Tropical Lending:
International Prices, Strategic Default and Credit Constraints among Coffee Washing Stations

Arthur Blouin
Toronto

Rocco Macchiavello
Warwick

April 2015

Motivation

Ability to enter into binding agreements is an essential ingredient of economic growth (Greif (2005)) and international trade (Rauch (2001))

- Distance, higher monitoring costs and different institutional regimes

Contractual parties limit opportunism by combining **formal** contract terms and **informal** relational mechanisms (e.g., reputation) (McLeod (2007))

Many models of opportunism/moral hazard – but limited empirical evidence (particularly on large firms)

This paper:

1. Can we detect (and distinguish) *a* form of moral hazard ?
2. How does it affect contract choice and efficiency ?

Two broad classes of MH

	Ex-Ante MH	Ex-Post MH
Credit	**Loan Diversion** *Holmstrom and Tirole* (1997), *Burkart and Ellingsen* (2004)	**Strategic Default** *Townsend* (1979), *Lacker and Weinberg* (1989)
Commercial	**Costly Quality Provision** *Shapiro* (1982)	**Side-Selling** *Olstrom* (1990)

Why is it important to distinguish ?

1. Optimal remedy depends on source of opportunism
   - Loan diversion → Trade credit (Burkart and Ellingsen (2004))
   - Strategic Default → Optimality of Debt (Townsend (1979))

2. Differently affected by changes in environment
   - E.g., market structure or technology

3. Different welfare implications:
   - Direct: Deadweight loss vs. transfers
   - Indirect: Contract Choice → Which Market is Missing

Why is it difficult to distinguish ?

- We need:

1. Contract-level data with terms and default

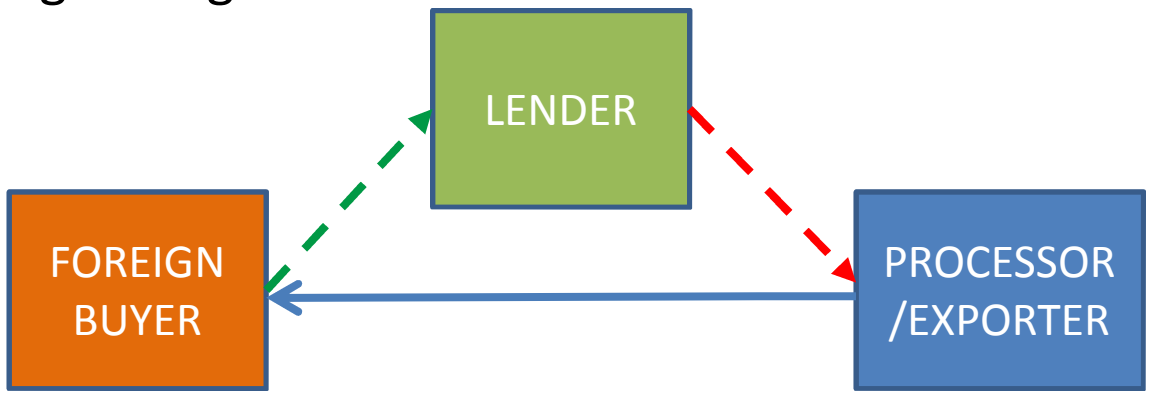
2. Exogenous changes in incentives when unobserved action is taken

This Paper

- This paper provides evidence for strategic default (ex-post MH) and its consequences in the international coffee market.

- We use data on ≈800 sale and working capital loans contracts to ≈300 coffee mills in ≈25 developing countries
  - Intrinsic interest
  - Methodological advantages

- Pre-financing arrangements



- Sales contract (*fixed price* vs. *differential price*) used as **collateral**

Why is it difficult to distinguish ?

- **Advantages** of our setting:

1. Contract-level data with terms and default: data on
  - Loans contracts: default is observed
  - Sales contracts: *fixed price* vs. *differential contracts*

2. Exogenous changes in incentives when unobserved action is taken
  - Observed unanticipated fluctuations in international prices

    a. When production decisions are made: **ex-ante MH**
    b. At the time of contract execution: **ex-post MH**

Summary of Results

1. Test for strategic default:
   - Unanticipated ↑ international coffee price ↑ defaults (for fixed price contracts)

2. Strategic default implies a trade-off between ***price*** and ***counterparty*** risk:
   - High relationship value → fixed price contract
   - Low relationship value → differential contract

3. Strategic default is quantitatively important
   - RDD evidence of credit constraints
     - Additional funds used to purchase inputs (not substitute other loans)
   - Model Calibration
     - date consistent with strategic default being source of credit constraint

Related Literatures

(Relational) Contracts:

- **Macchiavello and Morjaria** (*forthcoming*), **Banerjee and Duflo** (2000), **Antras and Foley** (2014), McMillan and Woodruff (2000), Lerner and Schoar (2002)

Credit Constraints (on larger firms), **Credit and Exports, Trade Credit, …**:

- **Banerjee and Duflo** (2015), Banerjee and Munshi (2004)
- Paravisini et al. (2011), Manova (2013a, 2013b), Amiti and Weinstein (2010)
- Klapper (2006), Klapper et al. (2011)
- Rampini and Viswanathan (2010, 2011)

Industrial Organization of Agricultural Sector:

- De Janvry et al. (2014), Dragusano and Nuun (2014), Macchiavello and Morjaria (2014), Casaburi and Reed (2013), Ghani and Reed (2014), Banerjee et al. (2001), Mullhainathan and Sukhatankar (2014), Fafchamps (et al., various)

Empirics of Contracts

- Chiappori and Salanié (2002), Karlan and Zimman (2010), Adams et al. (2009), Townsend (et al., various)

Contribution

Banerjee and Duflo (2000) and **Antras and Foley** (2014): reputational forces shape contract terms

→ Direct test for moral hazard + Quantify inefficiency

Macchiavello and Morjaria (*forthcoming*): relational capital/reputation a quantitatively important determinant of trade

→ Interaction between formal and informal contracts enforcement, richer understanding of (endogenous) market failures

Banerjee and Duflo (2015): evidence of credit constraints on Indian SMEs

- Evidence of high/heterogeneous F_K consistent with imperfect *credit* markets –mostly from *microenterprises* (De Mel et al. (2008, 2009), Fafchamps et al. (2011), Karlan et al. (2012, 2013), Kremer et al. (2011), Banerjee et al. (2015))

→ Source of credit (and insurance) constraints

The Plan

1. Context

2. Theoretical Framework

3. Strategic Default

4. Credit Constraints and Model Calibration

5. Discussion of Policy Implications & Conclusions

Context

What do Coffee Washing Stations do?

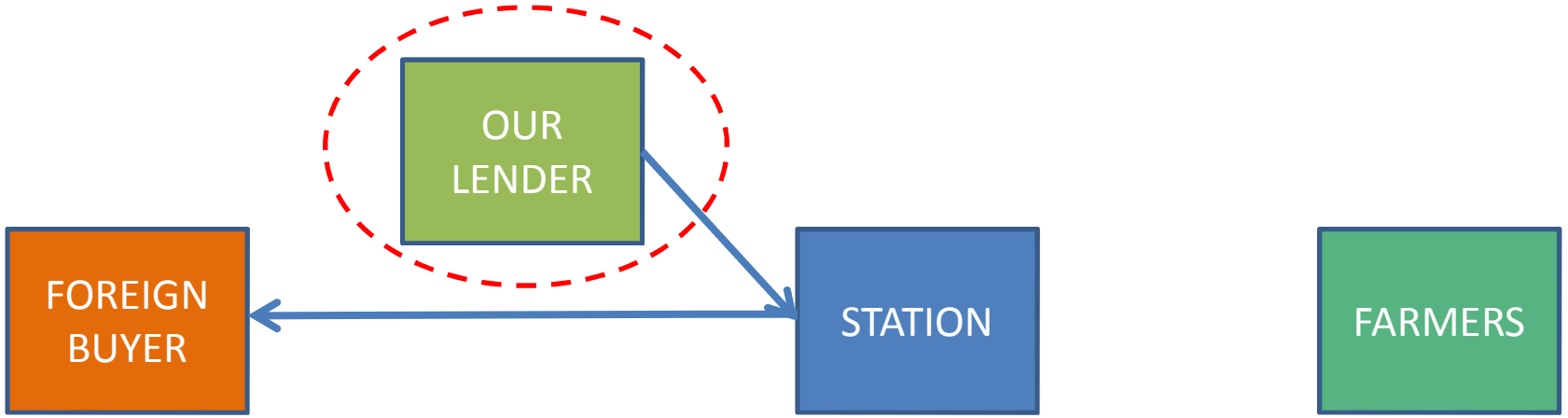
What do Coffee Washing Stations do?

What do Coffee Washing Stations do?

What do Coffee Washing Stations do?

What do Coffee Washing Stations do?

Data Source



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

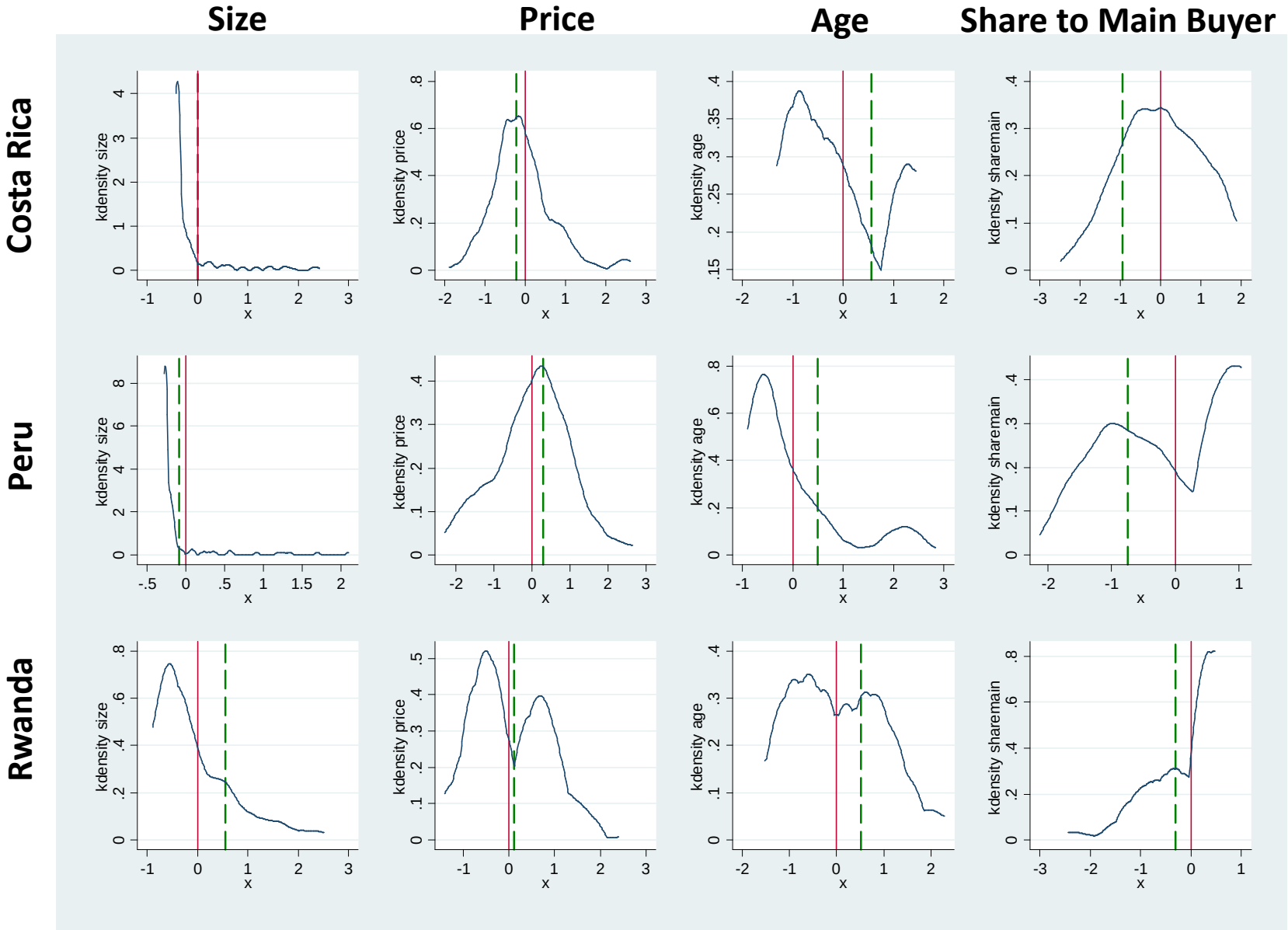
Lending Model

1. Similar to working capital loans based on account receivable:
   - Primary source of SME financing in US (Klepper (2004)) – even more important in developing countries (Demirguc-Kunt and Maksimovic (2001))

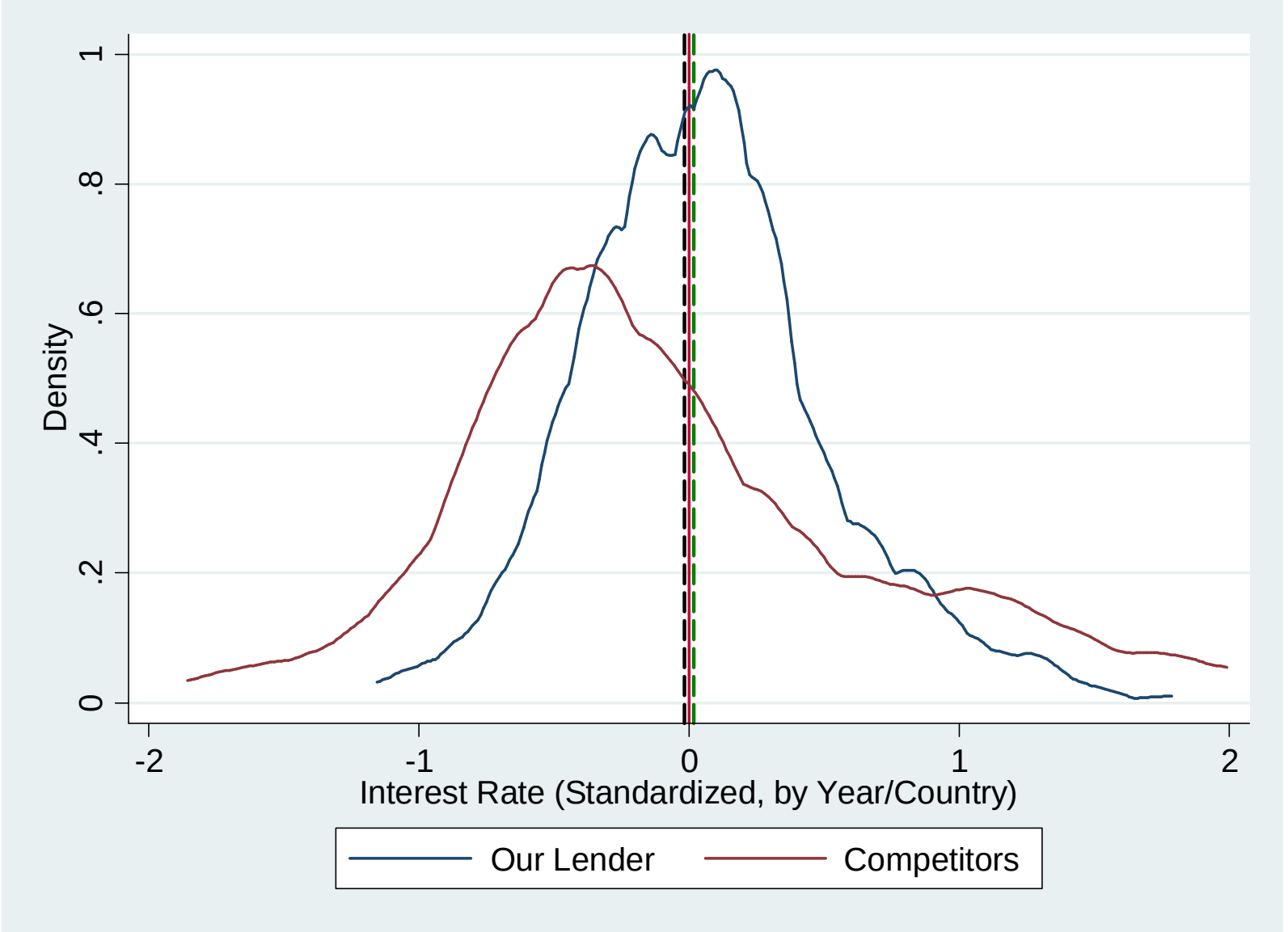
2. Extremely common practice in this (and related) industry:
   - "Processors and exporters engage in pre-financing to secure future supplies of coffees" (*Coffee's Exporter Guide*, *ITC*)
   - "Exporters often enter into pre-financing arrangements with importers ... However, pre-financing credit arrangements tend to be very short-term and restrict marketing options as well" (Larson and Varangis (2006), *WB*)

3. One of two main sources of working capital finance for:
   - **Rwandese** coffee washing stations (main source for ≈ 40% of stations)
   - **Peruvian** coffee exporters (approx. 30% of export transactions)

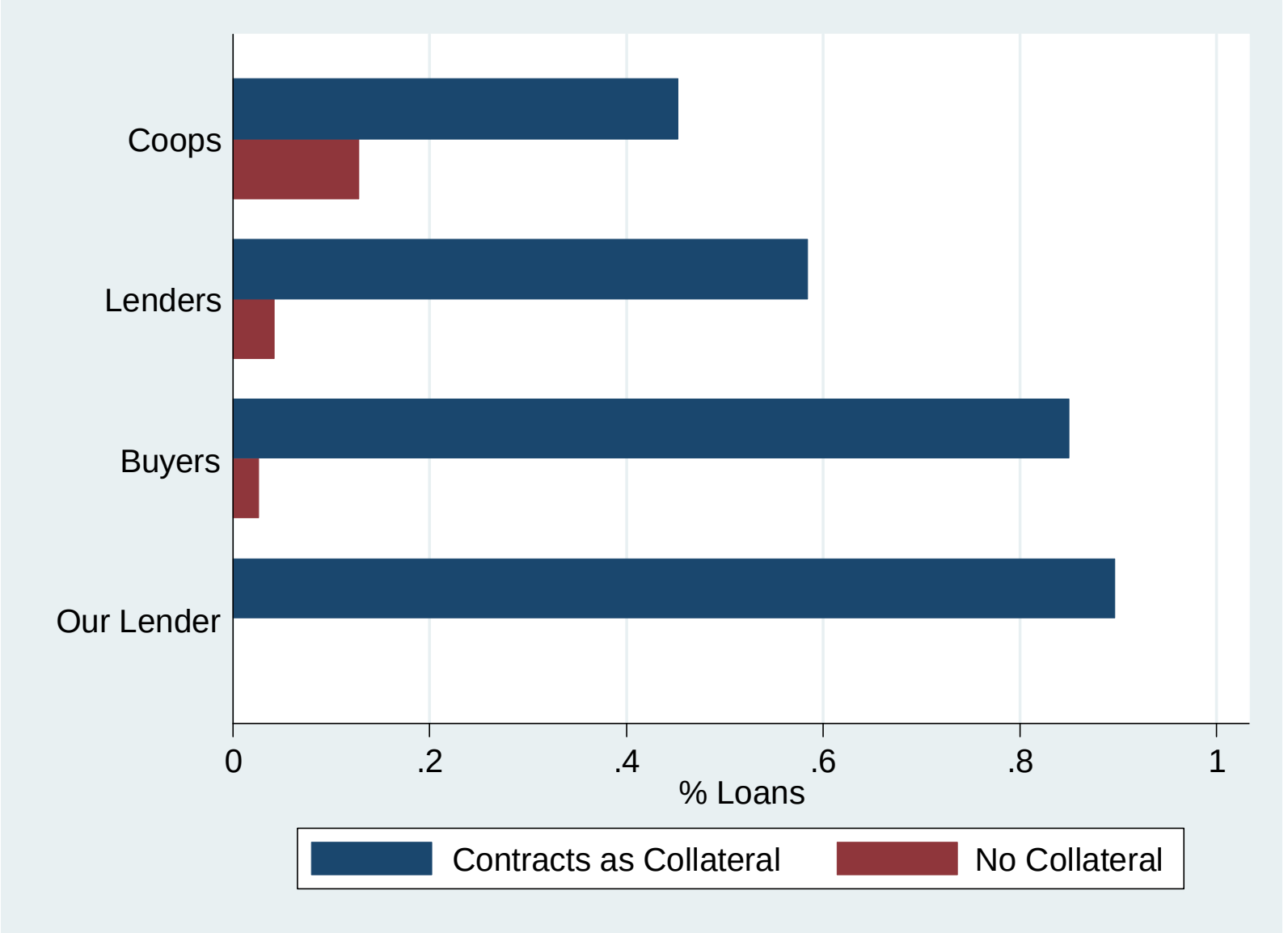
Representativeness of Lender's Portfolio



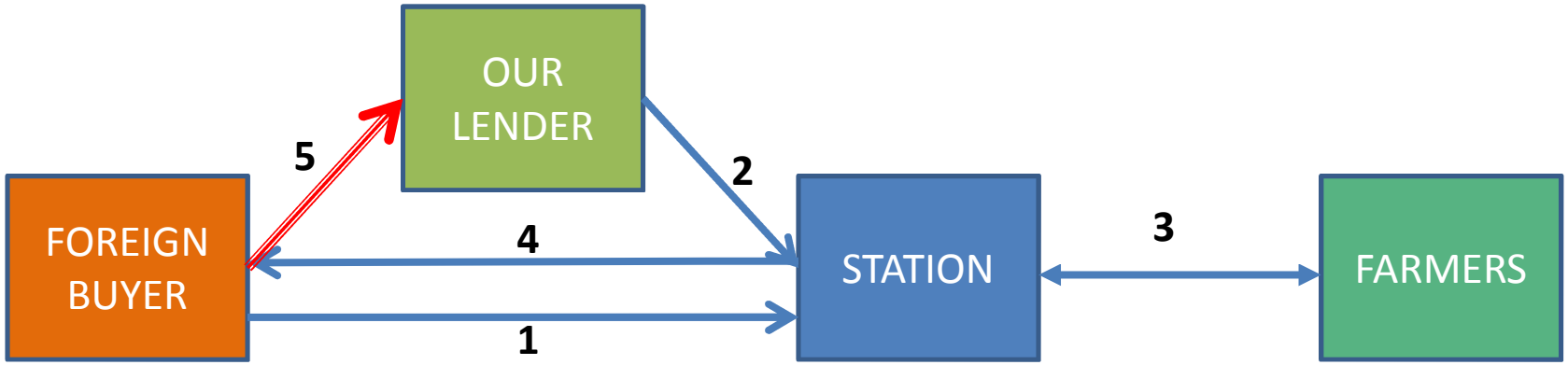
Representativeness of Lender's Interest Rates



