Benchmark Indexes, Firm Financing, and Real Effects: Evidence from a Global Natural Experiment

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ASSA Meetings

Motivation: The Growing Importance of Benchmarks

- Growing importance of **benchmark indexes** in the finance industry
  - Surge in the **assets under management (AUM)** of passive and exchange-traded funds (ETFs)
  - Active funds behaving like passive ones ("closet indexers")
- By 2019, **85 trillion USD** controlled by asset managers tracking their performance against benchmark indexes

Motivation: Effects on Firms?

- Kashyap, Kovrijnykh, Li, and Pavlova (henceforth **KKLP, 2020**) build a CAPM model
  - **Higher demand** from institutional investors tracking benchmark indexes
  - **Increase in stock prices** and reduction in financing costs
  - Higher **investments**
  - Denote this phenomenon the **"benchmark inclusion subsidy"**
- Some questions remain regarding **corporate financing**
  - **External or internal** financing?
  - If external, **equity, debt, or both?**

Motivation: Existing Empirical Evidence

- Extensive empirical index inclusion literature on **price effects**
- Fewer papers looking at effects on **investments** after index inclusions
  - **Massa et al. (2005)** show an increase in investments due to a reduction in cost of capital
  - **Bena et al. (2017)** argue that the increase in investment is due to higher foreign ownerwship
- Mixed evidence on **corporate financing**
  - **Massa et al. (2005) increase** in equity financing
  - **Bena et al. (2017) reduction** in equity financing and use of internal financing
  - **Cao and Gustafson (2018)** small firms move from bank to equity financing

Contribution: Identification Challenges

- Difficult to test **KKLP (2020)** predictions and effects on corporate financing with index inclusions
  - Additions might be caused by **good prior performance**
  - Additions might be caused by **prior equity issuance activity**
- **Our contribution** is to exploit the largest rebalancing in global benchmark indexes
  - Provide systematic evidence on the different predictions in **KKLP (2020)**
  - Explore the **corporate financing mechanism**

Contribution: Empirical Setting

- **MSCI Index Rebalancing** in 2000/2001/2002 moving from market capitalization to free float market cap indexes
- Important variation in **benchmark weights** (i.e. the relative importance of firms in the index)
  - Affected 2,508 firms in 49 countries
- Difference-in-difference study around this event
  - Analyze effects on **asset prices, issuance activity, and investments**

Preview of Findings

- **Asset prices**
  - Change in benchmark weights is **positively related to equity prices** after announcement
  - Event did not affect differentially **bond prices**
- **Issuance Activity**
  - **Increase in equity issuance** activity for positively affected firms relative to negatively affected ones
  - Increase in **debt issuance** for these firms
  - **No effects** on internal financing
- **Increase in Capex** for positively affected firms relative to negative ones
  - Effect driven by firms with **high cash flow** volatility

Related Literature and Relative Contribution

1. **Index Inclusion Literature**
   - Empirical test of several predictions in KKLP (2020)
2. **Institutional investor demand in asset pricing** (Koijen and Yogo, 2019)
   - Empirically show that supply responds to demand shocks
3. **Credit supply literature**
   - Concentrated in bank and bond markets, less about equity
4. **Corporate finance theories of leverage**
   - We empirically study how debt respond to equity shocks

Hypotheses

- Use KKLP (2020) to build hypothesis related to how index changes affect firms' corporate financing and investment

Hypothesis 1

An increase in a firm's benchmark weight leads to an increase in its stocks' prices

Hypothesis 2

An increase in a firm's benchmark weight leads to an increase in its equity issuance activity

Hypotheses

Hypothesis 3

An increase in a firm's benchmark weight leads to an increase in its debt issuance activity

Hypothesis 4

An increase in a firm's benchmark weight leads to an increase in investments

Hypothesis 5

An increase in a firm's benchmark weight increases investments more for firms with a riskier cash flow

Empirical Setting: MSCI Global Indexes

- MSCI indexes are the **most widely used international benchmarks**
- Used by institutional investors and asset managers to compare relative performance
- Portfolio weights have been shown to track benchmark weights closely (Cremers et al., 2017; Raddatz et al., 2017)

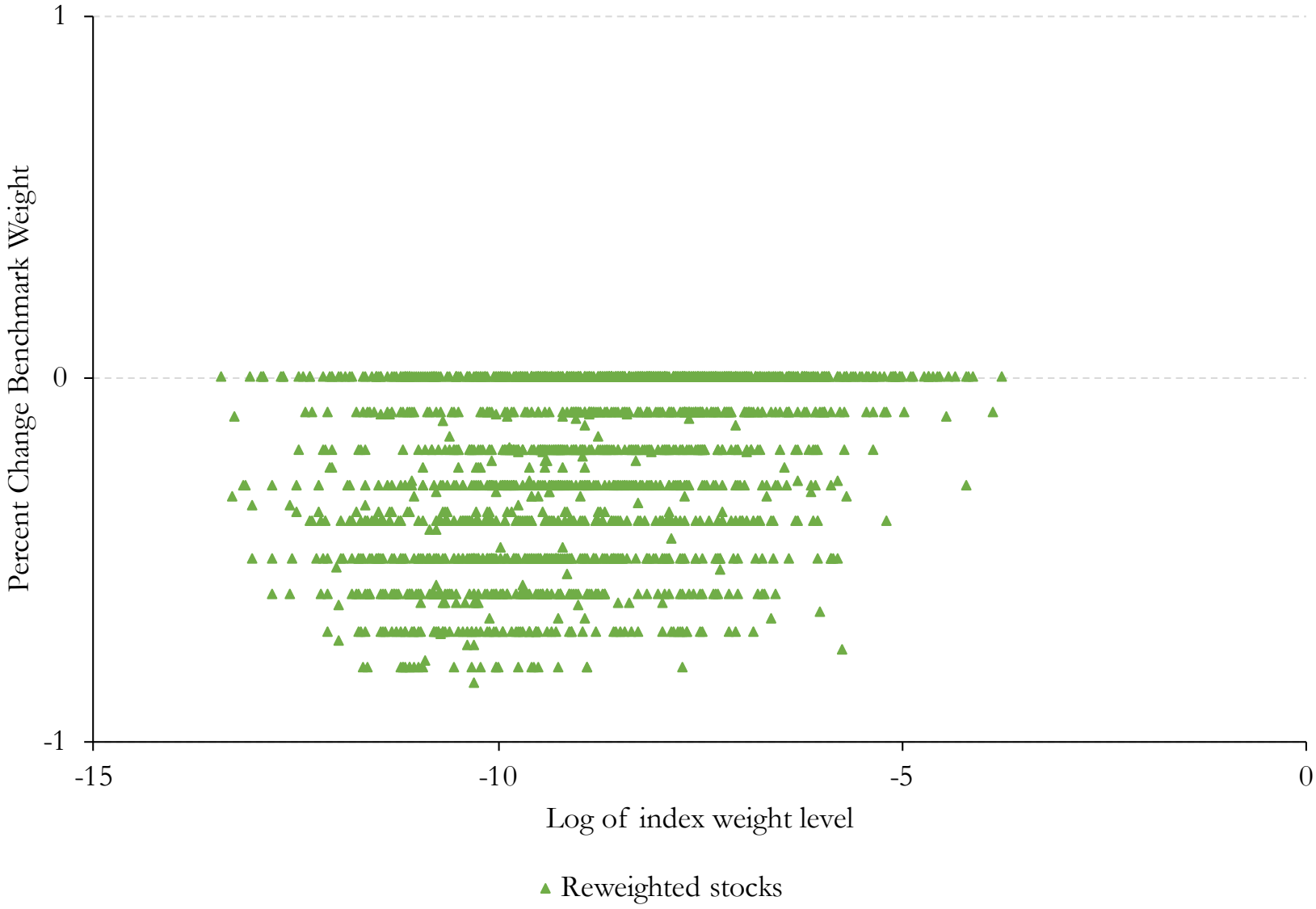
Empirical Setting: MSCI Global Indexes Redefinition

- **February 2000:** MSCI communicated potential review to its index weights policy
- **December 2000:** MSCI officially announced change
- **2 methodological changes**
  1. Benchmark weights changed to be based on **free float market capitalization**
  2. Target a **market representation of 85%** within each industry and country (old one was 60%)
- **Implementation in 2 phases:** November 2001 and May 2002

Empirical Setting: MSCI Global Index Redefinition

- **Ideal setting** to test our hypotheses
- Decision based on a better representation of world stock markets based on the **available shares** of each company
  - Change **was not due to the previous performance** of firms
  - Rebalancing was **unexpected** by market participants (Hau et al., 2010 and Hau, 2011)
- Important **variation in benchmark weights**
  - Affected 2,508 firms in 49 countries

