Dollars Dollars Everywhere, Not a Dime to Lend:

Credit Limit Constraints on Financial Sector Absorptive Capacity

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Financial System's Absorptive Capacity

- Developing countries are known to have very limited "absorptive capacity"
  - Lucas (1990)
  - Today such "global imbalances" even more stark (e.g. China, India → Net exporters of capital)
- Is financial underdevelopment a cause?
  - "Debt Capacity" constraints:
    - Banks unwilling to lend against future/expected NPV
    - Credit decisions are based on backward looking information (collateral, cash flows, balance sheet ratios)
- This paper uses an unusual natural experiment to answer this question:
  - The large liquidity inflows in Pakistan following 9/11

- Why 9/11?
  - Unexpected shock.
  - Immediately after 9/11, large amounts of capital flowed into Pakistan (*hundi* crackdown, reverse K).
  - The economy experienced large (positive) aggregate demand shocks (lifting of sanctions, ally in WAT).
  - One would expect sharp increases in bank lending, but lending to firms shows surprisingly little response, despite:
    - Sharp rise in deposit to loan ratios
    - Sharp drop in cost of capital from 11% to 2%
- Resolve Macro puzzle using Micro-evidence:
  - Use experiment to generate firm-level *cross-sectional predictions* of the debt capacity hypothesis
  - Test using firm level lending & credit limit data

Macro Evidence on 9/11

- Large increase in inflows
- Positive demand shock: investment, gdp, stock market, all shoot up. Defaults go down.
- Yet, very little expansion in bank credit

