Strategic Default in the Coffee Value Chain

Arthur Blouin - *Toronto*
Rocco Macchiavello - *LSE*

May 2017

Question

- This paper:
  1. provides a test for **strategic default** and
  2. explores its consequences for **contract choice** and **efficiency** in the coffee value chain

Question

- This paper:
  1. provides a test for **strategic default** and
  2. explores its consequences for **contract choice** and **efficiency** in the coffee value chain

- Ability to enter binding agreements is essential to well-functioning markets.

Question

- This paper:
  1. provides a test for **strategic default** and
  2. explores its consequences for **contract choice** and **efficiency** in the coffee value chain

- Ability to enter binding agreements is essential to well-functioning markets.

- **Strategic default** - *a situation in which one party reneges on an agreement just because it can get away with it* - can then severely hampers market functioning.

Question

- This paper:
  1. provides a test for **strategic default** and
  2. explores its consequences for **contract choice** and **efficiency** in the coffee value chain

- Ability to enter binding agreements is essential to well-functioning markets.

- **Strategic default** - *a situation in which one party reneges on an agreement just because it can get away with it* - can then severely hampers market functioning.

- Transacting parties adjust their behaviour and contracts in anticipation of **strategic default**
  - $\rightarrow$ we need to understand both its direct manifestation (*default*) and indirect one (*contract choice*)

What do we need?

1. Observe *default* and *contract choice*

2. Exogenous changes in incentives when default choice is made

Environment

- This paper provides evidence for strategic default and its consequences in the international coffee market
- **Pre-financing agreements**: working capital *loans* backed by *sales contracts*
- Data on approx. 800 pre-financing agreements to 300+ coffee mills in 22 developing countries
  - Intrinsic interest
  - Methodological Advantages

Why is it difficult to distinguish?

1. Observe contract terms and defaults
   - Sales contracts $\rightarrow$ *fixed price* vs. *differential*
   - Loans $\rightarrow$ default is observed

2. Exogenous changes in incentives when default choice is made
   - Unanticipated fluctuations in international prices
   - Different timing of loan utilization vs. contract execution

Summary of Results

A simple model i) delivers testable predictions and ii) guides exploration of quantitative implications of strategic default.

1. Can we detect strategic default?

   YES unanticipated increases in international prices increase likelihood of default on fixed price contracts

Summary of Results

A simple model i) delivers testable predictions and ii) guides exploration of quantitative implications of strategic default.

1. Can we detect strategic default?

   YES unanticipated increases in international prices increase likelihood of default on fixed price contracts

2. Does strategic default affect contract choice?

   YES *price* vs *counterparty* risk

   - ★ High relationship value $\rightarrow$ fixed price contract
   - ★ Low relationship value $\rightarrow$ differential contract

Summary of Results

A simple model i) delivers testable predictions and ii) guides exploration of quantitative implications of strategic default.

1. Can we detect strategic default?

   YES unanticipated increases in international prices increase likelihood of default on fixed price contracts

2. Does strategic default affect contract choice?

   YES *price* vs *counterparty* risk

   - ★ High relationship value $\rightarrow$ fixed price contract
   - ★ Low relationship value $\rightarrow$ differential contract

3. Does Strategic Default matter?

   YES Combining RDD & Model Calibration

   - ★ Firms are credit constrained
   - ★ SD generates externalities along the supply chain
   - ★ Relational capital is large (approx. 70% of contract sale)
   - ★ Removing SD would $\uparrow$ production by 28% and farmer welfare by 30%

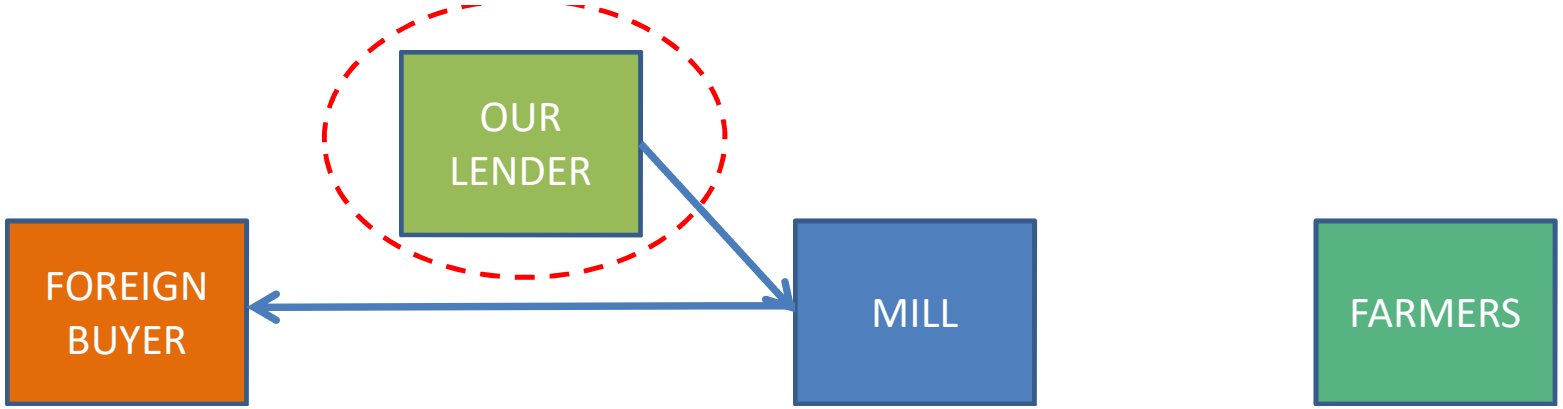
Related Literature

- (Relational) Contracts:
  - Banerjee and Duflo (2000), Antras and Foley (2015), Macchiavello and Morjaria (2016), Lerner and Schoar (2002)
- Credit Constraints (on larger firms), Credit and Exports, Trade Credit:
  - Banerjee and Duflo (2015), Banerjee and Munshi (2004), Klapper (2006), Klapper et al. (2011), Rampini and Viswanathan (2010, 2011)
- Empirics of Contracts
  - Chiappori and SalaniÃ© (2002), Karlan and Zimman (2010), Adams et al. (2009), Townsend (et al., various)
- Industrial Organization of Agricultural Sector:
  - De Janvry et al. (2014), Dragusano and Nuun (2014), Macchiavello and Morjaria (2014), Casaburi and Reed (2017), Ghani and Reed (2014), Banerjee et al. (2001), Mullhainathan and Sukhatankar (2014), Fafchamps (et al., various)

Roadmap

- Context & Data Go
- Model Go
- Empirics
  - **Test 1:** Detecting Strategic Default Go
  - **Test 2:** Strategic Default & Contract Choice Go
  - Does Strategic Default matter?
    - RDD Go
    - Calibration & Counterfacuals Go
- Conclusion & Discussion Go

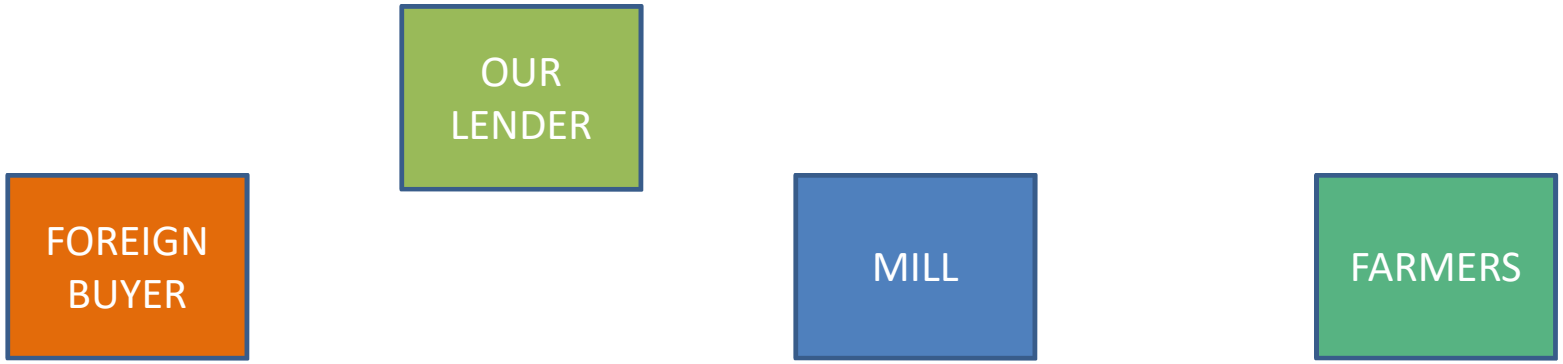
Lending Model



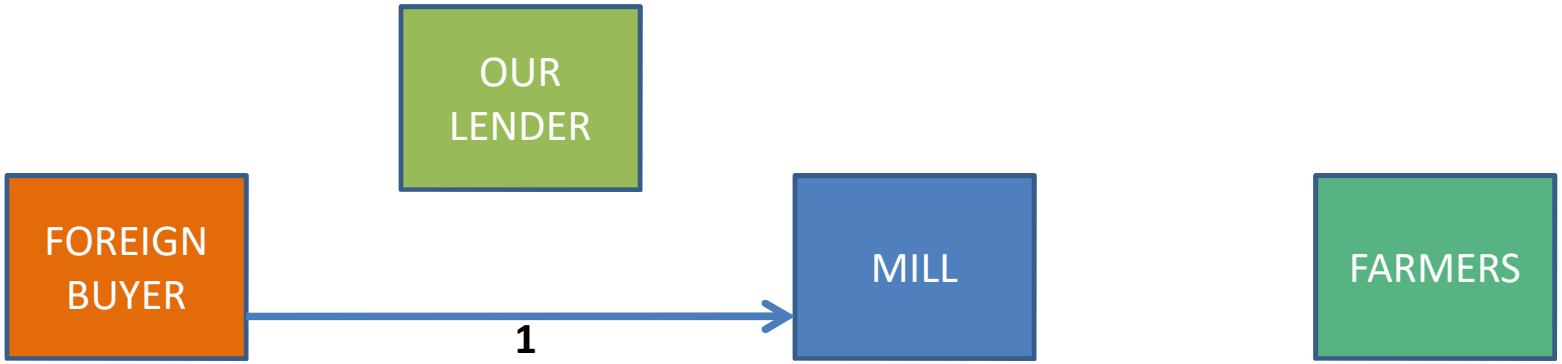
Lending Model

Variable	Observations	Median	Mean	St. Dev.
Panel A: Mills Characteristics				
Total Assets (in 1,000,000$)	136	1.09	2.43	3.52
Sales (in 1,000,000$)	136	1.36	2.64	4.38
Cherries Purchases (in 1,000,000$)	136	1.01	2.20	3.90
Sales / Cherries Purchases	136	0.66	0.71	0.39
Permanent Employees	136	10	18	22
Seasonal Emplyees	136	12	105	266
Growers Supplying Coffee	136	434	1076	1575
Number of Loans from Lender	136	5.00	5.38	2.82
Loan Amount (in 1,000,000$)	136	0.46	0.58	0.47
Share Purchases Financed by Lender	136	0.46	0.59	0.47
Number of Loans from Lender (full sample)	317	2.00	3.20	2.56
Loan Amount (in 1,000,000$) (full sample)	317	0.33	0.47	0.44
Panel B: Contracts & Loan				
Loan Amount (in 1,000,000$)	781	0.33	0.47	0.52
Interest Rate	781	0.10	0.10	0.01
Length Loan (days)	781	257	251	69.7
Renewal (=1), First Loan (=0)	781	1.00	0.72	0.45
Default (Write-Off, Restructured, Delay), %	781	0.00	0.04	0.17
Price Surprise	781	1.05	1.09	0.29
Africa	781	0.00	0.12	0.33
Central America	781	0.00	0.36	0.48
Latin America	781	0.00	0.49	0.51
Fixed Price Contract	598	1.00	0.59	0.49
Numerical Score	455	3.61	3.59	0.25

Lending Model

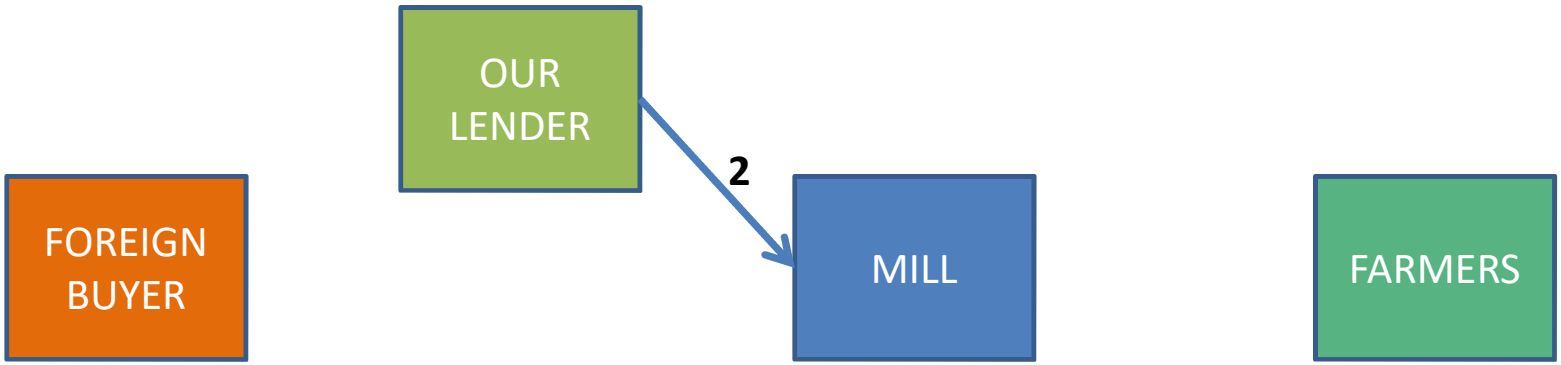


Lending Model



1. Buyer and mill negotiate a contract

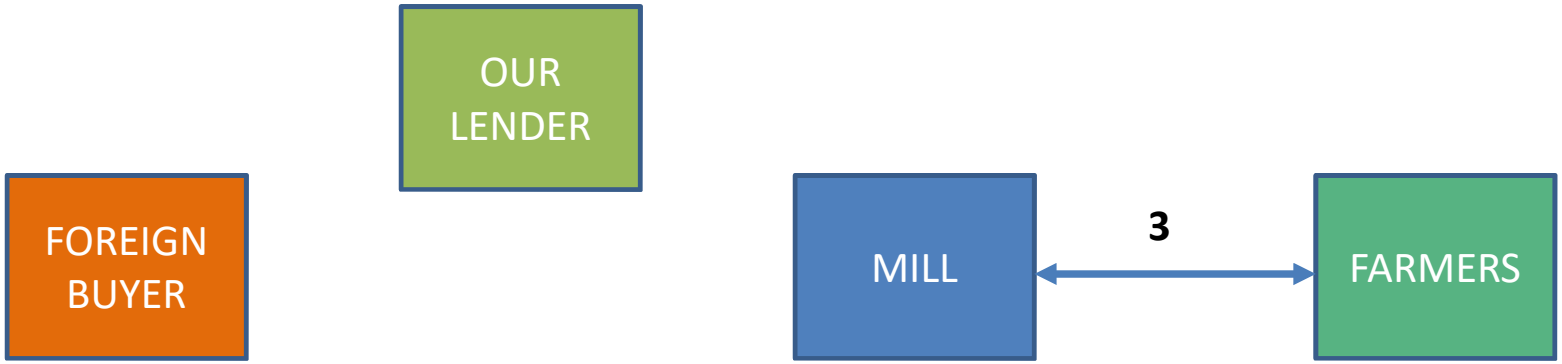
Lending Model



1. Buyer and mill negotiate a contract

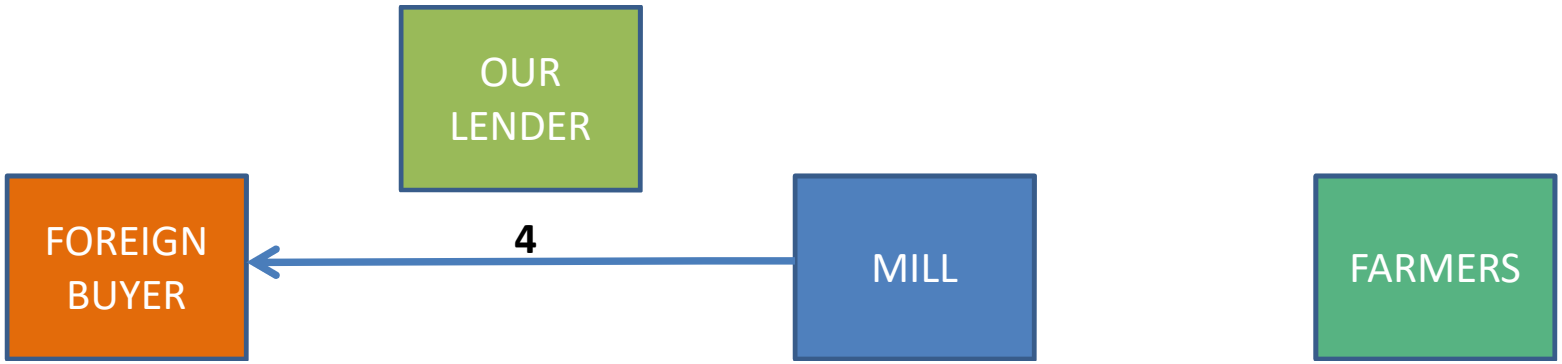
2. Lender extends loan to mill (formula + value of the contract)

