How Do Exporters Respond to Antidumping Investigations?

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Introduction

Background

- Increasing trade flows due to rounds of reduction in tariffs and advancement in telecommunications and logistics
- Yet persistent and even increasing use of contingent trade protection policies (especially antidumping investigations), which are permissible under the World Trade Organization (WTO) rules and regulations (e.g., Prusa, 2001; Zanardi, 2006; Bown, 2011).

Introduction

Research Question

- Existing research generally focuses on the impact of antidumping measures on **protected** firms and industries (see, for example, Gallaway, Blonigen and Flynn (1999), Konings and Vandenbussche (2008), and Pierce (2011))
- Limited studies on the impact of antidumping measures on **affected foreign exporters**.
- Using China Customs data that covers monthly transactions of all Chinese exporters, we investigate how Chinese exporters respond to U.S. antidumping investigations during the period of 2000-2006.

Introduction

Importance

- Essential for piecing up a picture of market competition between domestic firms and foreign exporters in both the short-run and the long-run, and its implications for industry dynamics and national competitiveness
- Understanding whether foreign affected exporters should continue their exporting behavior in response to negative shocks brought by antidumping investigations compliments the existing firm heterogeneity literature that focuses primarily on the entry decision into export market

Introduction

Our Focus

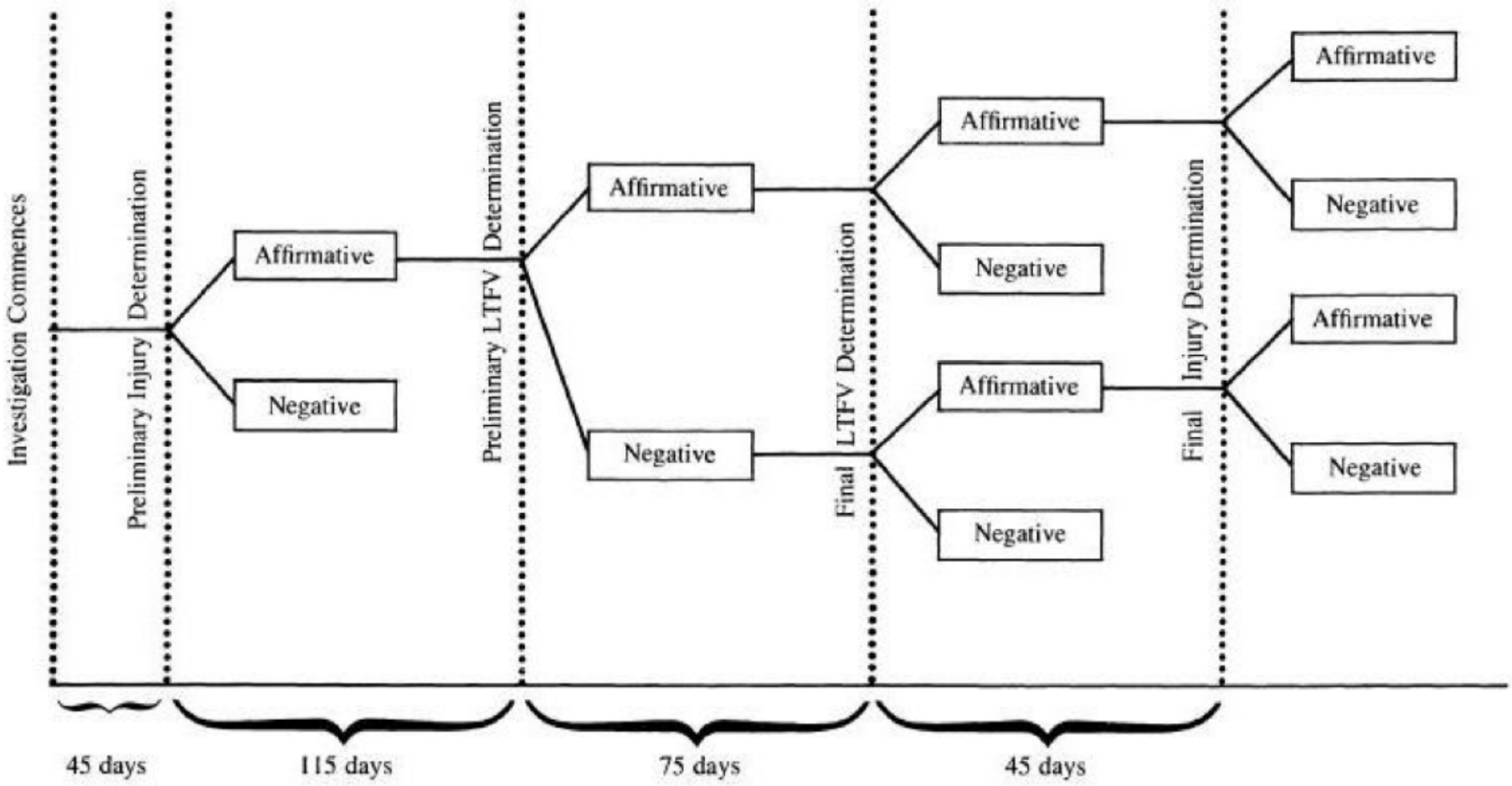
- Anatomize how the trade-dampening effect operates: extensive margin versus intensive margin
- Investigate how different exporters (direct exporters versus trade intermediaries, and single-product direct exporters versus multi-products direct exporters) may respond to antidumping investigations
- Study whether exporters adjust export prices of the concerned products.
- Examine differential impacts across different stages of the antidumping investigation process
- Finally, provide a coherent explanation to the aforementioned findings based on recent developments in trade theories.

Road Map

- Background
- Data
- Estimation Strategy: DID
- Main Results: Figures
- Robustness
- Discussion
- Conclusion

Background

Figure 1. Typical Course of an Antidumping Investigation



Data

- China Customs Data over the period of 2000-2006
  - covers monthly export transaction of every Chinese exporter to the U.S., including product information (classified at the Chinese HS-8 digit level), export volume, export value, and identity of Chinese exporters
- Global Antidumping Database from the World Bank
  - has detailed information on each antidumping case, such as product information (classified at the U.S. HS-10 digit level), initiation date, preliminary ITC and DoC determination dates, and final ITC and DoC determination dates
- We match the two data sets at the HS-6 digit level, the most disaggregated level at which the two data are comparable

Data

US Antidumping Cases against Chinese Exporters over 2000-2006

- A total of 47 U.S. antidumping cases against Chinese exporters
- Two cases (one in early 2000 and the other in late 2006) are dropped as there is not enough pre- or post-antidumping period for us to carry out difference-in-differences estimation.
- 28 cases out of the remaining 42 cases ended up with affirmative final ITC determination (referred to as *successful cases*)
- 5 out of the 6 cases that had affirmative preliminary ITC determination received negative final ITC determination (referred to as *unsuccessful cases*) and 1 was withdrawn before the final ITC determination (referred to as *withdrawn cases*);
- 8 cases were either withdrawn before the preliminary ITC determination or given the negative preliminary ITC determination (referred to as *terminated cases*).

Estimation strategy

- To identify the possible effects of antidumping investigations, we employ the difference-in-differences (DID) estimation strategy at both the product level (defined at HS-6 digit) and the firm-product level
  - time variation: before and after the relevant stages of the antidumping investigation process: initiation, ITC preliminary determination, and ITC final determination
  - cross-sectional variation: affected products (treatment group) and unaffected (control group)
- Control groups
  - all unaffected products/firms within the same HS-4 digit product category where the affected products/firms
  - a matched group, constructed using the method of Blonigen and Park (2004).