Use of Collateral

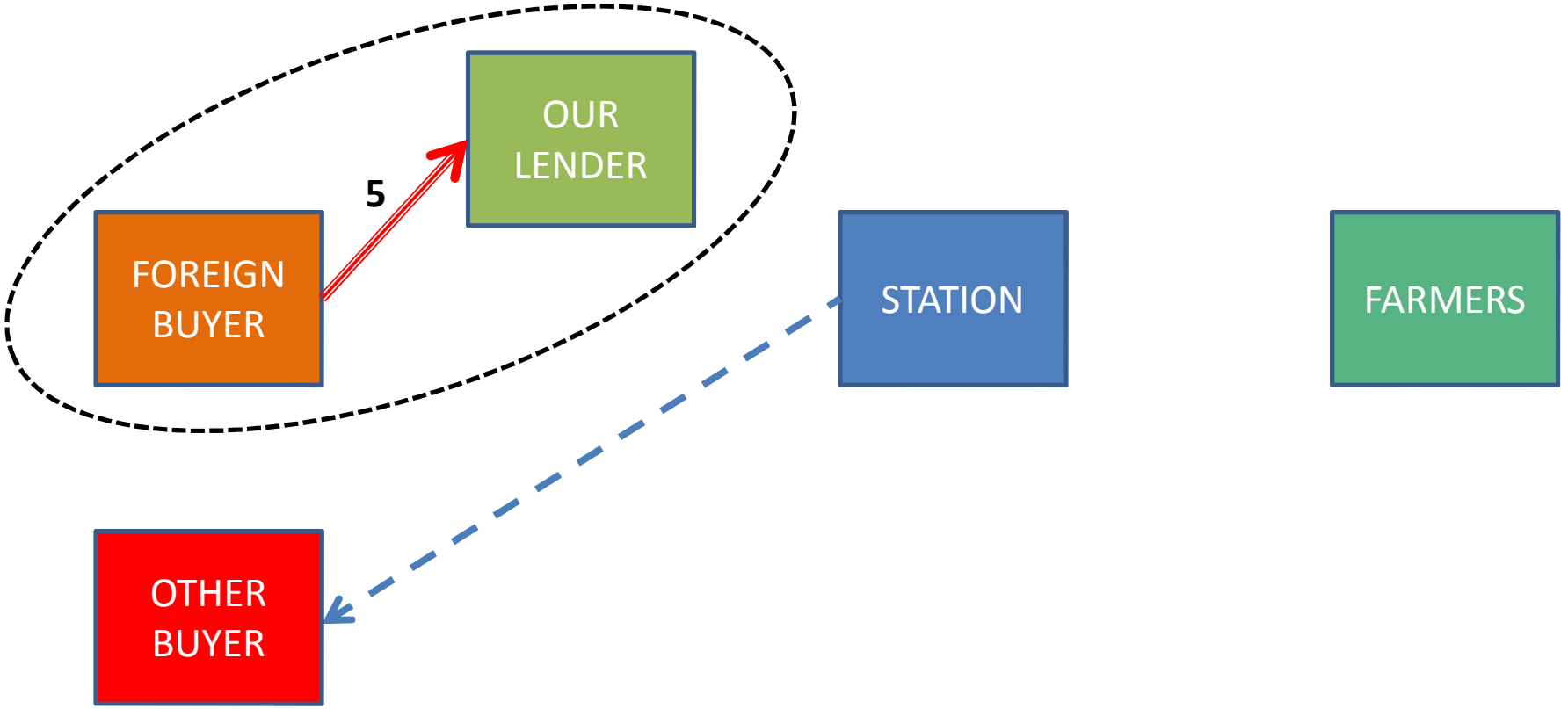


Lending Model



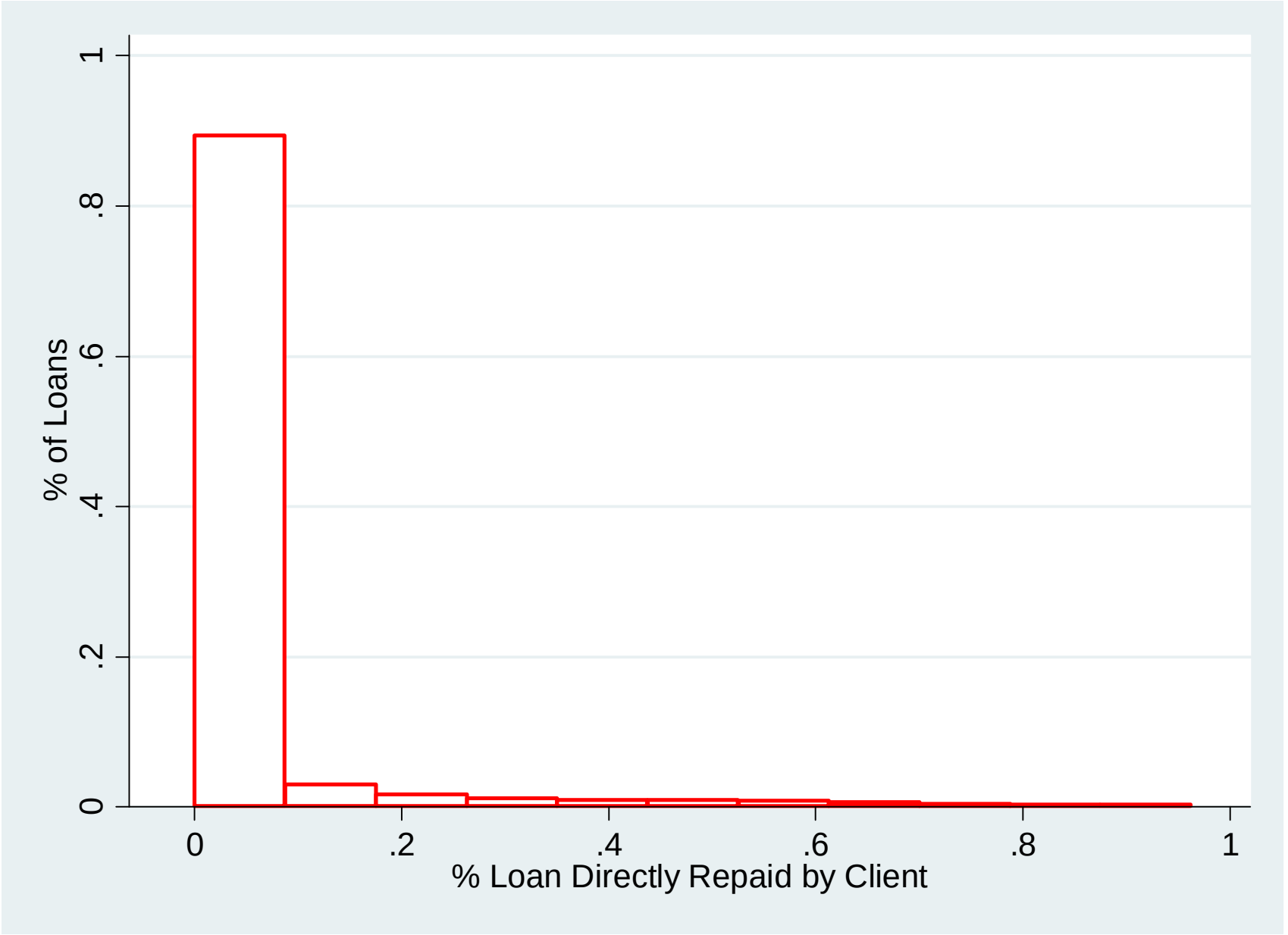
1. Buyer and station negotiate a contract
2. Lender extends loan to station (formula + value of the contract)
3. Station purchases cherries during harvest time.
4. After harvest station delivers coffee to buyer
5. **Lender is paid directly by buyer**

Default

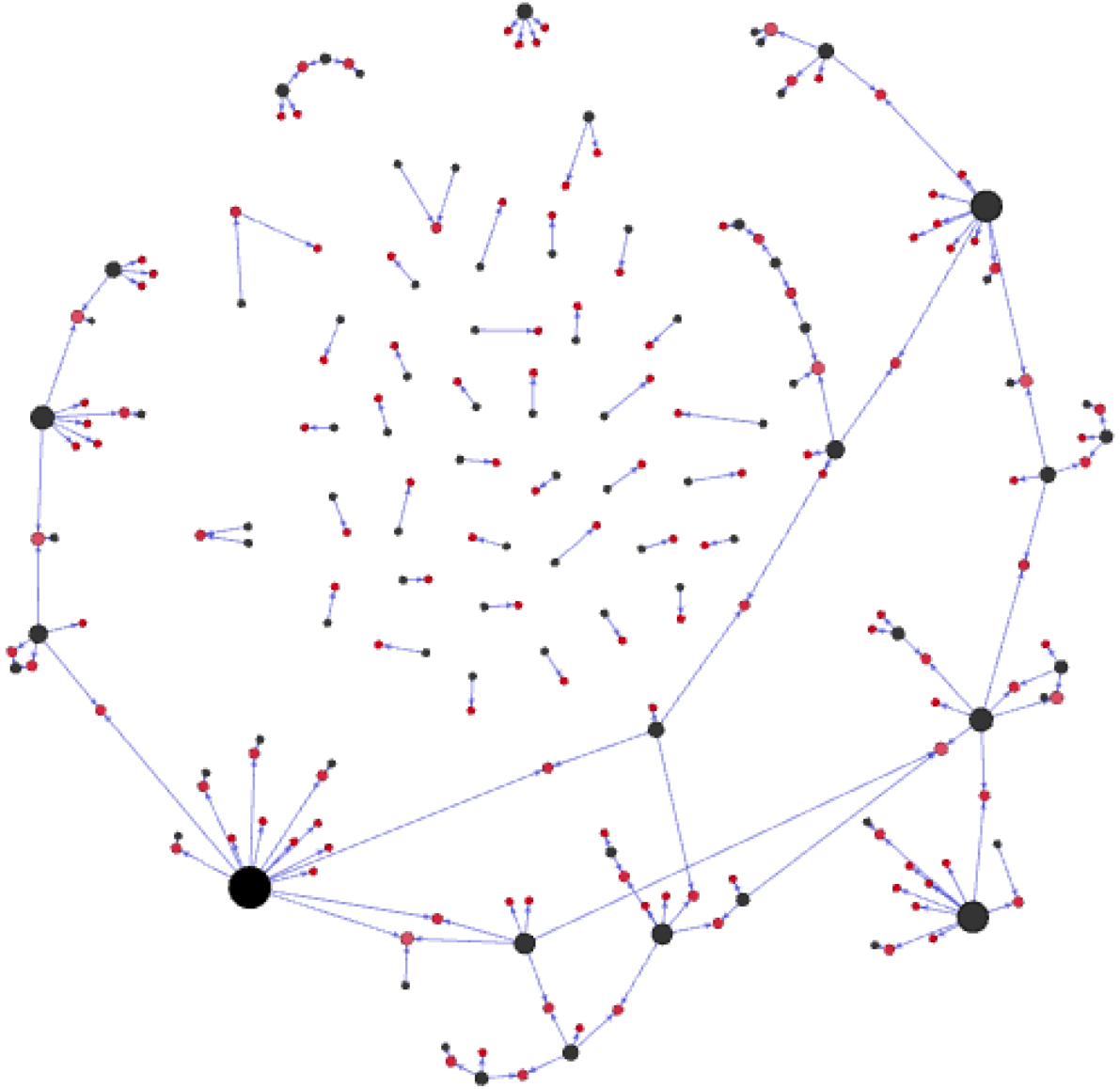


- To default on the loan a client must default on the buyer (and vice-versa)

As per contract, *most* loans are indeed repaid by buyer



Buyer – Lender Relationships



Theory

Theoretical Framework: Remarks

Two goals:

1. Derive ***qualitative*** predictions
   - Test for (ex-post) moral hazard, other testable predictions

2. Guide ***quantitative*** exercise
   - Can ex-post moral hazard generate credit constraints?

Theoretical Framework: Set-Up

- A (risk-averse) washing station (station) and a risk-neutral buyer-lender

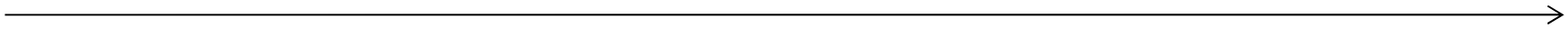
- Cost of producing q units of coffee

$$C(q) = q \times p_0 = q \times q^{\varepsilon}$$

Timing of Events

Negative Cash Flows:
Ex-ante MH constraint

Positive Cash Flows
Ex-post 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**	**Station repays or side-sells (default)**

Theoretical Framework: Set-Up

- A (risk-averse) washing station (station) and a risk-neutral buyer-lender

- Cost of producing q units of coffee

$$C(q) = q \times p_0 = q \times q^{\varepsilon}$$

- Station has all ex-ante bargaining power and cash W

- Contract $C^{BL} \equiv \{q^c, p^c \vee \Delta^c, L, D\}$ maximizes expected utility s.t.
  i. Buyer-Lender (expected) zero profit constraints
  ii. Incentive constraints (if any)
  iii. Limited Liability

Contracts (and zero profit constraints)

- **SALE CONTRACT**: two types

Fixed Price : p^c is fixed at time of contracting

$$[E[p|delivery] - p^c] \times q^c \geq 0$$

Contracts (and zero profit constraints)

- **SALE CONTRACT**: two types

Fixed Price : p^c is fixed at time of contracting

$$[E[p|delivery] - p^c] \times q^c \geq 0$$

Differential Price : $p^c = p + \Delta^c$ a differential over mkt. price at delivery

$$\left[E[p|delivery] - E[p^c|delivery]\right] \times q^c =$$

$$= \Delta^c \times \Pr(delivery) \times q^c \geq 0$$

Contracts (and zero profit constraints)

- **SALE CONTRACT**: two types

Fixed Price : p^c is fixed at time of contracting

$$[E[p|delivery] - p^c] \times q^c \geq 0$$

Differential Price : $p^c = p + \Delta^c$ a differential over mkt. price at delivery

$$\left[E[p|delivery] - E[p^c|delivery]\right] \times q^c =$$

$$= \Delta^c \times \Pr(delivery) \times q^c \geq 0$$

- **LOAN CONTRACT**: standard debt contract

$$L \leq \int_p \mathbf{I}[\mathrm{p}] \times \min\{D, p^c q^c\}\, dF(p)$$

Ex – Post IC Constraint

$$q^c p^c - D + \delta \mathbf{V} \geq \mu[pq^c + \delta \mathbf{U}^D] + (1-\mu)[q^c p^c - D + \delta \mathbf{U}^L]$$

- $q^c p^c$: Contract
- $\delta \mathbf{V}$: Continuation Value if *repay*
- $pq^c + \delta \mathbf{U}^D$: Value of *defaulting*
- $q^c p^c$: Contract
- $\delta \mathbf{U}^L$: Continuation Value if *late*

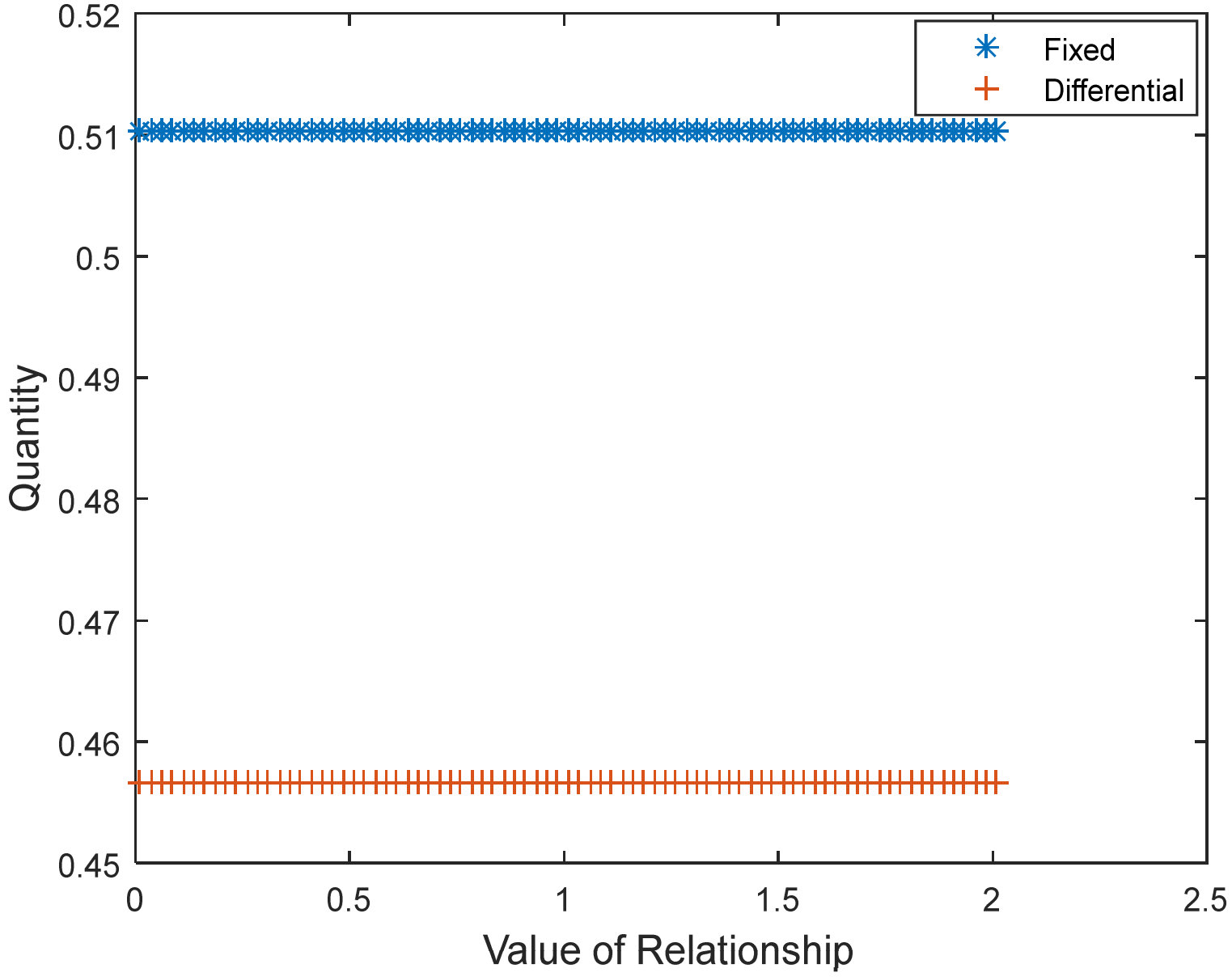
Assumptions: $\mathbf{U}^D = \mathbf{U}$ and $\mathbf{U}^L = \sigma \mathbf{V} + (1-\sigma)\mathbf{U}$

Let $\varphi = \frac{\mu}{1-\sigma(1-\mu)}$

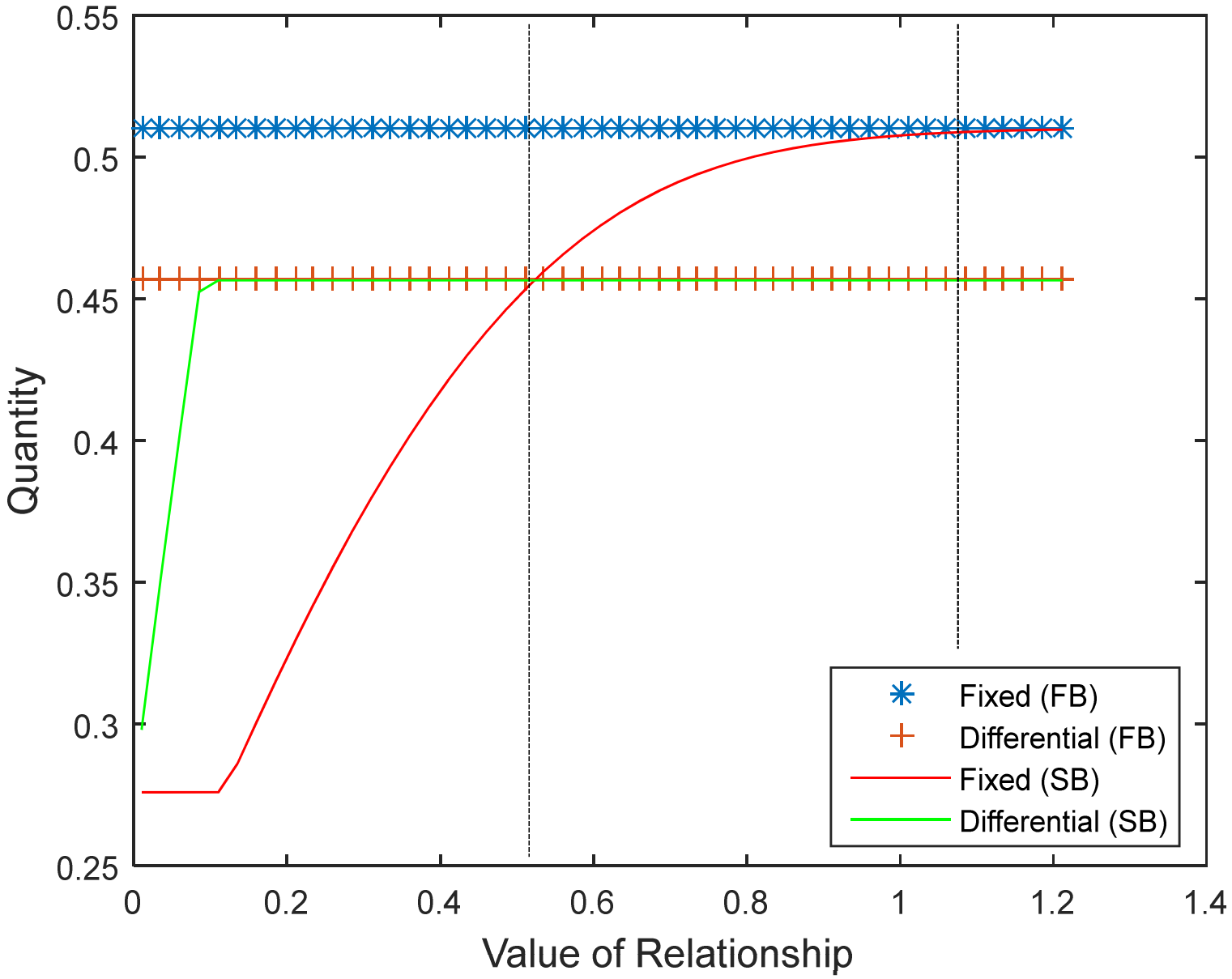
Rewrite as: $$\delta(\mathbf{V} - \mathbf{U}) \geq \varphi \times (D + (p - p^c)q^c)$$

