

Reduced ‘Border effects’, Free Trade Agreements and international trade

Sebastian Franco and Erik Frohm
(World Bank) (ECB)

OEET workshop
“Emerging economies in Global Value Chains:
impacts and policy issues”

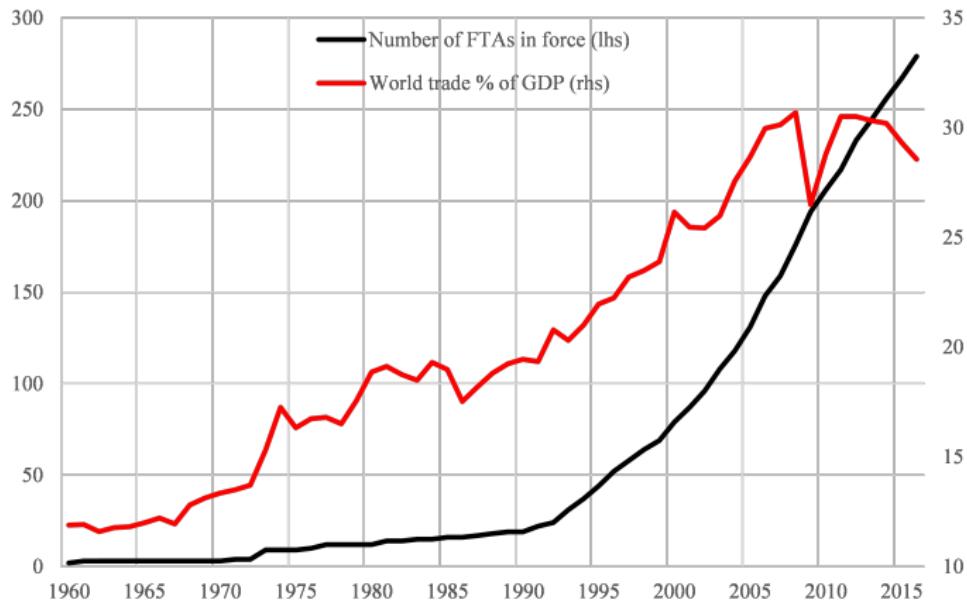
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Plan for today's presentation

- Precise estimates of the "Border effect" and FTAs on trade in final and intermediate goods.
- **Focus today: robust globalization measure.**
- Long-term perspective: 1970-2009 (some results with recent data).
- Framework: Structural gravity + fully consistent estimator.

Introduction: Global trade and FTAs

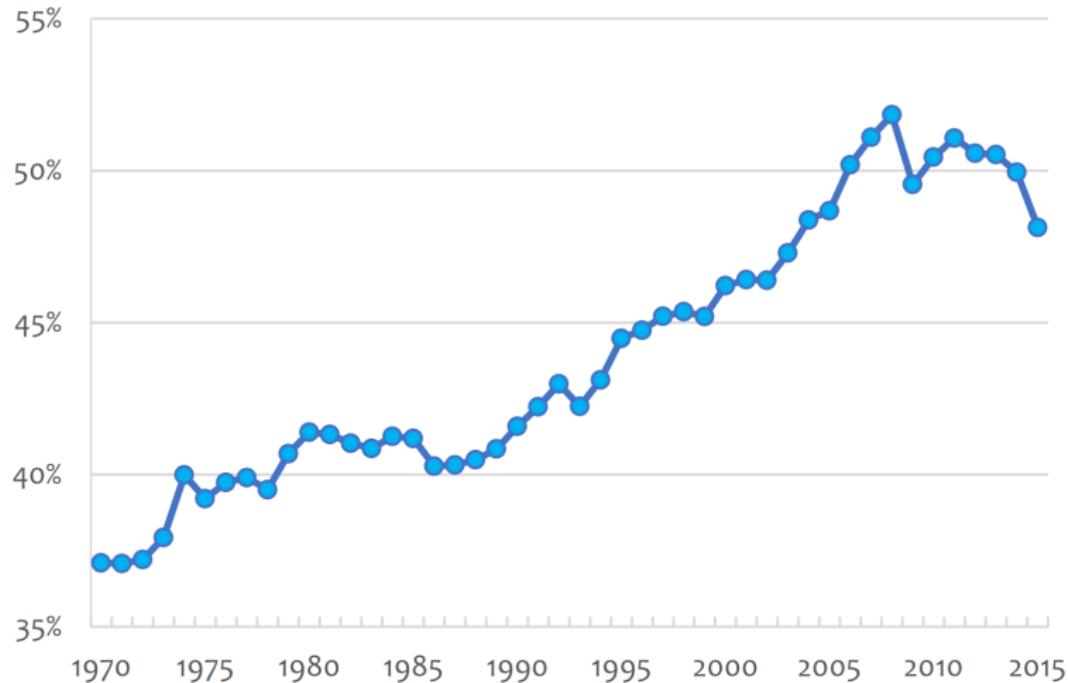
- *"This globalisation"* is driven by **trade liberalisation** and fast-paced **technological change**.



