Do Programs Mandating Small Business Lending Disincentivize Growth? Evidence from a Policy Experiment

Gursharan Bhue
Nagpurnanand Prabhala
Prasanna Tantri

May 22, 2017
ABFER, Singapore

Motivation

- (M)SMEs are drivers of economic growth and employment
  - Ayyagari et al. (2011, 2014)
- Credit constraints are impediment to SME growth
- Government intervention through directed lending programs
  - Lend to SMEs
- Lending for SME growth?

Importance of Small Businesses

- Important sources of employment in emerging markets
  - Beck et al (2006), Ayyagari et al. (2007)
- India, 2014-2015 data
  - 48 million working enterprises
  - 111.4 million people employed
  - 6,000+ products
  - ₹14 trillion in assets
  - ₹18 trillion in output

Credit Constraints of Small Firms

- Small firms are constrained (Berger and Udell, 1998; Beck and Demirguc-Kunt, 2006; Banerjee and Duflo, 2014)
- Constraints bite more for small firms (Beck, Demirguc-Kunt, and Maksimovic 2005)
- Especially in small firms in emerging markets (World Bank Enterprise Survey)

Government Interventions in Credit Markets

- Lending norms (Carrell and Zinman, 2014)
- DFIs (SIDBI, KfW)
- Directed lending programs

Directed Lending Programs

- Benefits
  - Higher business growth (Banerjee and Duflo (2014)).
  - Alleviation of poverty (Burgess et al. (2005)).
- Inefficiencies
  - Over-borrowing (Melzer (2011)).
  - Political capture (Khwaja and Mian (2005), Cole (2009)).
  - Diversion (Prabhala et al, 2015).

Research Issues

1. Do directed lending programs create *disincentives* for growth?
   - Incentive to retain eligibility
2. Difference in difference
   - By size of firm
   - By age of firm
   - By type of bank
   - In real activities, including non-accounting measures
3. Extensive margin: nature of new firm formation

India's Priority Sector Lending (PSL) Program

- 1969, 1980: Nationalization of banks.
  - Directed lending was a key focus
- 1990s: BOP crisis, private bank entry
- PSL
  - 1974: PSL = 33% of loans
  - 1980: PSL = 40%.
  - 2015: Further clarification, 3-year provision
- PSL non-compliance penalties
  - Banks: shortfalls $\rightarrow$ RIDF, below-market rates
  - Adverse loan officer evaluations (Bhowal et al, 2013)

Experiment

- SME definitions set by MSME ministry
  - 1998: ₹6.5 million $\rightarrow$ ₹30 million
  - 2000: ₹30 million $\rightarrow$ ₹10 million
- September 9, 2006: MSME Development Act
  - ₹10 million $\rightarrow$ ₹50 million.

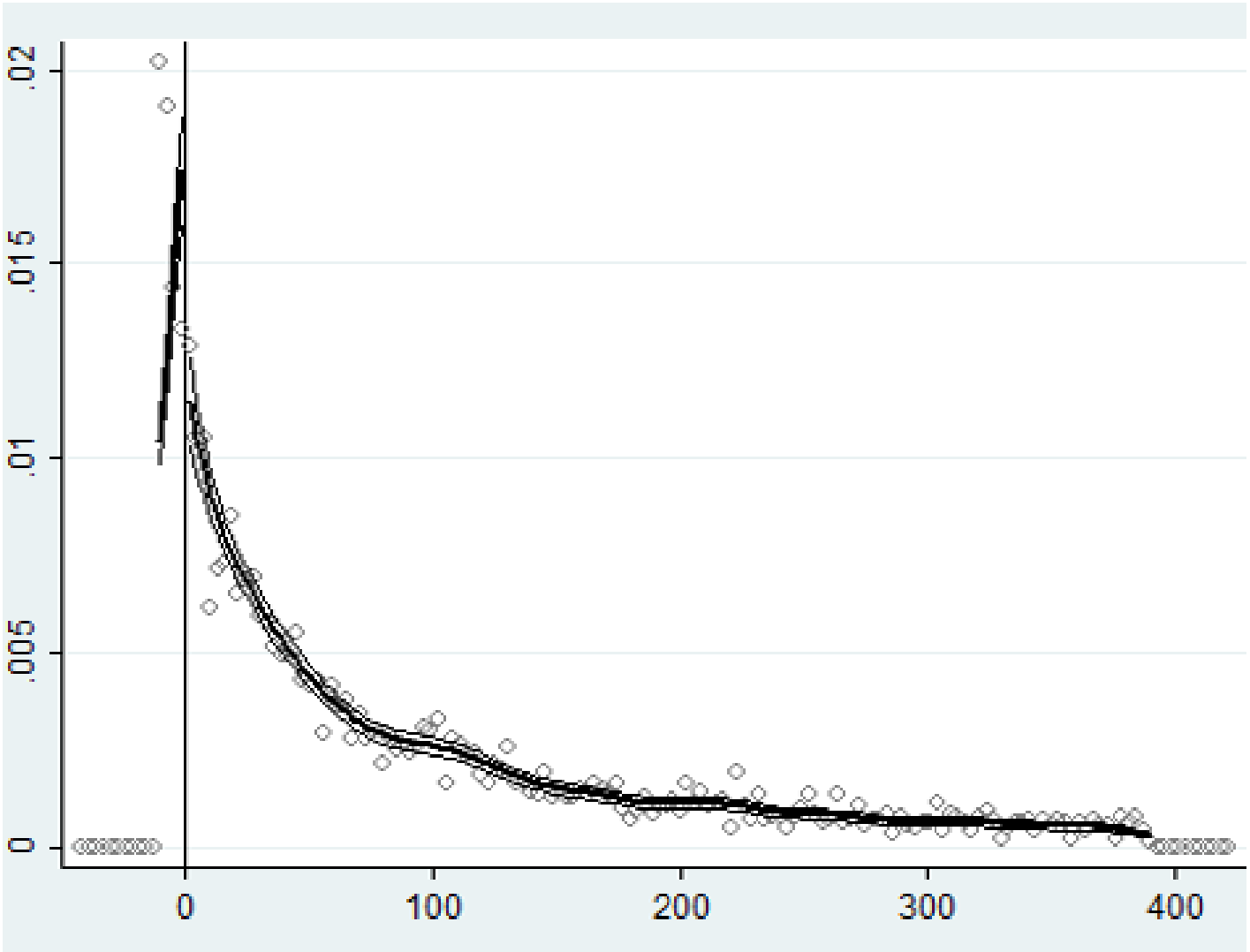
Identification

- In 2006, ₹10 - 50 million firms are newly eligible for PSL
  - High prior PMG: Treatment
  - Low prior PMG: Control
- Hypothesis: Treatment firms grow slower post-2006.
  - Firms wish to retain eligibility
  - Banks wish to retain eligible firms
- Policy paradox
  - PSL is needed the most $\rightarrow$ growth distorted the most

