

Export Modes and Adjustments to Exchange Rate Movements

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How do different exports/exporters react to RER changes?

- Two modes of export: direct and indirect (i.e. through an export intermediary)
- Macro-evidence: countries served primarily by intermediaries display more stable trade flows
- This work: micro-evidence on the heterogeneous response of wholesalers and direct exporters to RER movements
 - Both direct and indirect exporters adopt pricing-to-market (PTM) and adjust markup to limit transmission of RER movements into consumer (export) prices
 - prices of goods exported on the indirect channel are less responsive to RER movements
 - different patterns in the adjustment of product portfolio on the direct and indirect channels

⇒ Key role of intermediaries in stabilizing trade patterns

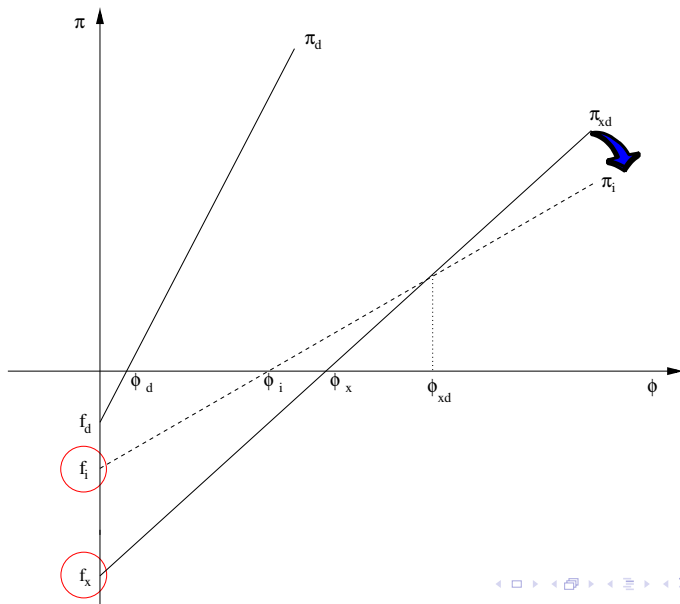
Our contribution: theory

- Melitz kind of framework: Heterogeneous (different varieties, different π), monopolistically competitive firms
- trade-off between (i) higher fixed costs of direct export Vs (ii) lower variable profits of indirect export

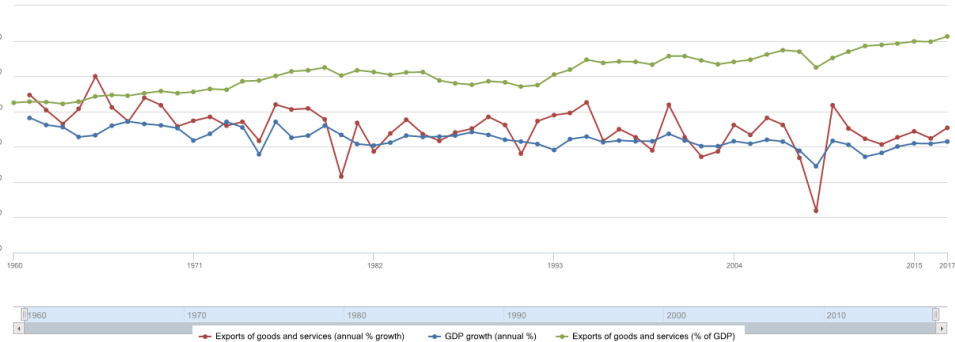
Double marginalization and PTM generate new theoretical predictions and accounts for previous findings:

- Export mode is chosen according to productivity sorting
- Manuf. & intermediary adjust export prices following RER change \rightarrow incomplete ERPT
- More productive firms (higher markups) can adjust more
- However, because of double marg., overall price variation is larger for Intermed. Double marg. further limits ERPT
- Adjustment of product portfolio

Direct and indirect exporting



GDP growth (blue), Export growth (red), Export share (green)



Country : Italy
Source: World Development Indicators
Created on: 01/22/2019

What do we know about trade intermediaries? (I)

- Wholesale firms account for:
 - 10% of exports in Italy (Bernard, Grazzi and Tomasi, 2015)
 - 10% of exports in the US (Bernard, Jensen and Schott, 2009)
 - 14% of exports in Sweden (Akerman, 2010)
 - 20% of exports in China (Ahn, Khandelwal, and Wei, 2011)
 - 20% of exports in France (Crozet et al, 2011)
- Exports through an intermediary increase the number of manufacturers that can reach foreign markets with their goods;
It can also be a transition to become direct exporter (Ahn, Khandelwal and Wei, 2011; Grazzi and Tomasi, 2016)

What do we know about trade intermediaries? (II)

- Productivity sorting in the export mode selection (Akerman, 2010; Ahn, Khandelwal and Wei, 2011; Falbermayr and Jung, 2011)
 - The most productive firms tend to export by their own
 - Firms with intermediate levels of productivity resort to wholesalers
 - The least productive firms serve the domestic market only

Indirect exporters face a lower (fixed) cost of entry in the foreign markets, but the export profit function is less steep.