Lending Model



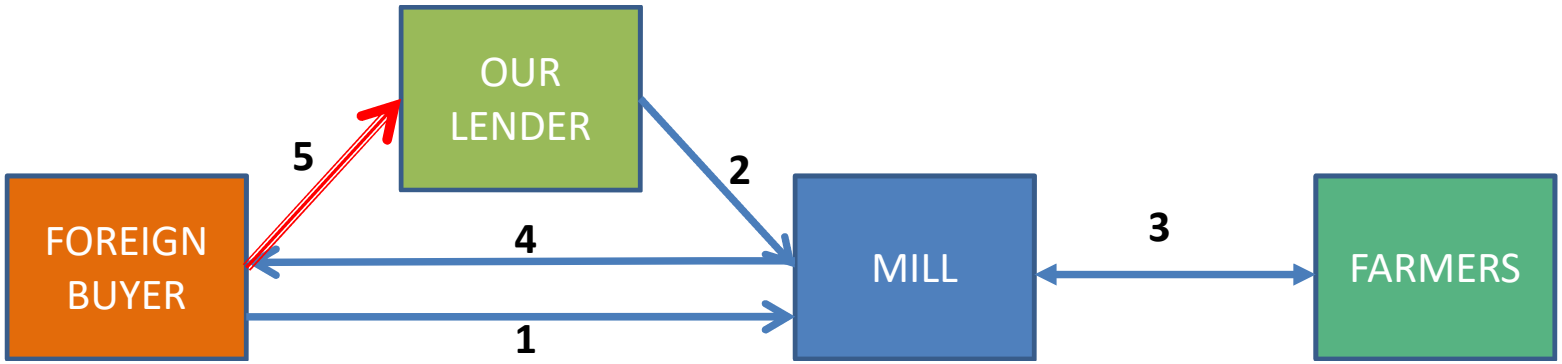
1. Buyer and mill negotiate a contract
2. Lender extends loan to mill (formula + value of the contract)
3. Mill purchases cherries during harvest time.

Lending Model



1. Buyer and mill negotiate a contract
2. Lender extends loan to mill (formula + value of the contract)
3. Mill purchases cherries during harvest time.
4. After harvest mill delivers coffee to buyer

Lending Model

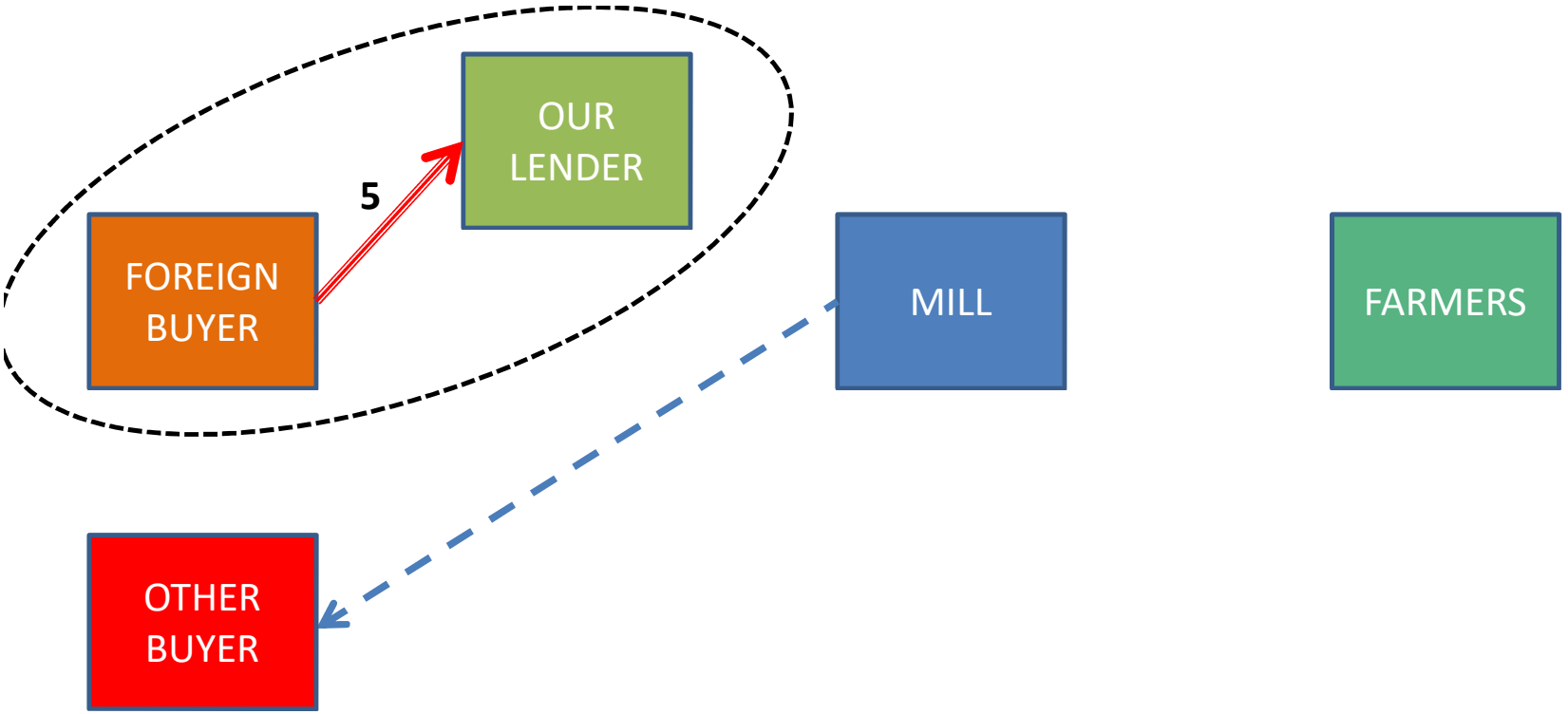


1. Buyer and mill negotiate a contract
2. Lender extends loan to mill (formula + value of the contract)
3. Mill purchases cherries during harvest time.
4. After harvest mill delivers coffee to buyer
5. **Lender is paid directly by buyer**

Lending Model: Remarks

- Similar to working capital loans based on account receivable:
  - Primary source of SME financing in US (Klepper (2004)), even more important in developing countries
- Extremely common practice in this (and related) industry:
  - Processors and exporters engage in pre-financing to secure future supplies of coffees (Coffee Exporter Guide, see also ITC, Larson and Varangis (2006), WB)
  - Data from Rwanda and Peru
- Lender's Portfolio and Terms broadly representative
  - Portfolio Go
  - Collateral Go
  - Interest rates Go

Lending Model: Default



- Mill must jointly default on buyer and lender (this *is* the contractual innovation). Potentially two types of collusion:
  - **A.** mill-buyer against the lender: possible, not a problem
  - **B.** mill-lender against the buyer: possible, we can check
- **For now** abstract from it. But see this and this

Roadmap

- Context & Data Go
- **Model** Go
- Empirics
  - **Test 1:** Detecting Strategic Default Go
  - **Test 2:** Strategic Default & Contract Choice Go
  - Does Strategic Default matter?
    - RDD Go
    - Calibration & Counterfacuals Go
- Conclusion & Discussion Go

Model

Two Goals:

1. Derive Qualitative Predictions
   - Test for strategic default, contract choice, heterogeneity
2. Guide Quantitative Exercise
   - Calibration and Counterfactuals

Set-Up

- A risk-averse mill and a risk-neutral buyer-lender
- Cost of producing q units:

$$C(q) = \gamma \times q \times p(q) = \gamma \times q \times p_0 \times q^{\eta}. \tag{1}$$

Set-Up

- A risk-averse mill and a risk-neutral buyer-lender
- Cost of producing q units:

$$C(q) = \gamma \times q \times p(q) = \gamma \times q \times p_0 \times q^{\eta}. \tag{1}$$

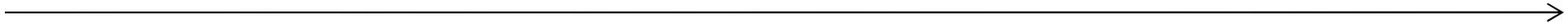
- Mill has ex-ante bargaining power but no cash
- Contract $\mathbf{C} = \{q_c, p_c \vee \Delta_c, L, D\}$ maximizes mill expected utility s.t.:
  - Lender and Buyer participation constraints
  - Mill LL and IC (if any)

Timing

Negative Cash Flows:
Ex-ante MH constraint

Timing

Negative Cash Flows:
Ex-ante MH constraint

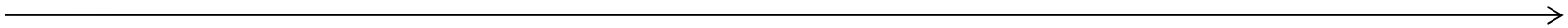


t = 0	*t = 1*	*t = 2*	*t = 3*
Contract is negotiated	**Loan disbursed, stations purchases inputs or diverts**	**international price drawn from $F(p)$ is realized**	

Timing

Negative Cash Flows:
Ex-ante MH constraint

Positive Cash Flows
Ex-post MH constrai



t = 0	*t = 1*	*t = 2*	*t = 3*
Contract is negotiated	**Loan disbursed, stations purchases inputs or diverts**	**international price drawn from $F(p)$ is realized**	**Station repays or side-sells (defau**

Participation Constraints

- **Buyer**

$$(\mathbf{E}\left[p - p_c\right] | delivery) \times q_c \geq 0 \tag{2}$$

Participation Constraints

- **Buyer**

$$(\mathbf{E}\left[p - p_c\right] | delivery) \times q_c \geq 0 \tag{2}$$

$\rightarrow$ Under Fixed Price

$$\mathbf{E}\left[p_c | delivery\right] = p_c \tag{3}$$

Participation Constraints

- **Buyer**

$$(\mathbf{E}\left[p - p_c\right] | delivery) \times q_c \geq 0 \tag{2}$$

$\rightarrow$ Under Fixed Price

$$\mathbf{E}\left[p_c | delivery\right] = p_c \tag{3}$$

$\rightarrow$ Under Differential

$$\mathbf{E}\left[p_c | delivery\right] = \mathbf{E}\left[p | delivery\right] + \Delta_c \tag{4}$$

Participation Constraints

- **Buyer**

$$(\mathbf{E}[p - p_c] | delivery) \times q_c \geq 0 \tag{2}$$

$\rightarrow$ Under Fixed Price

$$\mathbf{E}[p_c | delivery] = p_c \tag{3}$$

$\rightarrow$ Under Differential

$$\mathbf{E}[p_c | delivery] = \mathbf{E}[p | delivery] + \Delta_c \tag{4}$$

- **Lender**

$$L \leq \int_p \mathbf{I}[p] \times \min\{D, p_c q_c\} dF(p) \tag{5}$$

Ex-Post Incentive Constraint

Mill repays if ...

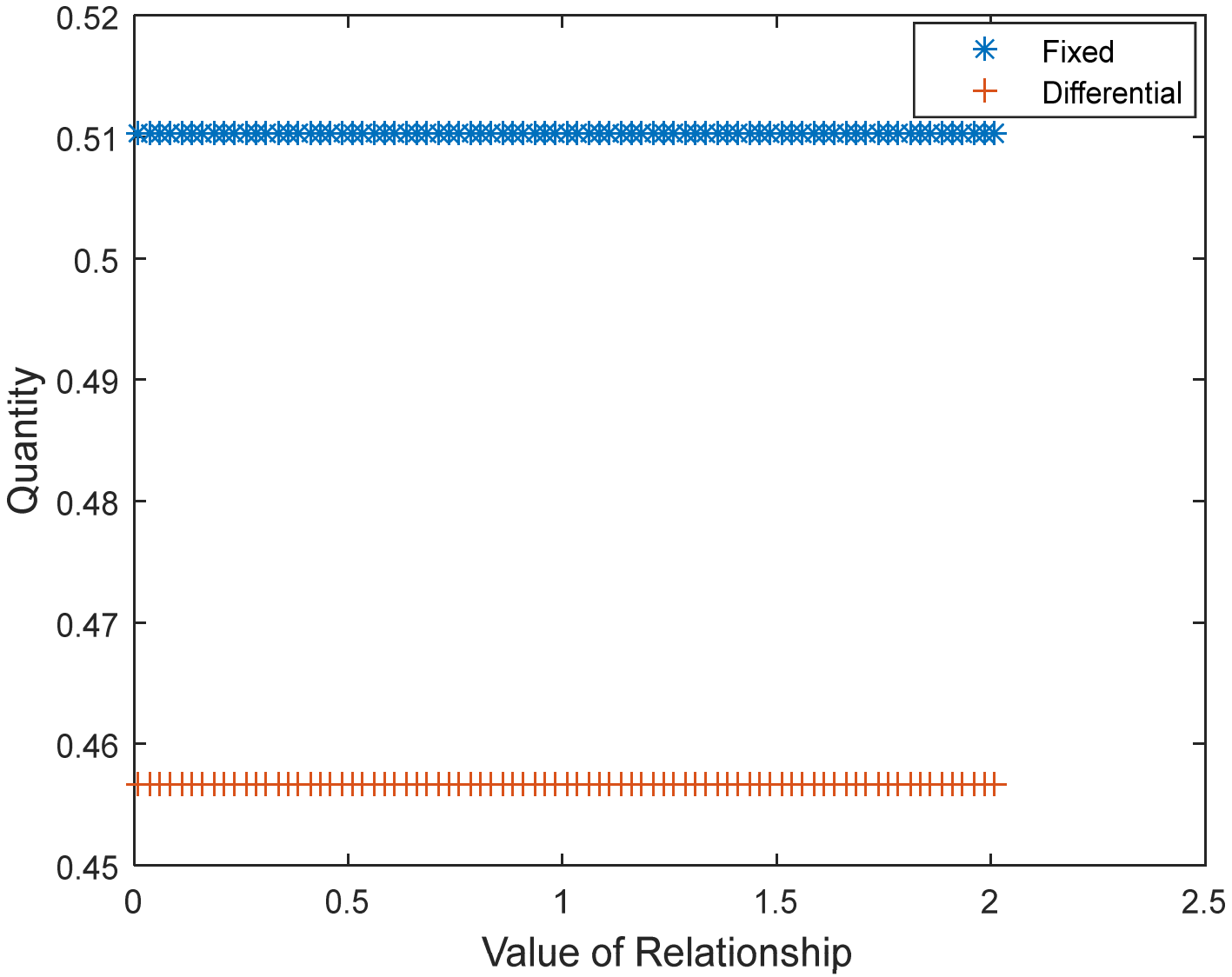
$$q_c p_c - D + \delta V \geq (p q_c + \delta U) \tag{6}$$

