

The Logic of Business Groups: A Moral Hazard Perspective

December 12th 2019

Gudrun Johnsen, ENS

Yu Zheng, Stanford University

Motivation

- Financial liberalization brings higher growth but frequent banking crisis
 - Ranciere, Tornell, Westermann (2008), Laeven & Valencia (2008, 2013, 2018)
- The supply side of credit well documented
- Demand side of credit remains largely hidden
- Evidence from the GFC shows credit allocated to the large degree into complex web of companies; **business groups** (SIC, 2010) as well as CLOs, CDOs

Literature on Business Groups

- The role of the financial network linked through equity stakes (business groups)
 - *Efficiency enhancing during economic development* - Khanna & Yafeh (2007)
 - *Risk management* Allan & Gale, (2000), Freixas, Parigi & Rochet, (2000), Berle and Means (1932) and Graham and Dodd (1934), Casey(2015)
 - *Rent extraction – Middle Income Trap*: Morck, et al. (2005)
 - *Tunneling* Johnson, La Porta, Lopez-de-Silanes and Shleifer (2000) , Almeida and Wolfenzon (2006)
 - Used as dumpsters to offload toxic assets, Bertrand, Mehta & Mullainathan (2002)
 - *Tax optimization*, Beuselinck and Deloof (2014)
 - *Market power*, Azar, Schmalz & Tecu (2018)
 - *Credit enhancement vehicles & Moral hazard*,, Johnsen & Zheng (2019)
- Leads to the questioning of pricing practices and credit risk assessment, SIC (2010)

Hence, we ask:

Compared to stand alone firms, how does business group affiliation affect group-affiliated firms'

1. likelihood of financial distress,
2. likelihood of debt write off
3. cost of capital
4. level of leverage?

Are business owners motivated by the promise of a government bail-out to take on higher leverage through the business group structure?

Identified through a quasi natural experiment with exogenous shocks to bailout expectations in Iceland 2008-2015 using firm level data (CreditInfo) and how it affected lending practices to group affiliated firms.

Main findings

Compared to stand alone firms, group affiliated firms are:

- more likely to experience financial distress
- bailout expectations present:
 - pay lower interest
 - more leveraged
- bailout expectations absent:
 - still pay lower interest but the spread is much smaller
 - mixed difference in leverage – ambiguous D/S effect
- just as likely to receive a write off

Why is this paper important?

First paper that puts forward the moral hazard motive for business group formation

Implications if true:

- 1) Group-affiliated firms' higher profitability may also arise from cheaper financing
- 1) Although cheaper financing can be incentive compatible, the funding of the financial network imposes a negative externality on taxpayers
- 2) Given the higher probability of distress, bankers should not be dazzled by the group affiliation status when pricing credit to group affiliated firms
- 3) Inequality?

Data

- CreditInfo rating agency in Iceland – set to open this database
 - The authors got a temporary proprietary access 2016-2019
- Firm level cross sectional time series panel 2008-2015
- Annual financial statements of all firms and shareholder ownership
- 201.674 observations
- Crisis period data
- Construct ownership variables of group affiliated firms with $>20\%$ ownership stake in another firm, or owning multiple firms:
 - 1) in the ownership of an individual
 - 2) in the ownership of another firm
 - 3) in the ownership of a holding company
 - 4) Firm is a holding company with 20% or larger stake in multiple firms
- Base case: Stand-alone firms

Table 1

Icelandic Firm Ownership Data and Variable Description:**Summary Statistics**

Variable	nr. Obs	Mean	Std.	Min	Max
distressed:					
1 if liabilities exceed assets	201,674	0.4	0.49	0	1

Table 3

Icelandic Firm Ownership Data:**Summary Statistics - Earnings, Leverage and Size Trimmed at 10 percent**

Variable	nr. Obs	Mean	Std.	Min	Max
distressed	201,674	0.4	0.49	0	1
log_totalAss	153,121	8.81	1.64	5.72	11.84
liability_to_asset	147,855	0.82	0.64	0	3.01
birthday	201,674	2001.89	9.34	1934	2015
ebitda_to_asset	143,118	0.02	0.16	-0.45	0.41
intang_to_asset	201,674	0.01	0.09	0	1
fix_ass_to_asset	201,674	0.27	0.36	-1.21	1.66
invent_to_asset	201,674	0.06	0.18	-1.9	2.83
ga_heldByFirm20	185,935	0.16	0.37	0	1
ga_held_ByInd20	185,935	0.37	0.48	0	1
ga_uo_holdFirm20	185,935	0.01	0.07	0	1
holds_Multiple20	185,935	0.04	0.19	0	1

ga_uo_holdFirm20

1 if firm is group affiliated firm in an ownership of a holding company, 20% ownership threshold