Figure IIIa: Pakistan Remittances in Millions of USD

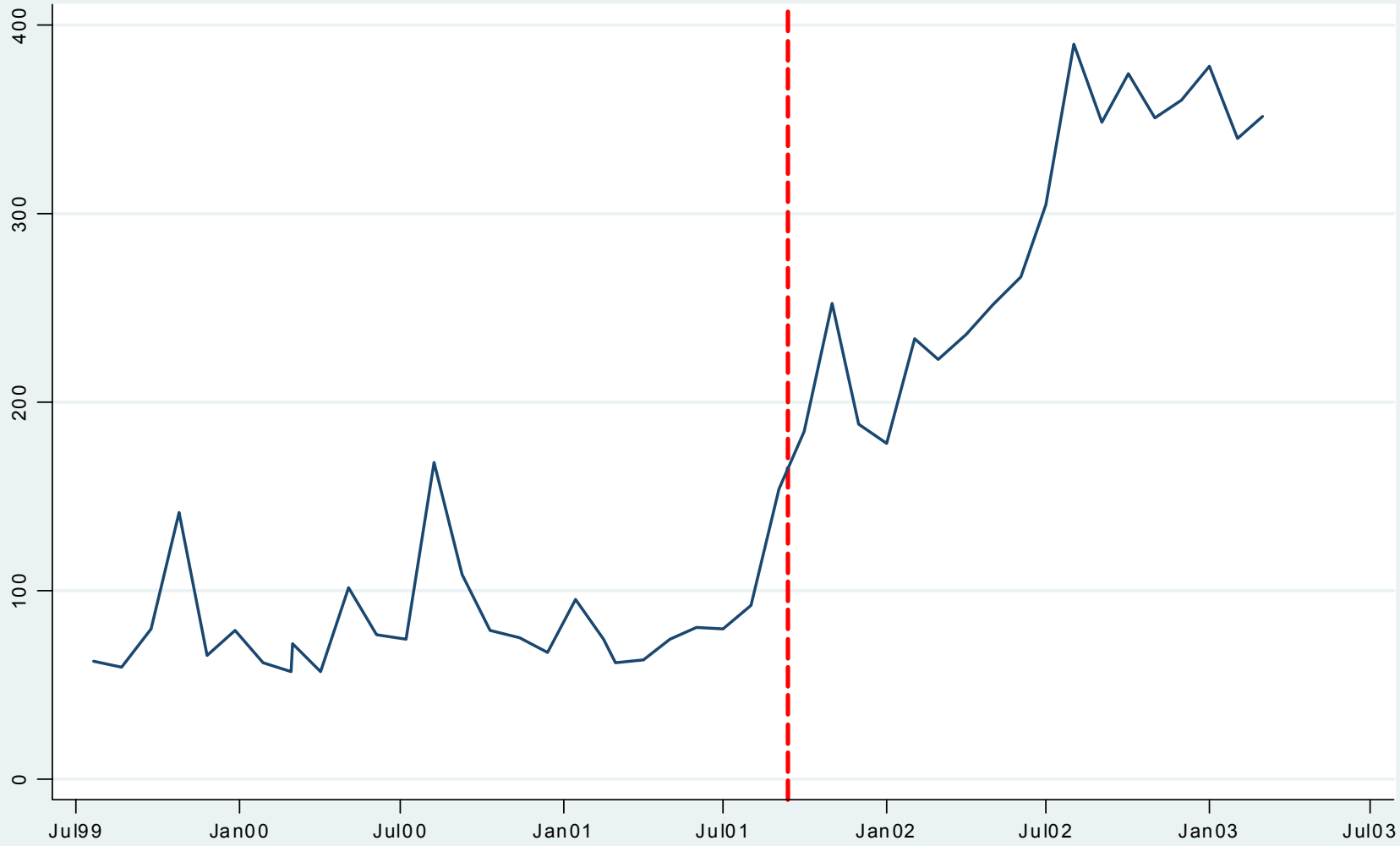


Figure IIIb: Pakistan Foreign Exchange Reserves in Millions of USD

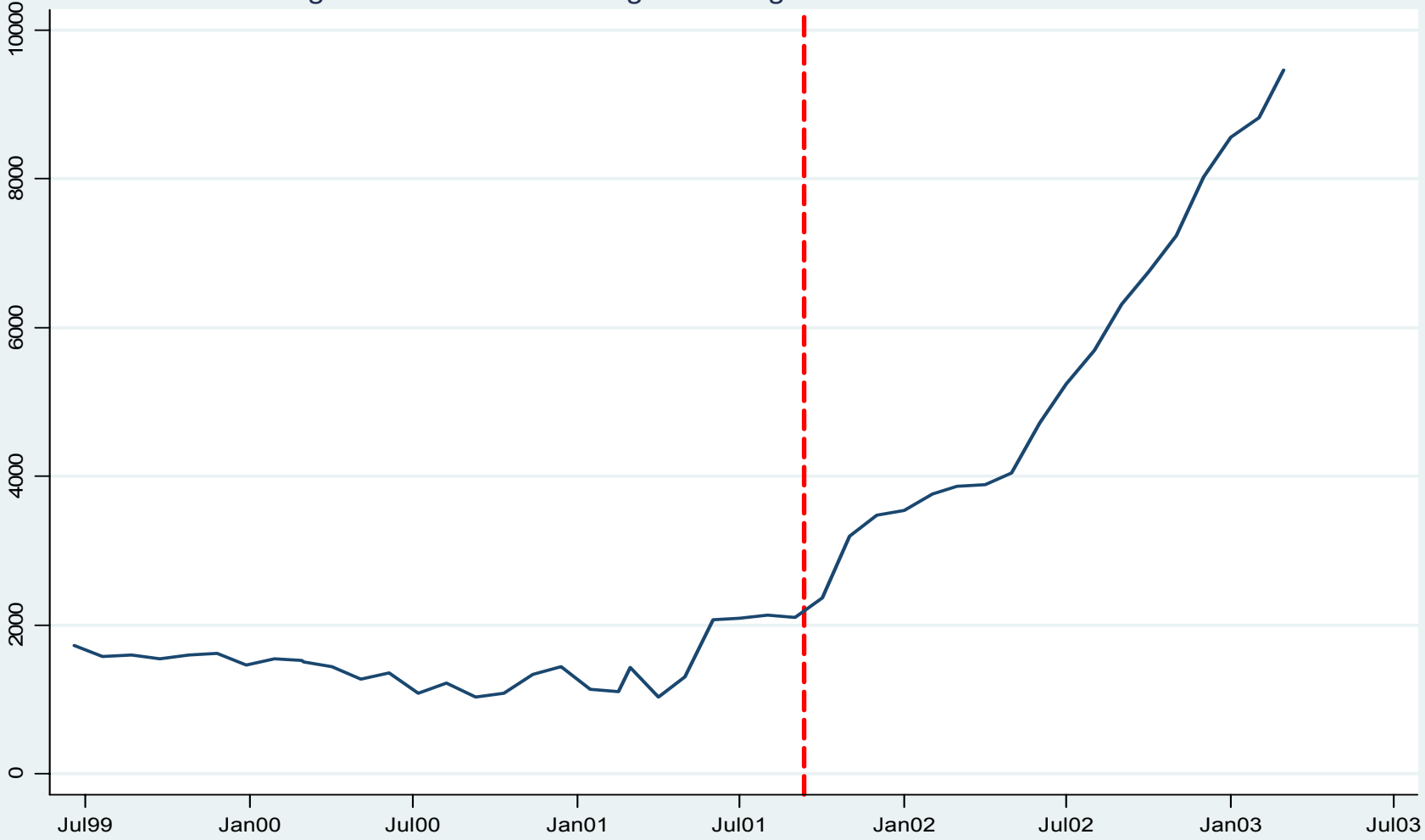


Figure IIIc: Official Exchange and Kerb Market Rates in USD (log scale)

Figure IIId: Domestic Interest Rates in Pakistan

Figure IVa: Investment Growth Trend

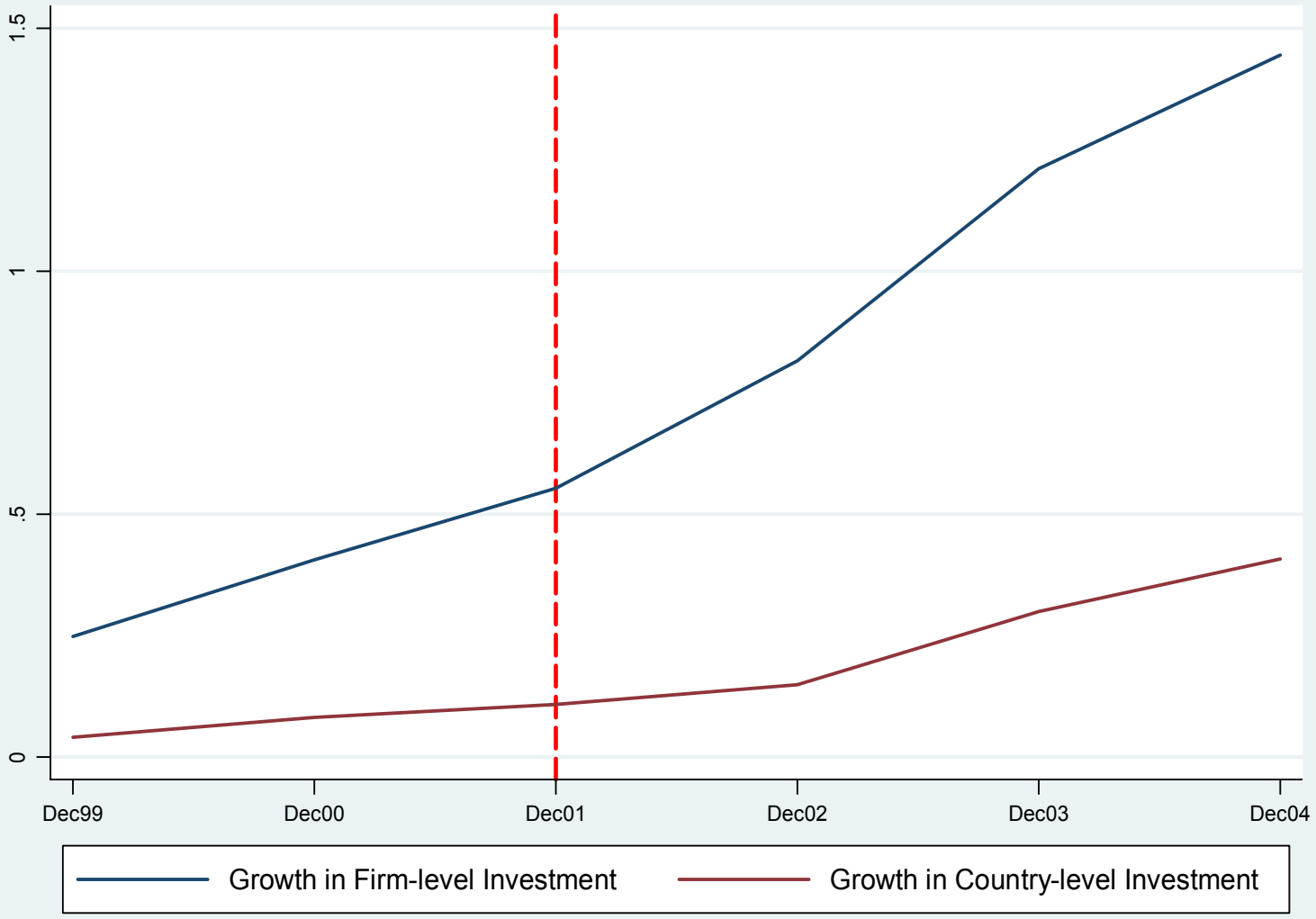


Figure IVb: Karachi Stock Exchange Index Closing Levels

Figure IVc: Borrower Default - Percentage of Firms Declaring Default for the First Time

