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4th Annual Conference

Government Financial Products, Policies, and Institutions

September 28, 2017

Credit Guarantees and New Bank Relationships

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September 2017

Disclaimer

This paper reflects the views of the authors only

The paper does not reflect the view of Chile's

- Ministry of Finance
- Superintendencia de Bancos
- FOGAPE
- or the view of the Central Bank of Chile

Focus of this paper: guarantees of bank loans

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  - Do they work? i.e. do they increase access to loans?
  - Do they do anything else?

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  - Do they do anything else?

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- For small (but not tiny) firms: sales $\approx$ US $1m
  - "SMEs" henceforth

Relevance: Guarantees widely used to improve SME credit access

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- CGS at heart of **most Governments'** strategies to help Small Businesses
  - CGS viewed as most effective policy, esp. vs direct subsidies
  - Used as counter-cyclical policy tool throughout OECD

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- SMEs have **strong political support**, complain about collateral
- CGS at heart of **most Governments'** strategies to help Small Businesses
  - CGS viewed as most effective policy, esp. vs direct subsidies
  - Used as counter-cyclical policy tool throughout OECD
- **Volume of covered lending** often vast:
  - Government CGS guaranteed loans (2014) =
    - 5.7% of GDP in Japan; 4.1% in Korea
  - US's SBA 7(a) guarantees $\sim$ US $27 billion of loans in FY 2017

Potential **benefits** of CGSs

A CGS increases the bank's expected profit by:

- reducing risk to bank
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CGSs may ***reduce two sources of credit rationing*** for some SMEs:

1. Allowing banks to lend to **firms without collateral**
2. Offsetting **fixed costs** of SME lending (loan officer time, IT) that are high relative to loan size

Potential **costs**... are large

China Faces Default Chain Reaction as Credit Guarantees Backfire

by Justina Lee
justinaknope

October 8, 2015 – 12:00 PM EDT *Updated on* October 8, 2015 – 11:11 PM EDT

Failures of guaranteed loans surged 86 percent last year to about 400 billion yuan ($63 billion), according to UBS Group AG. At the nation's Big Five lenders, such borrowings made up 18 percent of the total and 29 percent of non-performing financing, the Swiss bank said in a note. Standard & Poor's said specialist guarantee firms are suffering, while the industry's second-largest company halted operations amid accusations that it took on too much financial risk.

Literature on CGS

"*SME loan guarantee programs are* ***globally ubiquitous*** *and countries have invested significantly in them...*
Unfortunately, it is my sense that academic ***research on the effectiveness of these programs has not matched their policy importance***." Udell (2015) Lit:cc

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Robust result in literature: credit ↑, default rates ↑

- Causal? Mechanism?

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- Causal? Mechanism?

Empirical challenges: data availability and selection bias

Setting for this paper

- **Chile's** Govt. credit guarantee scheme for new loans, 2011-2012
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- **Chile's** Govt. credit guarantee scheme for new loans, 2011-2012
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- **Banks decide** if borrower gets a Govt. guarantee to go with loan
  - Limited supply of guarantees: most borrowers do not get one
- Exploit **eligibility rule**: "sales" cannot exceed US $1m
  - Regression discontinuity in narrow bandwidth (8,000 firms)

Main findings: effects of the Credit Guarantee Scheme (CGS)

- *Causes* $\uparrow$ in credit from bank providing private loan with Govt. guarantee - **Additionality**

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- **Scale up**: 10% ↑ in credit ⇒ Sales, input purchases, and workers ↑ by 4.4%, 3.9%, and 4.8%

Novel findings

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- **Amplification effect** in year following guarantee:
  - additional new bank relationships
  - more debt from bank(s) not providing guarantee

Establishing effects of CGS: key Empirical Challenge

Selection into scheme by firms or banks

- $\Rightarrow$**Selection bias** such that firms receiving guarantee are systematically different from available "control" or comparison firms

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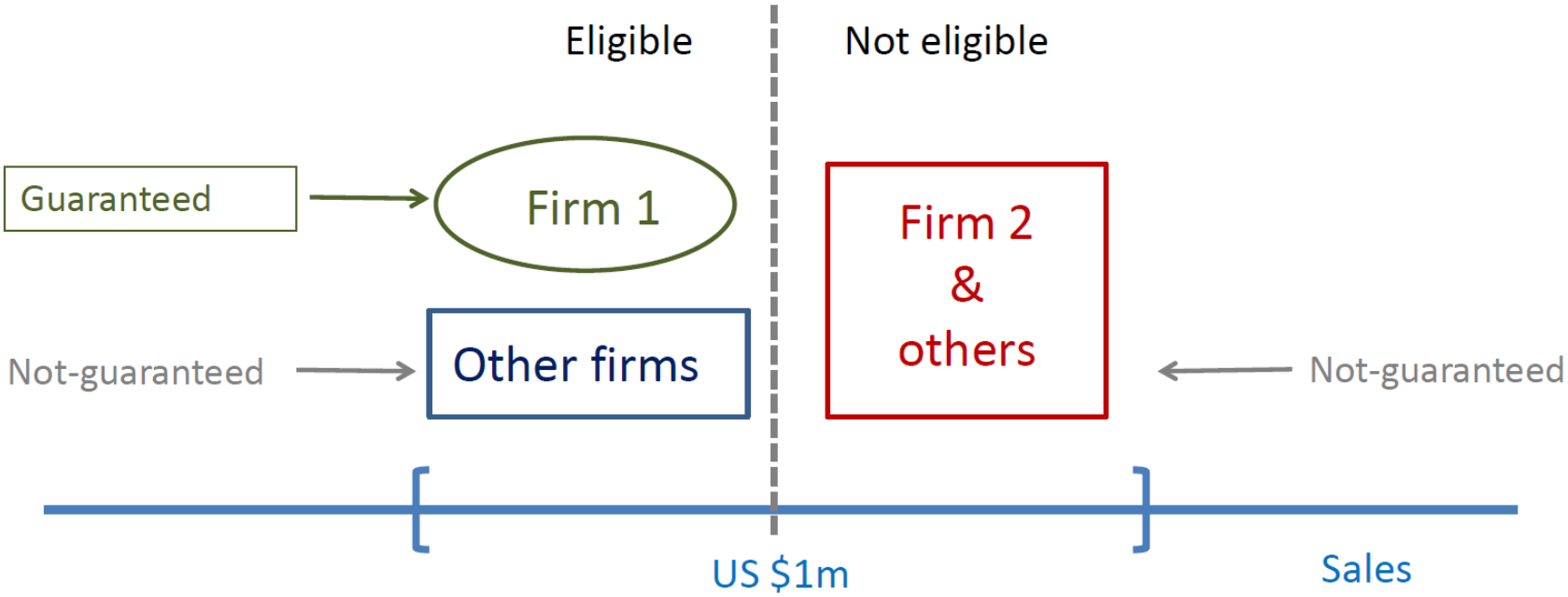
- **Our solution:** $\rightarrow$ *Compare all* ***eligible*** *firms to all* ***ineligible*** *firms in a RDD*

Empirical strategy: exploit eligibility cutoff

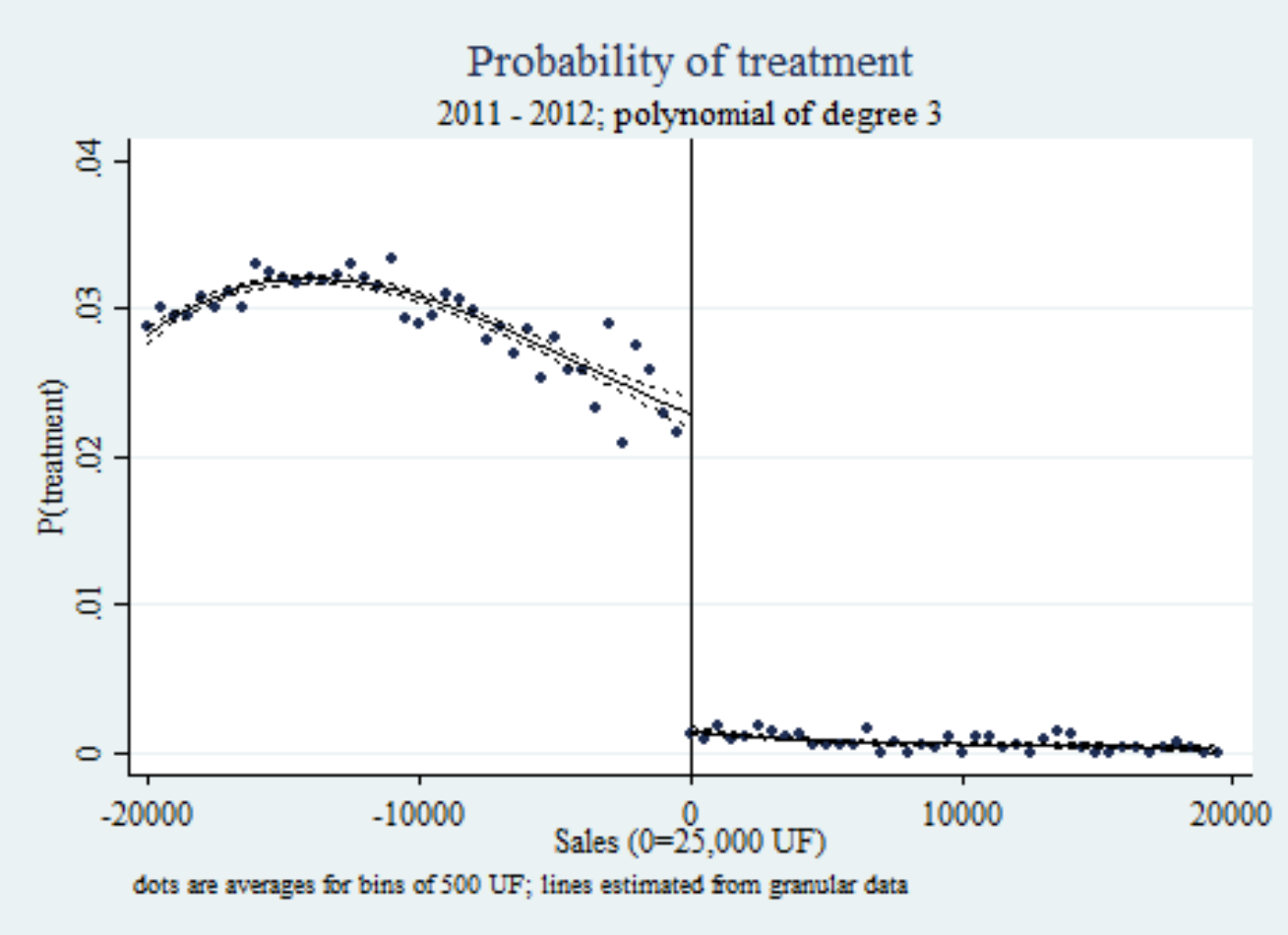


- Eligibility threshold based on 12 month moving sum of "sales"
- Strategy: (Fuzzy) RDD comparing eligible vs ineligible firms
  - Intuition: locally random assignment of firms around cutoff

Why use a Fuzzy RDD?