Rewrite as

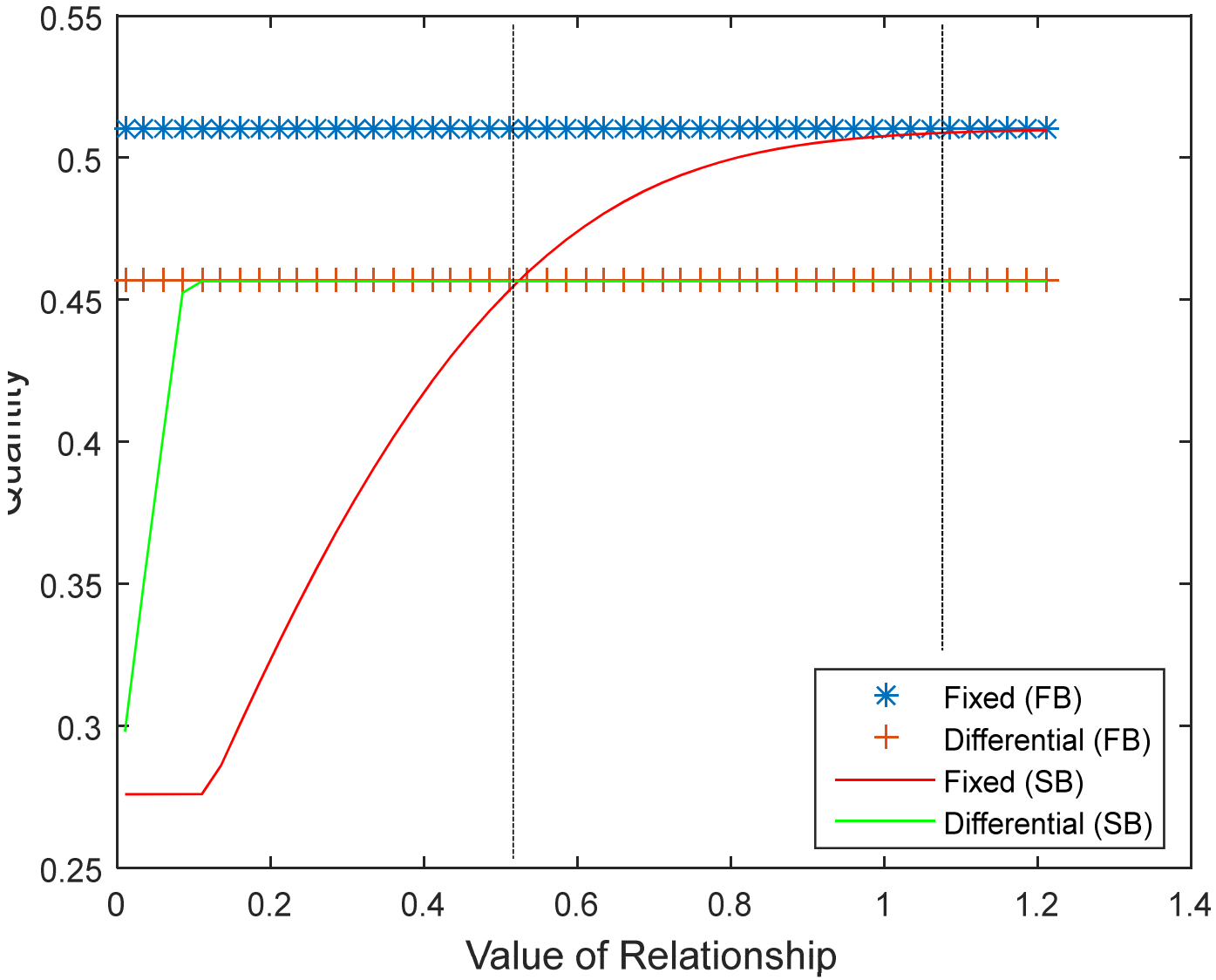
$$\underbrace{\mathbf{V}}_{\delta(V-U)} \geq D + (p - p_c)\, q_c \tag{7}$$

Empirical Extension ▸ Go

Solution: Perfect Enforcement vs. Strategic Default



Solution: Perfect Enforcement vs. Strategic Default



Predictions

P1: Unexpected increases in world prices lead to default under fixed price contracts but not under differential

Predictions

P1: Unexpected increases in world prices lead to default under fixed price contracts but not under differential

P2: Relationships with higher **V** are more likely to sign fixed price contracts

Predictions

P1: Unexpected increases in world prices lead to default under fixed price contracts but not under differential

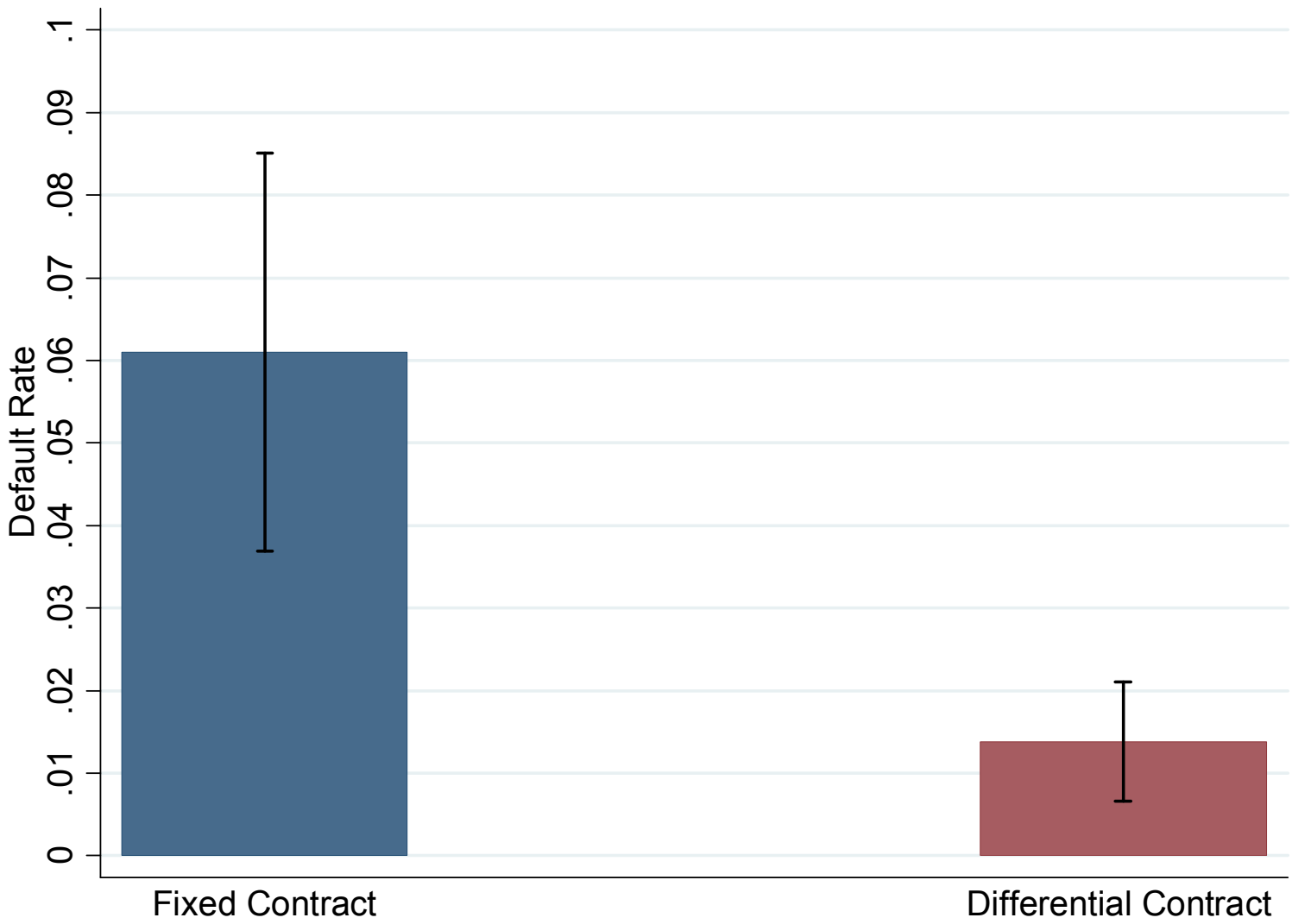
P2: Relationships with higher **V** are more likely to sign fixed price contracts

(P3): Conditional on a fixed price contract, higher **V** reduces strategic default

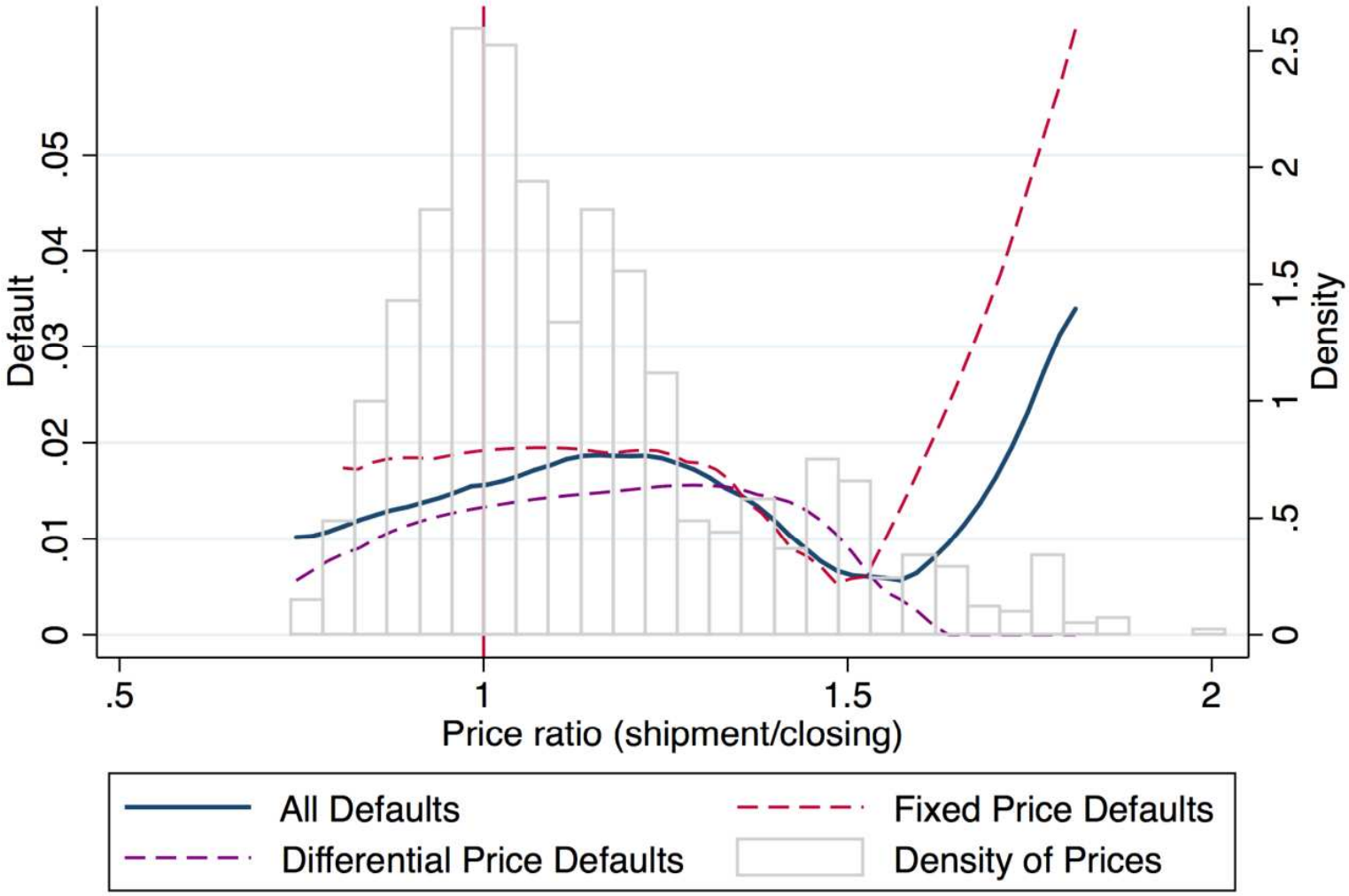
Roadmap

- Context & Data ▸ Go
- Model ▸ Go
- Empirics
  - **Test 1:** Detecting Strategic Default ▸ Go
  - **Test 2:** Strategic Default & Contract Choice ▸ Go
  - Does Strategic Default matter?
    - ★ RDD ▸ Go
    - ★ Calibration & Counterfacuals ▸ Go
- Conclusion & Discussion ▸ Go

Test 1: Strategic Default



Test 1: Strategic Default



Test 1: Strategic Default, Robustness

(Differential) Relationship is robust to regression analysis (Go)

- Control for contracting / maturity time fixed effects (Go)
- Control for mill fixed effects
- Control for contract size and duration
- Control for interactions with price surprise and with contract type

- Different thresholds to define fixed contracts (Go)
- Different definitions of default (Go)

NB: default leads to worse relationship with lender

Strategic Default as a form of MH

	Ex-Ante MH	Ex-Post MH
Credit	**Loan Diversion**	**Strategic Default**

Strategic Default as a form of MH

	Ex-Ante MH	Ex-Post MH
Credit	**Loan Diversion**	**Strategic Default**
Commercial	**Costly Quality Provision**	**Side-Selling**
Theory of Firm	**Non-Contractible Investments**	**Ex-Post Haggling**

Why is it important to distinguish?

1. Optimal contractual remedy depends on type of MH, e.g.:
   - Loan Diversion $\rightarrow$ Trade Credit (Burkart and Ellingsen (2004))
   - Strategic Default $\rightarrow$ Debt (Ellingsen and Johannson (2010))
2. Differently affected by changes in environment, e.g.:
   - market structure vs. technology
3. Differently welfare implications:
   - **Direct**: Deadweight loss vs. Transfer
   - **Indirect**: Contract Choice $\rightarrow$ which market is missing

Test 1: Strategic Default vs. Loan Diversion

- In general, we expect incentive to divert the loan to be lower when prices increases (reverse debt over-hang effect)

Test 1: Strategic Default vs. Loan Diversion

- In general, we expect incentive to divert the loan to be lower when prices increases (reverse debt over-hang effect)
- International coffee prices however might be transmitted to prices received by farmers $\rightarrow$ incentive to divert the loan might increase

Test 1: Strategic Default vs. Loan Diversion

- In general, we expect incentive to divert the loan to be lower when prices increases (reverse debt over-hang effect)
- International coffee prices however might be transmitted to prices received by farmers $\rightarrow$ incentive to divert the loan might increase
- Strategy: distinguish prices increases occurring during harvest season from those happening *after* the end of harvest season:
  - *During*: potentially affect loan diversion decision
  - *After*: loan utilization decisions is sunk

$\rightarrow$ event study to isolate strategic default (Go)

Test 1: Strategic Default vs. Loan Diversion

- In general, we expect incentive to divert the loan to be lower when prices increases (reverse debt over-hang effect)
- International coffee prices however might be transmitted to prices received by farmers $\rightarrow$ incentive to divert the loan might increase
- Strategy: distinguish prices increases occurring during harvest season from those happening *after* the end of harvest season:
  - *During*: potentially affect loan diversion decision
  - *After*: loan utilization decisions is sunk

