Overclaimed Refunds, Undeclared Sales, and Invoice Mills: Nature and Extent of Noncompliance in a Value-Added Tax

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Introduction

- The theoretical case for a VAT is weak
- Yet it has seen remarkable expansion in the last few decades
- The expansion is in large part driven by the belief that it is a harder tax to evade

Introduction

- The consensus on VAT has begun to weaken
- Malaysia has abandoned it; Zambia may do so next
- The discontent arises from two known sources:
  - Final mile problem
  - Refund payments on exports

Introduction

- Theoretical mechanisms driving VAT noncompliance are known

- We, however, still do not know enough on how important they are empirically

This Paper

- Estimates the extent and nature of VAT noncompliance in Pakistan
- Leverages a large reform that cuts the tax rate on the supply chains of five major industries from 15% to 0%. As the rate goes to zero so do the incentives to misreport $\rightarrow$ post-reform reports reveal true level of activity
- Compares changes in reports over time to uncover tax evasion

Nature of VAT Noncompliance

- VAT can be evaded by overreporting purchases or underreporting sales
- Overreporting purchases is sometimes facilitated by firms called invoice mills
- "A VAT invoice is a check written on the government" (Bird, 1993)
- Invoice mills are SPVs that trade VAT invoices

Preview of Results

- Reduction of the rate to zero induces strong behavioral responses. Reported purchases go down by 42 log-points, sales by 22, exports by 11, and non-export sales by 8 log-points $\rightarrow$ firms were overclaiming refunds by 22% and were underreporting B2C sales by 43.5%

- Together, this means that the evasion rate at the baseline was nearly 77% of true tax liability

- Roughly 37% of the excess-claimed refund was based on invoices of invoice mills

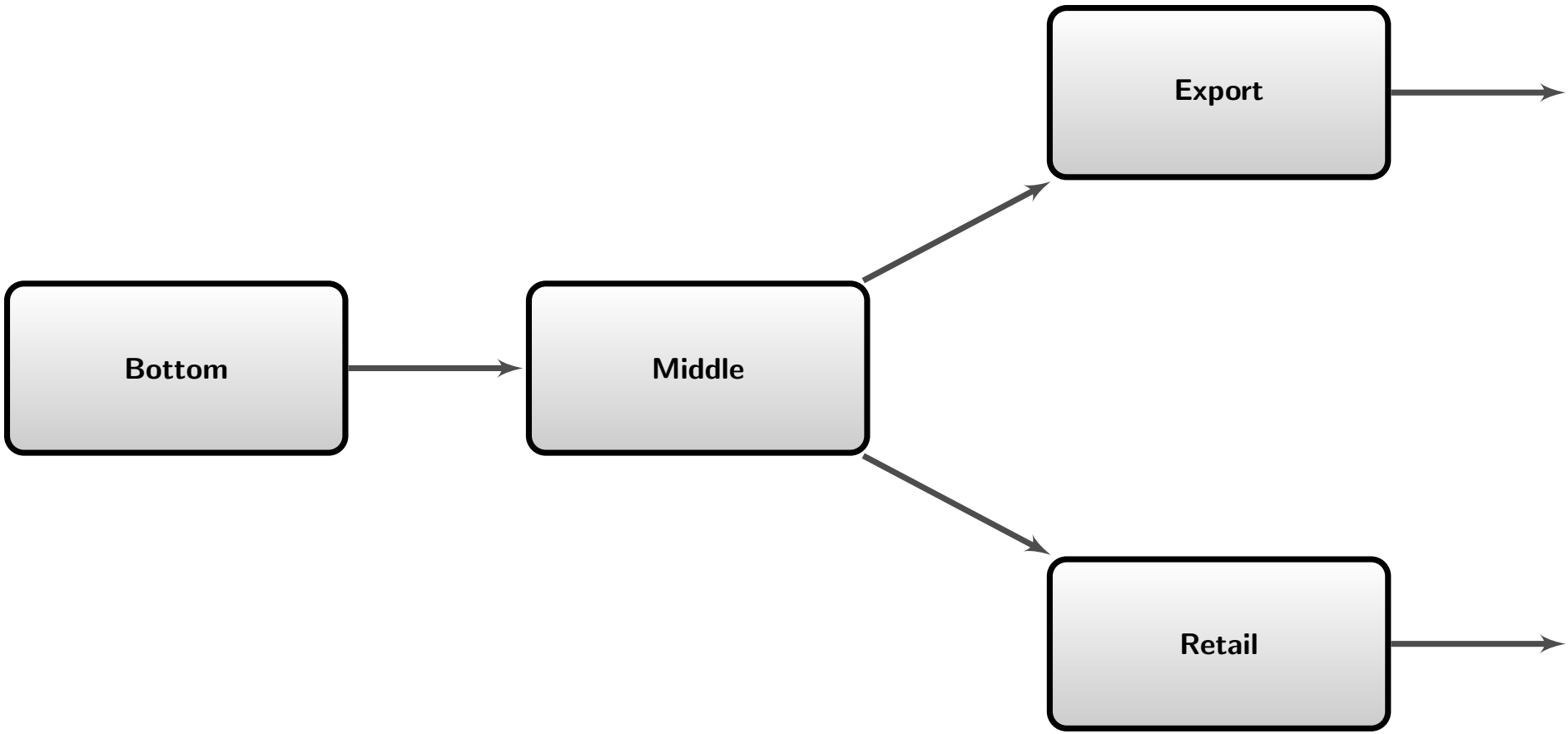
Outline

Outline

The Nature of VAT Noncompliance

- Consider a simply chain consisting of three stages
- The government implements a destination-based VAT $\rightarrow$ exports are zero-rated; imports are taxed at the standard rate
- I consider firm behavior under three different scenarios

A Simple Supply Chain



Example 1: The First-Best

- If firms report truthfully, the government revenue equals the tax rate times the retail sales—value of supplies made to the final consumer
- This is the standard result of the equivalence of a VAT and the RST
- What happens at other stages is irrelevant; tax remitted at the bottom and middle stages is refunded to the exporter and is credited by the retailer

Example 2: When Misreporting is Feasible

- The exporter would like to overreport purchases $\rightarrow$ increases the refund
- The retailer would like to underreport purchases $\rightarrow$ helps in evading the VAT due on sales
- This can give rise to collusion $\rightarrow$ the middle firm books some of its sales to retailer as sales to exporter in VAT records
- Misreporting one rupee of sale in this manner generates a surplus of $\tau + \tau.v_R$

Example 2: When Misreporting is Feasible

- The government revenue is now lower than the first-best by the following amount

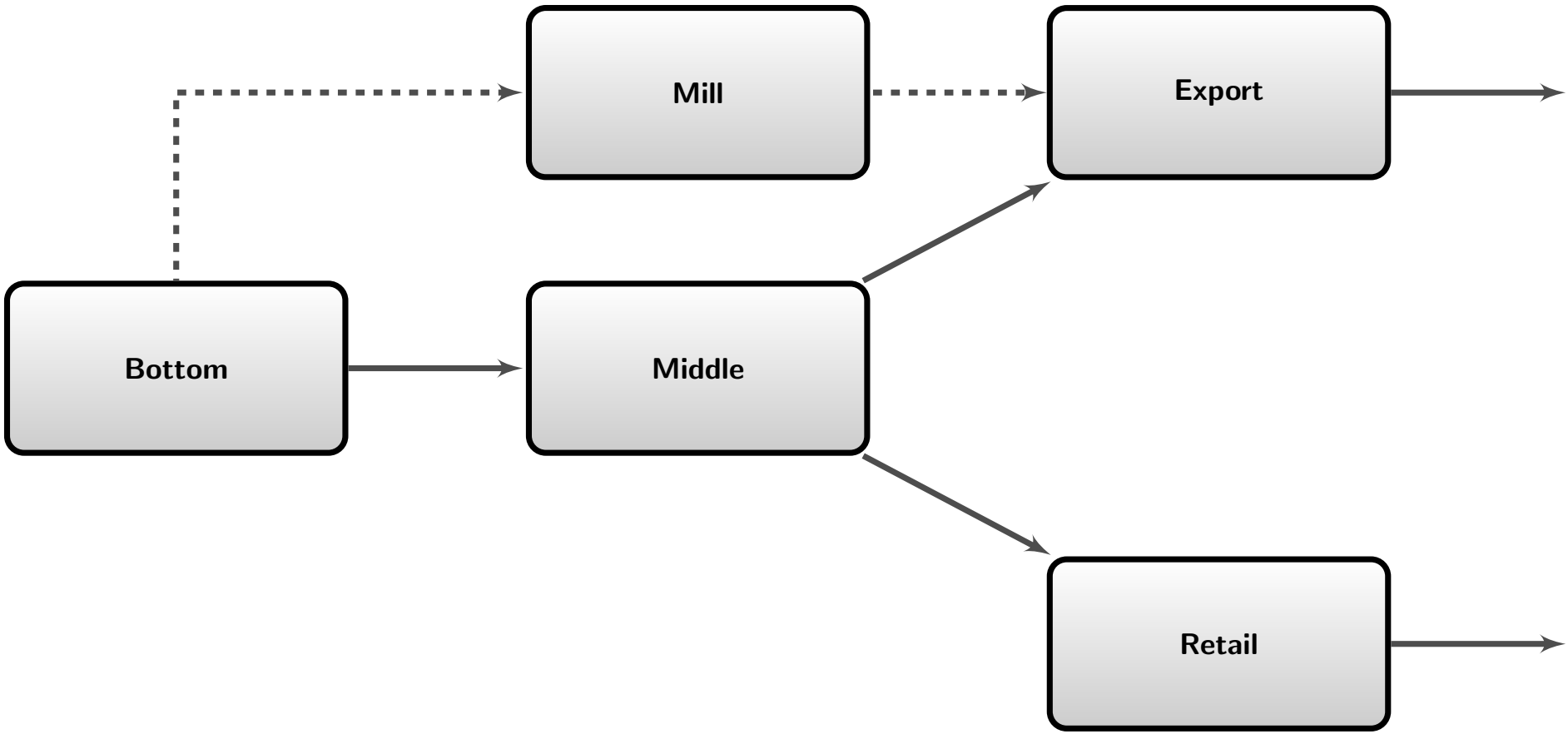
$$\Delta R = \underbrace{\tau\left(\hat{C}_E - C_E\right)}_{\text{overclaimed refund}} + \underbrace{\tau\left(S_R - \hat{S}_R\right)}_{\text{underpaid tax}}$$

- The extent of VAT evasion depends upon
  1. by how much purchases claimed for export are over-reported
  2. by how much domestic B2C sales are underreported