- $\delta(\mathbf{V} - \mathbf{U})$: **Value of Informal Enforcement** $\mathcal{V}$
- $(p - p^c)q^c$: **Temptation to Deviate**

First Best: Perfect Contract Enforcement



Second Best: Insurance vs. Enforcement Trade-Off



Qualitative implications

Rewrite as: $V \geq \varphi \times (D + (p - p^c)q^c)$

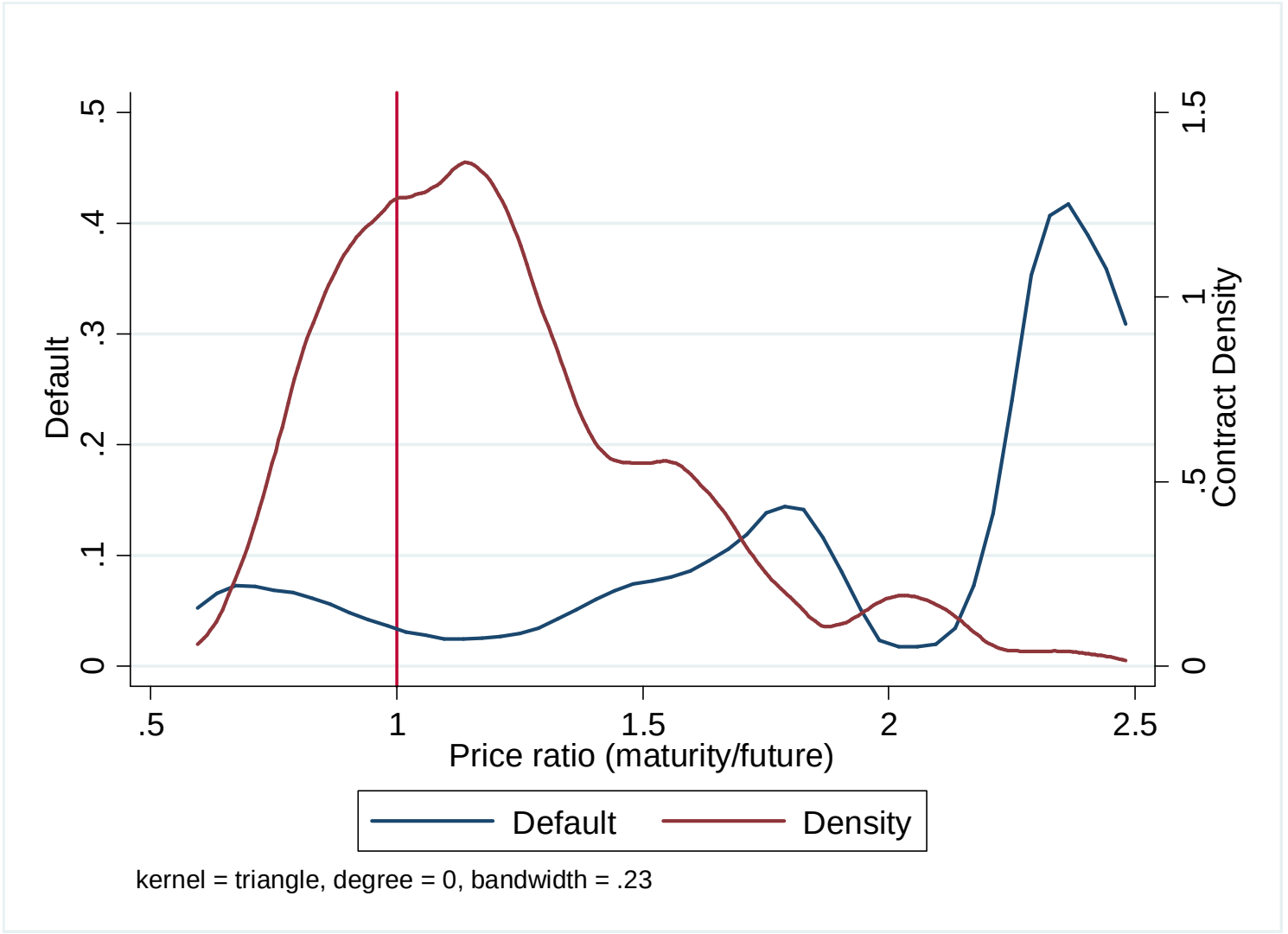
1. (**ex-post MH**) Unanticipated price increases lead to higher default:
   a. for fixed price contracts
   b. but *not* for differential price contracts

2. (**Contract Sorting**): clients with higher V get fixed contracts

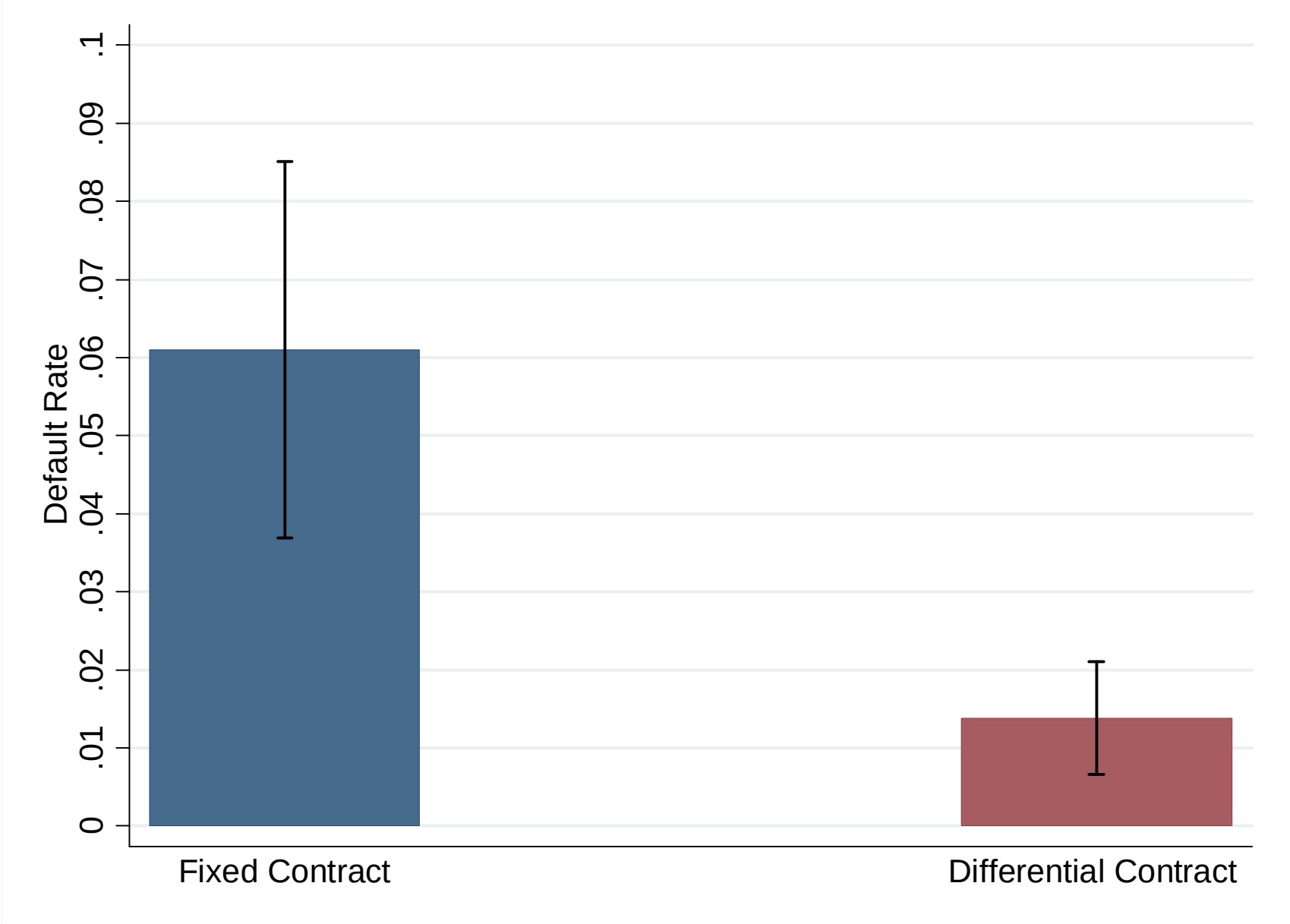
3. (**ex-post MH, heterogeneity**)
   - More default with lower relationship value (*omitted*)

Detecting Strategic Default

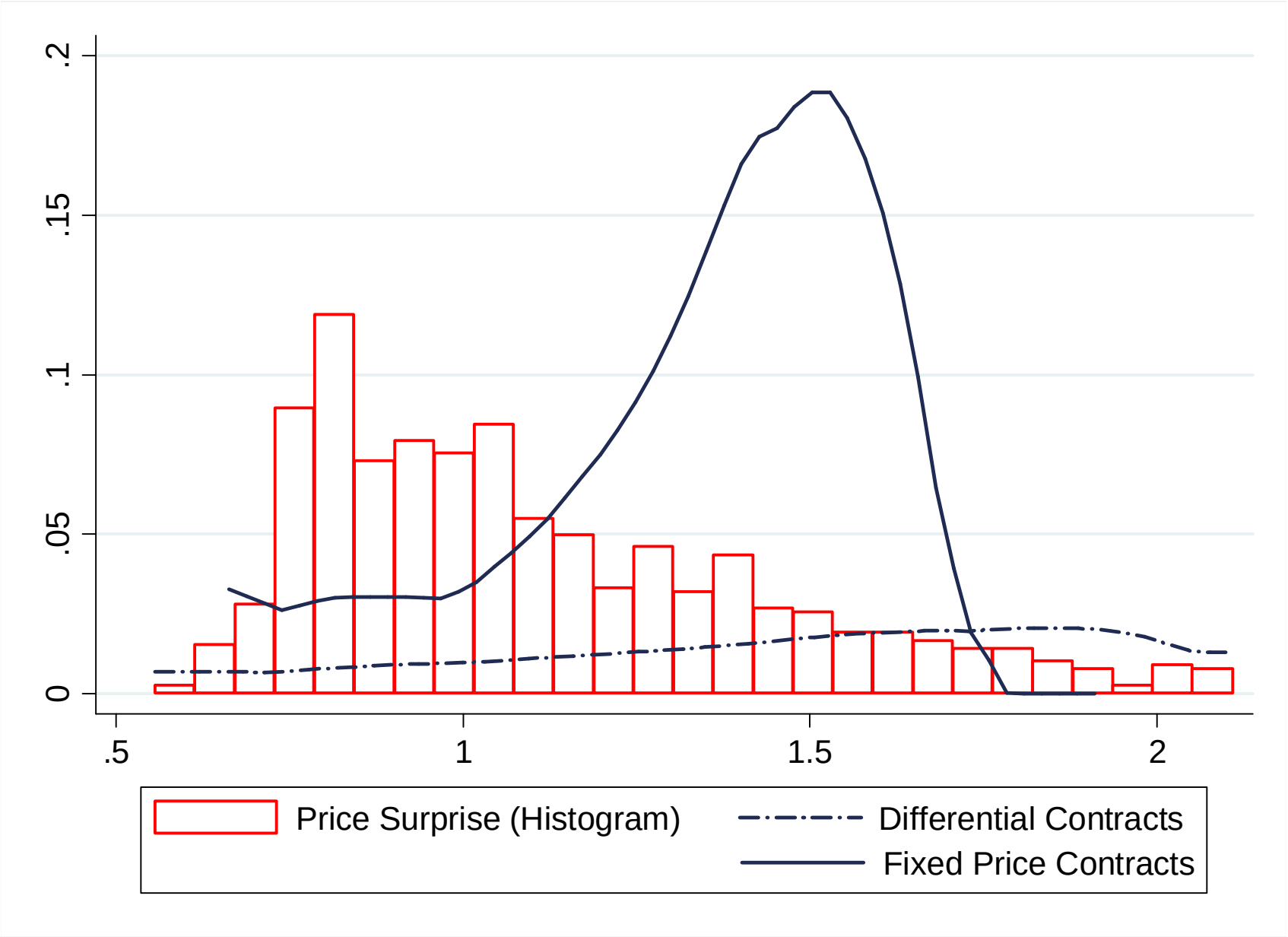
Prices and Default



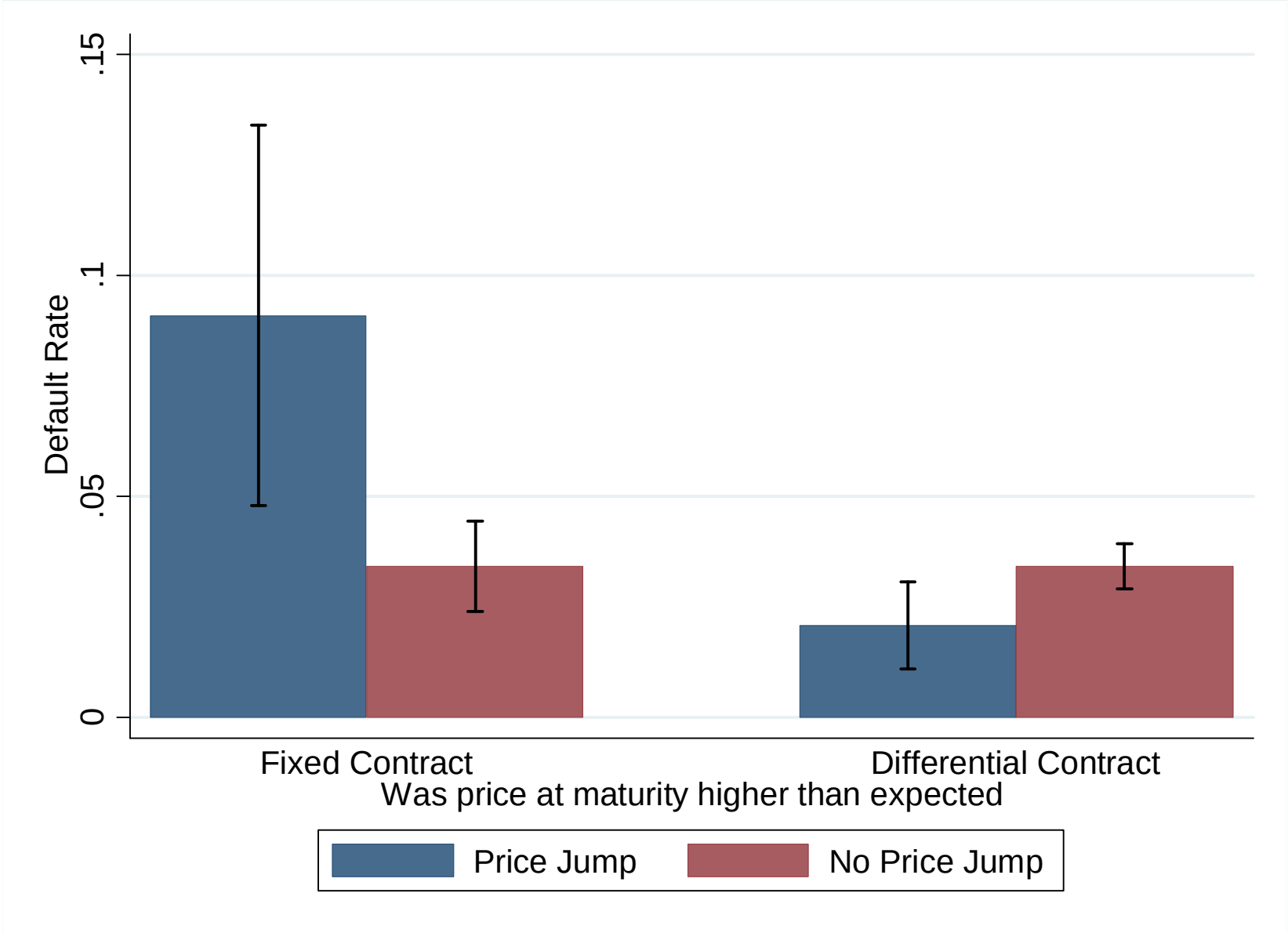
Prices and Default: Heterogeneity



Prices and Default: Heterogeneity



Prices and Default (*event study*): Heterogeneity



Selection into Contract Type

Strategic Default and Credit Constraints?

Quantitative implications

We have documented strategic default. Does it matter?

Step 1: **RDD** design to test for credit constraints

Step 2: Model's calibration

Credit Constraints: Definition, Strategy and Test

Test (Banerjee and Duflo (2012)**):**
A firm is credit constrained if additional supply of loan (at same *r*)

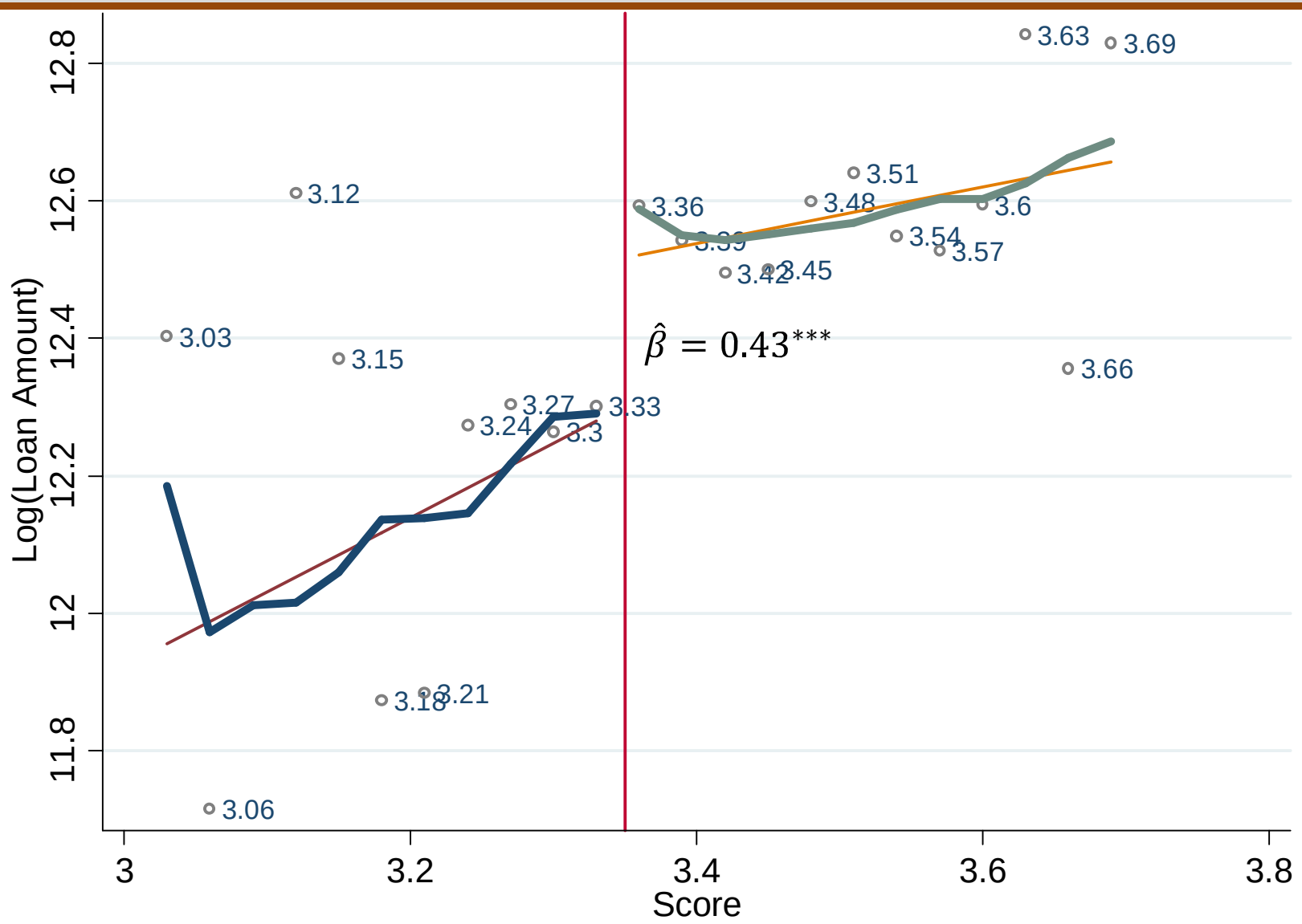
1. *is used to expand input purchases and sales*,
2. *without (completely) substituting for existing more expensive loans*

Strategy
% of contract that is pre-financed (at the same *r*) 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.