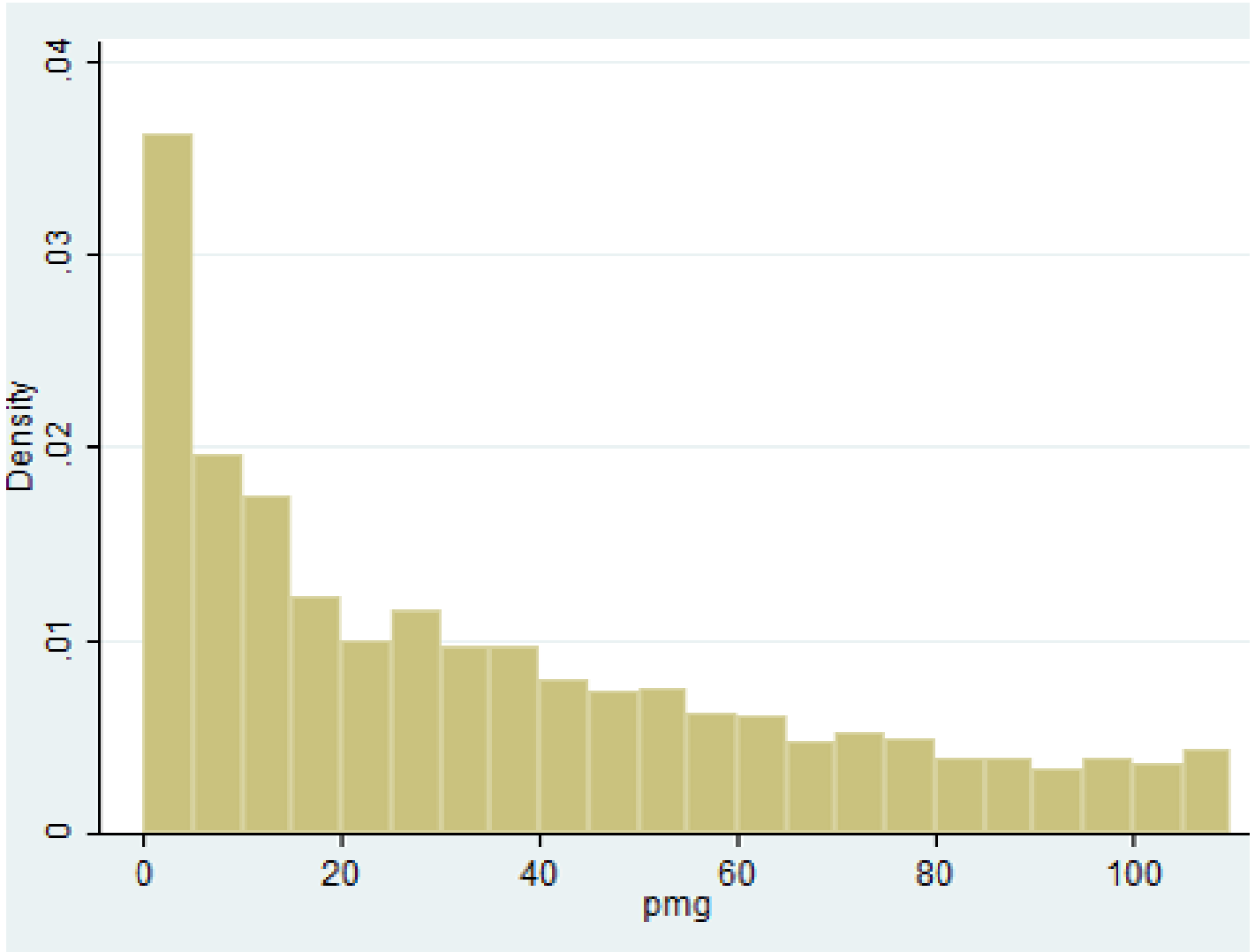
Preview of results

- Growth in PMG $\div$ Assets $\downarrow$ for treatment group post-2006
  1. $\downarrow$ 4.8% in the overall sample.
  2. $\downarrow$ 4.7% for small firms.
  3. $\downarrow$ 7.5% for young firms.
  4. $\downarrow$ 2.3% for PSL constrained banks.
- Capital Expenditure $\downarrow$ 31.1%
- Power Consumption $\downarrow$ 12.5%
- Sales $\downarrow$ 25% but *not* profits
- Several robustness – notably placebo – tests.

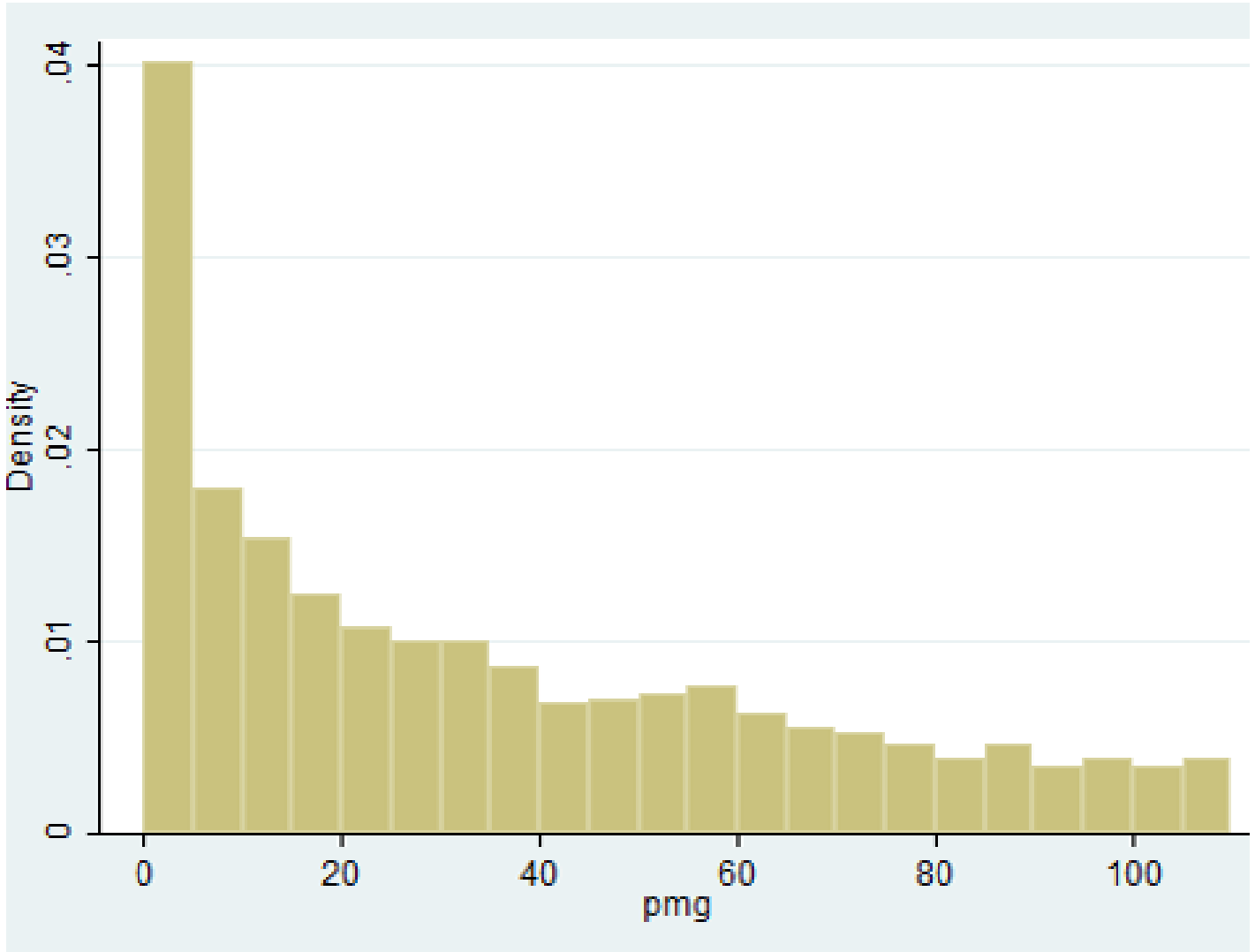
Clustering of Firms at 10 million PMG Cut-off in 2005