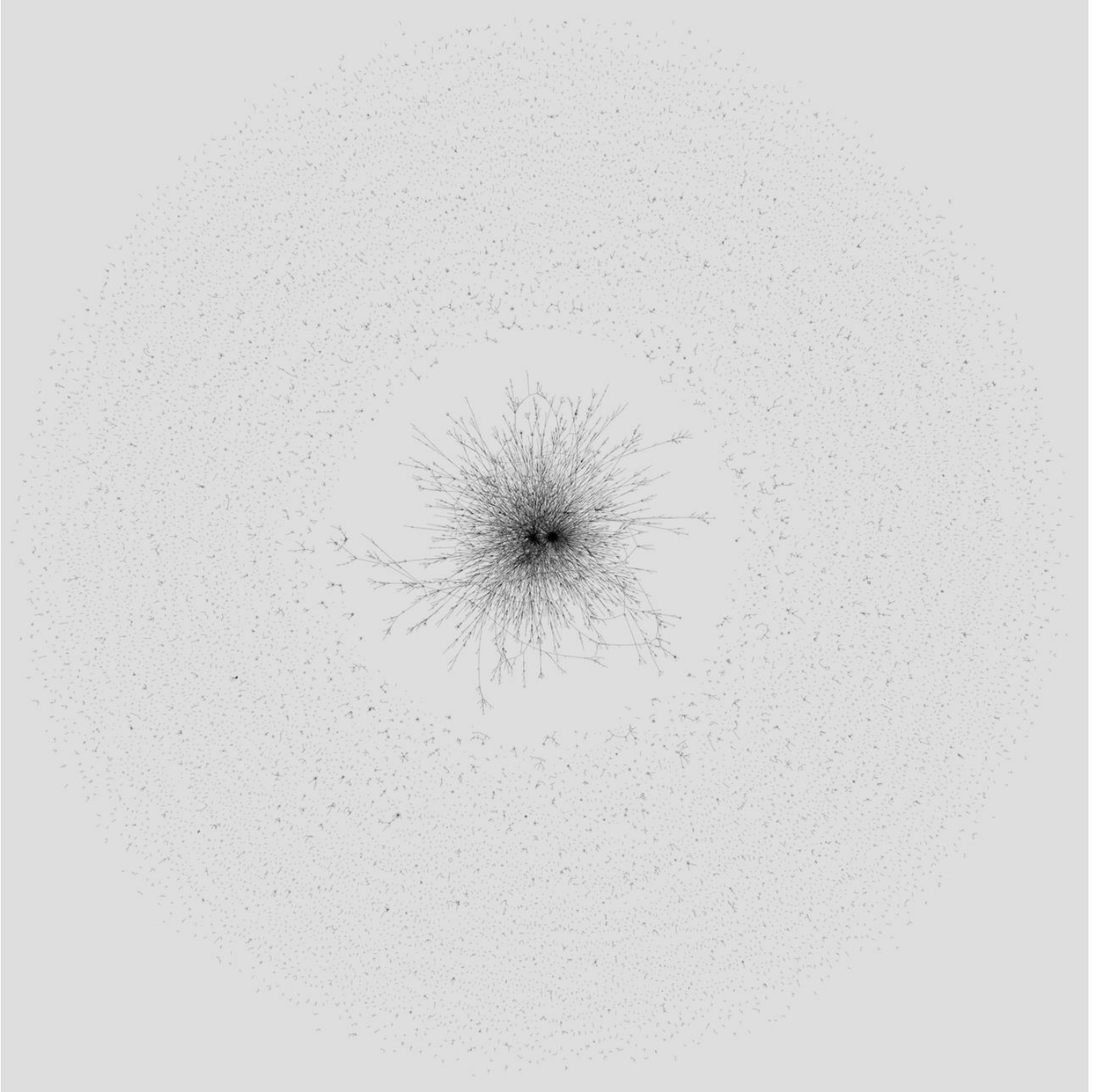
holds_Multiple20

1 if firm is an owner of at least 20% stake in multiple firms, at least 2 or more

