details of their family heads. A family head was defined as the person whose authority was recognized by the entire family. In the treatment group, the job of producing as many bags as possible within 24 hours was conditioned on the fact that by the end of the 24 hours task it would be the family head who decided on the allocation of the payment.

In the control group the tailor's family did not get involved into the job offer and no information about the family was retained. The only difference between the control group in the FEX and the REX is that in the REX tailors were aware of being part of a research project. But, they did not know that we were interested in measuring their productivity.

Figure 1 describes the setup of our experiment. We were only able to implement the treatment in the FEX if we could conduct the phone interview with one member of the tailor's solidarity network and if the interviewee indeed cited the corresponding tailor. 38 tailors were 'lost' on that stage. To keep the experimental framework of treatment and control groups identical we also dropped 29 tailors of the control group for whom we could not reach one of the peers for the telephone interview. In the subsequent stage of the FEX a total number of 32 tailors were dropped: Eighteen tailors (9 in the control and 9 in the treatment group) refused the offer either because they lacked the appropriate machines or time. Fourteen tailors could not be found or were absent on the day of the experiment. The tailors from the REX were randomly drawn from the remaining surveyed tailors that were not contacted for the FEX.

Figure 1: Experimental Setup
For the experiments we retained a total number of 154 tailors of which 94 took part in the FEX (47 in the treatment group and 48 in the control) and 60 in the REX (35 in the treatment group and 25 in the control).

RESULTS

Tailors who participated in the study were predominantly (82%) male of an average age of 35 years. Almost three quarters of the participants belonged to the ethnic group of the Mossi being the dominant ethnic group in that region. Almost 70% of the participating tailors (N=107) migrated to Ouagadougou in the age of 19 years (minimum of 0 years and maximum of 49). A total number of 22 tailors came with the aim to open a business\(^4\), 46 tailors came to seek work, and 19 initially followed their families.

Half of all tailors were Muslim, 38% were Catholic. Women in the sample were mostly Catholic (52%). The vast majority of the tailors (82%) in our sample started primary school. But, only 36% continued school after grade 1.

On average tailors had almost 7 years of experience as entrepreneur (age of workshop) and employed 3.8 workers of which two were unpaid workers, such as interns or unpaid family workers. Fifty percent of the tailors reported a weekly profit below 15 US-$. The highest quartile reported a weekly mean profit of 26 US-$.\(^5\) Tailors owned on average 1.6 sewing machines with a mean replacement value of 340 US-$. Fifty-seven tailors stated to own sewing machines worth over 200 US-$ per unit (mean of 400 US-$). Seventeen tailors reported the ownership of machines of a mean replacement value of 860 US-$ per unit. These figures seem unbelievably high even though they are broadly consistent with other information the tailors gave (average wage per worker and initial investments). Overall, we find that Muslim tailors reported higher investments into their workshops, a higher share of paid employees and ownership of more sewing machines. Yet, given the striking opposition of mean weekly profit and replacement value of sewing machines, we will exclude this data from the further analysis.

\(^4\) These working migrants came at the average age of 23 years and were predominantly male (91.67%).

\(^5\) The questionnaire included two measures for weekly profits: (1) Mean weekly profit on a scale between 0 and 20.5 USD and more and (2) mean of self-stated minimum and maximum weekly profit. Since data for the latter is very noisy, we will concentrate on the former measure.
On average each tailor supported 2.45 people financially or in kind. Four tailors supported in kind only. The average amount of annual financial transfers was 165 US-$. Given that tailors report a mean weekly profit of 15US-$, this corresponds to a share of 21.15% of their annual income. This translates into an average transfer of 67 US-$ per network member. Half of the supported individuals originated from the same village as the tailor. Most transfers went to family members. Half of tailors supported at least one brother or sister, 30% at least one of their parents.

We first check for differences in observables between treatment and control to rule out effects simply due to small sample correlation.

