

Negative Trade Diversion: A firm level analysis

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How do RTAs affect non-members' exports?

- By providing preferential treatment to member states (lower tariffs), regional trade agreements (RTAs) discriminate against non-members and reduce their exports (trade diversion).
- Firms' decision to serve new foreign markets depends on their prior export experience → They are more likely to export to new markets that are similar to their previous export destinations (extended gravity)
- As RTAs become “deeper”, they increasingly address behind-the-border policy areas such as domestic regulations, making member countries more “similar” in terms of regulatory environment

 Net effect is ambiguous

This paper

- We investigate the impact of RTAs on non-member firms and the mechanism through which deep agreements affect (negative) trade diversion.
- Using Costa Rican firm-level data, we test whether a firm is more likely to export (or start exporting) to a certain destination if it previously exported to the destination's RTA partner.
 - Is this effect larger for deeper RTAs?
 - Is this effect larger for regulation-intensive products?

Related literature

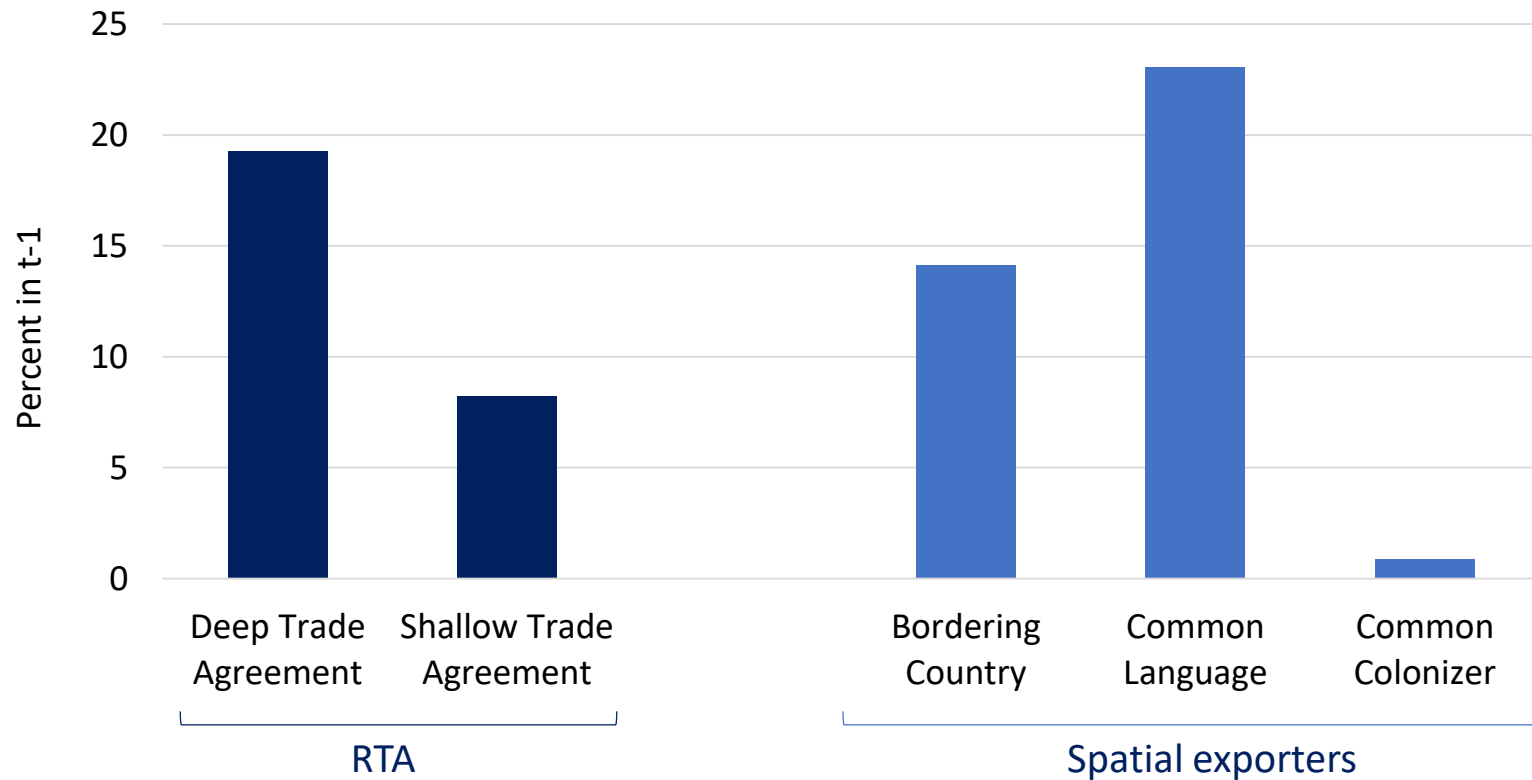
- Non-member impact of regional trade agreements
 - Romalis (2007); Freund (2010); Fugazza and Nicita (2013); Dai, Yotov, and Zylkin (2014); Limao (2016); Conconi et al. (2018)
 - Baldwin (2014); Mattoo, Mulabdic, and Ruta (2017)
- Extended gravity and spatial/sequential exporters
 - Albornoz et al. (2012); Chaney (2014); Morales, Sheu, and Zahler (2019)
 - Evenett and Venables (2002); Lawless (2009, 2013); Defever, Heid, and Larch (2015); Meinen (2015)
- Regulations and standards
 - Baldwin (2000); *Chen and Mattoo (2008)*; *Disdier, Fontagné, and Cadot (2015)*; Fontagné, Orefice, Piermartini, and Rocha (2015); Fernandes, Ferro, and Wilson (2017); *Fontagné and Orefice (2018)*

Data

- World Bank Exporter Dynamics Database
 - Panel of firm-level data on export destination, product (HS6), value and quantity
 - Costa Rica: 1998-2012, 12918 firms exporting to 115 destination countries*
- World Bank Content of Deep Trade Agreements Database*
 - Content and coverage of 279 RTAs, signed by 180 countries (1957-2015)
 - 52 provisions (coverage and legal enforceability): MFN/preferential, SPS/TBT
- WTO Specific Trade Concerns (STC) Database*
 - Revealed measure of restrictiveness of product standards (HS4)
 - Record of concerns raised in WTO's SPS/TBT committee, providing WTO members with a forum to discuss issues related to SPS/TBT measures imposed by other members
 - Reflects which products face sizable trade barriers, as perceived by exporters