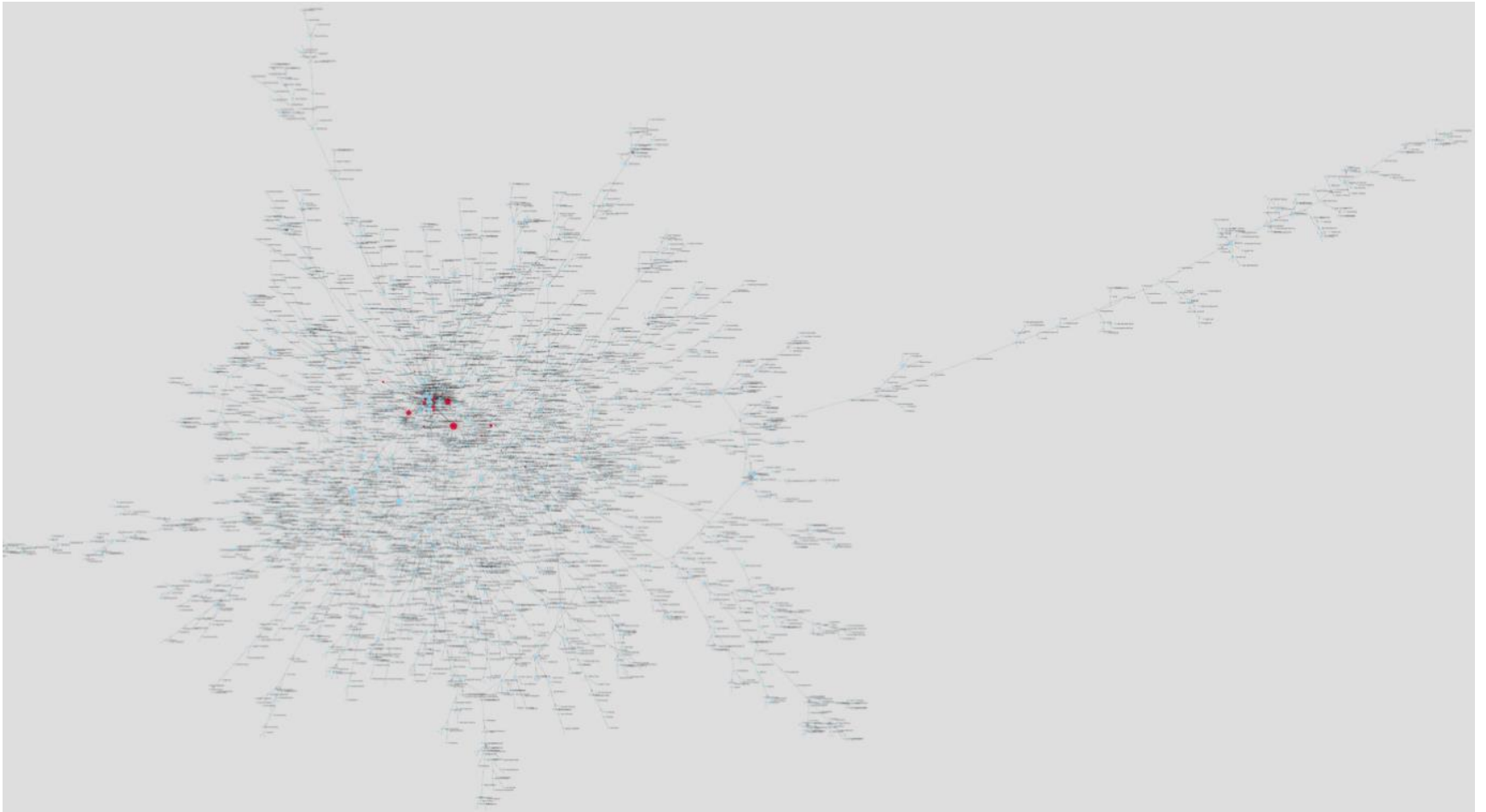
EBITDA*: Earnings Before Interest Payments, Taxes, Depreciation and Amortization

Empirical challenges

- Ownership data is rarely available for the universe of firms in one or more countries
- Exogenous shocks are hard to come by that have the same impact on all firms
- Business groups hard to identify – we use type of group affiliation status
 - Owned by:
 - A another firm
 - An individual
 - A holding company
 - Is a holding company
- Diff-in-diff not possible as we only have one period prior to crisis