Many eligible firms do not receive guarantee, because:

- Guarantee amounts are limited
- Firm may have no demand for additional credit ("never takers")



Specification

Reduced Form RD: effect of **eligibility**

$$Outcome_{it} = c + \rho Eligible_{it} + \gamma_1 Sales_{it} + \delta_t + \epsilon_{it}$$

Fuzzy RD: effect of **receiving a guaranteed loan** on "compliers"

$$Treatment_{it} = c + \gamma_0 Eligible_{it} + \gamma_1 Sales_{it} + \delta_t + u_{it}$$
$$Outcome_{it} = c + \beta Treatment_{it} + \phi_1 Sales_{it} + \eta_t + \nu_{it}$$

Key assumption: firms have only ***imprecise control*** of the assignment variable (sales)

Are firms manipulating assignment variable?

Tests indicate **no manipulation** of assignment variable:

- No bunching: McCrary (2008) + Cattaneo et al. (2016) density tests
- No change in estimates when include covariates
- No difference in firm characteristics on either side of cutoff

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- Unsurprising - costly *for firms* to manipulate eligibility:
  - Banks decide which firms receive guarantee
  - Firms could delay sales, but Sales formula is highly opaque: web query informs banks if clients eligible Yes/No
  - Firms could delay reporting of sales, but need clients to cooperate (VAT fraud) + no evidence

Data

For all firms in Chile:

- credit registry
- employment
- IRS data (sales, purchases)

Δ Debt: doubling relative to 6m average

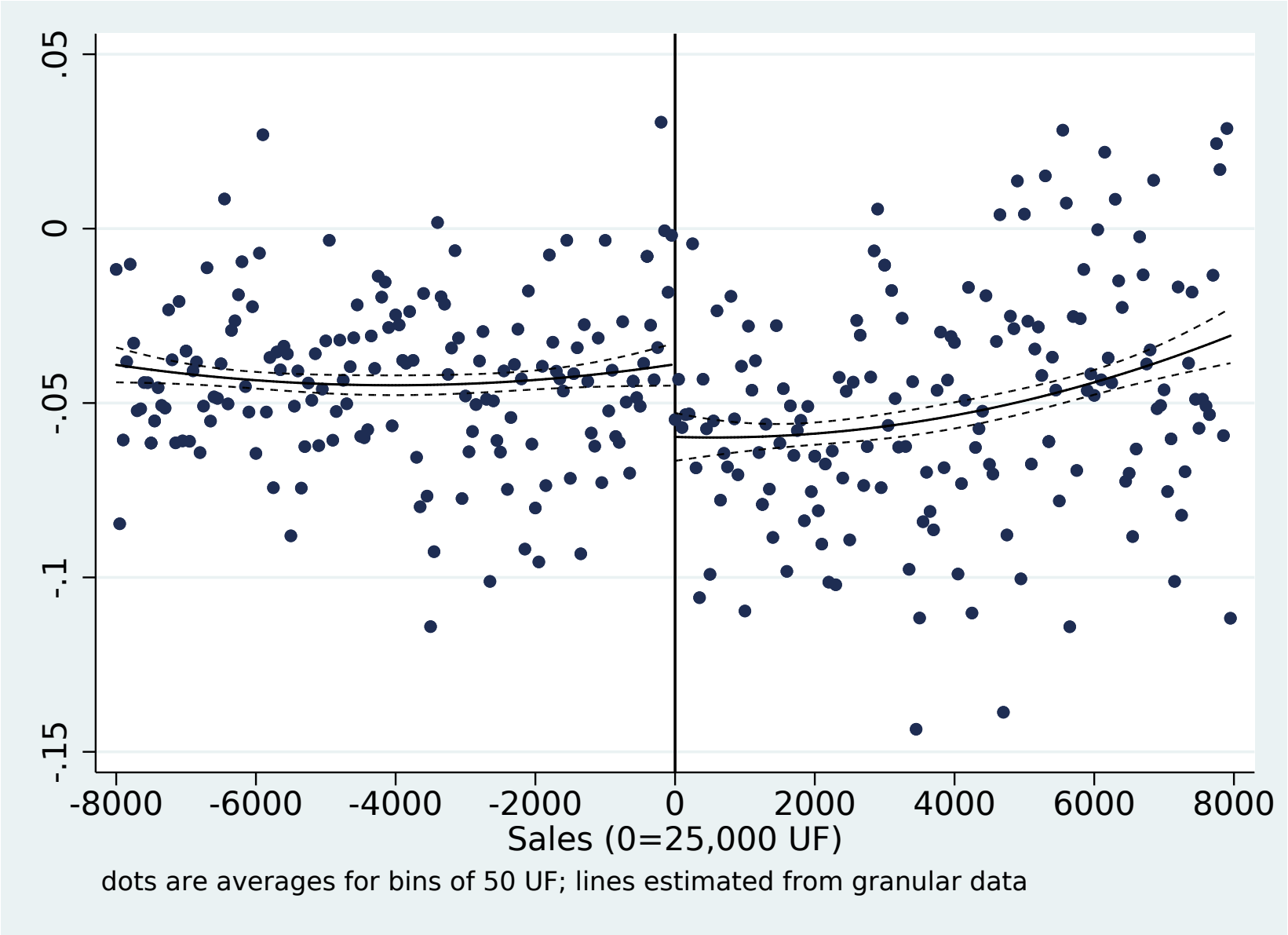
Panel A: Debt growth in focal period (Reduced form)

	Baseline			No assignment	Controls	Triangle kernel	Poly.(4th°)	CCT(2014)
	1500UF	1250UF	1750UF	500UF	1500UF	1500UF	10,000UF	bias-c+robust
Coefficient	**0.026****	**0.028****	**0.025****	**0.027*****	**0.033*****	**0.029****	**0.021***	**0.029****
s.e.	[0.012]	[0.013]	[0.011]	[0.010]	[0.011]	[0.013]	[0.011]	[0.012]
# obs.	30,937	25,857	36,066	10,379	29,843	30,937	229,055	36,845

Panel B: Debt growth in focal period (Fuzzy RDD)

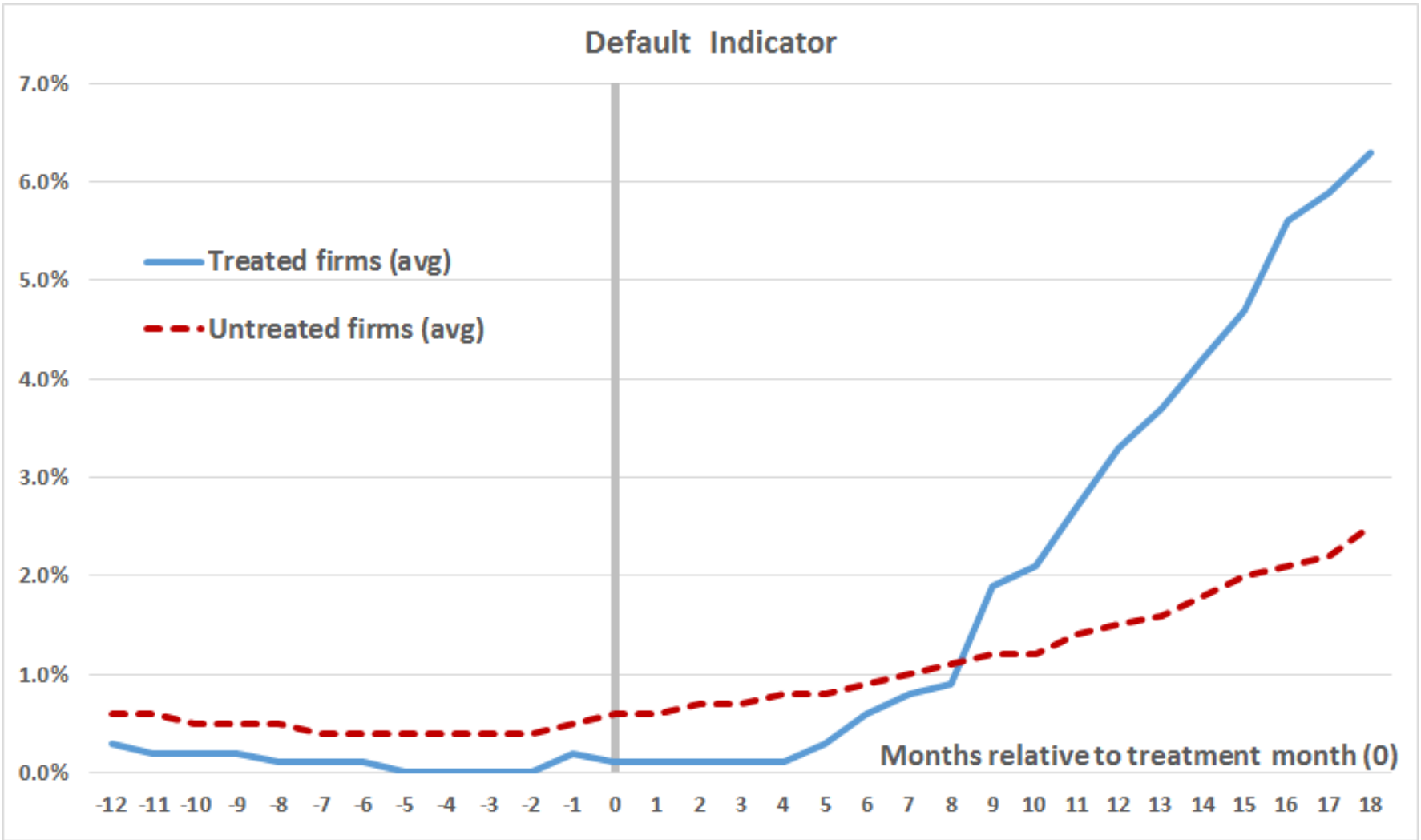
	Baseline			No assignment	Controls	Triangle kernel	Poly.(4th°)	CCT(2014)
	1500UF	1250UF	1750UF	500UF	1500UF	1500UF	10,000UF	bias-c+robust
Coefficient	**0.947****	**1.034****	**0.928****	**0.987*****	**1.213*****	**1.057****	**0.771***	**1.163****
s.e.	[0.431]	[0.489]	[0.420]	[0.366]	[0.422]	[0.475]	[0.415]	[0.466]
# obs.	30,937	25,857	36,066	10,379	29,843	30,937	229,055	36,845