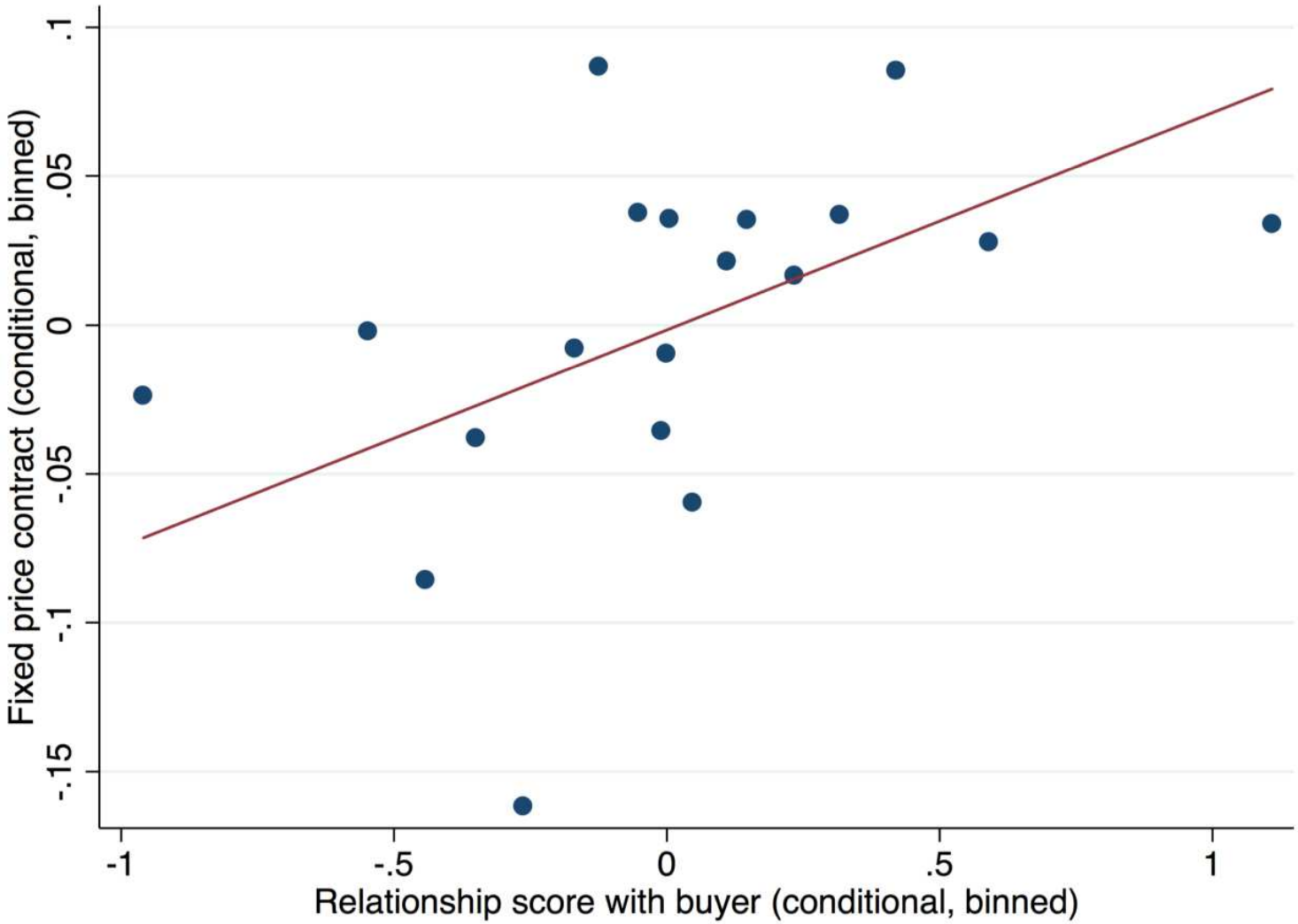
$\rightarrow$ event study to isolate strategic default (Go)

- Regression analysis also find no evidence of loan diversion. Why? (Go)

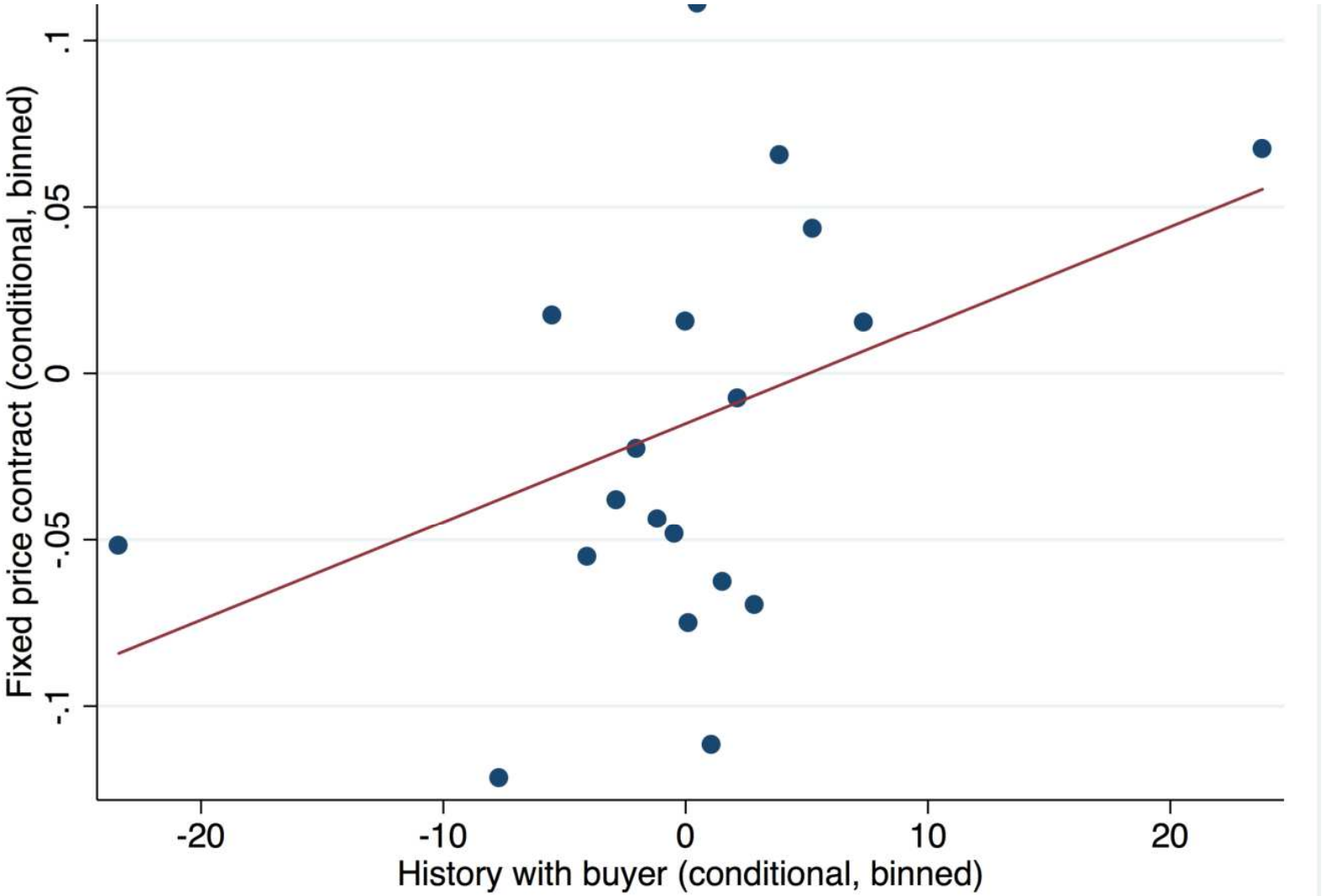
Roadmap

- Context & Data Go
- Model Go
- Empirics
  - **Test 1:** Detecting Strategic Default Go
  - **Test 2:** Strategic Default & Contract Choice Go
  - Does Strategic Default matter?
    - ★ RDD Go
    - ★ Calibration & Counterfacuals Go
- Conclusion & Discussion Go

Test 2: Contract Choice



Test 2: Contract Choice



Test 2: Contract Choice, Robustness

Correlation between strenght of relationship with buyer and contract choice is robust to regression analysis (▸ Go)

- Control for contracting / maturity time fixed effects
- Control for mill and buyer fixed effects
- Control for contract size and duration (and joint estimation)
- Control for price surprise (placebo)
- Control for loan application scores

- Remark: differential contracts get *higher* score from the lender - as expected

Further Results

- Heterogeneity (relationship importance, institutional quality, competition) (Go)
- Mill-Lender Collusion (Go)

Roadmap

- Context & Data ▸ Go
- Model ▸ Go
- Empirics
  - **Test 1:** Detecting Strategic Default ▸ Go
  - **Test 2:** Strategic Default & Contract Choice ▸ Go
  - Does Strategic Default matter?
    - ★ RDD ▸ Go
    - ★ Calibration & Counterfacuals ▸ Go
- Conclusion & Discussion ▸ Go

Quantitative Implications

We have documented strategic default. Does it matter?

Step 1: RDD to test for credit constraints (and recover key parameters)

Quantitative Implications

We have documented strategic default. Does it matter?

Step 1: RDD to test for credit constraints (and recover key parameters)

Step 2: Model calibration

- All model's parameter ($F(), \mu, \sigma, \alpha, \eta, \gamma_i$) from the data
- Recover **V** *for each* observation by matching contract choice and loan interest rate

$\rightarrow$ Are estimates consistent with strategic default generating credit constraint?

- Counterfactuals: **V** $=\infty$, **V** $=0$

Credit Constraints: Strategy

- A firm is credit constrained if additional supply of loan (at same r)
  - is used to expand input purchases and sales,
  - without (completely) substituting for existing more expensive loans
- Strategy: % of contract that is pre-financed depends on a score:
  - A (score > 3.35): 60% of value of contract is pre-financed
  - B (score < 3.35): 40% of value of contract is pre-financed
- Remarks:
  - Decision at the margin
  - Other loans can be substituted.

Credit Constraints: Experiment

Discontinuity at the letter score gives:

- approx. 20% higher loan $\rightarrow$ 100,000 USD Go
- identical interest rate Go

Validity

- No sorting Go
- No sorting, details Go
- No sorting, placebos Go

Credit Constraints: Results

Table 7: Contract information associated with larger loan amounts

	Loan Amount		Other Loans		Interest Rate	
	(1)	(2)	(3)	(4)	(5)	(6)
Optimal Bandwidth	84,383***		31,441		-0.00516	
	(23,553)		(43,916)		(0.00917)	
75% Optimal Bandwidth	113,709***		1,501		0.00534	
	(41,027)		(114,677)		(0.00565)	
125 %Optimal Bandwidth	88,017***		2,520		-0.0127	
	(4,632)		(27,893)		(0.0109)	
Observations	575		575		575	

Loan increases by 85K

Other Loans are *not* reduced

Same *r*

- Further remarks and results ▸ Go

Credit Constraints: Results

Table 8: Purchases associated with larger loan amounts

	Purchases		log(Purchases)		log(Purchase Volume)		log(Purchases Price)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Optimal Bandwidth	113,941**		0.110**		0.175**		0.0391**	
	(50,712)		(0.0473)		(0.0828)		(0.0195)	
75% Optimal Bandwidth	193,371		0.0882		0.0808***		0.0436*	
	(140,641)		(0.0649)		(0.0311)		(0.0247)	
125% Optimal Bandwidth	101,440**		0.202**		0.230**		0.0413**	
	(48,886)		(0.0916)		(0.101)		(0.0205)	

Cherry Purchases ↑ by 113K (≈85K), ≈11%

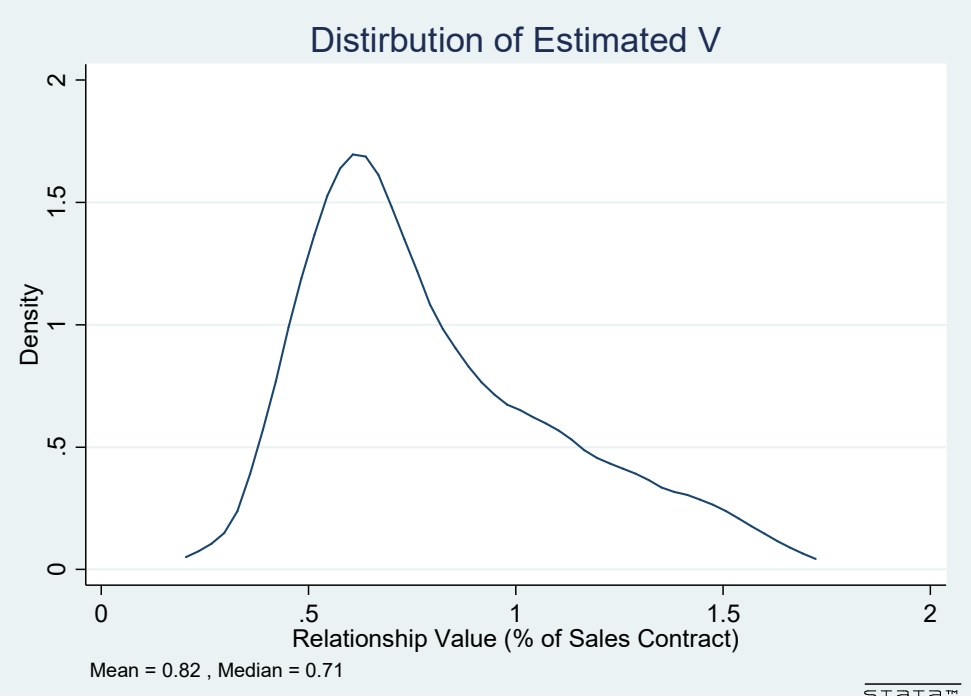
Prices paid to farmers ↑

- Further remarks and results ▸ Go

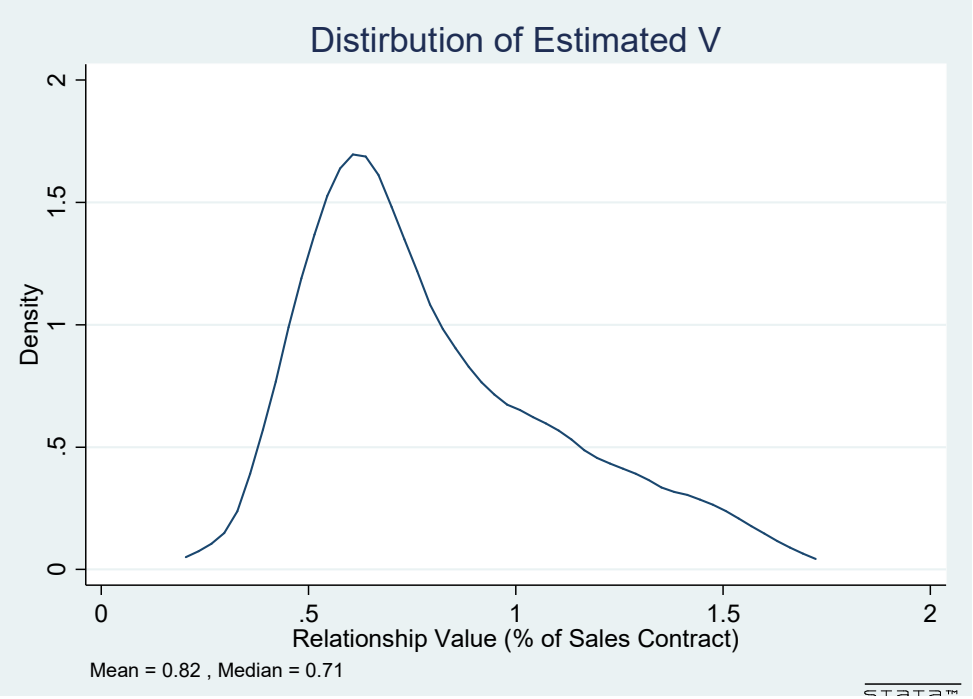
Calibration

	Parameter		Source
$F(p)$	(World) Price Surprise	Data	Observed
μ	Find Alternative Buyer	Late vs. Default	Observed
γ_i	Scale	Audited Accounts	Observed
η	Local Supply	RDD on prices to farmers	Estimated
σ	Penalty for Late	Punishment	Estimated
α	Risk Aversion	Average Fwd Discount	Calibrated
$\mathbf{V}_i$		**Solved**	

Relationship Value: Estimates (**Preliminary !**)

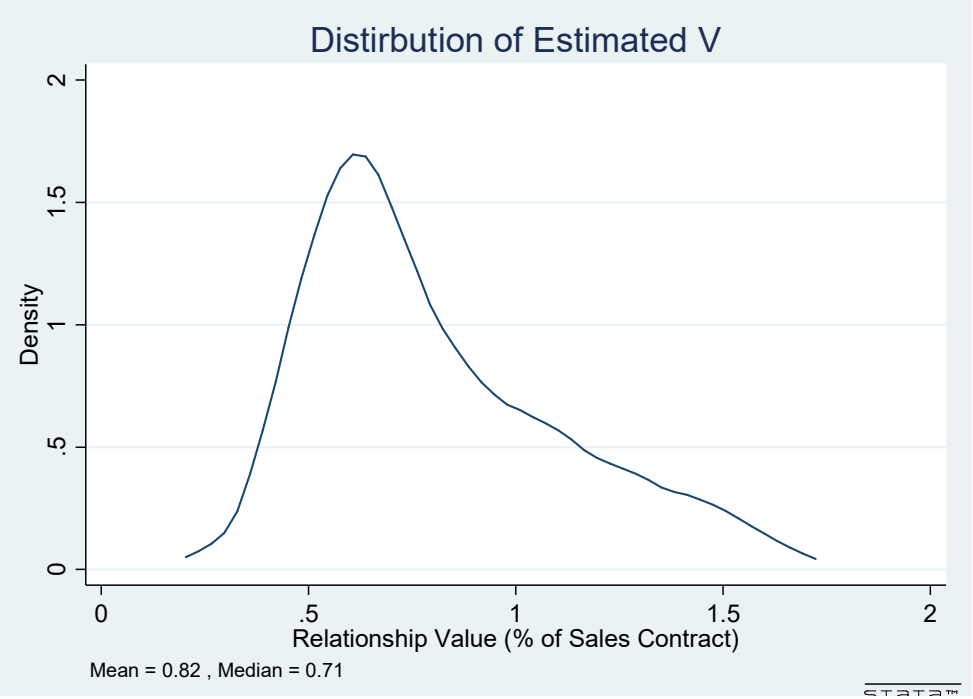


Relationship Value: Estimates (**Preliminary !**)