Estimation strategy

- Estimation specification
  - binary variables

$$\begin{aligned} y_{pt} &= \beta_1 Treatment_p \times Post^1_{pt} + \beta_2 Treatment_p \times Post^2_{pt} \\ &\quad + \beta_3 Treatment_p \times Post^3_{pt} + \lambda_p + \lambda_t + \varepsilon_{pt}, \end{aligned} \tag{1}$$

  - duties

$$\begin{aligned} y_{pt} &= \beta_1 Treatment_p \times Post^1_{pt} + \beta_2 Preliminary\ Duties_{pt} \times Post^2_{pt} \\ &\quad + \beta_3 Final\ Duties_{pt} \times Post^3_{pt} + \lambda_p + \lambda_t + \varepsilon_{pt}, \end{aligned} \tag{2}$$

Main Results

Product-level Quantity Response

Figure 1a (Control group 1)

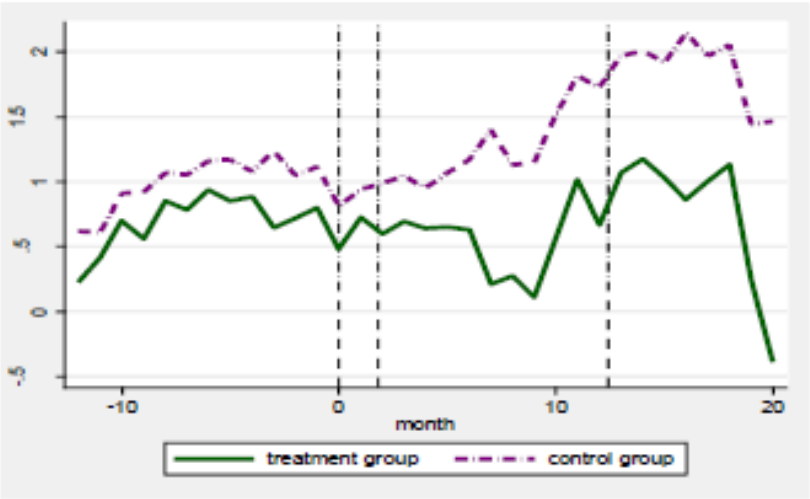


Figure 1b (Control group 1)

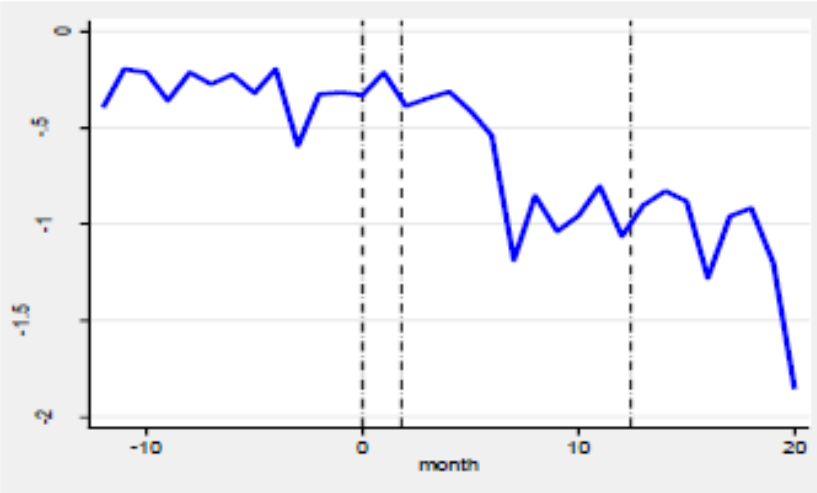


Figure 1c (Control group 2)

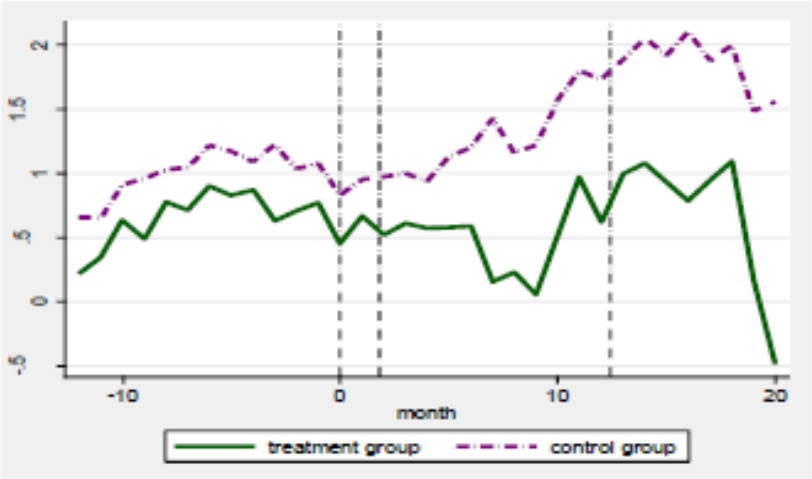
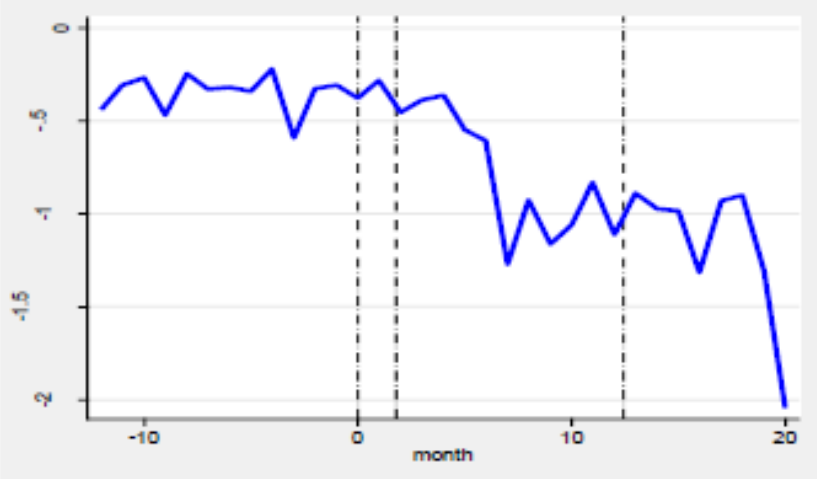


Figure 1d (Control group 2)



Main Results

Product-level Quantity Response

Dependent variable	Log (export volume)			
	(1)	(2)	(3)	(4)
Control group	1	2	1	2
Initiation (β1)	-0.108	-0.135	-0.004	-0.021
	(0.164)	(0.163)	(0.158)	(0.158)
Preliminary ITC determination (β2)	-0.430**	-0.450**		
	(0.112)	(0.112)		
Final ITC determination (β3)	-1.081**	-1.115**		
	(0.193)	(0.195)		
Preliminary duties(β4)			-0.0027**	-0.0028**
			(0.0007)	(0.0007)
Final duties(β5)			-0.0060**	-0.0061**
			(0.0013)	(0.0013)
Month fixed effects	yes	yes	yes	yes
Product fixed effects	yes	yes	yes	yes
Number of observations	16,294	14,993	16,294	14,993
R-squared	0.759	0.744	0.760	0.762

Main Results

Extensive versus Intensive Margins: Extensive Margin

Figure 2a (Control group 1)