Graphical version



P(loan delinquency) - suggestive evidence

- Smaller firms default more with guarantees in fixed effect estimator
- No RDD evidence of increased default at threshold, but:



Real effects

- Large elasticities strengthen evidence for credit constraints
- Similar magnitudes (although from different data sets) suggests general **scaling up of firm**

Elasticity of real variables with respect to bank debt at 12 months

	Employment	Permanent workers	Temporary workers	Cumulative sales	Cumulative input purchases
Coefficient	**0.48****	**0.45***	**0.06**	**0.50***	**0.56***
s.e.	[0.24]	[0.24]	[0.80]	[0.28]	[0.29]
# obs.	14,059	13,691	9,110	23,596	23,624

Recap

- Additionality: credit increase is causal
- Default: some evidence of increased default; not large
- Real effects: firms use credit to scale up

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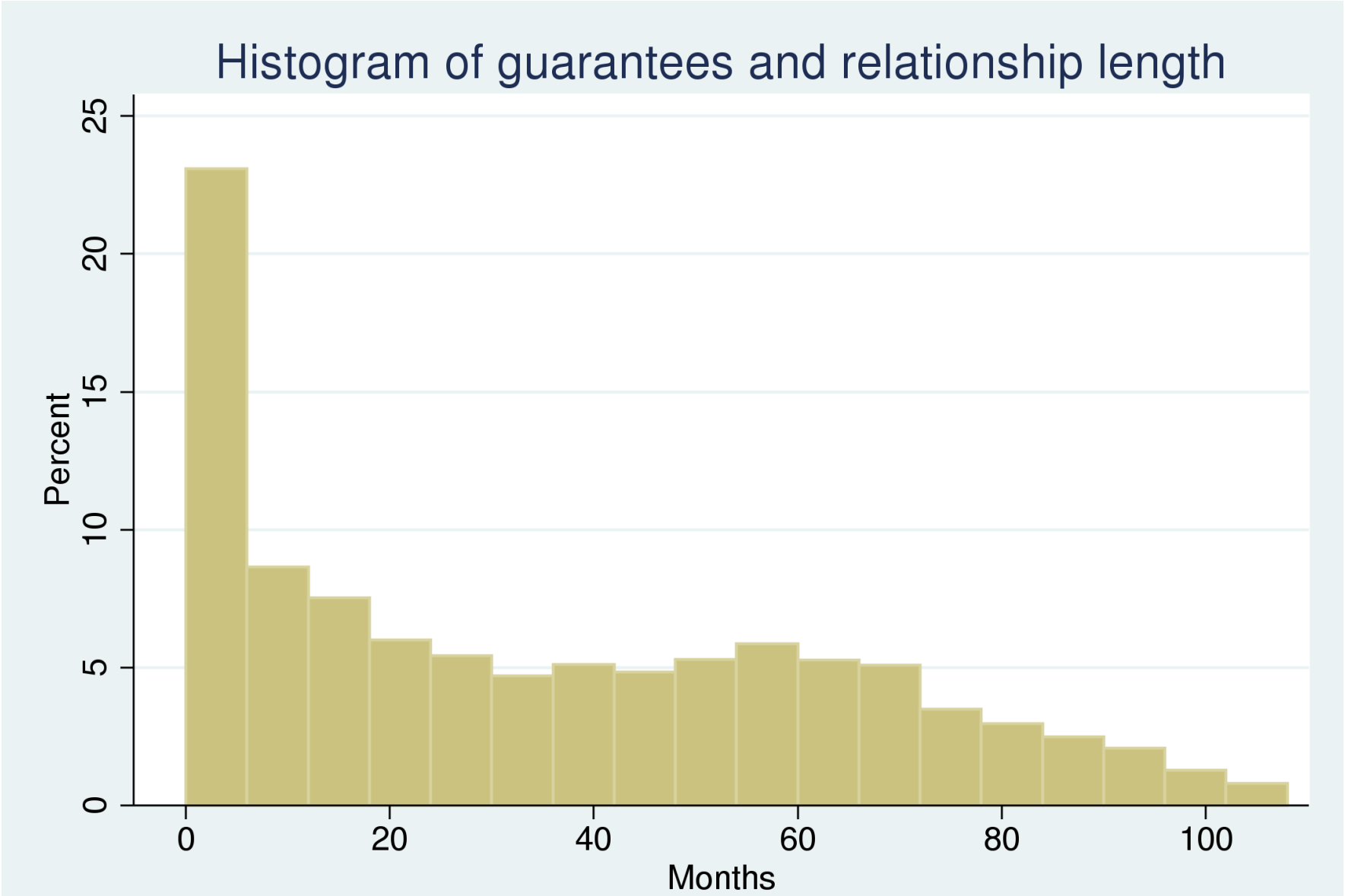
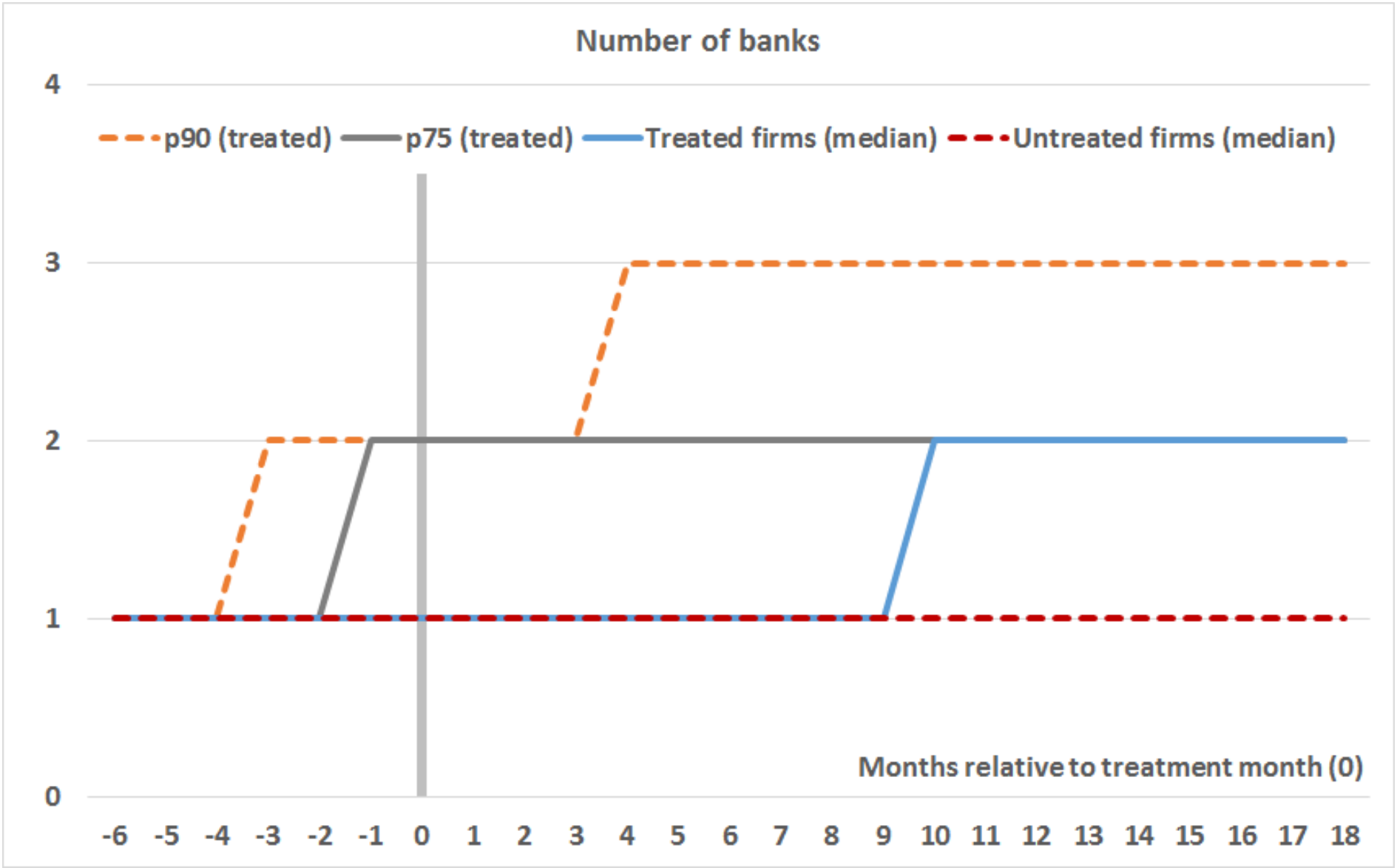
- Amplification effect in year following F:
  - new bank relationships
  - more debt from other banks (causal)
  - Mechanism: information externality or net worth increase