Variation in Benchmark Weights



Empirical Strategy

- Use the MSCI redefinition with a difference-in-difference strategy

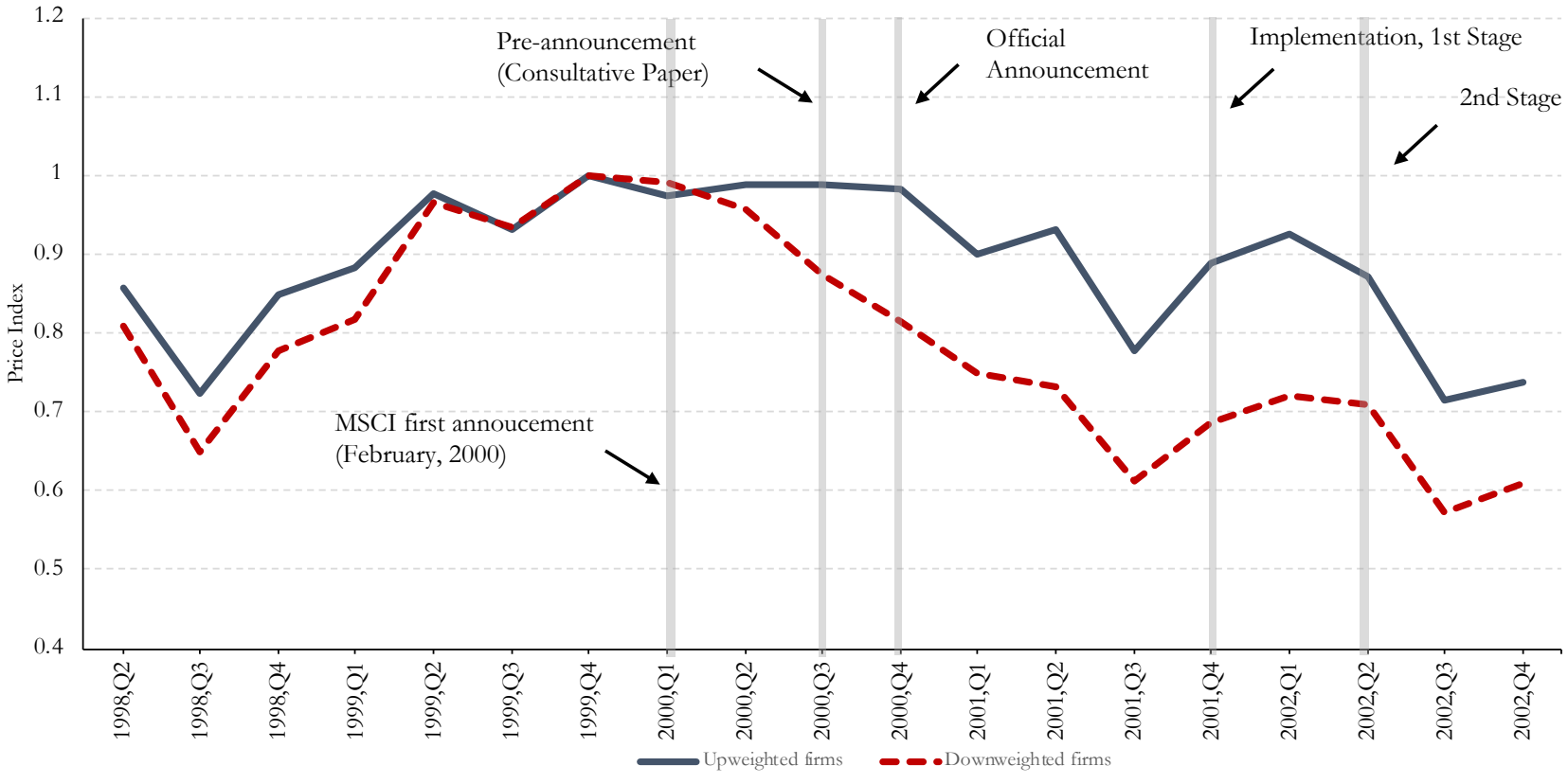
$$y_{it} = \theta_i + \theta_t + \beta X_i D_t^{Post} + Z_{cjt} + \varepsilon_{it}$$

- y_{it}: Asset prices, probability of issuing securities, Capex for firm i at time t
- X_i: Treatment instensity variable (two possibilities)
  - Indicator that is 1 for upweighted firms, 0 otherwise
  - Percent change in benchmark weights
- D_t^{Post}: Indicator for post February 2000
- Z_{cjt} controls that could vary at the country-industry-time level
- Standard errors clustered at the industry level

Data

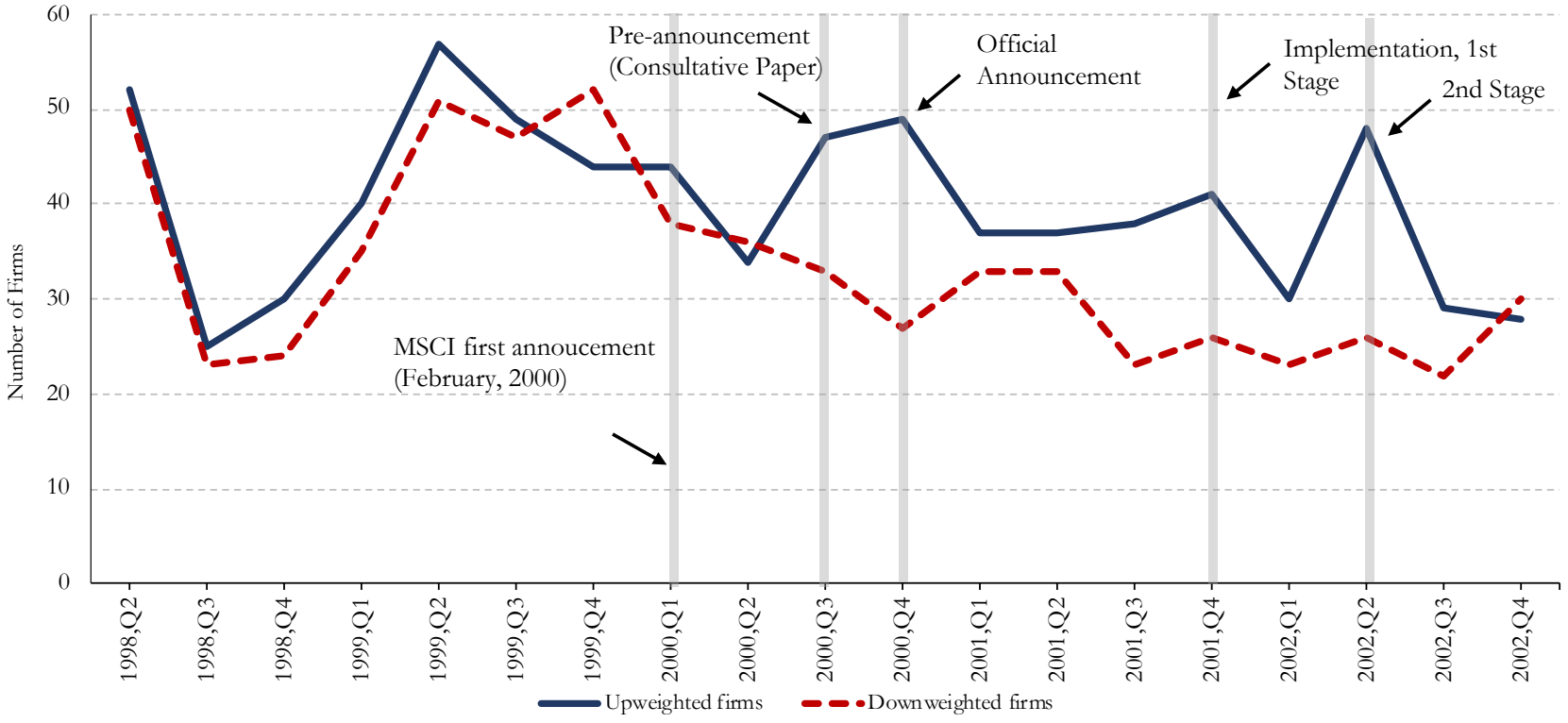
- Firm-level data on the constituents' ISIN codes and individual change weights from **MSCI**
- 2,508 firms from 49 countries
- Data on issuances from Refinitiv's Security Data Corporation **(SDC) Platinum**
  - Transaction-level information on new issuances of common and preferred equity, syndicated loans, and publicly and privately placed bonds
- Daily data on equity and bond trading prices data from **Datastream**
- Annual balance sheet information from **Worldscope**