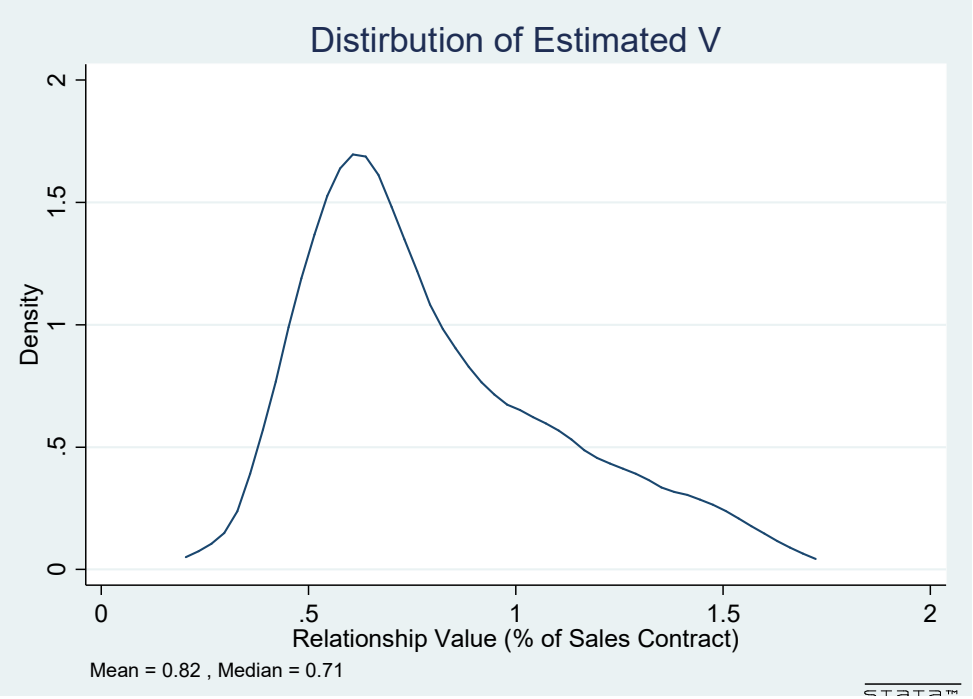
- Estimated $\mathbf{V}_i$ match bounds from observed temptations and are in the region where credit constraints bind

Relationship Value: Estimates (**Preliminary !**)



- Estimated $\mathbf{V}_i$ match bounds from observed temptations and are in the region where credit constraints bind
- Removing strategic default at the average mill increases production by 18% and farmers welfare by 30%

Relationship Value: Estimates (**Preliminary !**)



- Estimated $\mathbf{V}_i$ match bounds from observed temptations and are in the region where credit constraints bind
- Removing strategic default at the average mill increases production by 18% and farmers welfare by 30%
- Removing relational capital at the average mill decreases production by 43% and farmers welfare by 74%

Roadmap

- Context & Data ▸ Go
- Model ▸ Go
- Empirics
  - **Test 1:** Detecting Strategic Default ▸ Go
  - **Test 2:** Strategic Default & Contract Choice ▸ Go
  - Does Strategic Default matter?
    - ★ RDD ▸ Go
    - ★ Calibration & Counterfacuals ▸ Go
- Conclusion & Discussion ▸ Go

Policy Implications I

- A common problem in a specific context:
  - Many developing countries heavily rely on export revenues generated in few, highly volatile, mineral/agricultural markets.
  - Yet access to risk-management tools is limited
- Counterparty risk a key constraints $\rightarrow$ financing and risk management are linked:
  - both involve promises to pay that are limited by collateral constraints
- In our context, collateral is relational capital $\mathbf{V}$ $\rightarrow$ structure of formal contract $\rightarrow$ endogenous determination of missing market

Policy Implications II

- Can't mill insure against price fluctuations buying options?
- Strategic default
  - $\rightarrow$ Mill cannot credibly promise to pay back when price is high.

Policy Implications II

- Can't mill insure against price fluctuations buying options?
- Strategic default
  - → Mill cannot credibly promise to pay back when price is high.
- OK. But, why not just buy a put option against low prices?
  - → This already happens: *fair trade* contract
- However:
  - → counterparty risk on the buyer side (see de Javry et al. (2014))
  - → low willingness to pay due to limited liability

Conclusions: What have we learned?

1. This paper provided a test for strategic default (ex-post MH)

$\rightarrow$ a trade-off between *price* and *counterparty* risk

Conclusions: What have we learned?

1. This paper provided a test for strategic default (ex-post MH)

→ a trade-off between *price* and *counterparty* risk

2. Friction is quantitatively important:

→ Large enough to generate credit (or insurance) constraints

→ Imposes externality on farmers upstream

→ Many valuable trade opportunity are lost

→ Heterogeneous missing markets across firms

Conclusions: What have we learned?

1. This paper provided a test for strategic default (ex-post MH)

→ a trade-off between *price* and *counterparty* risk

2. Friction is quantitatively important:

→ Large enough to generate credit (or insurance) constraints

→ Imposes externality on farmers upstream

→ Many valuable trade opportunity are lost

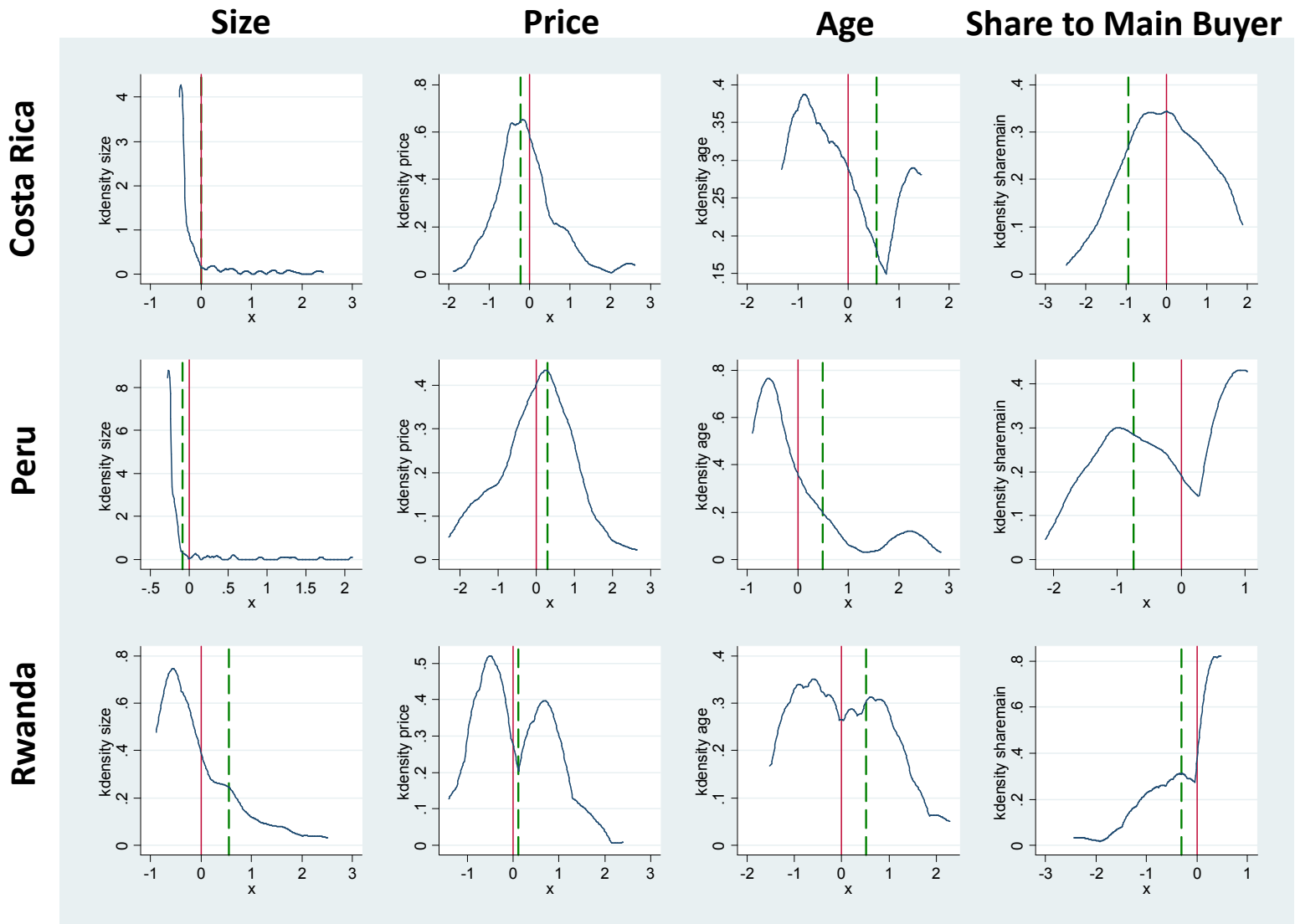
→ Heterogeneous missing markets across firms

3. Formal contracts adapted to leverage scarce relational capital

Thank you !