PMG Distribution 2005



PMG Distribution 2008



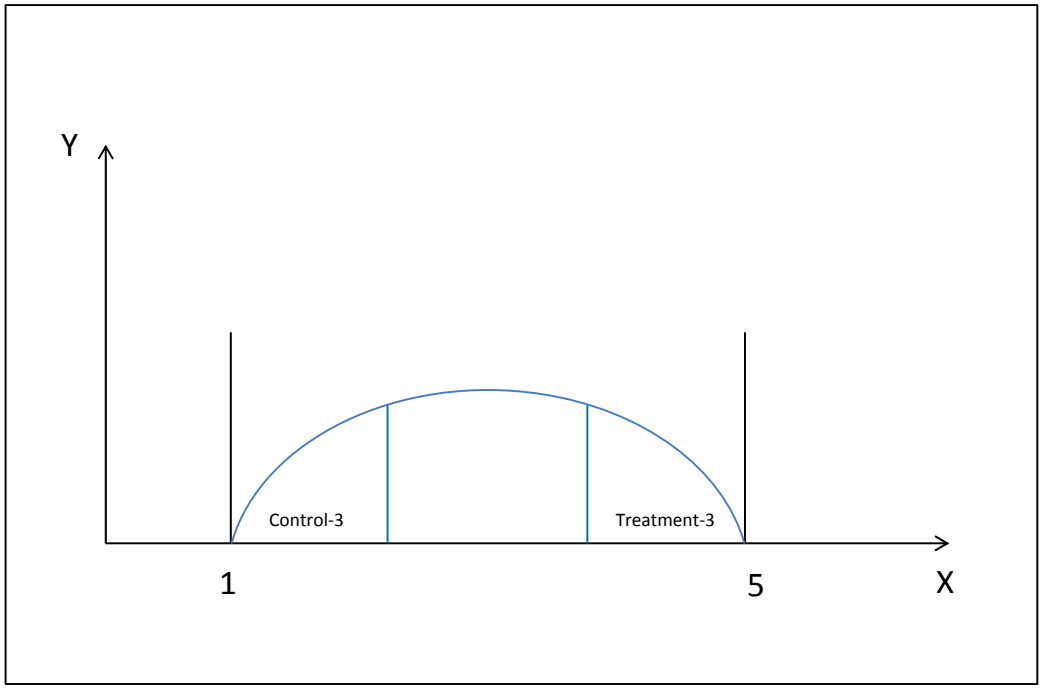
Data

- Primary source of data is CMIE Prowess
  - $\approx$ 29,000 firms
  - Financial data for $\approx$ 21,000 non-financial firms

Empirical Strategy

- Newly eligible firms post the SME definition change in 2006.
  - ₹10 million $<$ PMG $<$ ₹50 million as of 2006.
- Terciles based on the pre-treatment PMG.
  1. Treatment group - Top tercile.
  2. Control group - Bottom tercile
  3. Design similar to Vig (2013)

DID Design



Difference-in-difference estimation

- Standard D-I-D specification

$$\mathrm{Y_{ij}} = \alpha + \nu_{\mathrm{i}} + \delta_{\mathrm{j}} + \theta_{\mathrm{sj}} + \beta_{\mathrm{did}} \times \text{After} \times \mathrm{T} + \beta_2 \times \mathrm{T} + \beta_3 \times \mathrm{X_{ij}} + \epsilon_{\mathrm{ijs}}$$

- The key coefficient of interest is β_{did}

$$\begin{aligned}\beta_{\mathrm{did}} = \; & (\mathrm{E}(\mathrm{Y}|\beta\mathrm{X})_{\text{After 2006}} - \mathrm{E}(\mathrm{Y}|\beta\mathrm{X})_{\text{Before 2006}})|_{\text{Top Tercile}} \\ & - (\mathrm{E}(\mathrm{Y}|\beta\mathrm{X})_{\text{After 2006}} - \mathrm{E}(\mathrm{Y}|\beta\mathrm{X})_{\text{Before 2006}})|_{\text{Bottom Tercile}}\end{aligned}$$

D-I-D Estimate

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	PMG/Assets					
	1 year		3 year		5 year	
TOP × AFTER	-0.031*	-0.030	-0.050***	-0.048**	-0.051***	-0.049***
	(0.018)	(0.018)	(0.018)	(0.019)	(0.018)	(0.019)
AFTER	0.014	0.012	0.073***	0.078**	0.073***	0.063
	(0.014)	(0.030)	(0.026)	(0.033)	(0.025)	(0.044)
Log(Sales)	-0.041**	-0.040**	-0.066***	-0.066***	-0.059***	-0.060***
	(0.020)	(0.020)	(0.018)	(0.019)	(0.015)	(0.015)
EBIT/Assets	0.035	0.036	-0.145	-0.145	-0.133	-0.133
	(0.090)	(0.090)	(0.143)	(0.143)	(0.114)	(0.114)
Observations	2,206	2,206	4,059	4,059	4,741	4,741
R-squared	0.937	0.937	0.868	0.869	0.856	0.857
Adj R-squared	0.900	0.899	0.834	0.833	0.826	0.825
Industry × Year FE	No	Yes	No	Yes	No	Yes
Firm, Year FE	Yes	Yes	Yes	Yes	Yes	Yes

D-I-D Estimate

VARIABLES	(1) Log Real PMG	(2)
TOP × AFTER	-0.262***	-0.230***
	(0.030)	(0.032)
AFTER	-0.732***	-0.741***
	(0.119)	(0.131)
Log(Sales)		0.090***
		(0.023)
EBIT/Assets		-0.044
		(0.077)
Observations	5,045	4,531
R-squared	0.257	0.278
Adj R-squared	0.0911	0.106
Industry × Year FE	No	Yes
Firm, Year FE	Yes	Yes

Year by Year Dynamics

VARIABLES		PMG/Assets
Log(Sales)		-0.062***
		(0.016)
EBIT/Assets		-0.115
		(0.124)
Treatment & year_n==2004	0.015	-0.006
	(0.018)	(0.014)
Treatment & year_n==2005	0.008	-0.017
	(0.019)	(0.019)
Treatment & year_n==2006	-0.032	-0.074***
	(0.028)	(0.023)
Treatment & year_n==2007	-0.010	-0.071***
	(0.033)	(0.027)
Treatment & year_n==2008	0.005	-0.098***
	(0.041)	(0.029)
Treatment & year_n==2009	-0.009	-0.094***
	(0.051)	(0.036)
Observations	5,082	4,612
R-squared	0.859	0.858
Adj R-squared	0.828	0.824
Industry × Year FE	No	Yes
Firm, Year FE	No	Yes

Placebo: False Limits of ₹60 - 100 million

	(1)	(2)	(3)	(4)	(5)	(6)
	1 year		3 year		5 year	
VARIABLES	PMG/Total Assets					
TOP × AFTER	0.013	0.003	-0.005	-0.032	-0.011	-0.032
	(0.039)	(0.042)	(0.023)	(0.022)	(0.024)	(0.024)
AFTER	-0.018	-0.001	0.013	0.035	-0.025	0.002
	(0.031)	(0.032)	(0.034)	(0.032)	(0.043)	(0.043)
Log(Sales)		-0.043**		-0.038***		-0.027**
		(0.018)		(0.015)		(0.012)
EBIT/Assets		0.091		-0.125		-0.107
		(0.112)		(0.190)		(0.157)
Observations	1,101	1,041	2,045	1,961	2,418	2,324
R-squared	0.941	0.942	0.784	0.770	0.786	0.771
Adj R-squared	0.905	0.906	0.726	0.706	0.737	0.718
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Placebo: False treatment year 2009