Guarantees: 44% given to firms in first 2yrs of relationship, (24% to firms with <2yrs in banking system)



New bank relationships | only 1 bank 4m before



Amplification effect: Dynamics of Δ Debt

Panel A: total debt growth dynamics (Reduced form)

	lags and leads from focal period (months)									
	-6	**-4**	**-1**	**0**	**3**	**6**	**9**	**12**	**15**	**18**
Coefficient	**-0.013**	**0.003**	**0.016***	**0.026****	**0.039*****	**0.042****	**0.036****	**0.051****	**0.051****	**0.048***
s.e.	[0.011]	[0.009]	[0.010]	[0.012]	[0.014]	[0.017]	[0.018]	[0.021]	[0.024]	[0.027]
# obs.	30,154	30,409	30,808	30,937	30,509	30,256	30,056	27,267	23,204	19,304

Panel B: total debt growth dynamics (Fuzzy RDD)

	lags and leads from focal period (months)									
	-6	**-4**	**-1**	**0**	**3**	**6**	**9**	**12**	**15**	**18**
Coefficient	**-0.490**	**0.113**	**0.605**	**0.947****	**1.379****	**1.514****	**1.302***	**1.837****	**1.713****	**1.611***
s.e.	[0.418]	[0.333]	[0.369]	[0.431]	[0.539]	[0.612]	[0.666]	[0.786]	[0.837]	[0.917]
# obs.	30,154	30,409	30,808	30,937	30,509	30,256	30,056	27,267	23,204	19,304

- Amplification effect: Growth after F treatment month is due to ↑ **at Non-F bank**

Conclusion

Clear causal evidence regarding major policy intervention: CGS

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Novel results: F causes establishment of New bank relationships

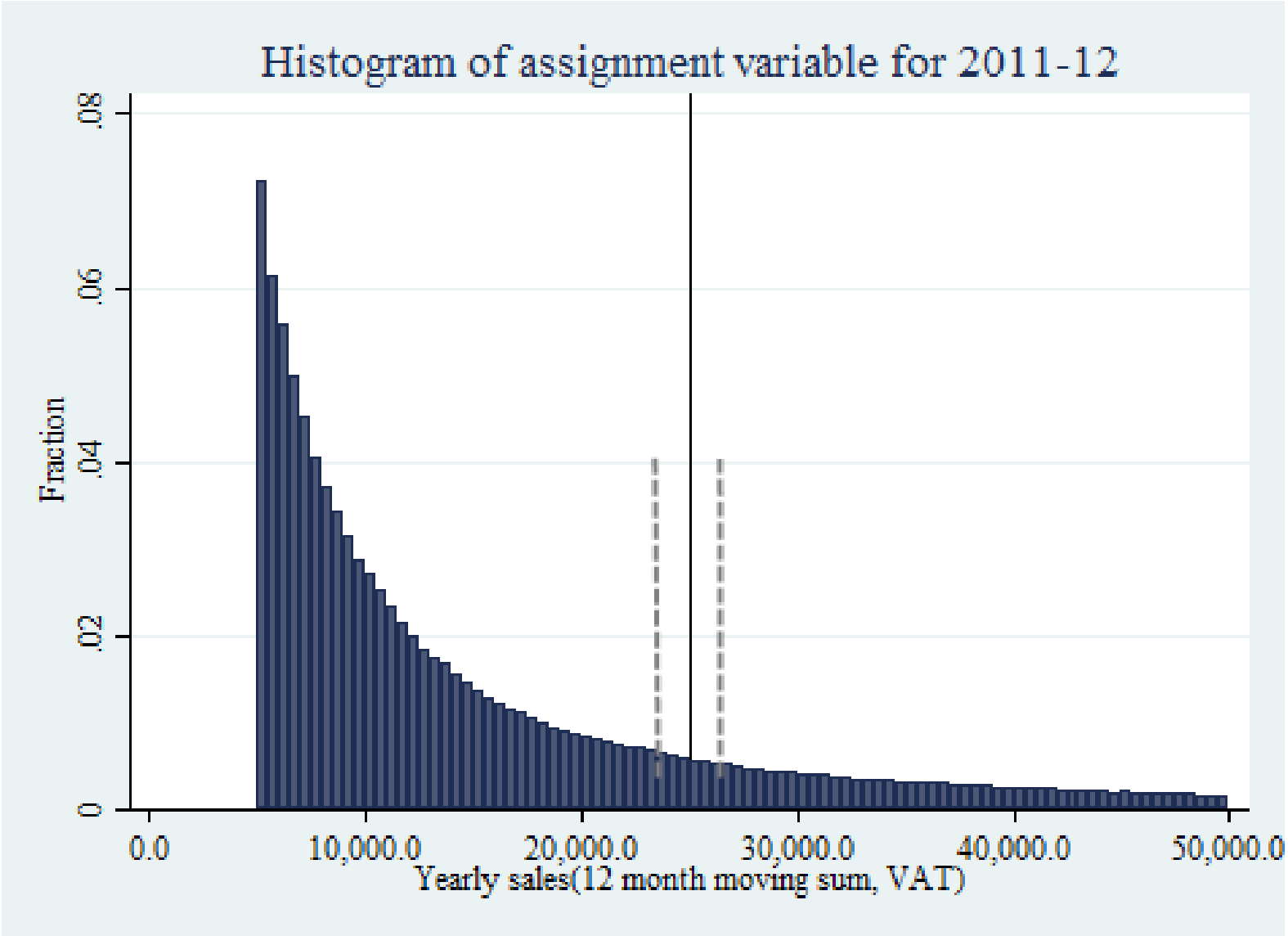
- F causes used to mitigate uncertainty about **firm type**
- **Amplification effect** in year following F:
  - new bank relationships
  - more debt from other banks (causal)
  - Mechanism: information externality or net worth increase

How Chile's FOGAPE works

- **Bank assigns guarantee** to borrower
- Guarantee for individual loans, maximum coverage = 80%
- Interest surcharge of 1-2% paid to FOGAPE

- Otherwise, **loan interest rates the same as for normal loans**
- Historical default rate$\sim$4-7% (similar to SME default rate of 6-7%)
- **Eligibility rule:** "sales" $<$ 25,000 UF = US \$1m

Where is cutoff in size distribution of firms?



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Public Bank Guarantees and Allocative Efficiency

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Golub Center for Finance and Policy
4^{th} Annual Conference - Cambridge, MA

Motivation

- After the 2007-09 financial crisis, many governments extended public guarantees to banks. Examples are:
  - US: Indy Mac, Fannie Mae, Freddy Mac
  - UK: Bradford Bingley, Northern Rock, RBS, HBOS, Lloyds
  - Germany: IKB, Hypo Real Estate
  - Belgium/Netherlands: Dexia, Fortis
- There is ample evidence that guarantees lead to higher risk taking by banks (Boyd and Runkle (1993), Boyd and Gertler (1994), Sapienza (2004), Gropp, Hackenes and Schnabel (2011), Gropp, Gruendl and Guettler (2014))
- But no evidence of the effects on the real economy.

This paper

- This paper tries to fill this gap: How do public guarantees affect real economic outcomes?
- Specifically, what are the effects of public guarantees on "allocative efficiency"?
- Following Bertrand, Schoar and Thesmar (2007), we define an intermediation allocative efficient if
  - efficient firms are able to obtain the funding they need to finance their investments while inefficient firms are cut off from external funding, and ultimately exit the market.

Productivity, growth and finance

- Fast growing and fast shrinking firms are both important for productivity growth
- How quickly are resources channeled from unproductive to productive uses?
  - Efficient (productive) firms should be able to access sufficient funding.
  - Inefficient (unproductive) firms must exit the market
  - Are efficient firms able to access the funding they need?
  - Are unproductive firms cut off from funding? Or are they being kept alive? ("Zombie firms")
- The financial system occupies a central allocative function in this process.

Theory

How do public guarantees affect the allocation of credit?

- on the banks side:
  - Lower screening and monitoring effect, as in Freixas and Rochet (1997), Boot and Greenbaum (1993), Dewatripont and Tirole (1993) and Matutes and Vives (1995)
- on the borrowers side:
  - Investment in negative NPV projects, as in Jensen and Meckling (1976), Dewatripont and Maskin (1995), Corsetti, Pesenti and Roubini (1999) and Carletti, Cerasi and Daltung (2007)

Both channels result in misallocation of credit.

Literature

- Black and Strahan (2002): deregulation increased allocative efficiency
- Jayaratne and Strahan (1996): bank branch restriction reduced efficiency and per capita growth
- Bertrand, Schoar and Thesmar (2007): deregulation in France increased allocative efficiency

Identification

- Tricky identification problem:
  - Guarantees are granted in the midst of a crisis.
    - ⇒ difficult to disentangle the real effects of the crisis and the guarantees
  - Guarantees are granted to the big and systemically important banks.
    - ⇒ difficult to find comparable control groups

⇒ We use a natural experiment.

