Microfinance in developed countries

Renaud Bourlès
(Centrale Marseille & AMSE)

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General research program

The impact of risk-sharing on risk-taking behaviour:

- Informal insurance (or mutual insurance or partnership)
  - how to deal w/ asymmetric information
  - the motive of sharing (altruism vs reciprocity)
  - network effects
- Financial regulation
  - the impact of cross-shareholding on portfolio choices
  - the role of capital requirement
  - network effects
- Microcredit in developed countries
  - state intervention to enhance risk-taking
  - impact on behaviour (of banks & borrowers)
  - it is worth it?

Microcredit in developed countries

- Why is it important/useful?
  - financial exclusion
  - externalities on social expenses
- Different from microcredit in developing countries?
  - individual loans
  - mostly non-for-profit
  - highly regulated
- Public intervention / subsidies key
  - what is the best form? (normative)
  - is it worth it? (positive)

Financial exclusion

Measured as the absence of **any** transaction account

- concerned $\sim$ 12% of pop. in EU-27 countries in 2008 (source: Eurostat, EU-SILC 2008)
- only 0.3% in France, and 0.4% in Germany
- but e.g. 17% in Ireland and 19% in Italy (83% in Bulgaria)

When it comes to credit (same source)

- 40% of pop. in EU-27 countries in 2008
- live in households with no credit card, or outstanding loan
- no data for France, 27.8% in Germany
- 30% in Ireland and 55% in Italy

As a result, reduction of financial exclusion

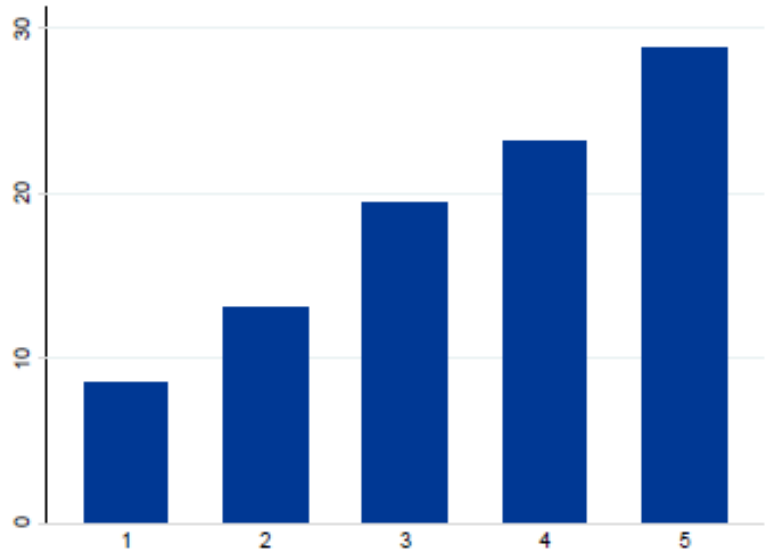
- one of the 2020 strategic objectives of the EU

Credit constraints (1)

- Income is a good predictor of credit application...

Applied for credit by income quintile

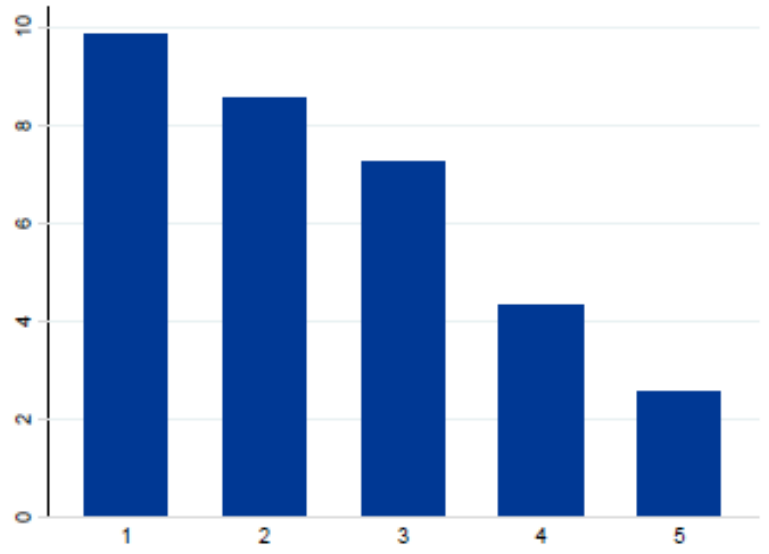
(percentage of households)



Sources: HFCS. Euro area; Hungary and Poland are not included.

