Borrowing constraints, own labour and homeownership

Does it pay to paint your own walls?

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What do we know about own labour?

Sweat equity

We use the term *own labour* and *sweat equity* interchangeable and define it as any contribution of a household increasing the value of its residence.

Scarce information available

- 71% of European households paint inside walls themselves (European Home Improvement Monitor, 2017)

- Luxembourg household budget survey in 2014:
  - 33.6% of Luxembourg households performed maintenance and repair works at home
  - The mean value of these contributions was €637.
  - 3.7% of households performed structural and large-scale works (avg. of €1,451)

- Online platforms
  - In Germany, formalized in mortgage applications → lenders accept up to 20% of the value
  - Luxembourg?

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Questions

- ## Who is a homeowner?
    - 2/3 own their main residence in Luxembourg

- ## Who painted her own walls or did other DIY improvements on the main residence?

- 59% of homeowners in Luxembourg did
- median contribution of €25,000
- accounting for an average of 19% of their total financial needs

Own labour contributions (sweat equity)

- can help to get access homeownership

- mortgage providers in Luxembourg are willing to accept own labour contributions

- are higher when
  - available resources are low
  - interest rate are high
  - households work in the trades

Motivation

- Credit constrained households

    - 5.7% of households indicated that loans were fully / partially turned down

    - 6.2% did not apply for a loan for they feared their application would be rejected

- Effect of borrowing constraints on households

    - Save and forego consumption while renting → The more so the higher the down payment requirement and the lower own funds (e.g. Guiso and Jappelli, 2002)

    - Reliance on gifts and transfers from family and friends (e.g. Engelhardt and Mayer, 1998; Guiso and Jappelli, 2002; Benito, 2006)

- Sweat equity has an impact on external financing (required down payment; interest rate) as it:

    1) lowers external financing needs

    2) and even increases the value of the HMR if it is considered by lenders as some kind of own funds.

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The supply side

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Survey among mortgage providers

- Does own labour help households get a mortgage?

- How widespread is it among borrowers?

- Do mortgage providers take it into account? → If so, how? To what extent?

Contact main mortgage providing banks in Luxembourg in June 2018

(about 90% of Luxembourg market share)

- Own labour considered only of little relevance for the application and with little if any formalization

- Lenders are typically willing to accept up to 10-15%

- 2014

  ~ 2% of applications included own labour contributions

  ~ 7% → conditional average share of own labour in the total investment value

- Applicants likely to contribute own labour → low revenue, low own funds, young, craftsmen

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A theoretical framework

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Theoretical framework

Imagine a population of nearly identical households that only differ in their available resources

- Available resources I_i:

  - initial endowment + present value of lifetime income flow

  - distributed along a continuum between l and h

- Homeownership ≻ Renting (ceteris paribus) Henderson and Ioannides (1983)

- Real estate market → only one type of dwelling (H)

- Dwelling acquisition always requires external funding

- Lenders credit rule is common knowledge:

  - level of resources ≥ α = minimum level (derived by LTV etc.)