Source: World Bank and WTO.

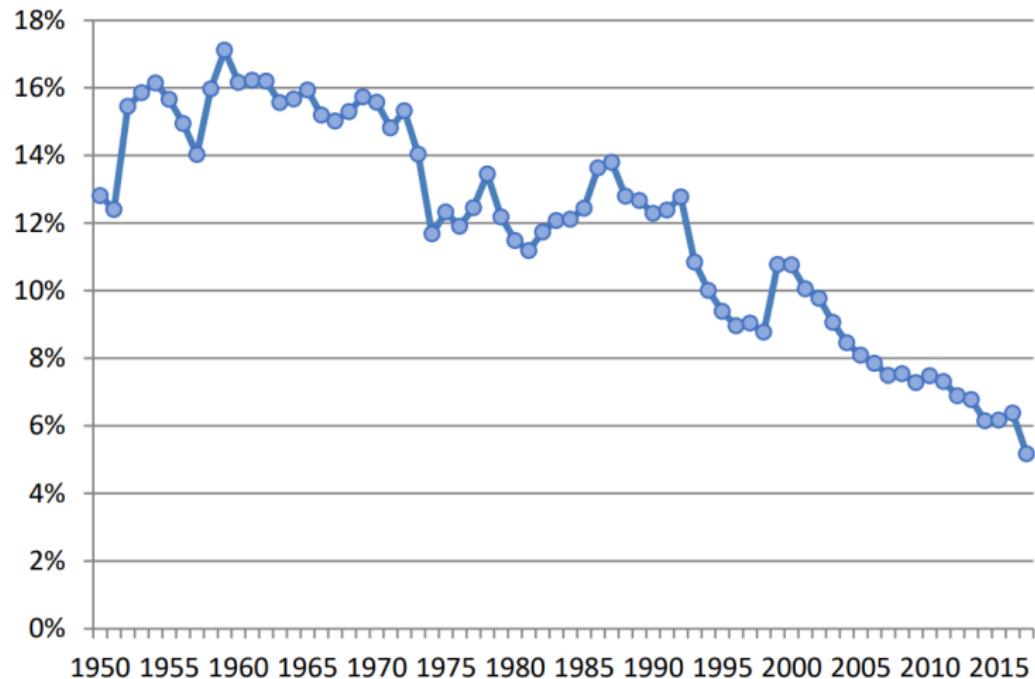
Introduction: GVC Trade as Percentage of World Trade

Source: World Development Indicators, Antras (2020)



Introduction: World Average Tariff

Source: World Development Indicators, Antras (2020)



Literature and our contribution

- Reliable FTAs' estimates fairly recent [Baier and Bergstrand, 2007].
 - **Importance of domestic trade** [Bergstrand et al., 2015].
 - FTAs might have network effects [Amador and Cabral, 2017] that could cause large trade disruptions [Blanchard, 2010].
 - The "New Globalisation" is about advancements in ICT [Baldwin, 2016] → could reduce "border effects".
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- Where do we stand? (**our contributions**):
 - Robust globalization measure.
 - Disentangle final goods and inputs.
 - **Long-term perspective:** evolution of the FTA's effect.