Example 3: When VAT Chain is Broken

- VAT chains are rarely complete, especially in developing economies
- When the chain breaks, VAT charged at the pre-break stage cannot be claimed at the post-break stage
- This creates arbitrage opportunities that are sometimes exploited by firms called invoice mills
- The invoice mills deal only in VAT *paper*, helping downstream firms claim credit of VAT remitted at the upstream stages

Example 3: When VAT Chain is Broken



Outline

The Zero-Rating Reform

- Reduces the VAT rate on the supply chains of five major industries from 15% to 0%

- Two main purposes of the reform
  - Reduce compliance costs in export-oriented industries
  - Prevent fraudulent refunds

The Zero-Rating Reform

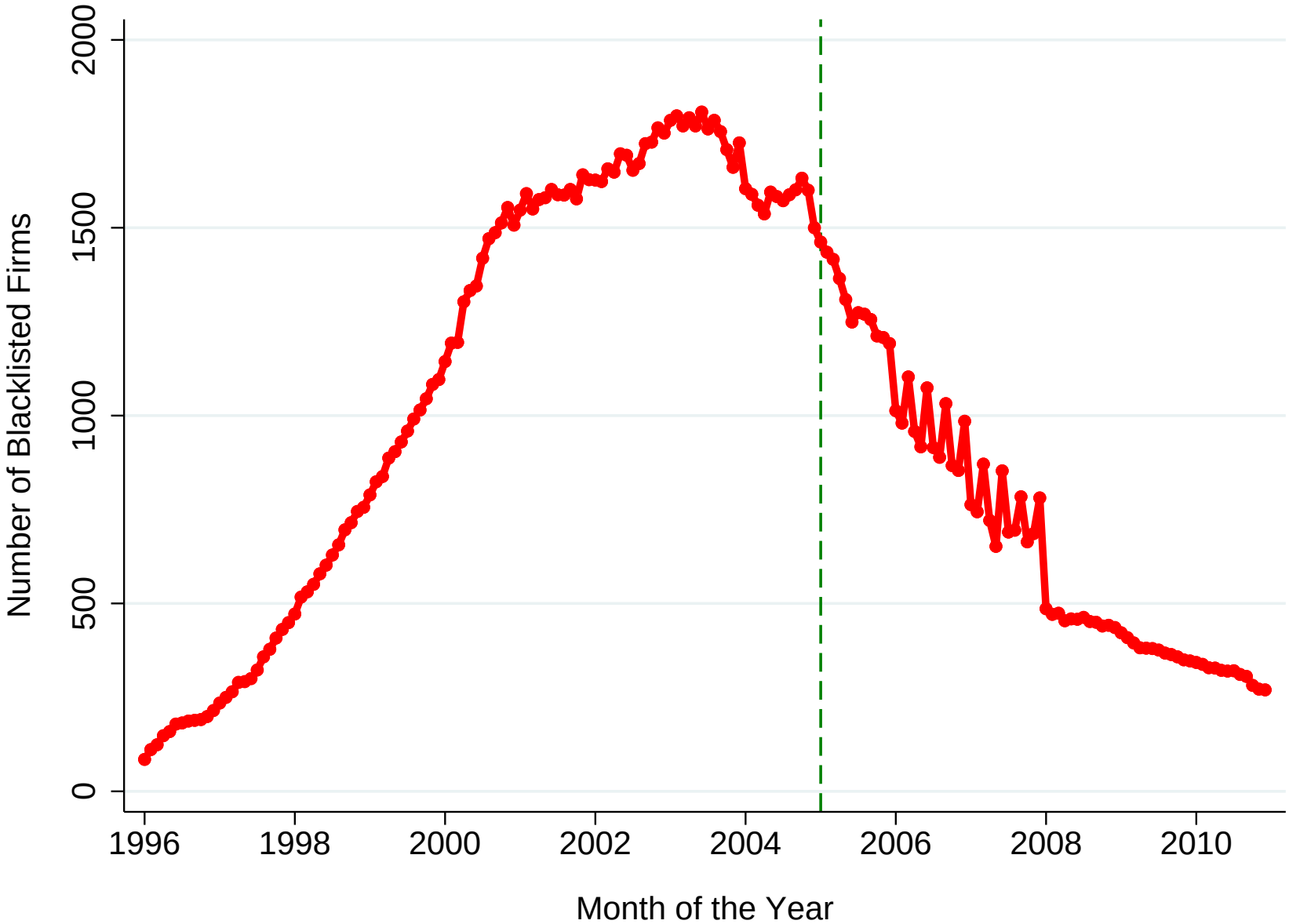
- Announced on June 06, 2005; applicable from July 01, 2005

- Zero-rated 152 items, including both finished goods and major inputs of five industries—textile, leather, carpets, sports goods, and surgical goods

Blacklisting

- Since July 2003, the tax administration possesses the power to blacklist a firm it suspect of being an invoice mill
- The procedure has three steps
  1. Suspension of registration
  2. Opportunity of being heard
  3. Blacklisting
- I use the procedure to identify invoice mills in my data

The Emergence & Growth of Invoice Mills



Outline

Model

- Estimate a DD model with firm and period (month) fixed effects

$$y_{it} = \alpha_i + \lambda_t + \boldsymbol{\beta X_{it}} + \gamma.\, zero\text{-}rated_i \times after_t + \varepsilon_{it}$$

where $zero\text{-}rated_i$ denotes that firm i belongs to one of the five treated industries

- Explore six VAT outcomes (y_{it}):

1. Output Tax
2. Input Tax
3. Sales
4. Purchases
5. Exports
6. Non-export Sales

Identification

- Conditional on the firm and time fixed effects, the time path of the outcomes would have been on average similar across the treated and untreated groups

- Show event study results spanning a number of pre- and post-reform periods to support this

Data

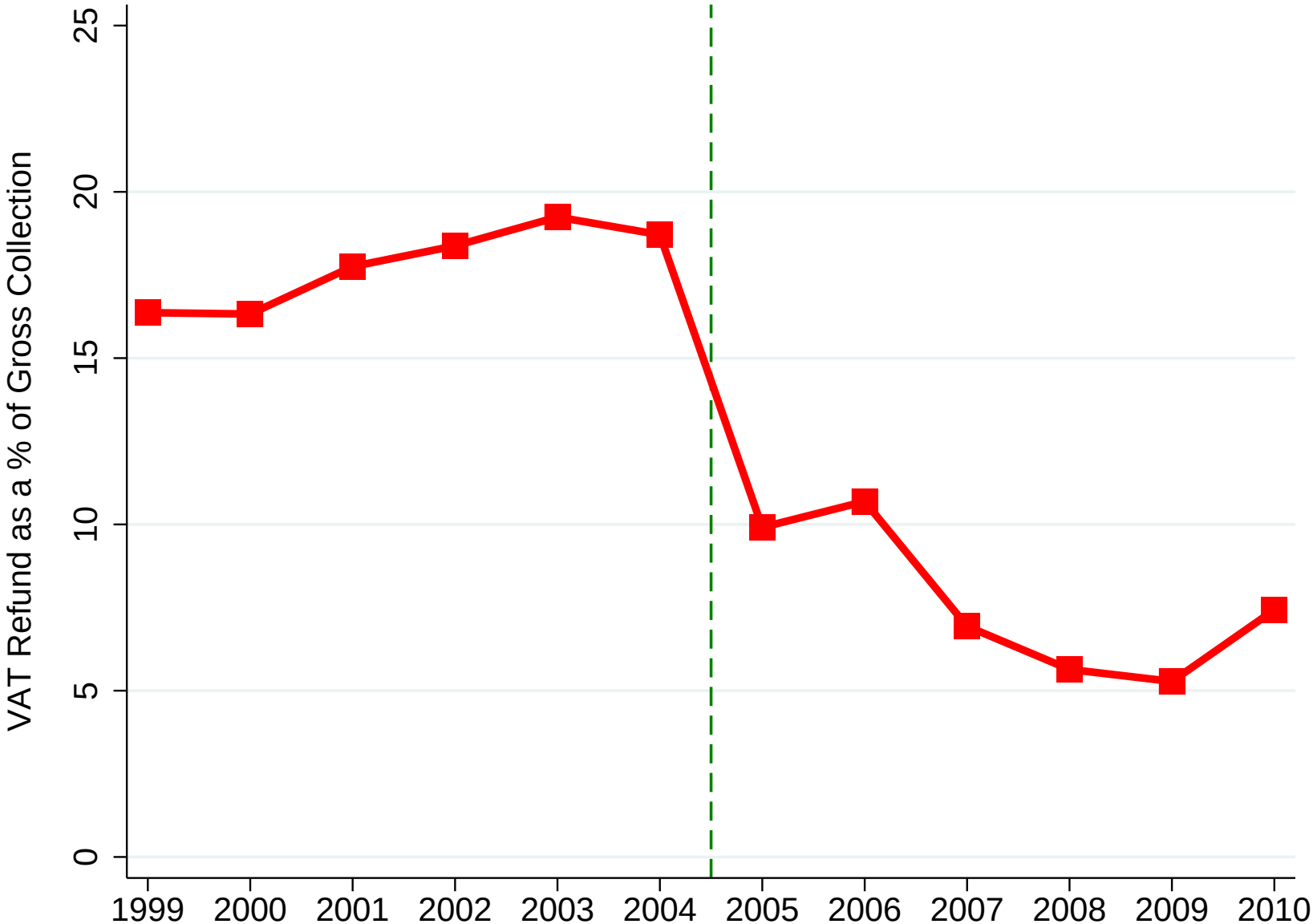
- The universe of VAT returns (1998-2010)

- Tax register containing firm characteristics including
  - Industry a firm operates in
  - Registration status (suspended, blacklisted, normal)