What do we know about trade intermediaries? (III)

- Intermediaries relatively more important in markets that are more difficult to penetrate

However, their incidence declines with both (i) market size and (ii) the degree of product differentiation

- Bernard, Grazzi and Tomasi (2015)

- Aggregate exports to destinations with high shares of intermediary exports less responsive to RER movements than exports to markets served primarily by direct exporters

- Bernard, Grazzi and Tomasi (2015)

Our contribution (I)

- Standard model of monopolistic competition
 - Heterogeneous firm (in the spirit of Melitz, 2003)
 - Local distribution costs (Corsetti and Dedola, 2005; and Chatterjee, Dix-Carneiro and Vichyanond, 2013)
 - Double marginalization for goods traded via intermediary (Akerman, 2010)
- Same predictions if demand a la Melitz and Ottaviano (2008), instead of local distribution costs
- Under mild assumption on firm productivity distribution...
... testable predictions on the change in the overall number of varieties traded directly and through an intermediary in the aftermath of RER movements.

Our contribution (II)

- The measure of varieties that intermediaries drop in response to real appreciations is larger, on aggregate, than the measure of varieties discarded from direct exporters
 - Empirical evidence supports this prediction that, by itself, plays against the evidence of Bernard, Grazi and Tomasi (2003)
- However... incomplete exchange rate pass-through (ERPT), lower in the case of wholesalers' exports
 - As a result, exports by wholesalers (in value) are less elastic to RER movements as compared to exports by direct exporters
 - Clear micro-foundation for the findings of Bernard, Grazi e Tomasi (2016)

What to bring home

- This theoretical result on the differential degree of ERPT, validated on our data, is found to be consistent with
 - (i) productivity sorting in the export mode selection;
 - (ii) the propensity of high-productivity firms to absorb more RER movements in their markups (Berman, Martin and Mayer, 2012)
- Hence, our theoretical framework manages to frame our new empirical findings consistently with most of the well-established facts emerged so far in the literature on trade intermediaries

The model: basic setup

- Key assumptions

- Non-homogeneous good available in many differentiated varieties
- Heterogeneous producers (φ_i) and standard CES demand
- Labor is the only input, fixed at country level but freely mobile ($w = 1$)
- Standard Dixit-Stiglitz markup in case of domestic sales

- Exporting to a given destination entails 3 types of costs

- Standard iceberg cost τ
- Fixed cost of entry into the foreign market, namely f_X
- (Additive) local distribution cost

Introducing wholesalers

- Export intermediaries randomly matched with indirect exporters
 - Intermediary firms are not heterogeneous
 - A given variety can not be exported to a given destination by more than one intermediary
- Intermediation services allow manufacturers to reduce the entry cost in the foreign market by a factor $\lambda \in (0, 1)$:
$$f_X^{ind} = \lambda f_X$$
- The main cost of resorting to intermediaries is represented by double marginalization
 - Wholesalers impose their markup over the procurement price, which already includes the markup imposed by the indirect exporter