  - considers own labour contributions, s_i
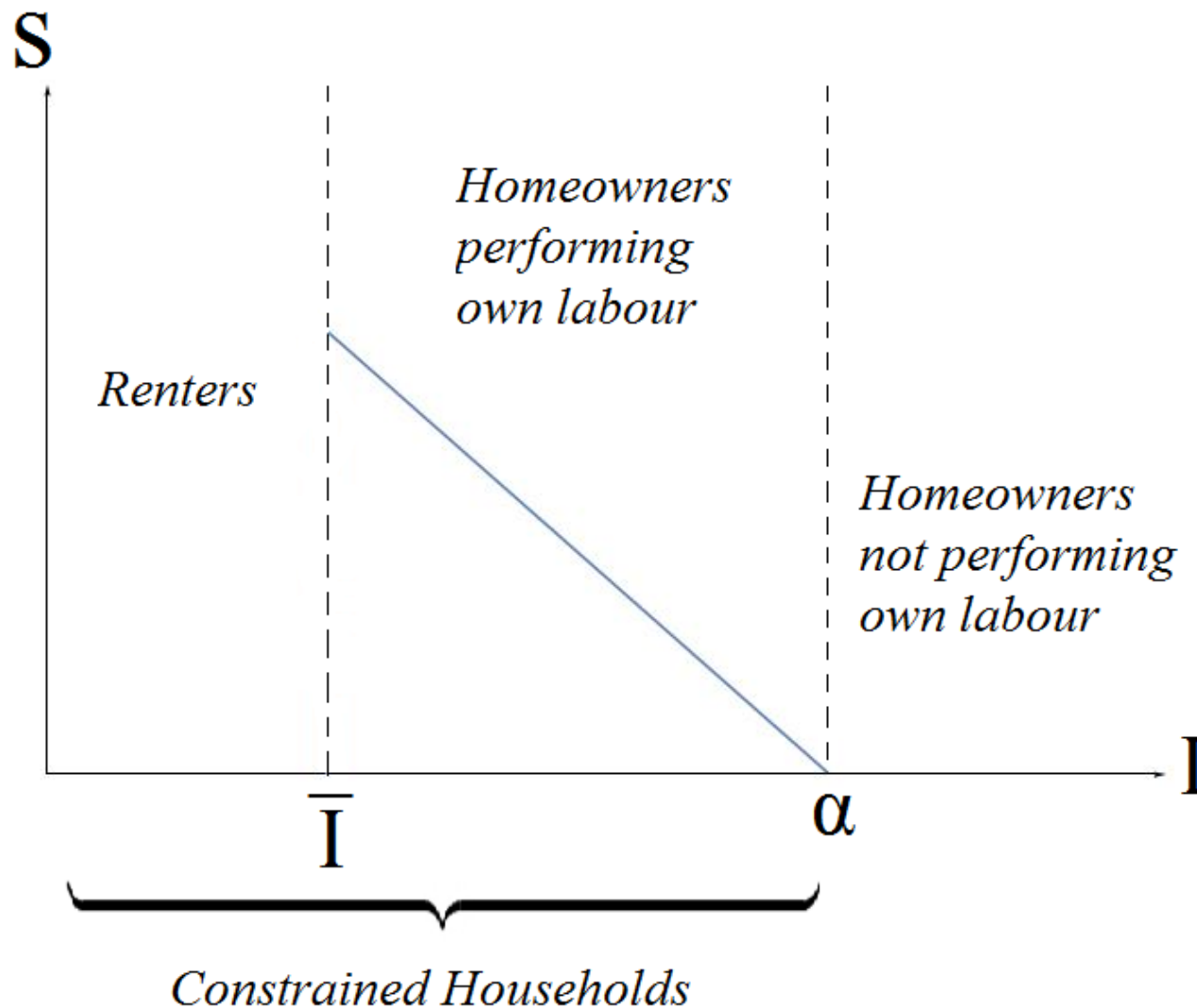
The household problem

Households' problem consists of choosing how much own labour to perform in order to maximize their utility.

- Own labour contributions, s_i:

    - marginal cost $\theta_i \rightarrow$ the same for every household: $\theta_i = \theta$