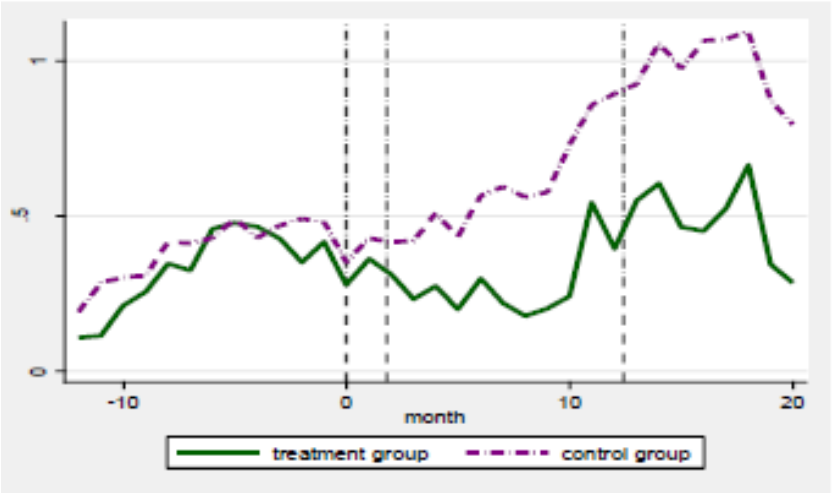


Figure 2b (Control group 1)

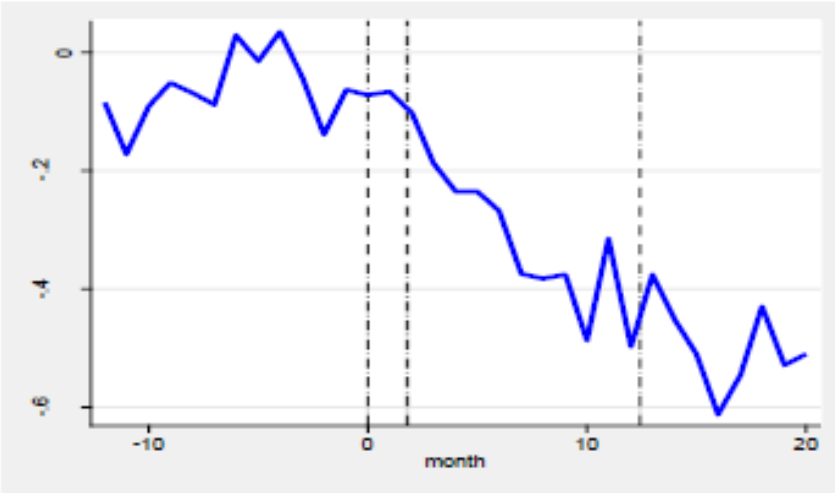


Figure 2c (Control group 2)

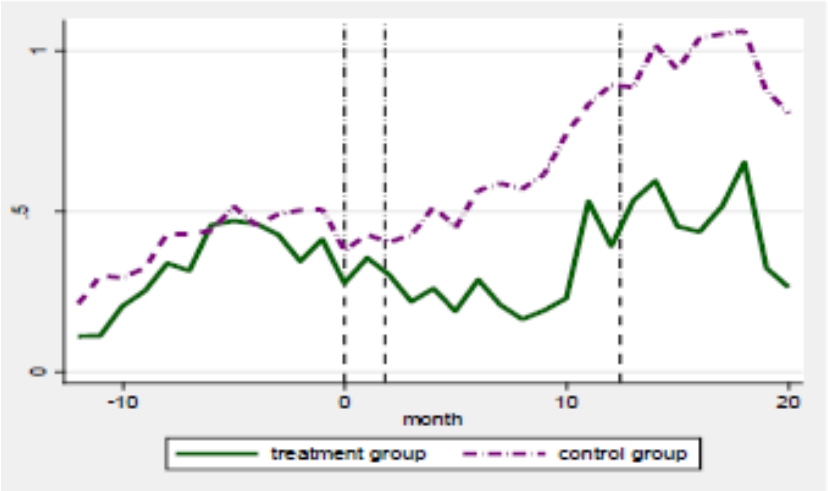
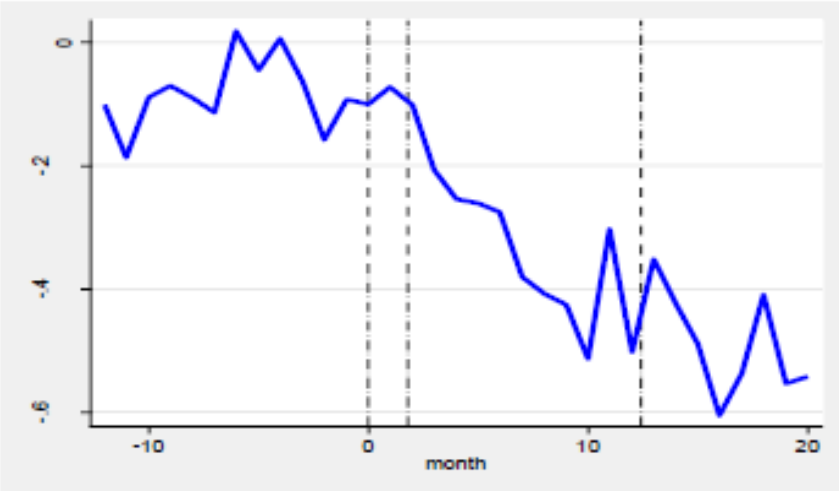


Figure 2d (Control group 2)



Main Results

Extensive versus Intensive Margins: Extensive Margin

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Specification			**Extensive margin**						**Intensive margin**			
Dependent Variable			**Log (number of exporters)**						**Log (export volume per exporter)**			
Sample			**Whole sample**				**Whole sample**				**Surviving firms**	
Control Group	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**
Initiation (β1)	-0.067	-0.076	-0.016	-0.021	-0.041	-0.060	-0.013	-0.001	0.026	0.025	-0.012	0.004
	(0.042)	(0.042)	(0.037)	(0.037)	(0.146)	(0.145)	(0.144)	(0.143)	(0.050)	(0.050)	(0.040)	(0.047)
Preliminary ITC determination (β2)	-0.228**	-0.235**			-0.198*	-0.212*			-0.034	-0.036		
	(0.056)	(0.057)			(0.090)	(0.090)			(0.035)	(0.035)		
Final ITC determination (β3)	-0.402**	-0.417**			-0.671**	-0.693**			-0.097	-0.101		
	(0.090)	(0.091)			(0.149)	(0.149)			(0.052)	(0.051)		
Preliminary duties(β4)			-0.0012**	-0.0012**			-0.0015**	-0.0016**			-0.0008**	-0.0008**
			(0.0003)	(0.0003)			(0.0005)	(0.0005)			(0.0002)	(0.0002)
Final duties(β5)			-0.0022**	-0.0022**			-0.0037**	-0.0038**			-0.0015**	-0.0016**
			(0.0005)	(0.0005)			(0.0009)	(0.0009)			(0.0003)	(0.0003)
Month fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Product fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Number of observations	16,302	14,997	16,302	14,997	16,302	14,997	16,302	14,997	547,007	538,113	547,007	538,113
R-squared	0.932	0.936	0.932	0.936	0.659	0.665	0.660	0.664	0.227	0.226	0.227	0.227

Main Results

Extensive versus Intensive Margins: Intensive Margin

Figure 3a (Control group 1)