Did not apply for credit because of perceived credit constraints by income quintile

(percentage of households)

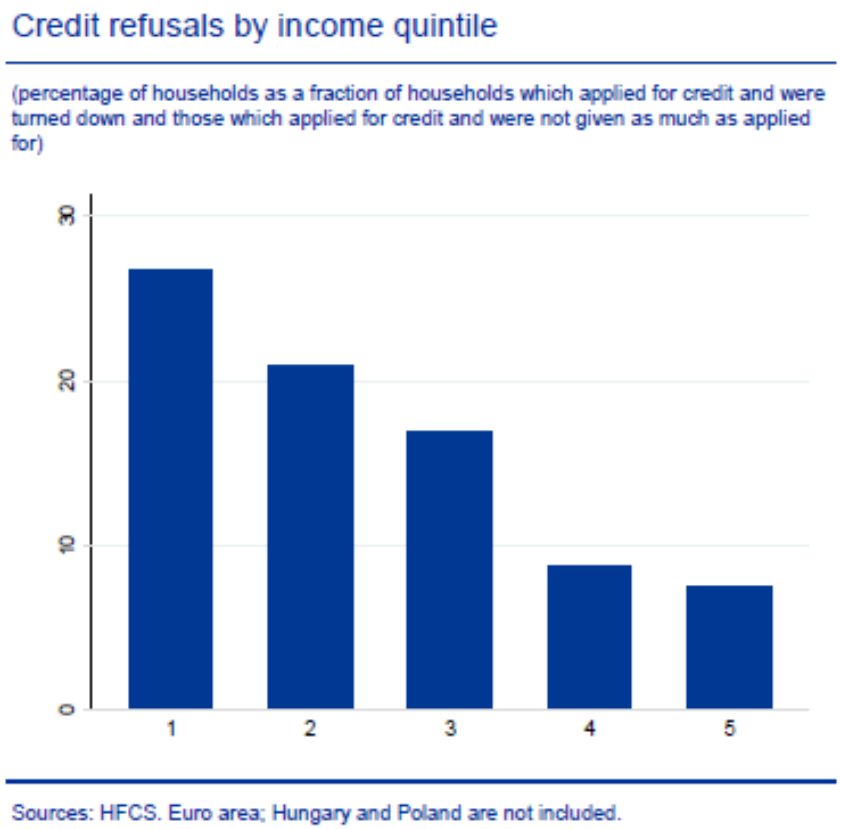


Sources: HFCS. Euro area; Hungary and Poland are not included.

Household Finance and Consumption Survey, ECB, 2014

Credit constraints (2)

- ... and of credit refusal



Household Finance and Consumption Survey, ECB, 2014

Credit rationing

- Why refusing credit...
- ...instead of raising interest rate?

- A matter of **information**
- basic model by Stiglitz and Weiss (1990).
- Intuition: in a monopolistic setting
- the bank doesn't want to set up too high interest rate
- not to discourage borrowers with safer projects

Stiglitz and Weiss: The setting

- N risk-neutral borrowers w/ project for which need financing
  - no collateral nor personal investment
  - $\rightarrow$ need to borrow the total funds, normalized to 1
- projects generate
  - ρ_i in case of success
  - 0 in case of failure
- heterogeneous borrowers
  - two types of projects: safe and risky
  - different proba of success: p_S and p_R $(p_S > p_R)$
  - same expected return: $p_S.\rho_S = p_R.\rho_R \equiv \Pi > 1$ $(\rightarrow \rho_R > \rho_S)$

- The (monopolistic) bank
  - offers to lend funds against repayment in case of success
  - but doesn't hold enough funds to serve everyone $(K < N)$
  - still $K > N \max\{\alpha, 1-\alpha\}$, with α the proportion of safe (excess demand not sufficient to explain complete exclusion)

Asymmetric information and adverse selection

- Assume that the bank doesn't observe the type of borrower
  - able to observe success or failure but not return
- if it only offers one contract with repayment $D = 1 + r$
  - type-i borrowers accepts iif $D < \rho_i$