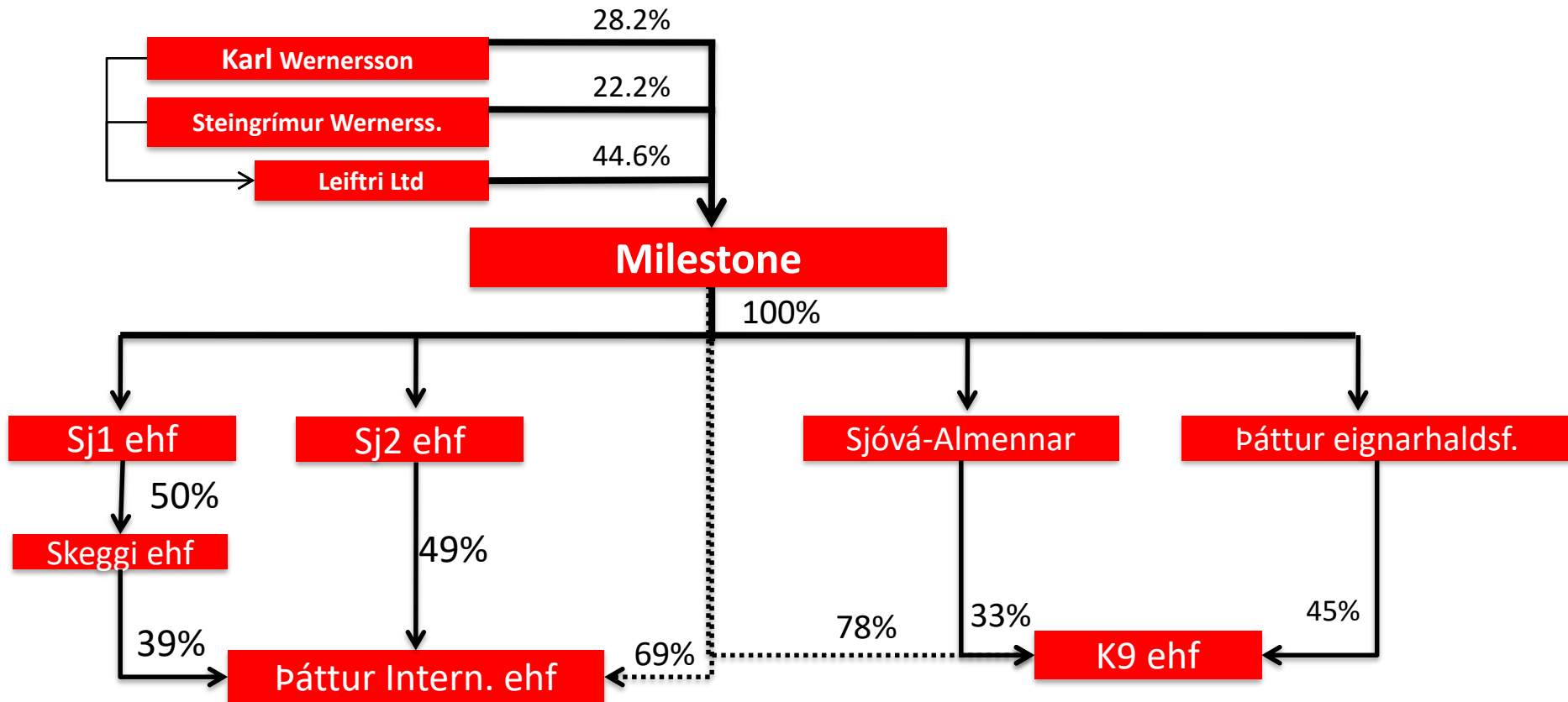


Giant component



Stories from the Pre-Crash Era

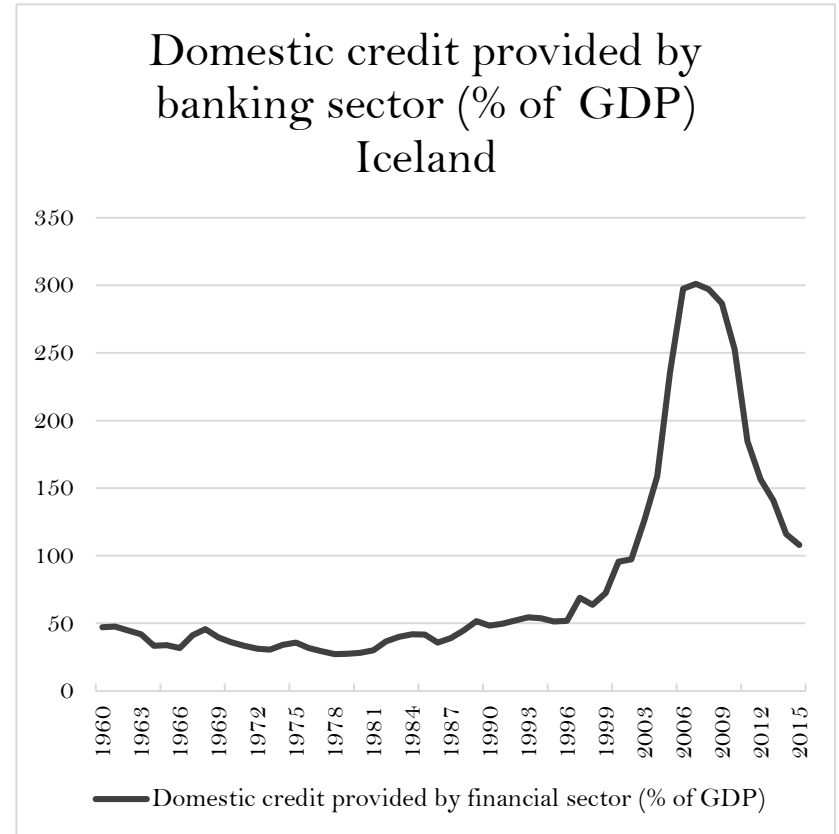
- Web of firms became increasingly complex