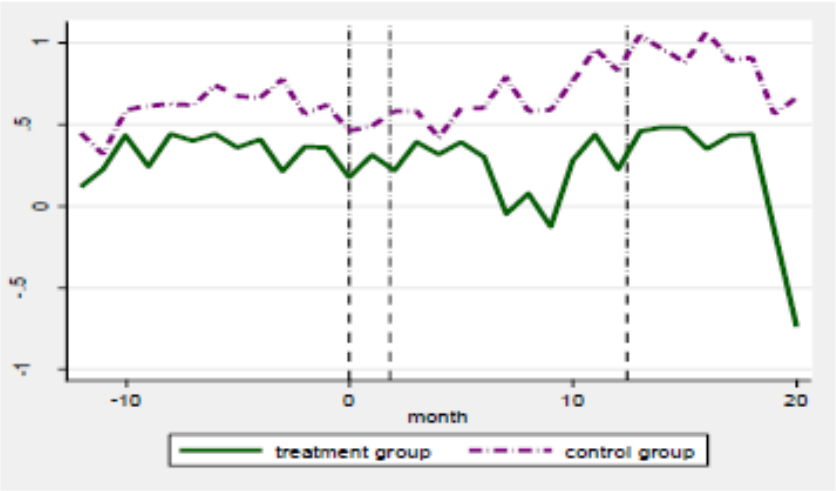


Figure 3b (Control group 1)

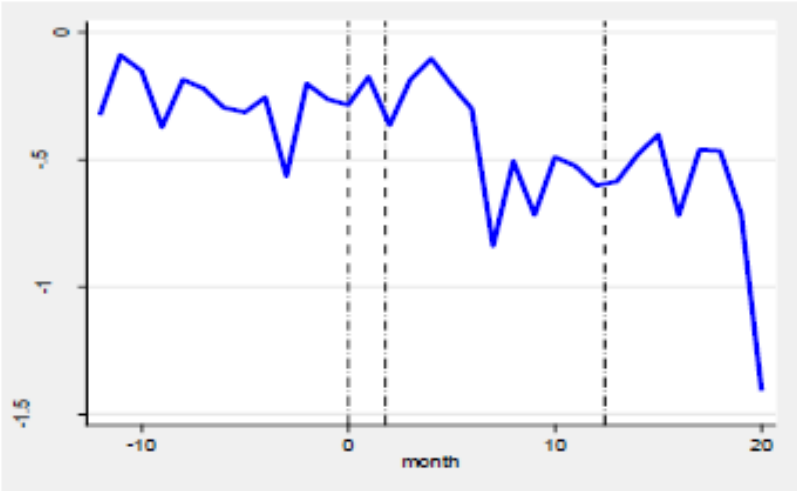


Figure 3c (Control group 2)

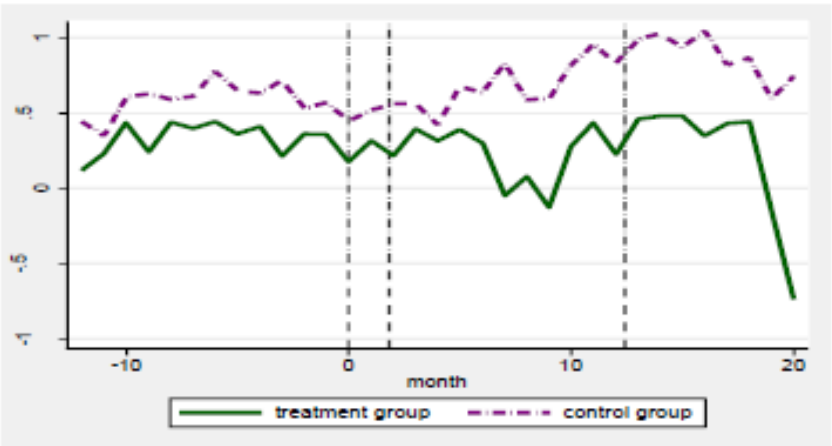
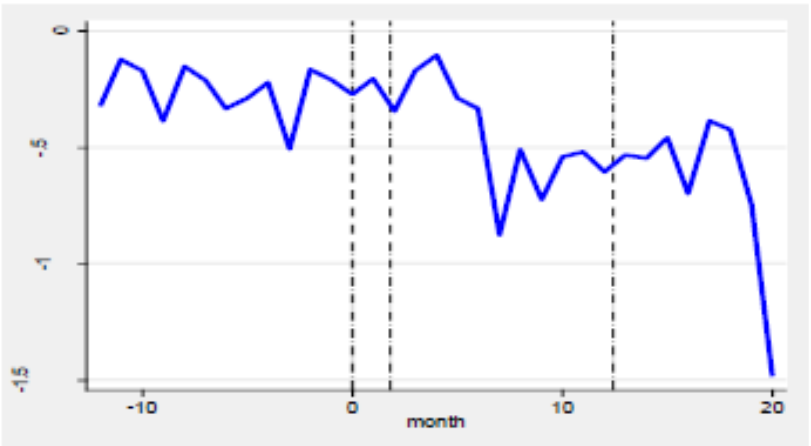


Figure 3d (Control group 2)



Main Results

Extensive versus Intensive Margins: Intensive Margin

Figure 4a (Control group 1)

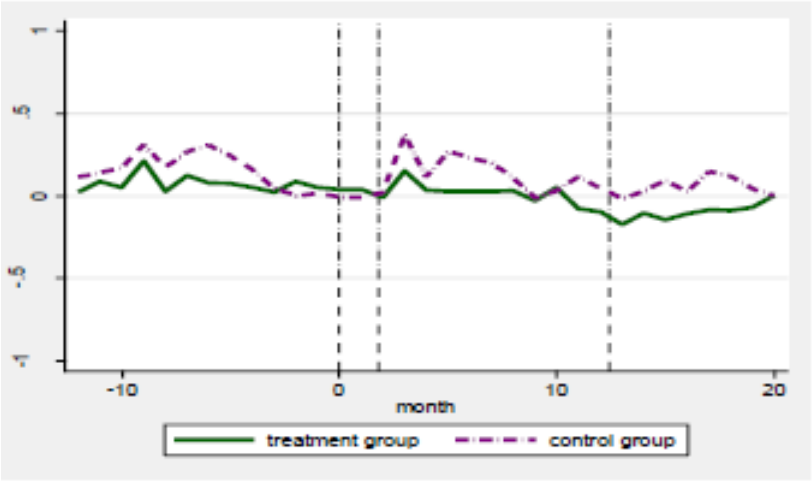


Figure 4b (Control group 1)

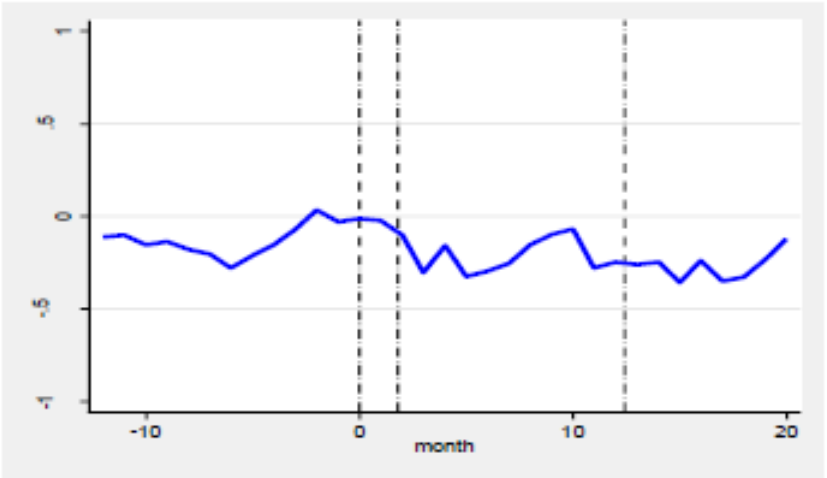


Figure 4c (Control group 2)