	(1)	(2)	(3)	(4)
	2009 treatment year		2011 treatment year	
VARIABLES	PMG/Total Assets			
TOP × AFTER	-0.010	-0.030	-0.037	0.008
	(0.126)	(0.024)	(0.075)	(0.029)
AFTER	0.382	-0.005	-0.100*	-0.053
	(0.414)	(0.052)	(0.052)	(0.035)
Log(Sales)		-0.032		-0.018
		(0.023)		(0.016)
EBIT/Assets		-0.240*		-0.088
		(0.145)		(0.098)
Observations	2,445	2,227	1,723	1,575
R-squared	0.637	0.891	0.463	0.885
Adj R-squared	0.493	0.846	0.279	0.845
Industry × Year FE	Yes	Yes	Yes	Yes
Firm, Year FE	Yes	Yes	Yes	Yes

Other Capital Expenditure and Power Consumption

	(1)	(2)	(3)	(4)
VARIABLES	log(CapEx)		log(power)	
TOP × AFTER	-0.320***	-0.311***	-0.203***	-0.125***
	(0.098)	(0.105)	(0.064)	(0.048)
AFTER	1.013***	1.008***	0.488***	0.210**
	(0.181)	(0.185)	(0.120)	(0.086)
Log(Sales)		0.152***		0.532***
		(0.045)		(0.036)
EBIT/Assets		0.058		-0.057
		(0.220)		(0.063)
Observations	1,872	1,721	3,782	3,696
R-squared	0.925	0.922	0.880	0.924
Adj R-squared	0.891	0.883	0.847	0.904
Industry × Year FE	Yes	Yes	Yes	Yes
Firm, Year FE	Yes	Yes	Yes	Yes

Sales and Profitability

	(1)	(2)	(3)	(4)
VARIABLES	Log (Sales)		EBIT/Sales	
TOP × AFTER	-0.249***	-0.250***	0.198	-0.013
	(0.080)	(0.080)	(0.423)	(0.530)
AFTER	0.550***	0.551***	0.773	1.239
	(0.148)	(0.148)	(2.459)	(2.660)
EBIT/Assets		-0.028		
		(0.197)		
Log (Sales)				-0.846
				(1.046)
Observations	4,669	4,669	4,669	4,669
R-squared	0.851	0.851	0.352	0.353
Adj R-squared	0.817	0.817	0.204	0.204
Industry × Year FE	Yes	Yes	Yes	Yes
Firm, Year FE	Yes	Yes	Yes	Yes

Heterogeneity: Young versus Old *Firms*

	Young firms		Old firms	
	(1)	(2)	(3)	(4)
VARIABLES	PMG/ Total Assets			
TOP × AFTER	-0.003	-0.075***	0.001	-0.041
	(0.042)	(0.025)	(0.041)	(0.035)
AFTER	0.025	0.101**	0.014	0.064
	(0.042)	(0.042)	(0.063)	(0.068)
Log(Sales)		-0.051***		-0.076***
		(0.018)		(0.024)
EBIT/Assets		-0.273		0.043
		(0.221)		(0.053)
Observations	3,042	2,741	2,040	1,871
R-squared	0.825	0.850	0.899	0.879
Adj R-squared	0.785	0.813	0.875	0.848
Industry × Year FE	Yes	Yes	Yes	Yes
Firm, Year FE	Yes	Yes	Yes	Yes

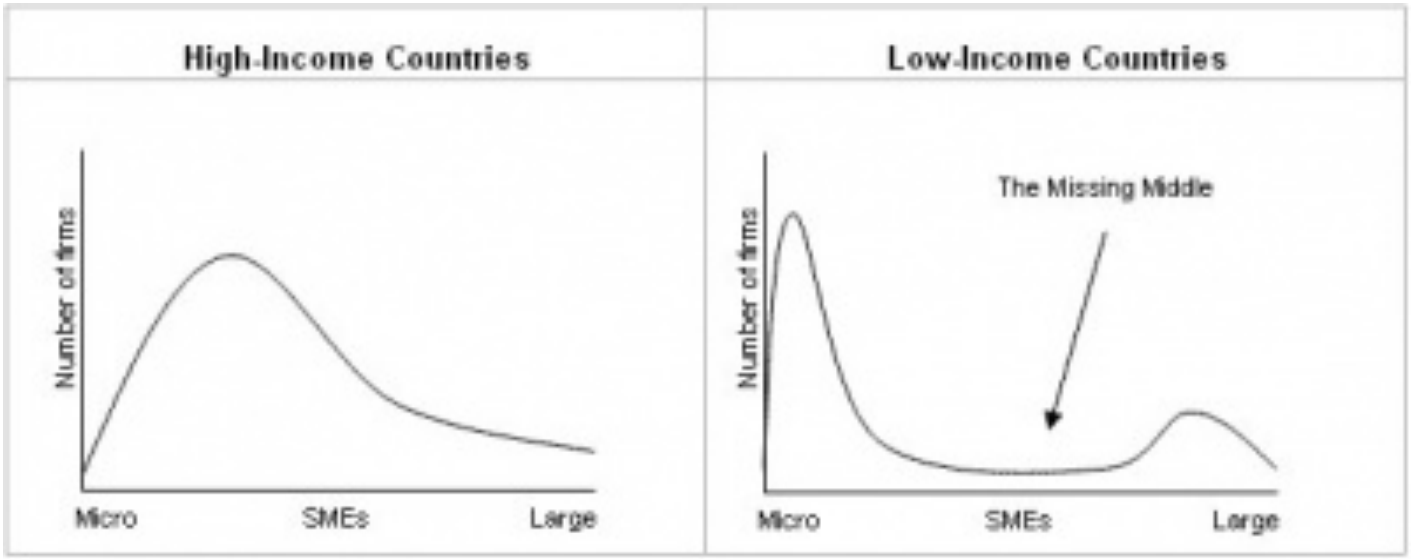
Heterogeneity: PSL Constrained *Banks*

VARIABLES	PMG/Assets			
	High PS banks		Low PS banks	
TOP × AFTER	0.014	0.012	-0.019**	-0.023**
	(0.014)	(0.014)	(0.010)	(0.009)
AFTER	0.049***	0.086***	0.027**	0.065***
	(0.014)	(0.031)	(0.011)	(0.016)
Log(Sales)	-0.061***	-0.060***	-0.046***	-0.044***
	(0.014)	(0.013)	(0.009)	(0.009)
EBIT/Assets	0.009	0.008	-0.029	-0.027
	(0.014)	(0.014)	(0.037)	(0.037)
Industry X Year FE	No	Yes	No	Yes
Observations	7,595	7,595	7,875	7,875
R-squared	0.897	0.898	0.928	0.929
Adj R-squared	0.870	0.871	0.910	0.911
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes

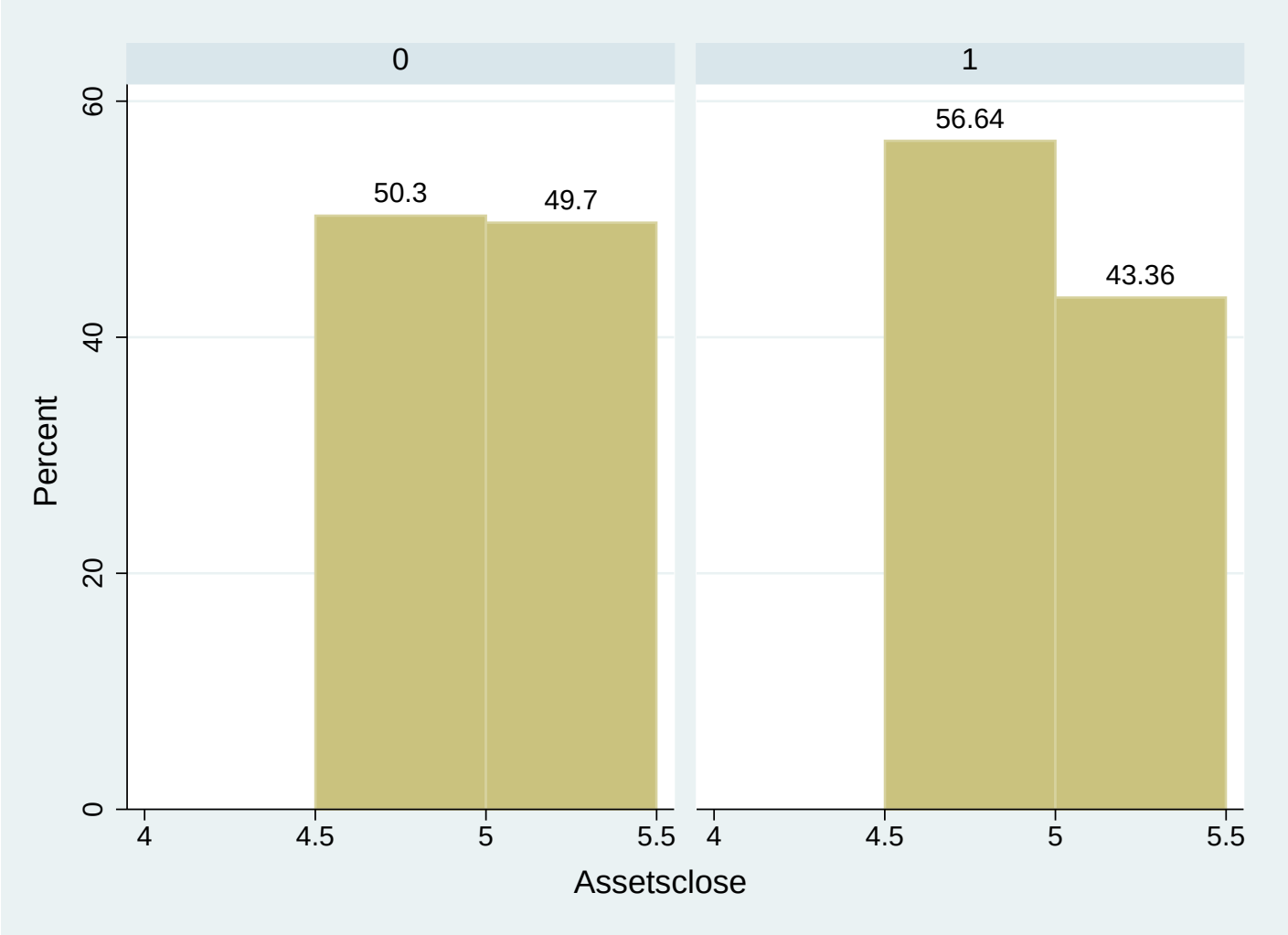
Extensive Margin: Constraints and *New* Firm Formation

- Robb and Robinson (RFS 2012)
  - Bank debt is important in new firms
- Clever entrepreneurs may bypass credit limits
  - India ranks 142 in new firm formation
  - 48 months to form new firms in our sample period
  - Circumvention has other costs. Our main point remains.
- India's missing middle
  - Ayyagari, Demirguc-Kunt, Maksimovic (2003)
  - Hsieh (2014) is a skeptical view