Framework: Structural gravity equation

Partial equilibrium version

- Strong theoretical foundations [Yotov et al., 2016].

$$X_{ij}^k = \frac{b_{ij}^{k-1} \left(w_i^k \tau_{ij,FTA}^k \right)^{-\sigma^k}}{P_j^k} E_j^k$$

- $X_{ij}^k \equiv$ bilateral trade between country i and j .
- $E_j^k \equiv$ total expenditure in destination country j .
- $P_j^k \equiv$ importer price-level.
- $w_i^k \equiv$ exporter's comparative advantage factor.
- $\tau_{ij}^k \equiv$ FTA-related trade costs (tariff and non-tariff).
- $b_{ij}^{k-1} \equiv$ "border effect" (non-FTA related trade frictions).
- $k \in \{final, input\}$.

Empirical approach: HDFE-PPML gravity

- Standard empirical gravity:

$$X_{ij,t} = \exp(\beta_1 FTA_{ij,t} + \eta_{i,t} + \psi_{j,t} + \gamma_{ij}) + \varepsilon_{ij,t}$$

- Rich set of fixed effects (HDFE):

- $\eta_{i,t}$ captures the time-varying comparative advantage term ($w_{i,t}$)
- $\psi_{j,t}$ absorbs the time-varying destination terms ($P_{j,t}$ and $E_{j,t}$).
- γ_{ij} controls for the endogeneity of FTAs.

- PPML estimator:

- Allows for zero trade flows in estimation.
- Avoids log-OLS inconsistency and bias [Silva and Tenreyro, 2006].
- Fully theory-consistent [Fally, 2015] .

Empirical approach: inputs and border

- FTA lags (up to 10+ years).
- Final and intermediate goods (dummy = 1 for inputs).
- Border effect: $B_t \equiv \mathbf{1} (i \neq j \text{ } \& \text{ } t = t)$.

$$X_{ij,t}^k = \exp \left(\sum_0^{10+} \beta_s FTA_{ij,t_0+s} + \sum_0^{10+} \beta_s FTA_{ij,t_0+s} \times Input \right. \\ \left. + \sum_{t \neq t_0}^T \beta_{b,t} B_t + \sum_{t \neq t_0}^T \beta_{b,t} B_t \times Input \right. \\ \left. + \eta_{i,t}^k + \psi_{j,t}^k + \gamma_{ij}^k \right) + \epsilon_{ij,t}^k$$

Empirical approach: revisiting one key assumption

year intervals vs all years

- Literature follows Cheng and J.Wall's, 2005 recommendation:
 - To use data in intervals of 3 to 5 years.
 - FTA's effect takes time \implies issue with fixed effects?
- We report **all** results using 5-year intervals too.
- Same conclusions.
- Strong preference for the use of all years (precision).

Data

- **Global IO tables** [Johnson and Noguera, 2017]
 - 43 countries over 1970-2009.
 - Intermediate inputs and final goods.
 - *Intra-national* trade flows.
 - Sectoral dimension: **manufacturing**, non-industrial manufacturing, agriculture, services.
- **Economic Integration Agreements Database**
[Baier and Bergstrand, 2015]
 - Preferential Trade Agreements
 - **Free Trade Agreements**
 - Custom Unions
 - Common Market
 - Economic Union

Results (1970-2009)