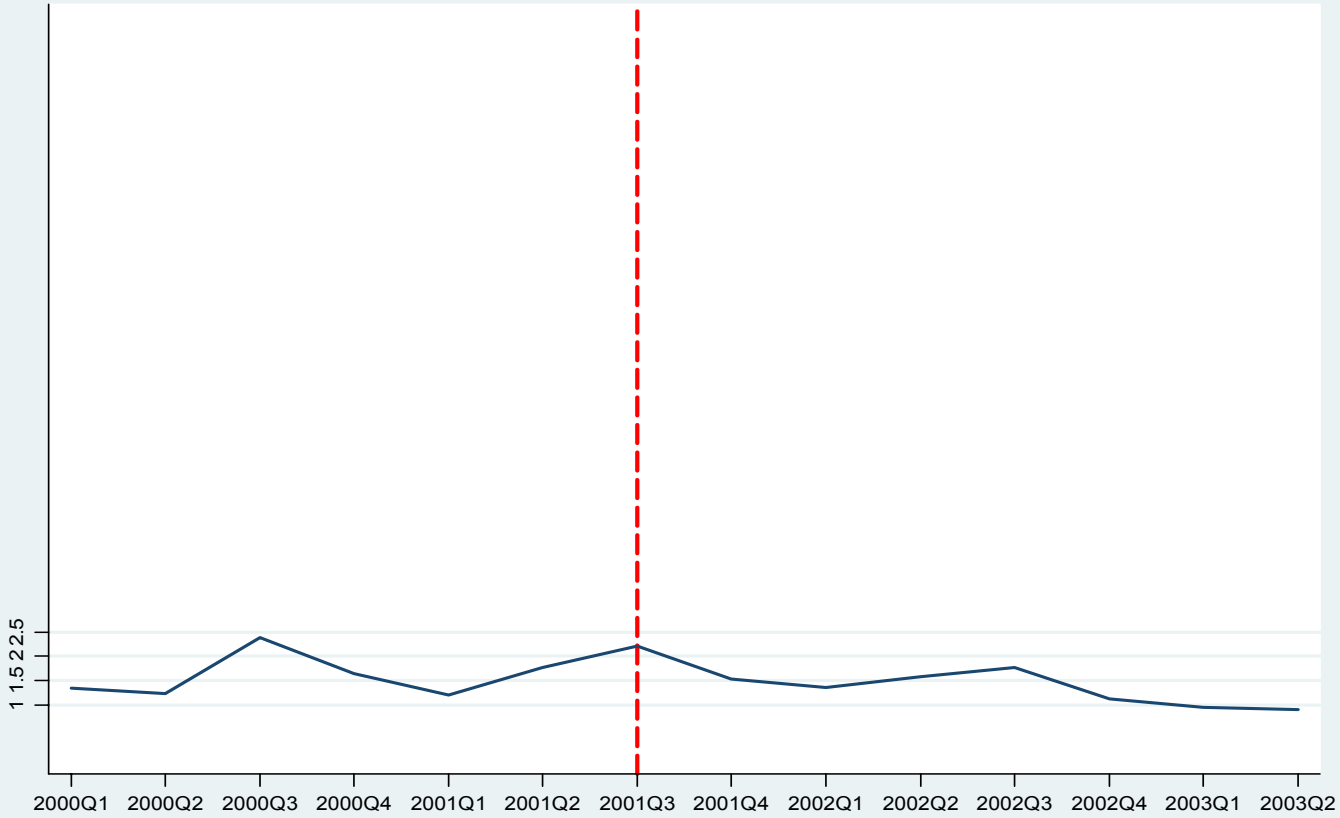


Figure Va: Quarter-by-Quarter Percentage Loan Growth - Firm Level Aggregated by Size

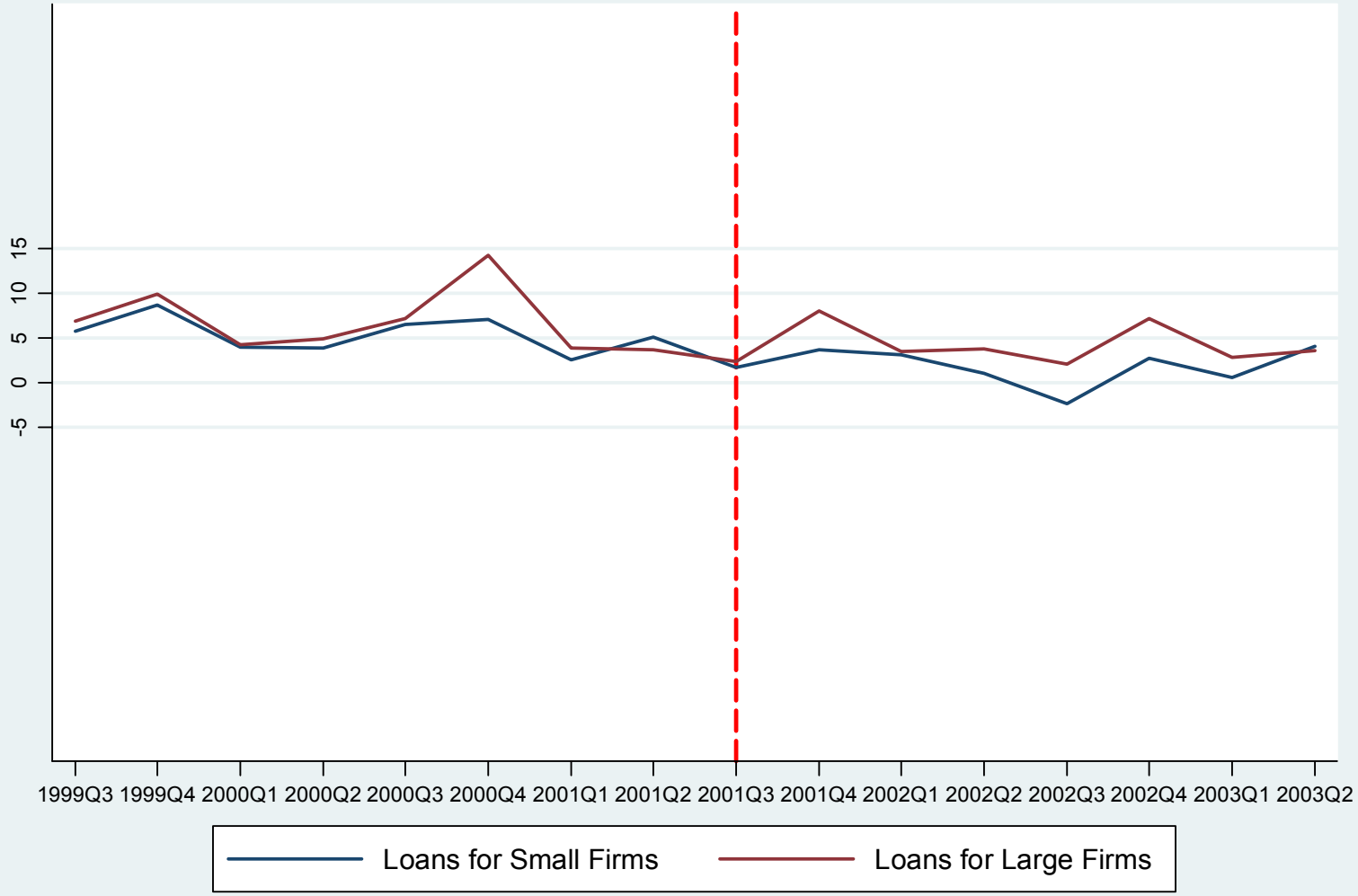


Figure Vb: Quarter-by-Quarter Percentage Entry Rates - Firm Level Aggregated by Size