RD on Loan Size (logs)



NOTE: ΔLoan ≈ 0.6 X 500K – 0.4 X 500K = 100K ≈ 90K

RD on Loan Size, Interest Rate (and Other Loans)

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*

RD on Cherries Purchases and Prices

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 ↑

RD on Sales and Profits

Table 9: Returns associated with larger loan amounts

	log(Sales)		log(Profit)	
	(1)	(2)	(3)	(4)
Optimal Bandwidth	0.136***		0.0821**	
	(0.0277)		(0.0324)	
75% Optimal Bandwidth	0.153***		0.115***	
	(0.0578)		(0.0362)	
75% Optimal Bandwidth	0.182***		0.0322	
	(0.0465)		(0.0506)	

Sales ↑ by ≈13% **Implied MPK ≈20-30% > *r***

(Unreported**):**

1. Sales to buyers other than those on the contract increase
2. Not much on sale prices

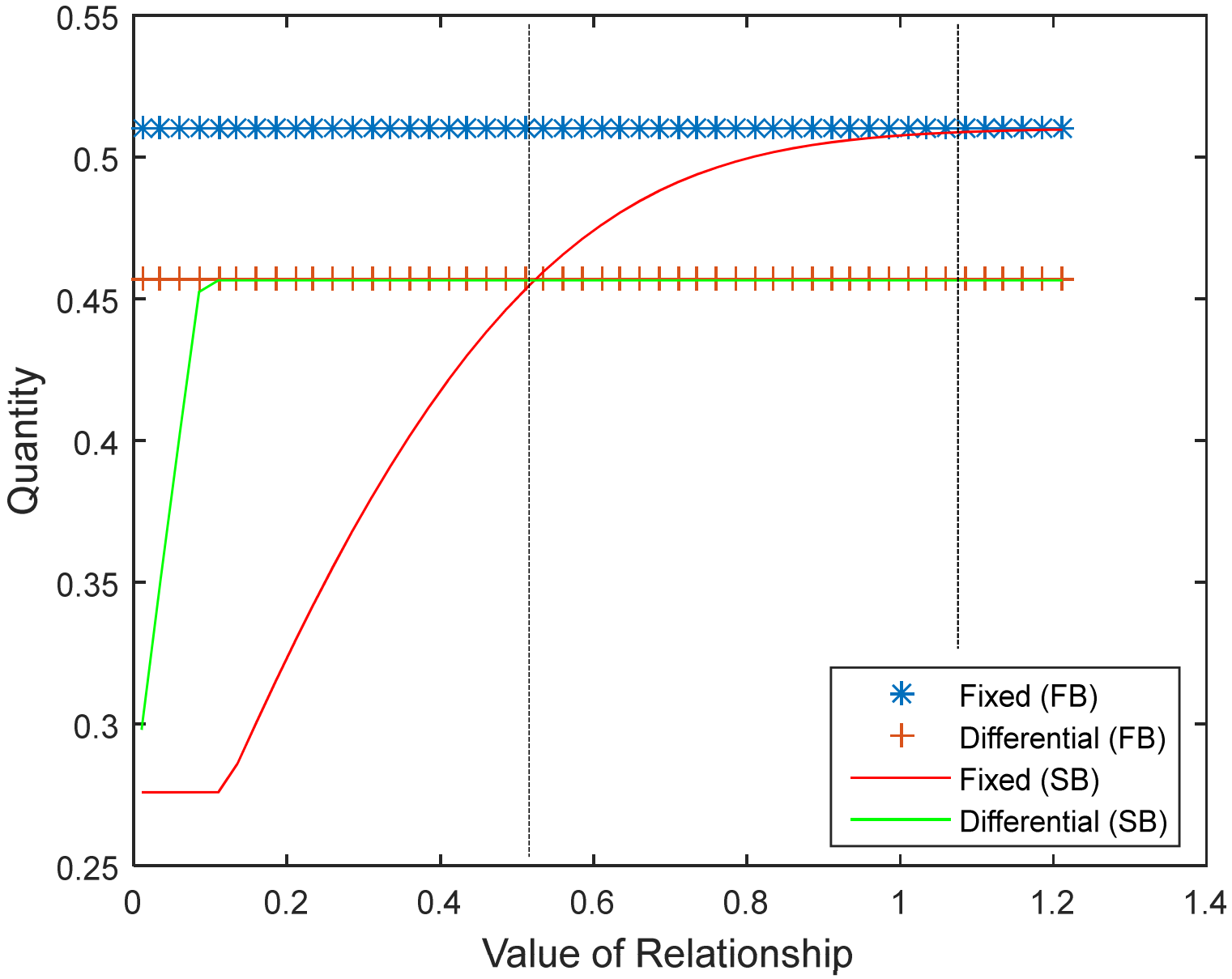
Could credit constraints be due to strategic default ?

Step 1: **RDD** design to test for credit constraints

Step 2: model's calibration

Parameters		Source
World Prices	$F(p)$	Data
Local Supply	ϵ	RDD
Search & Punishment	μ, σ	Data
"Wealth"	W	% Financed (matched)
Risk Aversion	$\boldsymbol{\alpha}$	$\boldsymbol{\alpha \in [0.1, 0.9]}$

Model Calibration $\alpha = 0.1$



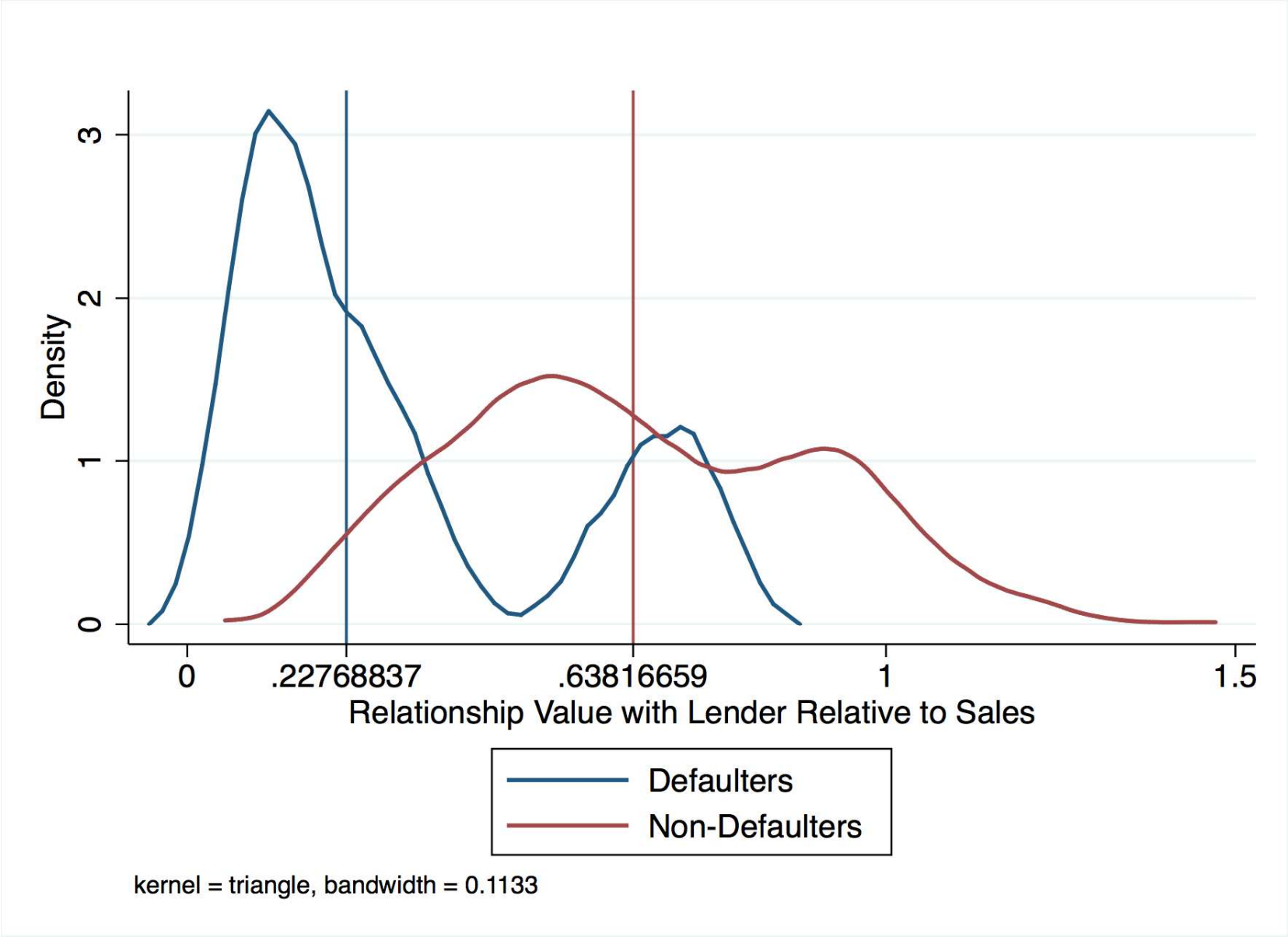
Quantitative implications

Step 1: **RDD** design to test for credit constraints

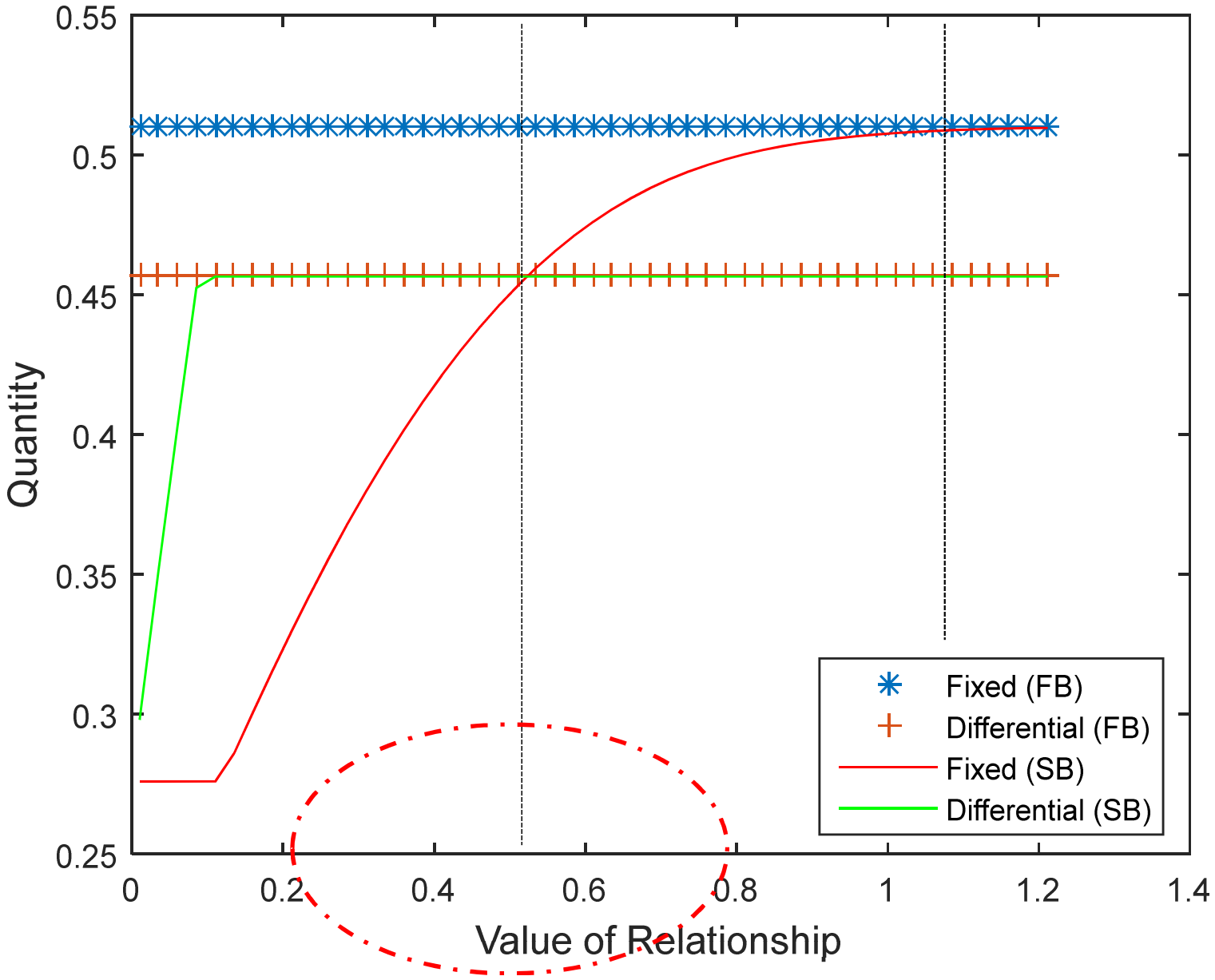
Step 2: model's calibration

Parameters		Source
World Prices	$F(p)$	Data
Local Supply	ϵ	RDD
Search & Punishment	μ, σ	Data
"Wealth"	W	% Financed (matched)
Risk Aversion	α	$\alpha \in [0.1, 0.9]$
Value of Relationship	V	Data (bounds)

Value of Informal Enforcement $\mathcal{V} \geq \varphi \times (D + (p - p^c)q^c)$



Model Calibration



Conclusions

Policy Implications

- We have studied 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 one of the key constraints
  → financing and risk management are linked: both involve promises to pay that are limited by collateral constraints

- In our context, collateral is **Relational capital** ($\mathcal{V}$) → structure of formal contract → endogenous determination of which market is missing

Policy Implications

Table 6: Barriers to commodity price risk management in developing countries by commodity group

	Lack of Know how	*Counter Party Risk*	*Intermediation issues*	*Basis Risk*	*Lack of Local Price Discovery*	*Low Liquidity*
Petroleum	Some cases	Maybe for some countries	No	No	No	No
Precious Metals	Some cases	Maybe for some countries	No	No	No	No
Base Metals	Some cases	Maybe for some countries	No	No (copper, alum.), possibly some basis risk with others	No	No (copper, alum.). Could be an issue for others
Agriculture: Mainly Exports	Moderate	Yes	Yes	For some (e.g. cotton) less for others (e.g. coffee, cocoa, sugar)	Moderate	moderate (less of an issue for coffee, cocoa, sugar)
Agriculture: for Local Markets	Yes	Yes	Yes	Yes	Yes	moderate (but not for grains and soybeans)

Policy Implications

- Can't exporters insure against price fluctuations buying **options**?

  - **Strategic default**
    → station can't 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))
    → willingness to pay should be low: due to limited liability the station's manager **likes risk** over low price realizations

Conclusions: What have we learned ?

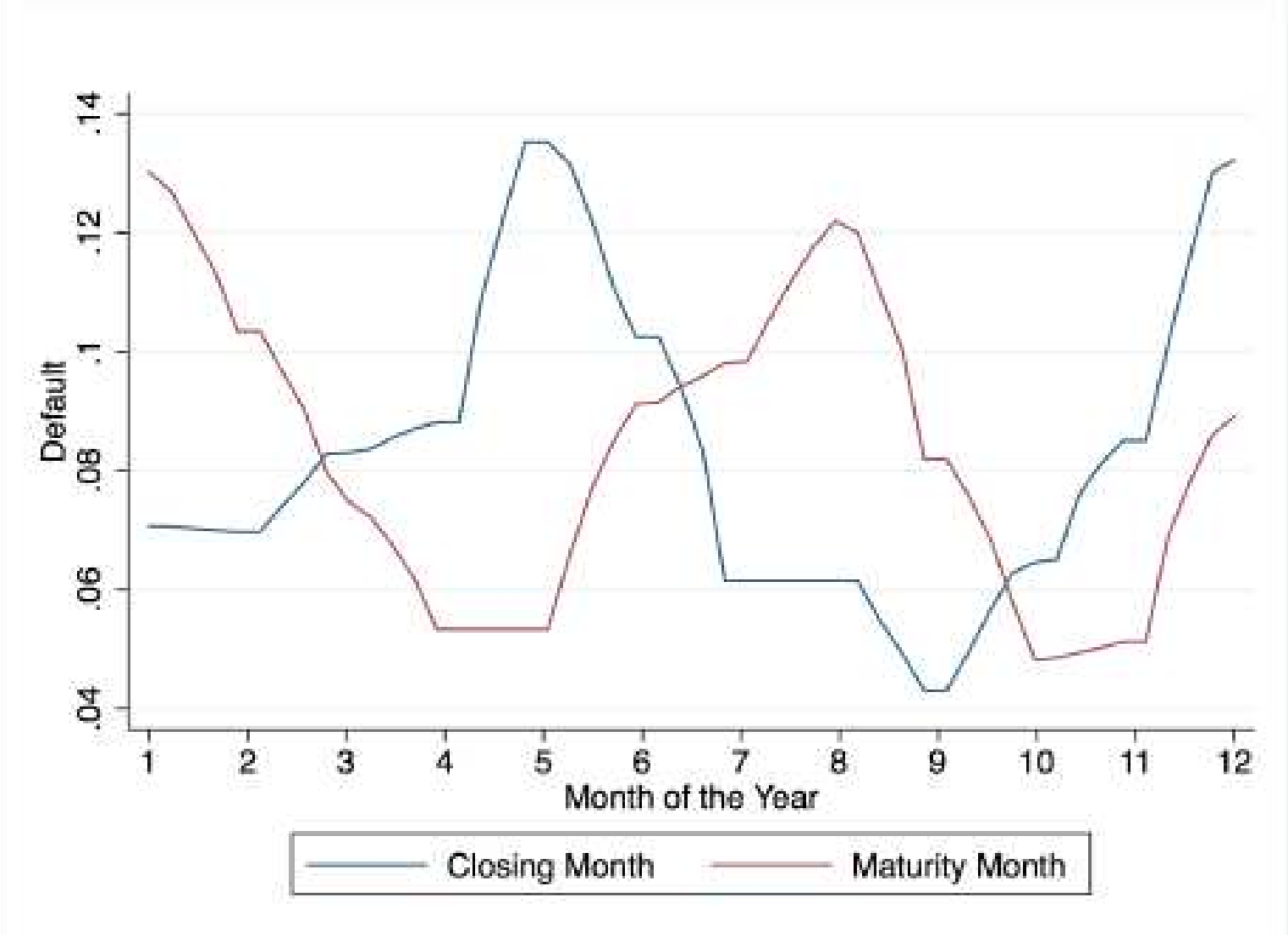
1. This paper provided a test for strategic default (ex-post MH)
   - Strategic default implies a trade-off between ***price*** and ***counterparty*** risk (or between ***insurance*** and ***enforcement***)

2. Friction is quantitatively important:
   → Large enough to generate credit (or insurance) constraints
   → Imposes externality on farmers upstream
   → Many valuable trade opportunity are lost

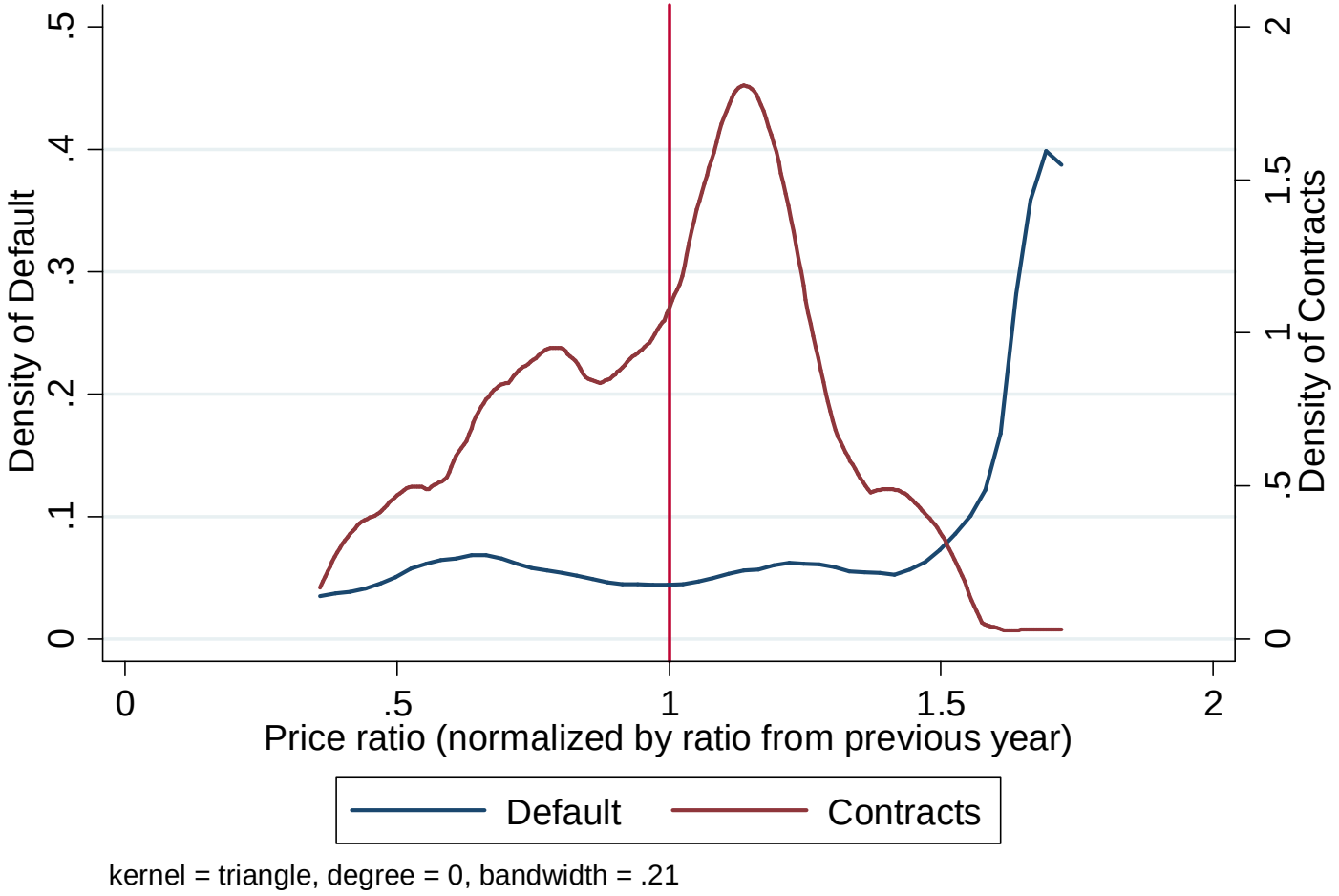
3. Scarce relational capital is leveraged to *adapt* formal contracts
   → Heterogeneity across firms on which markets are missing

Appendix!