	(1) Total	(2) Total	(3) Total	(4) Final	(5) Final	(6) Final	(7) Inputs	(8) Inputs	(9) Inputs
FTA × 0 years after	0.067*** (0.025)	0.435*** (0.052)	0.135*** (0.046)	0.073** (0.032)	0.516*** (0.065)	0.141** (0.057)	0.054** (0.026)	0.365*** (0.045)	0.122*** (0.040)
FTA × 1 year after	0.104*** (0.029)	0.514*** (0.067)	0.186*** (0.058)	0.119*** (0.036)	0.591*** (0.077)	0.181*** (0.069)	0.082*** (0.032)	0.440*** (0.060)	0.171*** (0.051)
FTA × 2 years after	0.112*** (0.035)	0.589*** (0.075)	0.227*** (0.071)	0.140*** (0.042)	0.700*** (0.082)	0.233*** (0.081)	0.079** (0.040)	0.489*** (0.068)	0.196*** (0.063)
FTA × 3 years after	0.133*** (0.034)	0.636*** (0.077)	0.234*** (0.074)	0.174*** (0.042)	0.774*** (0.084)	0.257*** (0.082)	0.093** (0.037)	0.516*** (0.070)	0.193*** (0.066)
FTA × 4 years after	0.160*** (0.038)	0.698*** (0.082)	0.279*** (0.073)	0.174*** (0.047)	0.841*** (0.090)	0.291*** (0.080)	0.132*** (0.039)	0.576*** (0.074)	0.247*** (0.065)
FTA × 5 years after	0.191*** (0.036)	0.798*** (0.084)	0.345*** (0.076)	0.203*** (0.044)	0.959*** (0.083)	0.357*** (0.076)	0.162*** (0.039)	0.661*** (0.081)	0.308*** (0.074)
FTA × 6 years after	0.201*** (0.037)	0.866*** (0.092)	0.357*** (0.083)	0.215*** (0.046)	1.030*** (0.089)	0.380*** (0.081)	0.168*** (0.039)	0.722*** (0.089)	0.309*** (0.082)
FTA × 7 years after	0.214*** (0.038)	0.881*** (0.082)	0.356*** (0.076)	0.231*** (0.048)	1.052*** (0.082)	0.377*** (0.077)	0.177*** (0.040)	0.736*** (0.079)	0.312*** (0.075)
FTA × 8 years after	0.217*** (0.041)	0.951*** (0.076)	0.383*** (0.077)	0.216*** (0.052)	1.125*** (0.074)	0.392*** (0.077)	0.192*** (0.042)	0.807*** (0.075)	0.348*** (0.077)
FTA × 9 years after	0.239*** (0.043)	0.985*** (0.075)	0.393*** (0.077)	0.237*** (0.055)	1.160*** (0.071)	0.389*** (0.080)	0.211*** (0.042)	0.843*** (0.076)	0.371*** (0.077)
FTA × 10 years after +	0.276*** (0.047)	1.227*** (0.103)	0.377*** (0.110)	0.274*** (0.059)	1.489*** (0.098)	0.418*** (0.113)	0.255*** (0.046)	1.034*** (0.107)	0.331*** (0.110)
Observations	60132	61700	61700	60132	61700	61700	60132	61700	61700
Domestic trade	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Border		No	Yes		No	Yes		No	Yes

*, **, and *** denote $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Standard errors in parentheses.

Results: Intermediate goods difference (rolling)

	(1) 1970	(2) 1973	(3) 1976	(4) 1979	(5) 1982	(6) 1985	(7) 1988
FTA × Input × 0 years	-0.019 (0.032)	-0.020 (0.032)	-0.026 (0.033)	-0.027 (0.034)	-0.025 (0.034)	-0.022 (0.033)	-0.015 (0.036)
FTA × Input × 1 years	-0.010 (0.034)	-0.012 (0.034)	-0.018 (0.035)	-0.017 (0.035)	-0.016 (0.035)	-0.011 (0.035)	-0.003 (0.038)
FTA × Input × 2 years	-0.036 (0.037)	-0.038 (0.037)	-0.040 (0.038)	-0.042 (0.038)	-0.040 (0.039)	-0.034 (0.039)	-0.021 (0.042)
FTA × Input × 3 years	-0.065* (0.034)	-0.067* (0.035)	-0.072** (0.035)	-0.074** (0.036)	-0.072** (0.036)	-0.065* (0.037)	-0.050 (0.039)
FTA × Input × 4 years	-0.044 (0.034)	-0.046 (0.035)	-0.052 (0.035)	-0.052 (0.036)	-0.048 (0.037)	-0.042 (0.037)	-0.023 (0.039)
FTA × Input × 5 years	-0.049 (0.032)	-0.050 (0.033)	-0.056 (0.034)	-0.054 (0.035)	-0.051 (0.036)	-0.044 (0.038)	-0.022 (0.041)
FTA × Input × 6 years	-0.071** (0.035)	-0.072** (0.036)	-0.078** (0.036)	-0.080** (0.037)	-0.076** (0.039)	-0.069* (0.041)	-0.046 (0.043)
FTA × Input × 7 years	-0.065* (0.036)	-0.067* (0.037)	-0.073* (0.037)	-0.074* (0.038)	-0.070* (0.039)	-0.060 (0.042)	-0.039 (0.044)
FTA × Input × 8 years	-0.044 (0.039)	-0.045 (0.040)	-0.051 (0.041)	-0.052 (0.042)	-0.046 (0.044)	-0.037 (0.047)	-0.017 (0.050)
FTA × Input × 9 years	-0.019 (0.043)	-0.020 (0.044)	-0.026 (0.044)	-0.028 (0.045)	-0.024 (0.047)	-0.010 (0.051)	0.010 (0.055)
FTA × Input × 10+ years	-0.087* (0.050)	-0.089* (0.051)	-0.096* (0.052)	-0.098* (0.054)	-0.094* (0.055)	-0.088 (0.058)	-0.066 (0.061)
Observations	123400	115186	106972	98758	90544	82330	74116