    - may or may not affect the cost of credit $\rightarrow r(s_i)$ vs r
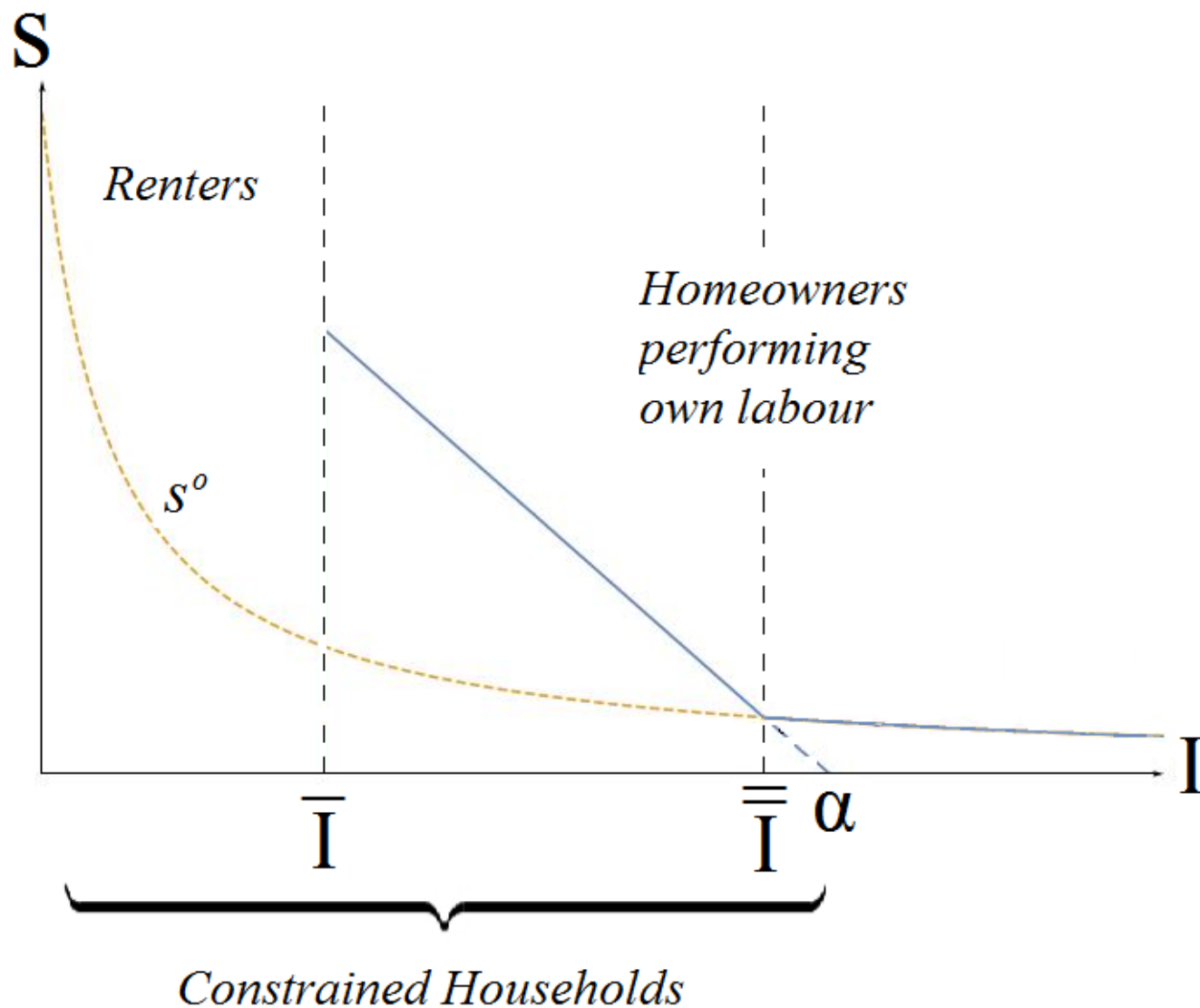
- Household preferences:

$$u_i = I_i - c_r + b_i[H - r - \theta_i s_i + c_r],$$

$$\text{where} \quad b_i = \begin{cases} 1 & \text{if eligible: } resources = I_i + s_i \geq \alpha \\ 0 & \text{otherwise} \end{cases}$$
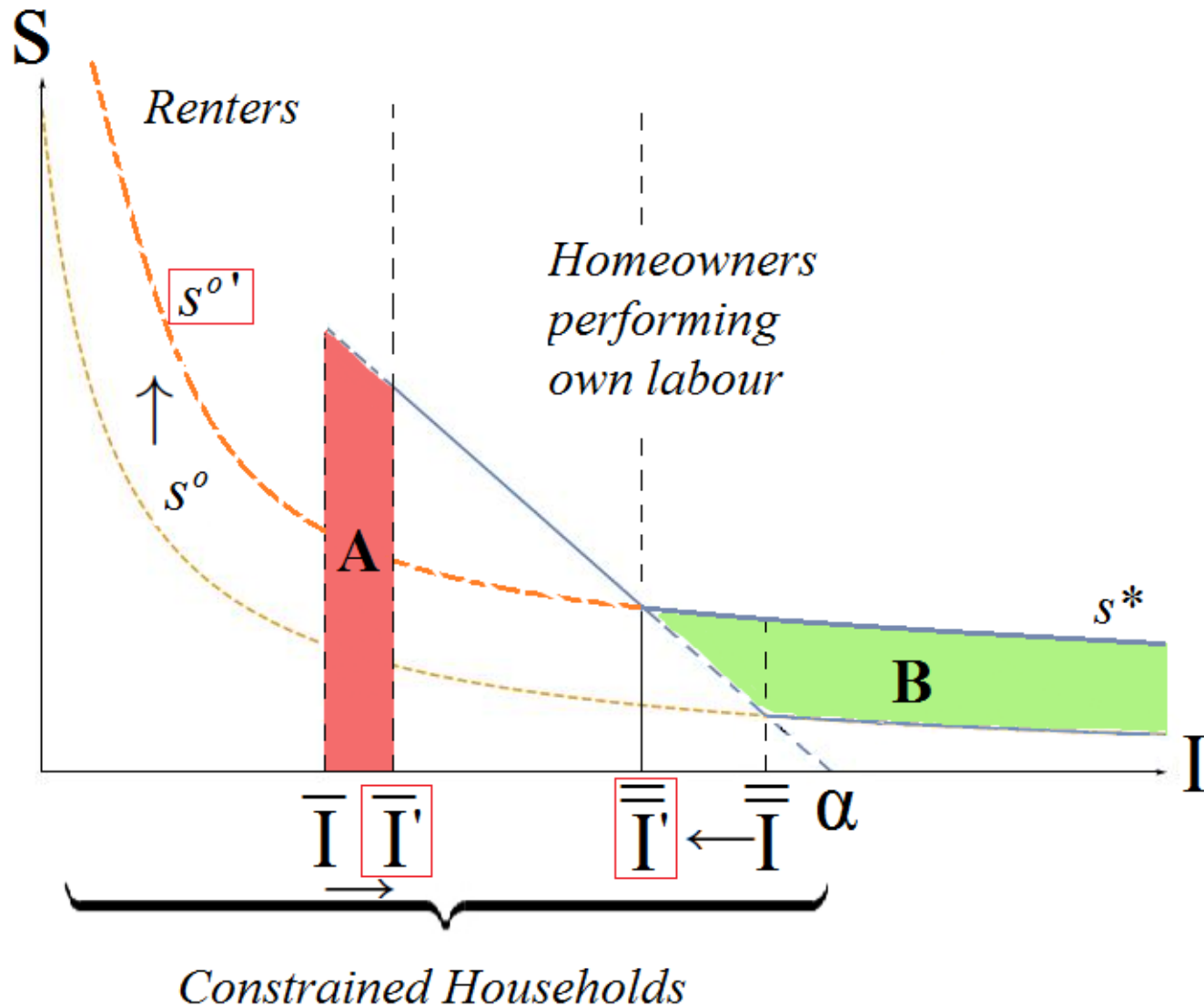
The household problem - the cost of credit