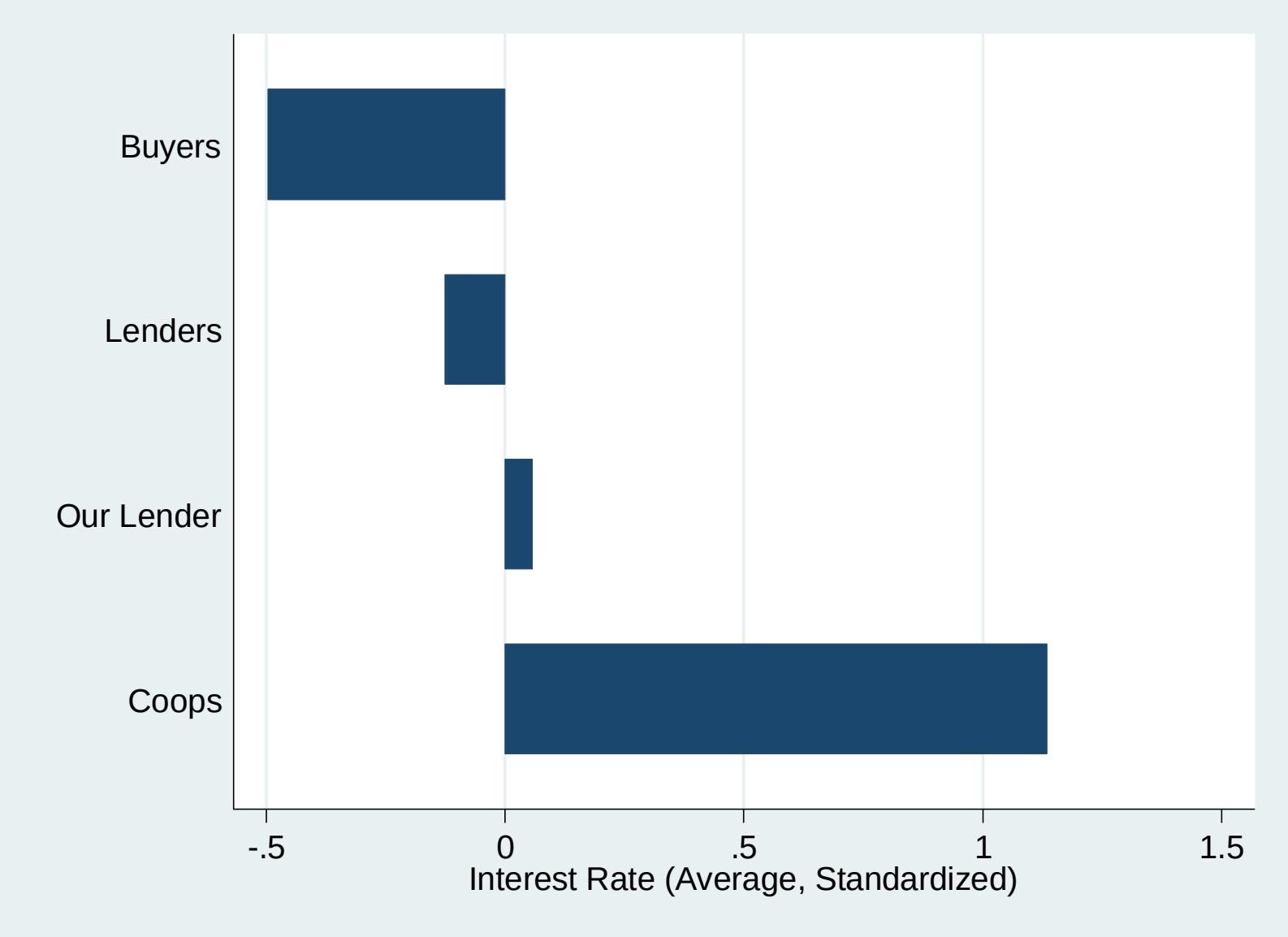
Timing of Contracts: Closing and Maturity Dates



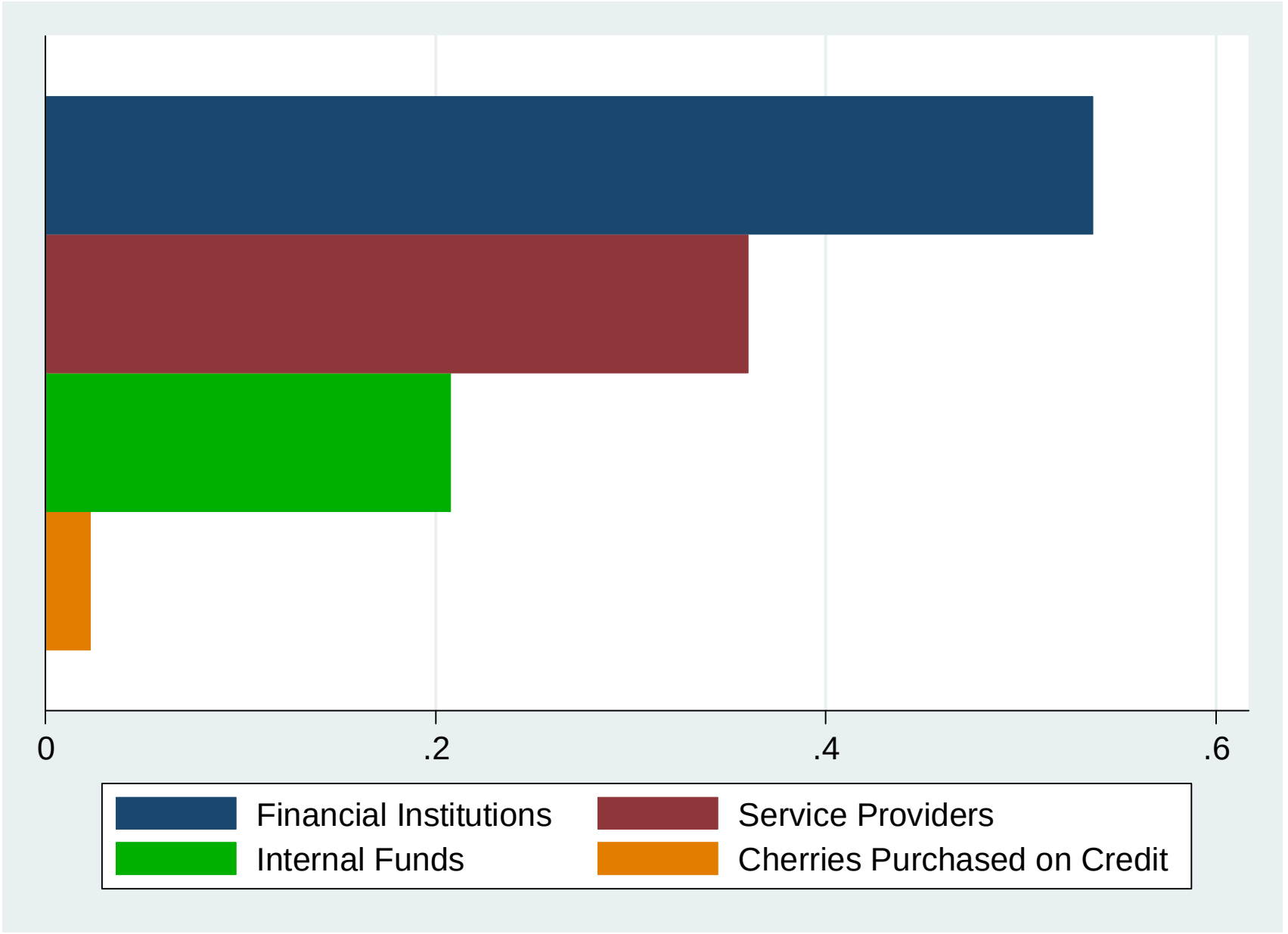
Prices and Default



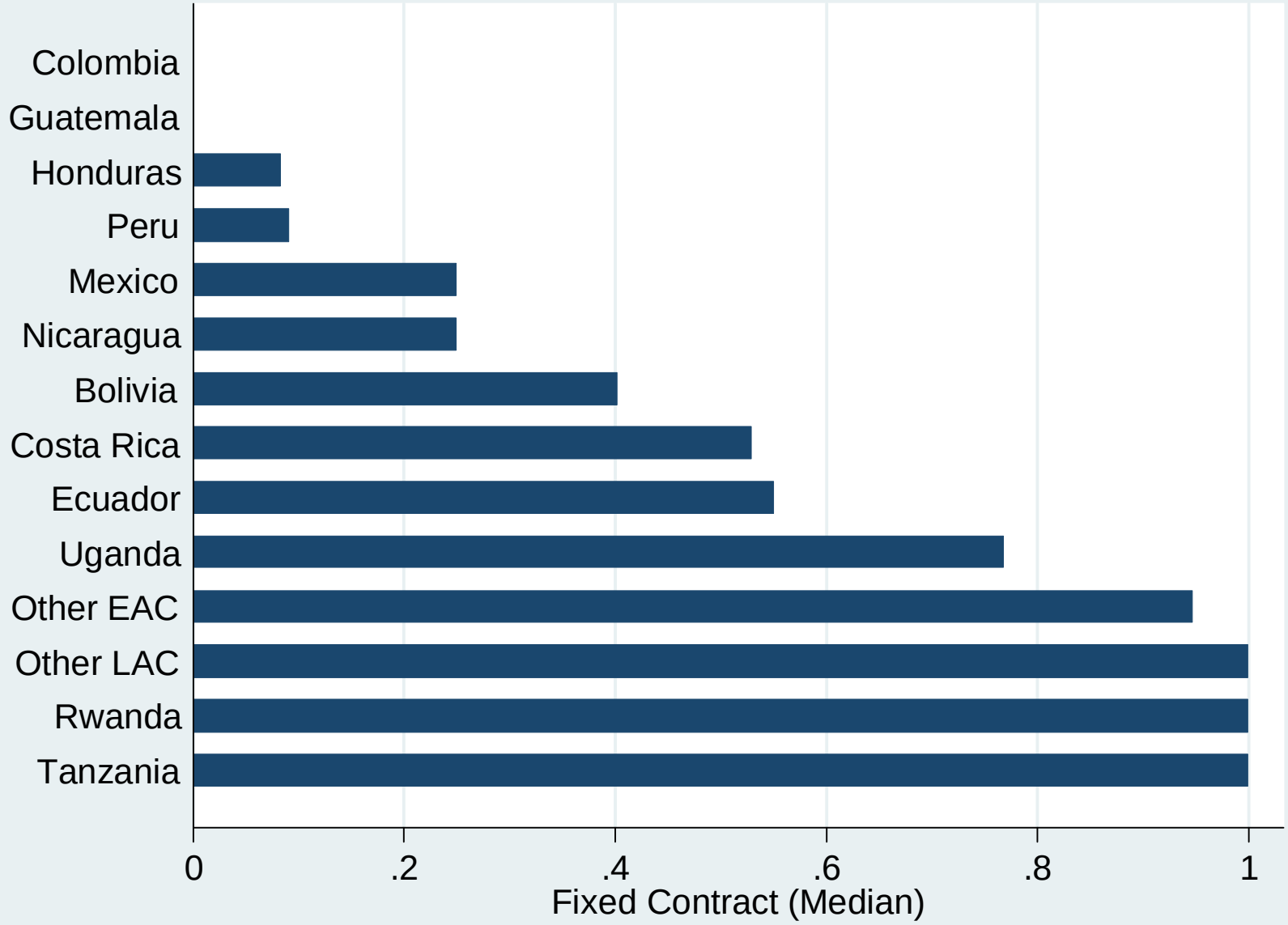
Representativeness of Lender's Interest Rates



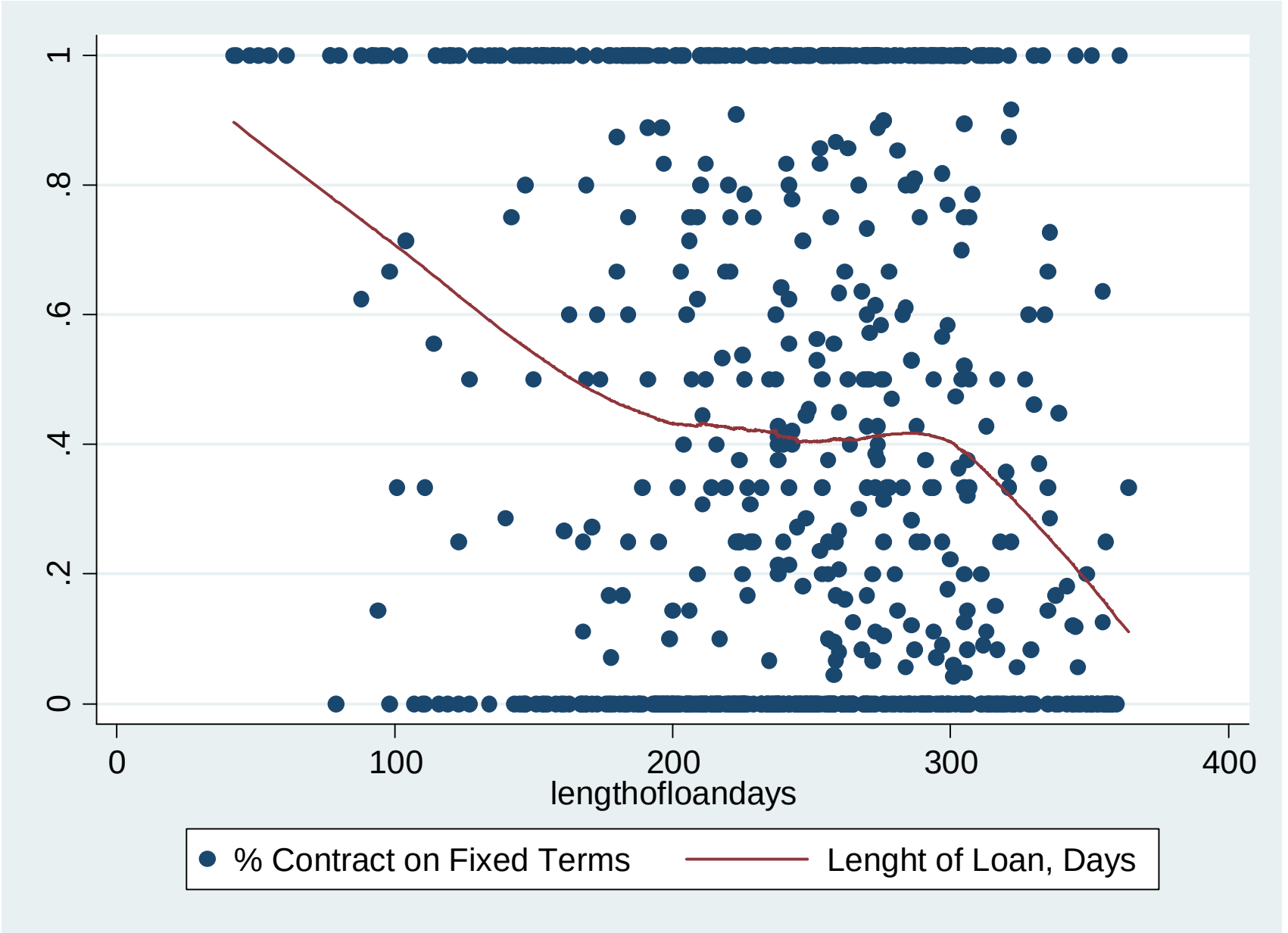
Sources of Finance (Rwanda)



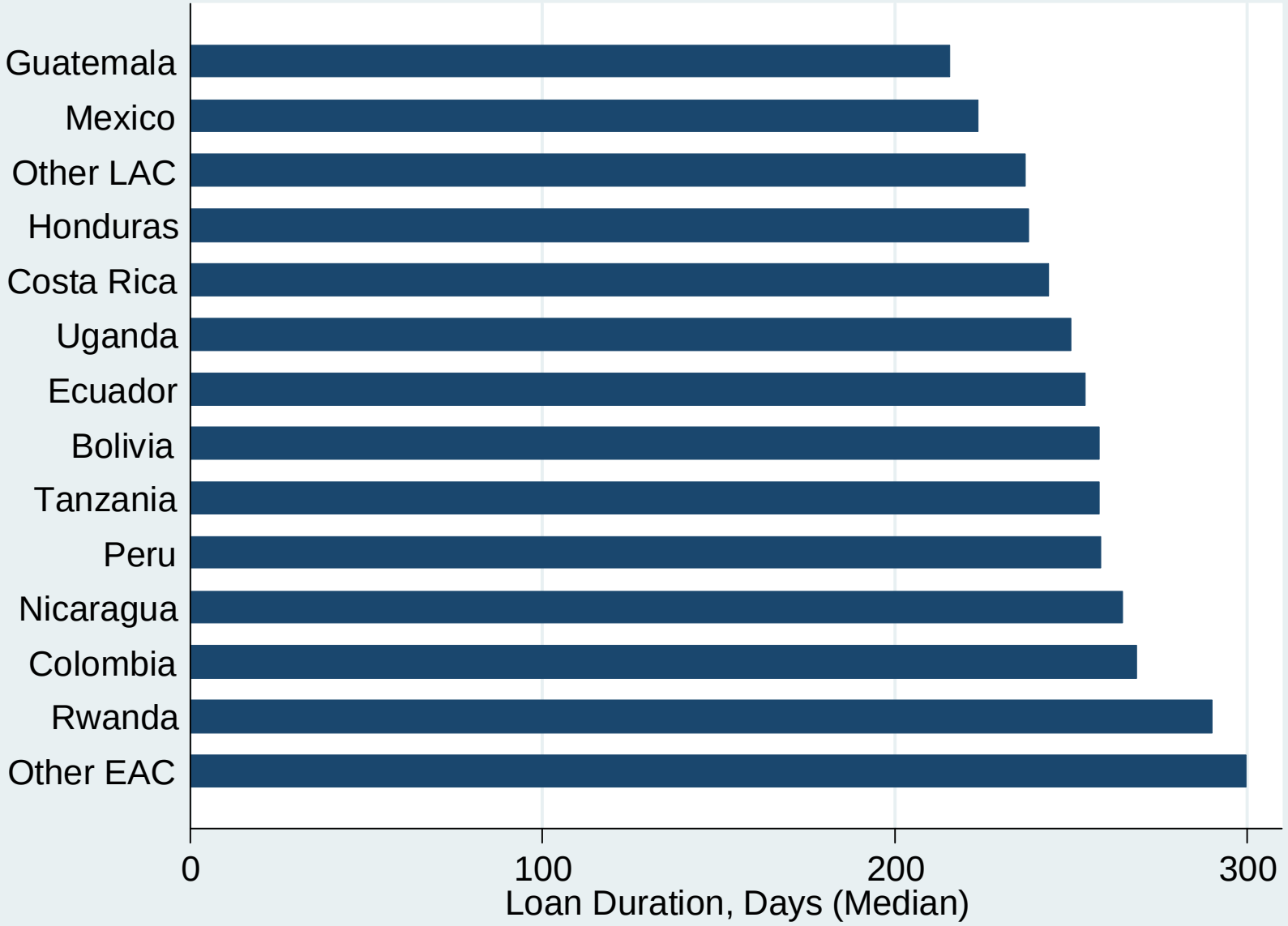
Contract Type by Country



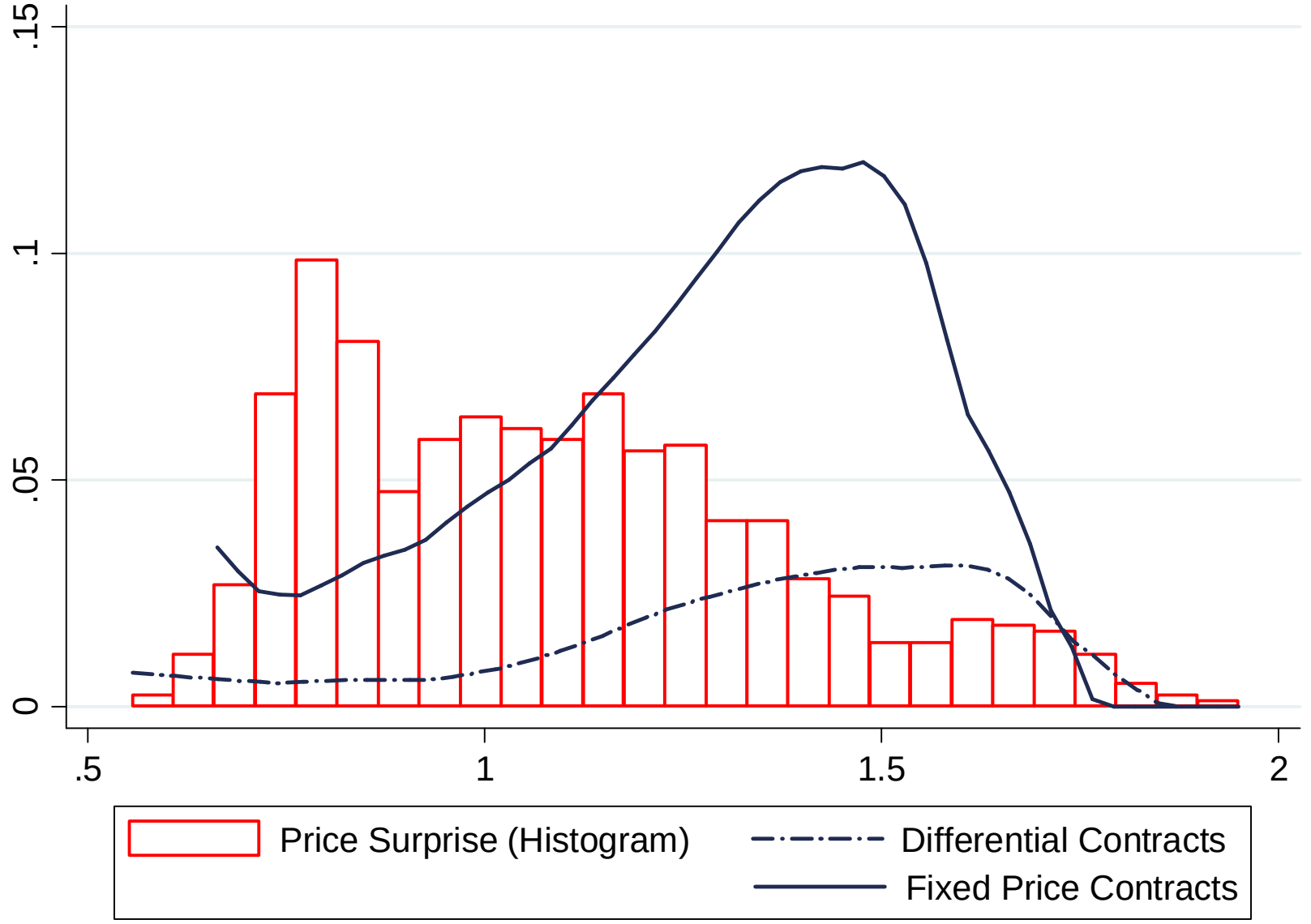
Contract Type and Length



Contract Type



Prices and Default: Heterogeneity



Prices and Default: Regression Analysis

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:			**Default**			
Price Surprise	0.44*	0.62**	1.82**	2.81***	8.08***	0.045**
	(0.23)	(0.25)	(0.78)	(0.86)	(3.13)	(0.021)
Loan Controls	no	yes	yes	yes	yes	yes
Month & Year of Closing FE	no	no	yes	yes	yes	yes
Price at Closing	no	no	yes	yes	yes	yes
Month & Year of Maturity FE	no	no	yes	yes	yes	yes
Alternative Surprise Measure	no	no	no	yes	yes	no
Numerical Score (Sample)	no	no	no	no	yes	no
Probit vs. OLS	Probit	Probit	Probit	Probit	Probit	OLS
Number of observations	781	781	781	781	455	781

Prices and Default: An Event Study

Table 2: Out of Season Price Increases and Default Robustness

	(1) Write-Off	(2) Write-Off or Restructured	(3) 90 days Late
t-test: 4 week window	0.0222*	0.0396**	0.0514*
	(0.0152)	(0.0187)	(0.0228)
Observations	539	539	322
t-test: 6 week window	0.0234*	0.0399**	0.0509**
	(0.0150)	(0.0183)	(0.0306)
Observations	566	566	327
t-test: 8 week window	0.0268**	0.0306*	0.0575**
	(.0137)	(.0173)	(.0234)
Observations	641	641	352

Prices and Default: Further Heterogeneity

Table 5: Heterogeneity 2 - International Prices and Default by Score and Relationship