Raw Data: Equity Prices



▸ Bond Prices ▸ Estimation Prices

Raw Data: Equity Issuance Activity



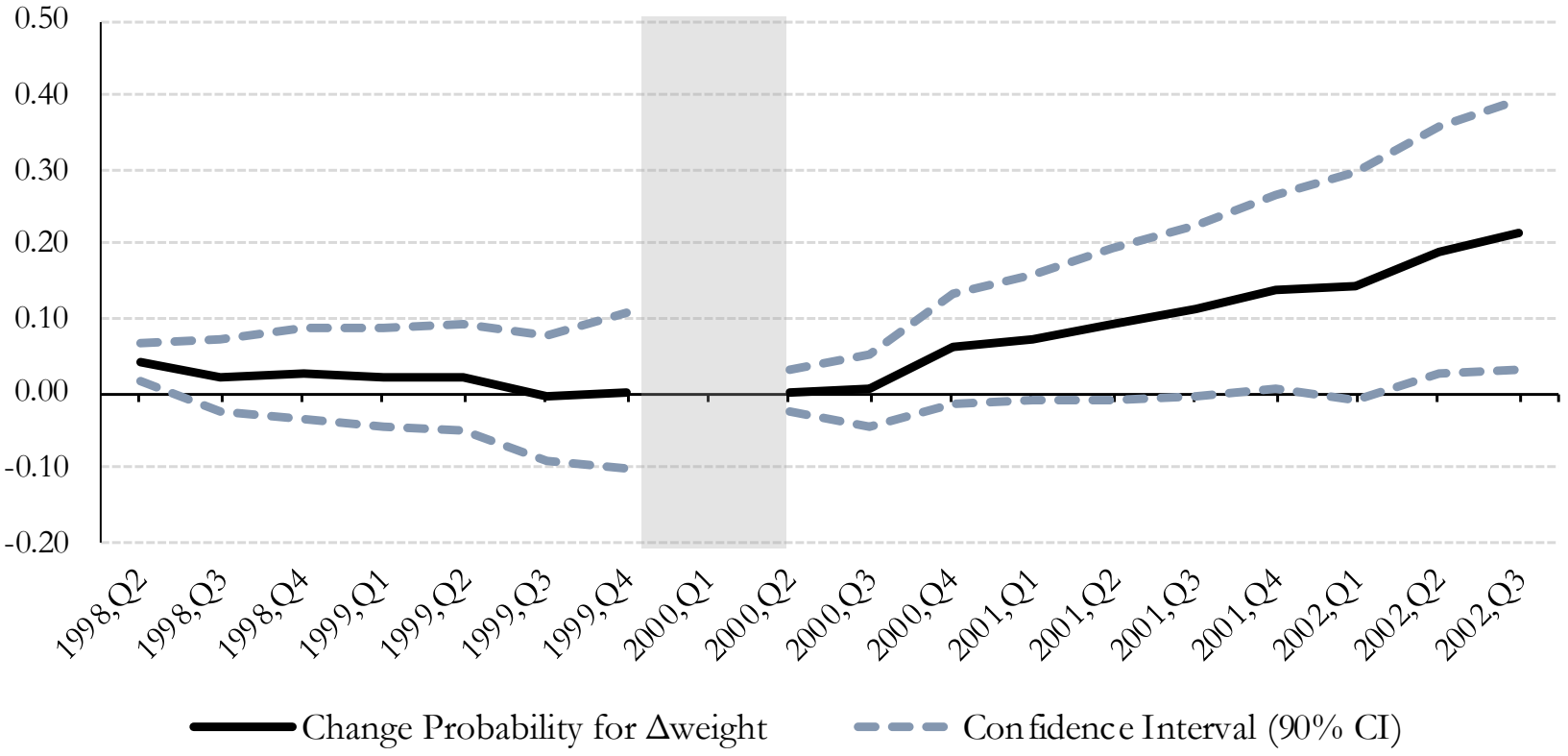
▸ Bond Issuances ▸ Syndicated Loan Issuances ▸ Figure Entrants

Main Estimations: Continuous Treatment Variable

Dependent Variable:	Log (1 + Equity Raised)				Dummy=1 if Firm Issued Equity			
Sample:	All Firms	Excl. U.S.	All Firms	All Firms	All Firms	Excl. U.S.	All Firms	All Firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.02	0.13	0.04	0.02	0.02	0.04	0.02	0.02
	[0.17]	[0.17]	[0.16]	[0.17]	[0.03]	[0.02]	[0.03]	[0.03]
Post x ΔWeight	1.05 **	1.18 ***	1.20 ***	1.05 **	0.22 ***	0.25 ***	0.24 ***	0.21 ***
	[0.46]	[0.44]	[0.43]	[0.46]	[0.07]	[0.07]	[0.07]	[0.07]
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Time Control	No	No	Yes	No	No	No	Yes	No
Country-Industry-Time Control	No	No	No	Yes	No	No	No	Yes
No. of Observations	2,860	2,331	2,860	2,860	2,860	2,331	2,860	2,860
R-squared	0.60	0.612	0.60	0.60	0.58	0.59	0.59	0.59
No. of Clusters	64	62	64	64	64	62	64	64

▸ Bond Issuances ▸ Syndicated Loan Issuances

Estimation Coefficients: Probability of Issuing Equity



▸ Bond Issuances ▸ Syndicated Loan Issuances

Capital Expenditures

Sample:	All Firms	High Risk	Low Risk
Post	0.02	0.15 ***	-0.05
	[0.04]	[0.05]	[0.06]
Post x ΔWeight	0.44 ***	0.66 ***	0.25
	[0.11]	[0.15]	[0.18]
Firm FE	Yes	Yes	Yes
No. of Observations	2,182	718	764
R-squared	0.947	0.938	0.953
No. of Clusters	64	47	48

▸ Estimation Coefficients

Balance Sheet: Sources of Financing

Dependent variable:	Sources of Financing						
	Total Sources of Funds	External Finance			Internal Finance		
		Book Value of Total Shares	Total Debt	Net Receivables	Dividends	Cash	Net Income
Post	0.19 ***	0.44 ***	0.22 ***	0.13 ***	0.31 **	0.23 ***	0.10 ***
	[0.03]	[0.05]	[0.04]	[0.03]	[0.12]	[0.04]	[0.03]
Post x ΔWeight	0.38 ***	0.21 **	0.33 ***	0.09	0.45	0.15	0.11
	[0.08]	[0.09]	[0.09]	[0.06]	[0.40]	[0.11]	[0.09]
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	2,000	2,048	2,252	2,012	2,342	1,760	2,008
R-squared	0.923	0.926	0.957	0.967	0.882	0.936	0.936
No. of clusters	62	61	64	64	64	61	64

▸ Figure Total Shares ▸ Figure Total Debt

Balance Sheet: Size and Capital Structure

	Size and Capital Structure			
Dependent variable:	Total Assets	Leverage (Debt / Assets)	Leverage (Debt / Book Equity)	Leverage (Debt / Market Equity)
Post	0.20 ***	0.01 **	0.05	0.14 ***
	[0.02]	[0.01]	[0.04]	[0.03]
Post x ΔWeight	0.21 ***	0.02	0.03	0.01
	[0.05]	[0.01]	[0.10]	[0.09]
Firm FE	Yes	Yes	Yes	Yes
No. of observations	2,284	2,226	2,206	2,164
R-squared	0.98	0.886	0.871	0.852
No. of clusters	64	63	62	63

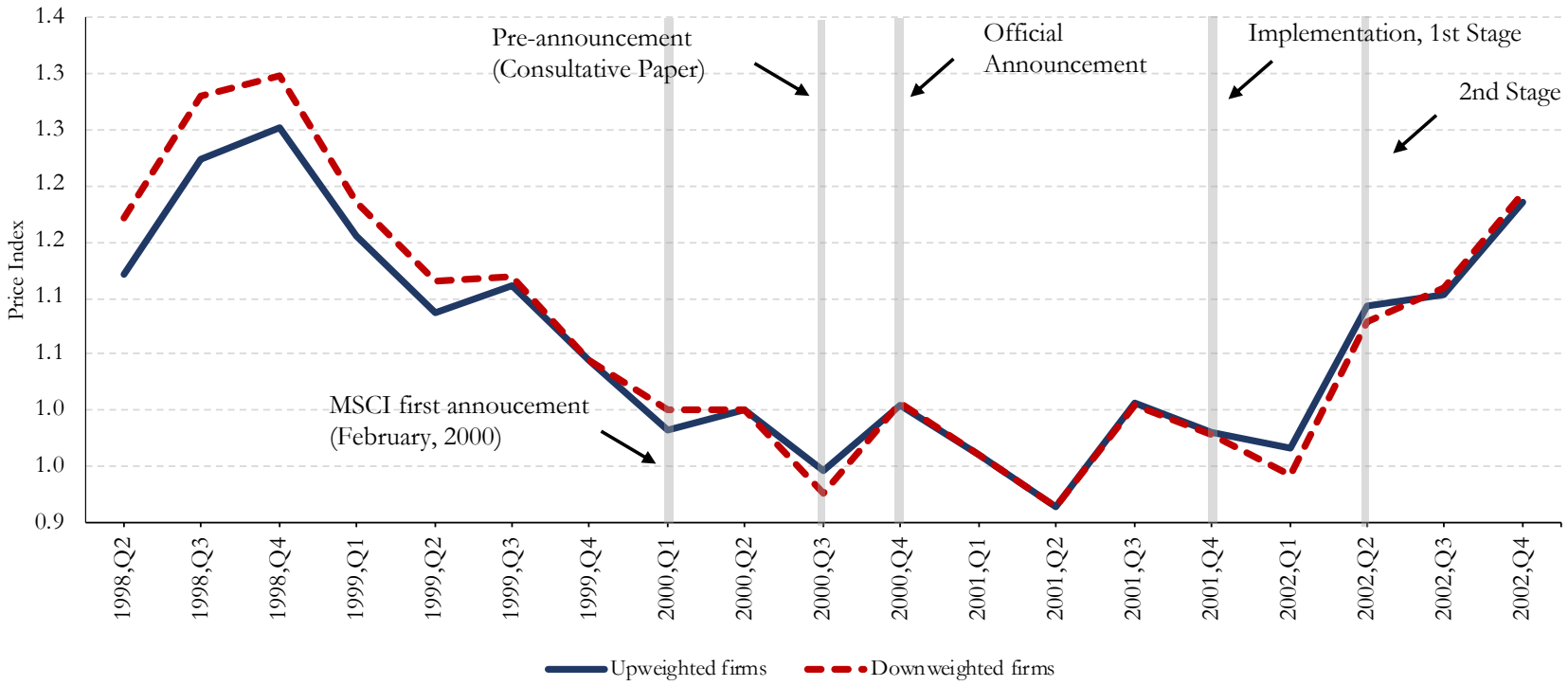
▸ Figure Total Assets

Final Remarks

- We use change in the methodology of global benchmark indexes to test predictions and mechanism in KKLP (2020)
- We show that increase in the relative importance of a firm in a benchmark index leads to
  - Increase in **equity prices, equity issuance, and debt issuance**
  - Increase in **capital expenditures** (especially for firms with high cash flow volatility)
  - No relevant changes in **leverage ratios**
- Provide **systematic evidence** on how changes in benchmark indexes have real effects

THANK YOU!!