Identification Strategy

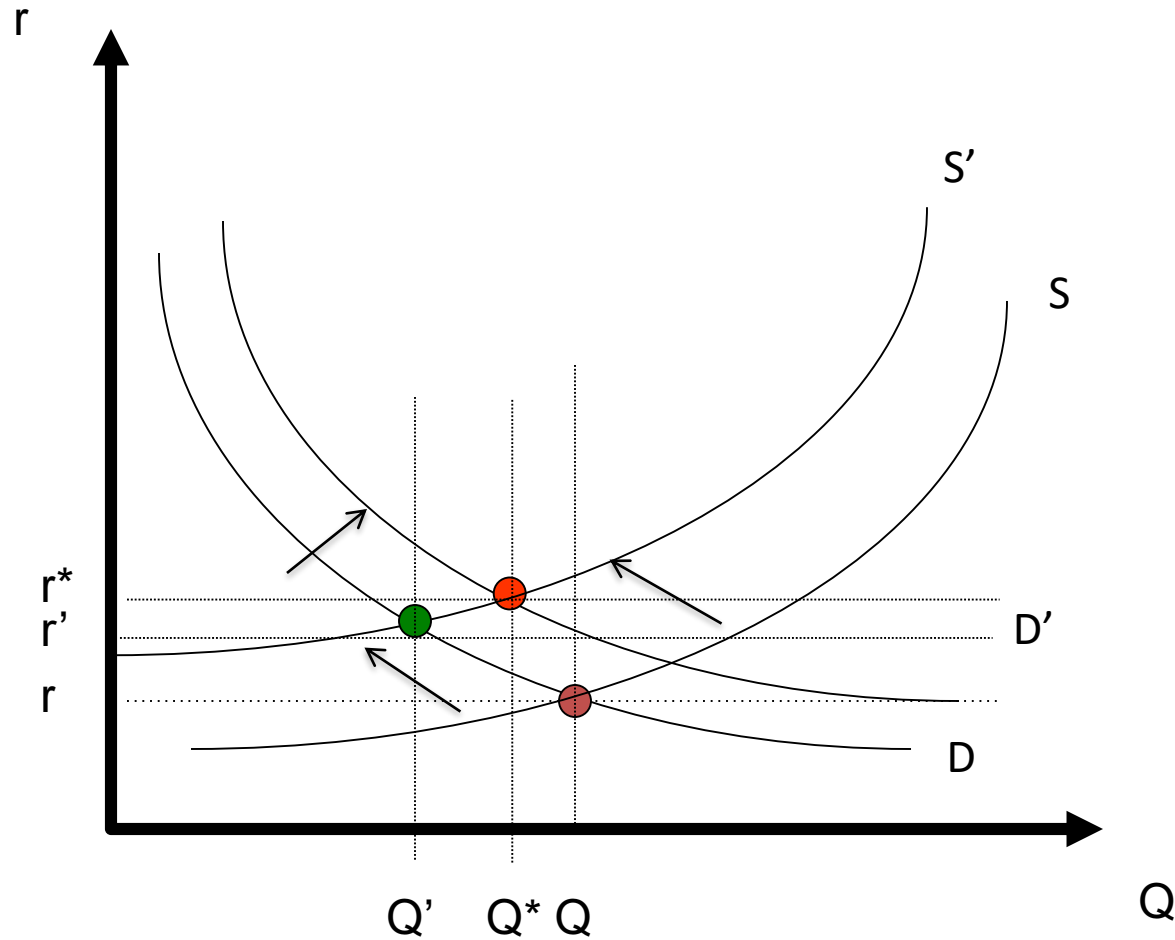
- Quasi-natural experiment
- Exogenous shock to bailout believes during the Icelandic Banking Crisis in 2008-2010:
 - Ex ante banks hoped for government bailing out business groups or banks