*, **, and *** denote $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Standard errors in parentheses.

Results: different types of EIA

	(1) Final	(2) Intermediate	(3) Final	(4) Intermediate	(5) Final	(6) Intermediate
FTA	0.328*** (0.081)	0.270*** (0.073)			0.291*** (0.078)	0.249*** (0.072)
PTA			0.239 (0.173)	0.113 (0.120)		
FTA			0.296*** (0.086)	0.223*** (0.075)		
CU			0.637*** (0.081)	0.500*** (0.067)		
CM			0.629*** (0.092)	0.410*** (0.073)		
EUN			0.701*** (0.107)	0.370*** (0.079)		
intraEU					0.330*** (0.045)	0.215*** (0.041)
Observations	61700	61700	61700	61700	61700	61700

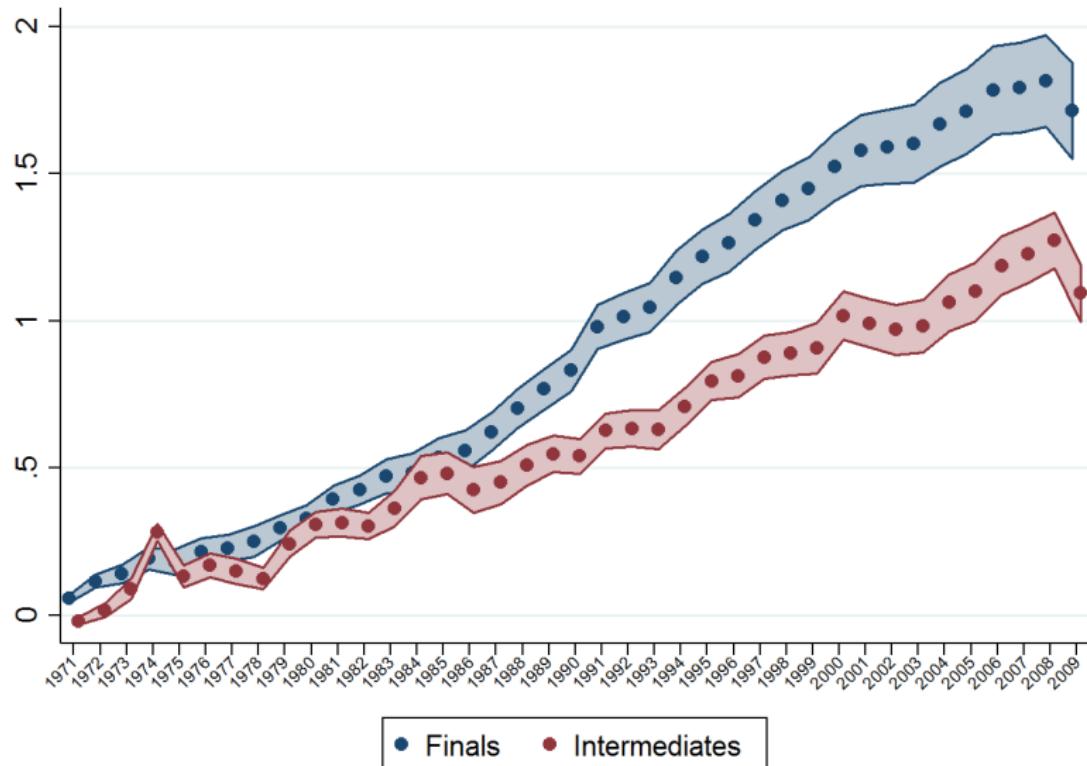
, **, and *** denote $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