Raw Data: Bond Prices



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Raw Data: Bond Prices

Market:	Equity		Bond	
Change in Weight:	Dummy	Percent Change	Dummy	Percent Change
Post	-0.07 ***	-0.02	-0.27 **	-0.14
	[0.02]	[0.02]	[0.10]	[0.09]
Post x Δweight	0.06 **	0.14 ***	0.17	0.28
	[0.02]	[0.04]	[0.17]	[0.29]
Firm FE	Yes	Yes	Yes	Yes
No. of Observations	2,584	2,584	76	84
R-squared	0.99	0.99	0.99	0.99
No. of Clusters	64	64	.	.

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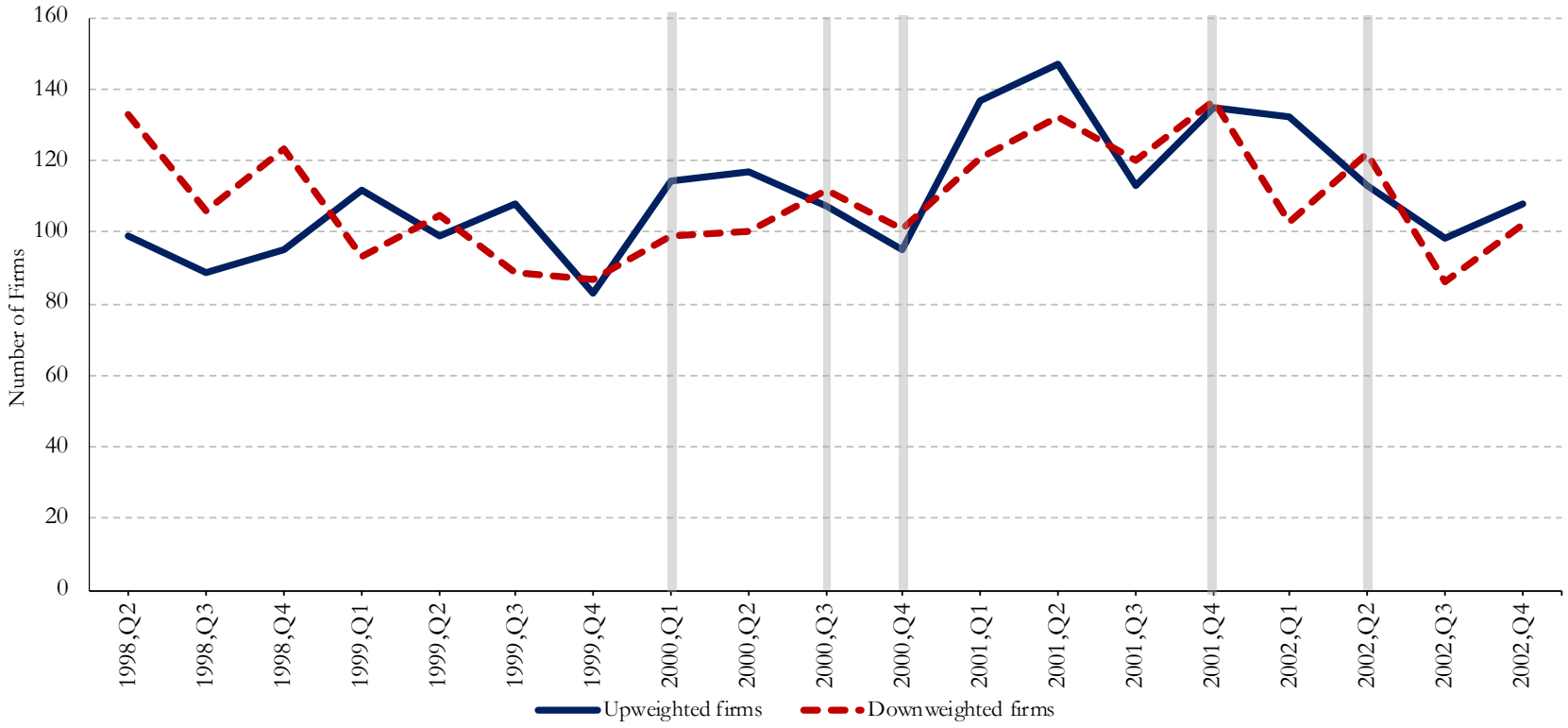
Raw Data: Bond Issuances



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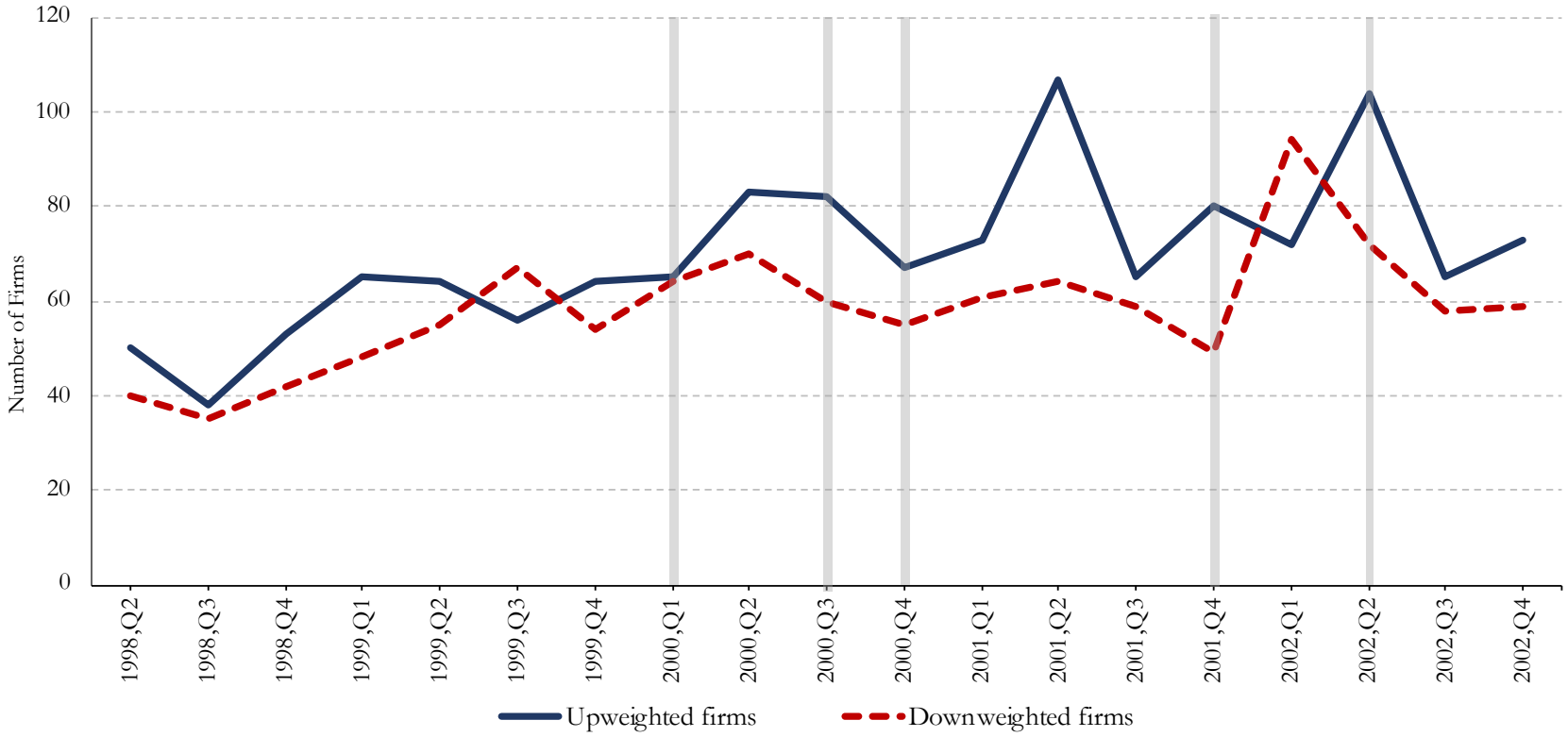
Raw Data: Syndicated Loan Issuances