-But instead it refused to bail out banks, but forced them to bail out businesses and **write off unsustainable debt** – credit risk remained *by those who took it*



Testable predictions

Credit to business groups as bailout promise is removed



Results 1

P(distress)

P(write off)

Table 4
Probit Regressions

This table shows the results of probit regressions estimating the probability of a group affiliated firm being distressed compared to stand-alone firm (base case), using the pooled dataset from 2008-2015. Model (1) shows probability of being in financial distress, where liabilities have exceeded the firm's assets. Model (2) shows the probability of receiving a debt write off as a consequence of the comprehensive debt relief program of the Icelandic government and the restructuring efforts made by banks post crisis.

Dependent variables:	(1) P(distressed)	(2) P(receiving a write off)
ga_heldByFirm20	0.08 (0.03)***	0.29 (0.04)***
ga_heldByIndiv20	0.15 (0.02)***	0.1 (0.03)***
ga_uo_holdFirm20	0.39 (0.13)**	0.15 (0.15)
holds_Multiple20	0.32 (0.05)***	0.44 (0.06)***
distressed		0.58 (0.03)***
log_totalAss	-0.11 (0.0001)***	-0.193 (2.22)
birthday	0.001 (0.0001)***	-0.006 (0.002).
ebitda_to_ass	0.00 (0.04)*	
rev_to_ass		0.088 (0.063).
intang_to_ass	1.43 (0.09)***	1.15 (0.12)***
fix_ass_to_ass	1.45 (0.03)***	0.64 (0.04)***
invent_to_ass	1.46 (0.06)***	0.46 (0.09)***
Industry dummies	Included	Included
No. Obs	22,247	22,612
Prob>chi2	0.00**	0.000
pseudo R2	0.15	0.14

Standard errors in parentheses

significant at 10% level*, significant at 5% level**, significant at 1% level***

Results 2

Price of capital (r)

Table 5

Pooled OLS estimate of cost of capital

This table shows the change of the pricing of credit risk of different type of group affiliated firms versus stand-alone firms (base case), prior and post non-bailout event from 2008-2009 and 2011-2015. (3) shows average cost of capital measured with the interest rate proxy, interest payments/total debt prior to exogenous shock of the government deciding against a bailout. (4) shows cost of capital using the interest rate proxy after the government decided against a bailout. (3) and (4) are functions of the ratio of total liabilities to total assets that have been winsorized at 5% and 95% level.

Dependent variables:	(3) Interest rate proxy 2008-2009	(4) Interest rate proxy 2011-2015
lib_to_assets_tr	0.47% (0.046)***	0.168% (0.043)***
ga_heldByFirm20	-0.868% (0.0918%)***	-0.600% (0.0433)***
ga_heldByIndiv20	-0.418% (0.065)***	-0.227% (0.0305)***
ga_uo_holdFirm20	-0.998% (0.436)**	-0.53% (0.309)
holds_Multiple20	0.126% (0.1947).	-0.3584 (0.0816)***
distressed	1.055% (0.0941)***	0.3282% (0.0433)***
log_totalAss_tr	0.544% (0.018)***	0.348% (0.0088)
birthday	-0.0090% (0.0035)***	-0.0015% (0.0016).
ebitda_to_ass_tr	2.2963% (0.1287)***	2.036% (0.0635)***
intang_to_ass	-0.311% (0.3205).	0.2204% (0.1733)***
fix_ass_to_ass	1.5898% (0.0999)***	1.1603% (0.0461)***
invent_to_ass	1.345% (1.833)***	0.7987% (0.0864)***
Industry dummies	Included	Included
No. Obs	29,550	78,324
Prob>chi2	0.00**	0.00**
pseudo R2	0.15	0.1073

Standard errors in parentheses

significant at 10% level*, significant at 5% level**, significant at 1% level***

Result 3

Leverage (q)