Table 1: Descriptive Statistics and Randomization Check

<table>
<thead>
<tr>
<th></th>
<th>FEX total</th>
<th>FEX control</th>
<th>FEX treat</th>
<th>p (ttest)</th>
<th>REX total</th>
<th>REX control</th>
<th>REX treat</th>
<th>p (ttest)</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>35.17</td>
<td>35.13</td>
<td>35.21</td>
<td>0.96</td>
<td>34.71</td>
<td>33.60</td>
<td>35.51</td>
<td>0.40</td>
</tr>
<tr>
<td>gender</td>
<td>0.82</td>
<td>0.81</td>
<td>0.83</td>
<td>0.79</td>
<td>0.83</td>
<td>0.88</td>
<td>0.80</td>
<td>0.42</td>
</tr>
<tr>
<td>mossi</td>
<td>0.76</td>
<td>0.81</td>
<td>0.70</td>
<td>0.23</td>
<td>0.68</td>
<td>0.64</td>
<td>0.71</td>
<td>0.53</td>
</tr>
<tr>
<td>muslim*</td>
<td>0.49</td>
<td>0.45</td>
<td>0.53</td>
<td>0.41</td>
<td>0.52</td>
<td>0.68</td>
<td>0.40</td>
<td>0.04**</td>
</tr>
<tr>
<td>school</td>
<td>0.82</td>
<td>0.74</td>
<td>0.89</td>
<td>0.06*</td>
<td>0.82</td>
<td>0.80</td>
<td>0.83</td>
<td>0.78</td>
</tr>
<tr>
<td>ouaga</td>
<td>0.27</td>
<td>0.30</td>
<td>0.23</td>
<td>0.49</td>
<td>0.38</td>
<td>0.36</td>
<td>0.40</td>
<td>0.56</td>
</tr>
<tr>
<td>machine</td>
<td>1.63</td>
<td>1.64</td>
<td>1.62</td>
<td>0.90</td>
<td>1.60</td>
<td>1.60</td>
<td>1.60</td>
<td>1</td>
</tr>
<tr>
<td>worker</td>
<td>3.87</td>
<td>3.89</td>
<td>3.85</td>
<td>0.89</td>
<td>3.80</td>
<td>3.80</td>
<td>3.80</td>
<td>1</td>
</tr>
<tr>
<td>profit (ord.)</td>
<td>3.72</td>
<td>3.81</td>
<td>3.64</td>
<td>0.64</td>
<td>3.4</td>
<td>2.80</td>
<td>3.82</td>
<td>0.03**</td>
</tr>
<tr>
<td>nw</td>
<td>2.45</td>
<td>2.43</td>
<td>2.47</td>
<td>0.86</td>
<td>2.45</td>
<td>2.08</td>
<td>2.71</td>
<td>0.08*</td>
</tr>
<tr>
<td>transfer</td>
<td>89.46</td>
<td>89.74</td>
<td>89.17</td>
<td>0.97</td>
<td>68.77</td>
<td>57.96</td>
<td>86.08</td>
<td>0.35</td>
</tr>
</tbody>
</table>

Note: Stars (*) next to variable name emphasize significant difference between the treatment and the control group for the total sample (i.e. FEX + REX).

Table 1 gives an overview of the mean values of the tailors’ observable characteristics. There are some differences between the treatment and the control group. However, the joint significance test of the observables on the assignment to treatment and control groups (Probit model including the 11 variables) estimates p-values of the Chi-squared test of 0.739 and 0.139 for the FEX and the REX, respectively. Hence we cannot reject the hypothesis that these characteristics do not help to predict whether or not tailors were assigned to the treatment or to the control. Consequently, we can rely on the assumption that all differences in measured outcomes are induced by the treatment and not by systematic differences between the samples.

Regarding the mean productivity of the tailors in the two experiments, we observe an average production of 8.35 bags in the FEX. Within the same time, tailors produced on average 8.25 bags in the REX. Figure 2 reports the distributions of bag production in both experiments.

Figure 2: Production of Bags

---

6 The p-value for the entire sample is 0.889.
We can make one important observation. Mean productivity seems identical in both experiments. The Kolmogorov Smirnov test confirms the intuition (p-value of 0.915). From Figure 3 and Table 2 we can infer that this is true not only for the overall production but also within the treatment and the control groups. The size of the effect is 1.25 and 1 bag, respectively. This translates into a reduction by 16% in the FEX and 13% in the REX.