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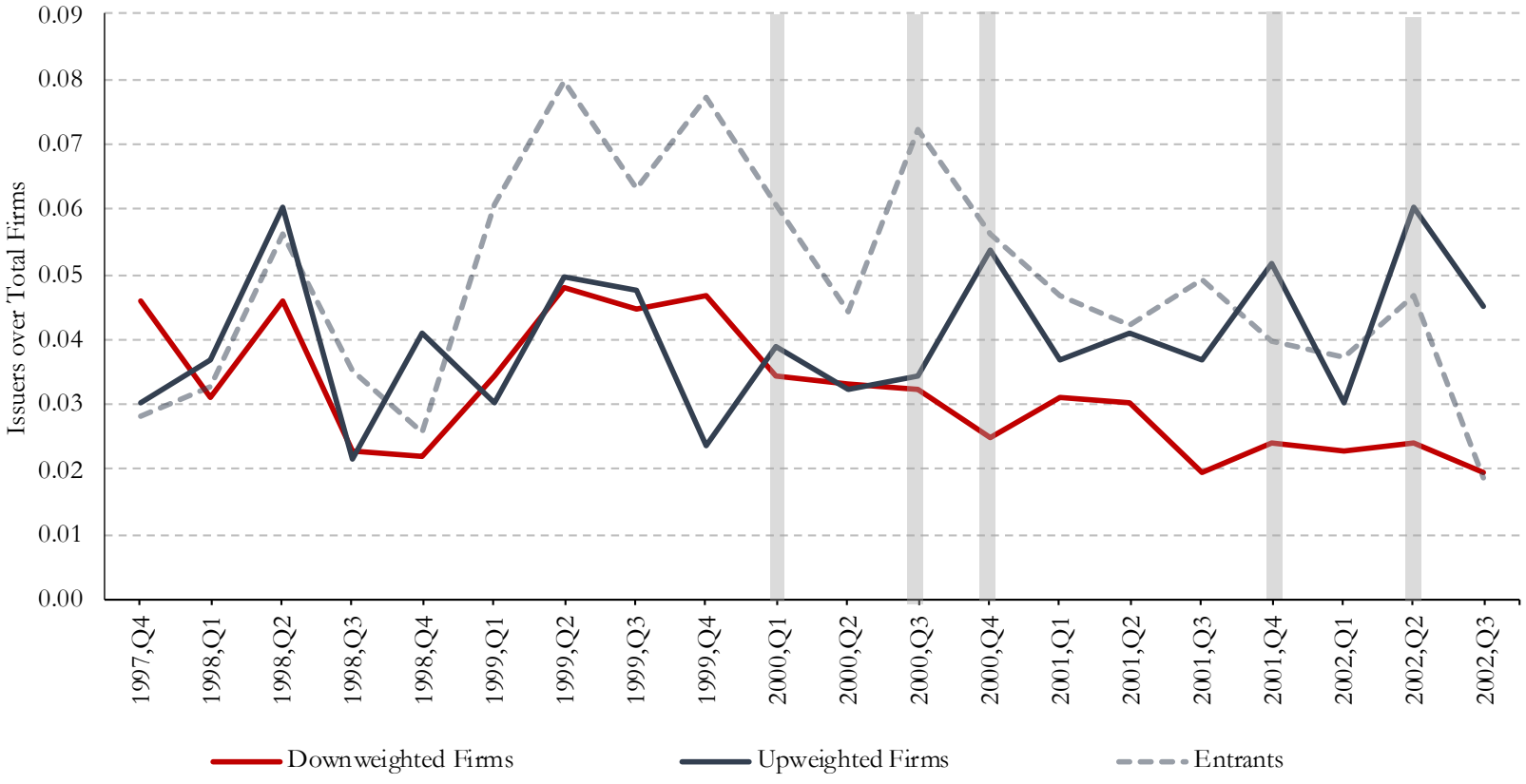
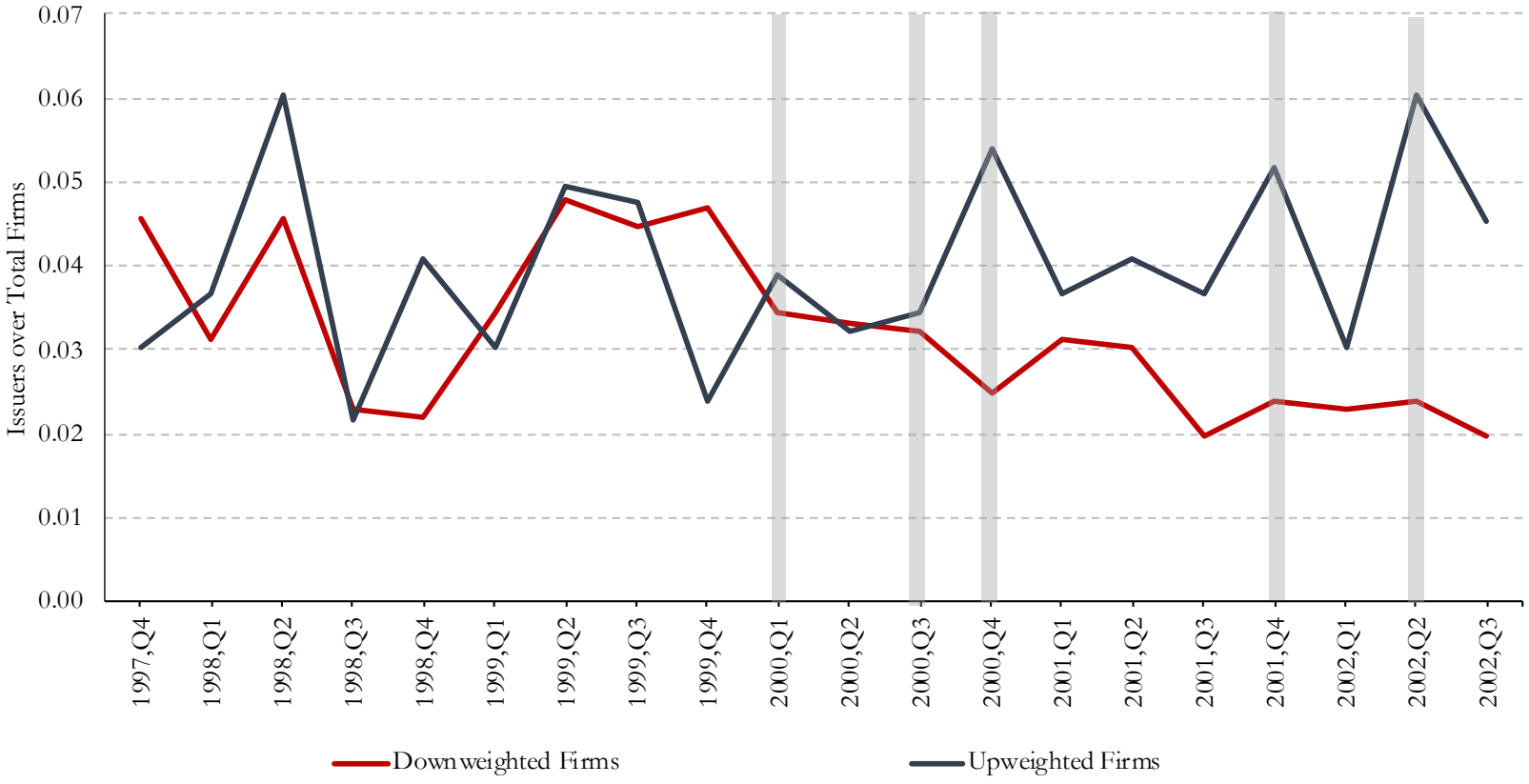
Equity Issuance Activity: Entrants