Then, optimally

- either $D = \rho_R$
  - only risky borrowers accept $(\rho_S < \rho_R)$
  - expected profit is $N(1-\alpha)(\Pi - 1)$
- or $D = \rho_S$
  - both type borrow, but $K < N$
  - if all borrowers have equal chance of being financed
  - expected profit is $K(\alpha(\Pi - 1) + (1-\alpha)(p_R.\rho_S - 1))$

  $\rightarrow$ bank "looses" on risky $(\theta_R.\rho_S < \Pi)$ to attract safe
- banks prefers 2nd strat. if α high and $\neq$ bw. type low

Credit rationing and solutions

We then talk about **credit rationing**

- some borrowers (risky) don't get funded, although
- they would accept a higher repayment/interest rate.

Solution

- Offer different contract to different types
- need to find another dimension (on top of i.r.) to differentiate
- S&W (monopoly): proba. to get financed (or refinanced)
- safe (self)-select contracts w/ lower i.r. but lower proba

Under competition (see e.g. Feixas & Rochet section 3.2)

- assuming risk-aversion
- borrowers signal their type through self-financing (collateral)
- and safer borrowers ready to self-finance more

Microcredit and the absence of collateral

- Issue: poor people lack collateral
- In developing countries
  - microcredit originally relied on **social collateral**
  - through peer/group lending and joint liability
  - group members are liable for others' debt
- In developed countries
  - microcredit often "collateralized" by state guarantee
  - and are often used as a step to "traditional" loans

Peer lending and peer monitoring

- Initiated in developing countries (through Grameen Bank)
- Microcredit relied on **group lending**, and joint liability
- Group members **liable** for others' repayment
- Reduces **moral hazard** (both ex-ante and ex-post)
  - if social capital is important: social collateral
- also influences **risk-taking** (Stiglitz 1990)
  - group lending influences loan size
  - through peer-monitoring of project **riskiness**; $i, j \in \{R, S\}$

$$p_i p_j [u(y(p_i, L) - (1+r)L] + p_i(1-p_j)u[y(p_i, L) - (1+r+q)L] - v(L)$$

- when i and j act cooperatively (w.r.t. riskiness and reporting)
- the maximum level of L s.t. safe project are chosen
- is higher with group lending $\rightarrow$ **higher repayment**

The progressive end of group liability

- Joint liability also have **pitfalls**
  - tension in groups, free-riding, strategic default, adverse sel.
- maybe higher repayment, but smaller client base

$\rightarrow$ most MFIs move away from group lending

- empirical analysis (ind. vs group): Giné and Karlan (2014)
- **randomization** to deal with endogeneity
  - randomly removing group liability to existing groups [removes peer monitoring but not peer screening]

  $\rightarrow$ no change in repayment
  - randomly assigning new groups to ind. or group liability

  $\rightarrow$ no difference in repayment

$\Rightarrow$ liability structure doesn't affect repayment

group effects (pressure, motivation, **information**) enough

- also higher client growth and smaller loan size after conversion

In developed countries

- Individual lending prevails (social capital less important)

- Microcredit is generally provided
  - by **not-for-profit** MFIs (in Western Europe at least)
  - using fixed interest rate
- and is
  - highly **subsidized**, notably through **guarantee**
    - up to 75% in the EU (by the European Investment Bank)
  - regulated, notably in term of loan size ($<$10,000 €in France)
    - may trigger co-financing with bank
    - and have adverse effects (Cozarenco and Szafarz, 2016, 2018)

- Often supplemented by **business development services**
  - that is various forms of training (in accounting, management, marketing, law, etc.)
  - offered by 68% of European MFIs (EMN-MFC Report 2018)

Why subsidizing?

Definition by the European Commission

Micro-credit is defined as a loan [...] to support the development of self-employment and micro-enterprises. It has a double impact [...]: an economic impact as it allows the creation of income generating activities and a social impact as it contributes to financial inclusion and therefore to the social inclusion of individuals.

- expected effects on employment and poverty alleviation

$\Rightarrow$ expected reduction on other social expenses

- Microcredit addresses
  - labor market failure (unemployment)
  - credit market failure (credit rationing)

$\Rightarrow$ Government intervention is justified

What form of state intervention?