Results: different data intervals (4-years)

	(1) Total	(2) Total	(3) Final	(4) Final	(5) Inputs	(6) Inputs
FTA	0.164*** (0.030)	0.179*** (0.030)	0.160*** (0.034)	0.182*** (0.033)	0.146*** (0.028)	0.157*** (0.030)
FTA _{t-4}	0.069** (0.028)	0.070** (0.028)	0.026 (0.034)	0.028 (0.034)	0.085*** (0.027)	0.086*** (0.027)
FTA _{t-8}	-0.029 (0.033)	-0.030 (0.034)	-0.069 (0.044)	-0.069 (0.045)	-0.004 (0.025)	-0.005 (0.025)
FTA _{t+4}		-0.034 (0.030)		-0.046 (0.031)		-0.026 (0.032)
Observations	15660	15660	15660	15660	15660	15660
Total FTA	0.204	0.219	0.118	0.141	0.227	0.238

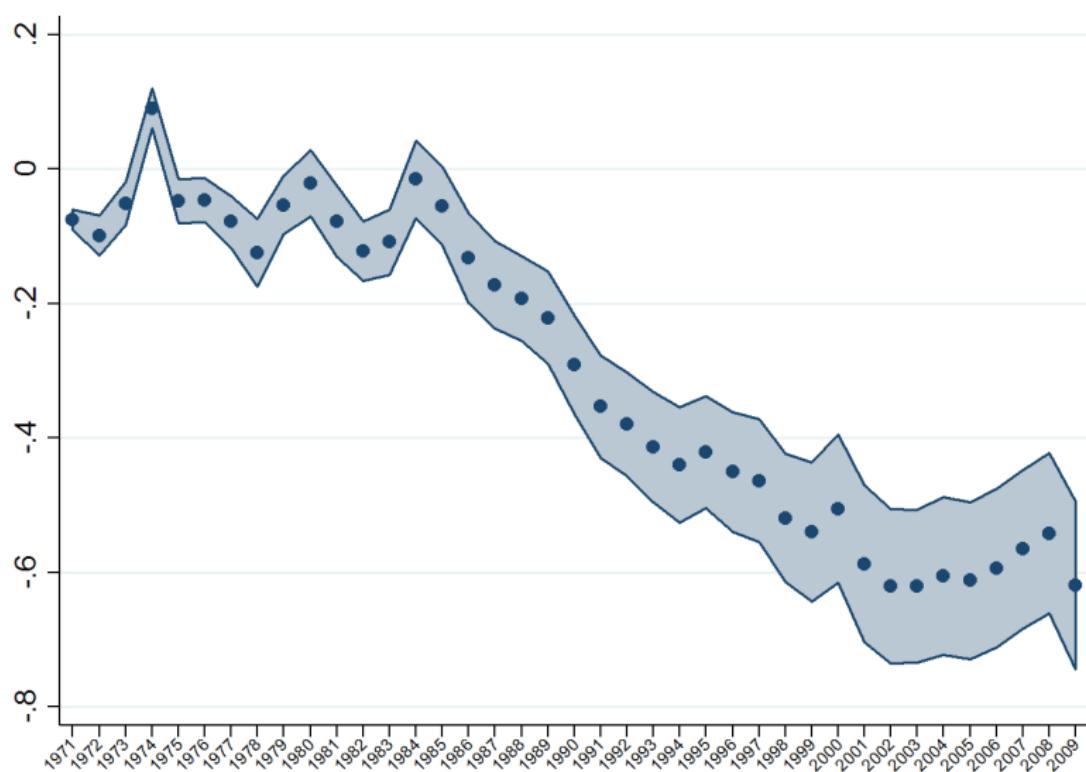
*, **, and *** denote $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

Results: The "Border effect"