Equity Issuance Activity



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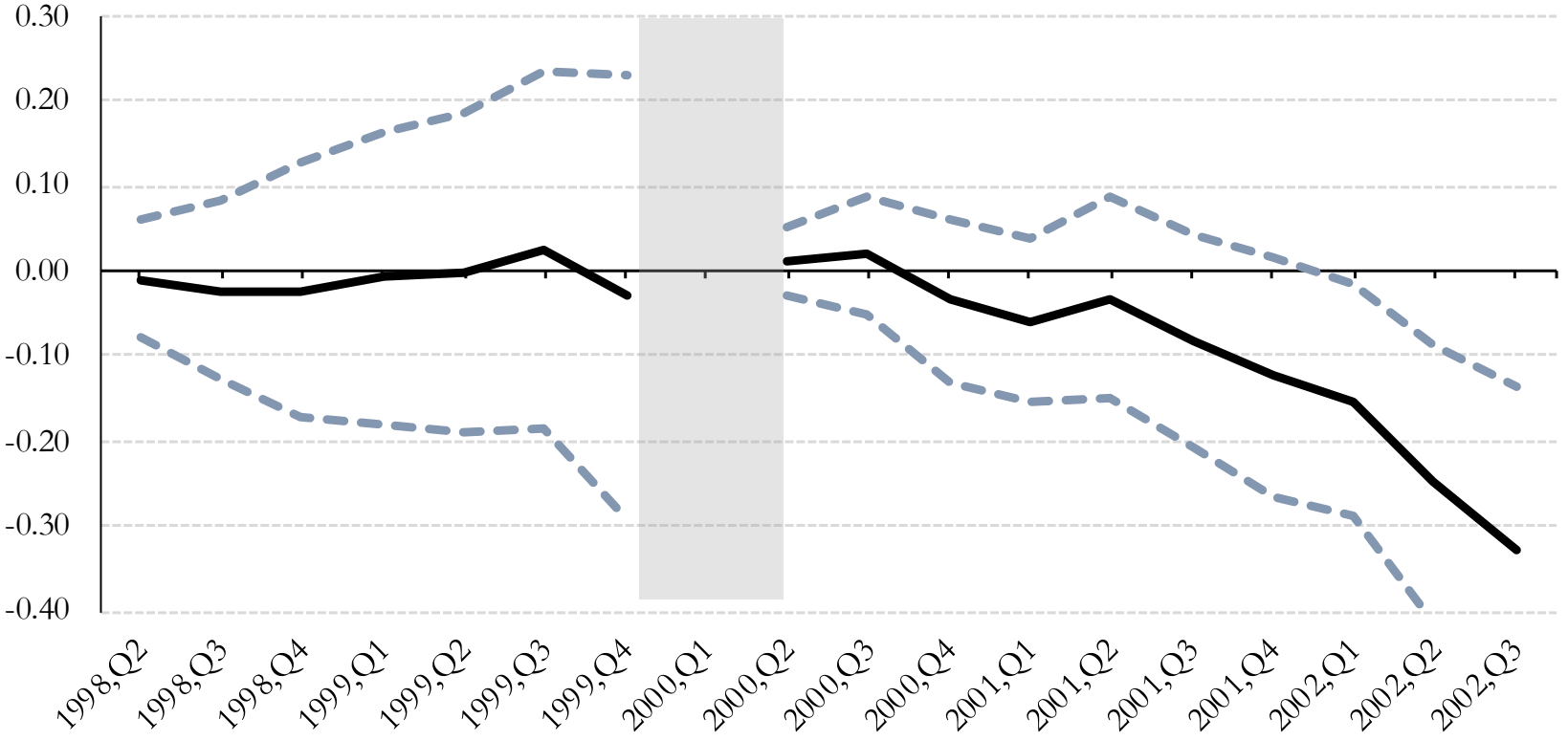
Estimation Coefficients: Bond Issuances



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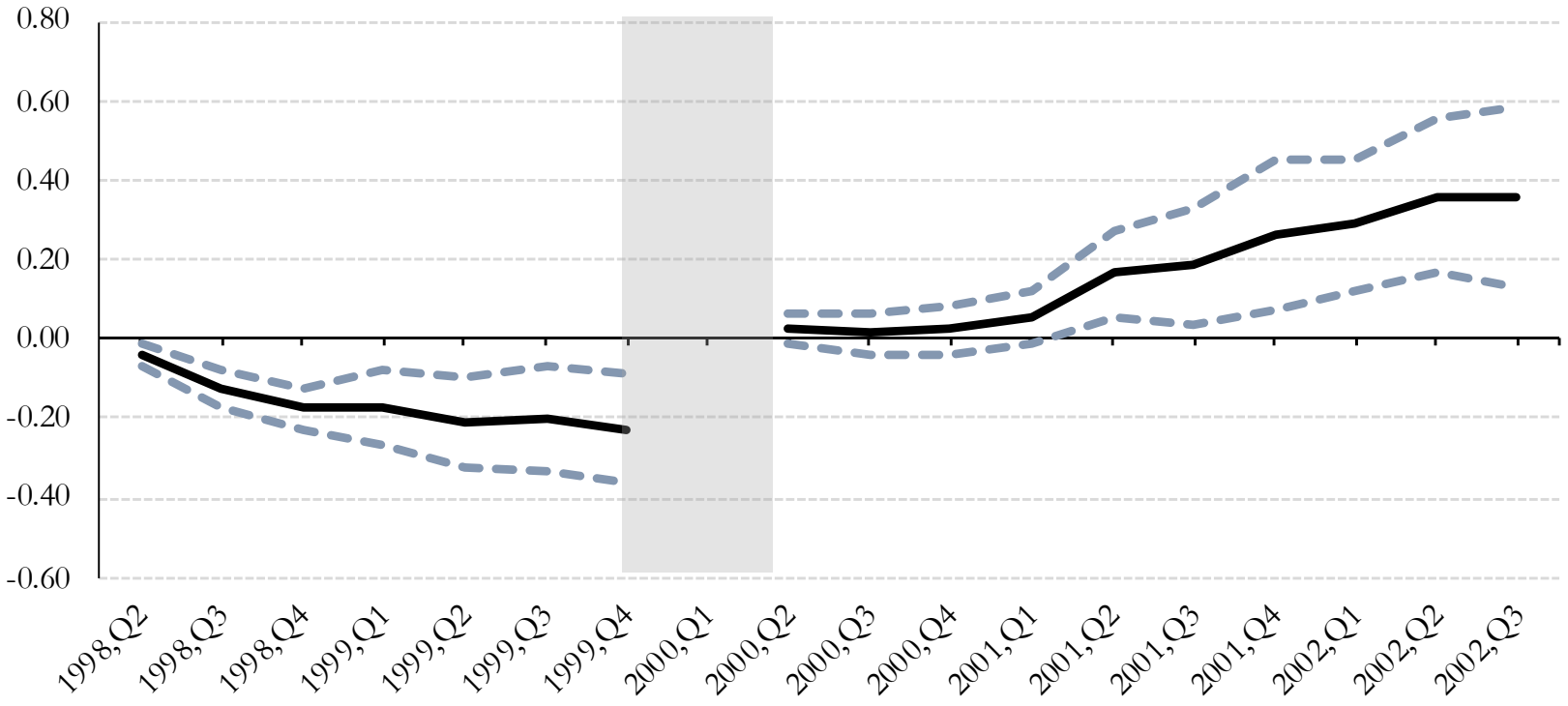
Estimation Coefficients: Syndicated Loan Issuances



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Main Estimations: Bond Issuances

Dependent Variable:	Log (1 + Bonds Raised)				Dummy=1 if Firm Issued Bonds			
Sample:	All Firms	Excl. U.S.	All Firms	All Firms	All Firms	Excl. U.S.	All Firms	All Firms
Post	0.32 **	0.20	0.29 **	0.32 **	0.02	0.02	0.02	0.02 **
	[0.14]	[0.17]	[0.14]	[0.14]	[0.02]	[0.03]	[0.02]	[0.02]
Post x Δweight	0.07	-0.20	-0.08	0.06	-0.07	-0.07	-0.08	-0.07
	[0.34]	[0.36]	[0.34]	[0.34]	[0.06]	[0.06]	[0.06]	[0.06]
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Time Control	No	No	Yes	No	No	No	Yes	No
Country-Industry-Time Control	No	No	No	Yes	No	No	No	Yes
No. of Observations	2,860	2,331	2,860	2,860	2,860	2,331	2,860	2,860
R-squared	0.78	0.76	0.78	0.78	0.73	0.71	0.73	0.73
No. of Clusters	64	62	64	64	64	62	64	64

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Main Estimations: Syndicated Loan Issuances

Dependent Variable:	Log (1 + Syndicated Loans Raised)				Dummy=1 if Firm Issued Syndicated Loans			
Sample:	All Firms	Excl. U.S.	All Firms	All Firms	All Firms	Excl. U.S.	All Firms	All Firms
Post	1.18 ***	1.05 ***	1.18 ***	1.18 **	0.15 ***	0.15 ***	0.15 ***	0.15 ***
	[0.16]	[0.17]	[0.15]	[0.16]	[0.02]	[0.03]	[0.02]	[0.02]
Post x Δweight	2.00 ***	1.70 ***	1.99 ***	2.00 **	0.24 ***	0.23 ***	0.25 ***	0.24 ***
	[0.36]	[0.40]	[0.35]	[0.36]	[0.05]	[0.06]	[0.05]	[0.05]
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Time Control	No	No	Yes	No	No	No	Yes	No
Country-Industry-Time Control	No	No	No	Yes	No	No	No	Yes
No. of Observations	2,860	2,331	2,860	2,860	2,860	2,331	2,860	2,860
R-squared	0.76	0.73	0.76	0.76	0.76	0.70	0.72	0.72
No. of Clusters	64	62	64	64	64	62	64	64