Descriptive evidence

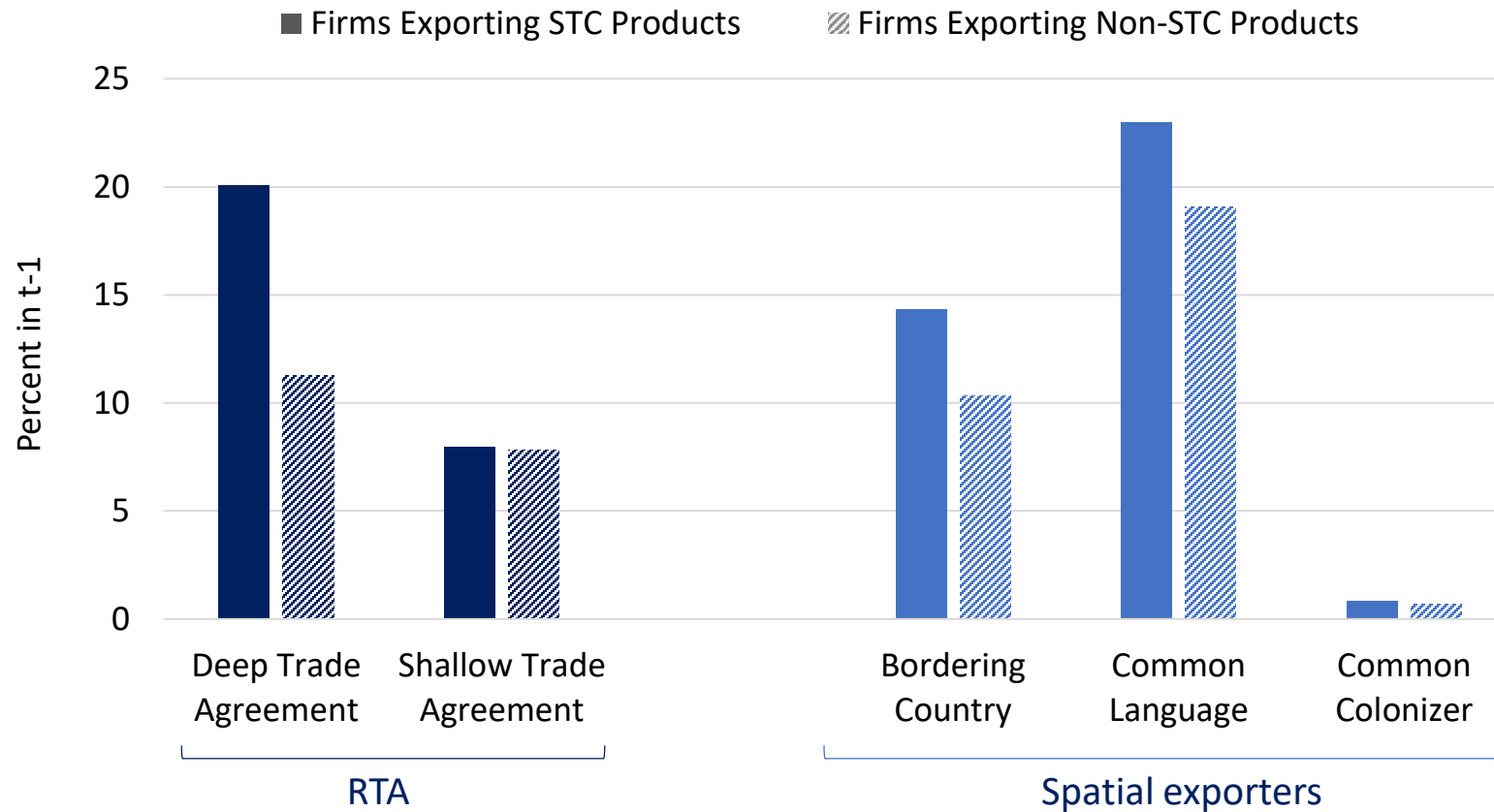
Firms that start exporting to new destinations (in year t) are likely to have exported to “similar” markets (in year $t-1$)...



Note: Deep (Shallow) Trade Agreements are agreements with the number of provisions higher (lower or equal) than the median agreement.

Descriptive evidence

... especially for firms exporting regulation-intensive products



Note: Deep (Shallow) Trade Agreements are agreements with the number of provisions higher (lower or equal) than the median agreement.

Firm-level analysis: Empirical specification

- Are firms more likely to export to new destinations if they previously exported to a country that has/signs an RTA with the destination country?

$$y_{ijt} = \beta_1 * \text{Exp Other RTA}_{ij,t-1} + \gamma * \mathbf{X}_{ij,t-1} + \alpha_{ij} + \delta_{it} + \theta_{jt} + \epsilon_{ijt}$$

- y_{ijt} : Export participation or entry dummy (=1 if firm i exports or starts exporting to country j in year t); *
- $\text{Exp Other RTA}_{ij,t-1} = \max_{k \neq j} (\text{Exporting Dummy}_{ik,t-1} \times \text{RTA}_{jkt})$: Dummy variable =1 if firm i exported in $t-1$ to a country that has an RTA with country j ;
- $\mathbf{X}_{ij,t}$: Spatial exporter controls (dummy=1 if firm i exported in $t-1$ to a country that shares a border, language, colonial history with country j);
- $\alpha_{ij}, \delta_{it}, \theta_{jt}$: Firm-destination, firm-year and destination-year fixed effects

Firm-level analysis: Empirical specification

- Is the effect stronger for deep trade agreements?

$$y_{ijt} = \beta_1 * \text{Exp Other RTA}_{ij,t-1} + \beta_2 * \text{Exp Other Depth}_{ij,t-1} + \gamma * \mathbf{X}_{ij,t-1} + \alpha_{ij} + \delta_{it} + \theta_{jt} + \epsilon_{ijt}$$

$\text{Exp Other Depth}_{ij,t-1} = \max_{k \neq j} (\text{Exporting Dummy}_{ik,t-1} \times \text{Depth}_{jkt})$: Depth of the *deepest* RTA that country *j* had with country *k* to which firm *i* exported to in *t-1*

Depth_{jkt} {

- Aggregate depth: Number of strictly enforceable provisions
- MFN/preferential depth: Number of strictly enforceable MFN (preferential) provisions*
- SPS/TBT provisions: Dummy variable =1 if RTA includes SPS or TBT provisions