Figure 3: Comparison of Bag Production by Experiment

Table 2: Comparison of Mean Production by Treatment

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>mean</th>
<th>p25</th>
<th>p50</th>
<th>p75</th>
<th>sd</th>
</tr>
</thead>
<tbody>
<tr>
<td>REXtreat</td>
<td>35</td>
<td>7.8</td>
<td>6</td>
<td>9</td>
<td>10</td>
<td>3.16</td>
</tr>
<tr>
<td>REXcontrol</td>
<td>25</td>
<td>8.8</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>4.01</td>
</tr>
<tr>
<td>FEXtreat</td>
<td>47</td>
<td>7.72</td>
<td>5</td>
<td>8</td>
<td>11</td>
<td>3.53</td>
</tr>
<tr>
<td>FEXcontrol</td>
<td>47</td>
<td>8.98</td>
<td>7</td>
<td>9</td>
<td>11</td>
<td>3.66</td>
</tr>
</tbody>
</table>

With a p-value of 0.73 for the entire sample and 0.98 and 0.88 for the treatment and the control groups, respectively, the Mann-Whitney test further suggests no significant differences between the two experiments. This observation clearly speaks against the existence of a Hawthorne effect stating that subjects’ behavior can be altered by their awareness of participating in the experiment.

RESULT 1: The tailors’ productivity is not altered by the awareness of participating in the experiment. Tailors participating in the FEX produced on average as many bags as tailors in the REX. This is true for treatment and control groups.
Given the absence of a Hawthorne effect and the limited sample size, we will merge the two experiments for the further analyses. As shown in Table 3, we can base our analysis on 154 observations, of which 72 observations in the control and 82 observations in the treatment group.

Table 3: Bag Production for Total Sample, by Treatment

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>mean</th>
<th>sd</th>
<th>se</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>72</td>
<td>7.75</td>
<td>3.36</td>
<td>0.37</td>
</tr>
<tr>
<td>Control</td>
<td>82</td>
<td>8.94</td>
<td>3.75</td>
<td>0.44</td>
</tr>
<tr>
<td>Total</td>
<td>154</td>
<td>8.31</td>
<td>3.59</td>
<td>0.29</td>
</tr>
</tbody>
</table>

The Mann-Whitney test states a significant difference between the control and the treatment group (p-value of 0.069). Further, the cumulated distribution function (cdf) displayed in Figure 4, shows the first order stochastic dominance of the control group over the treatment group. This is to say, tailors in the treatment group tended to produce fewer bags over all segments of the distribution (present in the lower segment of the cdf) and tailors in the control group produced more bags (in the higher segments of the cdf).

Figure 4: CDF

**RESULT 2:** Both, implicit and explicit solidarity obligations decreased productivity. Tailors in the treatment group produced significantly fewer bags compared to tailors who in the control group.

To provide a precise estimate of the treatment effect we run OLS regressions on the amount of bags produced with and without further controls. Controls include the tailors’ religion (being Muslim). We do so because of the previous observation that Muslim tailors tended to stand out of the total sample by investing more in workshops and machines and paying higher wages. Further we include controls for the tailors ability and experience to fulfill the task, such as the number of employed workers, the weekly profit (ordinal scaled) and the years of experience. Further, we include the tailors’ place of birth (being born in Ouagadougou or its outskirts). We include the latter because of strong evidence suggesting that entrepreneurs tend to migrate in order to escape solidarity obligations from the family (cf. Grimm et al 2011 and the literature cited). Hence, tailors who migrated to the capital might react to a stronger extend to the treatment.
Since we assume correlating standard errors on the district level but not between districts, we cluster on the district level.