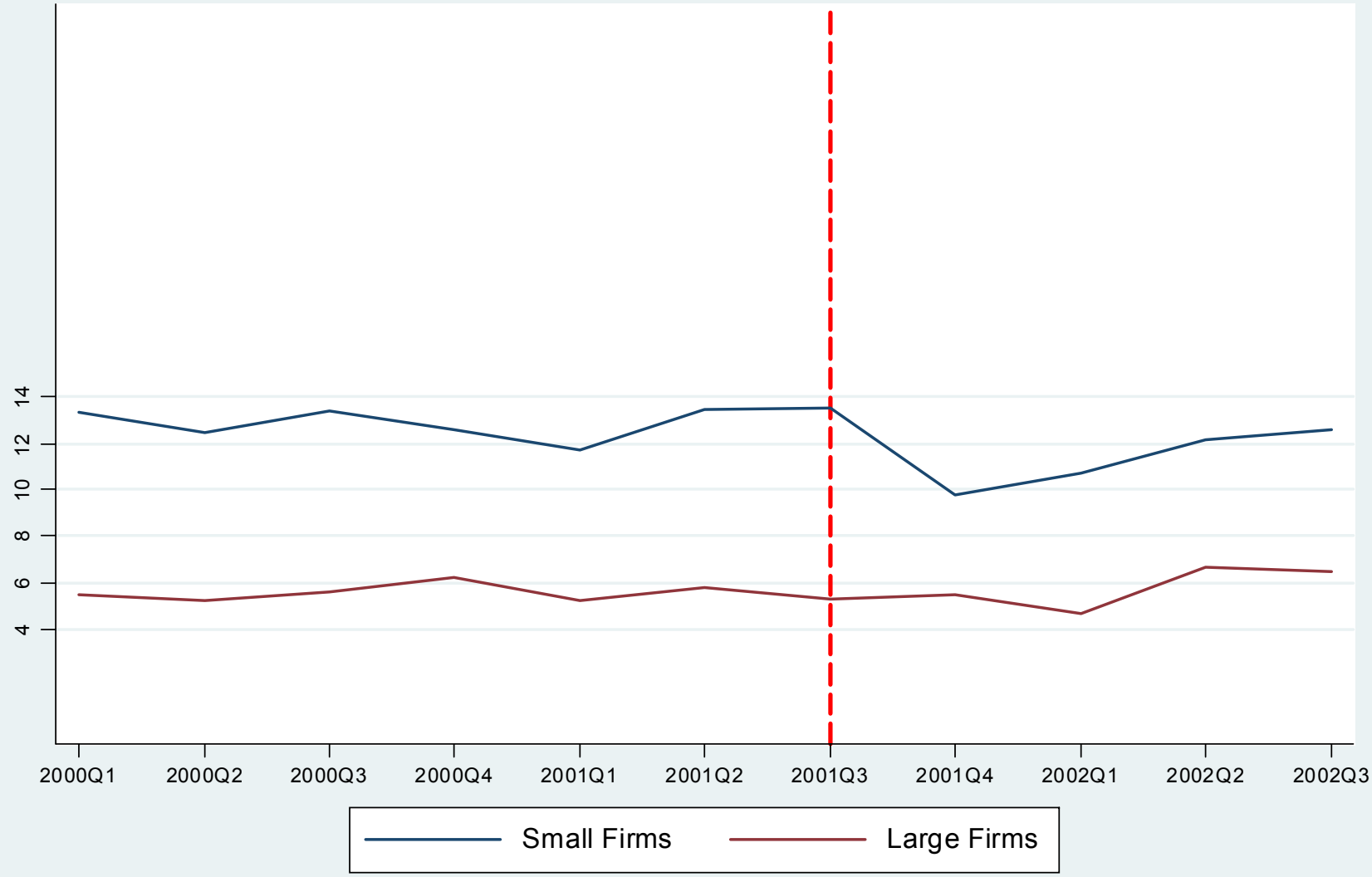
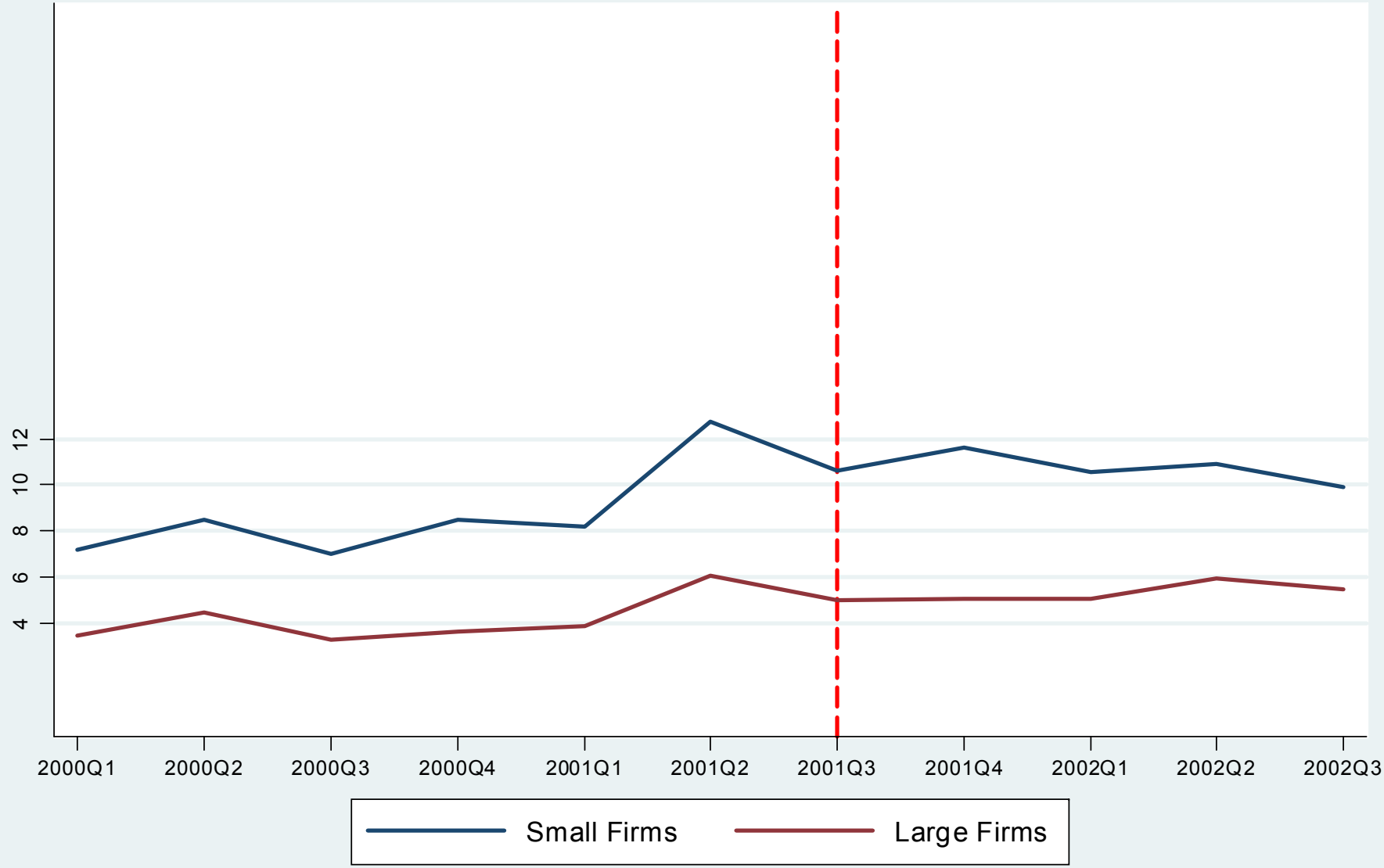


Figure Vc: Quarter-by-Quarter Percentage Exit Rates - Firm Level Aggregated by Size