Firm-level analysis: Results (Aggregate depth)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Export participation				Export entry			
Exp Other ... (t-1)								
... RTA	0.030*** (0.001)	0.022*** (0.001)	0.015*** (0.000)	0.009*** (0.001)	0.013*** (0.000)	0.009*** (0.000)	0.007*** (0.000)	0.005*** (0.000)
... Depth		0.020*** (0.002)		0.015*** (0.002)		0.008*** (0.001)		0.006*** (0.001)
... Border			0.060*** (0.002)	0.059*** (0.002)			0.022*** (0.001)	0.021*** (0.001)
... Language			0.006*** (0.000)	0.007*** (0.000)			0.004*** (0.000)	0.004*** (0.000)
... Colony			-0.017*** (0.001)	-0.016*** (0.001)			-0.006*** (0.001)	-0.006*** (0.001)
Observations	20,797,980	20,797,980	20,797,980	20,797,980	20,694,604	20,694,604	20,694,604	20,694,604
R-squared	0.462	0.463	0.466	0.466	0.178	0.178	0.179	0.179
Firm-year FE	YES	YES	YES	YES	YES	YES	YES	YES
Dest-year FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm-dest FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: Robust standard errors, clustered at the firm level, are in parenthesis. The dependent variable y_{ijt} is a dummy variable equal to 1 if firm i exported (or started exporting) to country j in year t . *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Firm-level analysis: Results (Aggregate depth)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Export participation				Export entry			
Exp Other ... (t-1)								
... RTA	0.030*** (0.001)	0.022*** (0.001)	0.015*** (0.000)	0.009*** (0.001)	0.013*** (0.000)	0.009*** (0.000)	0.007*** (0.000)	0.005*** (0.000)
... Depth		0.020*** (0.002)		0.015*** (0.002)		0.008*** (0.001)		0.006*** (0.001)
... Border			0.060*** (0.002)	0.059*** (0.002)			0.022*** (0.001)	0.021*** (0.001)
... Language			0.006*** (0.000)	0.007*** (0.000)			0.004*** (0.000)	0.004*** (0.000)
... Colony			-0.017*** (0.001)	-0.016*** (0.001)			-0.006*** (0.001)	-0.006*** (0.001)
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Firm-year FE	YES	YES	YES	YES	YES	YES	YES	YES
Dest-year FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm-dest FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: Robust standard errors, clustered at the firm level, are in parenthesis. The dependent variable y_{ijt} is a dummy variable equal to 1 if firm i exported (or started exporting) to country j in year t . *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Firm-level analysis: Results (Aggregate depth)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Export participation				Export entry			
Exp Other ... (t-1)								
... RTA	0.030*** (0.001)	0.022*** (0.001)	0.015*** (0.000)	0.009*** (0.001)	0.013*** (0.000)	0.009*** (0.000)	0.007*** (0.000)	0.005*** (0.000)
... Depth		0.020*** (0.002)		0.015*** (0.002)		0.008*** (0.001)		0.006*** (0.001)
... Border			0.060*** (0.002)	0.059*** (0.002)			0.022*** (0.001)	0.021*** (0.001)
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Firm-year FE	YES	YES	YES	YES	YES	YES	YES	YES
Dest-year FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm-dest FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: Robust standard errors, clustered at the firm level, are in parenthesis. The dependent variable y_{ijt} is a dummy variable equal to 1 if firm i exported (or started exporting) to country j in year t . *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Columns (7)-(8): A firm is more likely to enter a new destination if it previously exported to the destination's RTA partner (0.7 pp increase in probability), particularly so if the RTA is deep (1.1 pp increase for deep RTA).

Firm-level analysis: Results (Contents of depth)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Export participation				Export entry			
Exp Other ... (t-1)								
... RTA	0.025*** (0.001)	0.022*** (0.001)	0.010*** (0.001)	0.009*** (0.001)	0.011*** (0.001)	0.010*** (0.000)	0.006*** (0.000)	0.005*** (0.000)
... Depth MFN	0.055*** (0.003)		0.036*** (0.002)		0.021*** (0.001)		0.015*** (0.001)	
... Depth Pref	-0.036*** (0.002)		-0.021*** (0.002)		-0.014*** (0.001)		-0.009*** (0.001)	
... SPSorTBT		0.013*** (0.001)		0.011*** (0.001)		0.005*** (0.000)		0.004*** (0.000)
... Border			0.058*** (0.002)	0.059*** (0.002)			0.021*** (0.001)	0.021*** (0.001)
... Language			0.007*** (0.000)	0.006*** (0.000)			0.004*** (0.000)	0.004*** (0.000)
... Colony			-0.016*** (0.001)	-0.017*** (0.001)			-0.005*** (0.001)	-0.006*** (0.001)
Observations	20,797,980	20,797,980	20,797,980	20,797,980	20,694,604	20,694,604	20,694,604	20,694,604
R-squared	0.463	0.463	0.466	0.466	0.178	0.178	0.179	0.179
Firm-year FE	YES	YES	YES	YES	YES	YES	YES	YES
Dest-year FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm-dest FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: Robust standard errors, clustered at the firm level, are in parentheses. The dependent variable y_{ijt} is a dummy variable equal to 1 if firm i exported (or started exporting) to country j in year t . *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Firm-level analysis: Results (Contents of depth)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Export participation				Export entry			
Exp Other ... (t-1)								
... RTA	0.025*** (0.001)	0.022*** (0.001)	0.010*** (0.001)	0.009*** (0.001)	0.011*** (0.001)	0.010*** (0.000)	0.006*** (0.000)	0.005*** (0.000)
... Depth MFN	0.055*** (0.003)		0.036*** (0.002)		0.021*** (0.001)		0.015*** (0.001)	
... Depth Pref	-0.036*** (0.002)		-0.021*** (0.002)		-0.014*** (0.001)		-0.009*** (0.001)	
... SPSorTBT		0.013*** (0.001)		0.011*** (0.001)		0.005*** (0.000)		0.004*** (0.000)
... Border			0.058*** (0.002)	0.059*** (0.002)			0.021*** (0.001)	0.021*** (0.001)
... Language			0.007*** (0.000)	0.006*** (0.000)			0.004*** (0.000)	0.004*** (0.000)
... Colony			-0.016*** (0.001)	-0.017*** (0.001)			-0.005*** (0.001)	-0.006*** (0.001)
Observations	20,797,980	20,797,980	20,797,980	20,797,980	20,694,604	20,694,604	20,694,604	20,694,604
R-squared	0.463	0.463	0.466	0.466	0.178	0.178	0.179	0.179
Firm-year FE	YES	YES	YES	YES	YES	YES	YES	YES
Dest-year FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm-dest FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: Robust standard errors, clustered at the firm level, are in parentheses. The dependent variable y_{ijt} is a dummy variable equal to 1 if firm i exported (or started exporting) to country j in year t . *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Regulation-intensive products: Empirical specification

- Is the effect stronger for products that are sensitive to regulations?

$$y_{ijpt} = \beta_1 * \text{Exp Other RTA}_{ijp,t-1} + \beta_2 * (\text{Exp Other RTA}_{ijp,t-1} * \text{Reg}_p) + \beta_3 * \text{Exp Other Depth}_{ijp,t-1} + \beta_4 * (\text{Exp Other Depth}_{ijp,t-1} * \text{Reg}_p) + \gamma * \mathbf{X}_{ijp,t-1} + \alpha_{ijp} + \delta_{ipt} + \theta_{jpt} + \epsilon_{ijpt}$$