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Descriptive statistics

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Data: LU-HFCS

- 2014 wave of the Luxembourg Household Finance and Consumption Survey (LU-HFCS): 1,601 resident households

- Balance sheet information + socio-demographic & -economic variables.

- Specific questions related to the financing of the HMR at the time of acquisition:

  - External funds → mortgages
  - Internal funds → [liquid] wealth (incl. gifts and inheritances)
  - Own labour contributions (sweat equity)

Descriptive statistics

Financing sources composition

Legend:
- External funds only
- Own funds only
- Own funds + external funds
- Own funds + own labour
- External funds + own labour
- Own funds + external funds + own labour

Pie chart values: 5%, 9%, 27%, 5%, 9%, 45%

Source: Own calculations based on the 2nd wave of the LU-HFCS, data are multiply imputed and weighted.

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Descriptive statistics

Financing sources composition

- External funds only
- Own funds only
- Own funds + external funds
- 🟨 Own funds + own labour
- 🟦 External funds + own labour
- 🟩 Own funds + external funds + own labour

Source: Own calculations based on the 2nd wave of the LU-HFCS, data are multiply imputed and weighted.

- 59% of homeowners contributed to their home with own labour.

Descriptive statistics

- **Prevalence and amounts of different financing sources**

	Prevalence	conditional on HMR ownership				conditional on contribution by source			
		Mean	P25	Median	P75	Mean	P25	Median	P75
Own funds	85.8%	127,873	11,700	50,007	160,600	148,990	25,000	75,000	198,000
Own labour	58.9%	33,815	0	4,439	30,000	57,404	9,891	25,000	51,000
External funds	85.8%	166,091	37,518	111,511	269,688	193,516	66,289	141,998	294,736
Sum of financing sources	100.0%	327,780	126,002	255,320	442,301	327,780	126,002	255,320	442,301

Source: Own calculations based on the 2nd wave of the LU-HFCS, data are multiply imputed and weighted.

- **Contribution of different financing sources to total financing needs**

	conditional on HMR ownership				conditional on contribution by source			
	Mean	P25	Median	P75	Mean	P25	Median	P75
Own funds	35%	10%	27%	52%	41%	16%	33%	59%
Own labour	11%	0%	2%	15%	19%	4%	12%	27%
External funds	53%	30%	57%	80%	62%	43%	66%	83%