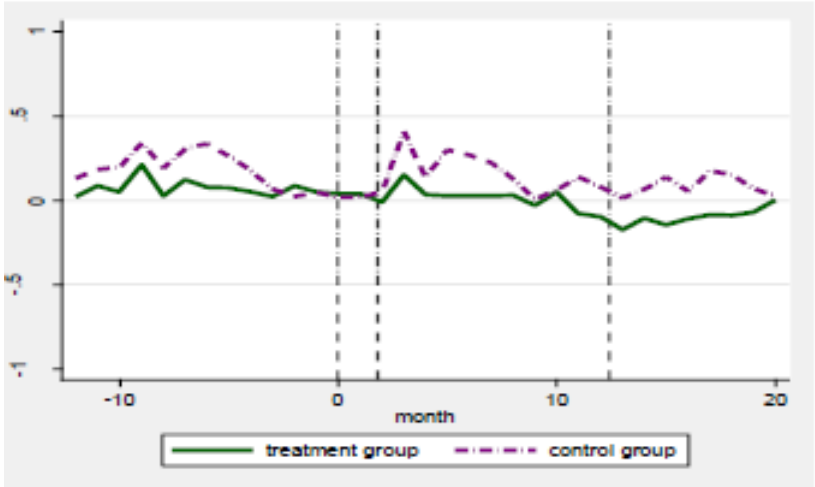
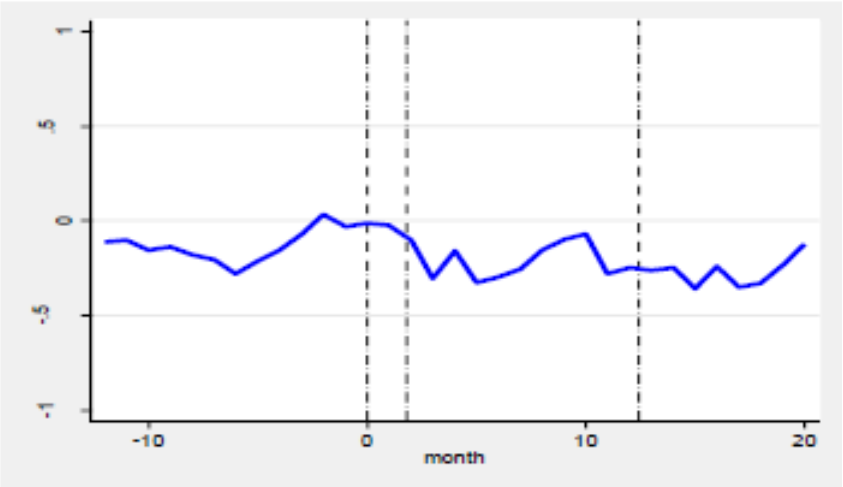


Figure 4d (Control group 2)



Main Results

Extensive versus Intensive Margins: Intensive Margin

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Specification			**Extensive margin**						**Intensive margin**			
Dependent Variable			**Log (number of exporters)**						**Log (export volume per exporter)**			
Sample			**Whole sample**				**Whole sample**				**Surviving firms**	
Control Group	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**
Initiation (β1)	-0.067	-0.076	-0.016	-0.021	-0.041	-0.060	-0.013	-0.001	0.026	0.025	-0.012	0.004
	(0.042)	(0.042)	(0.037)	(0.037)	(0.146)	(0.145)	(0.144)	(0.143)	(0.050)	(0.050)	(0.040)	(0.047)
Preliminary ITC determination (β2)	-0.228**	-0.235**			-0.198*	-0.212*			-0.034	-0.036		
	(0.056)	(0.057)			(0.090)	(0.090)			(0.035)	(0.035)		
Final ITC determination (β3)	-0.402**	-0.417**			-0.671**	-0.693**			-0.097	-0.101		
	(0.090)	(0.091)			(0.149)	(0.149)			(0.052)	(0.051)		
Preliminary duties(β4)			-0.0012**	-0.0012**			-0.0015**	-0.0016**			-0.0008**	-0.0008**
			(0.0003)	(0.0003)			(0.0005)	(0.0005)			(0.0002)	(0.0002)
Final duties(β5)			-0.0022**	-0.0022**			-0.0037**	-0.0038**			-0.0015**	-0.0016**
			(0.0005)	(0.0005)			(0.0009)	(0.0009)			(0.0003)	(0.0003)
Month fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Product fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Number of observations	16,302	14,997	16,302	14,997	16,302	14,997	16,302	14,997	547,007	538,113	547,007	538,113
R-squared	0.932	0.936	0.932	0.936	0.659	0.665	0.660	0.664	0.227	0.226	0.227	0.227

Main Results

Heterogeneous Responses: Trade Intermediaries versus Direct Exporters

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable				Exit				
Cutoff point	Preliminary ITC determination				Final ITC determination			
Trade intermediaries		-0.181**	-0.184**		-0.097**	-0.100**	-0.082**	-0.084**
		(0.021)	(0.022)		(0.031)	(0.031)	(0.036)	(0.036)
Log (export volume)	-0.048**		-0.048**	-0.012		-0.013		-0.009
	(0.005)		(0.005)	(0.007)		(0.007)		(0.008)
Final duties							-0.0008	-0.0009
							(0.001)	(0.001)
Product fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Number of observations	16,580	16,580	16,580	10,446	10,446	10,446	7,290	7,290
Pseudo R2	0.028	0.027	0.032	0.027	0.028	0.028	0.029	0.029

Main Results

Heterogeneous Responses: Single-product versus Multi-product Direct Exporters

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable				**Exit**				
Cutoff point	**Preliminary ITC determination**				**Final ITC determination**			
Single-product firms		-0.910**	-0.852**		0.436**	0.478**	0.546**	0.585**
		(0.074)	(0.074)		(0.068)	(0.069)	(0.084)	(0.086)
Log (export volume)	-0.023**		-0.059**	-0.005*		-0.033**		-0.029*
	(0.002)		(0.006)	(0.002)		(0.009)		(0.014)
Final duties							-0.0001	-0.0004
							(0.001)	(0.001)
Product fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Number of observations	9,063	9,063	9,055	5,411	5,411	5,410	2,615	2,615
Pseudo R2	0.045	0.052	0.046	0.046	0.051	0.049	0.082	0.084

Main Results

Price Response

Figure 5a (Control group 1)

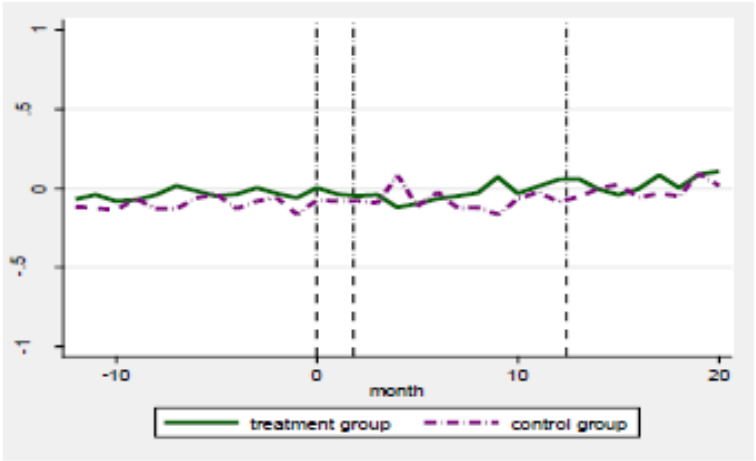


Figure 5b (Control group 1)