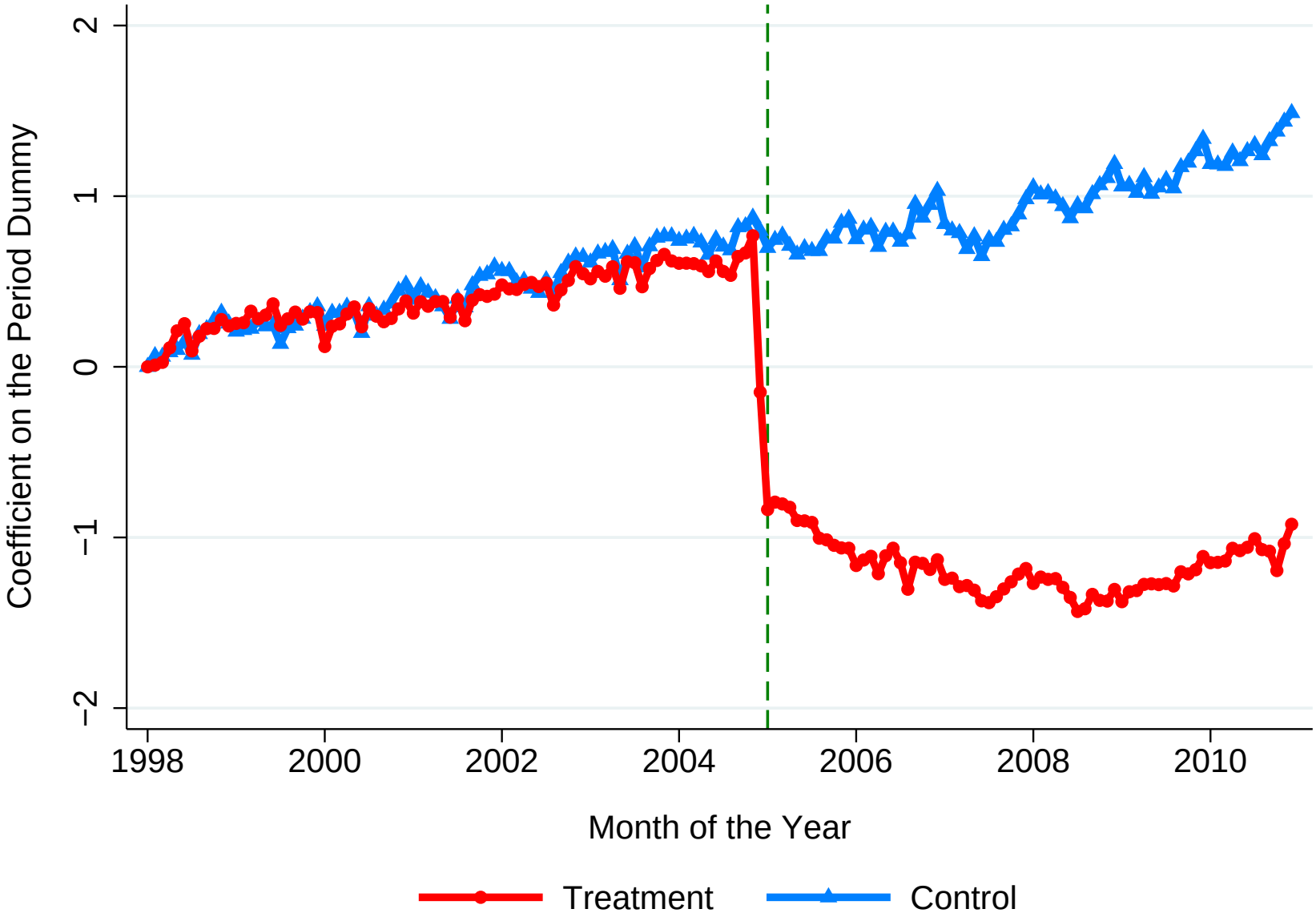
Outline

Outline

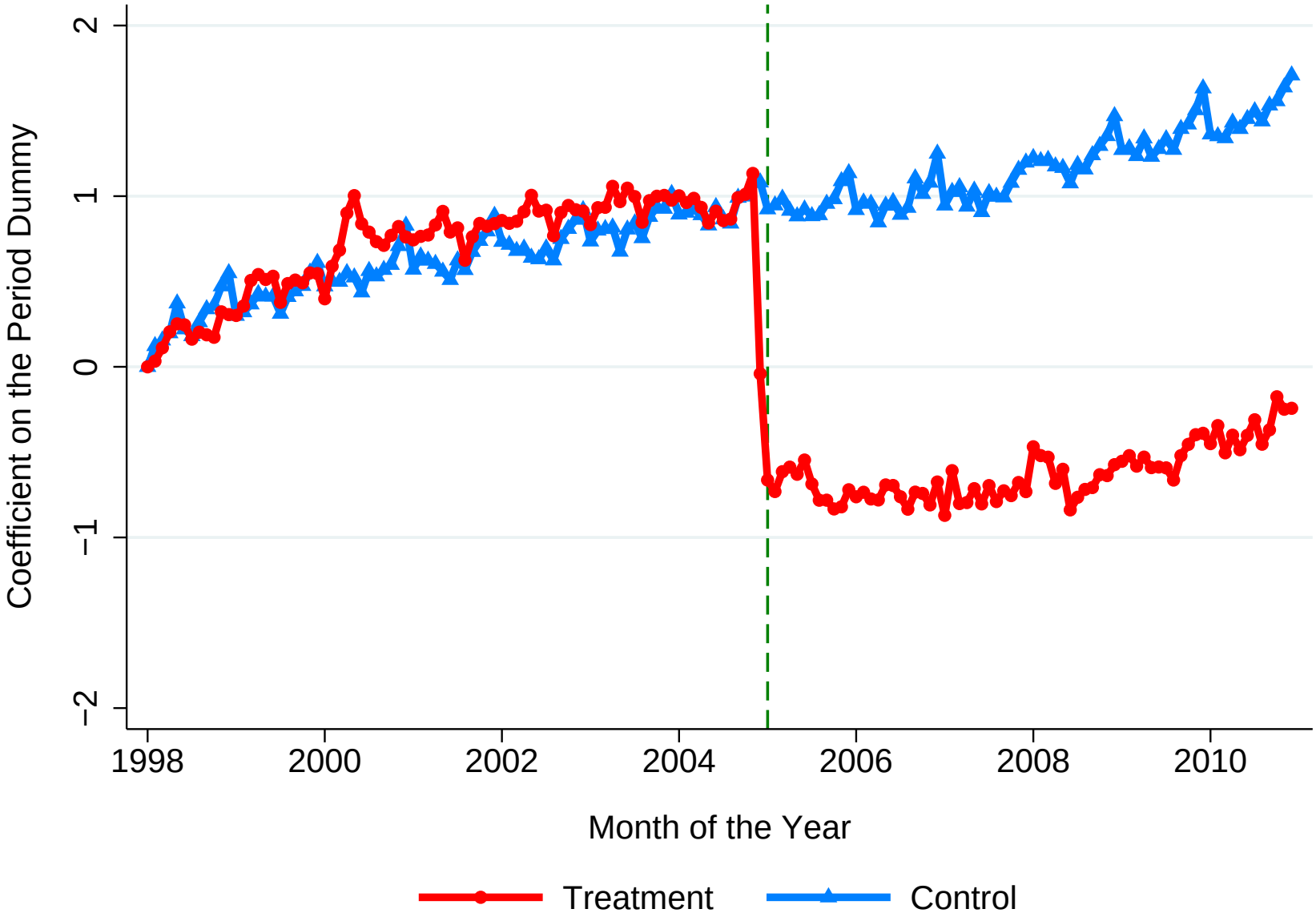
Aggregate VAT Refund Paid in Pakistan



Input Tax Reported By Firms



Output Tax Reported by Firms



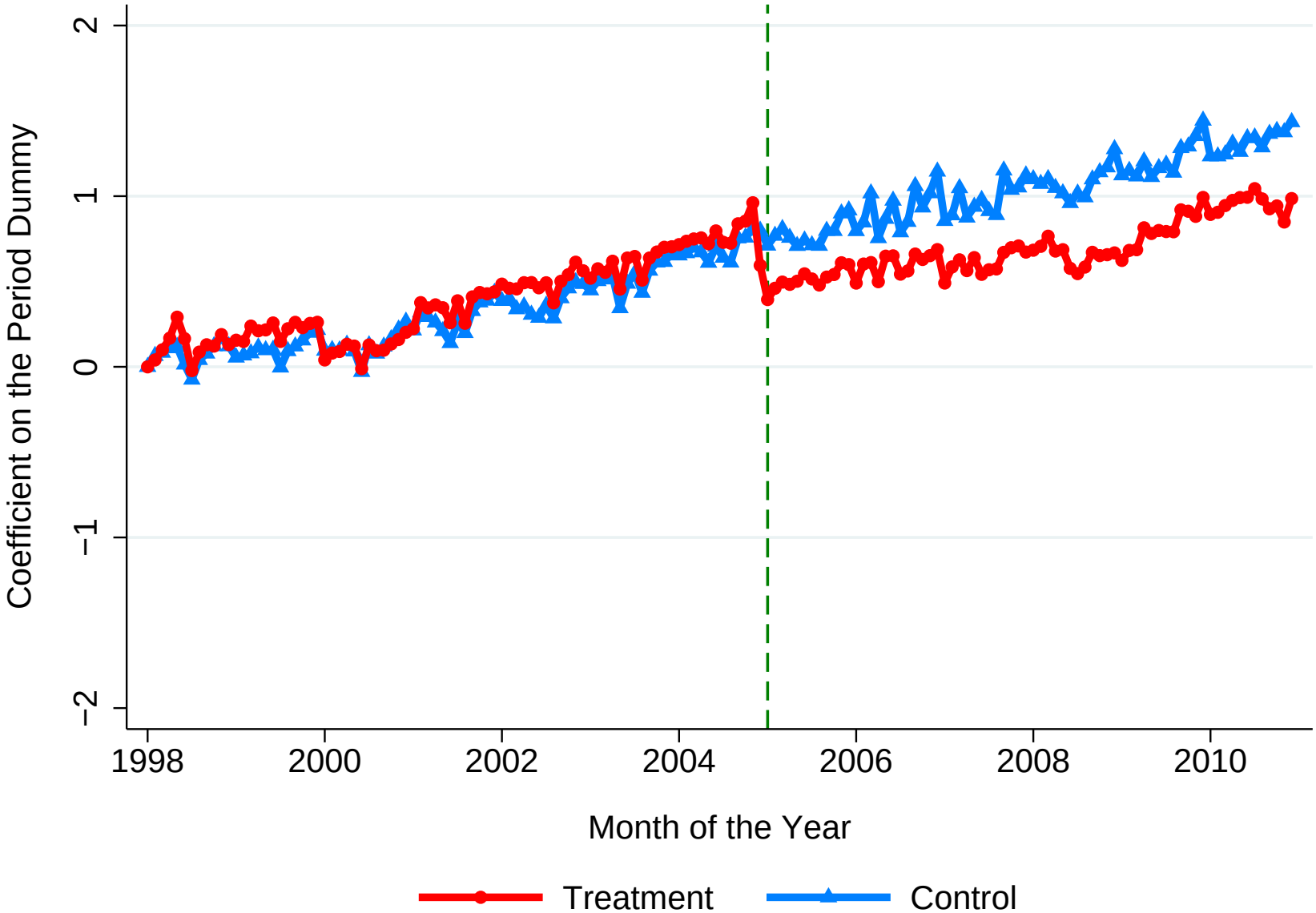
Input Tax – DD


Difference−in−differences Coefficient
1
0
−1
−2
1998
2000
2002
2004
2006
2008
2010
Month of the Year
Coefficient
95% Confidence Interval