- y_{ijpt} : export participation/entry dummy (=1 if firm i exports or starts exporting product p to country j in year t);
- $\text{Exp Other RTA}_{ijp,t-1} = \max_{k \neq j} (\text{Exporting Dummy}_{ik,t-1} \times \text{RTA}_{jkt})$: dummy variable =1 if firm i exported product p in $t-1$ to a country that has an RTA with country j ;
- Reg_p : dummy variable =1 if product p is regulation-sensitive (i.e. concern has been raised in WTO STC)
- $\mathbf{X}_{ijp,t-1}$: Spatial exporter controls (dummy=1 if firm i exported product p in $t-1$ to a country that shares a border, language, colonial history with country j);
- $\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$: Firm-product-destination, firm-product-year and product-destination-year fixed effects

Regulation-intensive products: Aggregate depth

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Export participation				Export entry			
Exp Other ... (t-1)								
... RTA	0.017*** (0.001)	0.018*** (0.001)	0.005*** (0.001)	0.007*** (0.001)	0.008*** (0.000)	0.008*** (0.000)	0.003*** (0.000)	0.004*** (0.000)
... RTA x STC	0.000 (0.001)	-0.004*** (0.001)	0.001* (0.001)	-0.003*** (0.001)	-0.000 (0.000)	-0.002*** (0.000)	0.000 (0.000)	-0.001*** (0.000)
... Depth		-0.002* (0.001)		-0.004*** (0.001)		-0.001 (0.001)		-0.001** (0.001)
... Depth x STC		0.012*** (0.002)		0.011*** (0.001)		0.005*** (0.001)		0.004*** (0.001)
... Border			0.045*** (0.001)	0.045*** (0.001)			0.017*** (0.000)	0.016*** (0.000)
... Language			0.003*** (0.000)	0.003*** (0.000)			0.002*** (0.000)	0.002*** (0.000)
... Colony			-0.013*** (0.001)	-0.013*** (0.001)			-0.003*** (0.000)	-0.003*** (0.000)
Observations	164,595,130	164,595,130	164,595,130	164,595,130	164,298,452	164,298,452	164,298,452	164,298,452
R-squared	0.338	0.338	0.340	0.340	0.156	0.156	0.156	0.156
FEs ($\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$)	YES	YES	YES	YES	YES	YES	YES	YES

Note: Robust standard errors, clustered at the firm-product level, are in parentheses. The dependent variable y_{ijpt} is a dummy variable equal to 1 if firm i exported (or started exporting) product p to country j in year t . STC=1 if a concern on product p has been raised in the WTO Specific Trade Concerns (STC) Database. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Regulation-intensive products: Aggregate depth

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Export participation				Export entry			
Exp Other ... (t-1)								
... RTA	0.017*** (0.001)	0.018*** (0.001)	0.005*** (0.001)	0.007*** (0.001)	0.008*** (0.000)	0.008*** (0.000)	0.003*** (0.000)	0.004*** (0.000)
... RTA x STC	0.000 (0.001)	-0.004*** (0.001)	0.001* (0.001)	-0.003*** (0.001)	-0.000 (0.000)	-0.002*** (0.000)	0.000 (0.000)	-0.001*** (0.000)
... Depth		-0.002* (0.001)		-0.004*** (0.001)		-0.001 (0.001)		-0.001** (0.001)
... Depth x STC		0.012*** (0.002)		0.011*** (0.001)		0.005*** (0.001)		0.004*** (0.001)
... Border			0.045*** (0.001)	0.045*** (0.001)			0.017*** (0.000)	0.016*** (0.000)
... Language			0.003*** (0.000)	0.003*** (0.000)			0.002*** (0.000)	0.002*** (0.000)
... Colony			-0.013*** (0.001)	-0.013*** (0.001)			-0.003*** (0.000)	-0.003*** (0.000)
Observations	164,595,130	164,595,130	164,595,130	164,595,130	164,298,452	164,298,452	164,298,452	164,298,452
R-squared	0.338	0.338	0.340	0.340	0.156	0.156	0.156	0.156
FEs ($\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$)	YES	YES	YES	YES	YES	YES	YES	YES

Note: Robust standard errors, clustered at the firm-product level, are in parentheses. The dependent variable y_{ijpt} is a dummy variable equal to 1 if firm i exported (or started exporting) product p to country j in year t . STC=1 if a concern on product p has been raised in the WTO Specific Trade Concerns (STC) Database. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Regulation-intensive products: Contents of depth

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Export participation				Export entry			
Exp Other ... $(t-1)$								
... RTA	0.018*** (0.001)	0.017*** (0.001)	0.005*** (0.001)	0.004*** (0.001)	0.009*** (0.001)	0.008*** (0.000)	0.004*** (0.000)	0.003*** (0.000)
... RTA x STC	-0.002** (0.001)	-0.003*** (0.001)	0.000 (0.001)	-0.001 (0.001)	-0.001** (0.001)	-0.001*** (0.000)	-0.000 (0.001)	-0.001 (0.000)
... Depth MFN	0.025*** (0.002)		0.008*** (0.002)		0.011*** (0.001)		0.006*** (0.001)	
... Depth Pref	-0.021*** (0.002)		-0.005*** (0.002)		-0.010*** (0.001)		-0.005*** (0.001)	
... Depth MFN x STC	0.014*** (0.003)		0.012*** (0.003)		0.005*** (0.001)		0.005*** (0.001)	
... Depth Pref x STC	-0.008*** (0.002)		-0.008*** (0.002)		-0.003** (0.001)		-0.003** (0.001)	
... SPSorTBT		0.001 (0.001)		0.001* (0.001)		-0.000 (0.000)		0.000 (0.000)
... SPSorTBT x STC		0.005*** (0.001)		0.003*** (0.001)		0.002*** (0.001)		0.001*** (0.001)
Observations	164,595,130	164,595,130	164,595,130	164,595,130	164,298,452	164,298,452	164,298,452	164,298,452
R-squared	0.338	0.338	0.340	0.340	0.156	0.156	0.156	0.156
FEs ($\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$)	YES	YES	YES	YES	YES	YES	YES	YES
Spatial controls	NO	NO	YES	YES	NO	NO	YES	YES

Note: Robust standard errors, clustered at the firm-product level, are in parentheses. The dependent variable y_{ijpt} is a dummy variable equal to 1 if firm i exported (or started exporting) product p to country j in year t . STC=1 if a concern on product p has been raised in the WTO Specific Trade Concerns (STC) Database. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Regulation-intensive products: Contents of depth