- State intervention can take the form of
  - direct or indirect **subsidies**, or
  - state **guarantee**

- State guarantee
  - is the most common intervention in Europe (**Recall**: the EIB guarantee loans up to 75%)
  - is favored as it directly deals with credit rationing

- However, it can have
  - **counterproductive** effects
  - by shifting the responsibility away from the lender
  - in particular when business devt. services is accounted for (Bourlès and Cozarenco, 2014)

A simple model of microcredit (1)

To analyze this issue,

- we adapt the seminal model of Tirole (2005)
- to account for the specifies of microcredit
  - the absence of collateral
  - state intervention
  - the importance of training (BDS)

Consider

- a continuum of risk neutral entrepreneurs
- each endowed with a project that needs financing D
- & can either succeed and generate ρD or fail and give zero
- ρ is assumed to be heterogeneous and distributed on $\left[\underline{\rho}, \overline{\rho}\right]$

To increase the probability of success

- costly effort (cost ψ), unobserved by MFI
- proba of success with effort: $\overline{p} >$ proba of success without: $\underline{p}$

A simple model of microcredit (2)

The MFI

- chooses projects it invests in (i.e. borrowers it lends D to)
- sets the i.r. r s.t. expected profit is zero for each contract

Moral hazard (unobservability of the effort by the MFI)

- For entrep. to exert effort, i.r. has to be incentive compatible
- Zero expected profit & incentive compatibility constraint

$\rightarrow$ minimum project return threshold & the interest rate

As in Tirole (2005), projects are only viable if effort:

- w/ effort the NPV is positive: $\overline{p}\rho > 1 \ \forall \rho$, or $\overline{p}\underline{\rho} > 1$
- w/out effort it is negative: $\underline{p}\rho < 1 - \frac{\psi}{D} \ \forall \rho$ or $\underline{p}\overline{\rho} < 1 - \frac{\psi}{D}$

$\Rightarrow$ MFI doesn't what to lend to those who won't provide effort

The benchmark case: "Laissez-faire"

Without state intervention and assuming away BDS

- a type-ρ entrepreneur (with $\rho > 1 + r$) exerts effort if:

$$\overline{p}\left[\rho D - (1+r)D\right] - \psi \geq \underline{p}\left[\rho D - (1+r)D\right]$$

$\Rightarrow$ for a given r, minimum return for borrower to exerts effort:

$$\rho_{\min} = \frac{\psi}{D\Delta p} + (1+r) > 1 + r$$

- when the borrower exert effort: $\mathbb{E}(\pi) = \overline{p}(1+r)D - D$ (remark: independent on ρ)
- and the zero profit condition gives the benchmark i.r. $\overline{r} = \frac{1-\overline{p}}{\overline{p}}$

$\Rightarrow$ the MFI invests in all projects generating a return higher than:

$$\rho_{\min} = \frac{\psi}{D\Delta p} + \frac{1}{\overline{p}}$$

The introduction of state guarantee

Loan guarantee

- reduces the risk taken by the MFI
- aims at crowding-in part of initially excluded borrowers

Assuming a prop. $\gamma < 1$ of outstanding guaranteed if project fails

- doesn't change behavior of borrowers
- only impacts the consequence of project failure for the MFI
- zero profit condition becomes

$$\mathbb{E}(\pi) = \overline{p}(1 + r_\gamma) D + (1 - \overline{p}) \gamma D - D = 0$$

- leading to $r_\gamma = \frac{1-\overline{p}}{\overline{p}}(1 - \gamma) < \bar{r}$

$\Rightarrow$ under level-γ loan guarantee, the MFI finance all $\rho >$

$$\rho_\gamma = \frac{\psi}{D\Delta p} + \frac{1 - (1 - \overline{p})\gamma}{\overline{p}}$$

- $\rho_\gamma < \rho_{\min}$: loan guarantee reduces credit rationing
- Why? Guarantee $= \downarrow$ risk $\rightarrow$ lower i.r. $\Rightarrow$ effort for lower ρ

$\Rightarrow$ less credit rationing $\rightsquigarrow$ less social expenses

Modeling Business Development Services

Business development services

- another key feature of small business microfinance
- modeled as an action provided by MFI, at cost K per contract
- that increases (uniformly) by ε the proba. to succeed

$\Rightarrow$ no effect on $\Delta p \Rightarrow$ no effect on borrowers' behavior

