

# Financial Dependence, Formal Credit and Firm Informality

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**Outline**

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Robustness  
Conclusions

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- ▶ Motivation
- ▶ Data Description

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- ▶ Stylized Facts and Econometrics

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# Small is unproductive, not beautiful

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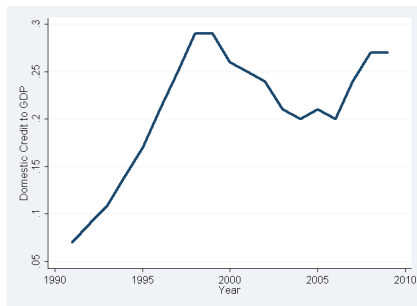
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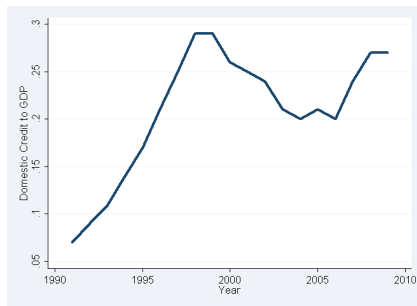
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# Credit availability has increased substantially in the last 2 decades



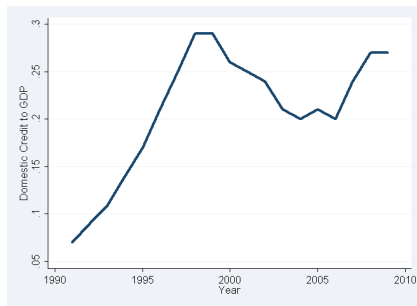


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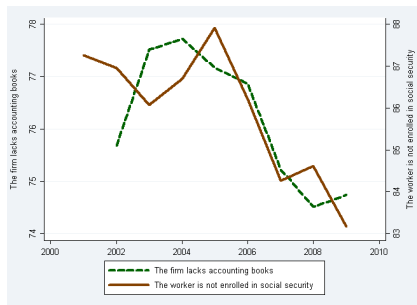
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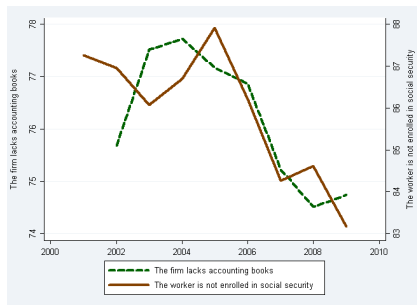


- ▶ Financial development in Peru: one of the most important (Hanson, 2010)
- ▶ What is this doing to formality?

... while informality has slowly decreased

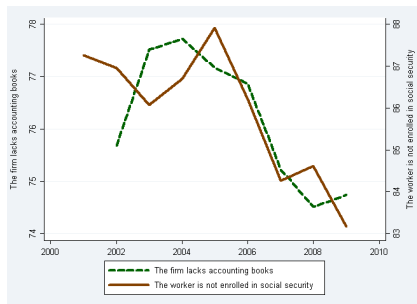


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- ▶ Formality slowly improving, but improving!

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- ▶ Formality slowly improving, but improving!
- ▶ Is it related to greater credit availability?

# ... slowly and differently

Formality change by Industry and formality definition (2002-2009)

Industry	Description	Lack of accounting books	The worker is enrolled in pension system
15	Manufacture of food products and beverages	-0.8%	10.2%
17	Manufacture of textiles	-2.4%	4.1%
18	Manufacture of wearing apparel, dressing and dyeing of fur	1.3%	11.0%
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	2.1%	14.6%
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	9.0%	18.8%
22	Publishing, printing and reproduction of recorded media	-0.6%	10.9%
24	Manufacture of chemicals and chemical products	0.5%	6.3%
25	Manufacture of rubber and plastics products	-1.0%	8.5%
26	Manufacture of other non-metallic mineral products	-0.2%	14.4%
27	Manufacture of basic metals	1.9%	5.8%
28	Manufacture of fabricated metal products, except machinery and equipment	-0.6%	8.1%
29	Manufacture of machinery and equipment n.e.c.	-0.7%	10.4%
36	Manufacture of furniture, manufacturing n.e.c.	0.1%	20.8%
45	Construction	5.3%	14.6%
50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	-4.0%	3.3%
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles	2.4%	8.7%
52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	1.1%	12.4%
55	Hotels and restaurants	-0.7%	9.0%
60	Land transport, transport via pipelines	-2.1%	21.6%
61	Water transport	-2.2%	-1.6%
63	Supporting and auxiliary transport activities; activities of travel agencies	0.0%	5.0%
64	Post and telecommunications	-7.0%	-7.0%
71	Renting of machinery and equipment without operator and of personal and household goods	12.1%	14.6%
72	Computer and related activities	3.5%	21.4%
74	Other business activities	-1.0%	5.6%
85	Health and social work	1.5%	7.2%
92	Recreational, cultural and sporting activities	-0.6%	9.7%
93	Other service activities	-1.4%	19.2%