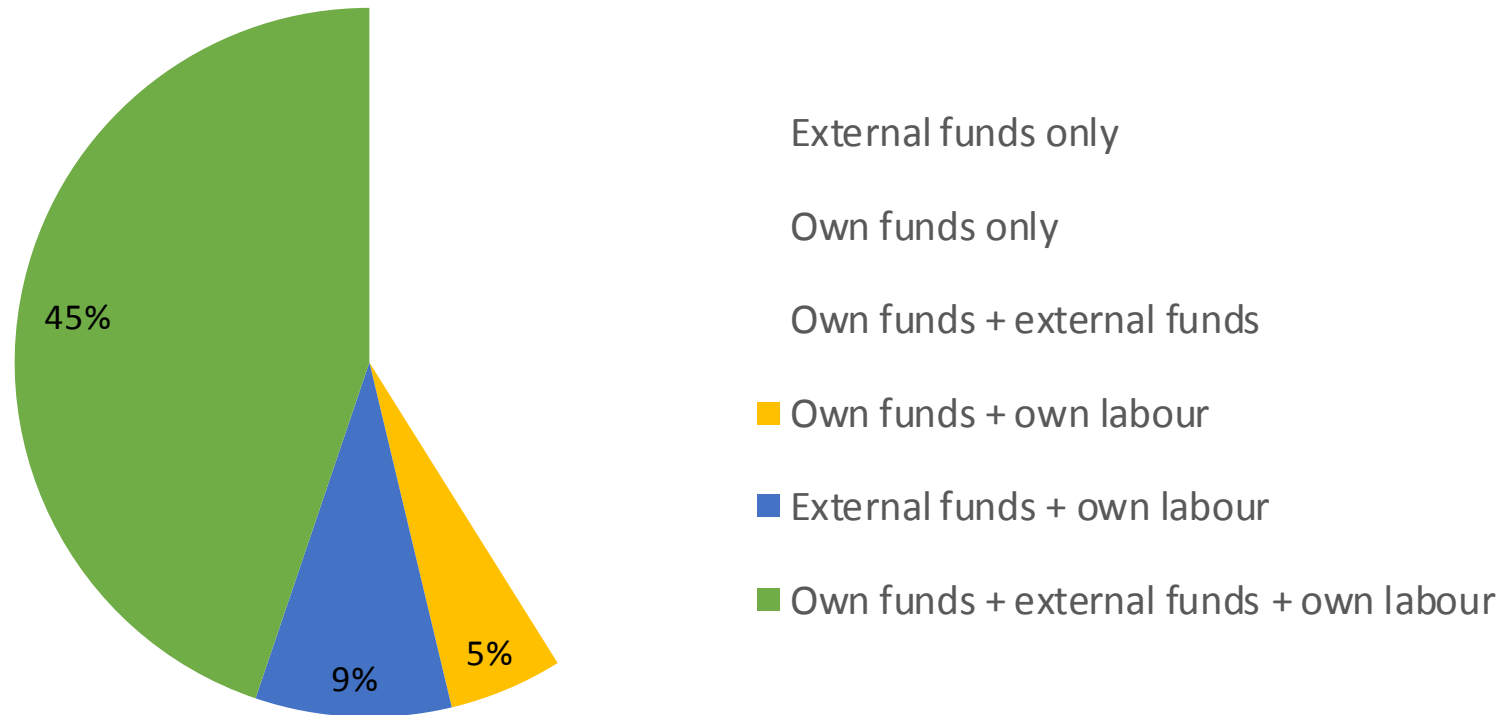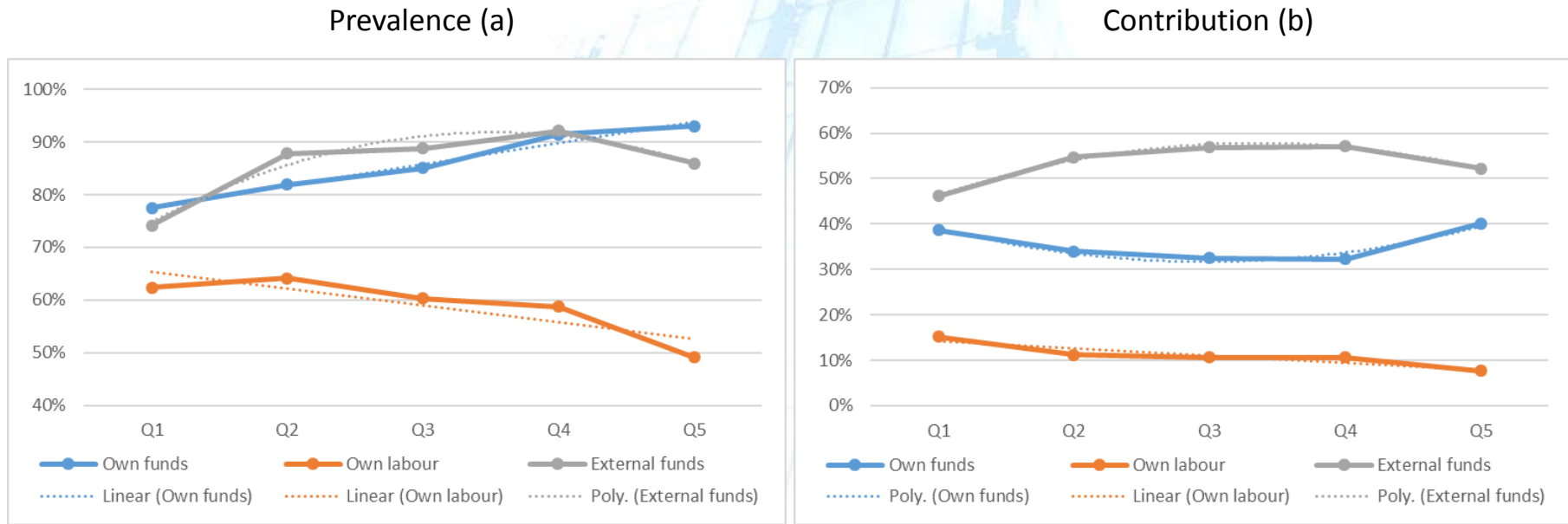*Source: Own calculations based on the 2nd wave of the LU-HFCS, data are multiply imputed and weighted.*