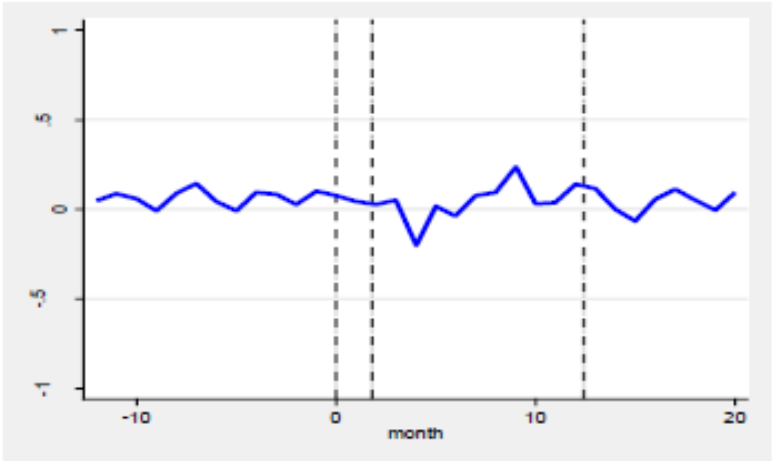


Figure 5c (Control group 2)

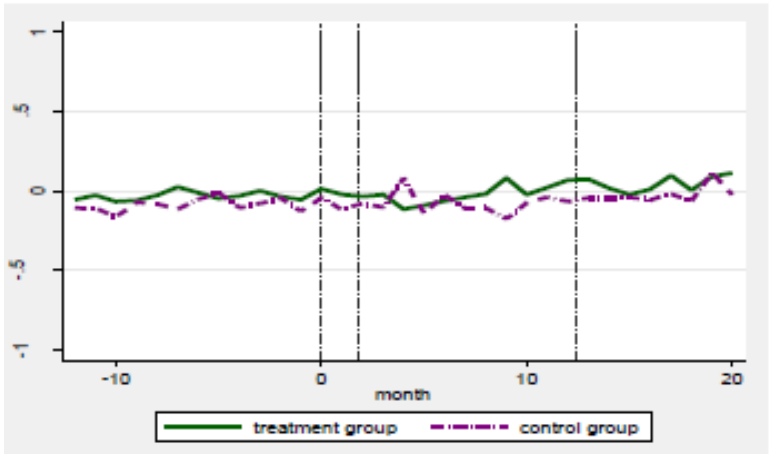
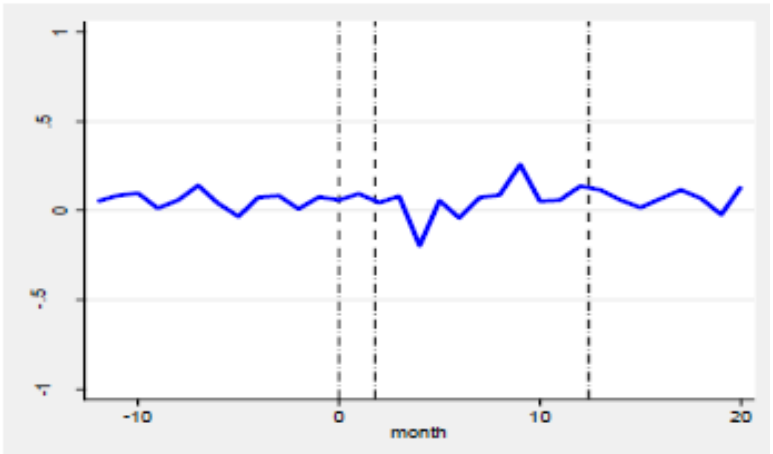


Figure 5d (Control group 2)



Main Results

Price Response

Figure 6a (Control group 1)

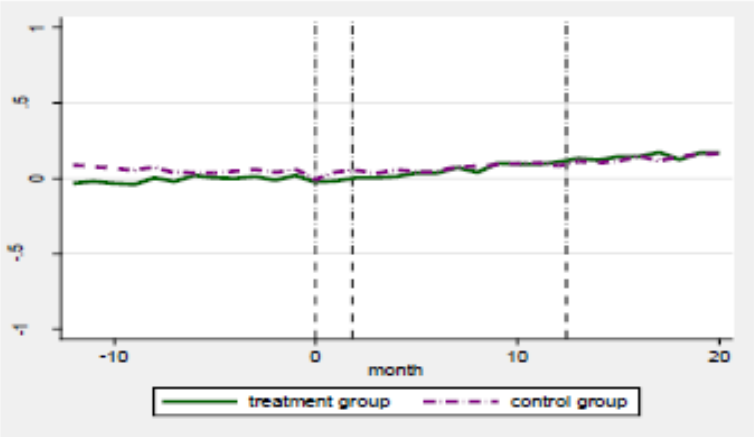


Figure 6b (Control group 1)

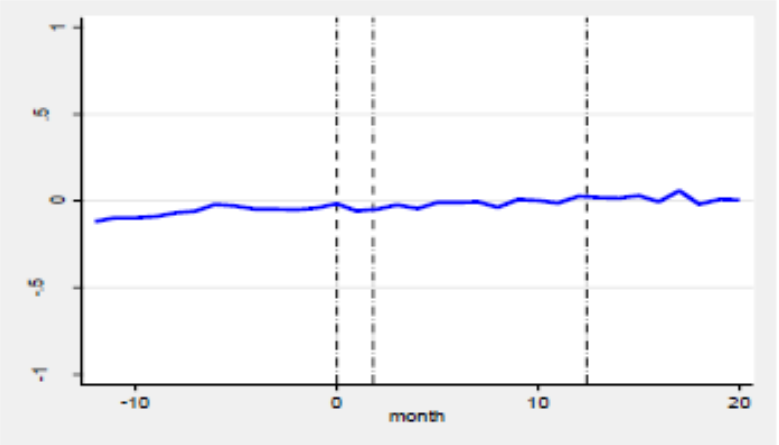


Figure 6c (Control group 2)

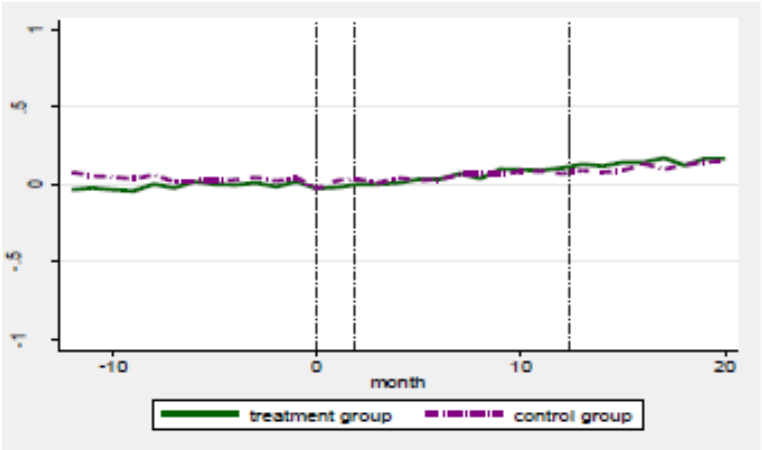
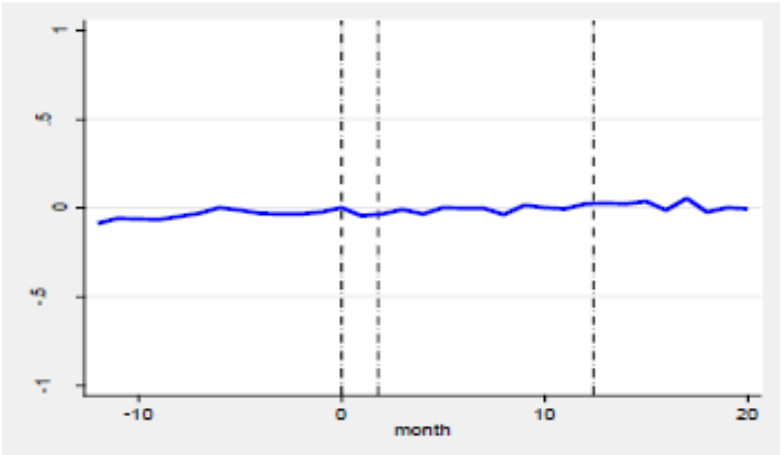