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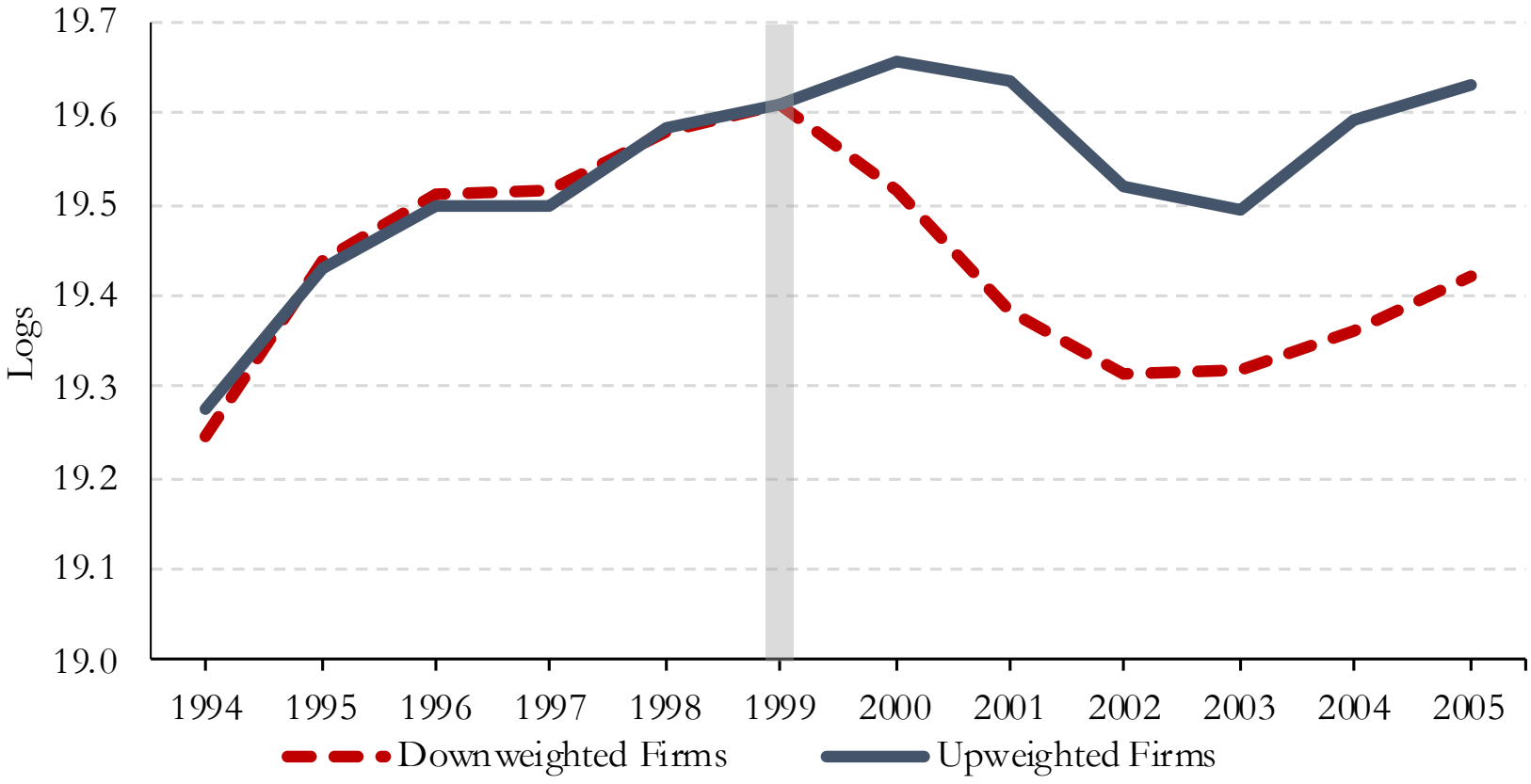
Figure Capex



Estimation Coefficients: Capex

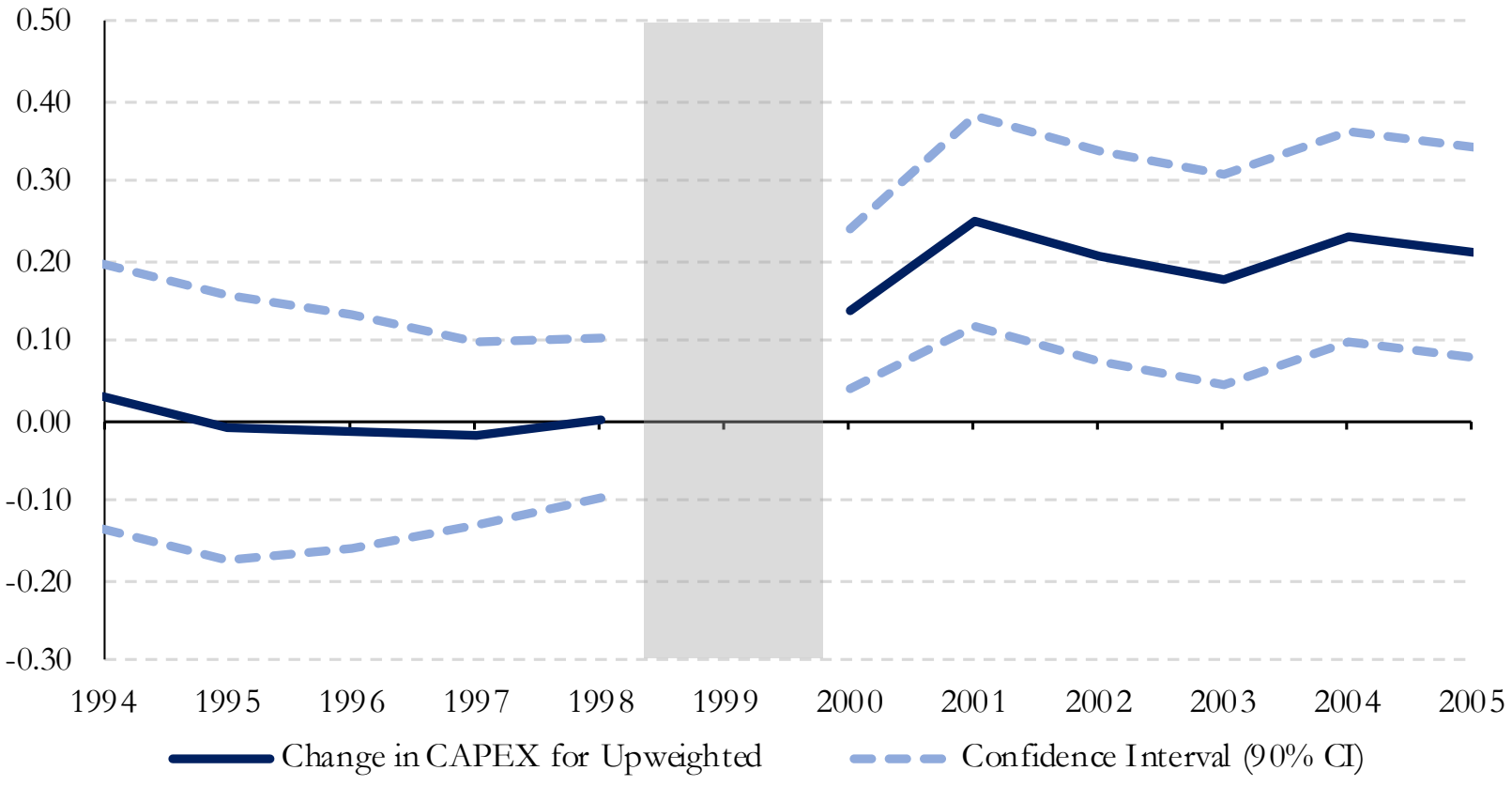


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Figure Book Value of Total Shares