	Dep Variable: Default, Restructured or 90+ days late				
	By Score			By Relationship	
	Below 1st thresh. (1)	Above 1st thresh. (2)	Above 2nd thresh. (3)	no rel. (4)	rel. (5)
Optimal Bandwidth	0.143**	0.0463**	-0.0741	0.0665***	0.00475
	(0.0701)	(0.0205)	(0.0654)	(0.0196)	(0.00341)
75% Optimal Bandwidth	0.144**	0.0463**	-0.0291	0.0667***	0.000887
	(0.0705)	(0.0205)	(0.0338)	(0.0196)	(0.000681)
125% Optimal Bandwidth	0.143**	0.0459**	-0.0684	0.0664***	0.00668
	(0.0700)	(0.0203)	(0.0620)	(0.0195)	(0.00474)
Observations	69	347	434	483	146

Prices and Default: Further Heterogeneity

Table 8: Heterogeneity 3 - Default by Ability of Lender to Punish the Station

	Dep. Variable: Default, Restructured or 90 days late			
	Financial Development		Importance of Buyer to Lender	
	High	Low	High	Low
	(1)	(2)	(3)	(4)
Optimal Bandwidth	0.0969***	0.0475	0.0475	0.118**
	(0.0279)	(0.0337)	(0.0340)	(0.0576)
75% Optimal Bandwidth	0.0972***	0.0476	0.0476	0.118**
	(0.0286)	(0.0336)	(0.0340)	(0.0571)
125% Optimal Bandwidth	0.0965***	0.0473	0.0474	0.117**
	(0.0278)	(0.0337)	(0.0338)	(0.0569)
Observations	464	375	103	104

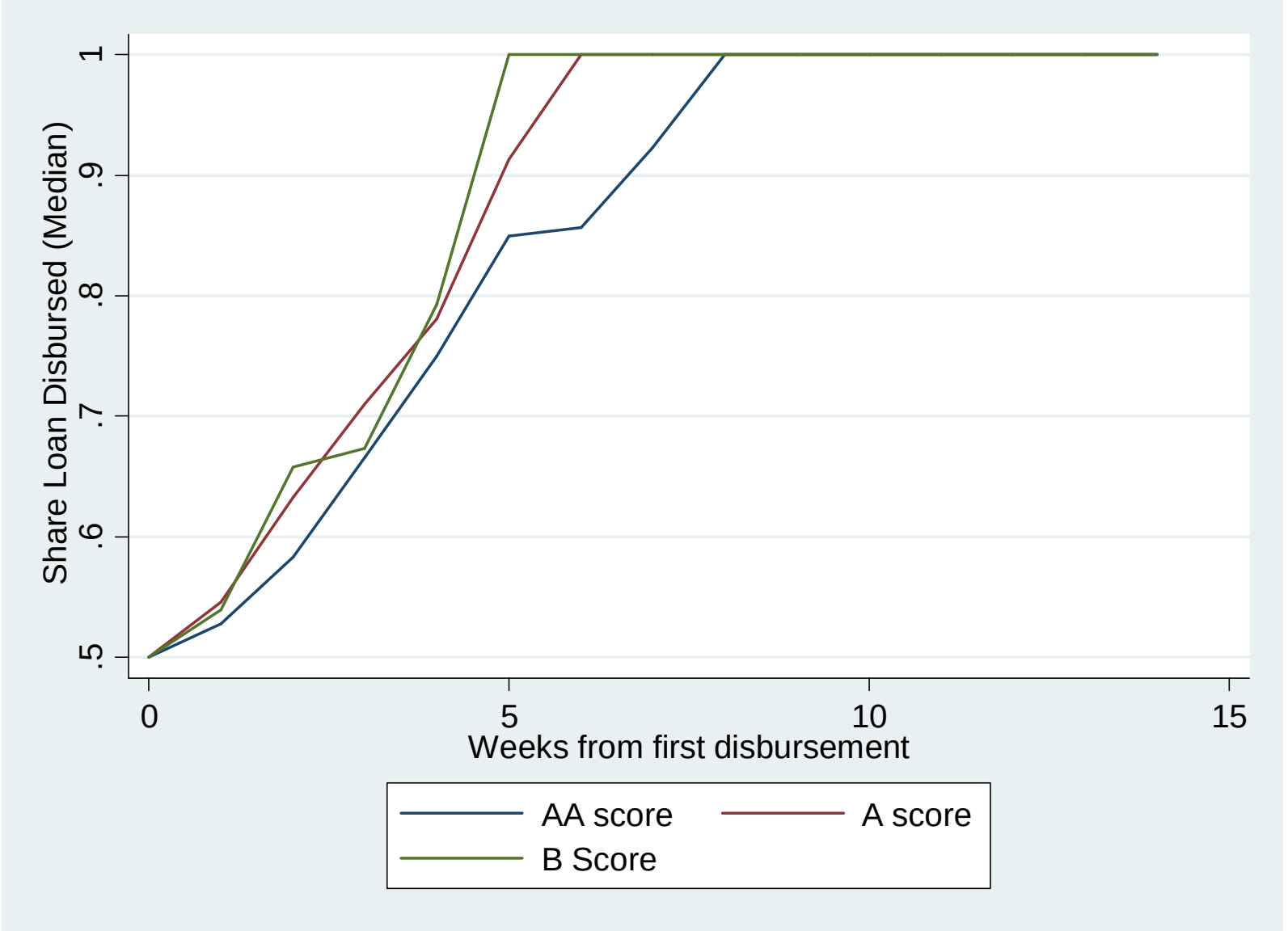
(No) Ex-Ante Moral Hazard

Prices and Default: Ex-Ante Moral Hazard

Table 13: Relationship between futures price at maturity changes during contract and default: Ex-Ante MH2

	Dependant Variable: Default or lateness				
	Default	Restructured	90 Days Late		
	(1)	(2)	(3)	(4)	(5)
Futures Price 3 months after closing	-0.000126	-1.73e-06	-9.29e-05	-0.00507	-0.000325
	(0.000238)	(0.000275)	(0.000311)	(0.00312)	(0.000343)
Futures price At closing	Y	Y	Y	Y	Y
Closing Price	Y	Y	Y	Y	Y
Maturity Price	Y	Y	Y	Y	Y
Price Ratio ($\frac{Maturity}{Closing}$)	Y	Y	Y	Y	Y
Letter Score Fixed Effects	Y	Y	Y	Y	Y
Country Fixed Effects	Y	Y	Y	Y	Y
Closing Month Fixed Effects	Y	Y	Y	Y	Y
Model	OLS	OLS	OLS	Probit	OLS
Sample	Full	Full	Full	Full	Numerical Score Only
Observations	713	713	713	713	432
R^2	0.139	0.135	0.139		0.115

Prices and Default: Ex-Ante Moral Hazard



Buyer – Lender Relations and Seller's Behaviour

Buyer – Lender Relationship

Relational enforcement rests on the idea that **buyer** and **lender** act together.

When relationship between buyer and the lender is weaker, seller/borrower might still default on the sale contract but not on the loan (and vice-versa).

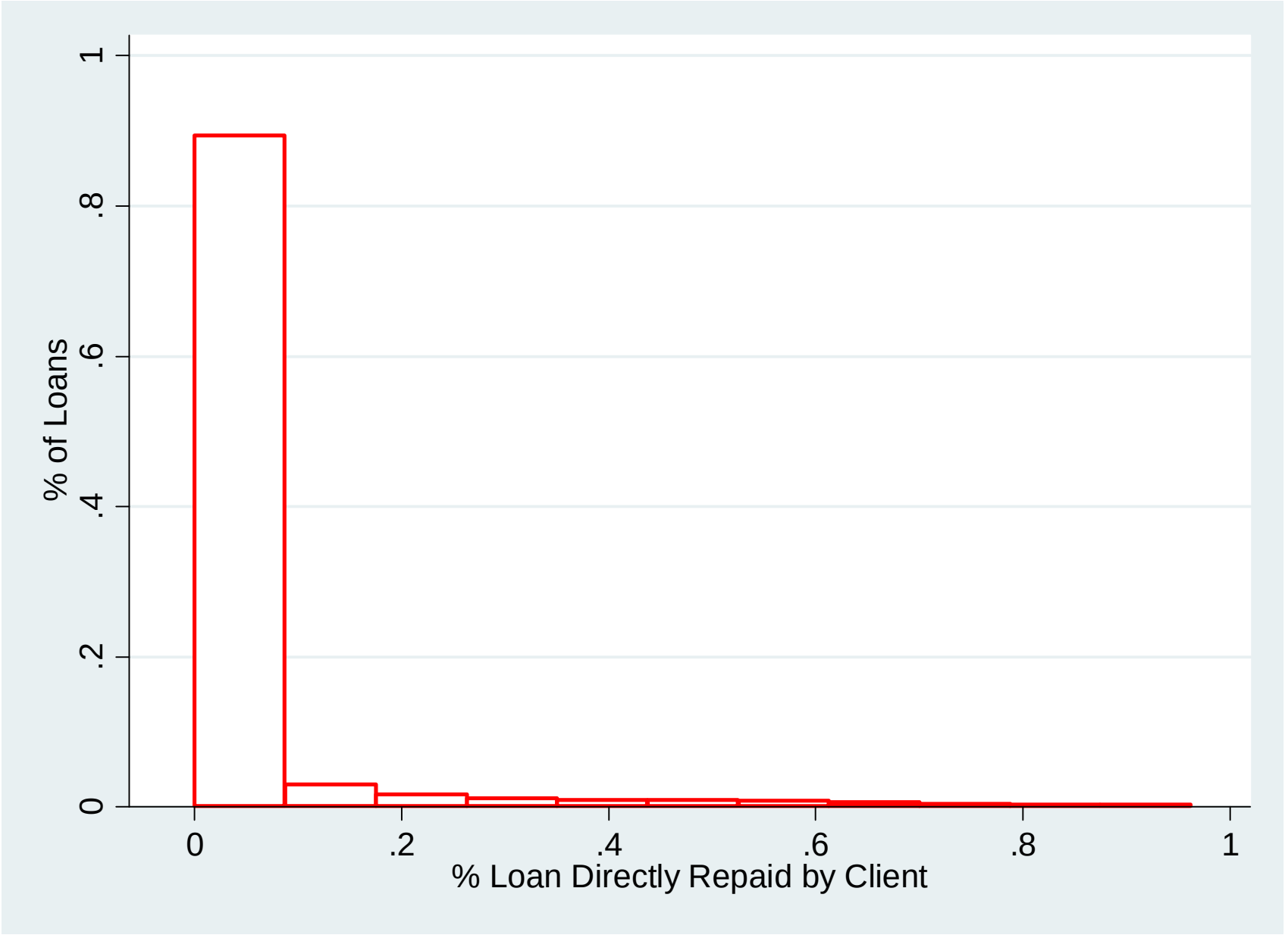
When this happens, we should observe:

1. Repayment is made directly by the seller/borrower (not by the buyer as per contract)

2. Relationship between buyer and lender is compromised

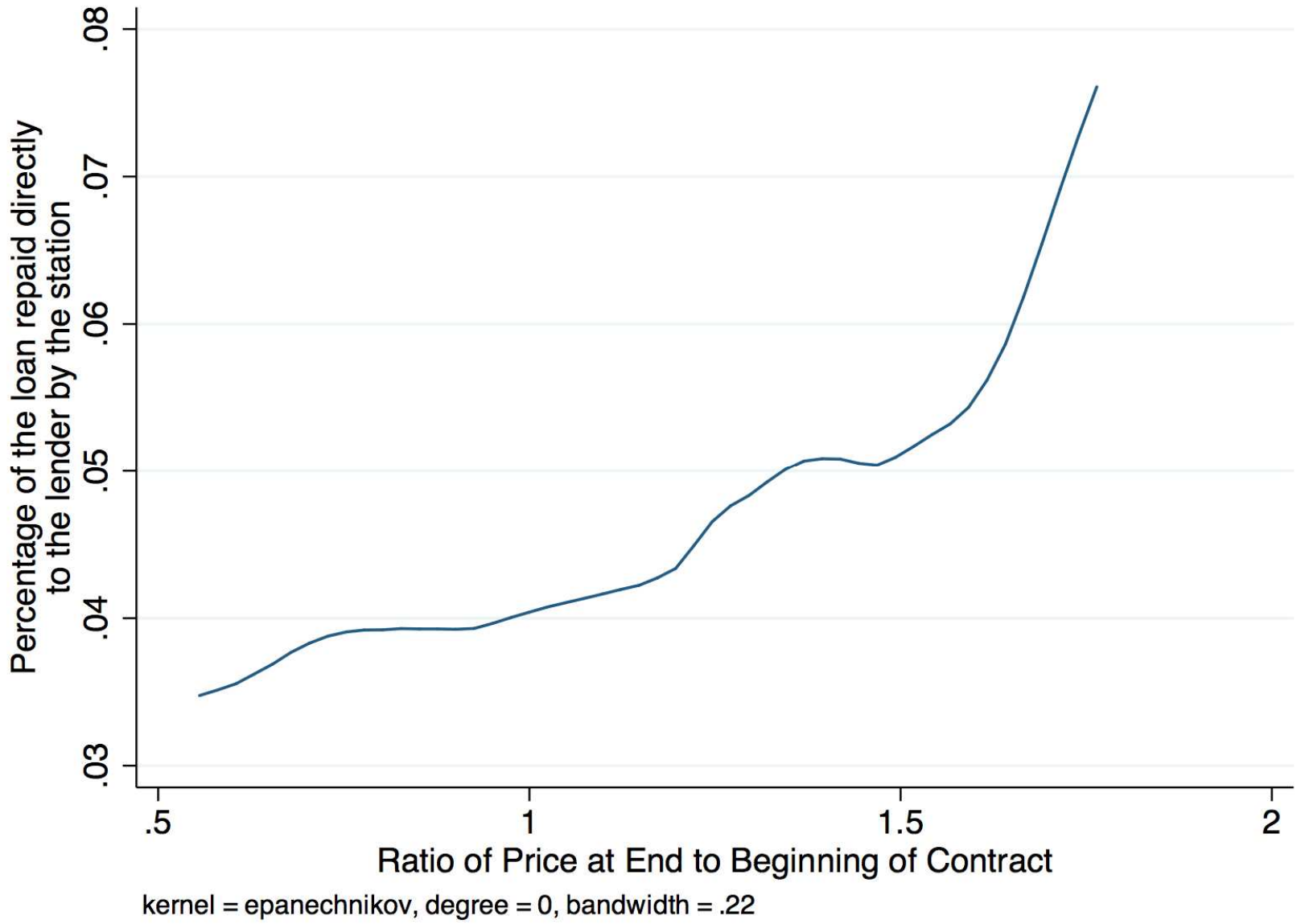
3. Less likely to happen with important buyers (i.e., those with which lender has numerous relationships

As per contract, *most* loans are indeed repaid by buyer

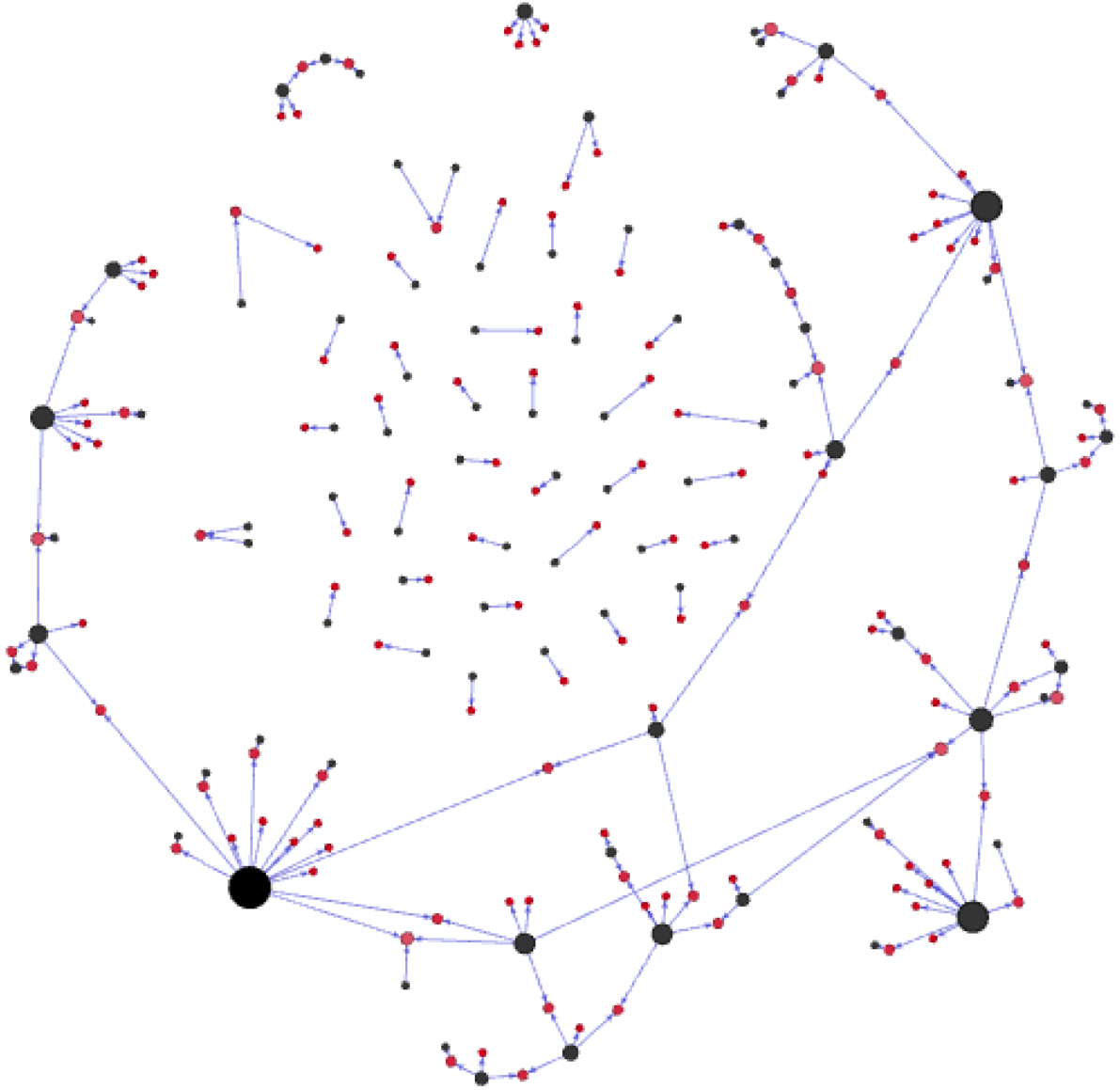


Repayment from client is associated with default …

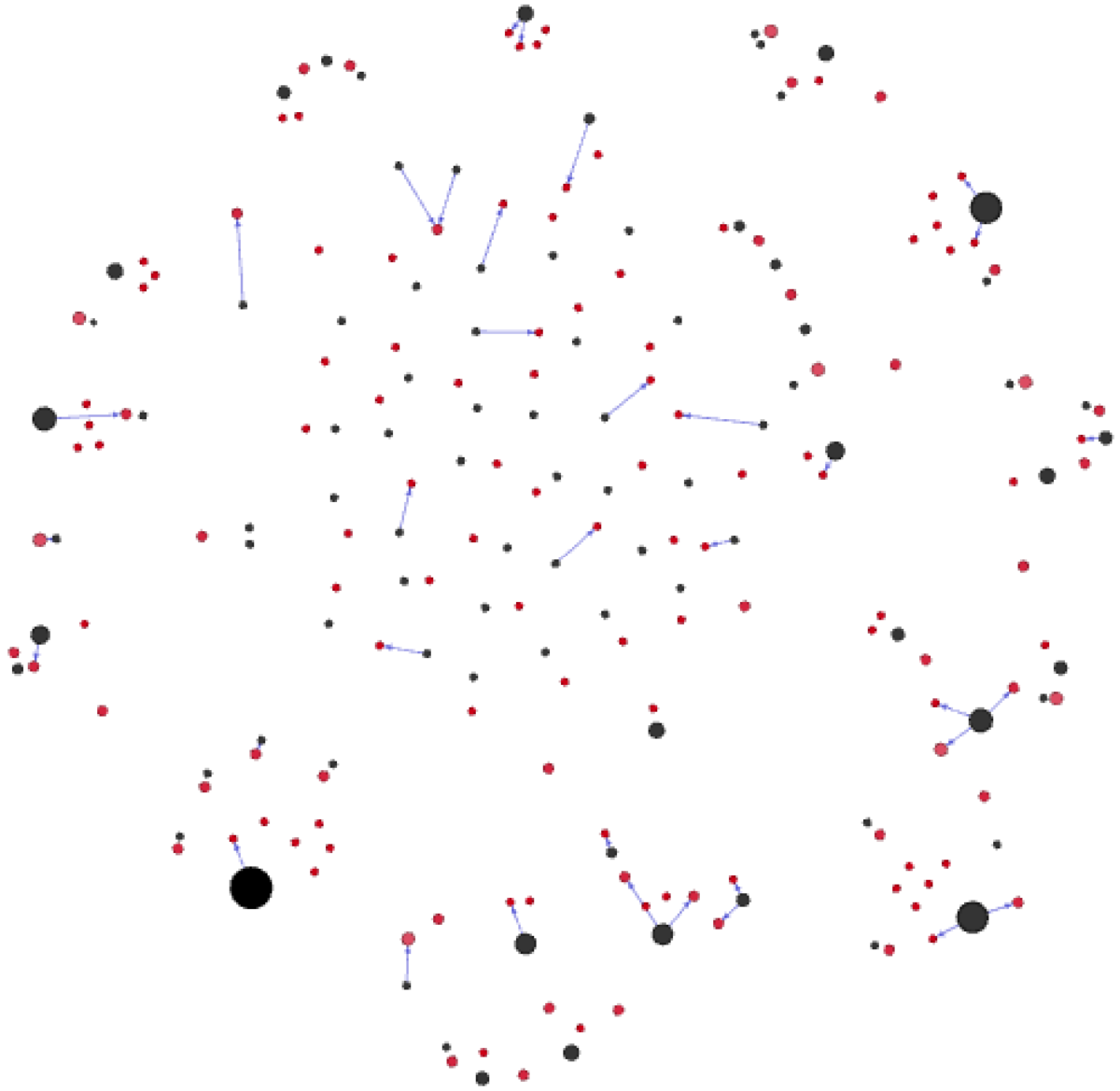
… and with (unanticipated) price increases