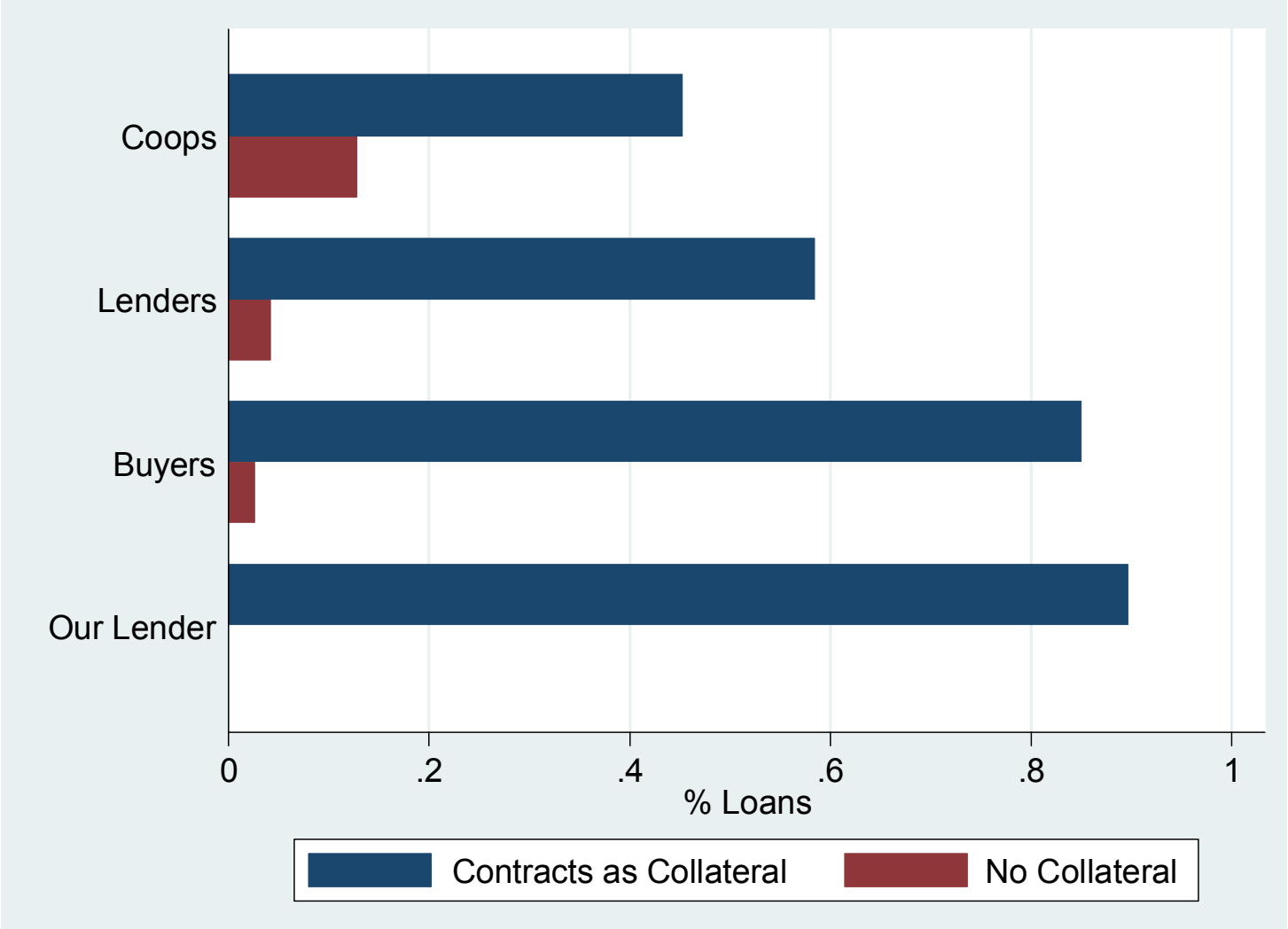
Lender Portfolio

Back



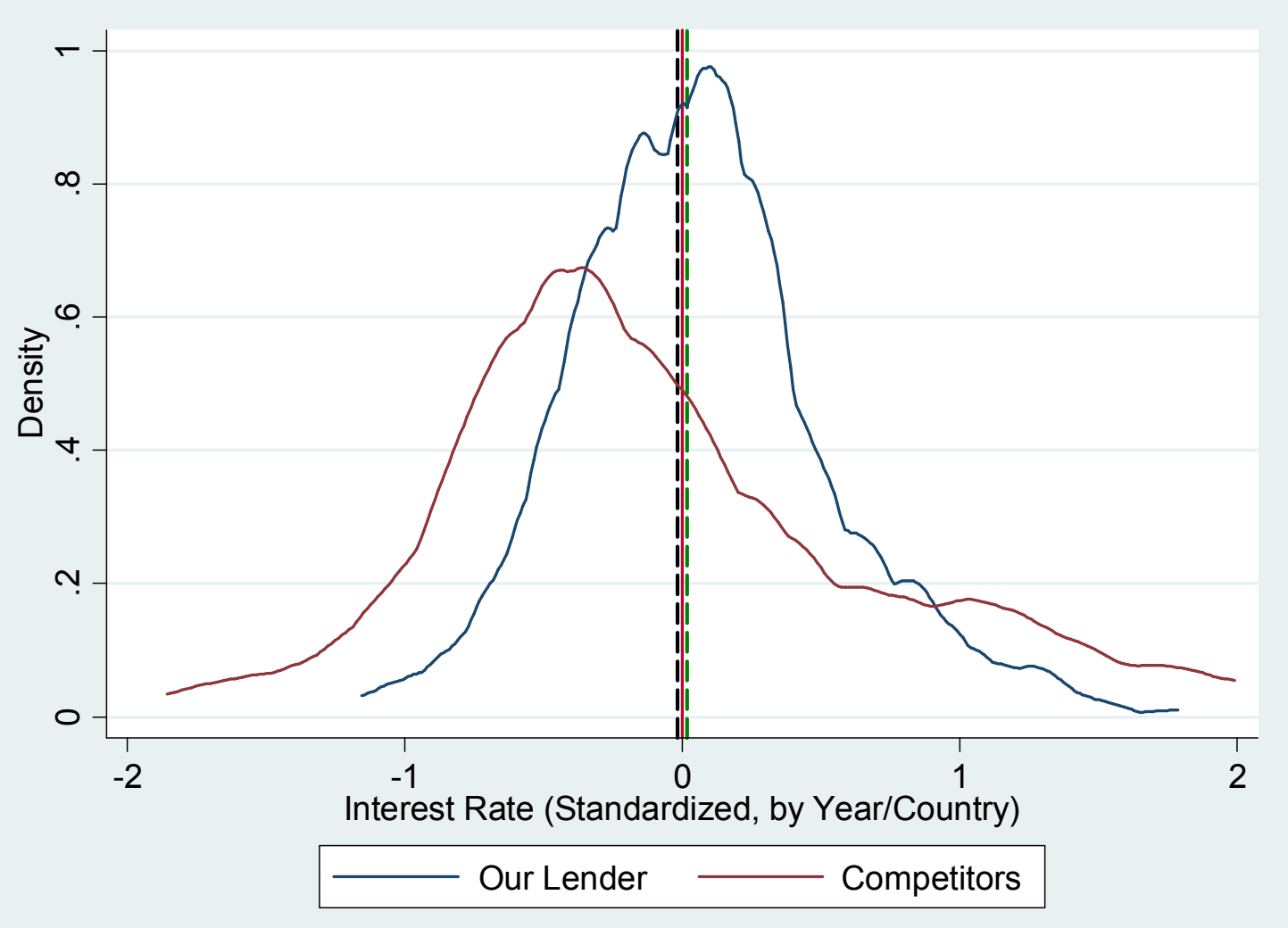
Lender Portfolio

Back



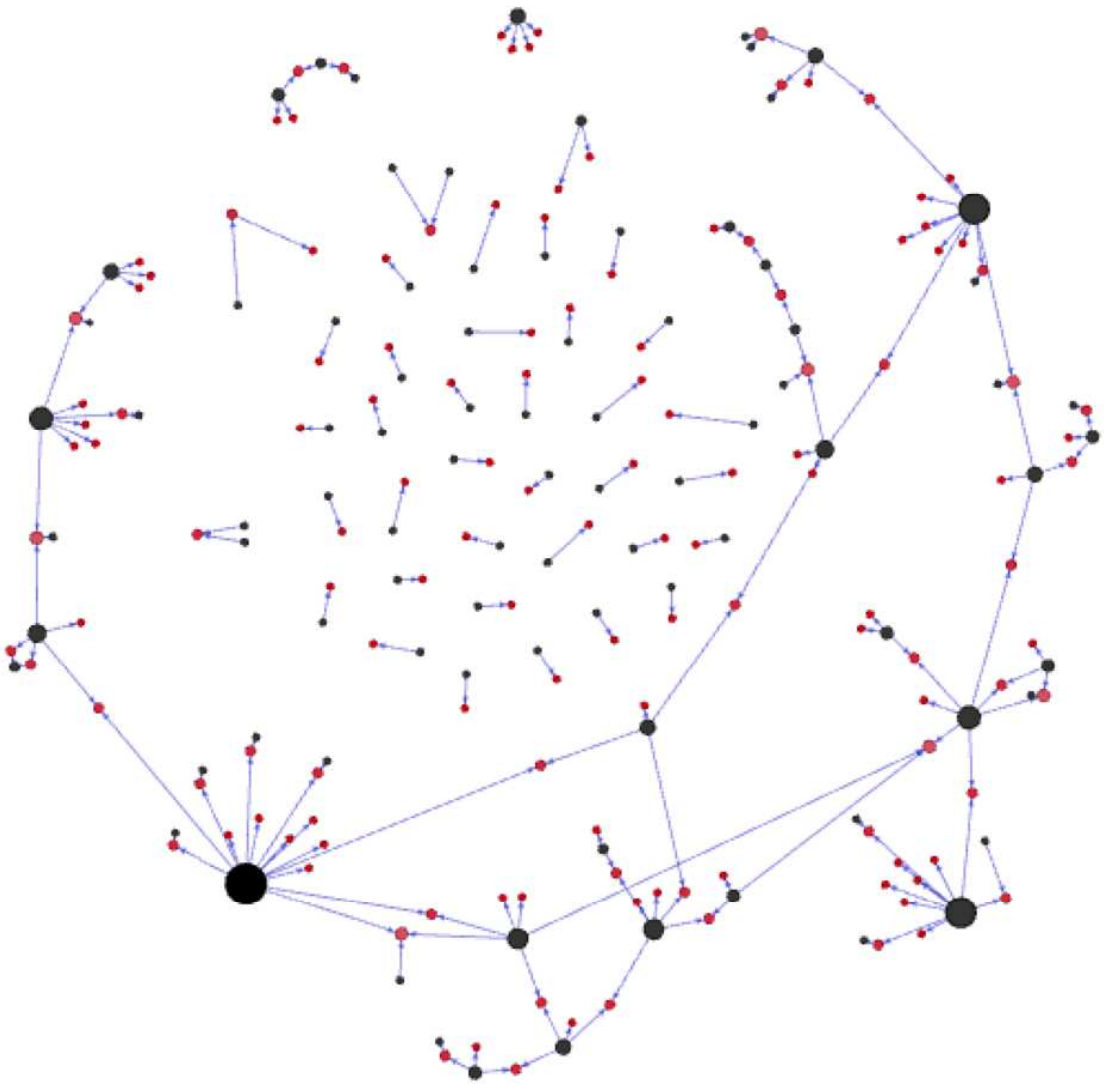
Lender Portfolio

Back



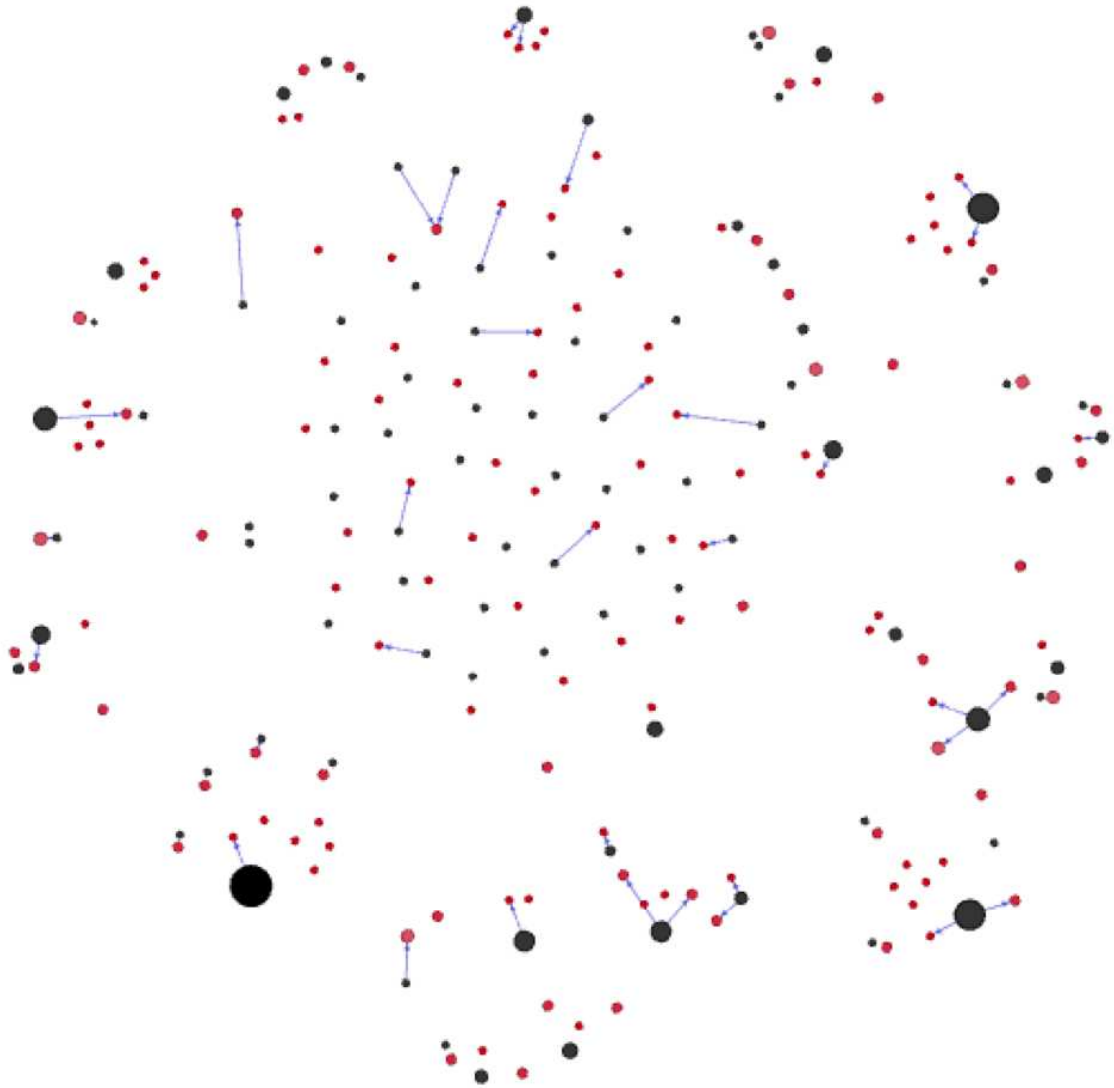
Lender Portfolio

Back



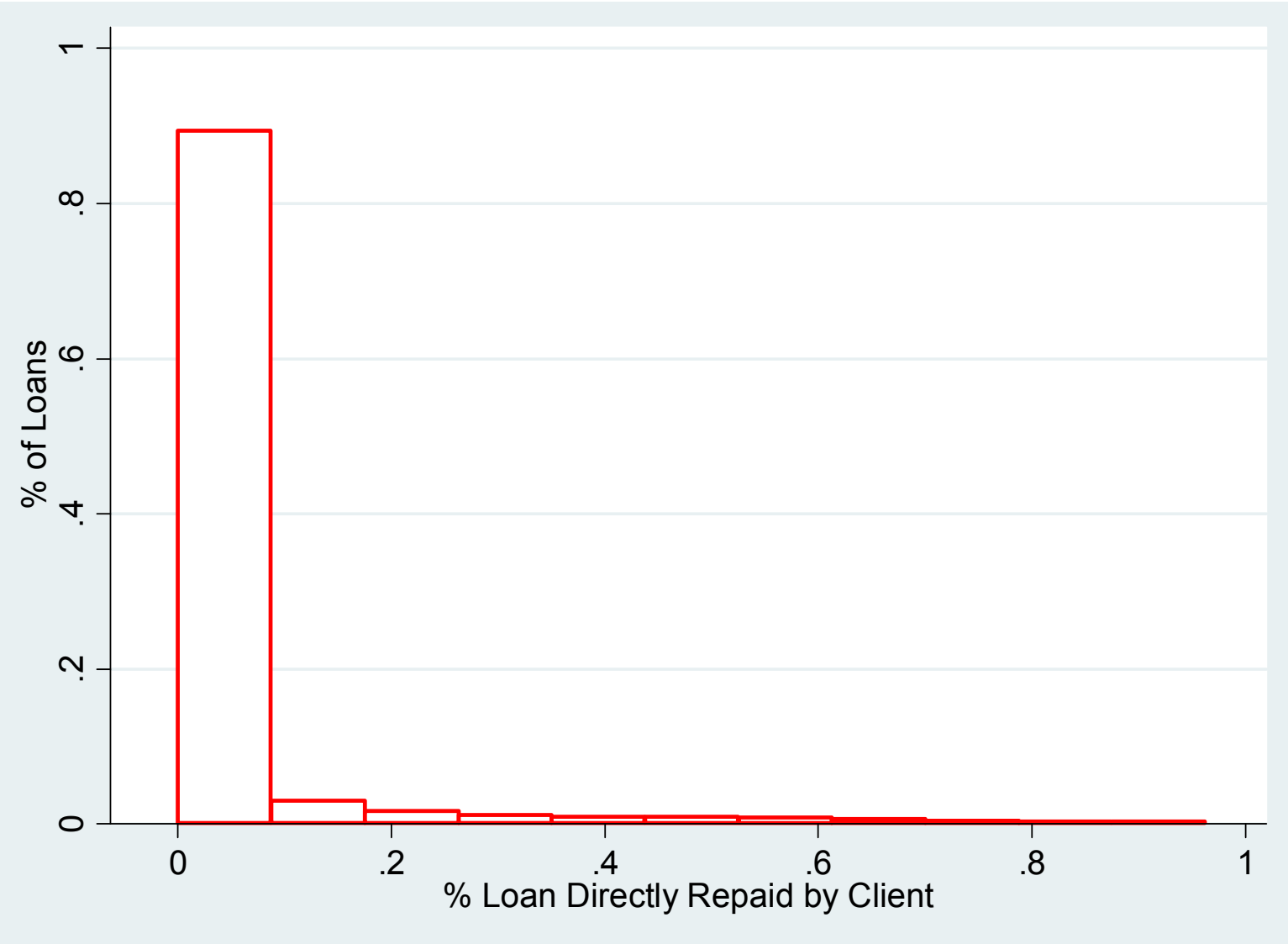
Lender Portfolio

Back



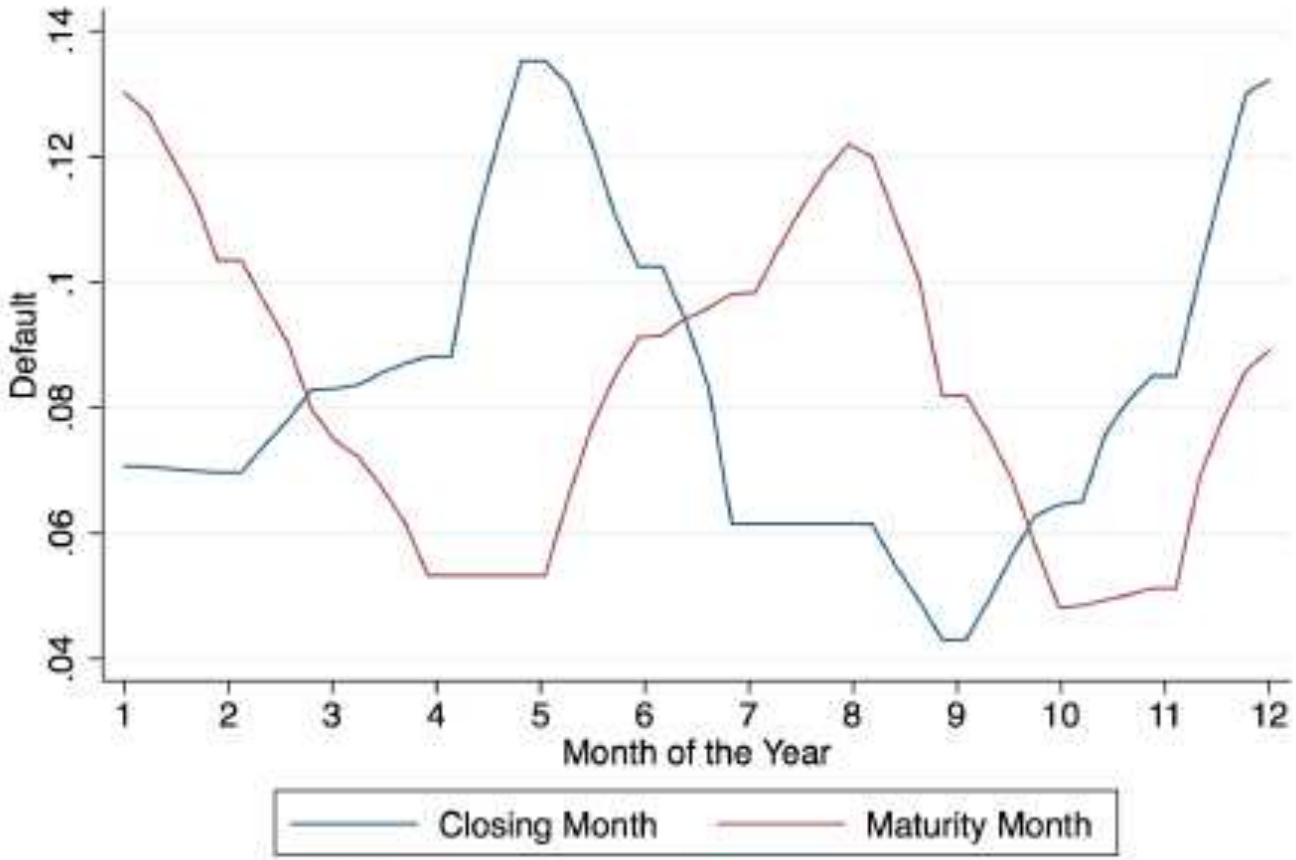
Lender Portfolio

Back



Variation in Contract Timing

Back



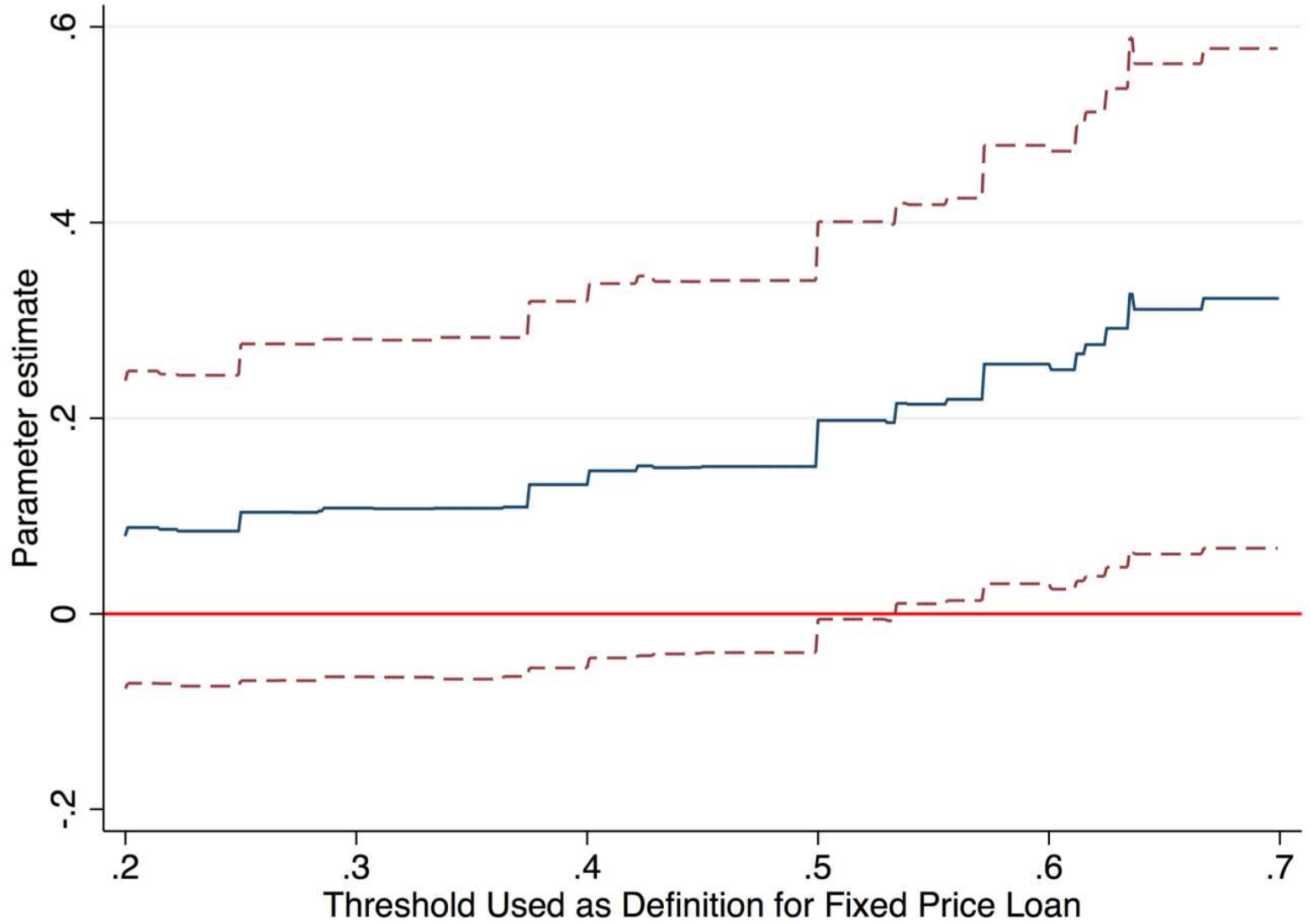
Test for Strategic Default

Back

Dependent Variable: Default or 90+ days late on repayment							
Sample:	All loans (Not split by type)	Fixed Shipments	Fixed Shipments	Loans where all shipments are fixed	Differential Shipments	All loans (Not split by type)	Weighted OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Price Surprise	0.052	0.098	0.146	0.22	0.0501	0.0263	0.035
	(0.032)	(0.045)**	(0.058)**	(0.11)**	(0.0411)	(0.036)	(0.027)
Fixed						-0.025	-0.182
						(0.529)	(0.076)**
Fixed x Price Surprise						0.184	0.153
						(0.092)**	(0.062)**
Futures Price			0.001	0.0015	0.00011	0.000631	-0.000781
			(0.0007)	(0.0015)	(0.00021)	(0.000222)	(0.000527)
Price at Maturity			0.0001	-0.0003	0.00023	-0.000744	0.00075
			(0.0005)	(0.0011)	(0.00022)	(000205)	(0.000527)
Maturity Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Closing Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Closing Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Price Interactions	No	No	No	No	No	Yes	Yes

Test for Strategic Default

Back



Test for Strategic Default

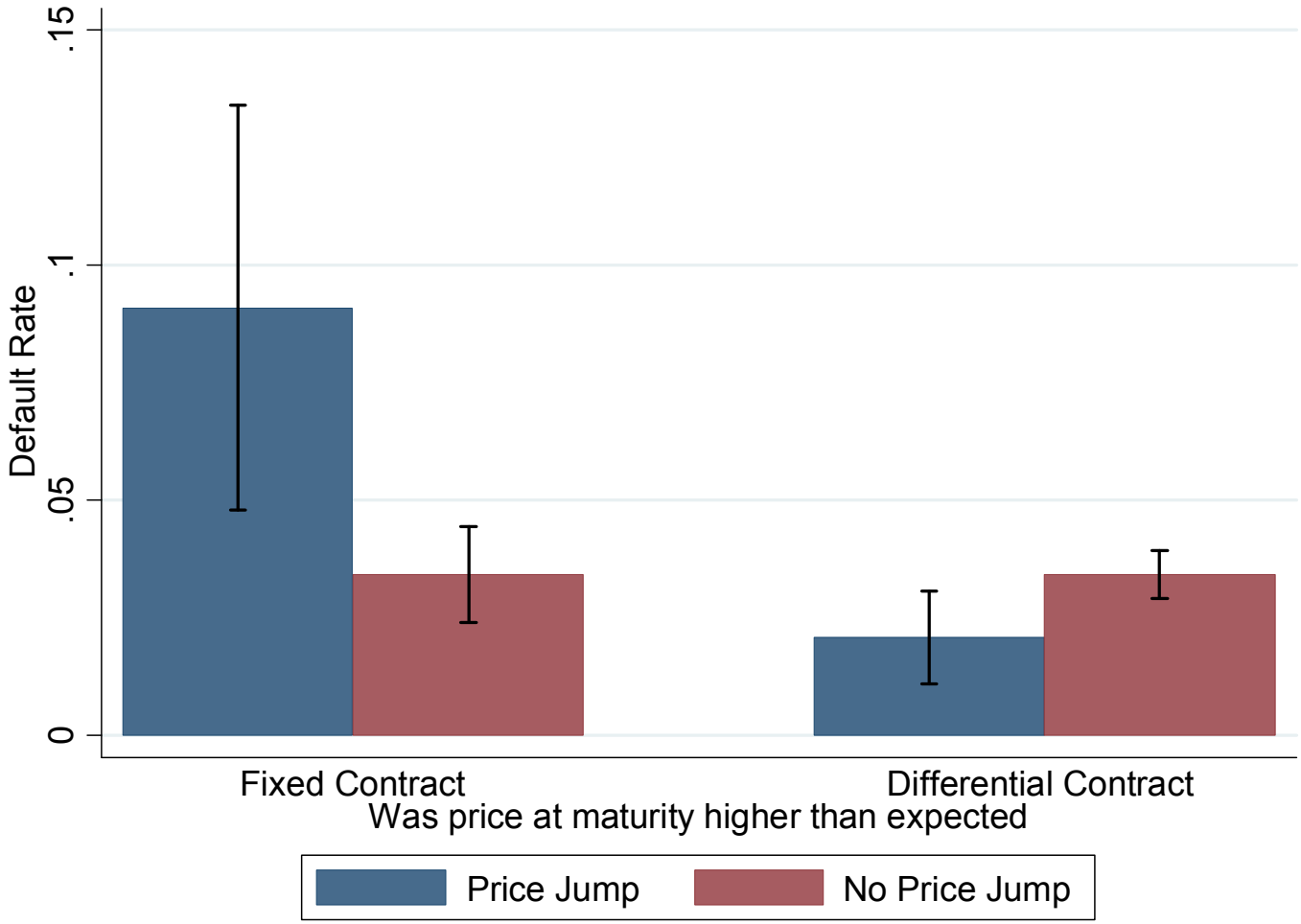
Back