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- ▶ The improvement in pension formality outperforms the improvement in registration formality when we look at the detail

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**Between** Is the distribution of formality changing among firm size categories?

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- ▶ Paravisini et al. (2010): finds that exports of formal firms react strongly to changes in the supply of credit in the intensive margin.

# Informality is not well represented in the National Economic Census

Table 2: Number of workers, value added, income and informality

	ENAH0		CENEC	
	Total Income (Mill. of S/.)	Number of workers	Value Added (Mill. of S/.)	Number of workers
Formal	35,900	2,692,133	121,000	1,775,350
Informal	11,300	8,343,406	1,930	247,700
<b>Total</b>	<b>47,200</b>	<b>11,035,539</b>	<b>122,930</b>	<b>2,023,050</b>
Formal	0.76	0.24	0.98	0.88
Informal	0.24	0.76	0.02	0.12
<b>Total</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>

Source: CENEC 2008 and ENAH0 2008. CENEC considers a firm as informal if it does not possess a Unique Taxpayer Register (RUC). For ENAH0 it was considered the accounting books informality measure. For ENAH0 estimation

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  - ▶ Interest rates for different firms groups

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$$\begin{aligned} \Delta \left( \frac{F}{E} \right) &= \Delta \left( \frac{F^{SE}}{E^{SE}} \right) \frac{E^{SE}}{E} + \Delta \left( \frac{E^{SE}}{E} \right) \frac{F^{SE}}{E^{SE}} \\ &\quad + \Delta \left( \frac{F^S}{E^S} \right) \frac{E^S}{E} + \Delta \left( \frac{E^S}{E} \right) \frac{F^S}{E^S} \\ &\quad + \Delta \left( \frac{F^L}{E^L} \right) \frac{E^L}{E} + \Delta \left( \frac{E^L}{E} \right) \frac{F^L}{E^L} \end{aligned} \quad (2)$$

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# Within and Between Effects: Accounting books informality

Table 5: Formality Rate Decomposition. Accounting Books

		Within			Between		
		Self	Small	Large	Self	Small	Large
2006-2002	-1.000	-0.475	-3.028	0.431	-0.094	0.704	1.462
2009-2006	1.000	0.207	0.133	0.047	-0.018	-0.040	0.670
2005-2002	-1.000	-0.776	-2.315	0.808	-0.047	0.366	0.965
2009-2005	1.000	0.303	-0.069	-0.089	-0.027	0.059	0.823
<b>2009-2002</b>	<b>1.000</b>	<b>0.099</b>	<b>-1.223</b>	<b>0.276</b>	<b>-0.087</b>	<b>0.270</b>	<b>1.664</b>

Source: ENAHO 2002-2009

Own estimations. The negative sign in the first column means that instead of an increase in formality for that period, the economy experienced a reduction in formality rate.