- only impact MFI behavior through p and K

Under laissez-faire

- $\mathbb{E}(\pi) = (\overline{p}+\varepsilon)(1+r_\varepsilon)D - D - K \Rightarrow r_\varepsilon = \frac{1-(\overline{p}+\varepsilon)}{\overline{p}+\varepsilon} + \frac{K}{(\overline{p}+\varepsilon)D}$

$\Rightarrow$ the MFI finances projects with returns higher than

$$\rho_\varepsilon = \frac{\psi}{D\Delta p} + \frac{1}{\overline{p}+\varepsilon} + \frac{K}{(\overline{p}+\varepsilon)D}$$

- $\rho_\varepsilon < \rho_{\min}$ (i.e. BDS crowds-in borrowers) $\Leftrightarrow \frac{\varepsilon}{\overline{p}} > \frac{K}{D}$

$\Leftrightarrow$ relative gain in proba. of success exceeds relative cost.

The counterproductive effect of state guarantee

Now, under state guarantee, taking into account BDS:

- $\mathbb{E}(\pi) = (\overline{p}+\varepsilon)(1+r_{\gamma\varepsilon})D + (1-(\overline{p}+\varepsilon))\gamma D - D - K$
- and the lower acceptable return becomes:

$$\rho_{\gamma\varepsilon} = \frac{\psi}{D\Delta p} + \frac{1-(1-(\overline{p}+\varepsilon)\gamma)}{\overline{p}+\varepsilon} + \frac{K}{(\overline{p}+\varepsilon)D}$$

- thus BDS is then useful, i.e. $\rho_{\gamma\varepsilon} < \rho_{\gamma}$ iif $\frac{\varepsilon}{\overline{p}} > \frac{K}{(1-\gamma)D}$

Proposition

$\rho_{\gamma} - \rho_{\gamma\varepsilon} < \rho_{\min} - \rho_{\varepsilon}$: Under uniform distribution of project returns, the number of additional entrepreneurs financed through business development services is larger without the state guarantee.

- Intuition: benefits of BDS decreasing with state guarantee
- BDS $\sim$ self-protection; guarantee $\sim$ insurance

Alternative policy: BDS subsidization

- Given this perverse effect of loan guarantee
- an alternative policy might do better in terms of fin. inclusion
- we show that this is the case for full BDS subsidization: $\mathbb{E}(\pi) = (\overline{p}+\varepsilon)(1+r_\varepsilon)D - D$

Proposition

If BDS are efficient enough and are targeted toward the borrowers with the lowest project returns, then the state can crowd-in more borrowers with the same budget by subsidizing BDS rather than guaranteeing loans.

We show it by

- finding the γ that cost as subsidizing BDS for every borrower
- showing this γ leads to same outreach as full BDS subs.
- (efficiency: $\frac{\varepsilon}{\overline{p}+\varepsilon} > \gamma(1-\overline{p})$)

Financial inclusion. And then?

- The above policies are **worthwhile**, only if
- financial inclusion allows saving on other **social expenses**
- i.e. if financed micro-enterprises **succeed** / last
- in part. when ran by people otherwise excluded from labour m.

Analyzed in Bourlès and Cozarenco (2018)

- credit repayment and business continuation
- after professional microcredit
- controling for entrepreneurial motivation
- and employment status

Entrepreneurial motivation

Following the Global Entrepreneurship Monitor, distinction betw/

- **Opportunity** entrepreneurs, who start a business
  - voluntarily, to take advantage of new opportunities
- **Necessity** entrepreneurs, who start a business
  - because they have difficulties remaining in the paid job market.
- Close to former pull/push entrepreneur dichotomy

- Theoretical effect on performance ambiguous
  - extrinsic motivation vs. outside opportunity
- Empirical difficulties on measurement
  - declarative and potentially endogenous

Entrepreneurial motivation and effort: A toy model

- Assume (now) risk-averse borrowers, without collateral
- who borrow at a fixed interest rate and differ in terms of
  - extrinsic motivation b_i (non-pecuniary benefit from success)
  - outside opportunity o_i (how much they earn after failing)
- they choose (now) continuous effort e_i to maximize $\mathbb{E}u$

$$p(e_i)\left[u(\rho-(1+r)D)+b_i\right]+(1-p(e_i))u(o_i)-\psi(e_i)$$

- that is (assuming $p''(\cdot)<0$), e_i^* such that

$$f(e_i^*,o_i,b_i)=p'(e_i^*)\left[u(R-r)+b_i-u(o_i)\right]-\psi'(e_i^*)=0$$

- using the implicit function theorem, $\frac{de_i^*}{db_i}>0$ and $\frac{de_i^*}{do_i}<0$
- and it is unclear that opportunity entr. (higher b_i; higher o_i)
- exert more effort and have better performance