Descriptive statistics

- Prevalence and contribution of different financing sources to total financing needs by gross income quintiles

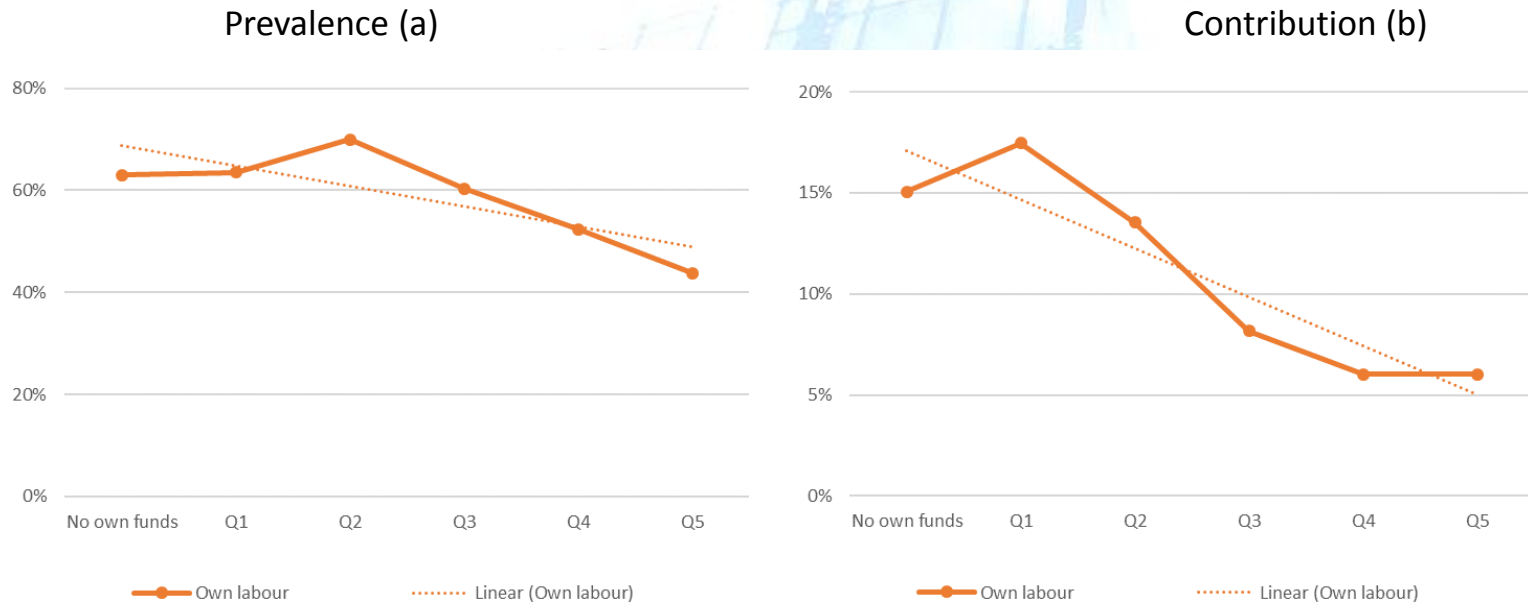Prevalence (a)   Contribution (b)

Source: Own calculations based on the 2ⁿᵈ wave of the LU-HFCS, data are multiply imputed and weighted. Gross income quintiles of households are constructed based on the sample of HMR owners only.