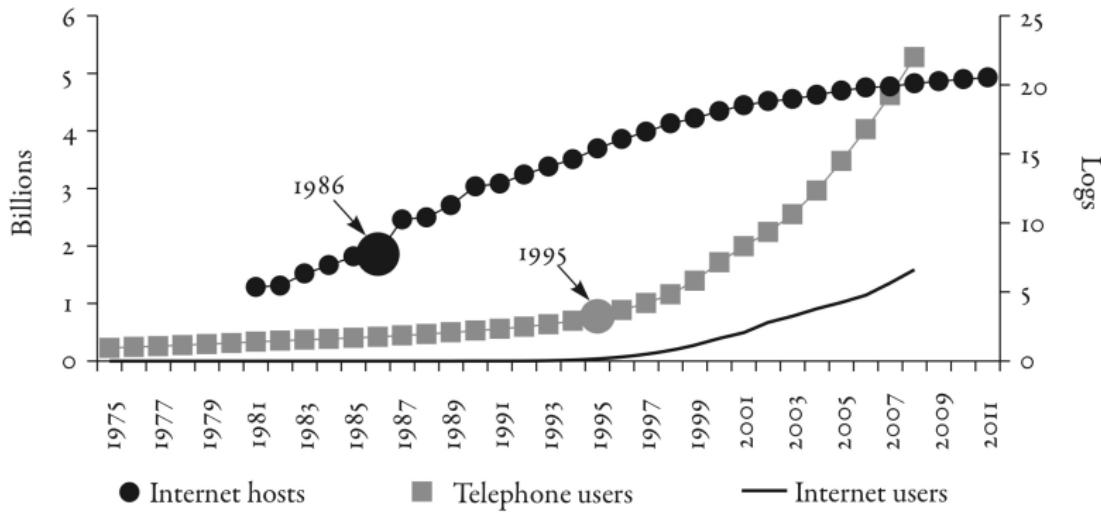


Results: The "Border effect"

Intermediates with respect to finals



Reduction in border effects? ICT indicators

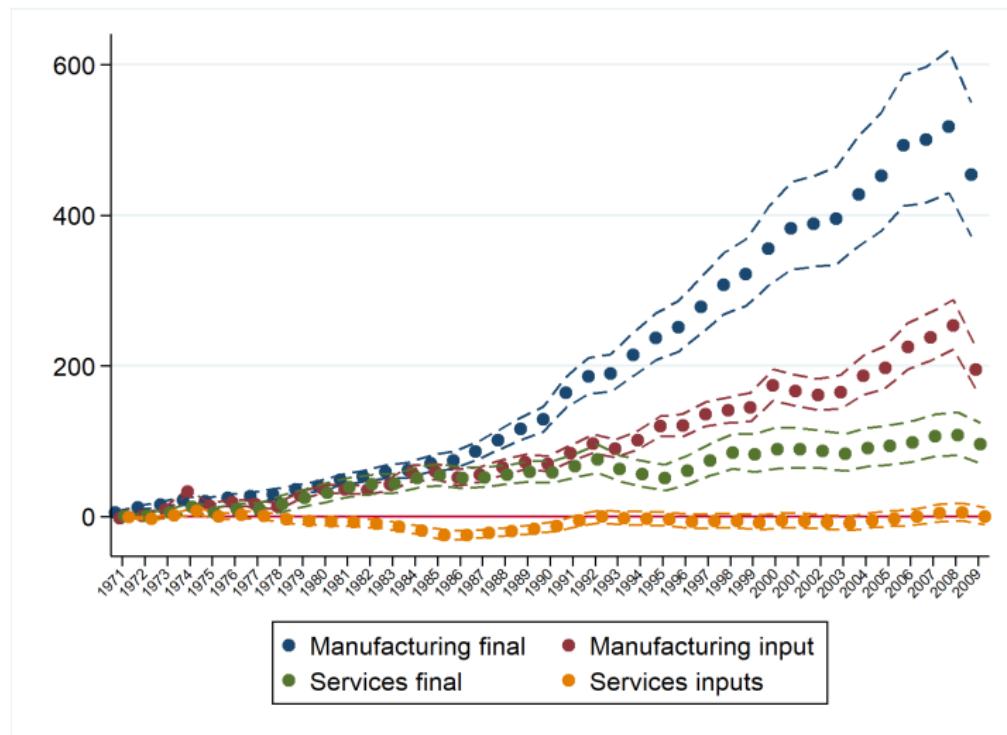


Source: Baldwin (2016)