Empirical analysis: context and data

- Sample of 275 microfirms, clients of of French MFI (NGO)
- operating in PACA: Créasol (from CEPAC CSR policy)
- average loan granted: 8,250 €; average duration: 52 months
- interest rate = 4.4% for all loans
- loans granted between between April 2008 and April 2012
- Data on:
  - Individual and business characteristics (from the MFI)
  - Repayment history within the MFI (from the MFI)
  - Business survival status and date of closure when applicable (from www.societe.com)
  - Information on entrepreneurial motivation (from a survey online and by phone between July and September 2012)
  - Business cycles at PACA-region level by sector and unemployment rates at the employment zone level (INSEE)

Dependant and main explanatory variables

Dependant variables: measure of performance

- Dummy *Repayment*= 1 if < 3 late payments in credit history by beginning of 2016 (56% of our sample)
- Dummy *Closed*= 1 if the business was closed as of March '16 (43% of our sample)

Main **explanatory** variable (alternatives)

- Dummy *Necessity*= 1 if answered "by necessity, to create my own job" to "Overall, did you create your business to seize an opportunity or by necessity, to create your own job?" (56% of our sample)
- Dummy *Avoid_unempl.*=1 if answered "To avoid unempl." to "What was your main reason for business start-up?" (32% of our sample; 55% among necessity; 9% among opp.)
- Dummy *Fulfill_dream*=1 if answered "To fulfill a life project or dream" to the above question (42% all; 29% nec; 56% opp)

Control variables

Additional controls are

- age, the square of age (non-linear effects)
- gender, education, household income
- dummy for long-term unemployment
- size of the project, having other debts, start-up dummy
- activity sectors and limited liability company dummies
- macroeconomic sources of variance
  - quarterly rates of increase in business failures in PACA (as a measure of economic health)
  - quarterly rates of increase in new business start-ups in PACA (as a measure of competition)
  - unempl. rate in borrower's empl. zone ($\sim$ city of residence)

  at the time the loan is granted

Determinants of entrepreneurial motivation

	Dependent variable: Necessity dummy	
Explanatory variables:		
Avoid unemployment	1.57***	(0.21)
Age	0.15*	(0.08)
Age^2	-0.002*	(0.001)
Male	0.22	(0.20)
Education	-0.00	(0.10)
HH income	-0.21**	(0.08)
Unemployed more 6	-0.17	(0.19)
Project size	-0.00	(0.00)
Personal investment	0.01	(0.27)
Other debts	-0.14	(0.19)
Start-up	0.04	(0.26)
Trade	0.34	(0.23)
Services	0.06	(0.27)
Food and accommodation	0.22	(0.33)
LLC	-0.67***	(0.20)
Unemployment rate	0.01	(0.04)
Constant	-3.10*	(1.60)
Observations	275	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The empirical model

- The variable *Necessity* is likely to be **endogenous**
- as respondent answers might evolve depending on perf
- in part. here as we don't "observe" motiv. at business start-up

- To deal with this caveat, we use a **bivariate probit** model
- instrument: *Avoid_unemployment* likely not endogenous

The model writes ($i \in \{Repaying, Closed\}$)

$$y_i = \mathbb{1}[\alpha_i Necessity + \boldsymbol{z_1}\boldsymbol{\beta_{1i}} + e_{1i}]$$
$$Necessity = \mathbb{1}[\boldsymbol{z}\boldsymbol{\beta_2} + e_2]$$

- w/ (e_{1i}, e_2) independent of $\boldsymbol{z}$, distributed as bivariate normal with mean zero, unit variance, and $\rho_i = Corr(e_{1i}, e_2)$
- $\boldsymbol{z_1}$ includes constant + all expl. var. except *Avoid_unempl*.
- only included in vector $\boldsymbol{z}$, with all others