- Prevalence and contribution of own labour **decrease with income**

Descriptive statistics

- Prevalence and contribution of own labour contributions, by financial funds quintiles used for the acquisition of the HMR

Prevalence (a)

Contribution (b)

Source: Own calculations based on the 2nd wave of the LU-HFCS, data are multiply imputed and weighted.
The sample of HMR owners is grouped into households having contributed with own financial funds and those who have not. Household having contributed with own financial funds are further grouped into quintiles according to their contribution of own financial funds to their total financing needs.

- Prevalence and contribution of own labour **decrease with own funds**

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Descriptive statistics

- Prevalence and contribution of different financing sources, by interest rate quintiles
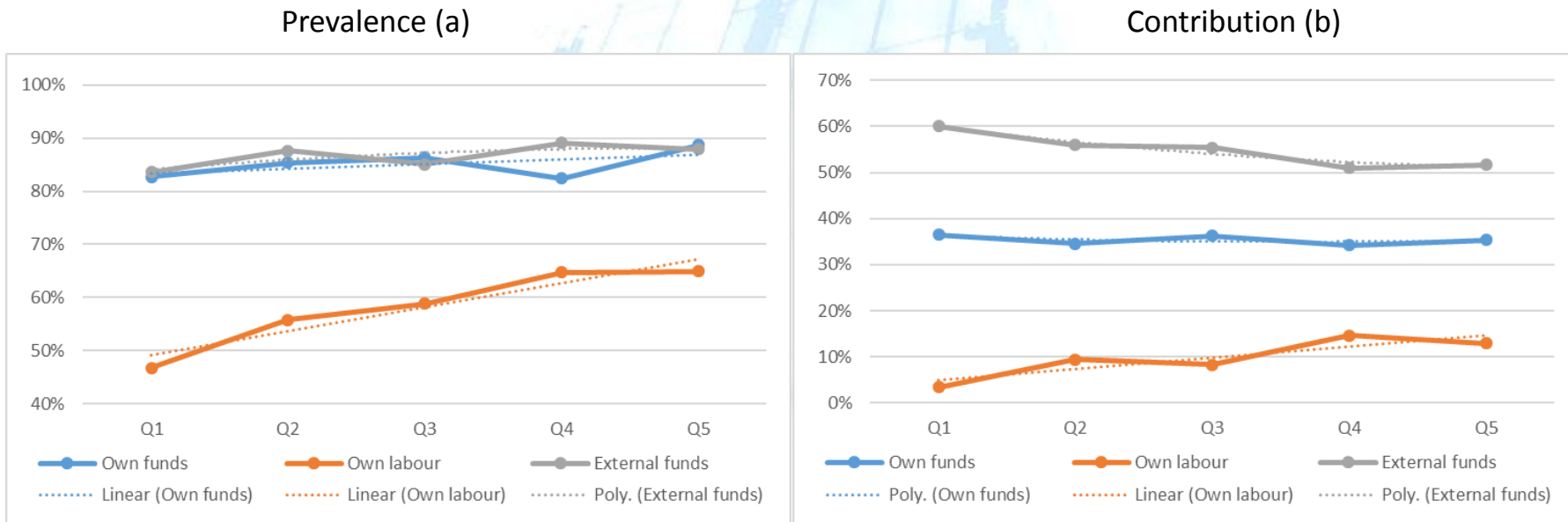
Prevalence (a)

Contribution (b)

Source: Own calculations based on the 2nd wave of the LU-HFCS, data are multiply imputed and weighted.
The annualised agreed rate of lending for house purchase in Luxembourg at the year of acquisition of the HMR is used to construct interest rate quintiles for our sample of HMR owners.