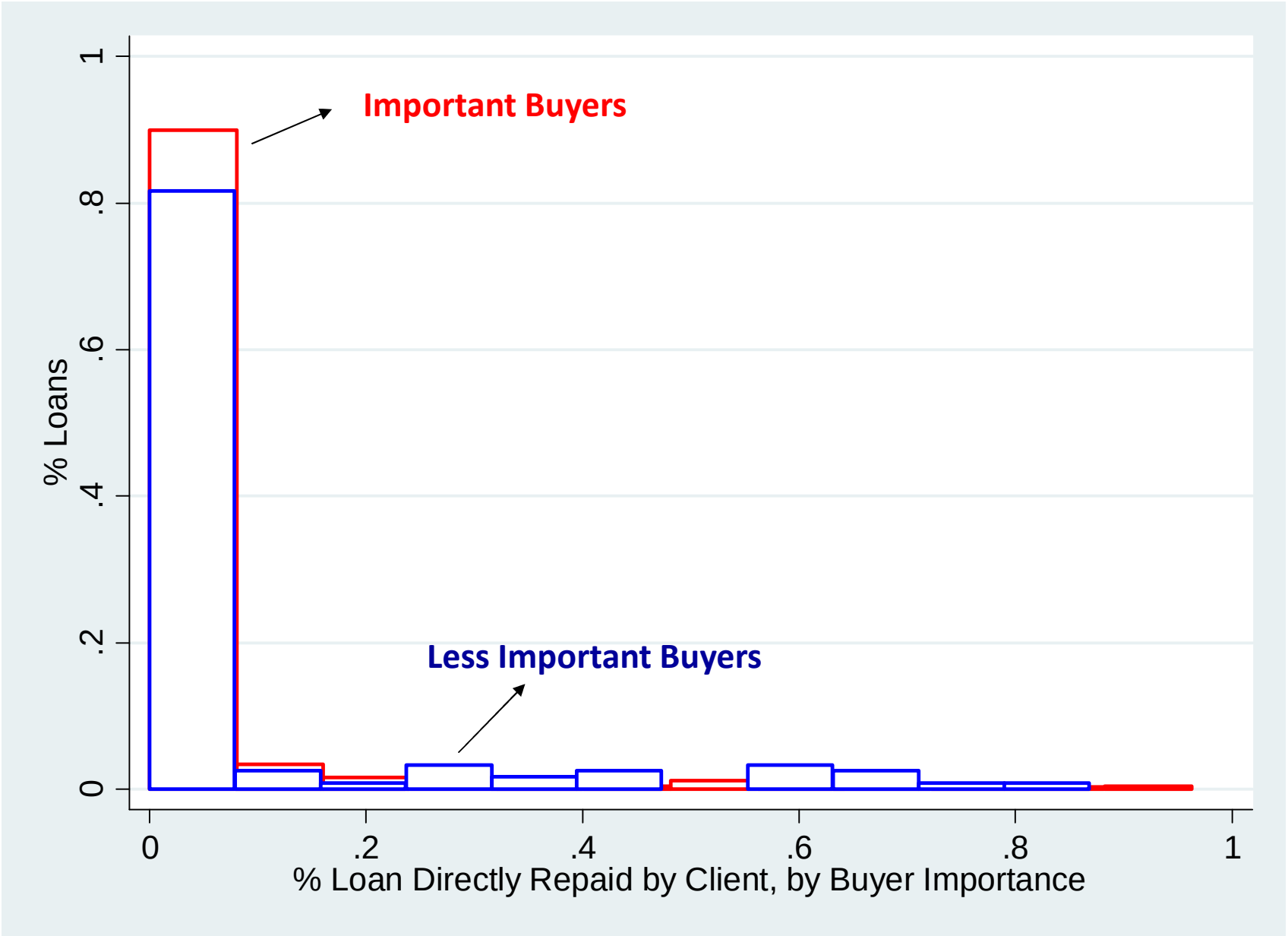
For which kind of buyers does this happen?



For which kind of buyers does this happen?



Buyer-Lender Relations & Borrower/Seller's Behaviour



Buyer-Lender Relations & Borrower/Seller's Behaviour

Table 6: Buyer-Lender relationship and Direct Payments to the Lender

	Station Paid Lender Directly				
	(1)	(2)	(3)	(4)	(5)
Price ratio x Buyer Importance				-0.0560**	-0.0569**
				(0.0222)	(0.0243)
Buyer Share of Lender Portfolio	-0.0345***		-0.0443***	0.0177	0.0187
	(0.00949)		(0.0126)	(0.0210)	(0.0241)
Price ratio $\frac{maturity}{closing}$		0.0712**	0.168*	0.231**	0.225**
		(0.0324)	(0.0916)	(0.107)	(0.104)
Country Fixed Effects	Y	Y	Y	Y	Y
Month-Year Fixed Effects	Y	Y	Y	Y	Y
Price at Closing	Y	Y	Y	Y	Y
Futures price at maturity at closing	Y	Y	Y	Y	Y
Numerical Score	N	N	Y	N	Y
Observations	283	485	218	218	218
R-squared	0.199	0.102	0.176	0.181	0.182

Buyer-Lender Relationship and Direct Lender

Table 11: Buyer punishment of lender for receiving direct payments

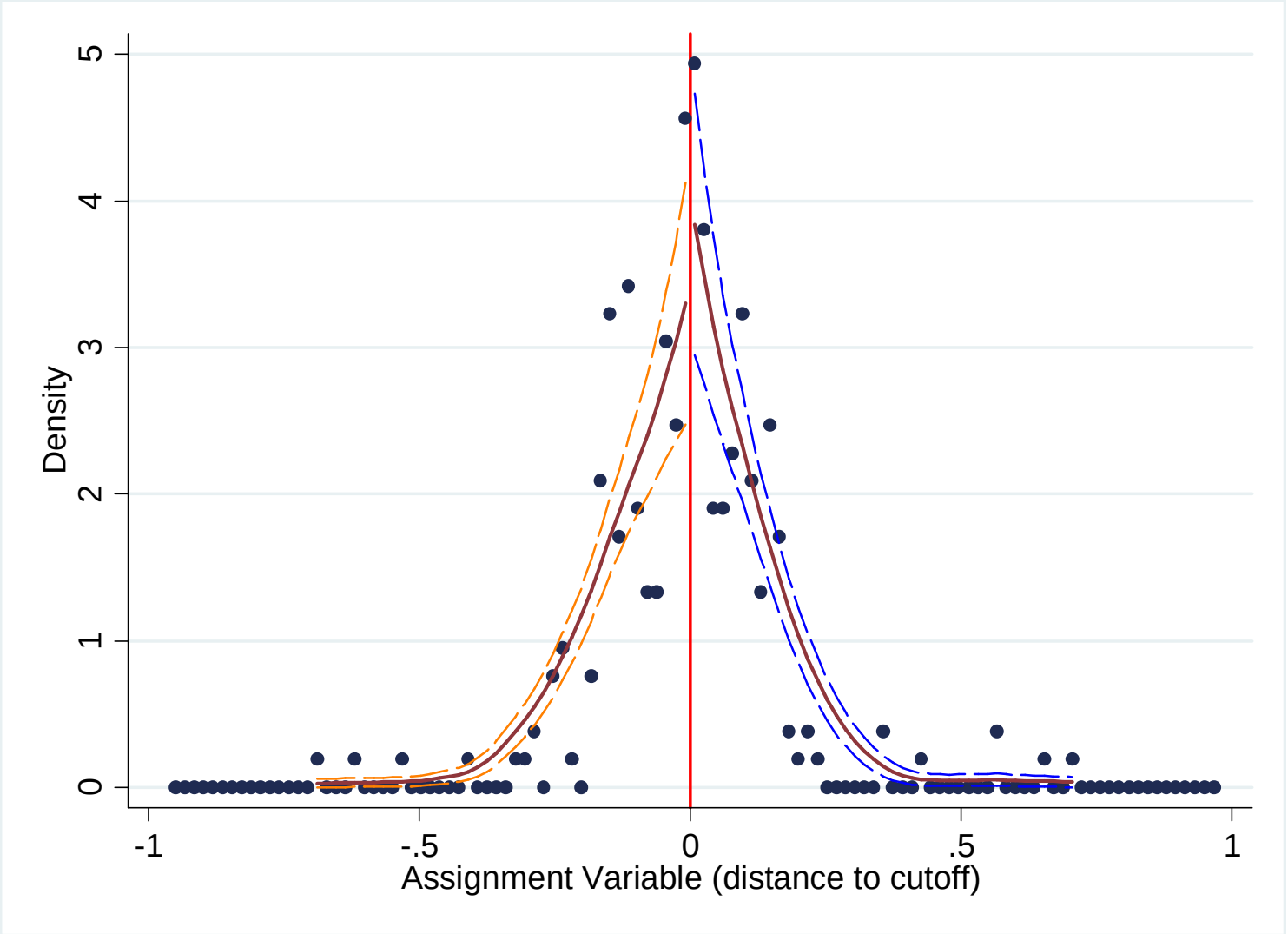
	Buyer Returns in Sample		
	(1)	(2)	(3)
Station Paid Direct to Lender	-0.197***	-0.155**	-0.147*
	(0.0722)	(0.0737)	(0.0758)
Station Defaulted on Loan		-0.365***	-0.357***
		(0.0794)	(0.0789)
Unexpected Price Jump At Delivery			-0.0792
			(0.145)
Buyer Fixed Effects	Y	Y	Y
Year Fixed Effects	Y	Y	Y
Observations	684	684	684
R-squared	0.395	0.403	0.403

Defaults, Delays and Future Loans

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

RD Design on Score: no sorting



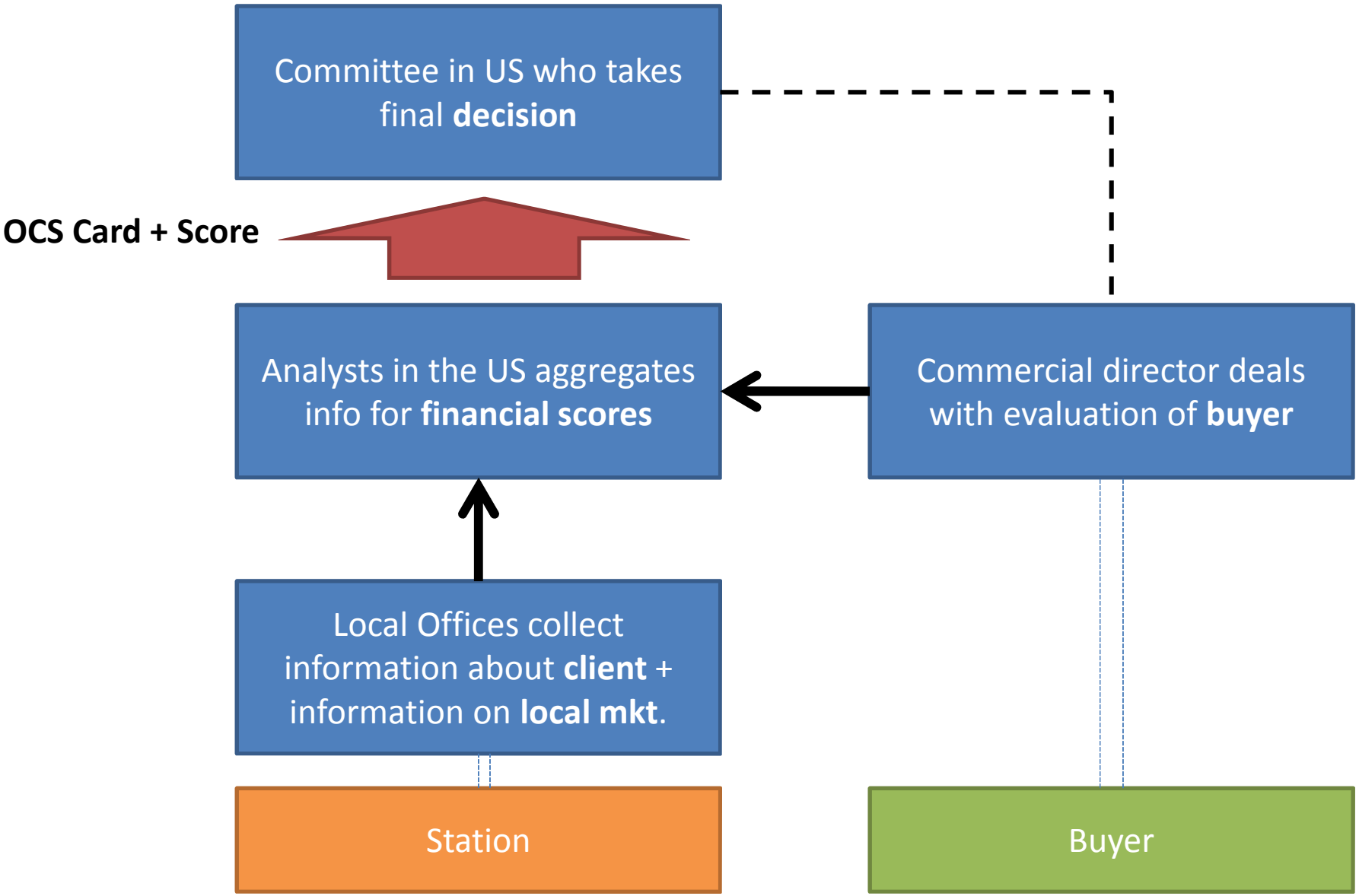
RD Design on Score: no manipulation

Dependent Variable	Estiamte	Standard Error	Observations
Entity Score	0.108	(0.109)	315
Accounting Quality	0.221	(0.226)	315
Planning Systems	0.250	(0.156)	315
Liquidity Risk	-0.0561	(0.206)	315
Leverage	0.156	(0.178)	315
Profitability	0.0934	(0.189)	315
Credit History (RC)	0.155	(0.203)	312
Asset Quality	0.205	(0.168)	303
Product Score	0.0407	(0.0960)	315
Processing	0.156	(0.131)	315
Supply Security	-0.0630	(0.103)	315
Management Score	0.0176	(0.114)	315
General Manager	-0.0649	(0.168)	315
Finance Accounting	0.0795	(0.190)	315
Internal Controls	0.156	(0.169)	314
Marketing Sales	-0.132	(0.162)	315
Staff Retention	0.142	(0.170)	303
Report Quality	0.00691	(0.142)	314
Report Punctuality	0.00318	(0.151)	302
Email Promptness	0.130	(0.168)	314
Email Quality	0.0682	(0.158)	302
Buyer Score	0.116	(0.0901)	315
Buyer Quality	0.158	(0.119)	315
Buyer Relationship	0.170	(0.165)	315
Buyer Mix	0.607**	(0.288)	315
Type of Contract	0.114	(0.160)	300
Context Score	-0.0328	(0.0473)	315
Weather	-0.0422	(0.146)	315
Country Stability	0.0621	(0.128)	314
Sales Price Volatility	0.0897	(0.222)	300