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Export participation				Export entry			
Exp Other ... (t-1)								
... RTA	0.018*** (0.001)	0.017*** (0.001)	0.005*** (0.001)	0.004*** (0.001)	0.009*** (0.001)	0.008*** (0.000)	0.004*** (0.000)	0.003*** (0.000)
... RTA x STC	-0.002** (0.001)	-0.003*** (0.001)	0.000 (0.001)	-0.001 (0.001)	-0.001** (0.001)	-0.001*** (0.000)	-0.000 (0.001)	-0.001 (0.000)
... Depth MFN	0.025*** (0.002)		0.008*** (0.002)		0.011*** (0.001)		0.006*** (0.001)	
... Depth Pref	-0.021*** (0.002)		-0.005*** (0.002)		-0.010*** (0.001)		-0.005*** (0.001)	
... Depth MFN x STC	0.014*** (0.003)		0.012*** (0.003)		0.005*** (0.001)		0.005*** (0.001)	
... Depth Pref x STC	-0.008*** (0.002)		-0.008*** (0.002)		-0.003** (0.001)		-0.003** (0.001)	
... SPSorTBT		0.001 (0.001)		0.001* (0.001)		-0.000 (0.000)		0.000 (0.000)
... SPSorTBT x STC		0.005*** (0.001)		0.003*** (0.001)		0.002*** (0.001)		0.001*** (0.001)
Observations	164,595,130	164,595,130	164,595,130	164,595,130	164,298,452	164,298,452	164,298,452	164,298,452
R-squared	0.338	0.338	0.340	0.340	0.156	0.156	0.156	0.156
FEs ($\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$)	YES	YES	YES	YES	YES	YES	YES	YES
Spatial controls	NO	NO	YES	YES	NO	NO	YES	YES

Note: Robust standard errors, clustered at the firm-product level, are in parentheses. The dependent variable y_{ijpt} is a dummy variable equal to 1 if firm i exported (or started exporting) product p to country j in year t . STC=1 if a concern on product p has been raised in the WTO Specific Trade Concerns (STC) Database. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Robustness analysis

- Alternative measure of regulation intensity
 - Continuous measure of STC: Number of concerns raised*
 - USA Food and Drug Administration (FDA) : List of “flagged” products that require prior notice to the FDA before being imported into the US*
- Alternative measure of depth
 - Mario Larch’s Regional Trade Agreements Database: Partial scope agreements, free trade agreements, and customs unions*
- Full set of fixed effects
 - Include destination-firm-year fixed effects*

Conclusions

- RTAs have positive spillover effects (→ negative trade diversion).
 - Firms are more likely to export and start exporting to new destinations if they previously exported to another country that has/signs an RTA with the new destination
 - Effects stronger for agreements that are deeper (more legally enforceable provisions), have high MFN-ness (more non-discriminatory provisions), or include SPS/TBT provisions
 - Effects stronger for products that are sensitive to regulations
- Deep trade agreements can act as public goods and generate negative trade diversion, through the positive externality effects driven by non-discriminatory provisions and regulatory convergence

Appendix

Descriptive statistics: Firm level

	count	mean	std. dev.	min.	max.
Unconditional (N=22,283,550)					
Export Participation Dummy	22,283,550	0.00506	0.0710	0	1
Export Entry Dummy	20,694,907	0.00204	0.0452	0	1
Conditional on exporting=1 (N=112,835)					
Export Entry Dummy	42,311	1	0	1	1
Exp Other ... (t-1)					
... RTA	106,407	0.572	0.495	0	1
... RTA x Depth	106,407	0.284	0.342	0	1
... RTA x Depth MFN	106,407	0.404	0.429	0	1
... RTA x Depth Pref.	106,407	0.466	0.459	0	1
... RTA x SPSorTBT	106,407	0.434	0.496	0	1
... Border	106,407	0.399	0.490	0	1
... Language	106,407	0.521	0.500	0	1
... Colony	106,407	0.0156	0.124	0	1

Descriptive statistics: Firm-product level

	count	mean	std. dev.	min.	max.
Unconditional (N=176,458,875)					
Export Participation Dummy	176,458,875	0.00189	0.0434	0	1
Export Entry Dummy	164,398,830	0.00111	0.0333	0	1
Conditional on exporting=1 (N=333,318)					
Export Entry Dummy	182,967	1	0	1	1
STC	333,318	0.783	0.412	0	1
Exp Other ... (t-1)					
... RTA	318,249	0.364	0.481	0	1
... RTA x STC	318,249	0.292	0.455	0	1
... RTA x Depth	318,249	0.160	0.273	0	1
... RTA x Depth x STC	318,249	0.134	0.263	0	1
... RTA x Depth MFN	318,249	0.244	0.382	0	1
... RTA x Depth Pref.	318,249	0.286	0.422	0	1
... RTA x Depth MFN x STC	318,249	0.200	0.360	0	1
... RTA x Depth Pref. x STC	318,249	0.233	0.398	0	1
... RTA x SPSorTBT	318,249	0.262	0.440	0	1
... RTA x SPSorTBT x STC	318,249	0.214	0.410	0	1
... Border	318,249	0.258	0.437	0	1
... Language	318,249	0.347	0.476	0	1
... Colony	318,249	0.00689	0.0827	0	1

Costa Rican exports

Top exported products
(export value)

HS2	Value (USD)	Share (%)	Product Description
85	1,236.6	16.1	Electrical machinery and equipment and parts thereof; sound recorders and reproducers
08	1,109.1	14.5	Edible fruit and nuts; peel of citrus fruit or melons.
84	1,062.1	13.9	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof
90	680.0	8.9	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus
62	296.7	3.9	Articles of apparel and clothing accessories, not knitted or crocheted.
09	281.6	3.7	Coffee, tea, mate and spices.
30	230.4	3.0	Pharmaceutical products.
21	213.8	2.8	Miscellaneous edible preparations.
20	199.3	2.6	Preparations of vegetables, fruit, nuts or other parts of plants.
39	182.6	2.4	Plastics and articles thereof
06	161.2	2.1	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage.
40	151.5	2.0	Rubber and articles thereof
61	140.1	1.8	Articles of apparel and clothing accessories, knitted or crocheted.
48	118.4	1.5	Paper and paperboard; articles of paper pulp, of paper or of paperboard.
15	110.3	1.4	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes.

Top exported products
(exporting firms)

HS2	# of firms	Share (%)	Product Description
39	1409	7.6	Plastics and articles thereof
84	1273	6.9	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof
85	1119	6.0	Electrical machinery and equipment and parts thereof; sound recorders and reproducers
08	1037	5.6	Edible fruit and nuts; peel of citrus fruit or melons.
06	792	4.3	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage.
49	768	4.1	Printed books, newspapers, pictures and other products of the printing industry; manuscripts, typescripts and plans.
48	757	4.1	Paper and paperboard; articles of paper pulp, of paper or of paperboard.
73	677	3.7	Articles of iron or steel.
94	575	3.1	Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting fittings
90	542	2.9	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus
38	484	2.6	Miscellaneous chemical products.
44	360	1.9	Wood and articles of wood; wood charcoal,
07	337	1.8	Edible vegetables and certain roots and tubers.
20	329	1.8	Preparations of vegetables, fruit, nuts or other parts of plants.
40	306	1.7	Rubber and articles thereof