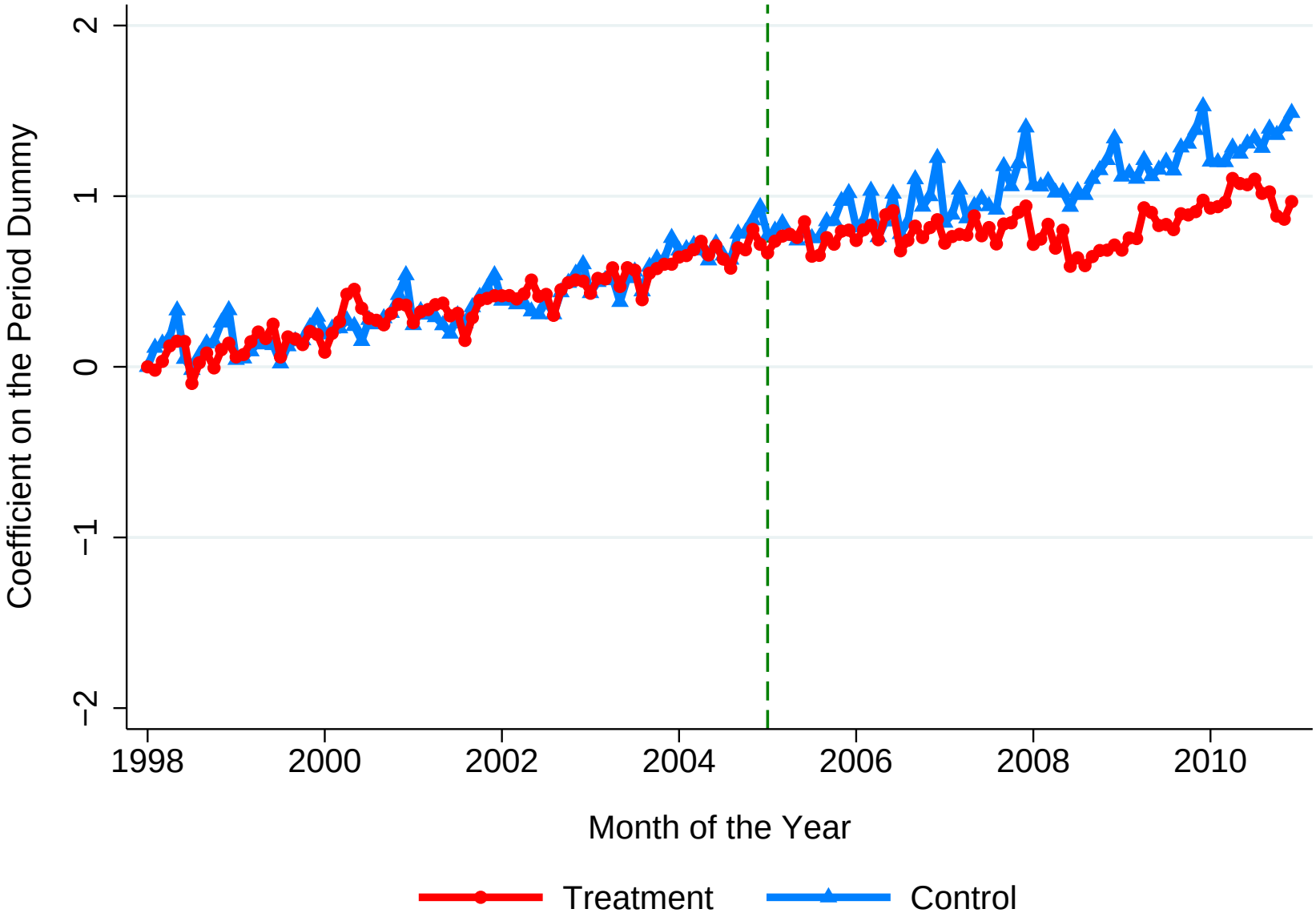
Output Tax – DD

Outline

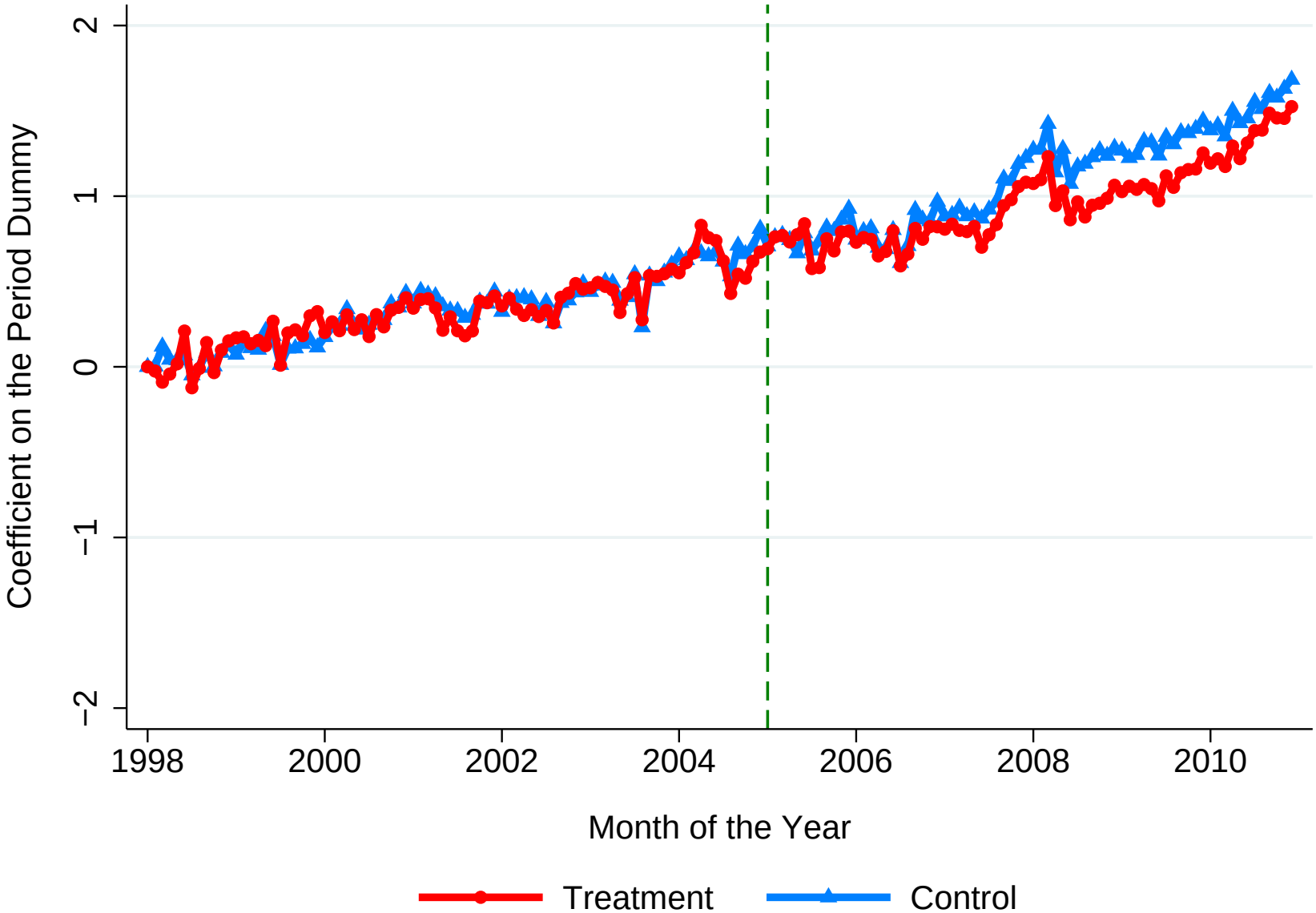
Purchases Reported by Firms



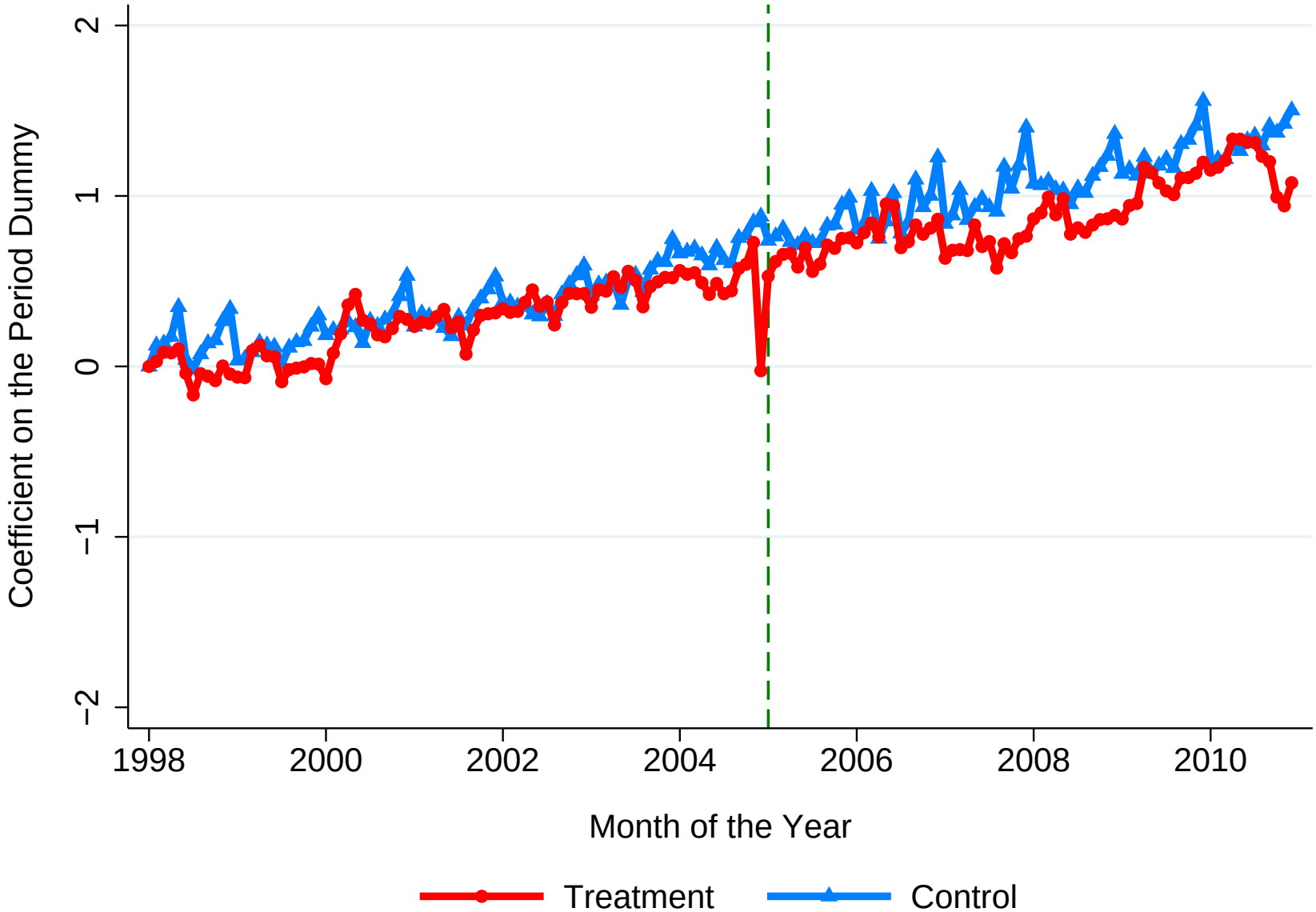
Sales Reported by Firms



Exports Reported by Firms

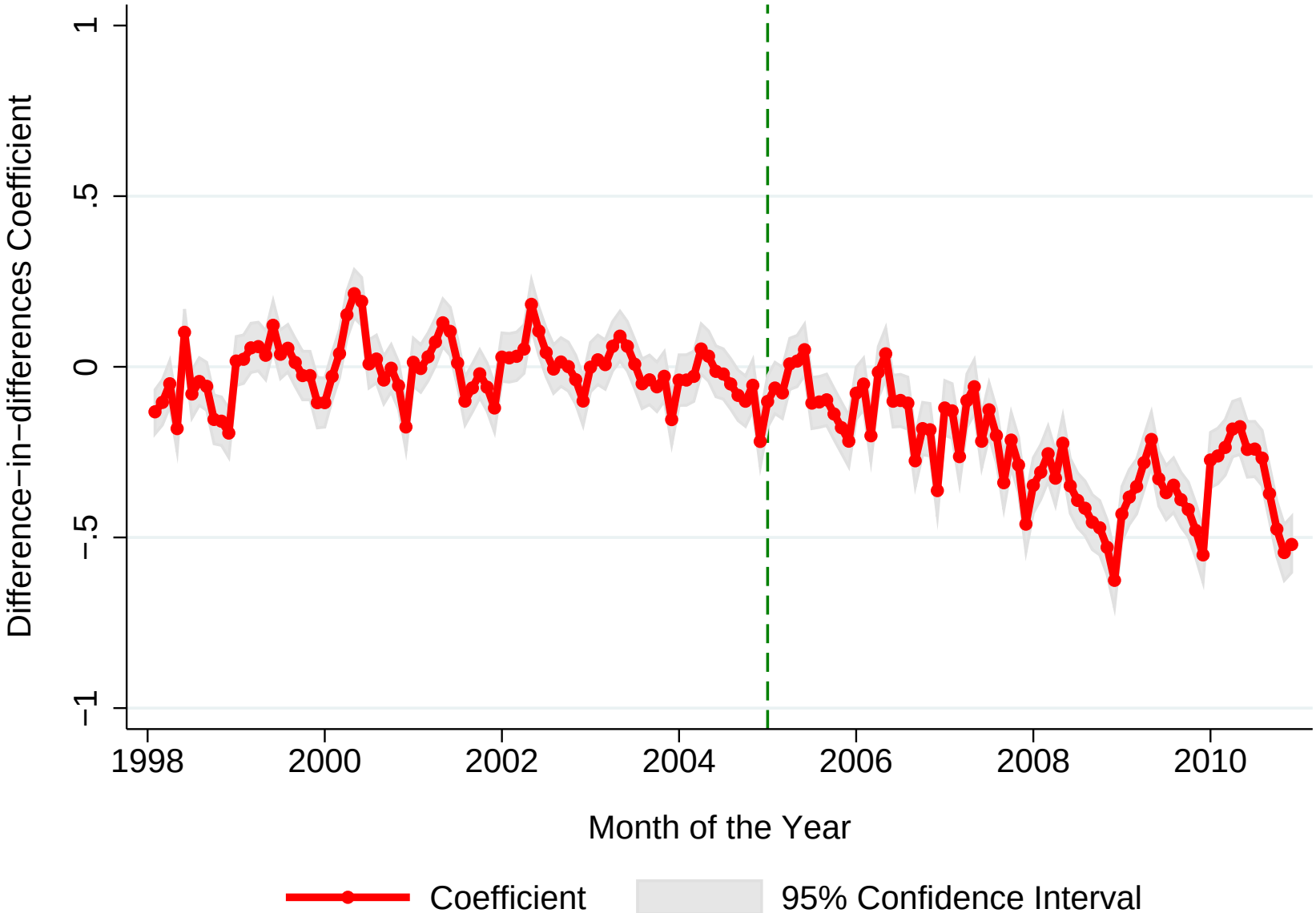