Table 10: Punishment for Default

	Default	Restructured	90 Days Late
	(1)	(2)	(3)
Differential Prob. of Future Loan	-0.520***	-0.460***	-0.329***
	(0.130)	(0.0983)	(0.0575)
Futures Price (mat.) at closing date	Y	Y	Y
Price at Closing	Y	Y	Y
Letter Score Fixed Effects	Y	Y	Y
Country Fixed Effects	Y	Y	Y
Closing Month Fixed Effects	Y	Y	Y
Observations	907	907	907
R^2	0.334	0.331	0.323

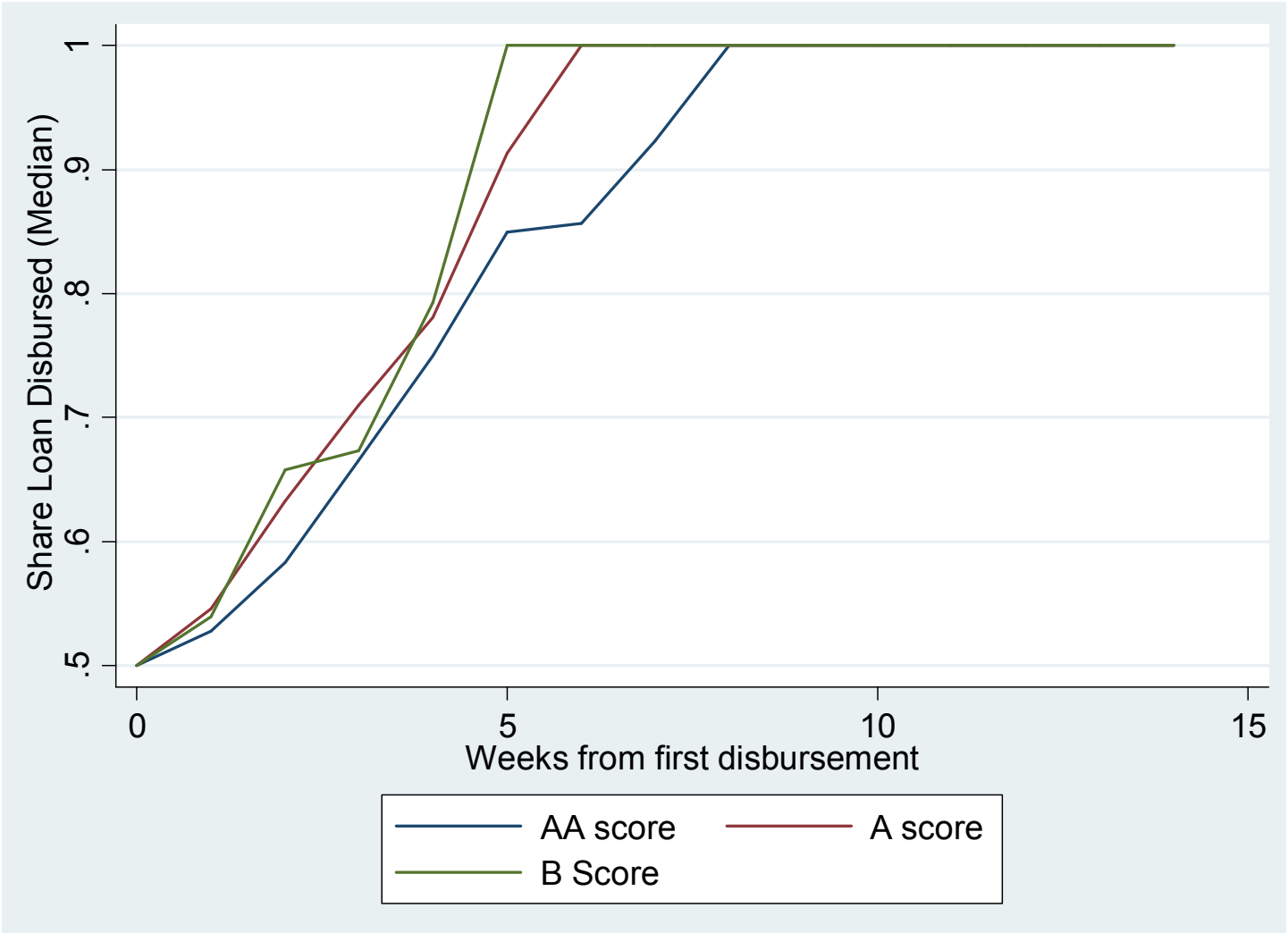
Test for Strategic Default: Event Study

Back



Controlling Loan Diversion

Back



Test for Strategic Default

Back

	(1)	(2)	(3)	(4)	(5)
Relationship Score with Buyer	0.07	0.0646	0.0648	0.0662	0.0648
	(0.0351)**	(0.0330)*	(0.0327)**	(0.0306)**	(0.0311)**
Number of observations	336	336	336	336	336
Cumulative business done to date between client-buyer (100,000)	0.0021	0.0028	0.0023	0.0023	0.0022
	(0.00041)***	(0.00036)***	(0.00036)***	(0.00036)***	(0.00038)***
Number of observations	379	379	379	379	379
Maturity Month Fixed Effects	Yes	Yes	Yes	Yes	Yes
Maturity Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Closing Month Fixed Effects	Yes	Yes	Yes	Yes	Yes
Closing Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Client Fixed Effects	Yes	Yes	Yes	Yes	Yes
Number of Buyers	Yes	Yes	Yes	Yes	Yes
Contract Value parameters	Panel A	Panel A	Panel A	Panel A	Panel A
Letter Score	No	Yes	Yes	Yes	Yes
Numerical Score	No	No	Yes	Yes	Yes
Future Price at Signing	No	No	No	Yes	Yes
Loan Length	No	No	No	No	Yes

Further Results

Back

Conditional on fixed contract, heterogeneity by relationship importance

- Buyer-Seller
-
- Control for contract size and duration (and joint estimation)