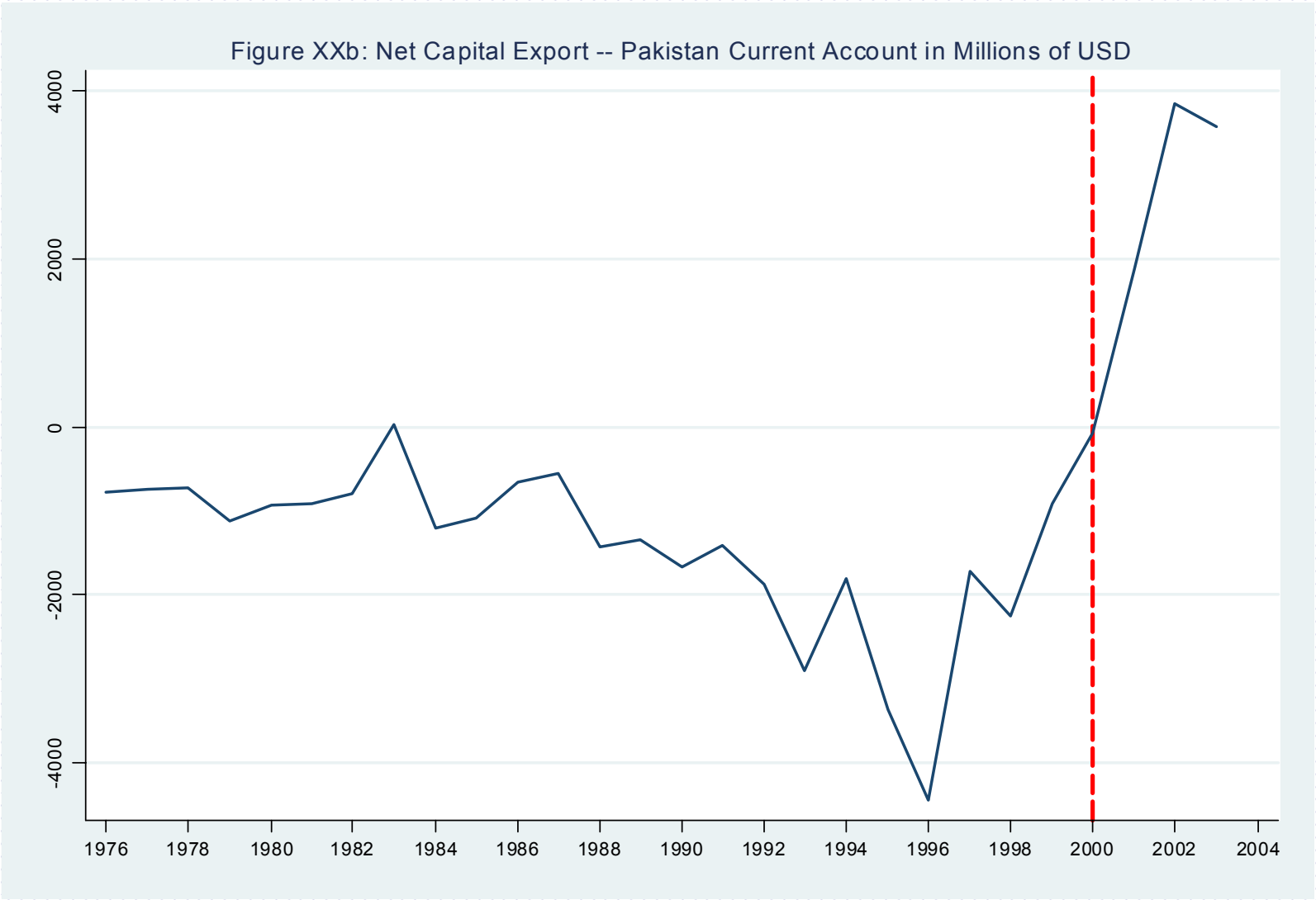
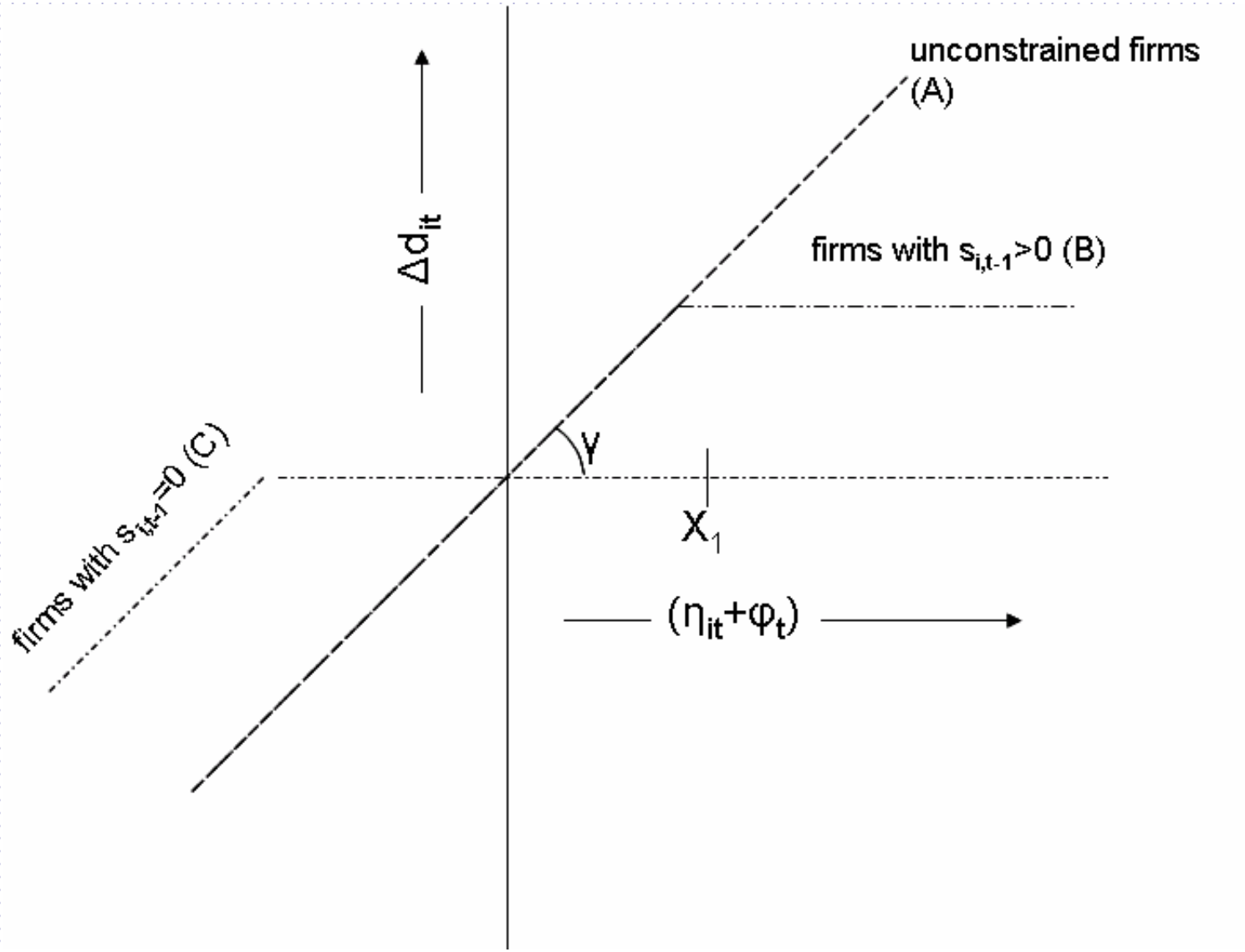


Figure XXb: Net Capital Export -- Pakistan Current Account in Millions of USD
4000
2000
0
-2000
-4000
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004

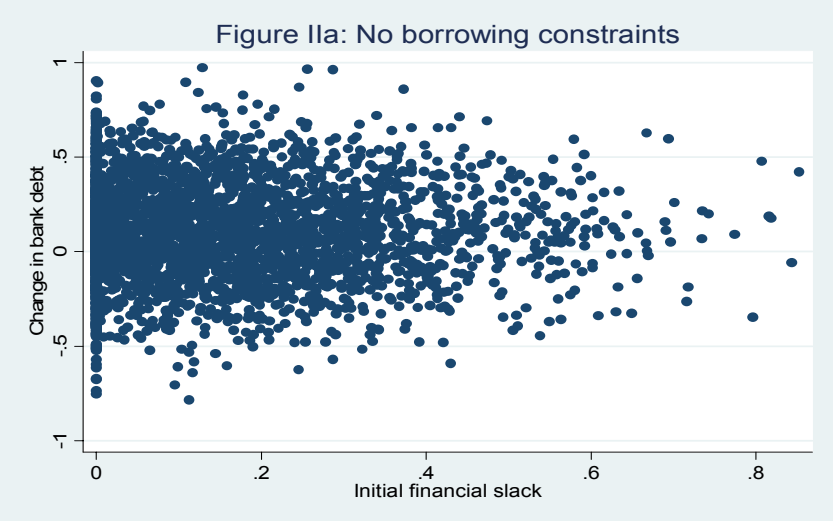
- A Simple Theory of Debt Capacity Constraints
  - Inability of firms to borrow (L) beyond their "debt capacity" (D), which is determined by characteristics such as collateralizable assets (W)
  - W is fixed (sticky) in the short run.
  - Thus future credit growth constrained by *financial slack*, S=(D-L), in response to 9/11 type experiment.