Non-Export Sales of Firms



Purchases – DD

Sales – DD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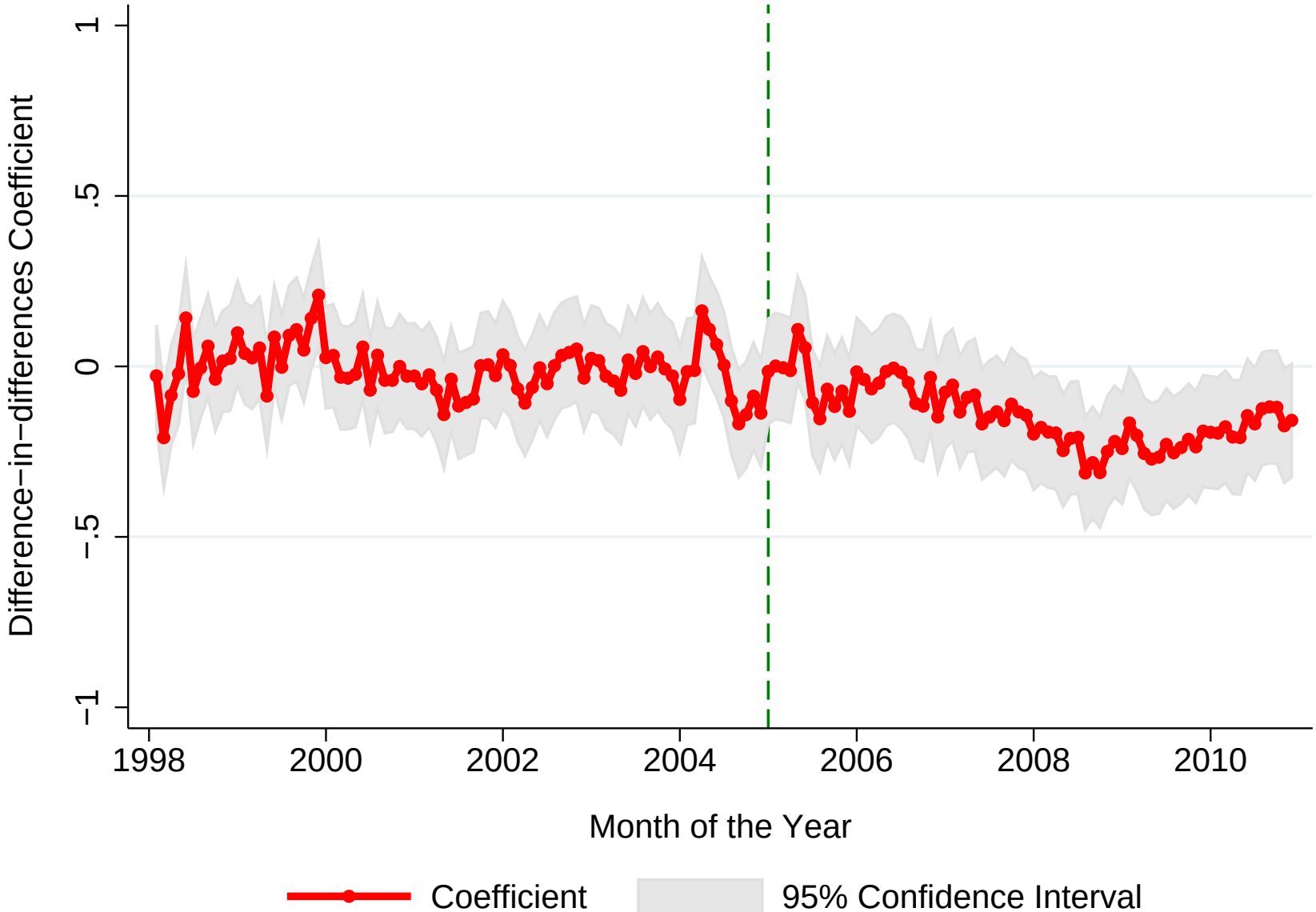
Exports – DD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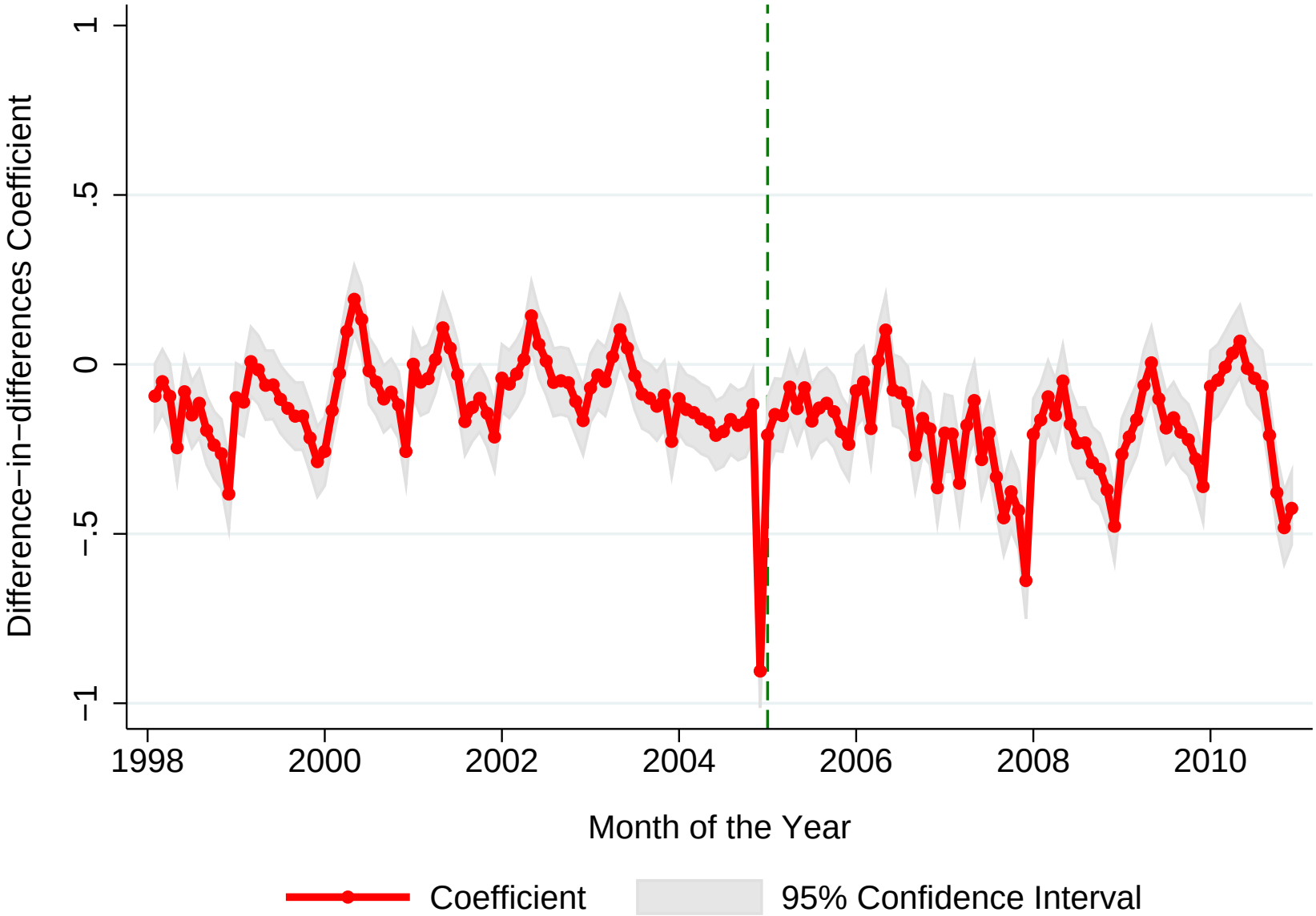