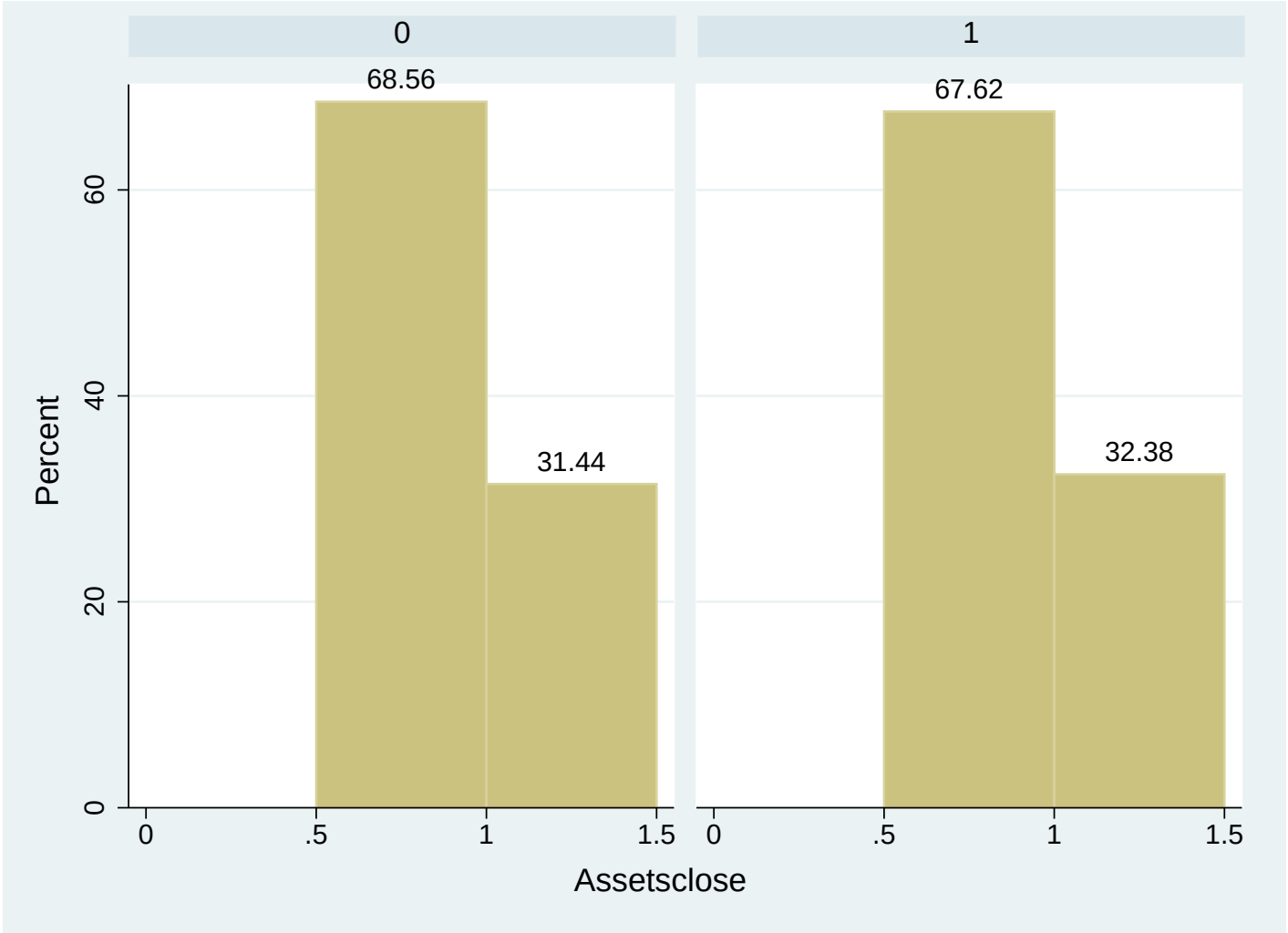
Missing middle



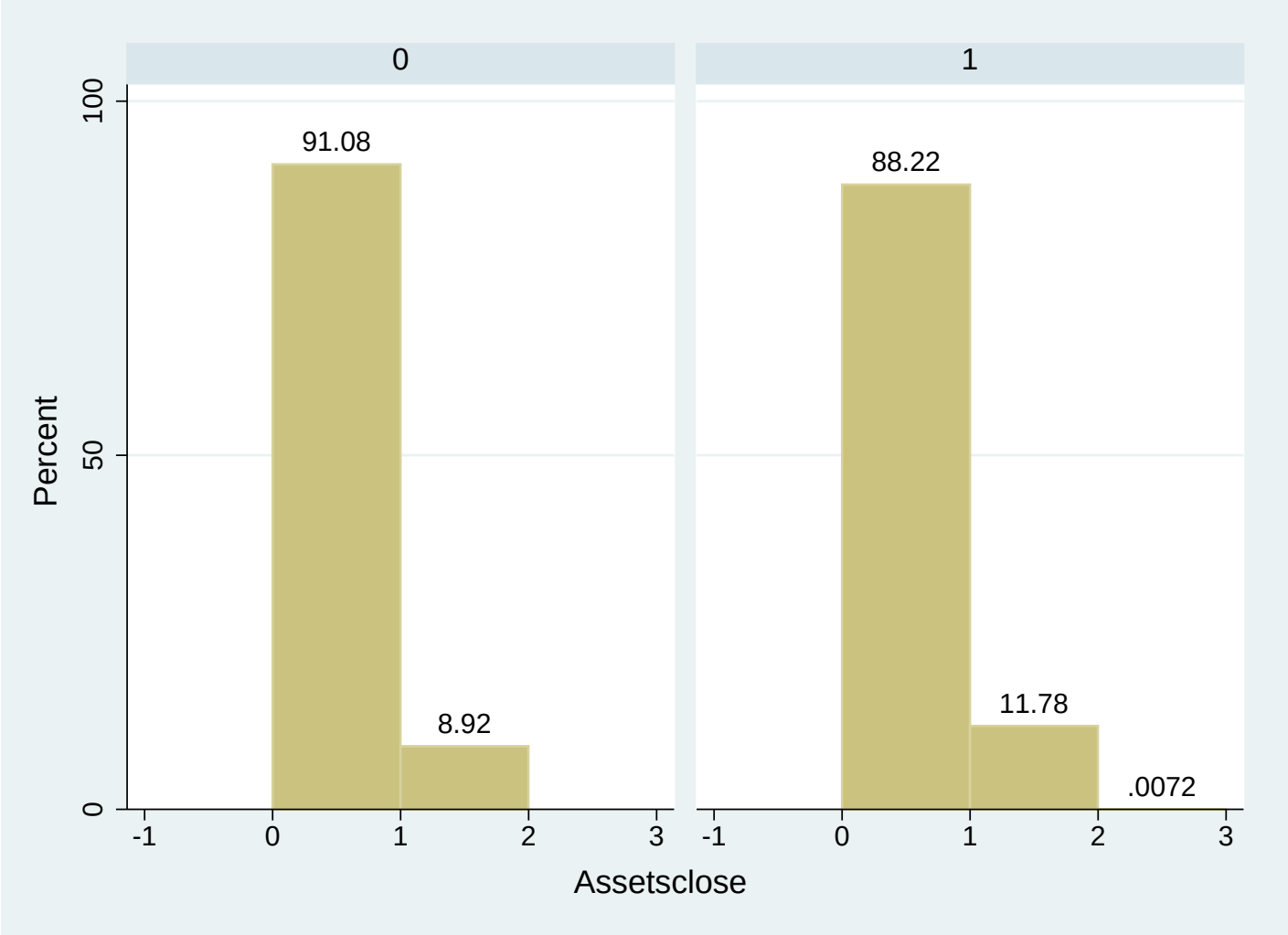
New Firm Formation



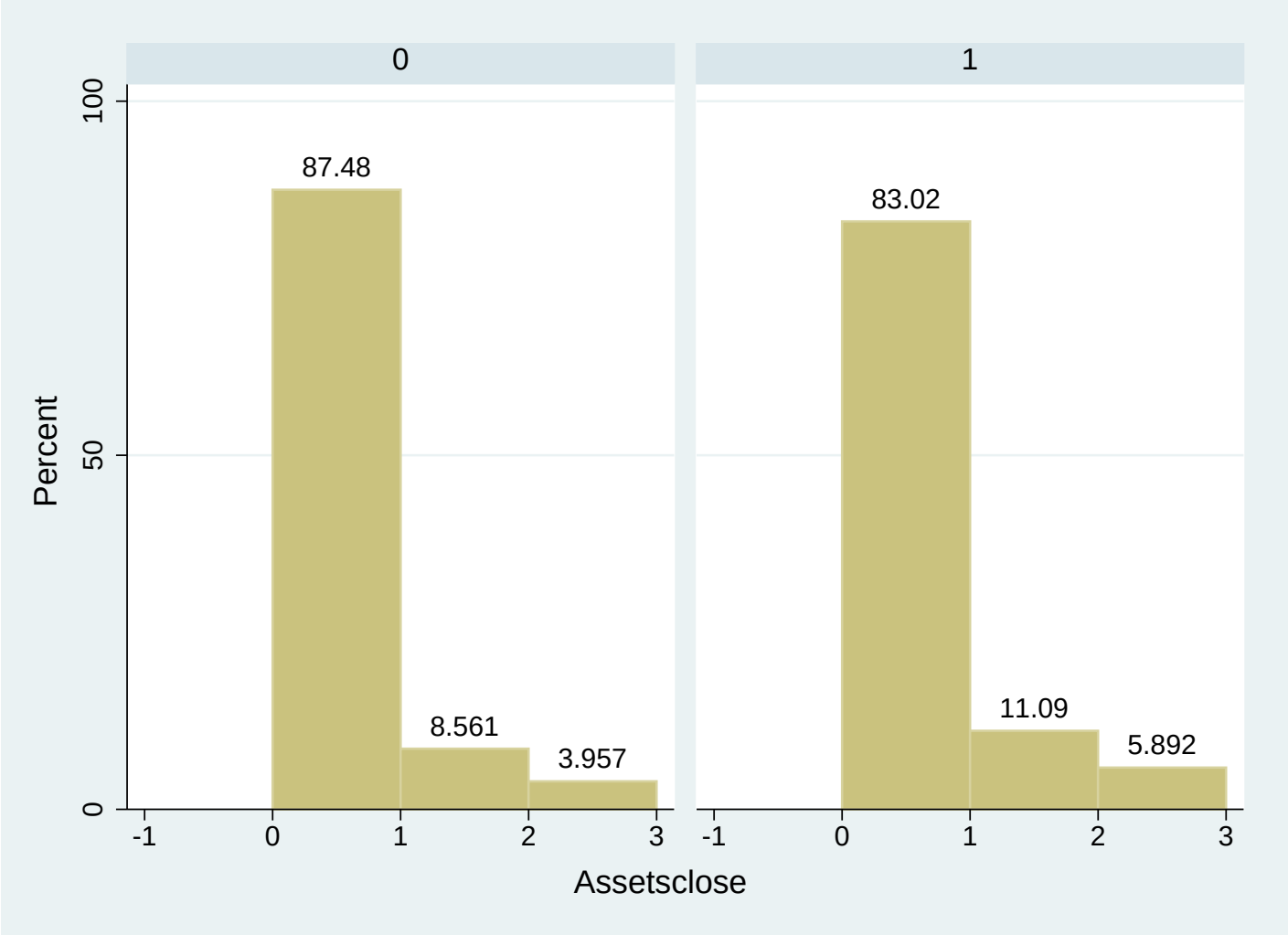
New Firm Formation



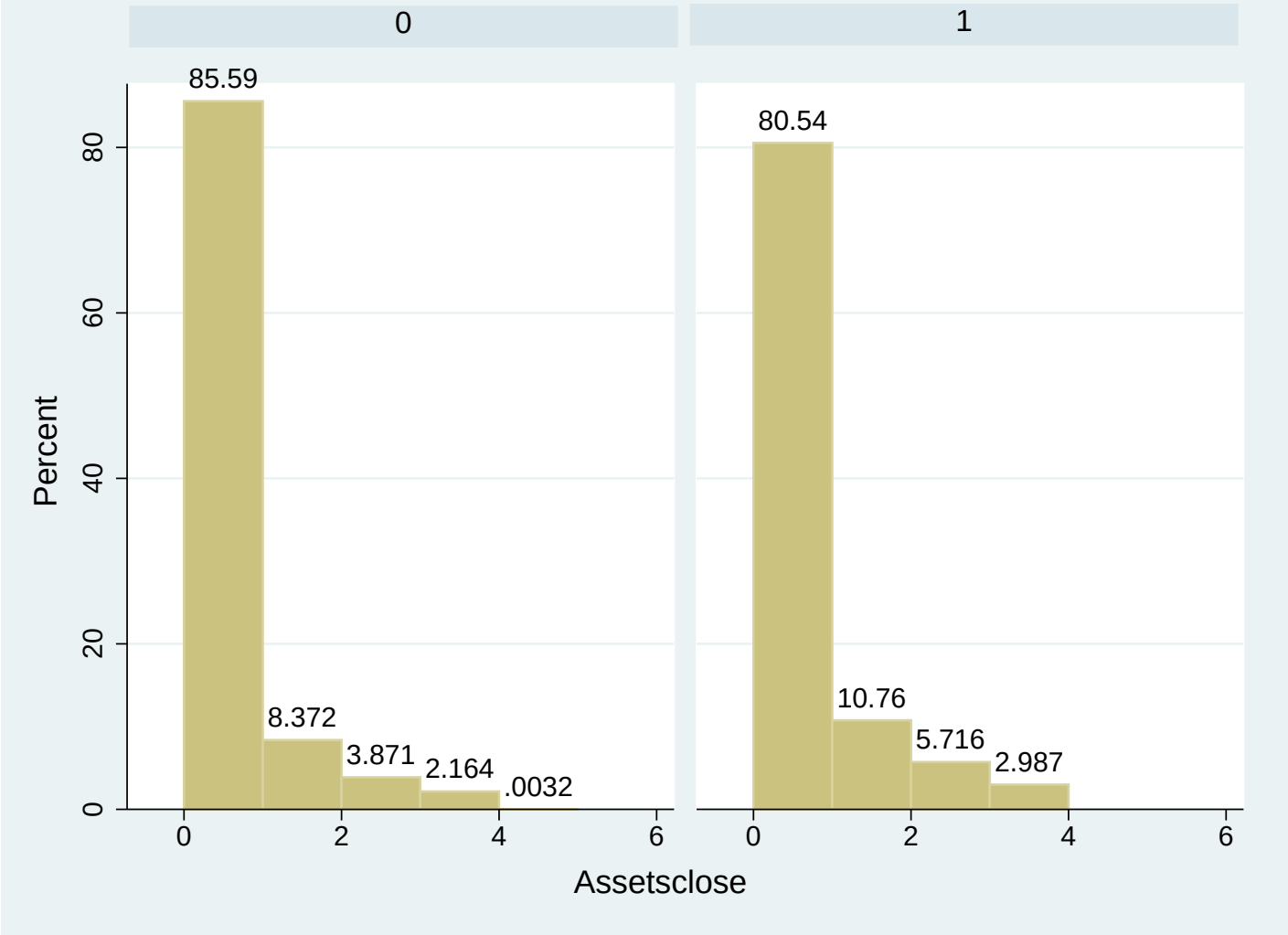
New Firm Formation



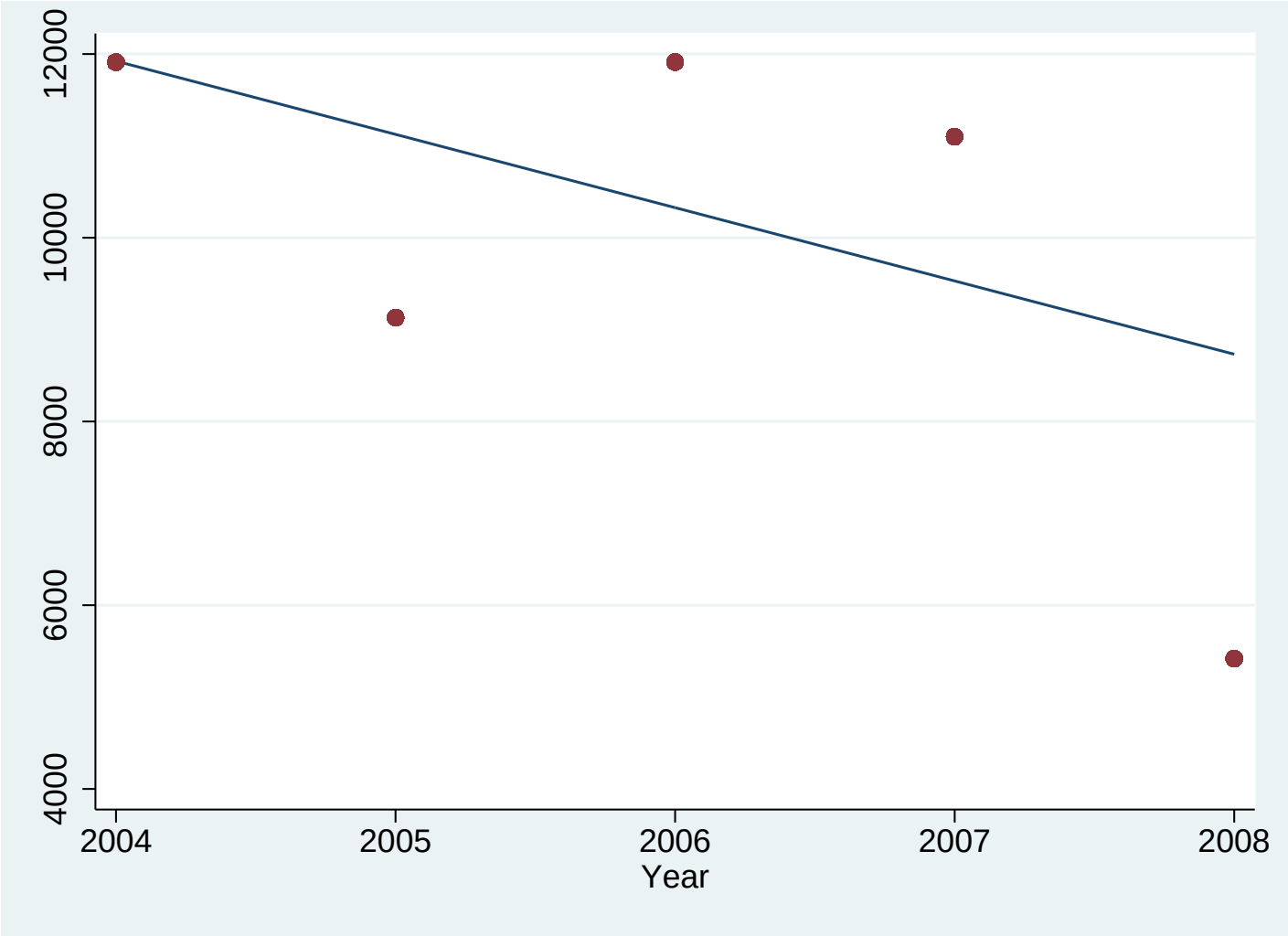
New Firm Formation



New Firm Formation



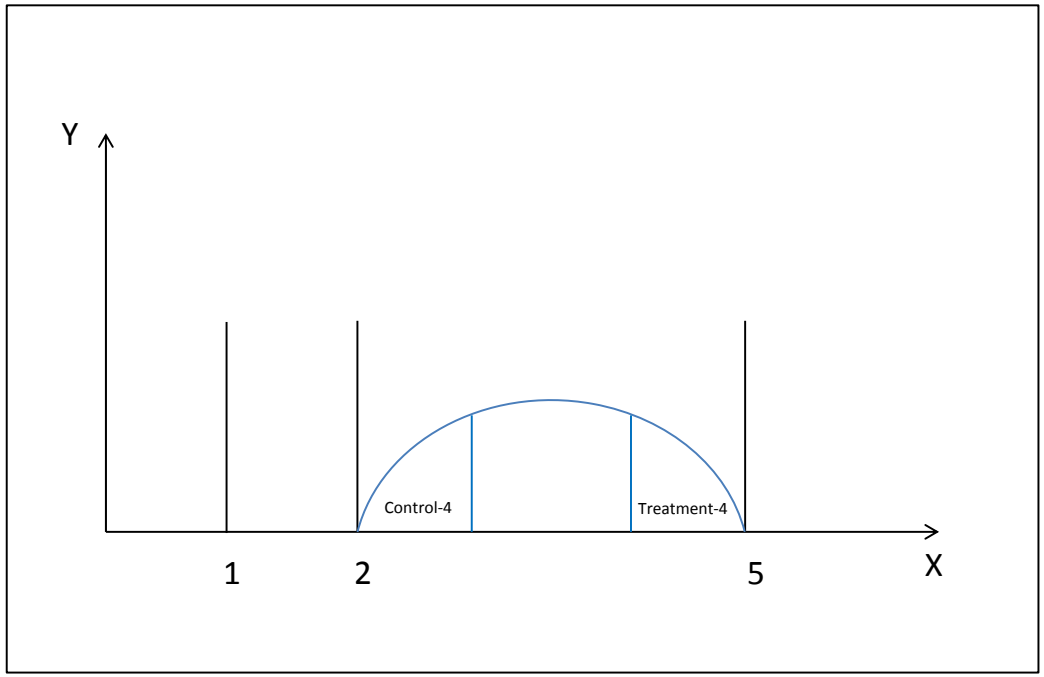
New Firm Formation Rate



New Firm Formation

VARIABLES	(1)	(2)	(3)	(4)
TOP × AFTER	0.037^a	0.043^a	0.043^a	0.040^a
	(0.013)	(0.015)	(0.012)	(0.013)
TOP	-0.096^a	-0.102^a	-0.049^a	-0.048^a
	(-0.014)	(-0.011)	(-0.016)	(-0.012)
AFTER	-0.099^a			
	(-0.0001)			
RURAL			-0.039^a	-0.039^a
			(-0.001)	(0.0001)
MANDAYS			0.000^a	0.000^a
			(0.000)	(0.000)
# Workers			-0.000	-0.000
			(-1.003)	(-0.949)
GVA			-0.000^b	-0.000^b
			(-0.000)	(0.000)
Profit			0.000^a	0.000^b
			(0.000)	(0.000)
Observations	31,997	31,997	30,703	29,413
Adj R^2	0.016	0.074	0.117	0.111
Organizational Code	No	No	Yes	Yes
Ownership Code	No	No	Yes	Yes
Industry Fixed Effect	No	Yes	Yes	Yes
Year Fixed Effect	No	Yes	Yes	Yes
State Fixed Effect	No	Yes	Yes	Yes

More Robustness: 20 mm



More Robustness: 20 mm

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	PMG/Assets					
Top Tercile* Post 2006	-0.047^{b}	-0.048^{b}	-0.056^{a}	-0.056^{a}	-0.058^{a}	-0.057^{a}