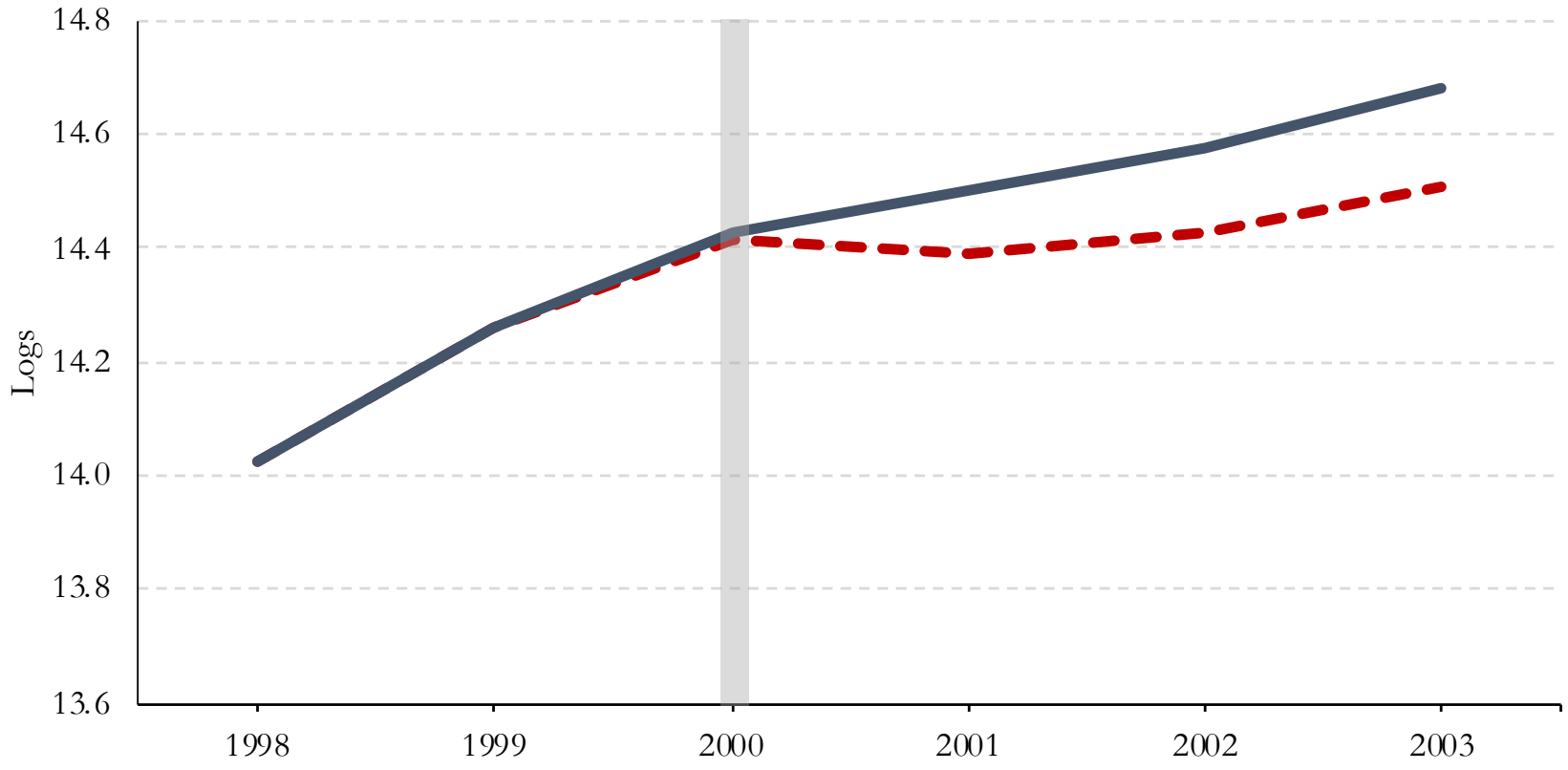

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Figure Total Debt

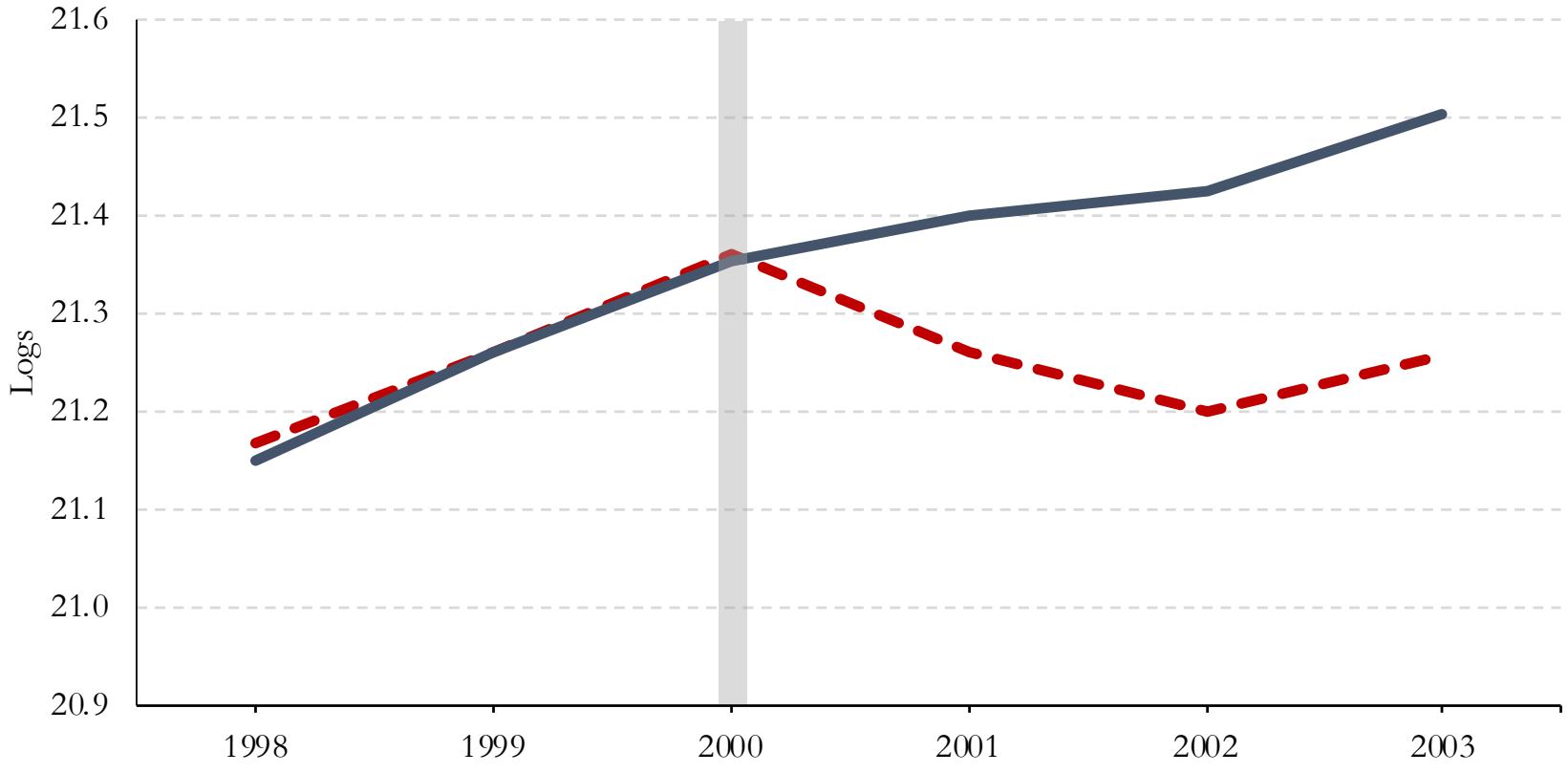

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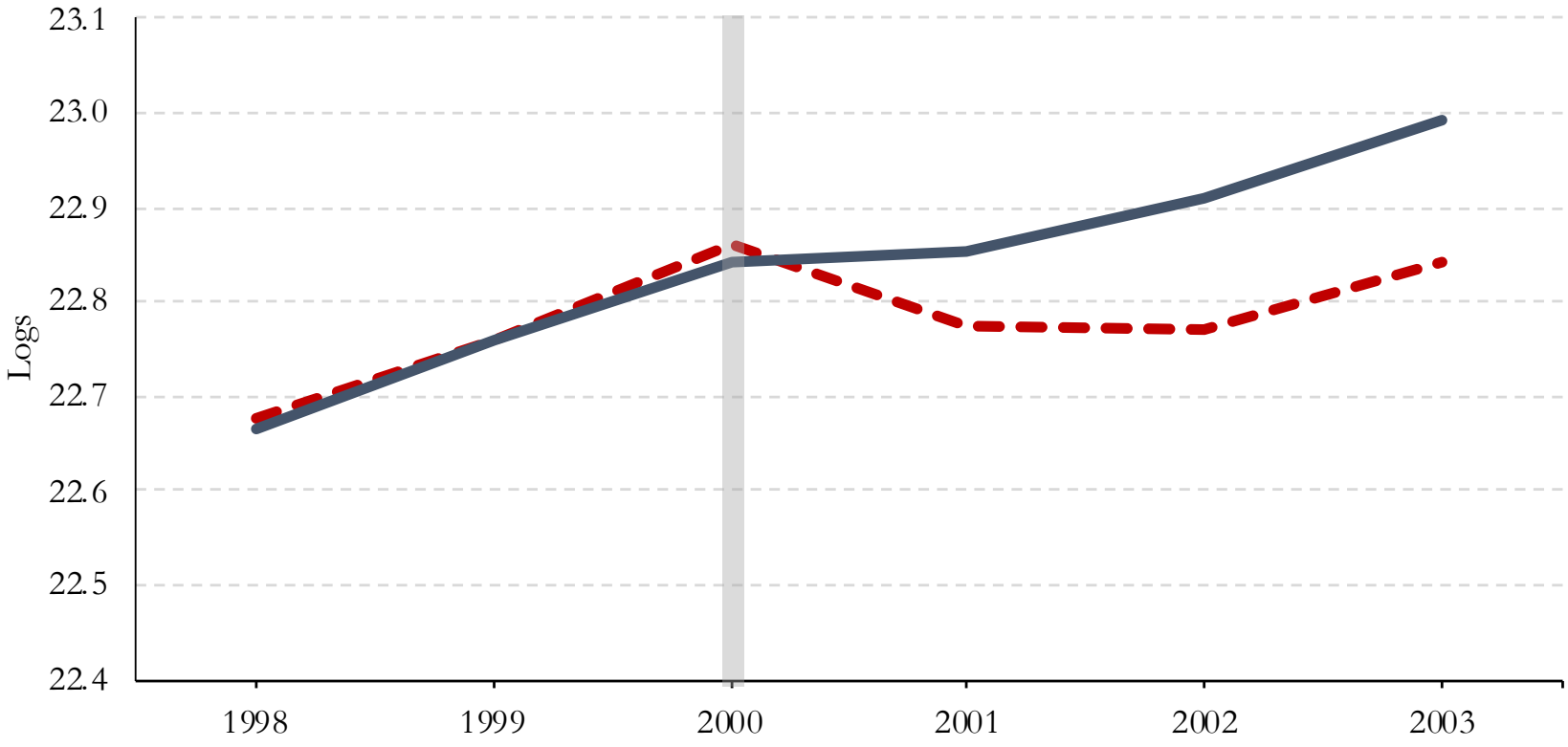
Figure Total Assets



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