# of Destination	Avrg	3.3
	Median	1
	Max	60
# of HS4 products	Avrg	7.9
	Median	2
	Max	502

Costa Rican exporters and turnover

Year	Firms		Firm-destinations		Firm-product-destinations	
	Number	Share of new entrants (%)	Number	Share of new entrants (%)	Number	Share of new entrants (%)
1998	2,240		6,428		15,069	
1999	2,290	37	6,222	40	15,453	56
2000	2,236	27	6,313	33	15,709	50
2001	2,406	30	6,503	34	16,537	48
2002	2,380	28	6,374	30	16,655	45
2003	2,468	28	6,649	31	17,695	48
2004	2,563	26	6,850	30	18,634	44
2005	2,662	25	7,254	28	19,649	43
2006	2,737	23	7,586	27	20,674	41
2007	2,752	19	7,936	25	21,438	40
2008	2,662	17	7,974	25	23,044	42
2009	2,624	18	7,931	27	26,393	49
2010	3,560	38	9,424	35	33,158	57
2011	3,629	34	9,629	32	36,012	53
2012	3,691	33	9,762	30	37,198	53

WTO Specific Trade Concerns (STC) Database

- Concerns raised between 1995-2011
- SPS: 312 concerns, 124 HS4 products (across 31 HS2-industries)
- TBT: 317 concerns, 863 HS4 products (across 82 HS2-industries)
- Product concerned (HS-4), type of concern, and objective of the measure
- Fontagné, Orefice, Piermartini, and Rocha. 2015. “Product Standards and Margins of Trade: Firm-Level Evidence.” *JIE*.
- Fontagné and Orefice. 2018. “Let’s Try next Door: Technical Barriers to Trade and Multi-Destination Firms.” *EER*.

STC TBT: Most frequent products

HS2	Freq.	Product Description
15	618	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes.
8	422	Edible fruit and nuts; peel of citrus fruit or melons.
7	421	Edible vegetables and certain roots and tubers.
12	411	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder.
2	339	Meat and edible meat offal.
22	337	Beverages, spirits and vinegar.
4	313	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included.
9	292	Coffee, tea, mate and spices.
85	269	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers,
20	263	Preparations of vegetables, fruit, nuts or other parts of plants.
11	262	Products of the milling industry; malt; starches; inulin; wheat gluten.
10	233	Cereals.
3	229	Fish and crustaceans, molluscs and other aquatic invertebrates.
84	227	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof
28	215	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or of isotopes.
29	210	Organic chemicals.
33	183	Essential oils and resinoids; perfumery, cosmetic or toilet preparations.
21	181	Miscellaneous edible preparations.
18	175	Cocoa and cocoa preparations.
62	175	Articles of apparel and clothing accessories, not knitted or crocheted.
61	164	Articles of apparel and clothing accessories, knitted or crocheted.
16	153	Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates.
19	152	Preparations of cereals, flour, starch or milk; pastrycooks' products.
17	116	Sugars and sugar confectionery.
55	111	Man-made staple fibres.

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STC SPS: Most frequent products

HS2	Freq.	Product Description
2	150	Meat and edible meat offal.
4	57	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included.
8	44	Edible fruit and nuts; peel of citrus fruit or melons.
1	38	Live animals.
5	25	Products of animal origin, not elsewhere specified or included.
7	25	Edible vegetables and certain roots and tubers.
16	21	Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates.
23	21	Residues and waste from the food industries; prepared animal fodder.
6	19	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage.
21	17	Miscellaneous edible preparations.
15	16	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes.
3	13	Fish and crustaceans, molluscs and other aquatic invertebrates.
44	13	Wood and articles of wood; wood charcoal,
10	12	Cereals.
9	9	Coffee, tea, mate and spices.
20	5	Preparations of vegetables, fruit, nuts or other parts of plants.
41	5	Raw hides and skins (other than furskins) and leather.
22	4	Beverages, spirits and vinegar.
30	4	Pharmaceutical products.
11	3	Products of the milling industry; malt; starches; inulin; wheat gluten.
17	3	Sugars and sugar confectionery.
33	3	Essential oils and resinoids; perfumery, cosmetic or toilet preparations.
35	2	Albuminoidal substances; modified starches; glues; enzymes.
51	2	Wool, fine or coarse animal hair; horsehair yarn and woven fabric.
12	1	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder.

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List of provisions (<http://data.worldbank.org/data-catalog/deep-trade-agreements>)

"WTO plus" areas covered by the WTO	"WTO extra" areas beyond the WTO	
<ul style="list-style-type: none"> • Tariffs industrial goods • Tariffs agricultural goods • Customs administration • Export taxes • SPS measures • State trading enterprises • TBT measures • Countervailing measures • Anti-dumping • State aid • Public procurement • TRIMS measures • GATS • TRIPS 	<ul style="list-style-type: none"> • Anti-corruption • Competition policy • Environmental laws • IPR • Investment measures • Labour market regulation • Movement of capital • Consumer protection • Data protection • Approximation of legislation • Agriculture • Audiovisual • Civil protection • Innovation policies • Cultural cooperation • Economic policy dialogue • Education and training • Energy 	<ul style="list-style-type: none"> • Financial assistance • Health • Human Rights • Illegal immigration • Illicit drugs • Industrial cooperation • Information society • Mining • Money laundering • Nuclear safety • Political dialogue • Public administration • Regional cooperation • Research and technology • SMEs • Social Matters • Statistics • Taxation • Terrorism • Visa and asylum