Table 6

Pooled OLS for Leverage Ratio		
This table shows the results of an OLS estimation on the changes in the difference between the leverage ratio (total liabilities/total assets) of group affiliated firms compared to stand alone firms prior and post the non-bailout event, from 2008-2009 and 2011-2015. (5) and (6) shows the difference of debt as share of total assets winsorized at 5% and 95%		
Dependent variables:	(5)	(6)
	Leverage Ratio 2008-2009	Leverage Ratio 2011-2015
ga_heldByFirm20	-13.03%	-0.650%
	(0.01%)***	(0.001).
ga_heldByIndiv20	2.41%	5.920%
	(0.01)***	(0.01)***
ga_uo_holdFirm20	12.19%	6.56%
	(0.07)*	(0.07)
holds_Multiple20	3.30%	6.58%
	(0.03).	(0.02)***
log_totalAss_tr	4.87%	-0.84%
	(0.0001)***	(0.001)***
birthday	0.25%	-0.09%
	(0.0035)***	(0.001)***
ebitda_to_ass_tr	-75.1%	-65.36%
	(0.02)***	(0.001)***
intang_to_ass	58.87%	51.77%
	(0.05)***	(0.04)***
fix_ass_to_ass	85.38%	75.34%
	(0.01)***	(0.001)***
invent_to_ass	106.08%	104.85%
	(0.03)***	(0.02)***
Industry dummies	Included	Included
No. Obs	29,550	78,324
Prob>chi2	0.00**	0.00**
pseudo R2	0.15	0.1073

Standard errors in parentheses

significant at 10% level*, significant at 5% level**, significant at 1% level***

Fixed effects interpretation

- Were business tycoons affected by the non-bailout event when deciding on affiliation structure?
- Holding company dummy measures the effect of holding an additional child
- Dummy turned OFF = 0 (1->0)
 - Deleveraging story
 - Firm has >1 child at beginning of period
 - Firm dropped all but 1 child at end of period
- Dummy turned ON = 1 (0->1)
 - Tycoons emboldened
 - They are widening their network
 - Too interconnected to fail
 - Firm has 1 child at beginning of period
 - Firm acquired additional child at end of period

Results 4

FE

Cost of capital

Table 7
Fixed Effects estimate of
cost of capital prior and post non-bailout event

This table shows the change of the pricing of credit risk to different types of group affiliated firms versus our base case; stand-alone firms, prior and post non-bailout event from 2008-2009; 2011-2015. Model 7 and 8 show fixed effects estimation of the interest rate proxy, i.e. the ratio of firm's annual interest payments/total debt by group affiliated firms

Dependent variables:	(7) Interest rate proxy Prior 2008-2009	(8) Interest rate proxy Prior 2011-2015
lib_to_assets_tr	0.45% (0.05)***	0.190% (0.043)***
ga_heldByFirm20	-1.210% (0.1)***	-0.680% (0.005)***
ga_heldByIndiv20	-1.190% (0.07)***	-0.280% (0.04)***
ga_uo_holdFirm20	-1.190% (0.44)***	-0.84% (0.28)***
holds_Multiple20	-0.280% (0.21)	-0.27% (0.09)***
distressed	1.030% (0.1)***	0.2600% (0.04)***
log_totalAss_tr	0.500% (0.02)***	0.300% (0.001)***
birthday	-0.0200% (0.001)***	-0.0100% (0.001)***
ebitda_to_ass_tr	2.0700% (0.12)***	1.520% (0.06)***
intang_to_ass	-0.350% (0.34)	0.5500% (0.19)***
fix_ass_to_ass	1.7100% (0.1)***	1.1000% (0.05)***
invent_to_ass	1.830% (0.19)***	1.0000% (0.09)***
Industry dummies	Included	Included
No. Obs	29,550	78,324
Prob>chi2	0.00**	0.00**
Overall R2	0.14	0.0864

Standard errors in parentheses are clustered at firm and year level
significant at 10% level*, significant at 5% level**, significant at 1% level***

Results 5

Leverage

FE

Table 8
Fixed effects for Leverage Ratio

This table shows the results of our estimation on the changes in the difference between the leverage of group affiliated firms compared to stand alone firms prior and post the non-bailout event, from 2008-2009 and 2011-2015. Models (5) and (6) shows the difference of debt as share of total assets winsorized at 5% and 95%

Dependent variables:	(9) Leverage Ratio 2008-2009	(10) Leverage Ratio 2011-2015
ga_heldByFirm20	-11.76% (0.02)***	-5.05% (0.001)***
ga_heldByIndiv20	0.84% (0.01).	1.940% (0.01)***
ga_uo_holdFirm20	-0.09% (0.05).	0.04% (0.04).
holds_Multiple20	1.84% (0.03).	-0.90% (0.01).
log_totalAss_tr	3.72% (0.0001)***	-0.87% (0.001)***
Birthday	0.06% (0.03).	-0.44% (0.001)***
ebitda_to_ass_tr	-43.9% (0.01)***	-35.66% (0.001)***
intang_to_ass	39.40% (0.03)***	34.53% (0.03)***
fix_ass_to_ass	64.70% (0.01)***	51.79% (0.001)***
invent_to_ass	73.99% (0.03)***	63.96% (0.02)***
Industry dummies	Included	Included
No. Obs	33,127	80,823
Prob>chi2	0.00**	0.00**
Overall R2	0.1875	0.1422