	[-2.487]	[-2.556]	[-2.948]	[-2.948]	[-3.055]	[-3.013]
Ln_sales	-0.051^{b}	-0.050^{b}	-0.058^{a}	-0.058^{a}	-0.055^{a}	-0.055^{a}
	[-2.271]	[-2.307]	[-3.501]	[-3.501]	[-3.934]	[-4.028]
EBIT/Assets	0.025	0.027	-0.005	-0.005	-0.013	-0.013
	[0.505]	[0.536]	[-0.190]	[-0.190]	[-0.428]	[-0.439]
Observations	1,499	1,499	2,771	2,771	3,229	3,229
R-squared	0.947	0.947	0.905	0.905	0.893	0.891
Industry X Year Fixed effects	No	Yes	No	Yes	No	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

More Robustness: 20 mm

VARIABLES	(1) Log_Capex	(2) Log_Capex	(3) Log_power	(4) Log_power
Top Tercile * Post 2006	-0.299^a	-0.227^b	-0.311^a	-0.221^a
	[-3.056]	[-2.181]	[-4.143]	[-3.889]
Post 2006	0.941^a	0.819^a	0.569^a	0.319^a
	[5.689]	[4.850]	[4.101]	[3.128]
Log(Sales)		0.154^a		0.515^a
		[3.241]		[12.673]
EBIT/Assets		0.081		-0.024
		[0.361]		[-0.527]
Observations	1,463	1,361	2,664	2,614
R-squared	0.912	0.907	0.879	0.924
Industry X Year Fixed Effects	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes

More Robustness: Service Sector

VARIABLES	(1) eqg_assets	(2) eqg_assets	(3) ln_eqg	(4) ln_eqg
Priority Sector * Post	-0.041^a	-0.048^a	0.025	-0.420^a
	(0.013)	(0.015)	(0.046)	(0.074)
Log(Sales)	-0.012^a	-0.015^a	0.206^a	0.141^a
	(0.004)	(0.005)	(0.027)	(0.023)
PBDITA/Assets	-0.034^c	-0.040^b	-0.087	-0.126^c
	(0.018)	(0.018)	(0.105)	(0.075)
Observations	2,478	2,478	2,478	2,478
R-squared	0.745	0.788	0.747	0.814
Adj R-squared	0.751	0.751	0.751	0.751
Industry X Year Fixed Effects	No	Yes	No	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes

Conclusions: Findings

- Directed lending programs for small firms deliver credit. But what about growth trajectory?
- Growth slows: sales, investment, and production (as reflected in power consumption).
- *Not* profitability. Consistent with pure growth effects.
- Impact on nature of new firm formation

Conclusions: Literature

- Banerjee and Duflo (2014).
  - They argue that financial constraints matter because (some) treated firms grow *faster*.
  - We agree. Financial constraints matter as (other) treated firms grow *slower*.
- Rajan (1992)
  - Bank hold up problems matter.
  - We agree. Banks hold up borrower growth to meet own lending targets.

Policy Paradoxes and Design Issues

- Is there an inclusion-growth tradeoff?
  - Tight, exclude too many. Loose, include too many
  - Small unproductive firms get ₹.
  - Large productive ones grow slower
- Penalties for shortfalls
  - Worsen growth disincentives
- Proxies other than size
  - Size is most important variable in explaining firm constraints
  - Hard to sell small businesses programs not looking at firm size.
- Policy measurement