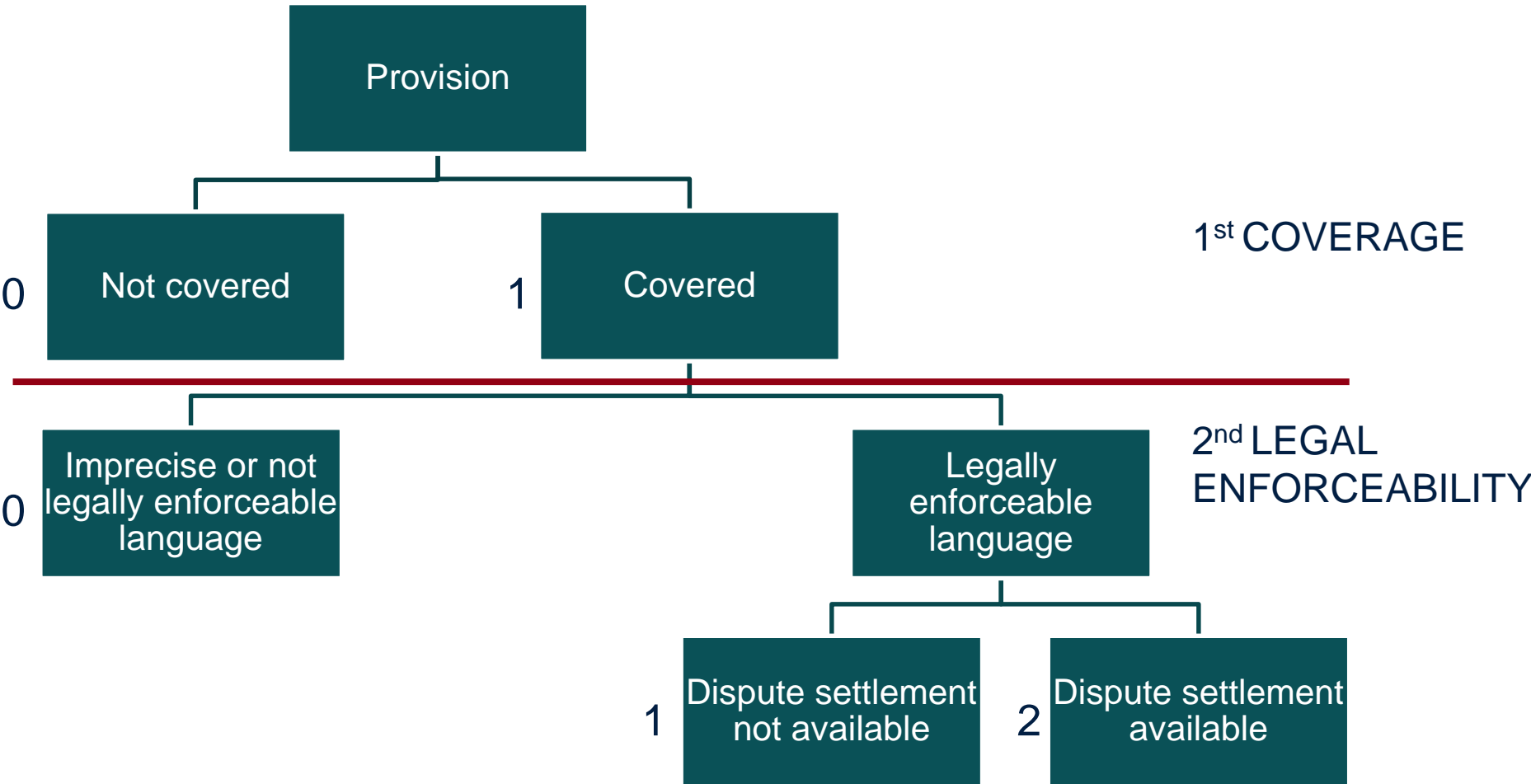
CORE (18)

Preferential (6)

MFN (12)



Coding of each provision



Robustness (1): Continuous STC measure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Export participation				Export entry			
Exp Other ... (t-1)								
... RTA	0.004*** (0.000)	0.006*** (0.000)	0.004*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.003*** (0.000)
... RTA x STC (cnt)	0.014*** (0.002)	-0.010*** (0.002)	0.006** (0.002)	0.002 (0.001)	0.004*** (0.001)	-0.005*** (0.001)	0.000 (0.001)	-0.001 (0.001)
... Depth		-0.004*** (0.001)				-0.001*** (0.000)		
... Depth x STC (cnt)		0.055*** (0.005)				0.022*** (0.002)		
... Depth MFN			0.008*** (0.001)				0.006*** (0.001)	
... Depth Pref			-0.005*** (0.001)				-0.005*** (0.001)	
... Depth MFN x STC (cnt)			0.080*** (0.007)				0.029*** (0.003)	
... Depth Pref x STC (cnt)			-0.053*** (0.005)				-0.017*** (0.003)	
... SPSorTBT				0.001*** (0.000)				0.000 (0.000)
... SPSorTBT x STC (cnt)				0.019*** (0.002)				0.008*** (0.001)
Observations	164,595,130	164,595,130	164,595,130	164,595,130	164,298,452	164,298,452	164,298,452	164,298,452
R-squared	0.340	0.340	0.340	0.340	0.156	0.156	0.157	0.156
FEs ($\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$)	YES	YES	YES	YES	YES	YES	YES	YES
Spatial controls	YES	YES	YES	YES	YES	YES	YES	YES

Note: Robust standard errors, clustered at the firm-product level, are in parentheses. The dependent variable y_{ijpt} is a dummy variable equal to 1 if firm i exported (or started exporting) product p to country j in year t . STC (cnt) is the incidence of concerns on product p raised in the WTO STC Dataset, normalized between 0 and 1. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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Robustness (2): FDA prior notice

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Export participation				Export entry			
Exp Other ... (t-1)								
... RTA	0.005*** (0.000)	0.006*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.004*** (0.000)	0.003*** (0.000)
... RTA x FDA	0.005*** (0.001)	-0.004*** (0.001)	0.002* (0.001)	0.001 (0.001)	0.001*** (0.000)	-0.003*** (0.000)	-0.001** (0.000)	-0.001** (0.000)
... Depth		-0.002** (0.001)				-0.000 (0.000)		
... Depth x FDA		0.021*** (0.002)				0.008*** (0.001)		
... Depth MFN			0.012*** (0.001)				0.008*** (0.001)	
... Depth Pref			-0.008*** (0.001)				-0.007*** (0.001)	
... Depth MFN x FDA			0.026*** (0.003)				0.008*** (0.001)	
... Depth Pref x FDA			-0.017*** (0.002)				-0.004*** (0.001)	
... SPSorTBT				0.002*** (0.000)				0.001*** (0.000)
... SPSorTBT x FDA				0.007*** (0.001)				0.003*** (0.000)
Observations	164,595,130	164,595,130	164,595,130	164,595,130	164,298,452	164,298,452	164,298,452	164,298,452
R-squared	0.340	0.340	0.340	0.340	0.156	0.156	0.156	0.156
FES ($\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$)	YES	YES	YES	YES	YES	YES	YES	YES
Spatial controls	YES	YES	YES	YES	YES	YES	YES	YES

Note: Robust standard errors, clustered at the firm-product-destination level, are in parentheses. The dependent variable y_{ijpt} is a dummy variable equal to 1 if firm i exported (or started exporting) product p to country j in year t . FDA =1 if product p requires submission to FDA for prior notice to be imported into the United States. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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Robustness (3): Alternative measure of depth

	(1)	(2)		(3)	(4)	(5)		(6)	
		Export participation				Export entry			
	y_{ijt}	y_{ijpt}	y_{ijpt}	y_{ijpt}	y_{ijt}	y_{ijpt}	y_{ijpt}	y_{ijpt}	
Exp Other ... (t-1)									
... CU	0.038*** (0.001)	0.021*** (0.001)	0.019*** (0.001)	0.016*** (0.001)	0.010*** (0.001)	0.010*** (0.000)	0.010*** (0.000)	0.010*** (0.000)	
... FTA	0.010*** (0.001)	0.004*** (0.000)	0.003*** (0.000)	0.006*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	
... PS	-0.006*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	0.000 (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	
... CU x STC		0.002 (0.001)				0.000 (0.001)			
... FTA x STC		0.000 (0.001)				-0.000 (0.000)			
... PS x STC		-0.000** (0.000)				-0.000** (0.000)			
... CU x STC (cnt)			0.030*** (0.004)				0.007*** (0.002)		
... FTA x STC (cnt)			0.004*** (0.001)				0.001 (0.001)		
... PS x STC (cnt)			-0.008*** (0.001)				-0.003*** (0.000)		
Observations	20,797,980	164,595,130	164,595,130	20,694,604	164,298,452	164,298,452			
R-squared	0.467	0.340	0.340	0.179	0.157	0.157			
Fixed Effects	$\alpha_{ij}, \delta_{it}, \theta_{jt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$	$\alpha_{ij}, \delta_{it}, \theta_{jt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$			
Spatial controls	YES	YES	YES	YES	YES	YES			