Standard errors in parentheses
significant at 10% level*, significant at 5% level**, significant at 1% level***

Robustness checks

– actively acquiring firms (r)

Table 10
Fixed effects estimate Interest Rate Proxy
Actively Acquiring Firms

This table shows fixed effects regressions estimating cost of capital, interest rate proxy, to holding companies and other affiliated firms that are actively acquiring firms prior and post the non-bailout event.

	(11) Interest Rate Proxy 2008-2009	(12) Interest Rate Proxy 2011-2014
lib_to_assets_tr	0.64% (0.07)***	0.10% (0.043)***
ga_heldByFirm20	-1.21% (0.13)***	-0.58% (0.07)***
ga_heldByIndiv20	-0.60% (0.09)***	-0.29% (0.08)***
ga_uo_holdFirm20	-1.40% (0.58)***	-0.87% (0.53)***
holds_Multiple20	-0.40% (0.23)*	-0.16% (0.13).
distressed	0.88% (0.14)***	0.76% (0.12)***
log_totalAss_tr	0.53% (0.03)***	0.22% (0.02)***
birthday	-0.03% (0.0001)***	-0.05% (0.001)***
ebitda_to_ass_tr	2.18% (0.18)***	1.32% (0.15)***
intang_to_ass	-0.65% (0.45).	0.83% (0.48)*
fix_ass_to_ass	1.63% (0.13)***	0.62% (0.11)***
invent_to_ass	2.27% (0.24)***	0.42% (0.21)***
Industry dummies	Included	Included
No. Obs	15,441	6,801
Prob>chi2	0.00**	0.00**
Overall R2	0.14	0.0864

Standard errors in parentheses

significant at 10% level*, significant at 5% level**, significant at 1% level***

Robustness checks

– actively acquiring firms (q)

Table 11

Fixed effects estimate of Leverage Ratio

This table shows the results of a fixed effects estimation on the changes in the difference between the leverage of group affiliated firms compared to stand alone firms prior and post the non-bailout event, from 2008-2009 and 2011-2015 for actively acquiring firms, excluding firms that received a write-off. (13) and (14) shows the difference of debt as share of total assets winsorized at 5% and 95%

	(13) Leverage Ratio 2008-2009	(14) Leverage Ratio 2011-2015
Dependent variables:		
ga_heldByFirm20	-20.03% (0.02)***	-17.88% (0.02)***
ga_heldByIndiv20	-2.77% (0.01)**	-7.280% (0.02)***
ga_uo_holdFirm20	-10.47% (0.08).	1.73% (0.11).
holds_Multiple20	3.400% (0.03).	-13.17% (0.03)***
log_totalAss_tr	6.040% (0.0001)***	10.14% (0.001)***
birthday	0.07% (0.03%).	-0.88% (0.001)***
ebitda_to_ass_tr	-71.2% (0.01)***	-39.97% (0.03)***
intang_to_ass	53.00% (0.06)***	14.68% (0.1).
fix_ass_to_ass	76.70% (0.01)***	46.52% (0.02)***
invent_to_ass	102.10% (0.03)***	71.82% (0.04)***
Industry dummies	Included	Included
No. Obs	18,283	6,928
Prob>chi2	0.00**	0.00**
Overall R2	0.2	0.25

Standard errors in parentheses

significant at 10% level*, significant at 5% level**, significant at 1% level***

Finally....

- We manage to show a signal of moral hazard being present –
 - We only have a proxy for interest rates
 - for causal identification we need loan level data (never going to happen?)
- Bankers raise their price on credit to business groups as they realize the heightened risk when they can no longer rely on a bailout
- Business group owners may, however be emboldened by the write off program – which would call for a rightward shift in demand, if there were any
- Alternative stories would need to support the bailout anticipation

All we can say responsibly..

- Banks underestimate the risk on loans that they extend to the group affiliated firms prior to crisis
- The probability of financial distress is higher for group affiliated firms
- Group affiliated firms paid significantly lower interest than stand alone firms – and they still do – but the spread has decreased after bailout promise was abolished
- This mispricing is particularly acute for firms that hold multiple other firms and those affiliated to a individual