Table 4: OLS regressions

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>bags</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>treat</td>
<td>-1.19*</td>
<td>-1.19*</td>
<td>-1.26*</td>
<td>-1.18*</td>
<td>-1.97**</td>
</tr>
<tr>
<td></td>
<td>(0.42)</td>
<td>(0.43)</td>
<td>(0.63)</td>
<td>(0.38)</td>
<td>(0.57)</td>
</tr>
<tr>
<td>rex</td>
<td>-0.00</td>
<td>-0.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.74)</td>
<td>(1.32)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rex_treat</td>
<td>0.18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.72)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>muslim</td>
<td></td>
<td></td>
<td>1.29*</td>
<td>1.37*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.52)</td>
<td>(0.56)</td>
<td></td>
</tr>
<tr>
<td>ouaga</td>
<td></td>
<td>0.34</td>
<td>-1.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.53)</td>
<td>(0.82)</td>
<td></td>
</tr>
<tr>
<td>worker</td>
<td></td>
<td>0.14</td>
<td>0.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.10)</td>
<td>(0.10)</td>
<td></td>
</tr>
<tr>
<td>profit</td>
<td></td>
<td>0.28</td>
<td>0.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.21)</td>
<td>(0.21)</td>
<td></td>
</tr>
<tr>
<td>experience</td>
<td>0.06*</td>
<td>0.08*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.03)</td>
<td>(0.03)</td>
<td></td>
</tr>
<tr>
<td>ouaga_treat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.61**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.70)</td>
</tr>
<tr>
<td>_cons</td>
<td>8.94**</td>
<td>8.95**</td>
<td>8.98**</td>
<td>6.25**</td>
<td>6.70**</td>
</tr>
<tr>
<td></td>
<td>(0.42)</td>
<td>(0.50)</td>
<td>(0.52)</td>
<td>(1.01)</td>
<td>(1.16)</td>
</tr>
<tr>
<td>N</td>
<td>154</td>
<td>154</td>
<td>154</td>
<td>154</td>
<td>154</td>
</tr>
<tr>
<td>R-sq</td>
<td>0.09</td>
<td>0.03</td>
<td>0.03</td>
<td>0.09</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Note: Clustered standard errors in parentheses (district level), * p<0.10, ** p<0.05, *** p<0.01

The first three columns replicate what we already know from the previous analysis. Column 4 includes the controls and column 5 includes an interaction term analyzing the treatment effect for tailors who were born in Ouagadougou and those who migrated. Because of the possible collinearity we dropped the control for the REX in column 5 and decided to include a minimum of necessary control variables. However, the inclusion of the REX does neither alter the coefficients nor level of significance. Also, the inclusion or exclusion of further controls such as the tailors’ network size, education, gender or the amount of financial transfers does not alter the results.

The treatment effect remains stable and significant over the different models. This strongly supports our hypothesis. The tailors’ religion and their experience impact productivity in a positive way. Muslim tailors were generally more productive compared to Catholics or Protestants. This effect is independent of the treatment. This observation might partially reflect our earlier observation that Muslim tailors seemed to be more ambitious about their profession, implied by higher investments into the workshop, higher number of paid
workforce and ownership of more sewing machines. Lastly, tailors with more experience showed higher productivity irrespective of the treatment.\textsuperscript{7}

Column 5 shows that the interaction effect for migrants is strongly significant and economically important. We observe that tailors who migrated to Ouagadougou showed a strong reaction to the treatment.

Table 5: Working migrants

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>treatment</th>
<th>control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migrants</td>
<td>107</td>
<td>7.42</td>
<td>9.3</td>
</tr>
<tr>
<td>Non-Migrants</td>
<td>47</td>
<td>8.13</td>
<td>8.52</td>
</tr>
<tr>
<td>Total sample</td>
<td>154</td>
<td>7.76</td>
<td>8.94</td>
</tr>
</tbody>
</table>

There is evidence suggesting that in the context of developing countries rural-urban migration takes place among ambitious individuals who aim to escape solidarity obligations from the family. We can verify this observation by limiting the analysis to those tailors who came to the capital for business reasons only. If the hypothesis is correct, these 22 tailors should react to an even stronger extend to the treatment. Mann-Whitney confirms with a z-score of 2.438 and a p-value of 0.015.