Figure 6d (Control group 2)



Main Results

Price Response

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Specification		**Product Level**				**Surviving Exporters**		
Dependent Variable				**Log (export price)**				
Control Group	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**
Initiation (β1)	0.006	0.021	0.008	0.019	-0.017	-0.017	-0.024	-0.024
	(0.034)	(0.033)	(0.029)	(0.028)	(0.019)	(0.019)	(0.016)	(0.016)
Preliminary ITC determination (β2)	-0.011	0.001			0.011	0.012		
	(0.035)	(0.036)			(0.015)	(0.015)		
Final ITC determination (β3)	0.105	0.119*			0.047	0.049		
	(0.055)	(0.057)			(0.034)	(0.034)		
Preliminary duties(β4)			0.0002	0.0003			0.0002*	0.0002*
			(0.0002)	(0.0002)			(0.0001)	(0.0001)
Final duties(β5)			0.0006**	0.0007**			0.0002	0.0002
			(0.0002)	(0.0003)			(0.0001)	(0.0001)
Month fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Product fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Number of observations	16,294	14,993	16,294	14,993	547,007	538,113	547,007	538,113
R-squared	0.839	0.847	0.839	0.847	0.612	0.613	0.612	0.613

Main Results

Trade-deflection Response

Figure 6a (Control group 1)

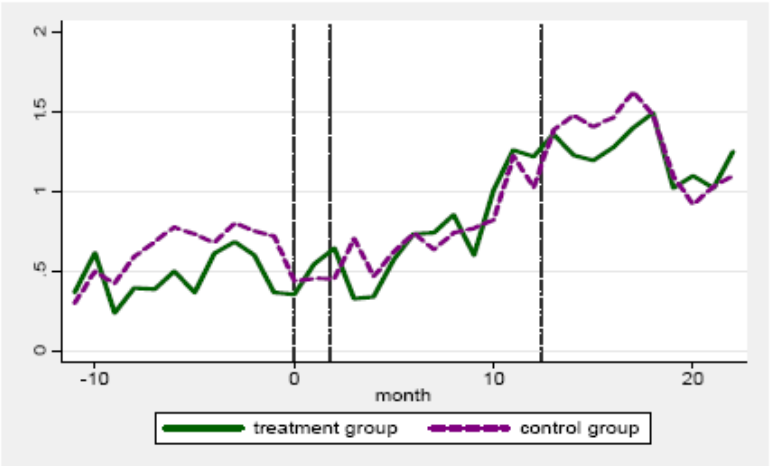


Figure 6b (Control group 1)

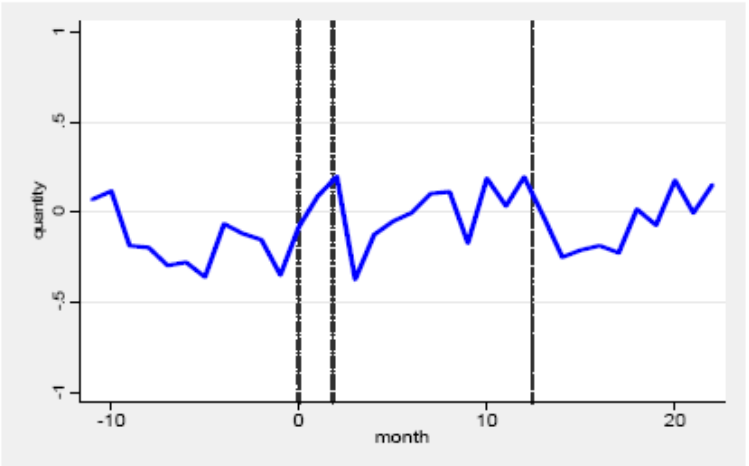


Figure 6c (Control group 2)

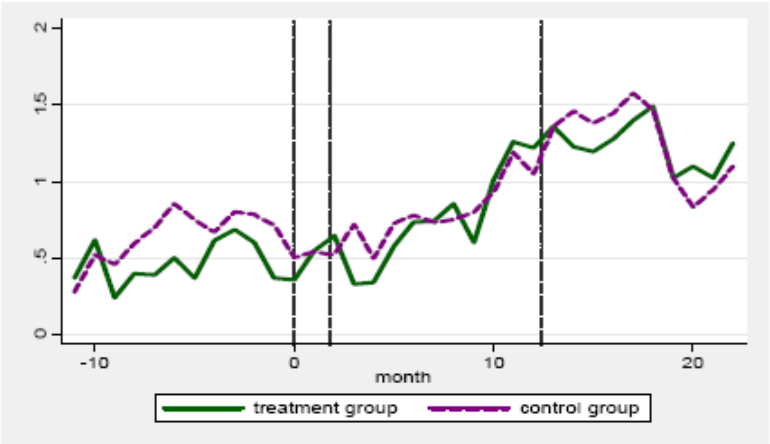
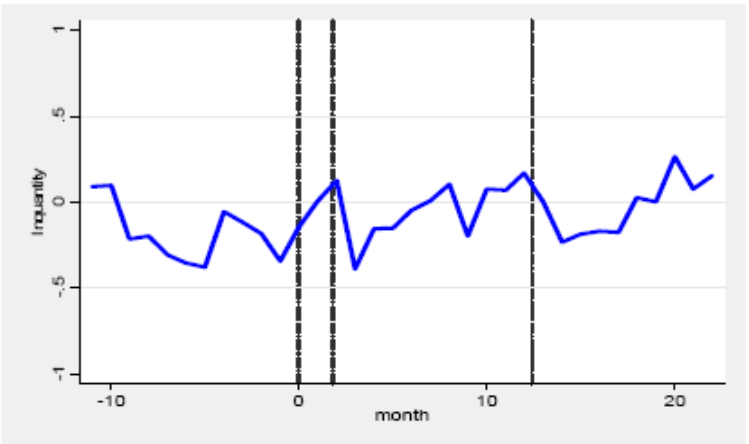


Figure 6d (Control group2)



Main Results

Trade-deflection Response

	(1)	(2)	(3)	(4)
Dependent variable	**Log (export volume)**			
Control group	**1**	**2**	**1**	**2**
Initiation (β1)	-0.156	-0.191	-0.173	-0.211
	(0.137)	(0.140)	(0.128)	(0.132)
Preliminary ITC determination (β2)	-0.019	-0.010		
	(0.117)	(0.116)		
Final ITC determination (β3)	-0.044	-0.003		
	(0.160)	(0.160)		
Preliminary Duties			0.0003	0.0004
			(0.0007)	(0.0007)
Final duties			-0.0007	-0.0005
			(0.001)	(0.001)
Month fixed effects	yes	yes	yes	yes
Product fixed effects	yes	yes	yes	yes
Number of observations	12,484	11,561	12,484	11,561
R-squared	0.850	0.857	0.850	0.857

Robustness checks

- Checks on the DID identification assumption
  - differential time trends before the antidumping investigation (Table A3)
  - inclusion of product-specific time trends (Table A4)
- Measurement errors
  - quarterly instead of monthly data (Table A5)
  - exclusion of outliers – the top and bottom 1% observations (Table A6)
- Inclusion of unsuccessful and withdrawn cases (Table A7)
- Exclusion of antidumping cases concurrently investigated by other countries (Table A8)

Robustness checks

- Exclusion of processing trade (Table A9)
- Exclusion of foreign firms (Table A10)
- Aggregation bias (Table A11)
- Controlling for other trade shocks
  - safeguard measures (Table A12)
  - China's WTO accession (Table A13)
- Different products (import demand elasticity) (Table A14)
- Alternative definition of single-product direct exporters (Table A15)