⇒ We can form a meaningful control group.

Identification

- In 2000, the EU filed a lawsuit against the government guarantees on German Savings Banks. ($\rightarrow$ *exogenous*)
- Subsequently, on July 17, 2001 the public guarantees were removed in two steps.
- During the transition period (July 18, 2001 to July 18, 2005), newly contracted obligations continued to be secured if maturing by the end of 2015,
  - We consider the transition period, hence we check the effect of *expectation* of the removal of the guarantees on *allocative efficiency*.
- Experiment has been used frequently in the literature (Fischer, Hainz, Rocholl, and Steffen (2011), Schnabel and Koerner (2012) and Gropp, Gruendl, and Guettler (2014))

Data

- We have two sets of data:
- Firm-level data
  - The data cover balance-sheet information of savings banks borrowers, mostly SMEs, from 1995 until 2006.
  - Importantly, we know the amount of outstanding loans of each firm from savings banks and from all other banks.
  - We drop firms in finance sector, to focus on the real side of the economy.
- Sector-by-state-level data:
  - Exit data by sector and German state (Bundesland)

Intensive versus extensive margin

- Poor incentives by banks may have an effect on the "intensive margin" and the "extensive margin" of firms in the corporate sector.
- Intensive margin: Lack of monitoring may result in insufficient "restructuring" activities (Bertrand et al. (2007)), i.e., firms adopting new technologies, new internal processes etc.
  - We follow the **same** firm over time
- Extensive margin: Lack of screening may result in inefficient firms obtaining too much and efficient firms obtaining too little credit.
  - We examine the efficiency of firms that enter into and exit from savings banks' loan portfolios with and without guarantees
  - We examine sectoral data on firm exit and entry

Empirical strategy: intensive margin

- We estimate treatment intensity of public guarantees on firms which are differentially dependent on savings banks, using the following model:

$$Y_{it} = \beta_1(Guarantee_t \times SBDep_i) + a_i + a_{st} + a_{jt} + \varepsilon_{it}$$

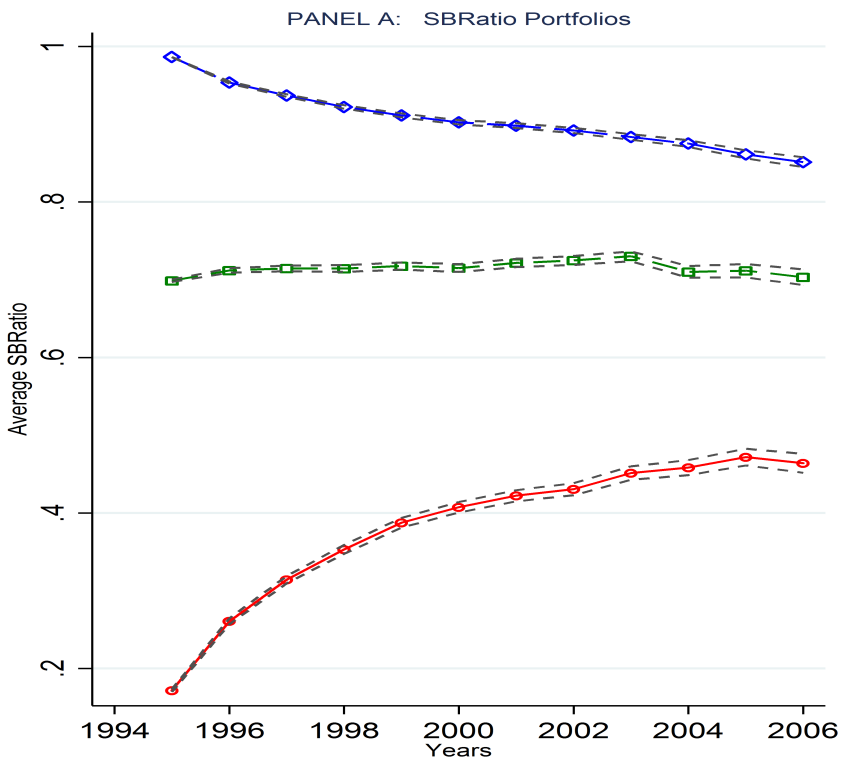
  - Y_{it}: Investment (as a share of total assets), Sales Growth and Total Factor Productivity
  - *Guarantee* is a dummy, equal to one for 1995-2000, and zero for 2001-2006.
  - $SBDep$ is a ratio between zero and one and measures each firm's pre-2001 reliance on savings banks' credit relative to its total amount of loans.
  - We control for firm (a_i), state-by-year (a_{st}), and industry-by-year (a_{jt}) fixed effects.

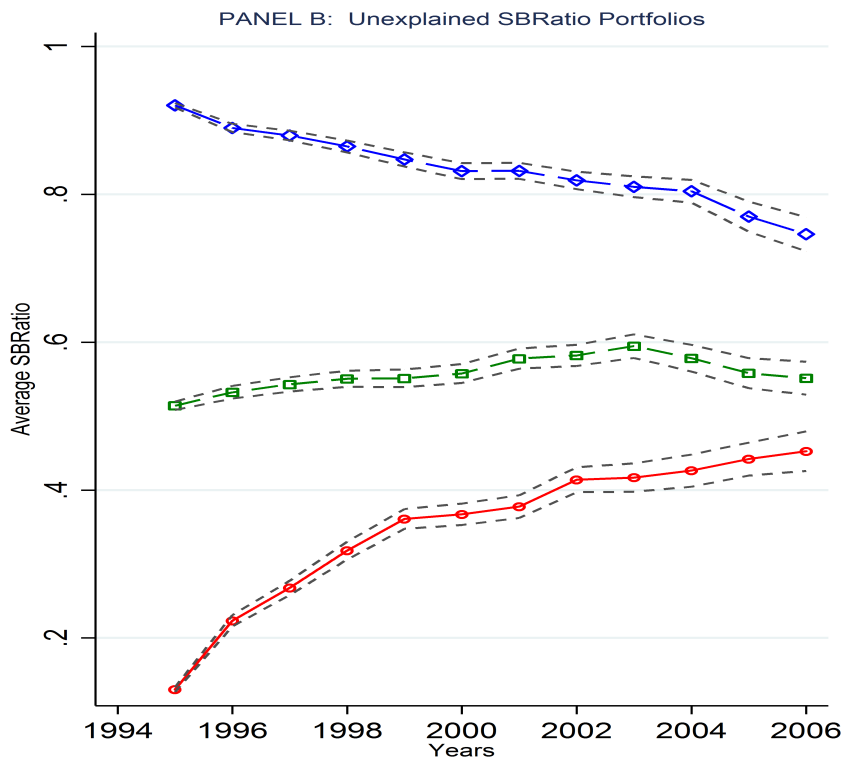
Savings Banks Dependence

- Our identification strategy is hinged upon two assumptions with regards to the measure of Savings Banks dependence:
  - It is randomly assigned to borrowers
  - It is persistent over time.
  - We examine the persistence and random assignment of Savings Banks dependence measure by forming portfolios, ranking firms based on their savings bank dependence.
  - We then run savings bank dependence on observables (size, industry etc.) and re-form the portfolios

Persistence of SBDep. Measure

- Plotting this over time yields the following:





Persistence of Savings Banks Ratio Measure

Firm Efficiency

- We measure the efficiency of firms in two ways:
  - ex-post efficiency: profitability (ROA)
  - ex-ante efficiency: total factor productivity (TFP), following Levinsohn and Petrin (2003)

Matching

- We are not interested in a "continuous" effect of savings bank dependence, but rather would like to compare dependent firms to independent firms.
- We define $Dependent = 1$ if borrowers in the 4^{th} quartile of (loans from savings banks) / (total loans) and zero otherwise (or alternatively, zero only for borrowers in the 1^{st} quartile) of (loans from savings banks) / (total loans)
- Savings banks independent firms are about five times the size of savings banks dependent firms and differ in a number of other characteristics.
- Common support may be a problem (even though we use saturated set of fixed effects).
- We use propensity score matching to generate a matched sample.
- We match on total assets and fixed assets, within state-by-industry spells.

Matching Quality

Variables		Mean Values Dep.	Mean Values Indep.	% Bias	Bias Reduction	Difference
Total Assets	Pre-match	1.0868	5.0197	-56.1		3.933***
	Post-match	1.0872	1.0783	0.1	99.8	0.009
Fixed Assets	Pre-match	0.4381	1.8857	-45.7		-1.448***
	Post-match	0.4382	0.4232	0.5	99.0	0.015
ROA	Pre-match	0.1052	0.0578	27.5		0.0474***
	Post-match	0.1052	0.1126	-4.3	84.5	-0.007
Productivity	Pre-match	6.6012	7.0443	-58.1		0.0443***
	Post-match	6.6014	6.6473	-6.0	89.6	-0.046

Restructuring results: matching

Panel A	Pre-2001 ROA Quartile					
	Full Sample	1^{st}	2^{nd}	3^{rd}	4^{th}	$1^{st} - 4^{th}$
Investment Ratio	0.0120***	0.0216***	0.0093**	0.0058	0.0020	0.0223**
	(0.001)	(0.005)	(0.004)	(0.004)	(0.005)	(0.009)
Sales Growth	0.0398***	0.0690***	0.0487***	0.0009	0.0116	0.0663*
	(0.004)	(0.022)	(0.015)	(0.012)	(0.015)	(0.034)

Panel B	Pre-2001 TFP Quartile					
	Full Sample	1^{st}	2^{nd}	3^{rd}	4^{th}	1^{st}-4^{th}
Investment Ratio	0.0115***	0.0300***	-0.0005	0.0062	0.0050	0.0187*
	(0.001)	(0.007)	(0.005)	(0.004)	(0.004)	(0.01)
Sales Growth	0.0347***	0.0733***	0.0072	0.0271**	-0.0065	0.0989**
	(0.004)	(0.023)	(0.014)	(0.012)	(0.020)	(0.041)

Panel C	Full Sample
Productivity	-0.0161***
	(0.003)

Entry to and exit from banks' portfolios: Extensive margin

- We look at the portfolio rebalancing activity of banks by checking the likelihood of a new firm entering a bank's pool of borrowers, and alternatively, how often a bank stops lending to an existing borrower.
- We identify observations where the firms is observed for the first (last) time in the bank's portfolio.
- We then estimate:

$$Pr(Y_{it}) = \beta_1(Guarantee_t \times Dependent_j) + a_j + a_{st} + \varepsilon_{it}$$

where Y_{it} represents the dummy variables for entering firms, exiting firms, and turnover.