## Within and Between Effects: Social security informality

Table 6: Formality Rate Decomposition. Social Security

		Within			Between		
		Self	Small	Large	Self	Small	Large
2006-2002	1.000	0.316	0.270	0.352	-0.025	0.018	0.069
2009-2006	1.000	0.261	0.270	0.329	-0.014	-0.032	0.186
2005-2002	1.000	0.355	0.345	0.264	-0.017	0.015	0.038
2009-2005	1.000	0.249	0.196	0.420	-0.033	-0.012	0.181
<b>2009-2002</b>	<b>1.000</b>	<b>0.299</b>	<b>0.266</b>	<b>0.349</b>	<b>-0.024</b>	<b>0.004</b>	<b>0.107</b>

Source: ENAHO 2002-2009

Own estimations

# Econometric specification

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- ▶ Within

$$f_{jt}^c = \beta_o^c + \delta_t^c + \delta_j^c + \gamma^c \left( \frac{\text{Credit}}{\text{GDP}} \right)_t * FD_j + \epsilon_{jt}^c \quad (3)$$



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- ▶ Between

$$\left( \frac{E^c}{E} \right)_{jt} = \lambda_o^c + \delta_t^c + \delta_j^c + \gamma^c \left( \frac{\text{Credit}}{\text{GDP}} \right)_t * FD_j + \epsilon_{jt}^c \quad (4)$$

# Econometrics: within effects (1)

Table 7: Formality Rate accounting books

	Self-employed	2-10 employees	More than 10 employees
Credit to Private Sector/GDP	0.0789***	0.967	0.181
Credit to Firms/GDP	0.0840***	0.673	0.276
Interest Rate	-0.0324	0.488	-0.308
Sectors	16	29	20
Obs.	128	232	160

## Econometrics: within effects (2)

Table 8: Formality Rate social security

	Self-employed	2-10 employees	More than 10 employees
Credit to Private Sector/GDP	0.0659	-0.459	0.286*
Credit to Firms/GDP	0.065	-0.481	0.286
Interest Rate	-0.0123	0.134***	0.435
Sectors	20	25	26
Obs.	160	200	208

# Econometrics: between effects

Table 9: Between Effect

	Self-employed	2-10 employees	More than 10 employees
Credit to Private Sector/GDP	-0.328*	0.192*	-0.0283
Credit to Firms/GDP	-0.178*	0.227*	0.101
Interest Rate	0.0733***	-0.121***	0.241
Sectors	24	24	24
Obs.	192	192	192

# Robustness

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- ▶ Avoiding the effect of the level of FD.
- ▶ What if FD is just a dummy (0,1) as in Catao et al (2009) *1 if the sector  $j$  is more FD than the average, 0 otherwise.*

# Robustness (1)

Table 10: Formality Rate accounting books - Dummy interaction

	Self-employed	2-10 employees	More than 10 employees
Credit to Private Sector/GDP	-0.303**	0.889	0.511
Credit to Firms/GDP	-0.425***	0.627	0.662*
Interest Rate	0.104*	0.559	-0.227
Sectors	16	29	20
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## Robustness (1)

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Sectors	16	29	20
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- ▶ All the signs for the self employed are reversed ...

## Robustness (2)

Table 11: Formality Rate social security - Dummy interaction

	Self-employed	2-10 employees	More than 10 employees
Credit to Private Sector/GDP	0.331	-0.367	0.759*
Credit to Firms/GDP	0.334	-0.543	0.74
Interest Rate	-0.045	0.170**	0.634
Sectors	20	25	26
Obs.	160	200	208

## Robustness (2)

Table 11: Formality Rate social security - Dummy interaction

	Self-employed	2-10 employees	More than 10 employees
Credit to Private Sector/GDP	0.331	-0.367	0.759*
Credit to Firms/GDP	0.334	-0.543	0.74
Interest Rate	-0.045	0.170**	0.634
Sectors	20	25	26
Obs.	160	200	208

- ▶ The results remained the same, even a stronger effect in larger firms

## Robustness (3)

Table 12: Between Effect - Dummy interaction

	Self-employed	2-10 employees	More than 10 employees
Credit to Private Sector/GDP	-0.0758	0.255	0.0733
Credit to Firms/GDP	-0.172	0.291	0.0456
Interest Rate	0.0947	-0.190**	0.456
Sectors	24	24	24
Obs.	192	192	192

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- ▶ Results are robust if we use interest rates as the measure of credit access.

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  - ▶ More access to credit?
  - ▶ Less costly credit?
- ▶ Is there a life-cycle effect in the formalization decision?