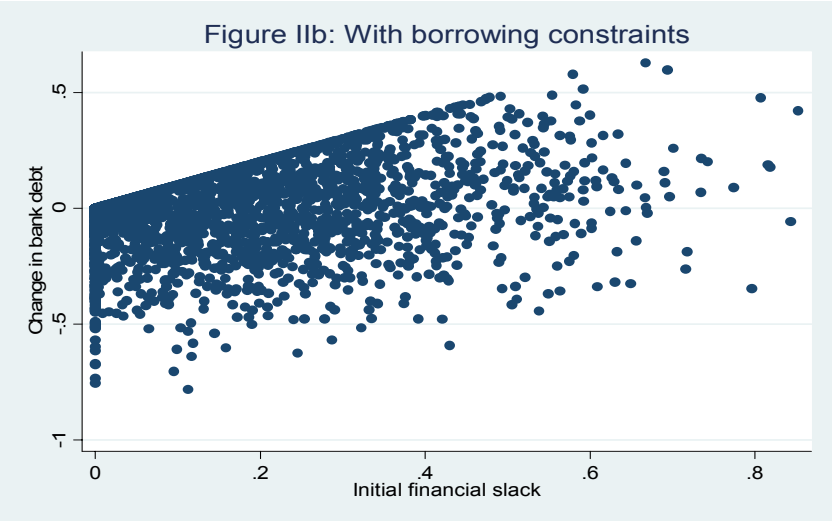
$$\Delta d_{it} = \alpha + \beta * S_{it-1} + \varepsilon_{it}$$

- Main Identification Concern:
  - S and unobserved η (firm specific demand shocks) are *positively* correlated (anticipation effects, firm quality).


unconstrained firms
(A)
firms with $s_{i,t-1}>0$ (B)
firms with $s_{i,t-1}=0$ (C)
Δd_{it}
γ
X_1
$(\eta_{it}+\varphi_t)$

Simulation Exercise





$$\Delta d_{it} = \alpha + \beta * S_{it-1} + \varepsilon_{it}$$

- Predictions of the debt capacity hypothesis:
  - The "Financial Slack" effect is positive ($\beta > 0$)
  - β is larger for bigger (unexpected) demand shocks:
    - In the time-series *within* firms (when 9/11 hits)
    - And in the cross section *across* firms (for high demand shock industries)
  - β is larger for firms facing stricter *ex-ante* balance sheet constraints, as per credit manuals:
    - Smaller firms
    - Non-exporting firms

- Macro evidence is suggestive of financial sector's limited absorptive capacity

- Use firm-level cross-sectional predictions to test whether debt capacity constraints are driving the result
  - Firm level data on external borrowing and bank credit limits covering all private firms in Pakistan.
  - Sample Selection: All performing loans at the time of 9/11.
    => 23,000 firms with quarterly data from April 1999 to June 2003.

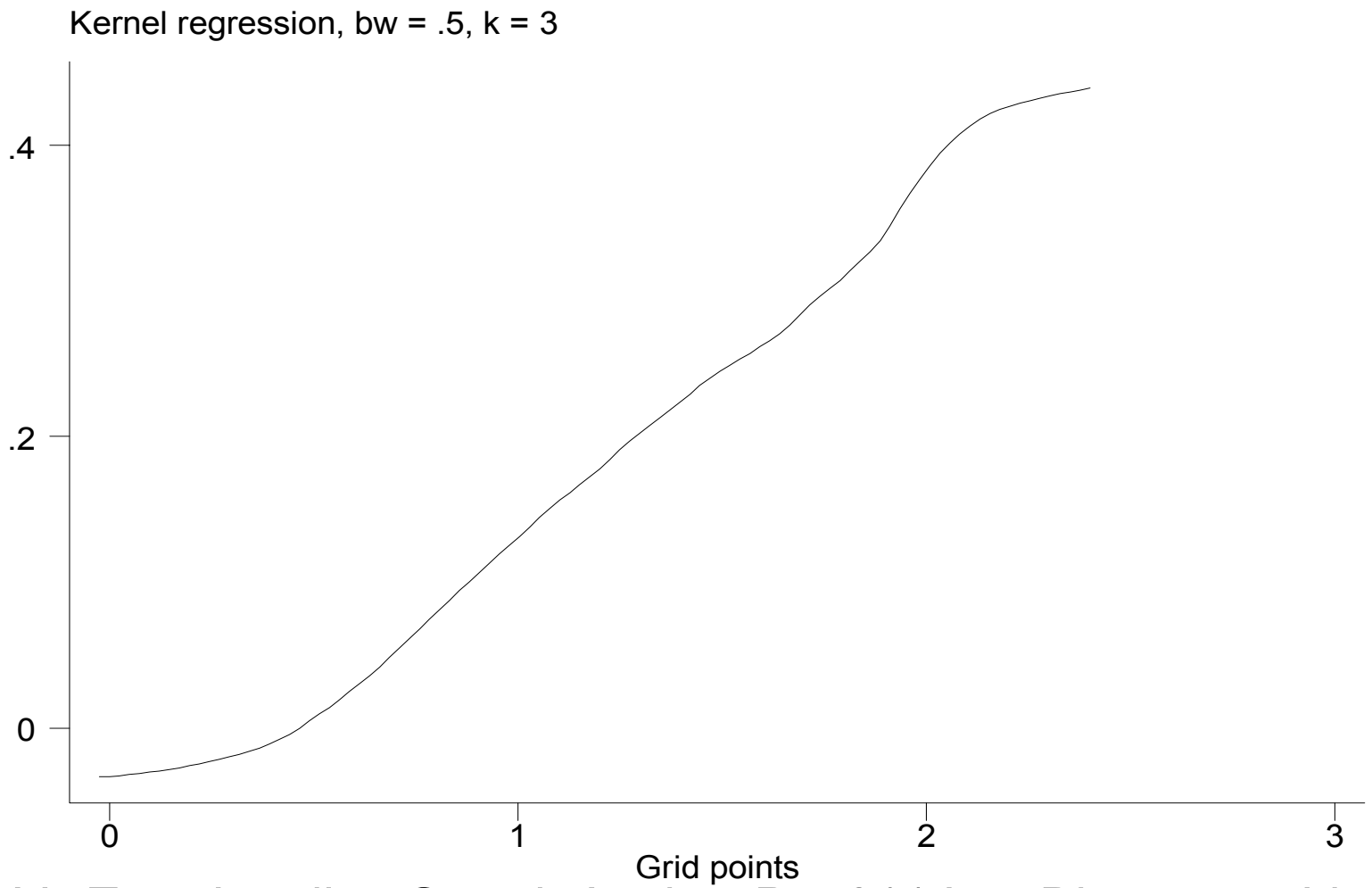
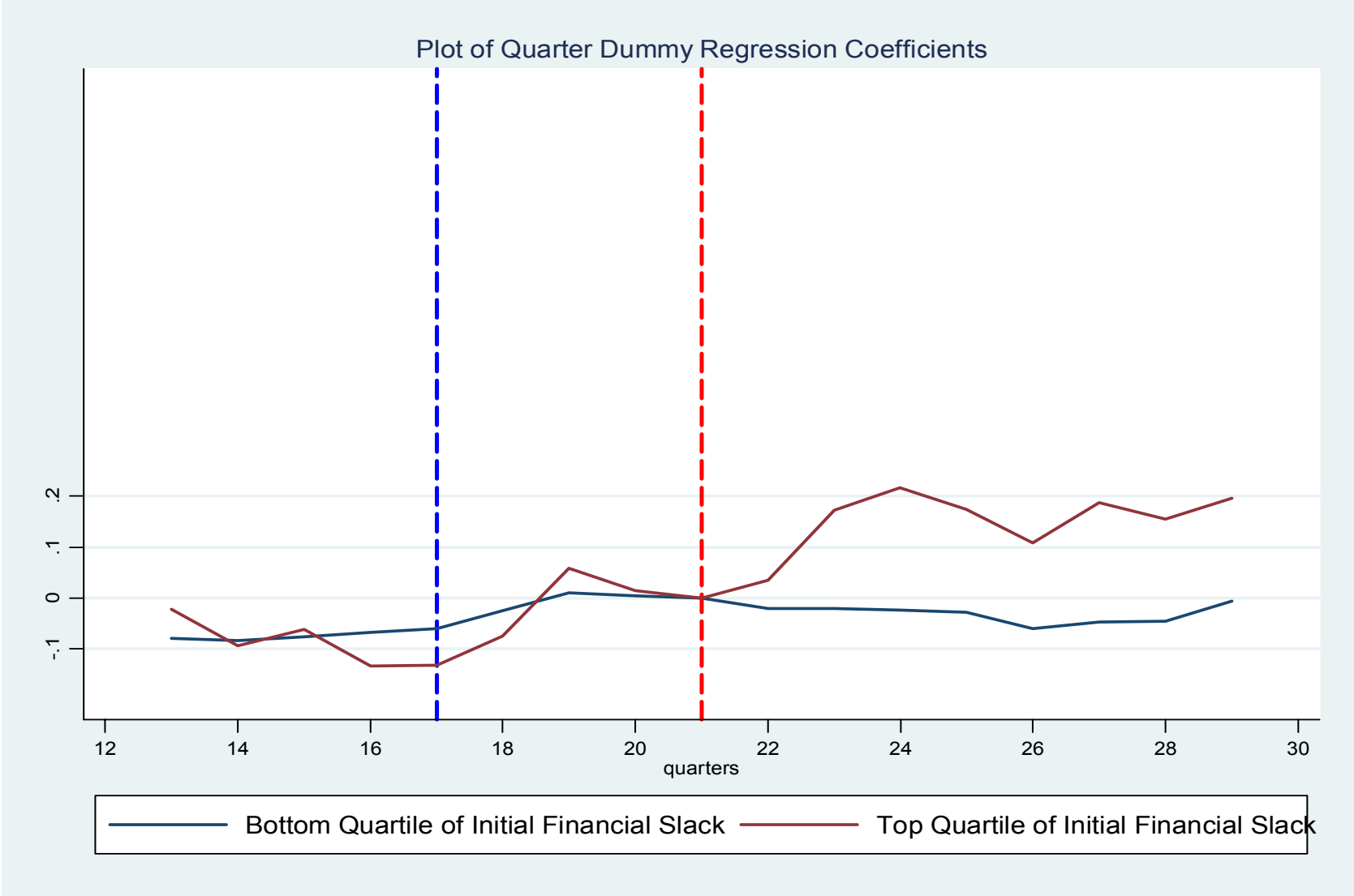