Firm Behavior to the Zero-Rating

	Output Tax	Input Tax	Sales	Purchases	Exports	Non-Export Sales
	(1)	(2)	(3)	(4)	(5)	(6)
A: Complete Panel						
treat × after	-1.842	-1.961	-0.223	-0.419	-0.106	-0.082
	(0.071)	(0.026)	(0.012)	(0.017)	(0.025)	(0.014)
Observations	4,179,561	3,728,660	5,058,579	3,983,213	612,993	4,623,907
B: Balanced Panel						
treat × after	-2.536	-2.337	-0.405	-0.484	-0.158	-0.101
	(0.139)	(0.043)	(0.024)	(0.031)	(0.037)	(0.029)
Observations	877,354	948,385	1,126,539	981,954	264,719	960,697
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes

Firm Behavior to the Zero-Rating – Dynamics

	Output Tax	Input Tax	Sales	Purchases	Exports	Non-Export Sales
	(1)	(2)	(3)	(4)	(5)	(6)
treat × 2005	-1.732	-1.568	-0.072	-0.335	-0.019	-0.046
	(0.062)	(0.022)	(0.010)	(0.015)	(0.022)	(0.013)
treat × 2006	-1.816	-1.891	-0.126	-0.391	-0.035	-0.028
	(0.070)	(0.027)	(0.012)	(0.017)	(0.027)	(0.014)
treat × 2007	-1.855	-1.984	-0.203	-0.440	-0.103	-0.220
	(0.088)	(0.029)	(0.016)	(0.021)	(0.030)	(0.022)
treat × 2008	-1.949	-2.240	-0.383	-0.498	-0.216	-0.135
	(0.090)	(0.033)	(0.018)	(0.021)	(0.033)	(0.017)
treat × 2009	-1.956	-2.283	-0.365	-0.475	-0.212	-0.083
	(0.090)	(0.035)	(0.019)	(0.023)	(0.036)	(0.018)
treat × 2010	-1.911	-2.270	-0.295	-0.432	-0.148	-0.021
	(0.084)	(0.036)	(0.020)	(0.024)	(0.038)	(0.019)
Observations	4,179,561	3,728,660	5,058,579	3,983,213	612,993	4,623,907
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes

Textile Vs. Non-Textile

	Output Tax	Input Tax	Sales	Purchases	Exports	Non-Export Sales
	(1)	(2)	(3)	(4)	(5)	(6)
treat × after	-1.925	-1.978	-0.221	-0.394	-0.065	-0.082
	(0.076)	(0.026)	(0.013)	(0.017)	(0.027)	(0.014)
treat × after × non-textile	0.958	0.260	-0.023	-0.403	-0.224	-0.001
	(0.196)	(0.102)	(0.040)	(0.078)	(0.042)	(0.081)
Baseline Coefficient	-1.842	-1.961	-0.223	-0.419	-0.106	-0.082
	(0.071)	(0.026)	(0.012)	(0.017)	(0.025)	(0.014)
Observations	4,179,561	3,728,660	5,058,579	3,983,213	612,993	4,623,907
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes

Within Textile Supply Chain

	Output Tax	Input Tax	Sales	Purchases	Exports	Non-Export Sales
	(1)	(2)	(3)	(4)	(5)	(6)
treat × after	-0.468	-2.040	-0.266	-0.429	-0.108	0.092
	(0.074)	(0.053)	(0.027)	(0.034)	(0.035)	(0.033)
treat × after × ginning	-2.184	2.053	0.305	0.389	0.193	-0.001
	(0.096)	(0.075)	(0.036)	(0.067)	(0.057)	(0.042)
treat × after × spinning	-3.613	-0.504	0.030	0.110	0.210	-0.351
	(0.207)	(0.074)	(0.035)	(0.045)	(0.071)	(0.042)
treat × after × weaving	-1.831	0.018	0.026	0.001	0.025	-0.204
	(0.147)	(0.061)	(0.031)	(0.039)	(0.044)	(0.037)
Baseline Coefficient	-1.925	-1.978	-0.221	-0.394	-0.065	-0.082
	(0.076)	(0.026)	(0.013)	(0.017)	(0.027)	(0.014)
Observations	4,158,258	3,685,909	4,987,477	3,934,914	563,822	4,597,087
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes

Outline

From Behavioral Responses to Tax Evasion

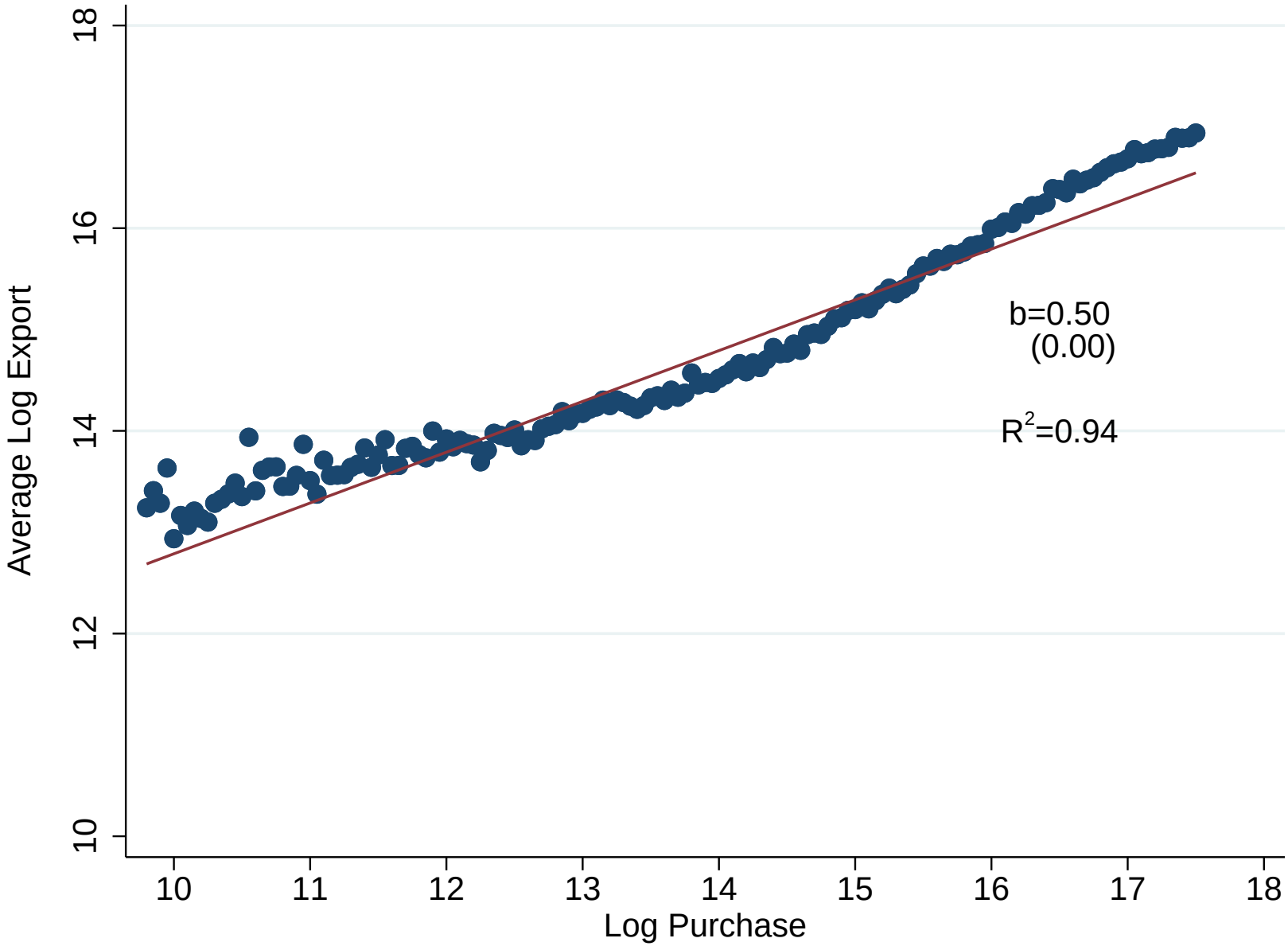
- The amount of VAT evasion is given by the following formula

$$\Delta R = \underbrace{\tau\left(\hat{C}_E - C_E\right)}_{\text{overclaimed refund}} + \underbrace{\tau\left(S_R - \hat{S}_R\right)}_{\text{underpaid tax}}$$

- The first term in the formula is the amount by which purchases claimed for export are over-reported

- I do not directly observe the term but can back it out from the behavioral response of exports to the zero-rating

Exports as a Function of Purchases



Quantifying Tax Evasion – I

	Complete Panel (1)	Balanced Panel (2)
A: Overclaimed Refunds		
1. Percent Decrease in $\hat{S}_E$	0.112	0.171
	(0.025)	(0.038)
2. $\hat{S}_E$ in 2004	687.038	389.506
3. $\Delta\hat{S}_E$	76.826	66.670
	(17.392)	(14.682)
4. $\Delta\hat{C}_E$	153.652	133.340
	(34.785)	(29.363)
5. Overclaimed Refunds in 2004	23.048	20.001
	(5.218)	(4.404)