Table 6: Working migrants – Business reasons only

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>treatment</th>
<th>control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business reasons</td>
<td>22</td>
<td>6.93</td>
<td>13.71</td>
</tr>
<tr>
<td>Other reasons</td>
<td>85</td>
<td>7.59</td>
<td>8.58</td>
</tr>
</tbody>
</table>

RESULT 3: The treatment effect of solidarity obligations on productivity was particularly strong among tailors who migrated to Ouagadougou with the aim to open a business.

This result confirms the observations that individuals migrate from rural areas into cities to escape family obligations. We also find that these business migrants occupy significantly fewer unpaid workers (p-value of 0.004) despite the same total number of 4 employed workers. Either they have smaller networks in the city and therefore have less access to cheap labor or they consequently try to keep their solidarity network out of their business. The fact that transfers to their network members are lower compared to other migrants speaks in favor of the latter argument: their annual financial support lied with an amount of 148 US-$ by 14.6\% below the other migrants’ transfers. All of this suggests that our treatment in a sense “countervails” the effect of rural-urban migration aiming to escape solidarity obligations. Given that tailors try to hide income from their solidarity network by migrating the threat of informing the solidarity network about upcoming income opportunities reduces work incentives dramatically.

In order to better understand the driving forces of the treatment we use insights from the REX. The benefit of the twofold approach of our experimental setup is the availability of data through the survey of the tailors’ expectations. Prior to the start of the REX we asked the

\textsuperscript{7} Including a further control for the number of sewing machines does not impact the level of significance of the variable ‘Muslim’.
tailors to estimate how much they expected the family head to claim if they produced a hypothetical amount of 2, 5, 10 or 15 bags. On average they expected a “solidarity tax” between 31% (production of 10 and 15 bags) and 36% (production of 2 and 5 bags). We find that these estimates reflect reality to a large extend. On average, family heads demanded for a share of 21.35% of the tailors’ earnings. This figure also corresponds to the annual transfers the tailors made to their network members (average of 780 US-$). The coefficients of correlation of the expected and effective claims are highly significant (Spearman’s rho: -0.426, p-value of 0.012 for 5 bags and rho= -0.302 with p= 0.083 for 10 bags).

If our hypothesis that tailors reduce entrepreneurial activity because of solidarity obligations holds, the tailors’ expectations should matter. We should be able to observe a significant reduction in productivity with increasing expectations. To test this, we group tailors according to their expected tax rate into three groups. We then relate the tailors’ expected claims from the family head (decision maker) for a hypothetical production of 5 and 10 bags, respectively to their productivity. We restrict the analysis to these two figures since they are closest to real outcomes (mean production of 7.8 bags). Figure 5 reports the results.

For the hypothetical production of 5 bags tailors who expected a low tax rate (5 observations, average expected tax rate of 6%) produced on average 10.3 bags. In the medium range (N=14, average expected tax rate of 28%) tailors produced an average of 7.8 bags. In the highest range (N=14, average tax of 54%) mean production was 4.3 bags. For the hypothetical production of 10 bags we have 6 tailors in the lowest group (average tax rate of 7% and mean production of 9.25 bags), 14 tailors in the medium group (average tax rate of 24% and mean production of 8.57 bags), and 11 tailors in the high tax group (average tax rate of 51% and mean production of 6.15 bags).

Figure 5: Productivity by Expected Tax Rate

The results are further supported by a regression analysis of overall productivity on the expected tax rates, even though the figures must be read with caution given the small sample size: An increase of the expected tax rate of 1 percentage-point decreases productivity by 6.91 bags (p-value of 0.003) for the hypothetical production of 5 bags and by 6.35 bags for a hypothetical production of 10 bags (p-value of 0.096).

In the survey we further asked whether tailors’ family members usually claimed a share of their earnings. Analyzing this data we find further evidence supporting our hypothesis. Tailors who faced claims from their families expect significantly higher taxes (MW z= -1.988, p-value of 0.047 for 5 bags and z= -1.229 with p= 0.219 for 10 bags). Further, tailors who are
see themselves confronted with regular solidarity obligations also face higher claims from the decision taker in the experiment (MW z = -2.242, p-value of 0.025).