Figure VI: Total Lending Growth Against Pre 911 Log Distance to Limit

Firm Level Evidence



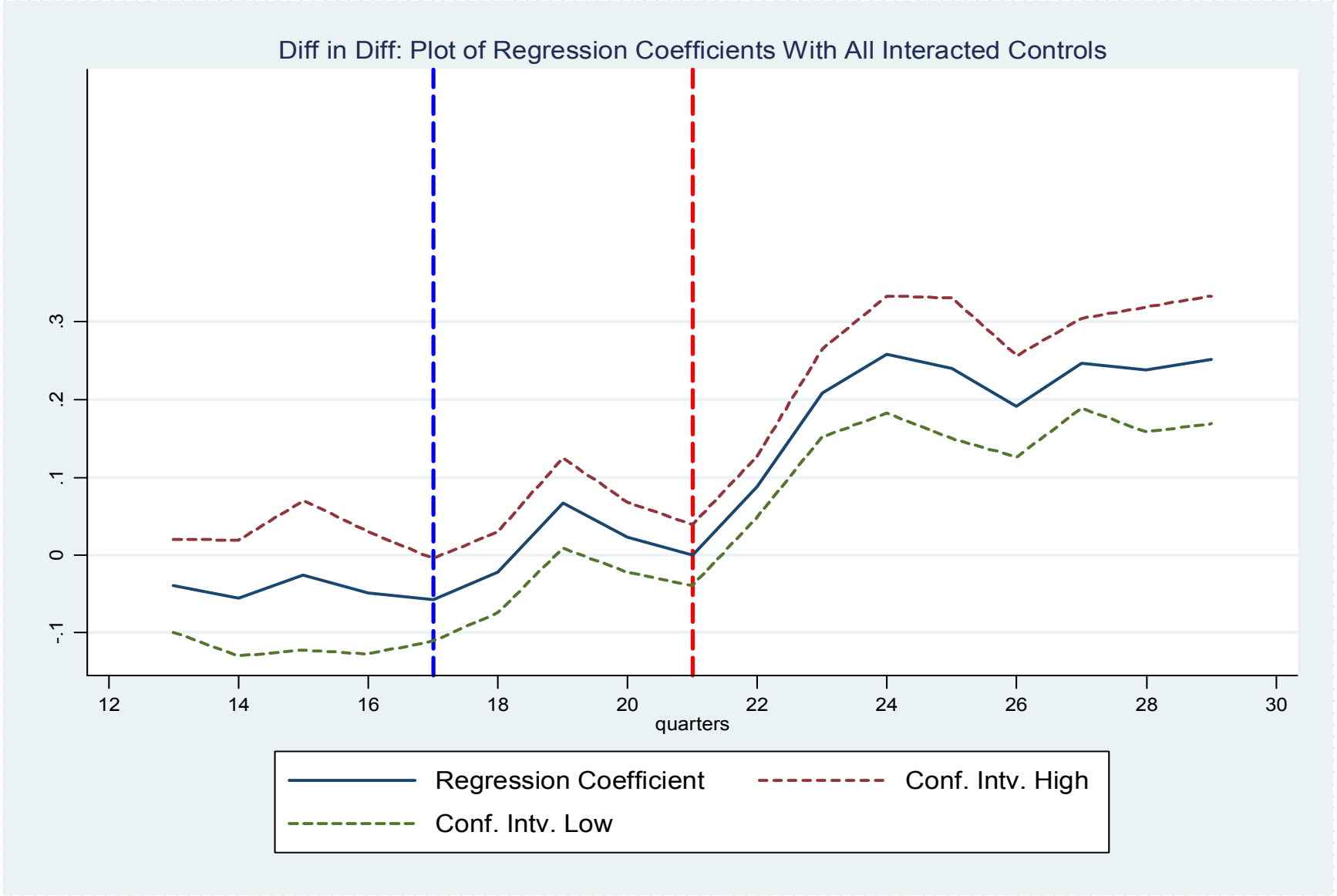

Diff in Diff: Plot of Regression Coefficients With All Interacted Controls
-.1
0
.1
.2
.3
12
14
16
18
20
22
24
26
28
30
quarters
Regression Coefficient
Conf. Intv. High
Conf. Intv. Low

Table III: Does Financial Slack Predict Credit Growth?

	(1)	(2)	(3)	(4)
Dep Var = Loan Growth	All Firms		Firms with Non-Missing Lagged Loan Growth	
Initial Financial Slack	0.206	0.193	0.185	0.178
	(0.020)	(0.015)	(0.017)	(0.015)
Lagged Loan Growth				-0.021
				(0.015)
Industry, City, and Bank FEs		YES	YES	YES
Observations	23010	23010	15406	15406
R-squared	0.032	0.102	0.089	0.089

Concerns with Firm Level Evidence

- Initial Financial slack positively correlated with unobserved firm quality *and*
- 9/11 triggered a greater boon for better quality firms.