Results: Determinants of Entrepreneurial Performance

	Repaying		Closed	
Explanatory variables:				
Necessity	-0.98***	(0.35)	0.05	(0.37)
Age	0.24***	(0.07)	0.01	(0.08)
Age^2	-0.003***	(0.001)	-0.00	(0.00)
Male	-0.16	(0.18)	-0.25	(0.19)
Education	0.10	(0.09)	-0.22**	(0.09)
HH income	-0.04	(0.08)	0.06	(0.08)
Unemployed more 6	-0.03	(0.17)	0.11	(0.17)
Project size	-0.00	(0.00)	-0.00	(0.00)
Personal investment	0.36	(0.25)	-0.28	(0.25)
Other debts	0.34*	(0.18)	-0.31*	(0.18)
Start-up	-0.19	(0.23)	0.40*	(0.24)
Trade	0.09	(0.21)	0.42**	(0.21)
Services	0.29	(0.25)	-0.32	(0.26)
Food and accommodation	-0.35	(0.29)	0.66**	(0.30)
LLC	-0.10	(0.20)	-0.07	(0.21)
ρ	0.62*	(0.24)	0.08	(0.24)
Constant	-4.69***	(1.53)	0.50	(1.53)
Business cycles	Yes		Yes	
Observations	275		275	
Standard errors in parentheses	*** p<0.01, ** p<0.05, * p<0.1			

Comments and interpretation

- Necessity entrep. have significantly **more difficulty** repaying
- BUT their businesses are just **as likely** to survive

- Consistent with our theoretical framework:
  - because of better external options, opportunity entrepreneurs
  - may close their business **despite** better financial performance

- In case of business closure due to a better outside option
  - they seem to **continue repaying** their loans
  - arguably to maintain a good credit history

- Results on control variables in line w/ intuition and literature
  - interestingly, having other debts improves performance
  - probably due to the **screening** complementarities
- ρ only significant for loan repayment estimation
  - then bivariate probit is appropriate

Robustness checks: duration models

- As indicated by the literature on credit scoring models
- it is not just credit default itself that is important
- but **when** the default occurs (early default more costly)

$\Rightarrow$ duration analysis on loan repayment and business survival

- Issue: deal w/ endogeneity when survival time & censoring
- Alternative: use directly *Avoid_unempl*. (and *Fulfill_dream*)

- Results are confirmed
  - respondents giving "Avoid unemployment" reason to start-up
  - have 0.74 times shorter expected time before 3rd late pay.
  - BUT length of business survival is not significantly $\neq$ for them
  - Similarly, we find a positive effect of *Fulfill_dream* dummy
  - on time before 3rd late pay. but no impact on business survival

Policy implications: Cost-benefit analysis

Is public intervention worth it? Results suggest

- predicted proba. of having at least three unpaid installments
- is equal to 0.27 for opportunity, 0.6 for necessity
- predicted survival time before the third late payment
- is equal to 23 months for opportunity, 17 months for necessity

Using average values: 8,250 €at 4.4% for 52 months

- Expected gross capital loss: 1315€ for opp.; 3436€ for nec.

$\Rightarrow$ Cost of 70% guarantee by the state (case at that time) respectively 921€ and 2405€

- compared to average monthly allowance of unempl.: 1160€
- this seems to make perfect sense

Simple analysis. Call for more work (regarding both cost & benefit)

What about business training?

- Also important to measure the effect of business training
- Issue: assignment to training likely to be **endogenous**
- Solution: Randomized Control Trials
  - Findings: big impact on knowledge
  - BUT **small impact** on financial performance

- Moreover, when not random
  - training/help may trigger **behavioral** reactions
  - in particular if borrowers think MFI has superior info
  - looking-glass self effect (Benabou and Tirole, 2003)

- In Bourlès, Cozarenco, Henriet and Joutard (2019)
  - we try to control for this
  - trivariate model (credit alloc, training alloc, repayment)

  $\rightarrow$ **positive effect** of business training on survival time of loans

Conclusion. Take-away message.

- Why is microcredit useful even in developed countries?
  - financial exclusion
  - externalities on social expenses
- How is it different from microcredit in developing countries?
  - mostly individual loans, non-for-profit
  - highly regulated
- Public intervention / subsidies key!
  - Mostly state guarantee; BDS subsidization might do better
  - Still, seems worth the cost!

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