Following our previous analysis of working migrants we also find that tailor who came to Ouagadougou with the aim to open a business expected on average higher claims from the decision takers. Whereas non-business migrants expect a claim of 30%, business migrants expect the decision taker to ask for 50% (34%) for the hypothetical amount of 5 (10) bags.

RESULT 4: Tailors’ expectations of future solidarity obligations reflect actual claims in the real effort experiment. The higher tailor’s expectations the lower is their productivity.

CONCLUSION

"Les demandes de soutien familial impactent négativement sur mes projets d’investissement. Chaque fois il [mon père] me fait savoir qu’il a besoin d’argent pour résoudre un problème; souvent je lui donne." Mr. Amado Corgo

We examined the impact of obliged solidarity on productivity. We defined obliged solidarity as implicit and explicit demand for financial support by an entrepreneur’s solidarity network. We suggest that demands for financial support hamper economic growth by deviating resources that are supposed to be invested in an economic activity. Our sample consisted of 154 small-scale tailors operating a workshop in Burkina Faso’s capital city Ouagadougou.

To analyze the economic effect of obliged solidarity we combined survey data with two experimental settings, a field experiment (FEX) to measure the impact of peer information in a natural environment and a real effort experiment (REX) complementing the first by adding the opportunity to measure additional information, such as beliefs and motivations through pre and post-experimental questionnaires. In both experiments the treatment groups faced a situation in which they were either implicitly or explicitly exposed to solidarity obligations from their solidarity network. We find that the tailors’ productivity is not altered by the awareness of participating in the experiment. Tailors participating in the FEX produced on average as many bags as tailors in the REX.

Through the experimental setup we were able to quantitatively derive the causal effect of demands for financial support by comparing the productivity in the treatment groups with the control groups in which the tailors’ solidarity network was not informed about prospective income opportunity.

In this paper we showed that both, implicit and explicit solidarity obligations decreased tailors’ productivity. Tailors in the treatment group produced significantly fewer bags compared to tailors in the control group. Further, we show that the tailors’ migration history mattered. The treatment effect of solidarity obligations on productivity was particularly strong among tailors who migrated to Ouagadougou with the aim to open a business. We argue that individuals tend to migrate from rural areas into cities in order to escape family obligations. By anticipation of higher demands of financial support caused by the treatment, tailors reduced productivity. Finally, we find that tailors’ expectations of future solidarity obligations reflect actual claims in the real effort experiment. The higher tailors’ expectations the lower was their productivity.
Our results apply to the real world. The tailors' effort choice in the experiment translates into small entrepreneurs' investments into their businesses. This investment plans are hampered through either real or anticipated solidarity obligations. A conflict rises if many individuals rely on only few family members who deal with situations of financial distress. Profits cannot be accumulated for future investments and dynamic individuals may by anticipation reduce entrepreneurial activity.

Note that one should not confound obliged solidarity with other forms of solidarity that are indispensable for societies lacking access to formal insurance systems and credit markets. Solidarity becomes an obstacle to economic growth only if a large group of individuals financially relies on a much smaller group or, if demands for financial support increase disproportionately with increasing income. If supporters are as in our study self-employed solidarity obligations deviate financial resources from (lucrative) investments. If solidarity obligations drive entrepreneurs to reduce effort the whole community loses.
REFERENCES


We study the impact of demands for financial support from family members on entrepreneurial activity in a field and real effort experiment in Burkina Faso, West Africa. 154 tailors accepted a lucrative job opportunity and we measured their productivity in two distinct treatments where the tailors’ solidarity network was either informed or not informed about the prospective income. Our results show that implicit and explicit solidarity obligations as well as the expectation of future claims for financial support lead to a significant reduction in productivity. The results provide evidence that solidarity networks hinder entrepreneurial activity. We further find that tailors expectation of future claims for financial support are as high as real demand from their family. Furthermore, tailors who migrated to the capital in order to open a business most strongly reacted to our peer-information treatment. This has important implications on individual investment decisions and therefore long-term economic growth.