- Prevalence and contribution of own labour **increase with interest rate**

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Regression results

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Regression results - Main explanatory variables

VARIABLES	Linear probability model probability of own labour contribution	Probit probability of own labour contribution	Tobit share of own labour / total financing needs	Tobit logarithm of own labour amount
Gross income in Euro 10,000: linear	-0.006***	-0.007***	-0.002**	-0.090**
	(0.002)	(0.003)	(0.001)	(0.036)
Positive own financial funds: logarithm	-0.006	-0.006	-0.011***	-0.055
	(0.010)	(0.010)	(0.004)	(0.114)
Mortgage interest rate at year of take out: logarithm	0.165**	0.160**	0.055**	1.987**
	(0.068)	(0.069)	(0.024)	(0.872)
Mortgage interest rate at year of take out: missing	0.480**	0.464**	0.169**	5.670**
	(0.220)	(0.230)	(0.082)	(2.810)
ISCO code: non-manual worker (d)	(ref.)	(ref.)	(ref.)	(ref.)
ISCO code: manual worker (d)	0.133**	0.144**	0.035*	1.503**
	(0.056)	(0.064)	(0.018)	(0.657)
ISCO code: not (self-)employed (d)	0.054	0.055	-0.006	0.370
	(0.051)	(0.053)	(0.015)	(0.594)
Educational attainment: low (d)	(ref.)	(ref.)	(ref.)	(ref.)
Educational attainment: middle (d)	-0.069	-0.066	-0.019	-0.725
	(0.043)	(0.044)	(0.017)	(0.525)
Educational attainment: high (d)	-0.162***	-0.156***	-0.047***	-1.820***
	(0.052)	(0.054)	(0.017)	(0.619)
Other controls (see Table 4)	Yes	Yes	Yes	Yes
Observations	1,164	1,164	1,164	1,164
Wald test of overall significance	8.71	6.50	6.01	5.94
R2 adjusted mean	0.125	0.111		
R2 adjusted min	0.110	0.099		

Source: Own calculations based on the 2nd wave of the LU-HFCS, data are multiply imputed and weighted.
Variance estimation based on 1000 replicate weights. *** p<0.01, ** p<0.05, * p<0.1.
The probit estimates report weighted average marginal effects.
The tobit model reports weighted marginal effect for the censored mean.

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Regression results – Other controls

VARIABLES	Linear probability model probability of own labour contribution	Probit probability of own labour contribution	Tobit share of own labour / total financing needs	Tobit logarithm of own labour amount
Main explanatory variables (see Table 3)	Yes	Yes	Yes	Yes
Gender: female (d)	(ref.)	(ref.)	(ref.)	(ref.)
Gender: male (d)	0.093**	0.093**	0.028**	1.107**
	(0.038)	(0.037)	(0.012)	(0.455)
Marital status: single (d)	(ref.)	(ref.)	(ref.)	(ref.)
Marital status: couple (d)	0.082*	0.086*	0.022*	0.961*
	(0.044)	(0.046)	(0.014)	(0.511)
Marital status: divorced (d)	0.088	0.087	0.027	1.244
	(0.069)	(0.069)	(0.021)	(0.843)
Marital status: widowed (d)	-0.039	-0.034	-0.004	-0.402
	(0.091)	(0.096)	(0.030)	(1.055)
Age at the time of acquisition: 16-34	(ref.)	(ref.)	(ref.)	(ref.)
Age at the time of acquisition: 35-44	-0.098**	-0.096**	-0.024*	-1.156**
	(0.042)	(0.043)	(0.013)	(0.498)
Age at the time of acquisition: 45-54	-0.199***	-0.197***	-0.026	-2.017**
	(0.070)	(0.073)	(0.023)	(0.820)
Age at the time of acquisition: 55-64	-0.314***	-0.307***	-0.039	-3.301***
	(0.108)	(0.109)	(0.039)	(1.100)
Age at the time of acquisition: 65+	-0.558***	-0.562***	-0.104**	-5.477***
	(0.109)	(0.119)	(0.047)	(1.382)
Typ of HMR: apartment	(ref.)	(ref.)	(ref.)	(ref.)
Typ of HMR: house	0.088*	0.086*	0.039**	1.346**
	(0.053)	(0.052)	(0.017)	(0.668)
Year of HMR acquisition	0.010**	0.010**	0.002	0.118**
	(0.004)	(0.004)	(0.002)	(0.051)
Square meter size of HMR	0.000	0.000	0.000	0.006*
	(0.000)	(0.000)	(0.000)	(0.004)
Observations	1,164	1,164	1,164	1,164
Wald test of overall significance	8.71	6.50	6.01	5.94
R2 adjusted mean	0.125	0.111		
R2 adjusted min	0.110	0.099		

Conclusion - Does it pay to paint your own walls?

Yes

- 59% of LU homeowners contribute with own labour to finance homeownership
  - helps to get access to
    - homeownership
    - bigger HMR
  - are high if
    - available resources are low
    - interest rate are high
    - households work in the trades

- Confirmed by mortgage providers in LU
  - willing to accept up to 10-15% of total costs

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