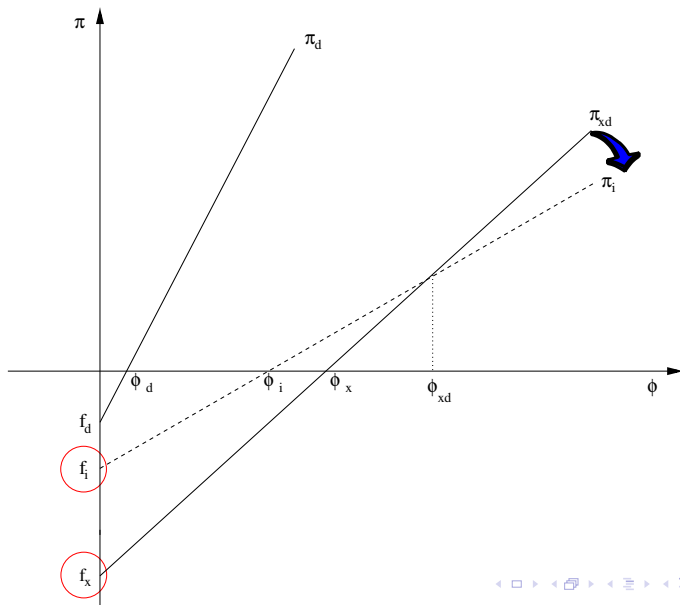
Caveat

- IO literature: double marginalization is inefficient and can be ruled out by means of a 2-part-tariff (TPT)
- Many reasons to believe that TPT is not suitable for the case of export intermediation
 - Not stable relationships between wholesalers and manufacturers (Bernard, Grazzi and Tomasi, 2011)
 - Full rent extraction to the detriment of wholesalers is not doable: they sunk the entry cost in the overseas market (they cannot be left with zero profit!)

Productivity sorting

- If $\lambda \in (0, 1)$ is sufficiently low (i.e. fixed costs of export for manufacturers significantly reduces when resorting to intermediaries), then the usual sorting pattern emerges.
- The expected sorting patterns emerges
- $\varphi_{X^{dir}} > \varphi_{X^{ind}} > \varphi_D$ (under mild restriction on λ)

Direct and indirect exporting



Extensive margin adjustment of the two export channels

- The **"indirect export" cut-off is more elastic to RER**, than the cut-off for direct export
- If firm productivity density is monotonically (weakly) decreasing (Pareto or uniform distributions), then new testable predictions on the effects of RER movements
- The measure of varieties that intermediaries drop in response to real appreciations is larger (on aggregate) than the measure of varieties discarded from direct exporters

Direct vs indirect exporters: pricing

- **Direct exporters** export price

$$p_i^*(\varphi_i) = \mu_i^* \cdot \frac{\tau}{\varphi_i}, \text{ where } \mu_i^* \equiv \frac{1}{2} \left(1 + \frac{\varphi_i}{\Phi} \right) \text{ and } \Phi \equiv \frac{w^* \varepsilon \tau}{a - dQ^*}.$$

- Firm j (**indirect exporter**) sells to intermediary k at price

$$p_{jk}(\varphi_j) = \mu_{jk} \cdot \frac{1}{\varphi_j}, \text{ where } \mu_{jk} \equiv \frac{1}{2} \left(1 + \frac{\varphi_j}{\Phi} \right),$$

- Heterogeneous markups and pricing-to-market also for all the exporters
- Manufacturing firm charges the same markup even when choosing different modes of export.

Wholesalers' pricing

- Given the procurement price p_{jk} , **intermediary** k will sell abroad at price

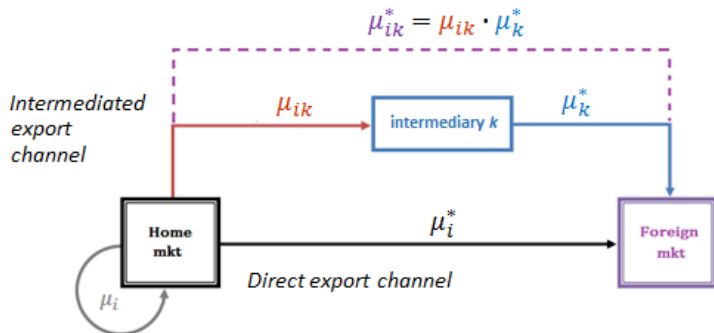
$$p_{jk}^*(\varphi_i) = \mu_k^* \cdot \tau \cdot p_{jk}(\varphi_j) , \text{ where } \mu_k^* \equiv \frac{1}{2} \left(1 + \frac{1}{\Phi \cdot p_{jk}(\varphi_j)} \right) ,$$

- To sum up, for products exported by trade intermediaries, the overall markup is

$$\mu_{jk}^* = \mu_k^* \cdot \mu_{jk} = \frac{1}{4} \left(\frac{\Phi + 3\varphi_j}{\Phi} \right) ,$$

- Since the intermediary's markup μ_k^* is greater than one, the overall markup, μ_{jk}^* , turns out to be larger than μ_j^* , i.e., the markup that would be imposed in case of direct export of the very same goods.