From Behavioral Responses to Tax Evasion

- The second term in the formula is the under-reported B2C sales

- Again, I do not directly observe the term but can back it out using the following accounting identities

$$\sum_{i \in I} \left(\hat{s}_i - \hat{s}_{i,E} \right) \equiv \sum_{i \in I} \left(\hat{s}_{i,B2B} + \hat{s}_{i,B2C} \right)$$

$$\sum_{i \in I} \hat{c}_i \equiv \sum_{i \in I} \left(\hat{s}_{i,B2B} + \hat{c}_{i,OS} \right)$$

- Using the above, the response of B2C sales can be written as

$$\Delta \hat{S}_R \equiv \Delta \left(\hat{S} - \hat{S}_E \right) - \Delta \hat{C} + \Delta \hat{C}_{OS}$$

Quantifying Tax Evasion – II

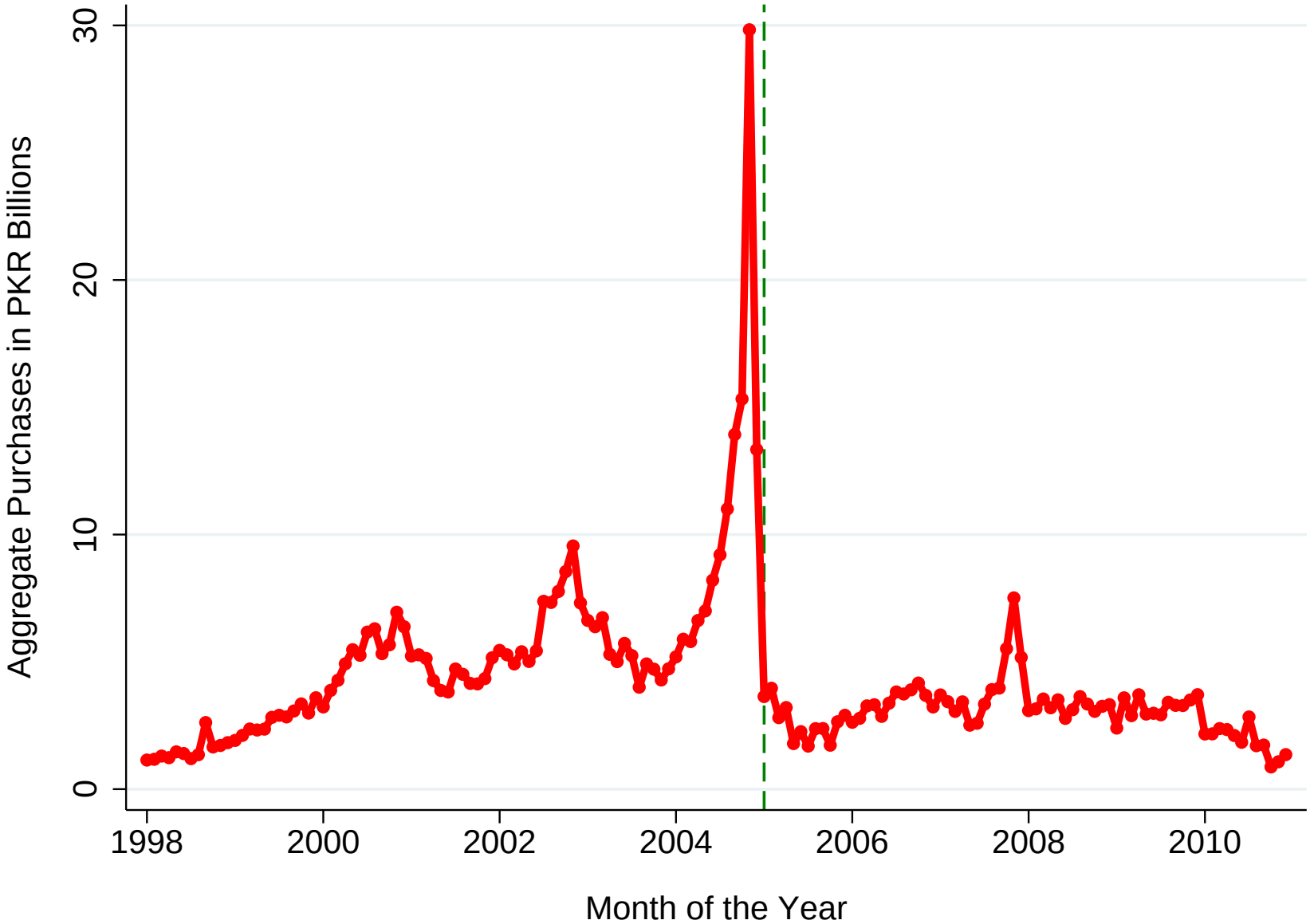
	Complete Panel (1)	Balanced Panel (2)
B: Underpaid Tax on B2C Sales		
6. Percent Decrease in $(\hat{S} - \hat{S}_E)$	0.087	0.111
	(0.013)	(0.029)
7. Percent Decrease in $\hat{C}$	0.522	0.626
	(0.017)	(0.031)
8. Percent Decrease in $\hat{S}_{B2C}$	0.435	0.515
	(0.022)	(0.043)
9. $\hat{S}_{B2C}$ in 2004	229.013	129.835
10. Under-reported $\hat{S}_{B2C}$ in 2004	99.717	66.877
	(4.939)	(5.595)
11. Under-paid VAT on $\hat{S}_{B2C}$ in 2004	14.957	10.032
	(0.741)	(0.839)
C: Total Evasion		
12. Total Tax Evasion	38.005	30.033
	(5.270)	(4.484)