Discussion

Differences across Products

- Summary of the findings
  - there is significant extensive margin effect, i.e., a sharp decrease in the number of exporters
  - intensive margin effect is not found when a binary variable of treatment status is used, but uncovered when the antidumping duties are used
  - there is little adjustment in F.O.B. export prices when a binary variable of treatment status is used, but a modest increase in prices when the antidumping duties are used
  - no trade deflection

Discussion

Differences across Products

- No trade deflection
  - to Canada or the EU (similar structure to the U.S.)
  - among different types of exporters
  - different quantiles
- Possible explanations
  - the fixed costs of exporting are country-specific (e.g., Chaney, 2008; Arkolakis, 2010)
  - Indeed, we find in our data that Chinese exporters to the U.S. are heavily weighted in the U.S. market (63% of these exporters' world export revenues)

Discussion

Differences across Products

- Inference: products facing different levels of antidumping duties may behave differently
- Further investigation: three quantiles
  - low (i.e., $< 50\%$)
  - medium (i.e., $50 \sim 100\%$)
  - high (i.e., $> 100\%$) antidumping duties.

Discussion

Differences across Products

Group	Extensive	Intensive	Price	Final duties	Dispersion	Import elasticity
Low	0.223	-0.203*	0.240**	20.85	0.27	3.10
Medium	-0.303+	-0.138	-0.048	86.54	0.24	8.98
High	-0.524**	0.020	0.077**	185.18	0.32	4.09

Discussion

Differences across Products: Low Quantile

- Low margins of antidumping duties are quite small: average about 20.85%
  - the affirmative determinations should be viewed as surprises to the producers in these products
    - according to the study by Blonigen and Park (2004), exporters under such a scenario will raise prices over time
  - the small magnitude of duties makes it easy for producers easy raise prices, and by doing so, they can get rid of the duties (and nuisances) in the future years through administrative reviews
  - raising prices is achievable given that these products are relatively inelastic (i.e., the average elasticity of import substitution is 3.1)
- The estimation results suggest that producers in these products increase prices by around 24%

Discussion

Differences across Products: Low Quantile

- Final sales prices of the export products concerned in the U.S. market will generally increase
  - lead to a decline in demand of the products concerned
  - at the status quo, shrinking market demand is likely to lead to a decrease in firm export volume across the board
  - indeed, it is found that the average export volume per exporter decreases by 20%
- Exporters could compensate the loss in demand by the increase in their F.O.B. export prices
  - 24% increase in export prices versus 20% decrease in export volume
  - no significant exit of exporters

Discussion

Differences across Products: High Quantile

- High margins of antidumping duties: average about 185%
- Such huge negative shocks drive weak exporters out of the market
  - especially, with large variations in exporter heterogeneity: i.e., the average coefficient of variation is 0.32
  - indeed, we find that the number of exporters fall by 52%
- The wipeout substantially consolidate the market
  - more productive exporters can not just survive but even grow after the imposition of antidumping duties
  - indeed, we find that surviving exporters modestly increase their F.O.B. prices and maintain their export volume by grabbing the market left the exiting firms

Discussion

Differences across Products: Medium Quantile

- Blow is relatively large but not devastating: average about 86%
  - a number of exporters exit the market: fall by 30%
- The post market remains competitive
  - especially in such elastic markets: the average elasticity of import substitution is 8.98
  - surviving exporters may lower the prices to increase the competitiveness
  - and their export volume also fall

Discussion

Differences across Firms

- Summary of the findings
  - less productive firms more likely to exit U.S. market
  - direct exporters more likely to exit U.S. market than are trade intermediaries
  - multi-product direct exporters are more likely to exit the U.S. market than are single-product direct exporters upon issuance of an affirmative preliminary ITC determination, but the opposite holds following an affirmative final ITC determination

Discussion

Differences across Firms: Productivity Effect

- Generally in line with the firm heterogeneity literature
  - in the case of a per-period fixed cost of exporting (Melitz, 2003), the negative shock causes a fall in export revenue, as a result of which some less productive ones are unable to recover the per-period fixed cost of exporting
  - in the world without fixed cost of exporting (Melitz and Ottaviano, 2008), the negative shock causes a decrease in exporters' markups, as a result of which some less productive ones incur losses

Discussion

Differences across Firms: Trade Intermediaries versus Direct Exporters

- Stylized facts
  - trade intermediaries are more multi-market for the concerned products, and sell more products in the US
  - 68% of trade intermediaries sell the affected products to countries other than the U.S., versus 64% for direct exporters
  - 91% of trade intermediaries sell products other than the affected products in the U.S. market, versus 81% for direct exporters
  - trade intermediaries could tap into their reserves in other products and other markets to cross-subsidize their affected products in the U.S., which allows them to better weather the storm brought by the antidumping investigations

Discussion

Differences across Firms: Single- versus Multi-product Direct Exporters

- Overall, single-product direct exporters are more likely to exit the U.S. market
- This can be explained by the greater capabilities of multi-product direct exporters to cross-subsidize the affected products than their single-product counterparts, which is in line with our aforementioned explanation on the differential likelihood of exiting between trade intermediaries and direct exporters

Discussion

Differences across Firms: Single- versus Multi-product Direct Exporters

- Difference between preliminary and final determination: uncertainty
- A simple model
  - two periods: 1 for preliminary and 2 for final determination
  - profits in each period: π
  - duties paid: d
  - probability of affirmative final determination at period 1: p (28 out of 34 in our sample)

Discussion

Differences across Firms: Single- versus Multi-product Direct Exporters

- Choices
  - period 2: if $\pi > d$, stay; if $\pi < d$, exit
  - period 1: if stay, expected payoff is $\pi - pd + \delta(\pi - pd) = (1+\delta)(\pi - pd)$; if exit, 0
    $\Rightarrow$ if $\pi > pd$, stay; if $\pi < pd$, exit
- Equilibrium
  - if $\pi > d$, stay after the preliminary and final determinations
  - if $d > \pi > pd$, stay after the preliminary but exit after the final determination
  - if $pd > \pi$, exit after the preliminary

Discussion

Differences across Firms: Single- versus Multi-product Direct Exporters

- Our findings imply
  - single-product direct exporters relatively concentrate in the second group
  - multi-product direct exporters relatively separate in the first and third groups
  - multi-product direct exporters are more heterogeneous than single-product direct exporters
- Dispersion in the data
  - single-product direct exporter: 0.23
  - multi-product direct exporter: 0.32

Conclusion and Implications

- Our results suggest that U.S. antidumping investigations wipe out weaker Chinese exporters and leave behind more productive exporters often with multi-market and multi-product coverage
- In many product categories (especially those facing high margins of antidumping duties), the wipeout results in a substantial consolidation of Chinese exporters, under which the surviving, stronger Chinese exporters can even raise their F.O.B. export prices and at the same time grab the market share left by the weaker ones

Conclusion and Implications

- Existing studies (e.g., Pierce, 2011) on the impacts of U.S. antidumping measures on its domestic, protected firms have shown that while protected firms are able to increase their prices, their physical productivity actually falls
- And the protection through temporary imposition of antidumping duties is more tilted toward the weaker domestic producers, thereby slowing down the resource reallocation towards more productive ones.

Conclusion and Implications

- Taken together, U.S. antidumping investigations definitely bring temporary benefits to domestic producers, who expand their market share, as Chinese imports substantially fall and numerous Chinese exporters exit the market
- In the long-run (especially when the antidumping duties are lifted), however, antidumping investigations may spell more troubles for U.S. domestic producers in their competition with the Chinese exporters, as the former become less productive on average whereas the latter experience just the opposite