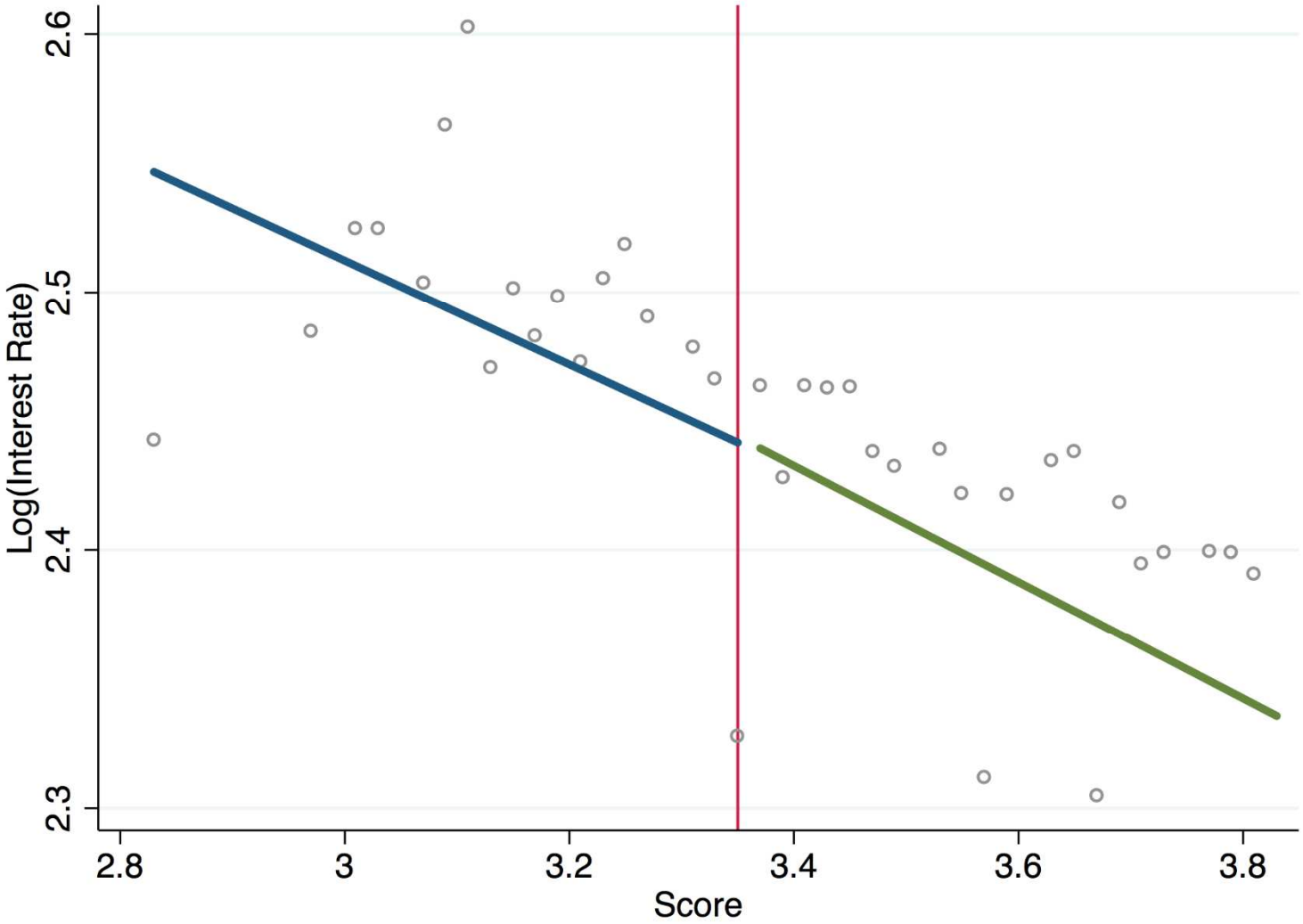
RD Design on Score: no manipulation

	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

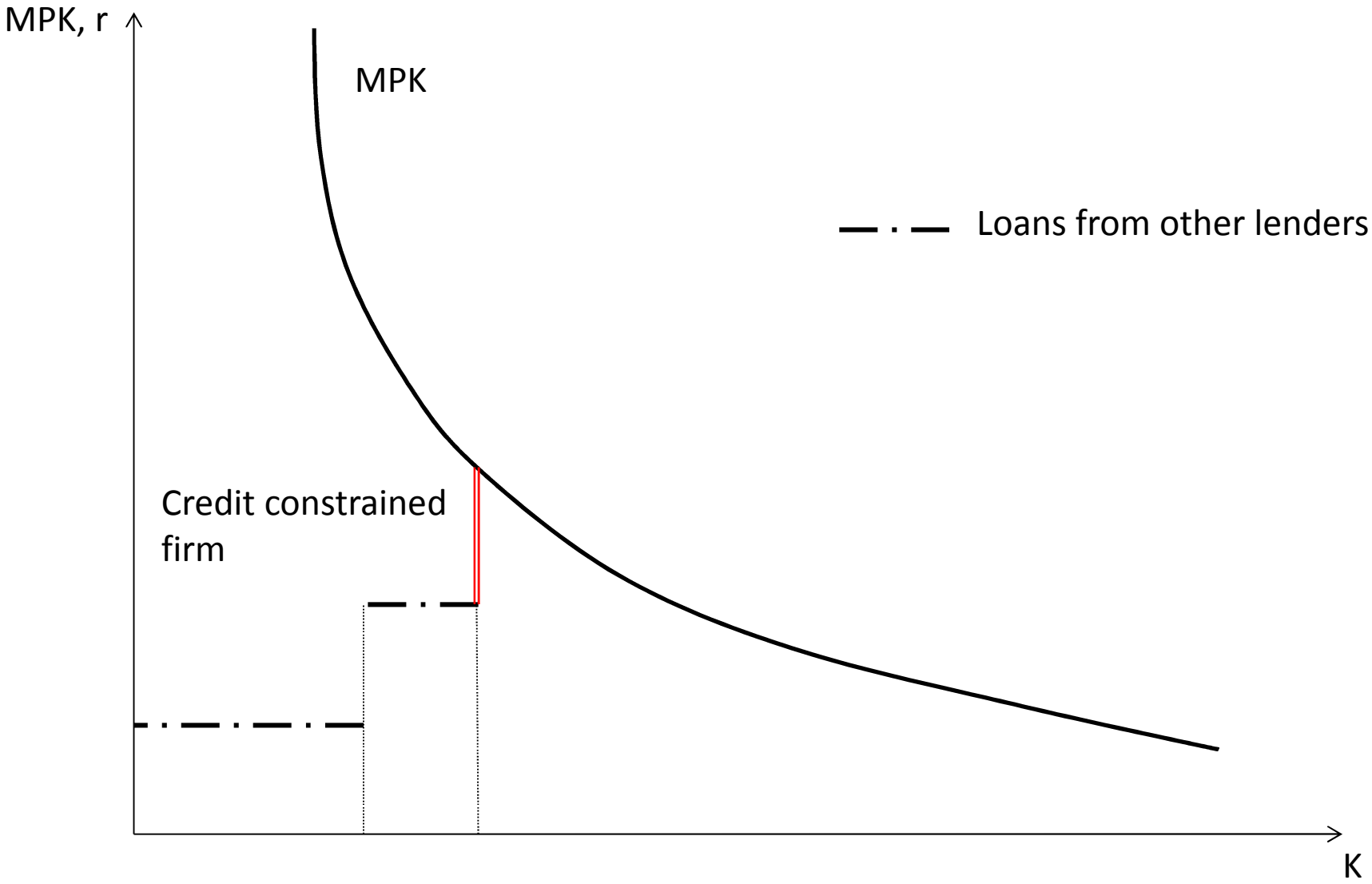
Decision Process



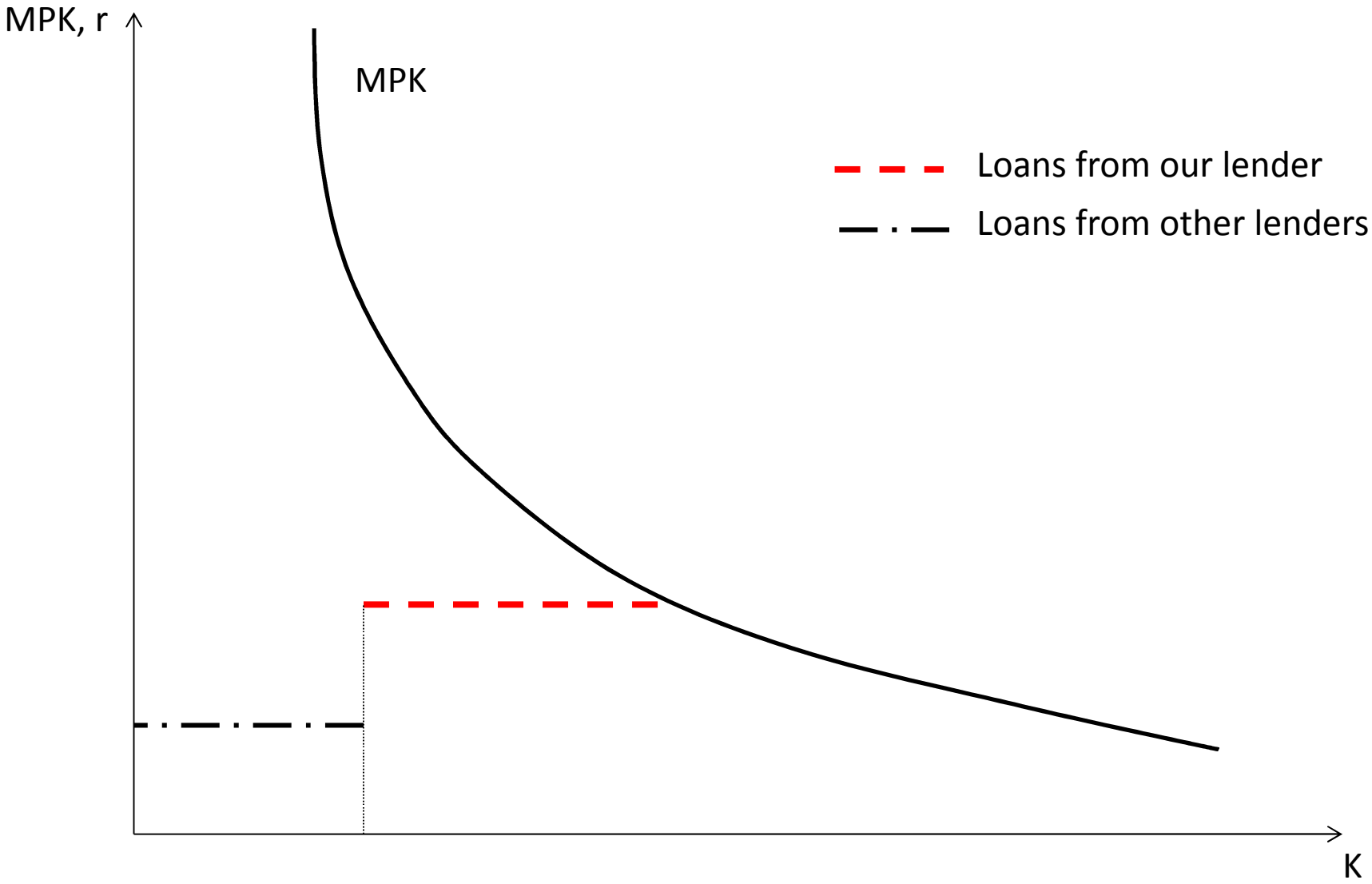
RD on interest rate



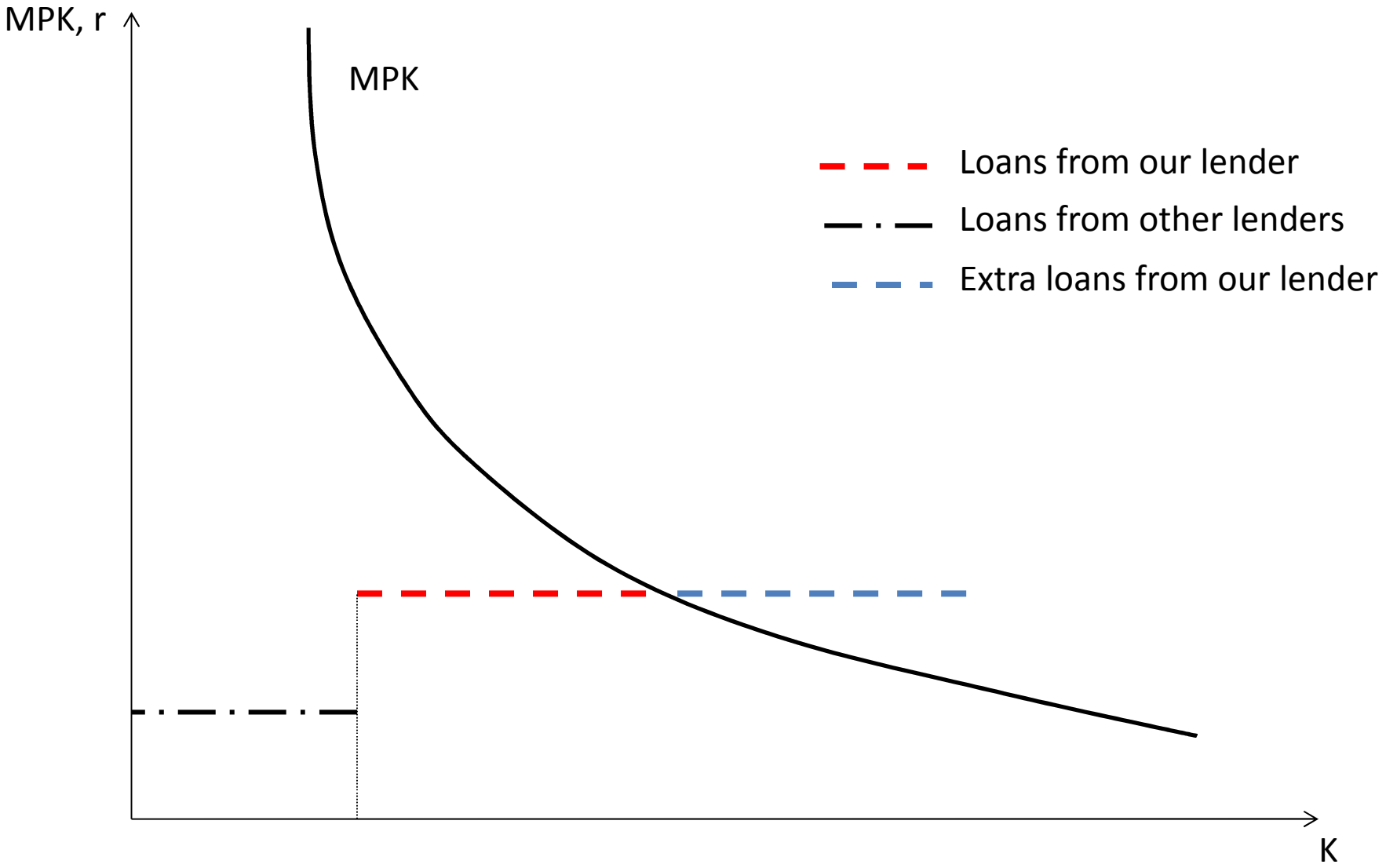
Are Firms Credit Constrained? Definition



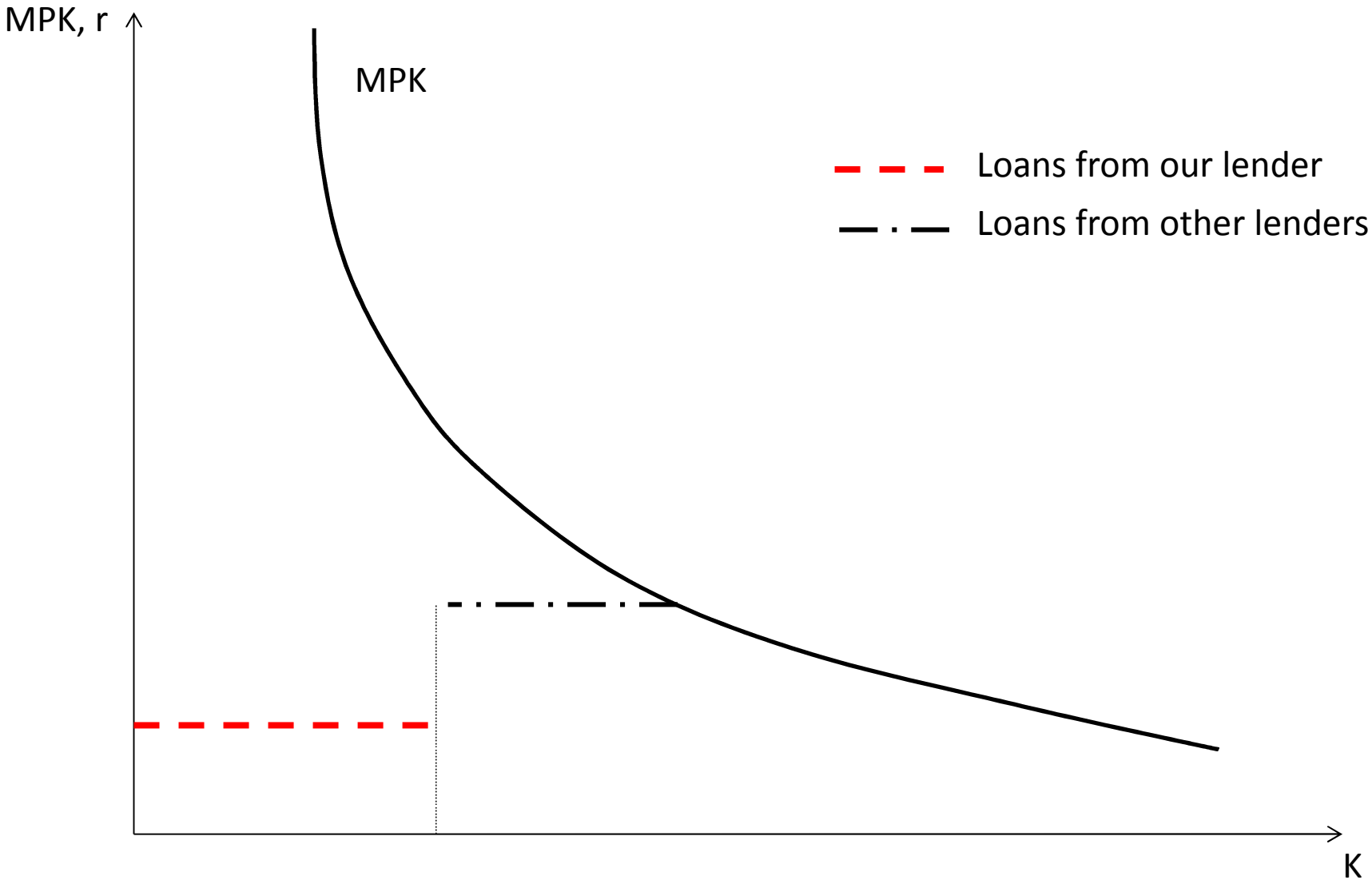
Case 1: Our Lender is Mg.



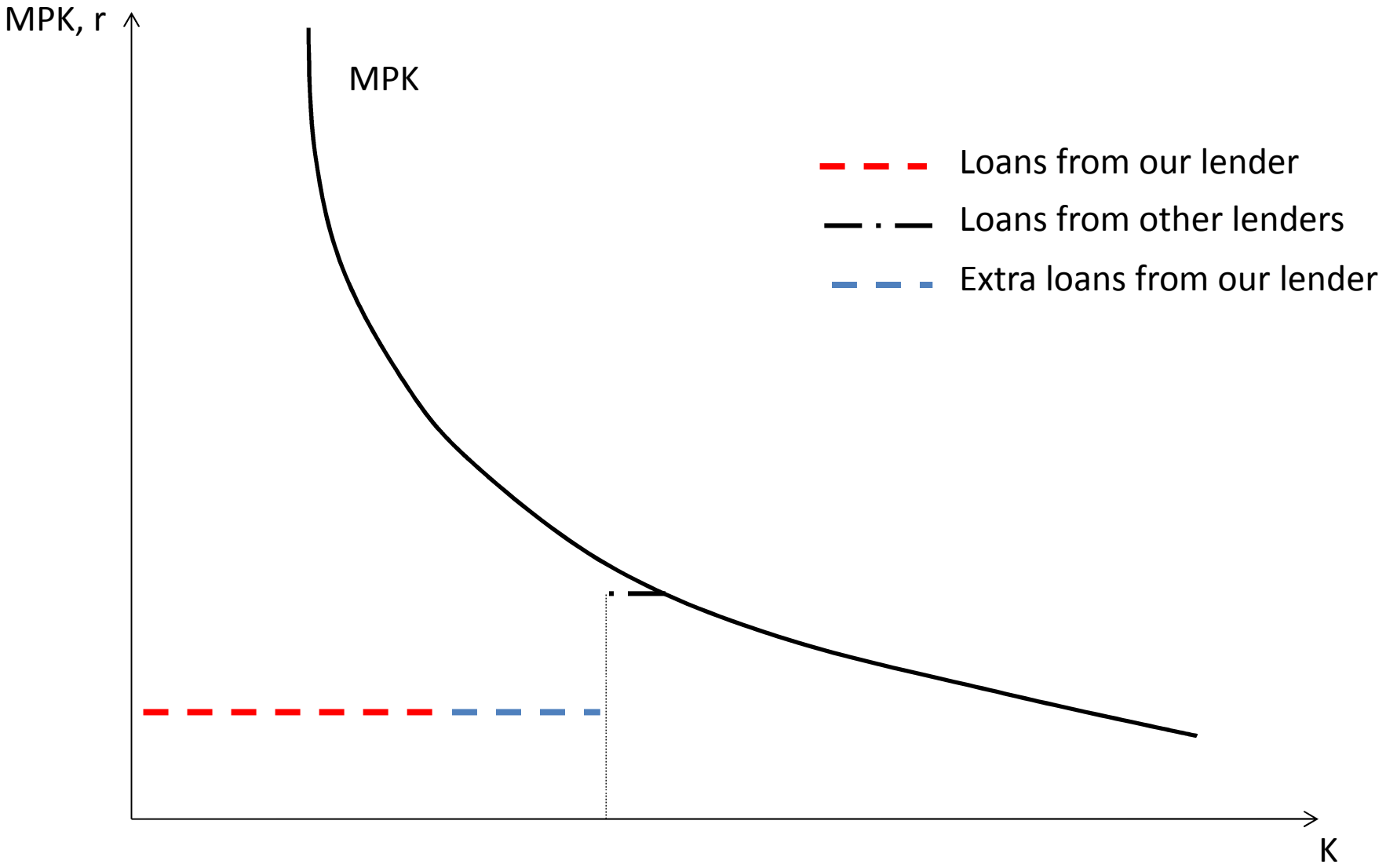
Case 1: Our Lender is Mg.



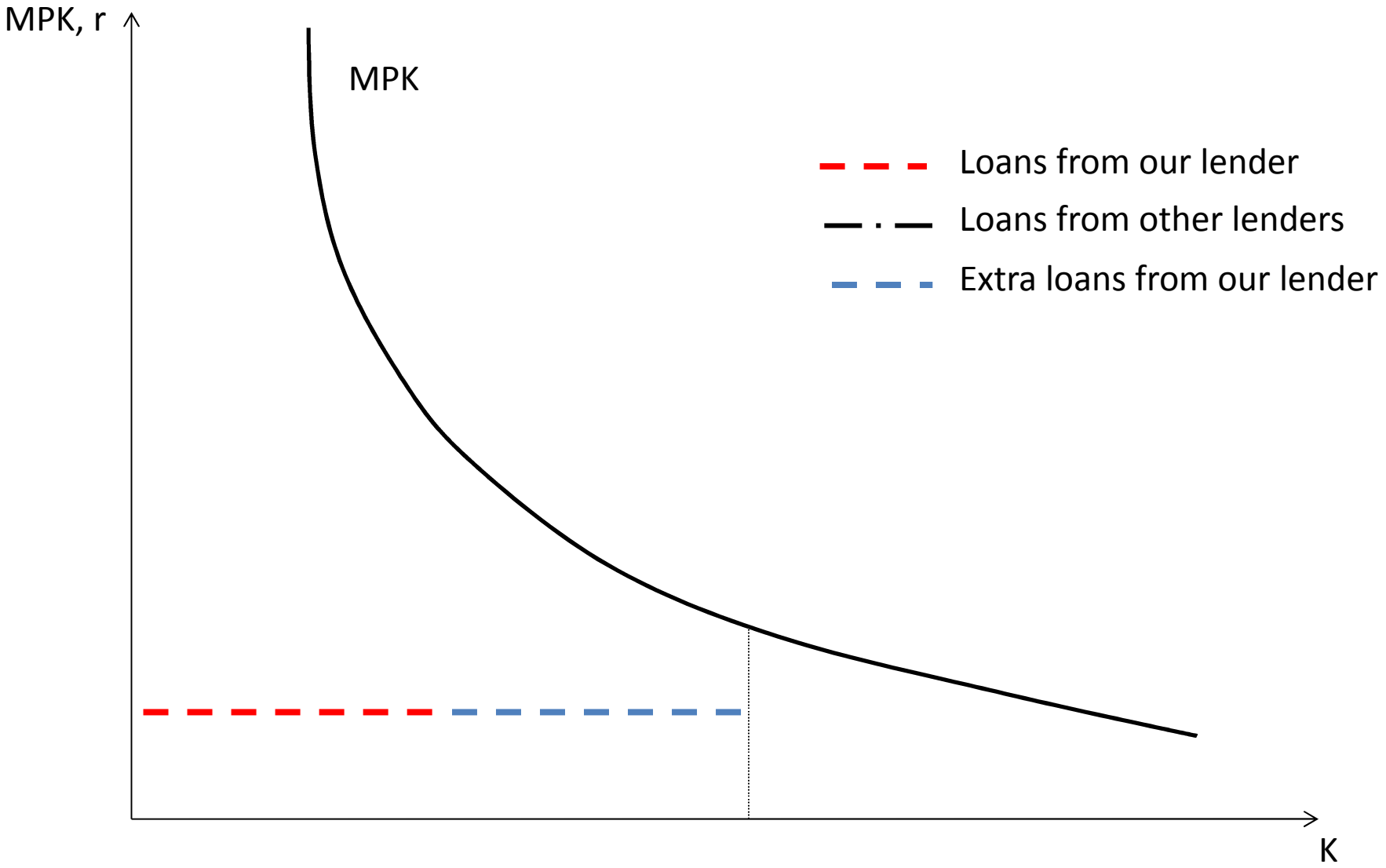
Case 2: Our Lender is Infra-Mg.



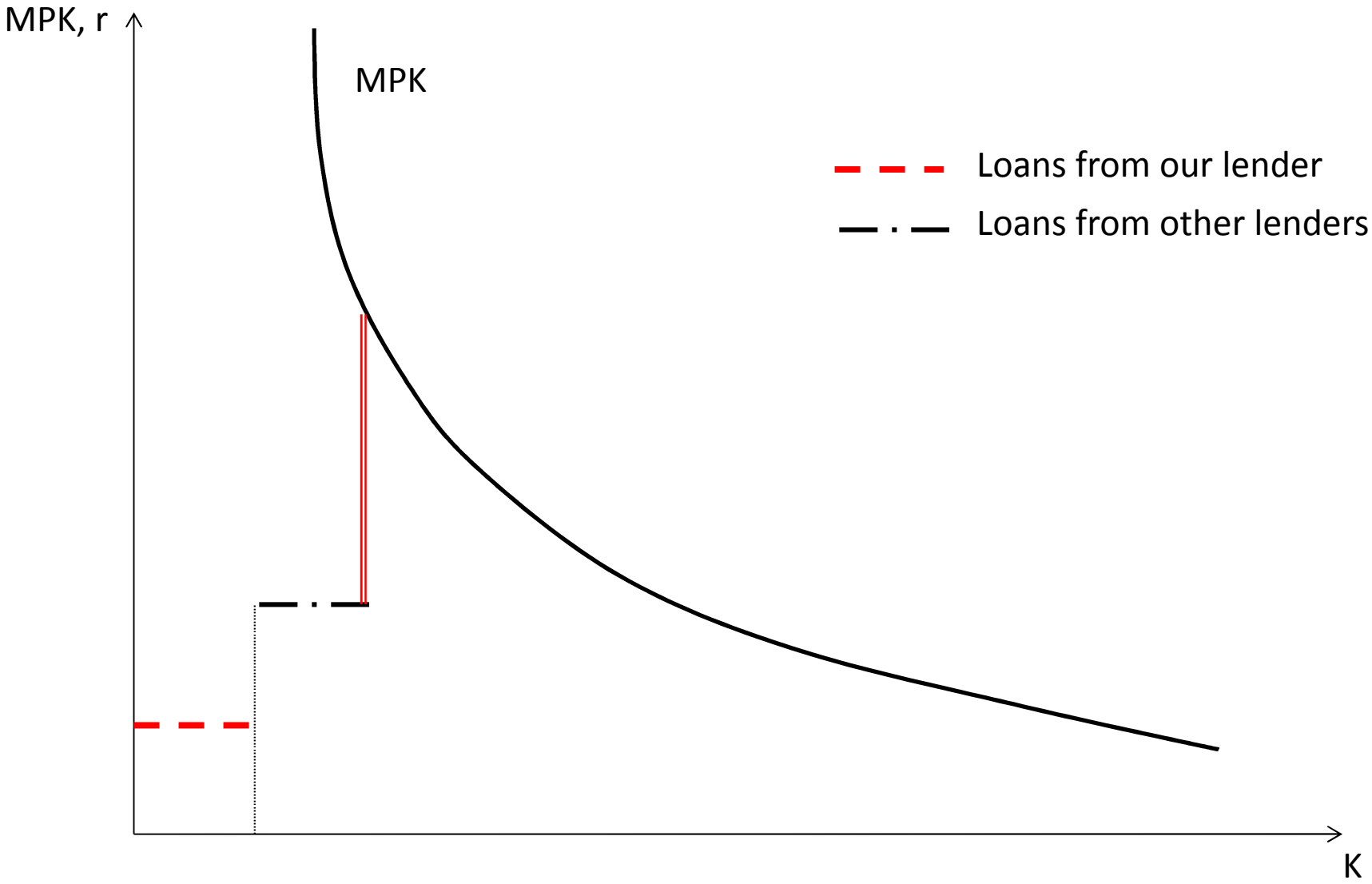
Case 2: Our Lender is Infra-Mg.



Case 2: Our Lender is Infra-Mg.



A Credit Constrained Firm



A Credit Constrained Firm