Entry to and exit from banks' portfolios: Results

	Probit Model		
	Entering Firm	Exiting Firm	Turnover
Guarantee×Dependent	-0.0530**	-0.0610***	-0.0726***
	(0.024)	(0.020)	(0.020)
Industry FE	Yes	Yes	Yes
State-by-year FE	Yes	Yes	Yes
Pseudo/Adj. R-squared	0.024	0.069	0.027
Number of Obs.	611339	580418	552384

Efficiency differences between entering and exiting firms

- We estimate the differences in productivity of firms entering into a credit relationship with savings banks in each year with those that exit such a relationship with and without guarantees
- Hence, we estimate

$$TFP_{it} = \beta_1 Entering_{it} + \beta_2 Entering_{it} \times Guarantee_t + a_{jt} + a_{st} + \varepsilon_{it}$$

Efficiency differences between entering and exiting firms

	Productivity
Entering Firm	0.0245***
	(0.008)
Entering Firm×Guarantee	-0.0380***
	(0.015)
Industry-by-year FE	Yes
State-by-year FE	Yes
Adj. R-squared	0.153
Number of Obs.	198,840

Exit: Data and estimation

$$Log(Exit_{jt}) = \beta_1(Guarantee \times Dependent)_{jt} + a_t + a_j + \varepsilon_{jt}$$

- For each sector we define Savings Banks dependence as the Savings Banks dependence level of the median firm.
- Sectors in the 4^{th} quartile of Savings Banks dependence measure are classified as *Dependent*.
- We have two yearly datasets, both from Germany's Federal Statistical Office (Destatis):
  - The number of firms in each industry that exit the market from 1996 until 2006,
  - The number of firms in each industry-state combination that file for bankruptcy from 1999 until 2006.

Differences in firm exits

	Log(Exit)	Log(Exit)	Log(BF)	Log(BF)
Guarantee×Dependent	-0.367***	-0.280***	-0.313*	-0.321*
	(0.136)	(0.082)	(0.155)	(0.173)
Log(Total No. Firms)		0.762***		0.604
		(0.255)		(0.495)
Industry FE	Yes	Yes	No	No
Industry-by-State FE	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R-squared	0.986	0.989	0.954	0.955
Number of Obs.	143	143	1033	1033

Robustness

- Instrumental variable estimates as in Lewbel (2012)
- Relationship lending: effects are unrelated to different measures of firm opacity
- Labor market reforms in Germany (Agenda 2010)
- Business cycle effects: using variation in state business cycles across Germany
- Collapse of the dot.com bubble
- Financing of the R&D-intensive industries
- Introduction of the €

Conclusion

- Public bank guarantees reduce allocative efficiency,
- This hinders the "creative destruction process",
- Consequently, public guarantees may result in lower long-term growth, by keeping the unproductive firms in the market and by allocating "too much" resources to unproductive firms and "too little" resources to productive new firms.
- Public guarantees not only distort the competitive conduct within the banking sector (Gropp et al. (2011)), but also in the corporate sector.

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4th Annual Conference

Government Financial Products, Policies, and Institutions

September 28, 2017

Equity is Cheap for Large Financial Institutions

Priyank Gandhi [1] Hanno Lustig [2] Alberto Plazzi [3]

[1]University of Notre Dame

[2]Stanford University and NBER

[3]USI-Lugano and Swiss Finance Institute

MIT Golub Center for Finance and Policy
4^{th} Annual Conference, September, 2017

Research question:

- In many countries – A regulatory policy to insure large financial institutions but not others
- CAN lower the cost of capital of large financial institutions
- Implicit guarantees lower debt cost of capital for large financial institutions
- Do they also affect equity valuation?
- Equity of large financial institutions is safer, hence appears "over-priced" (i.e. has negative alpha)

This paper:

- I: Look for evidence of this "over-pricing" in equity of large financial institutions in a broad set of countries
- II: Differentiate this from the regular "size" anomaly by relating "over-pricing" to institutional framework of a country
- Hypothesis: "Over-pricing" of large financial firm's equity is higher in countries with institutional features that increase likelihood or extent of bailouts

Large literature:

- **Collective bailouts**: Acharya/Yoroulmazer(07), Farhi/Tirole (09)
- **Strategic complementarities of government actions**: Morris/Shin(98), Schneider/Tornell(04)
- **Size in banking**: Boyd/Gertler(93), O'Hara/Shaw(90), Kho/Lee/Stulz(00)
- **Cost of bailout**: Veronesi/Zingales(09), Kelly/Lustig/VanNieuwerbugh(16), Gandhi/Lustig (15)

Dataset:

- Source: Thomson Reuters Datastream
- Cross-section: 31 countries in MSCI Developed or Emerging markets index
- Time-series: 1^{st} year when number of firms exceeds 40, at least 3 yrs of data
- Financials identified using Datastream *sector* (based on Worldscope ICB codes)
- Include ALL financial firms not just banks
  - Significant differences in financial sector organization across countries
  - E.g. Aegis (Belgium), HDFC (India)
- Final sample: 1,418,532 firm-month observations

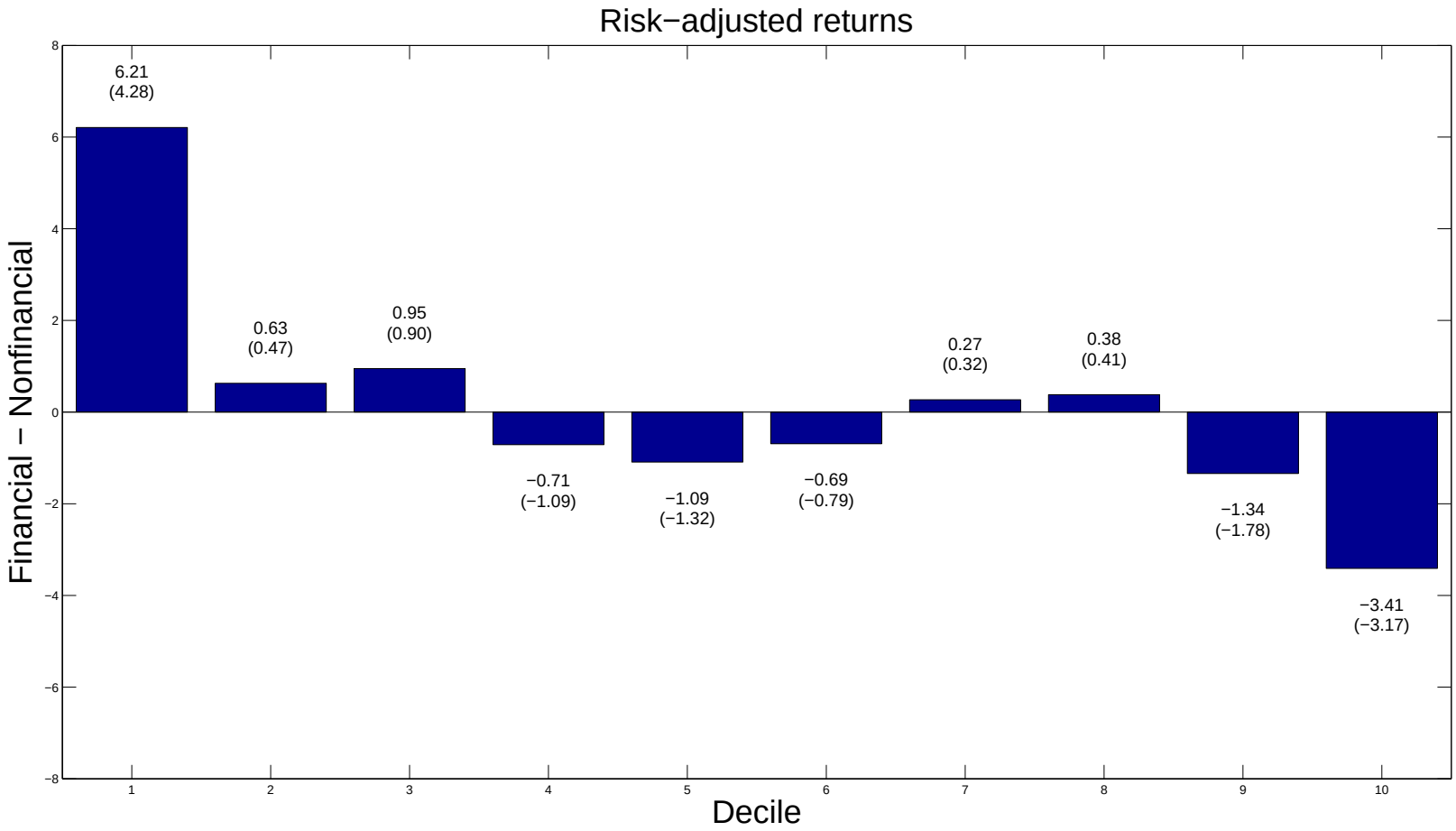
Forming portfolios and risk-adjustment:

- Build size-sorted portfolios of financial firms using standard strategy of Fama and French (1993)
- Each month/country, allocate firms to deciles based on mktcap at the end of previous month and compute VW returns for each decile/country
- Risk-adjust returns using local Fama-French three-factor model constructed with data for all firms in each country
- Robustness: Convert to USD; Additional risk factors

I: Equity of large financial institutions is overpriced:

	Fin		Non-fin		Fin Minus Non-Fin	
	α	*t-stat*	α	*t-stat*	α	*t-stat*
Panel A: All countries						
Large	-2.41**	-2.41	1.46***	2.89	-3.86***	-3.50
Small	8.07***	3.75	3.98***	3.01	4.09***	2.93
LMS	-10.47***	-4.50	-2.52*	-1.72	-7.96***	-4.73
Panel B: Developed markets						
Large	-3.40***	-3.01	0.91*	1.68	-4.31***	-3.11
Small	6.07***	2.65	4.12**	2.34	1.95*	1.79
LMS	-9.47***	-3.83	-3.21*	-1.69	-6.26***	-3.54
Panel C: Emerging markets						
Large	-1.51	-1.04	2.19***	2.94	-3.70**	-2.44
Small	12.31***	3.18	3.81***	2.02	8.51***	3.23
LMS	-13.82***	-3.26	-1.62***	-0.76	-12.21***	-4.25

I: Another way to look at this:



I: Banks cost of equity adjusts in anticipation of financial crisis:

Table: Forecasting regressions for the aggregate stock market and gross domestic product.

	Horizon (H) in months			
	3	6	9	12
Panel A: Gross domestic product				
DY_{LMS}	-2.73**	-2.44*	-2.51*	-1.30
t-stat	-2.27	-1.90	-1.91	-0.90
Δ *Odds* (%)	12.43	11.04	11.38	5.75
Panel B: Aggregate stock market				
DY_{LMS}	-2.02***	-0.57	-0.06	-0.55
t-stat	-2.97	-0.76	-0.07	-0.73
Δ *Odds* (%)	9.12	2.49	0.24	2.42

I: Over pricing of equity of large financials is robust:

- Different sorting mechanisms: By book value, by market β, by loadings on other risk factors
- By type of financial firms
- Look at largest 3, 5, 10, firms
- Equal-weighted, Value-weighted, Winsorized, Non-winsorized, etc.
- Additional risk factors: BAB, Co-Skewness, Idiosyncratic Risk

II: Relate overpricing to institutional environment:

- In next few slides: Panel regressions
- LHS is the 3-year rolling-window α on LMS financials in a country
- LHS measures the extent of overpricing of large financial institutions
- Dependent variables: Legal, financial, sovereign etc. environment in country
- Negative coefficient implies large financials more overpriced – bailout / extent more likely

II: Overpricing and legal environment:

Table: Legal environment and the size anomaly for financial firms.

Variable	L_{UK}	L_{FR}	L_{GR}	L_{SC}	*Property*	*Left*	*Integrity*
Fin	-3.71***	0.85	1.43	3.33***	2.14*	-1.27	4.09***
	(-3.21)	(0.78)	(1.57)	(3.89)	(1.78)	(-1.11)	(3.29)
R^2(%)	12.15	9.44	9.72	11.66	8.32	9.61	11.08
TFE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

- Overpricing increases: Common law countries
- Overpricing decreases: Stronger property rights / government integrity

II: Overpricing and business environment:

Table: Business environment and the size anomaly for financial firms.

Variable	*Disclose*	*Govern*	*Nfirm*	*Regln*	*Bankrupt*	*Global*	*Mktcap*	*ExpropRisk*	*StockVol*	*StockRet*
Fin	2.84**	3.10***	-0.90	4.27***	-17.69***	15.01**	-1.66	-5.30***	-4.10**	0.40
	(2.35)	(2.76)	(-0.44)	(3.12)	(-2.75)	(2.58)	(-2.09)	(-0.75)	(-2.06)	(0.22)
N	332	332	315	265	153	332	316	355	322	327
$R^2(\%)$	10.12	10.44	32.03	10.10	59.74	37.77	31.93	15.15	37.66	36.64
TFE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CFE	No	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes

- Overpricing increases: In bad times, With expropriation risk
- Overpricing decreases: Stronger governance, regulations

II: Overpricing and financial environment

Table: Financial environment and the size anomaly for financial firms.

Variable	*Branches*	*Deposits*	*Nonperform*	*Liquidity*	*Profit*	*Defaults*	*Leverage*	*BondDepth*	*Foreign*	*Insurance*	*Top3*	*Top5*	*PvtCredit*	*GovCredit*
Fin	-11.20***	-6.35*	-6.47***	3.31***	4.50***	-7.44***	-0.54	2.97	3.18***	1.45	-4.06*	-8.32***	0.54	-0.73
	(-3.02)	(-1.83)	(-3.63)	(2.99)	(3.41)	(-4.46)	(-0.17)	(1.01)	(3.42)	(1.21)	(-1.91)	(-3.10)	(0.28)	(-0.39)
N	144	320	243	256	256	230	228	292	297	355	253	245	340	341
R^2(%)	63.15	35.79	47.89	8.67	43.92	50.44	44.04	38.90	10.95	9.71	44.05	47.4	35.64	35.62
TFE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CFE	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes

- Overpricing increases: When banks are large or in trouble
- Overpricing decreases: When foreign (not domestic) investors likely to loose

II: Overpricing and sovereign environment

Table: Sovereign environment and the size anomaly for financial firms.

Variable	*Surplus*	*Spread*	*CentBank*	*Inflation*	*GDP*
Fin	-0.92	4.17*	-3.91**	5.05**	-25.60***
	(-0.48)	(1.86)	(-2.25)	(2.24)	(-3.13)
N	281	324	307	341	346
R^2(%)	35.59	27.86	36.96	37.73	38.13
TFE	Yes	Yes	Yes	Yes	Yes
CFE	Yes	No	Yes	Yes	Yes

- Overpricing increases: When governments or central banks are well funded
- Overpricing increases: In economically bad times – high inflation, low growth

II: Overpricing and regulatory environment

Table: Regulatory environment and the size anomaly for financial firms.

Variable	*Cost*	*LiqSupport*	*NPLevel*	*SovDebtInc*	*MonetaryExp*	*EntryBarrier*	*Supervision*	*Privatize*	*Reform*	*Restrict*
Fin	-4.52***	-2.75**	-3.89***	-4.24***	-3.33***	-1.88	5.35**	7.04***	5.64*	0.41
	(-3.70)	(-2.42)	(-2.69)	(-3.43)	(-2.68)	(-0.76)	(2.11)	(2.81)	(1.78)	(0.27)
N	355	355	355	355	355	355	355	355	355	355
R^2(%)	38.94	36.95	38.00	38.58	37.35	35.77	36.68	38.08	36.30	35.71
TFE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CFE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

- Overpricing increases: With size of past bailouts
- Overpricing decreases: When losses are imposed on banks

Conclusion:

- Non-financial size anomaly does not relate to institutional features in same way
- Inconsistent with a pure "mis-pricing" story
- Equity markets reveal that equity issued by large financial institutions benefit from tail risk insurance
- Use panel dimension to provide evidence of how government guarantees distort equity of large financial institutions
- Size of tail insurance: (2000-2013) is 3.5% of GDP (5.4% for Developed markets)
- Clear implication: Stock-based risk measures may reflect the value of government guarantees

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REAL EFFECTS OF GOVERNMENT GUARANTEES

MATTHEW RICHARDSON (NYU STERN SCHOOL OF BUSINESS)
4TH ANNUAL CONFERENCE, SEPT. 28TH, MIT GOLUB CENTER

OUTLINE

OUTLINE

- Primer on government guarantees

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- Primer on government guarantees
- Highlights of the three papers
  - *Credit Guarantees and New Bank Relationships* (Mullins and Toro)
  - *Public Bank Guarantees and Allocative Efficiency* (Gropp, Guettler and Saadi)
  - *Equity Is Cheap for Large Financial Institutions* (Gandhi, Lustig and Plazzi)

PRIMER ON GOVERNMENT GUARANTEES

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- Financial firm's assets
  - Shareholder equity (with limited liability!)
  - Debtholders
  - Government guarantees

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  - Shareholder equity (with limited liability!)
  - Debtholders
  - Government guarantees
- In single-period world (Merton (1977) on deposit insurance), government covers bankruptcy losses and effectively writes a put option on the assets, debt is risk-free and priced that way, shareholders are unaffected (cost of equity same).
- Lucas (2012) survey

PRIMER ON GOVERNMENT GUARANTEES CONTINUED…

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- **Cost of equity**

PRIMER ON GOVERNMENT GUARANTEES CONTINUED…

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  - Repeated debt-guarantees (Lucas & MacDonald (2010)).
    - Potentially extends equity's call option on the assets (lowers cost of equity); government in theory might impose regulatory cost (prompt corrective action, forced sale, preferred shares), e.g., F&F, AIG, Bear, Wash Mutual, etc.

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  - **Moral hazard** (Jensen & Meckling (1976), Black-Scholes-Merton)
    - With debt risk-free and no debtholder discipline (and insufficient regulatory supervision), financial firms have an incentive to take risk. This is the standard agency problem between equity and debt, but now government. Two ways: (i) riskier investments, and/or (ii) increase leverage. This increases their cost of equity though not by as much given the risk!

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  - Market-wide guarantees (Acharya, Drechsler & Schnabl (2014), Gandhi and Lustig (2015), Kelly, Lustig and Van Nieuwerburgh (2016))
    - Rather than backstopping individual firm debt, government can provide market-wide guarantees (MBSs, money market funds, TLGP, TARP, in recent financial crisis). Without quid pro quo, provide incentive for financial sector to take on more risk, but also caps tail risk for shareholders.