- But there is more: container (1960s → 70s, 80s), air cargo (1980s)

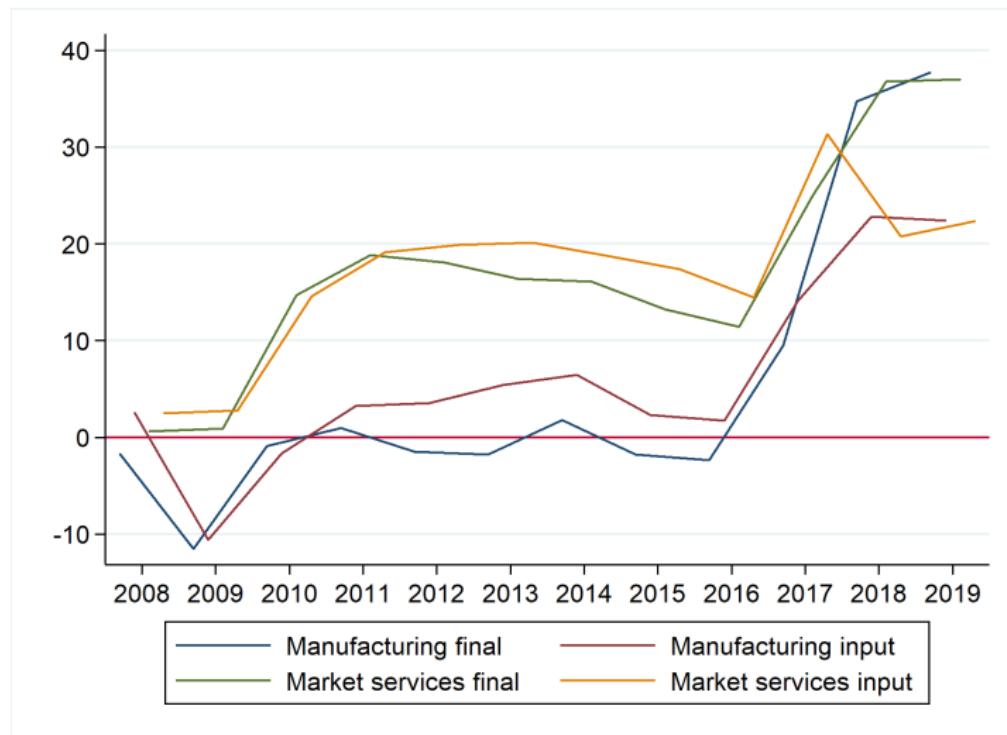
Results (bonus)

What about services? One big caveat but...



Results (bonus)

What about more recent years? ADB MRIO Nowcasting



Concluding remarks

- We provide a precise estimation of the trade effect of FTAs and reduced border effects.
- HDFE and fully theory-consistent.
- Distinguishing between final and intermediate goods (GVCs).
- Emphasizing the different nature of both goods.
- Avenues for future research:
 - More disaggregated data (challenge).
 - Refine the input classification (BEC 5).
 - General equilibrium effects (QGEM).

Thank you!

Appendix

Economic Integration Agreements classification

EIA Ranking	Type of Agreement	Type of Agreement	Definition
1	NR-PTA	Non Reciprocal Preferential Trade Arrangement	Preferential terms and customs concessions given by developed nations to developing countries
2	PTA	Preferential Trade Arrangement	Preferential terms to members vs non-members
3	FTA	Free Trade Areas	Trade barriers eliminated (or substantially so) among members; treat non-members differently
4	CU	Customs Union	Same as FTA; but treat non-members the same
5	CM	Common Market	Same as CU; but also includes free movement of labor/capital
6	EUN	Economic union	Same as CM, but also monetary and Fiscal Policy coordination; further harmonization of taxes/regulation/monetary system



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