Conditional on fixed contract, heterogeneity by

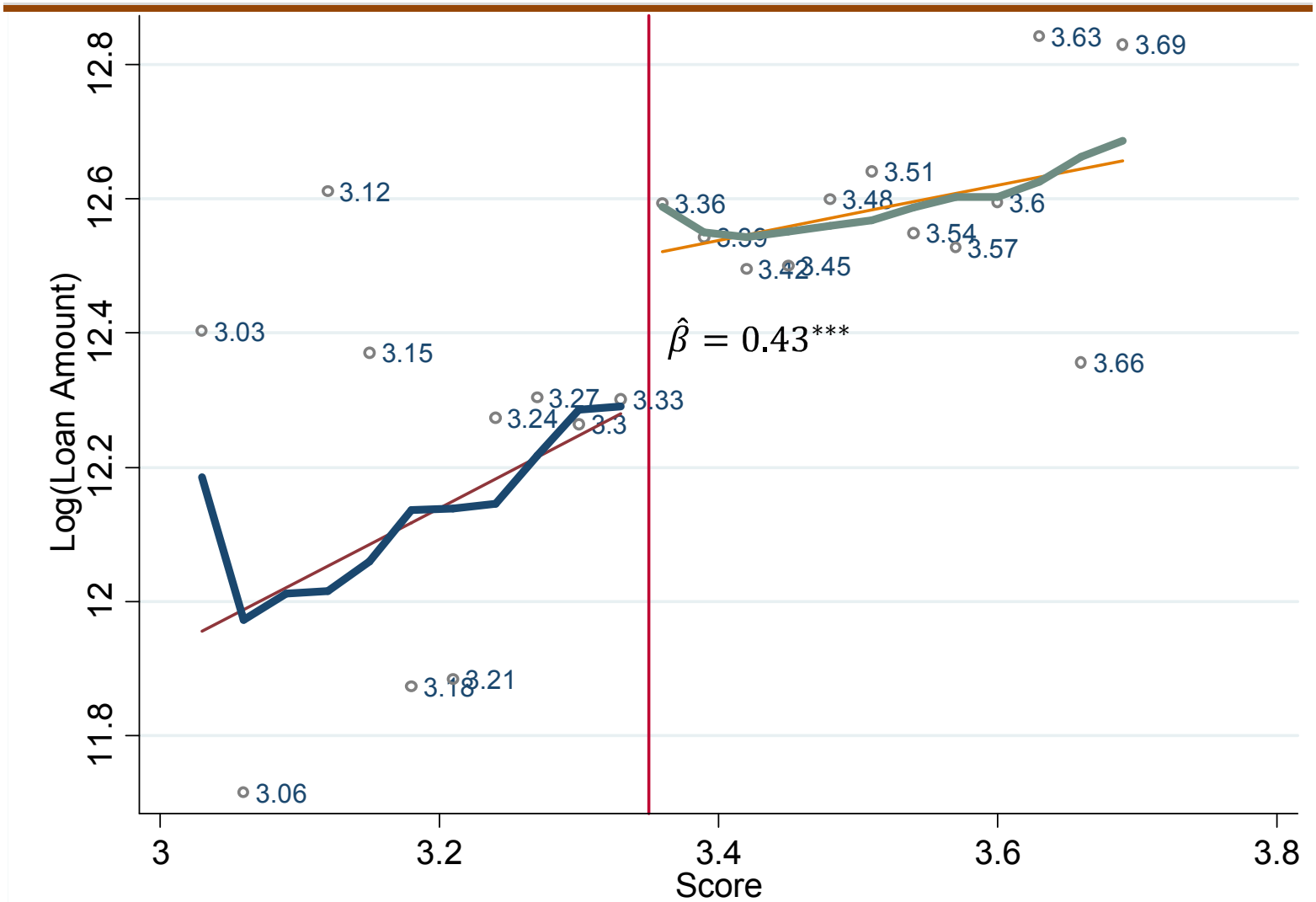
- Institutional Quality
- Lender Competition (*in sample*)
- Buyer Competition (*in sample*)

Mill-Lender Collusion ▸ Back

- Nearly 90% are indeed directly repaid by the buyer
- When relationship btw. buyer and lender is weaker mill might default on sale contract while still repaying the loan
- When this happens, we (should) observe:
  - Repayment is made directly by the mill (▸ Go)
  - Relationship between buyer and lender is compromised
  - Less likely to happen with buyers important for the lender (▸ Go)
  - More likely to happen with late repayment and at times of positive price surprise

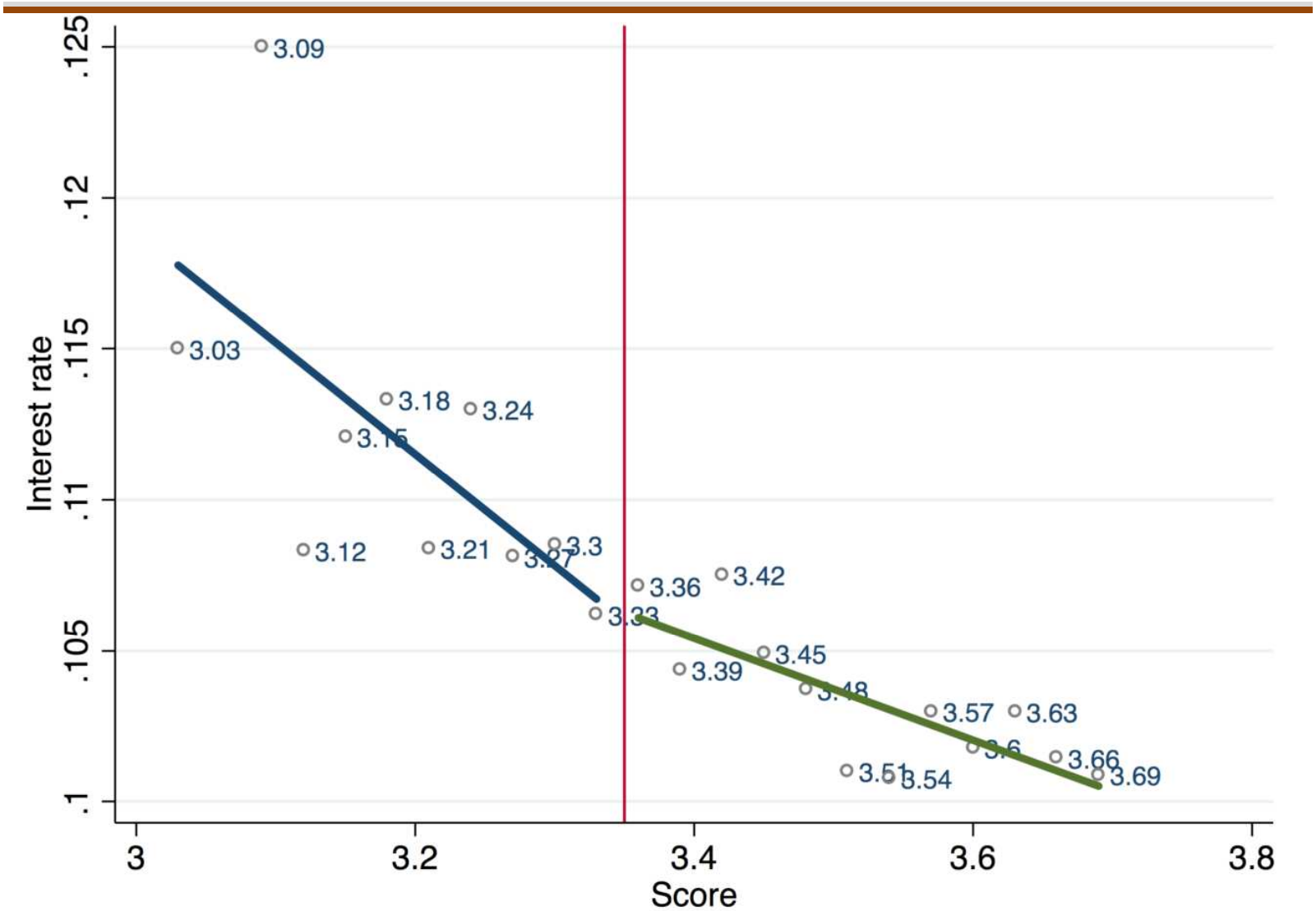
RDD Design: Experiment

Back



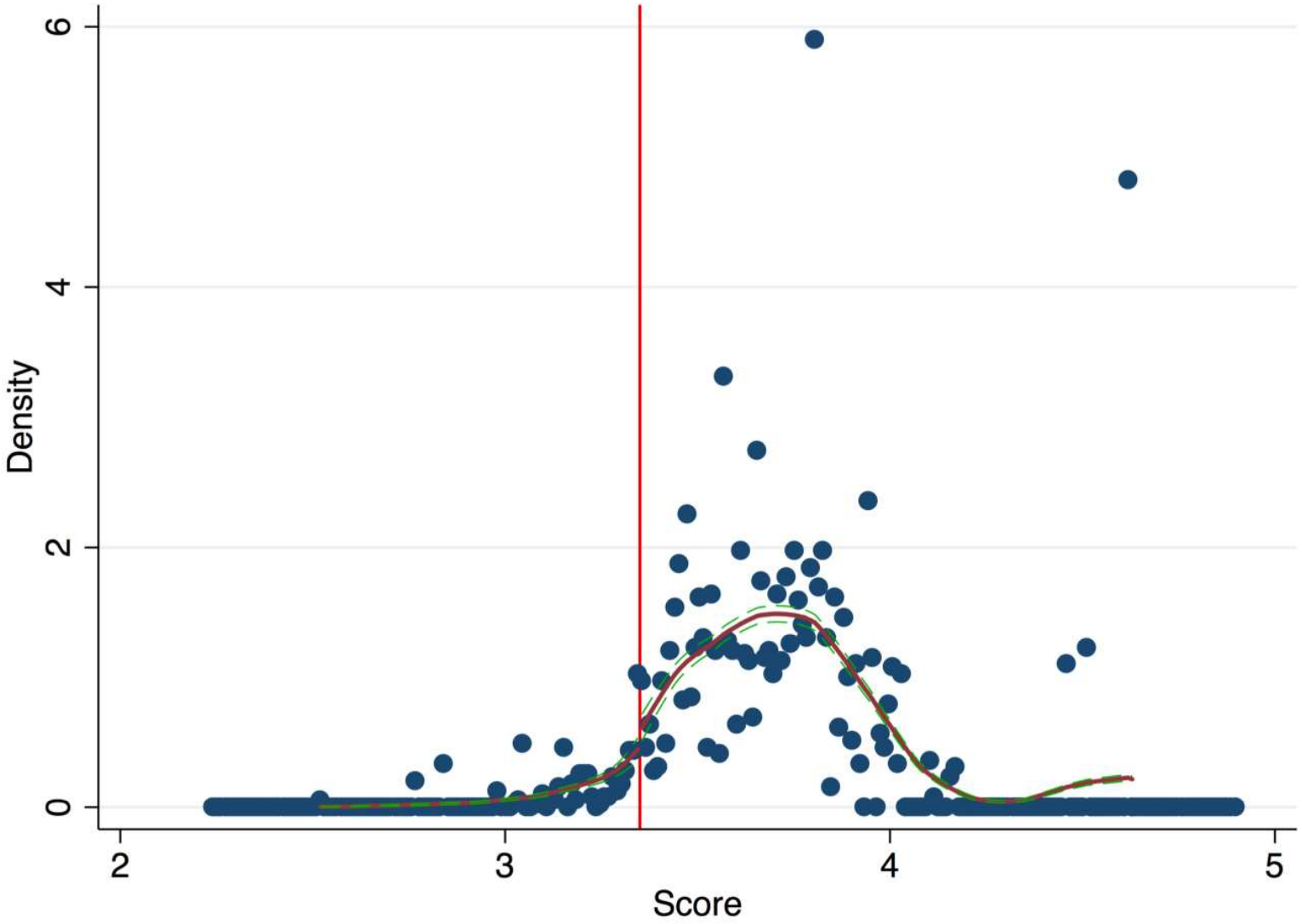
RDD Design: Experiment

Back



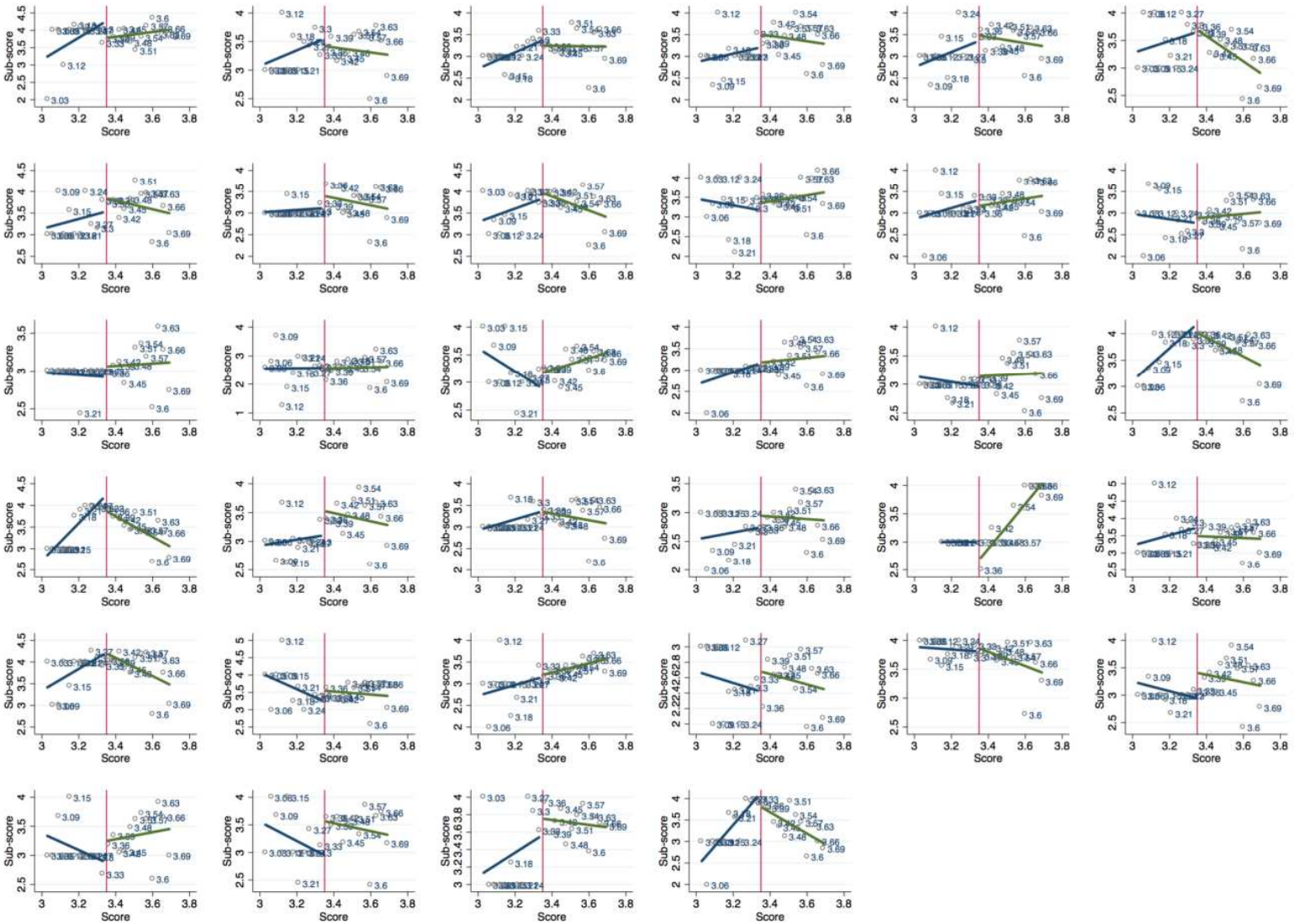
RDD Design: Validity

Back



RDD Design: Validity

Back



RDD Design: Validity

Back

	No. of sig. estimates for score		
	10% significance	5% significance	1% significance
	(1)	(2)	(3)
	11 Station Characteristics		
3.25 threshold	0	0	0
3.35 threshold (B-A)	1	1	0
3.45 threshold	1	0	0
3.71 threshold	1	1	0
3.81 threshold (A-AA)	0	0	0
3.91 threshold	1	1	0
Observations per sub-score regression	575	575	575
	34 Subscores		
3.25 threshold	1	0	0
3.35 threshold (B-A)	5	3	0
3.45 threshold	11	5	0
3.71 threshold	1	0	0
3.81 threshold (A-AA)	4	1	0
3.91 threshold	5	1	0
Observations per sub-score regression	575	575	575

Credit Constraints: Remarks

Back

Further Results

- Sales increase to buyers *not* on the contract, no effect on sales price
- Profits increase, suggesting MPK $\simeq$ 20-30% $>$ interest rate

Heterogeneity

- Not enough power to run RDD by contract type (endogenous anyway)
- Second discontinuity A $\rightarrow$ AA
  - Relatively more differential contracts
  - No credit constraints: larger loan substitutes other loans

Ex-Post Incentive Constraint

Back

Mill repays on time if ...

$$q_c p_c - D + \delta V \geq \mu \left(p q_c + \delta U^D \right) + (1 - \mu) \left(q_c p_c - D + \delta U^L \right) \tag{8}$$

Assume $U^D = U$, $U^L = \sigma V + (1 - \sigma) U$ and denote $\varphi = \frac{\mu}{1 - \sigma(1-\mu)}$

Rewrite as

$$\underbrace{V}_{\delta(V-U)} \geq \varphi \times (D + (p - p_c) q_c) \tag{9}$$