- While better quality firms may be more likely to get larger credit limits they are also more likely to have greater current demand for credit (which goes the other way).

- Nevertheless …
  - Late payment proxy does not lower effect
  - Management fixed effects does not lower effect
  - Firm fixed effects does not lower effect

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Table IV: Robustness Checks - Firm Quality

Dep Var = Loan Growth	(1)	(2)	(3)	(4)	(5)	(6) Pooled Sample:Firms appearing in all 3 periods
Financial Slack	0.193	0.19	0.19	0.19	0.21	0.555
	(0.014)	(0.021)	(0.027)	(0.020)	(0.029)	(0.037)
Late Paymen History?	-0.108					
	(0.019)					
Financial Slack *9/11 period						0.228
						(0.018)
9/11 Period						-0.189
						(0.018)
Industry, City, and Bank FEs	YES	YES	YES	YES	YES	--
Management FEs			YES (4,994 FEs)		YES (4,993 FEs)	
Firm FEs						YES
Observations	23,010	10,888	10,888	8,031	8,031	31,339
R-squared	0.103	0.1	0.5	0.09	0.68	0.59

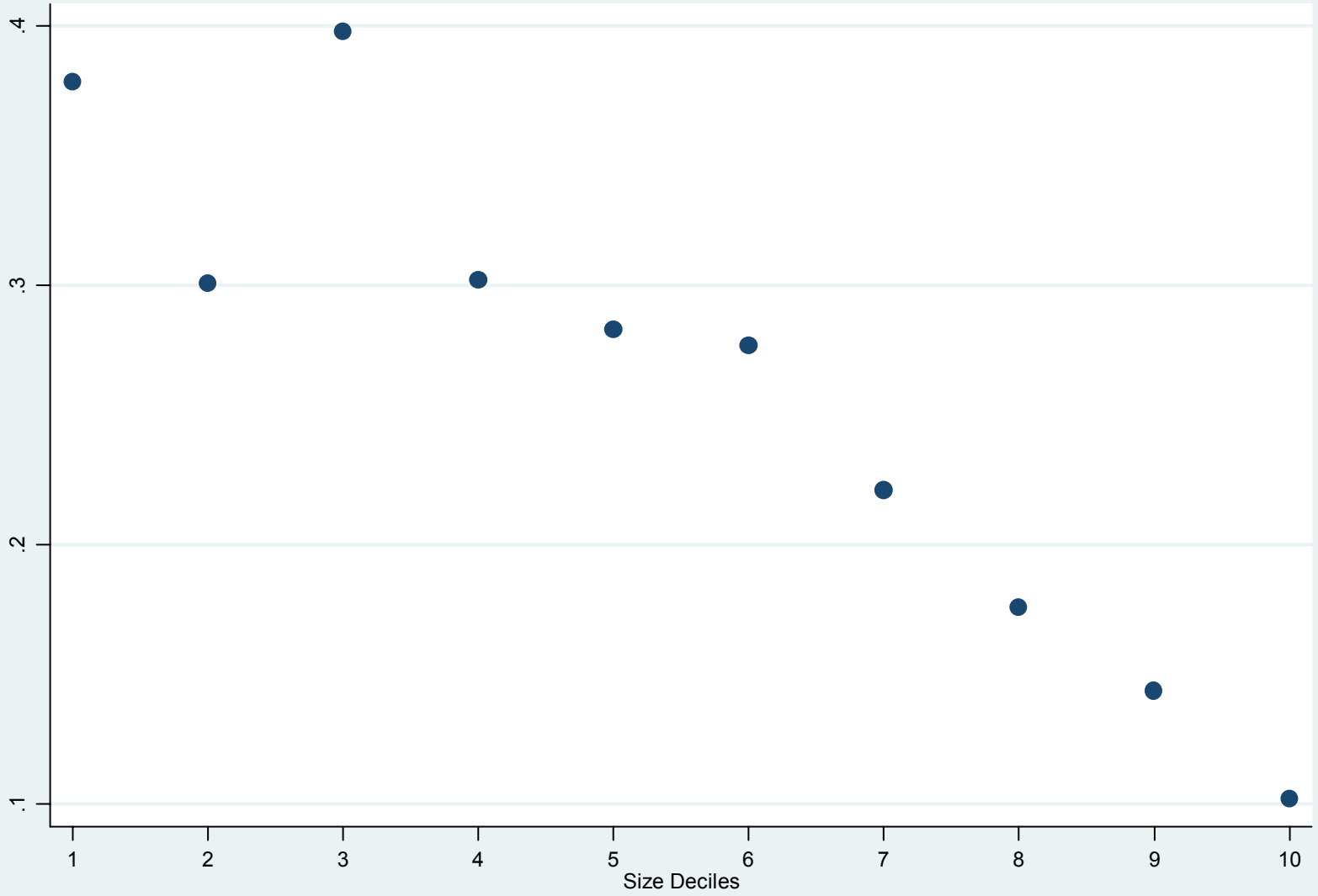
Table VII: Varying Demand Shocks Across Industries

	(1)	(2)	(3)	(4)	(5)
Dep Var = Loan Growth	High Demand Shock	Low Demand Shock		Full Sample	
Financial Slack	0.219	0.108	0.108	0.109	--
	(0.020)	(0.022)	(0.022)	{0.019)	
High Demand Shock * Financial Slack			0.111	0.096	0.075
			(0.025)	(0.021)	(0.021)
Constant	-0.066	0.006	0.006	-0.029	-0.285
	(0.023)	(0.018)	(0.017)	(0.188)	(0.218)
Industry, City, and Bank FEs				YES	YES
Firm Size FEs and All Interactions with Financial Slack					YES
Observations	20291	2719	23010	23010	23010
R-squared	0.037	0.008	0.033	0.103	0.11

Table V: Exporter Heterogeneity

	(1)	(2)	(3)	(4)	(5)
Dep Var = Loan Growth	Non-Exporting Firms	Exporting Firms		Full Sample	
Financial Slack	0.213	-0.007	-0.007	-0.005	--
	(0.020)	(0.033)	(0.033)	(0.034)	
Non-Exporting Firms *Financial Slack			0.22	0.206	0.166
			(0.038)	(0.036)	(0.032)
Constant	-0.062	0.059	0.059	0.141	-0.139
	(0.022)	(0.027)	(0.027)	(0.112)	(0.136)
Industry, City, and Bank FEs				YES	YES
Firm Size FEs and All Interactions with Financial Slack					YES
Observations	22,039	971	23,010	23,010	23,010
R-squared	0.035	0.001	0.034	0.103	0.11

Figure IX: Size Heterogeneity - Plot of Regression Coefficients



Economy Wide Cost

- Calculate missed credit using estimated coefficients ("size weighted"), for firm i in size decile j. $\sum_i (L_{it-1} * (1 - S_{it-1}) * \hat{\beta}_j)$

- What is the PV of missed return?
  - average M/B (2.96) minus one.

- Therefore, Total PV Cost/Loss
  - 45.4*1.96=88.9 Billion Rs, or 2.3% of GDP in 2000

Conclusion

- Substantial financial constraints; average lending does not increase despite large net demand shocks
- Cost to the economy (NPV of missed investment)?
  - Back of the envelope calc ≈ 2.3 % of GDP (2000)
- Other Costs:
  - Missed lending to non-borrowers
  - Consequences on firm distribution
  - Excess liquidity spurs speculative investments:
    - Stock market Index increases five-fold within two years (all time high)
    - Real estate prices appreciate at over 100% a year
    - Both “cooling off” now
- Too much money (too suddenly) may not be a good thing?