Note: Robust standard errors, clustered at the firm level (columns 1, 4) or firm-product level (columns 2, 3, 5, 6), are in parentheses. The dependent variable $y_{ij(p)t}$ is a dummy variable equal to 1 if firm i exported or started exporting (product p) to country j in year t . STC=1 if a concern on product p has been raised in the WTO Specific Trade Concerns (STC) Database. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Robustness (3): Alternative measure of depth

	(1)	(2)	(3)	(4)	(5)	(6)
	Export participation			Export entry		
	y_{ijt}	y_{ijpt}	y_{ijpt}	y_{ijt}	y_{ijpt}	y_{ijpt}
Exp Other ... (t-1)						
... CU	0.038*** (0.001)	0.021*** (0.001)	0.019*** (0.001)	0.016*** (0.001)	0.010*** (0.001)	0.010*** (0.000)
... FTA	0.010*** (0.001)	0.004*** (0.000)	0.003*** (0.000)	0.006*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
... PS	-0.006*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	0.000 (0.000)	0.000*** (0.000)
... CU x STC		0.002 (0.001)			0.000 (0.001)	
... FTA x STC		0.000 (0.001)			-0.000 (0.000)	
... PS x STC		-0.000** (0.000)			-0.000** (0.000)	
... CU x STC (cnt)			0.030*** (0.004)			0.007*** (0.002)
... FTA x STC (cnt)			0.004*** (0.001)			0.001 (0.001)
... PS x STC (cnt)			-0.008*** (0.001)			-0.003*** (0.000)
Observations	20,797,980	164,595,130	164,595,130	20,694,604	164,298,452	164,298,452
R-squared	0.467	0.340	0.340	0.179	0.157	0.157
Fixed Effects	$\alpha_{ij}, \delta_{it}, \theta_{jt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$	$\alpha_{ij}, \delta_{it}, \theta_{jt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$
Spatial controls	YES	YES	YES	YES	YES	YES

Note: Robust standard errors, clustered at the firm level (columns 1, 4) or firm-product level (columns 2, 3, 5, 6), are in parentheses. The dependent variable $y_{ij(p)t}$ is a dummy variable equal to 1 if firm i exported or started exporting (product p) to country j in year t . STC=1 if a concern on product p has been raised in the WTO Specific Trade Concerns (STC) Database. *** p<0.01, ** p<0.05, * p<0.1

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Robustness (3): Alternative measure of depth

	(1)	(2)		(3)	(4)	(5)		(6)	
		Export participation				Export entry			
	y_{ijt}	y_{ijpt}	y_{ijpt}	y_{ijpt}	y_{ijt}	y_{ijpt}	y_{ijpt}	y_{ijpt}	
Exp Other ... (t-1)									
... CU	0.038*** (0.001)	0.021*** (0.001)	0.019*** (0.001)	0.019*** (0.001)	0.016*** (0.001)	0.010*** (0.001)	0.010*** (0.001)	0.010*** (0.000)	
... FTA	0.010*** (0.001)	0.004*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.006*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	
... PS	-0.006*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000*** (0.000)	
... CU x STC		0.002 (0.001)				0.000 (0.001)			
... FTA x STC		0.000 (0.001)				-0.000 (0.000)			
... PS x STC		-0.000** (0.000)				-0.000** (0.000)			
... CU x STC (cnt)			0.030*** (0.004)				0.007*** (0.002)		
... FTA x STC (cnt)			0.004*** (0.001)				0.001 (0.001)		
... PS x STC (cnt)			-0.008*** (0.001)				-0.003*** (0.000)		
Observations	20,797,980	164,595,130	164,595,130	164,595,130	20,694,604	164,298,452	164,298,452	164,298,452	
R-squared	0.467	0.340	0.340	0.340	0.179	0.157	0.157	0.157	
Fixed Effects	$\alpha_{ij}, \delta_{it}, \theta_{jt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$	$\alpha_{ij}, \delta_{it}, \theta_{jt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$	$\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$	
Spatial controls	YES	YES	YES	YES	YES	YES	YES	YES	

Note: Robust standard errors, clustered at the firm level (columns 1, 4) or firm-product level (columns 2, 3, 5, 6), are in parentheses. The dependent variable $y_{ij(p)t}$ is a dummy variable equal to 1 if firm i exported or started exporting (product p) to country j in year t . STC=1 if a concern on product p has been raised in the WTO Specific Trade Concerns (STC) Database. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Robustness (4): Additional fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Export participation				Export entry			
Exp Other ... (t-1)								
... RTA	0.004*** (0.000)	0.004*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.001)	0.002*** (0.000)
... RTA x STC	0.003*** (0.001)	0.000 (0.001)	0.002** (0.001)	0.001** (0.001)	0.001*** (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)
... Depth		-0.001 (0.001)				0.000 (0.001)		
... Depth x STC		0.006*** (0.001)				0.003*** (0.001)		
... Depth MFN			0.008*** (0.002)				0.006*** (0.001)	
... Depth Pref			-0.004** (0.002)				-0.004*** (0.001)	
... Depth MFN x STC			0.009*** (0.002)				0.004** (0.001)	
... Depth Pref x STC			-0.006*** (0.002)				-0.002 (0.001)	
... SPSorTBT				0.003*** (0.001)				0.001** (0.000)
... SPSorTBT x STC				0.002** (0.001)				0.001** (0.001)
Observations	156,595,040	156,595,040	156,595,040	156,595,040	156,302,077	156,302,077	156,302,077	156,302,077
R-squared	0.536	0.536	0.536	0.536	0.431	0.431	0.431	0.431
FEs ($\alpha_{ijp}, \delta_{ipt}, \theta_{jpt}$)	YES	YES	YES	YES	YES	YES	YES	YES
Firm-dest-year FE	YES	YES	YES	YES	YES	YES	YES	YES
Spatial controls	YES	YES	YES	YES	YES	YES	YES	YES

Note: Robust standard errors, clustered at the firm-product-destination level, are in parentheses. The dependent variable y_{ijpt} is a dummy variable equal to 1 if firm i exported (or started exporting) product p to country j in year t . STC=1 if a concern on product p has been raised in the WTO Specific Trade Concerns (STC) Database. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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