Outline

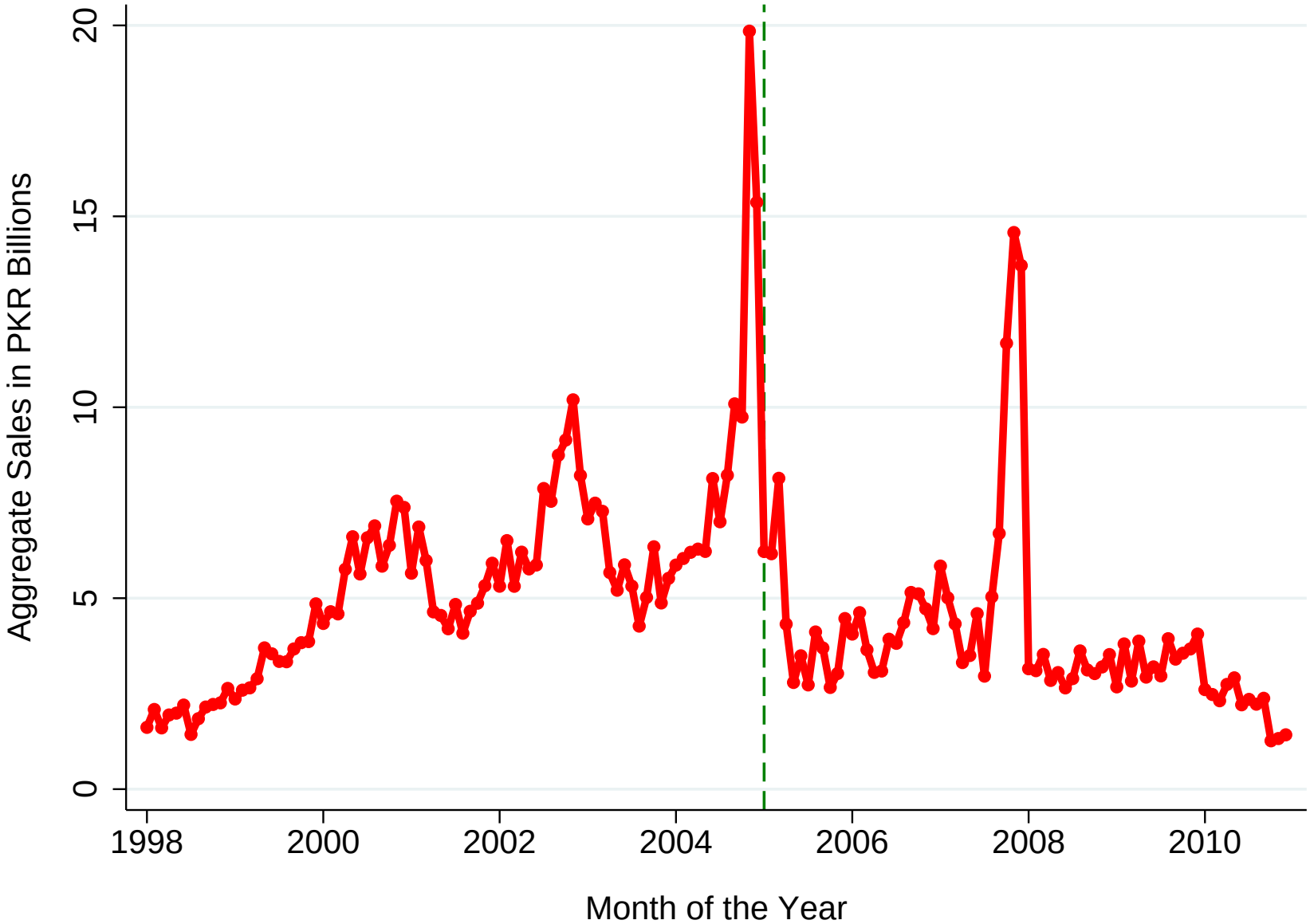
Aggregate Input Tax

Aggregate Output Tax

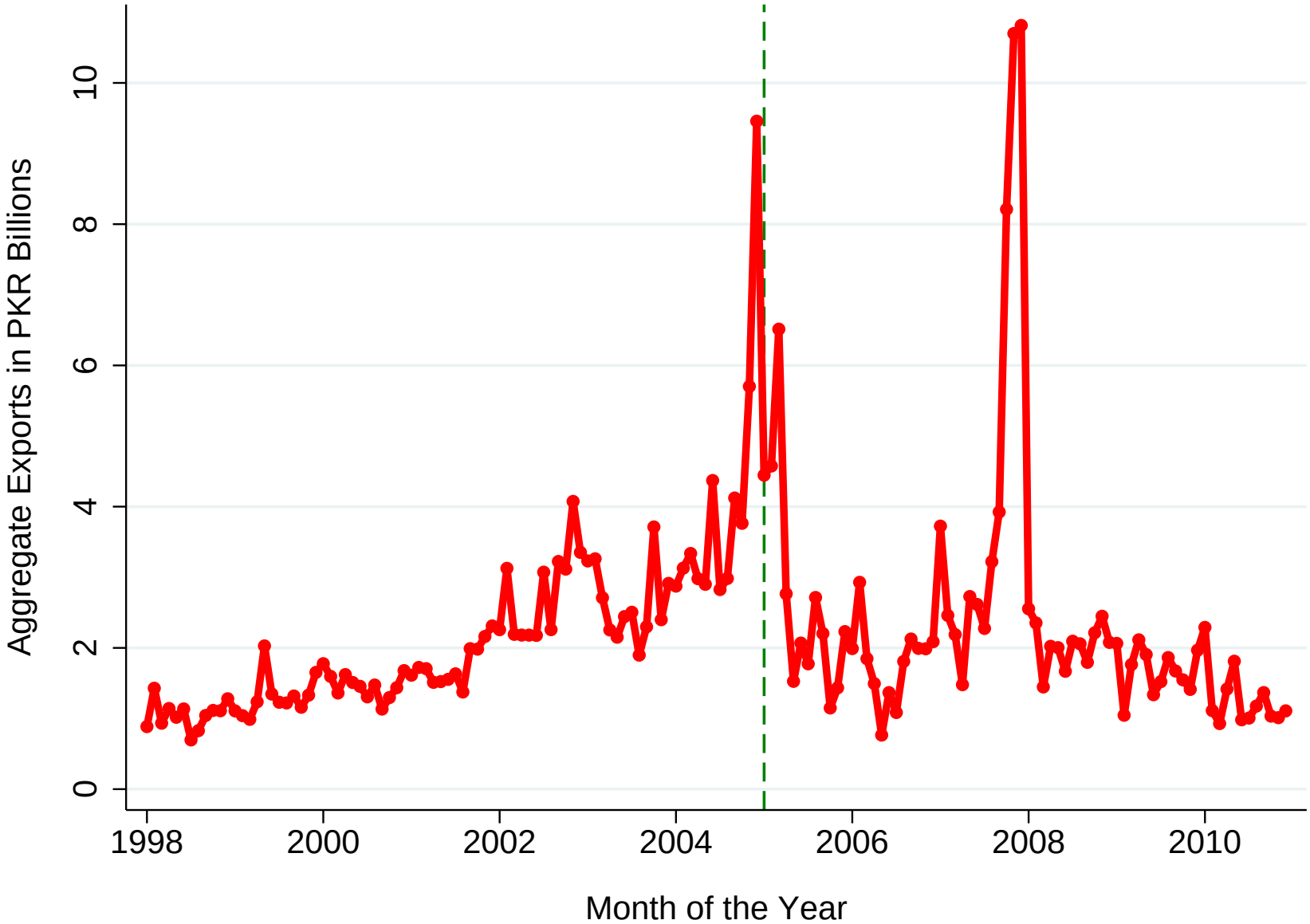
Aggregate Purchases



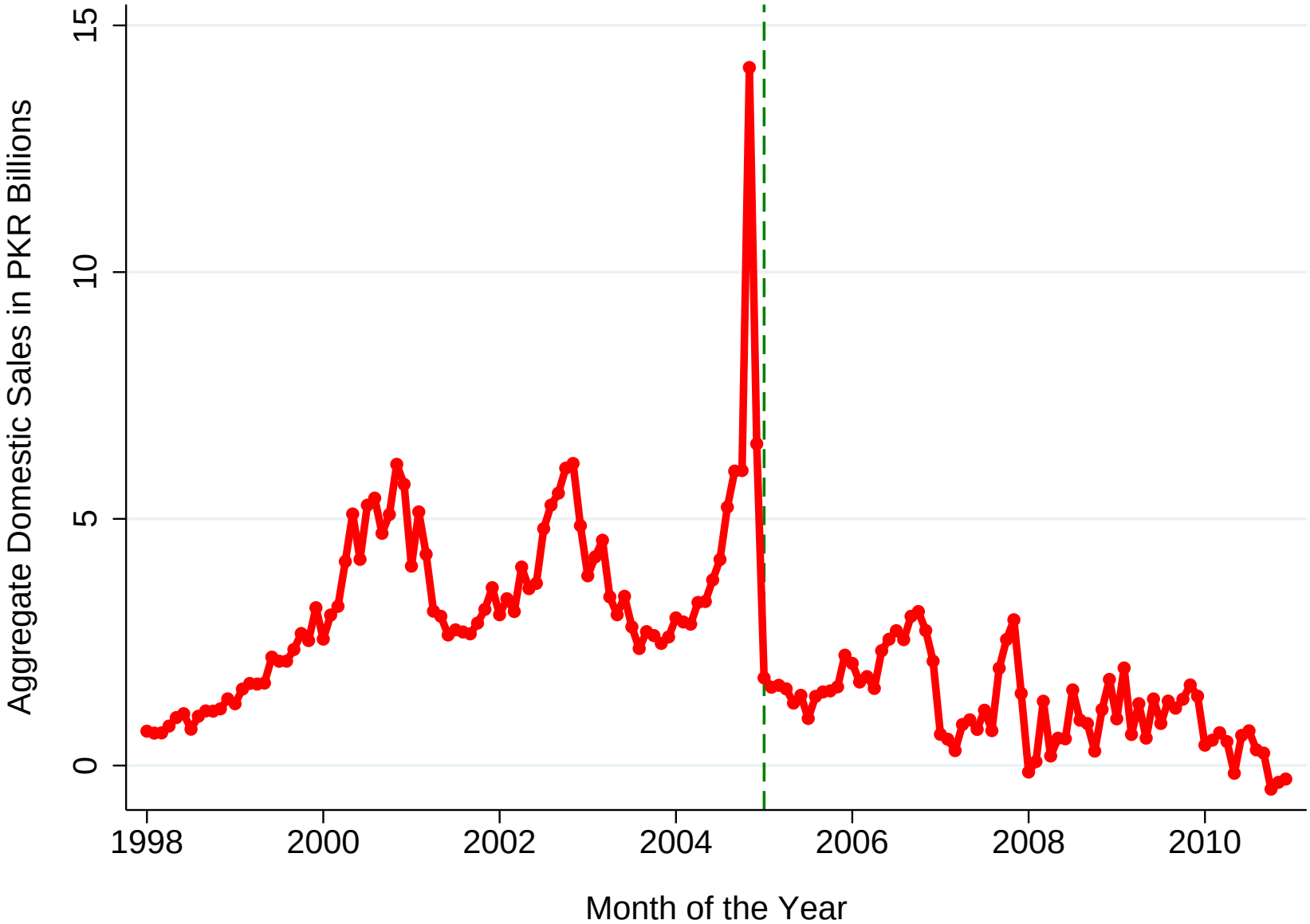
Aggregate Sales



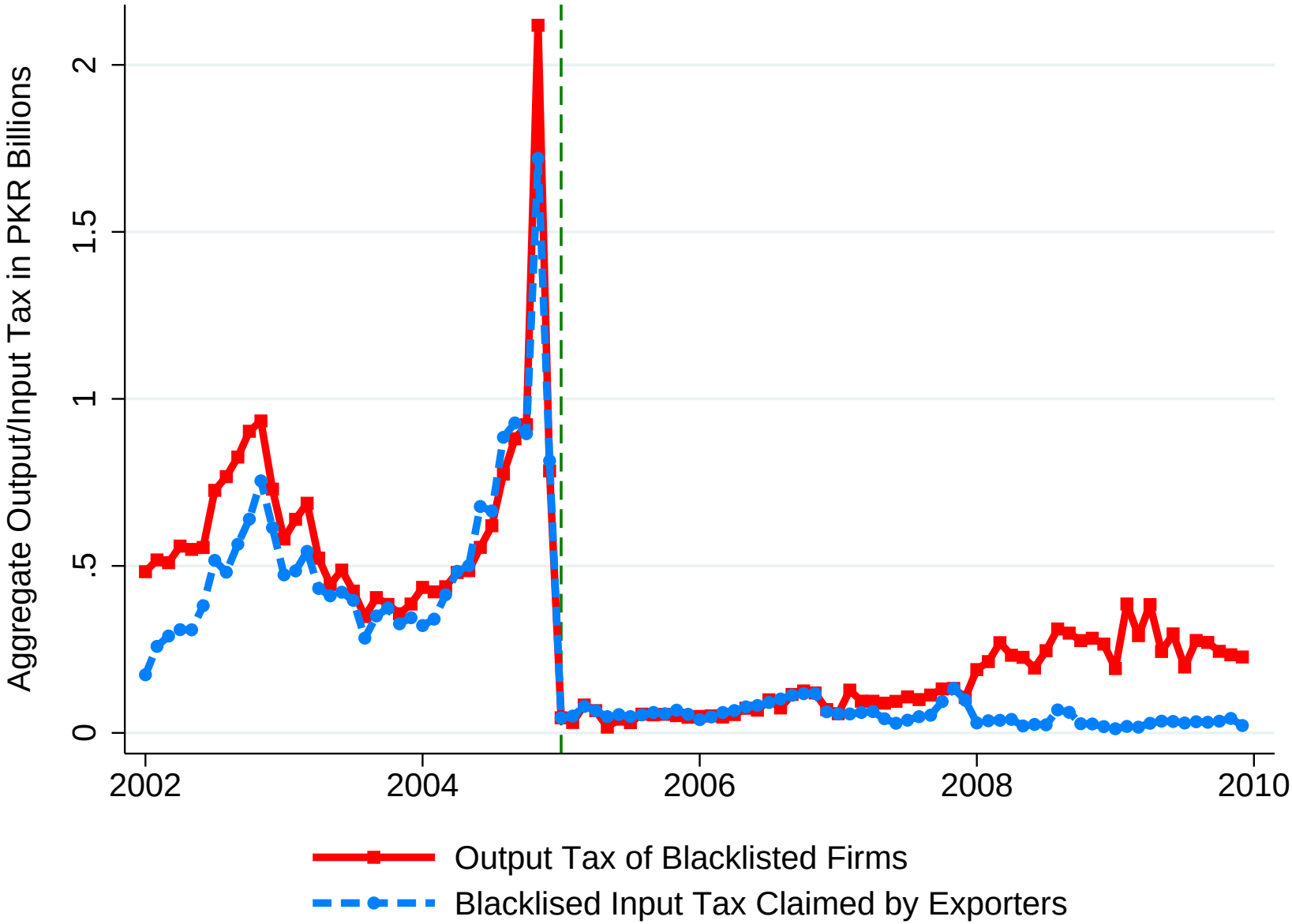
Aggregate Exports



Aggregate Non-Export Sales



Invoice Mills & VAT Refund



Outline

Conclusions

- I leverage a large Pakistani tax cut to estimate the nature and extent of VAT noncompliance
- At the baseline, the refund was overclaimed by nearly 22% and domestic B2C sales were underreported by 43.5%. This translates into an evasion rate of 77%
- Roughly three-fifths of the revenue loss was caused by the overclaiming of VAT refunds and the rest by the underreporting of B2C sales
- Invoice mills facilitate the overreporting of purchases. Nearly 37% of the overclaimed refunds are based on their invoices