PRIMER ON GOVERNMENT GUARANTEES CONTINUED…

PRIMER ON GOVERNMENT GUARANTEES CONTINUED…

- **Costs: Impact on behavior**
  - Take on negative NPV (riskier) investments and more leverage. (e.g., Boyd & Runkle (1993), Flannery (1998), Nier and Baumann (2006), Gropp, Guettler & Grundl (2014).)
  - Guarantees lead to more enhanced supervision.

PRIMER ON GOVERNMENT GUARANTEES CONTINUED…

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  - Guarantees lead to more enhanced supervision.

- **Benefits:**
  - Managing systemic risk and associated negative externalities (e.g., deposit insurance and cost of bank runs, TBTF guarantees)
  - Enhance liquidity (MBS guarantees)
  - Fix market imperfections and failures (credit constraints, money market guarantee during crisis)

BANK BEHAVIOR

CREDIT GUARANTEES AND NEW BANK RELATIONSHIPS
PUBLIC BANK GUARANTEES AND ALLOCATIVE EFFICIENCY

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PUBLIC BANK GUARANTEES AND ALLOCATIVE EFFICIENCY

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- Similarities
  - Behavior change under guarantees
    - Chile – do banks lend more to small enterprises when the loan repayment has a guarantee?
    - Germany – are savings banks more careful in who they lend to when the banks lose their guarantees?
  - Evaluate loans to small-to-medium enterprises (Chile smaller)

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PUBLIC BANK GUARANTEES AND ALLOCATIVE EFFICIENCY

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  - Evaluate loans to small-to-medium enterprises (Chile smaller)
- Differences
  - Guarantee at loan level (Chile) versus bank level (Germany)
  - Greater credit constraints in Chile than Germany (?)

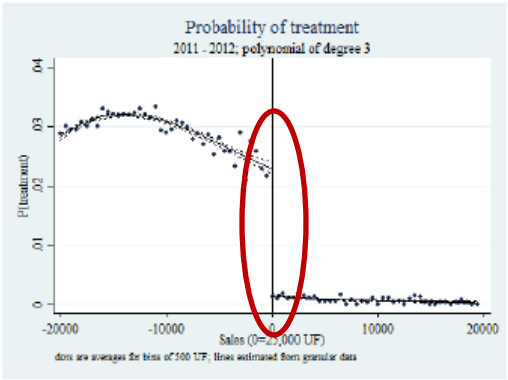
CREDIT GUARANTEES AND NEW BANK RELATIONSHIPS

PUBLIC BANK GUARANTEES AND ALLOCATIVE EFFICIENCY

CREDIT GUARANTEES AND NEW BANK RELATIONSHIPS

PUBLIC BANK GUARANTEES AND ALLOCATIVE EFFICIENCY

Figure 1: Probability of receiving a FOGAPE guaranteed loan



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PUBLIC BANK GUARANTEES AND ALLOCATIVE EFFICIENCY

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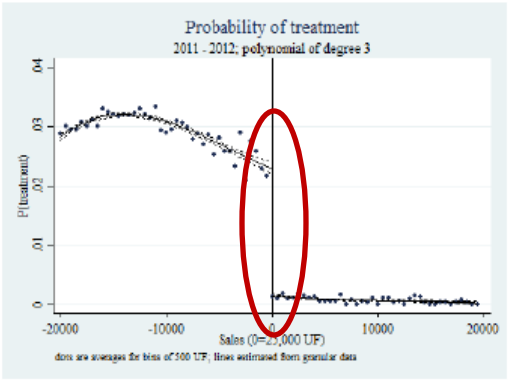

More bank debt and **future borrowing**; more employment, input purchases, sales (about 50% of debt growth); more banking relationships; but some evidence of more default.

Is this good or bad? Need evidence of productivity.

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PUBLIC BANK GUARANTEES AND ALLOCATIVE EFFICIENCY

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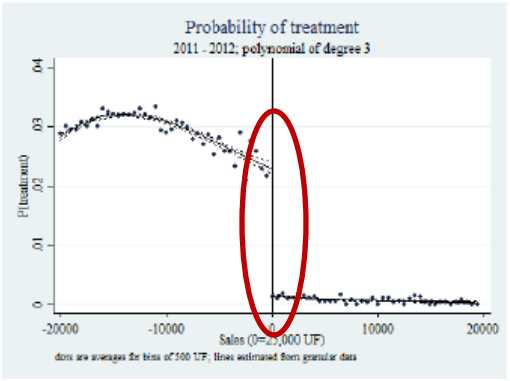
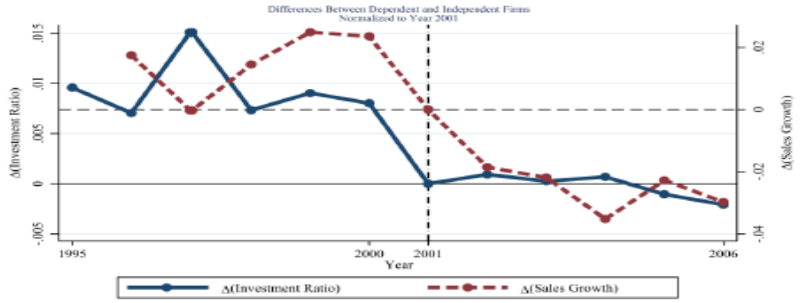


Figure 3 – Differences between Dependent and Independent Firms

This figure shows the difference in the annual average investment ratio (left axis) and the sales growth (right axis) between the savings bank dependent and independent firms. Each variable is separately normalized to its value in 2001.



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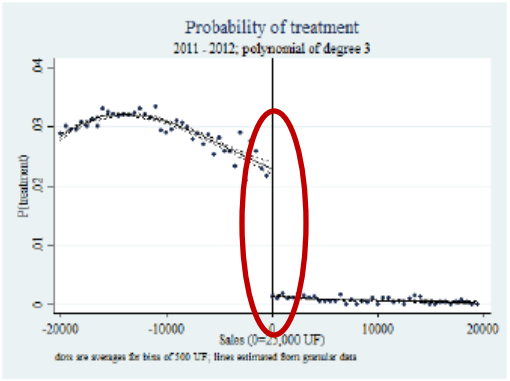

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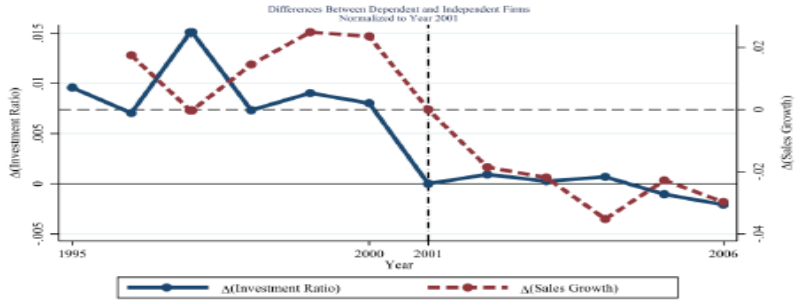

Prior to losing guarantees, savings banks dependent firms invest more, have higher sales growth, and are more unproductive. Banks continue lending to these less productive firms. This changes after guarantees are lifted.

These results are surprising. Using same data, Gropp, Gruendl and Guettler (2014) **link guarantees to greater risk-taking**. Enhance shareholder value. Costs of screening??

EQUITY IS CHEAP FOR LARGE FINANCIAL INSTITUTIONS

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Carefully executed study w/ many stylized facts (especially relative performance in crisis, cross-sectional analysis using country-specific environment)

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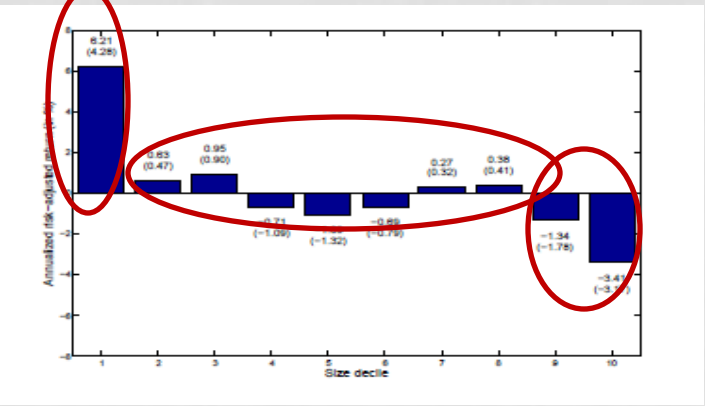

"**Risk-adjusted**" returns of financial versus non-financial based on size sorts

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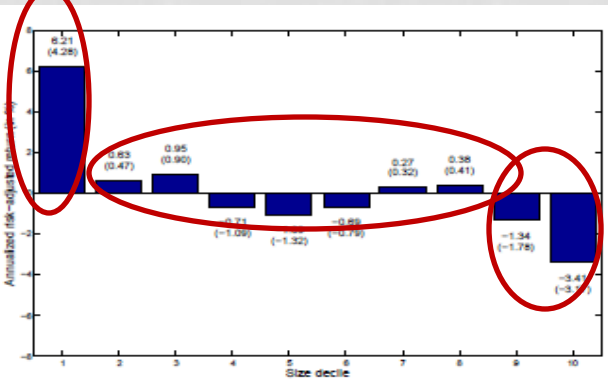

"**Risk-adjusted**" returns of financial versus non-financial based on size sorts

Risk is changing because of leverage. Authors own theory is that it is not F-F model, but nonlinear in market (at least in left tails).

Authors do some robustness but …
Winsorizing returns???
All financial firms? This should help identify the effect because not all financials have access to guarantees.

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September 28, 2017