Export modes and markups



μ_i markup on domestic sales; μ_i^* markup on direct exports
 μ_{ik} markup manuf (ind exp); μ_k^* markup on indirect exports (intermediary)

Export price elasticity to RER movements

- Proposition 1: Both direct exporters and intermediaries adjust their export prices in response to real exchange rate movements, so as to limit the transmission of exchange rate variation into the final consumer price.
- As a result of the double price adjustment along the intermediated export channel it follows that

$$|E_{p_{jk}^*; \varepsilon}| > |E_{p_i^*; \varepsilon}| \quad \text{for any } \varphi_j > \frac{1}{3} \cdot \varphi_i \quad (1)$$

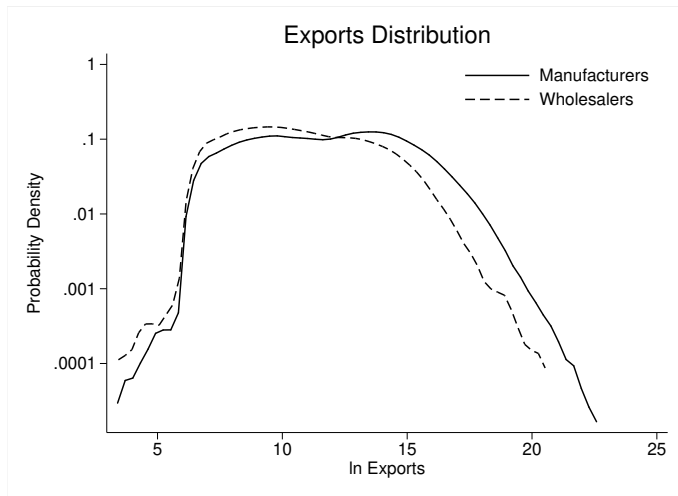
- Proposition 2: Because of the combination of the two price adjustment mechanisms, the partial elasticity of the export price to the real exchange rate can be larger for intermediaries than for direct exporters.

Adjustments along the extensive margins

- Following RER movements also the productivity cut-off to access foreign markets changes
 - In case of appreciation, some marginal direct exporters switch to being indirect; some indirect serve only the domestic market
- Proposition 3: In the event of a real appreciation (depreciation), the measure of varieties that switch from being exported indirectly to exiting the foreign market (that enter the foreign market through the intermediated channel) increases, compared to the measure of varieties that switch from being exported directly to being exported indirectly (from the indirect to the direct export channel), the higher the level of entry costs in the foreign market.

- **Statistiche del Commercio Estero (COE) Custom data**
 - Transactions level data: export values and quantity of the firm for HS6 product-country destination pairs
 - All cross-border transactions, 2000-2007
- **Archivio Statistico delle Imprese Attive (ASIA)**
 - Census of all operating businesses: sales, employment, main activity of the firm (NACE code)
 - Manufacturers (M) and Wholesalers (W) defined according to their primary NACE 3 digit industry
- **Istat standard firm level data, Micro.3, to test for the relation between productivity and ERPT**

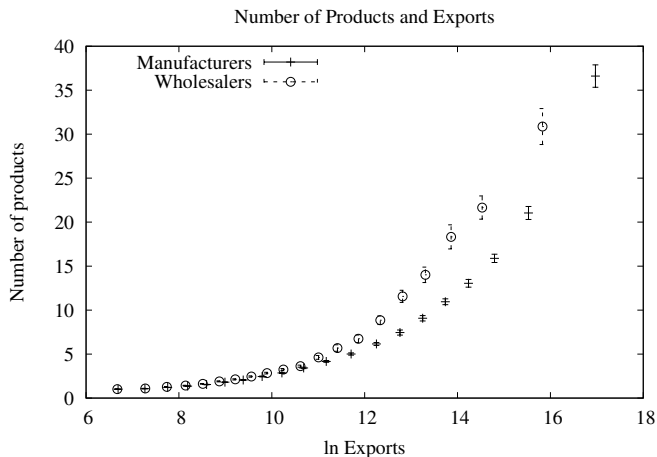
Descriptive evidence: distributions



Descriptive evidence: Number of countries



Descriptive evidence: Number of products



Empirical specifications

- Export **price elasticity** to the RER (reduced form)

$$\Delta \ln UnitValue_{fcpt} = \beta_0 + \beta_1 D_{ft}^W + \beta_2 \Delta \ln RER_{ct} + \\ + \beta_3 \Delta \ln RER_{ct} * D_{ft}^W + d_j + v_{fpct}$$

- We expect both β_2 and $\beta_3 < 0$

Evidence on export price (Table 2, paper)

Dep. Var.	$\Delta \ln \text{UnitValue}_{fcpt}$					
	(1)	(2)	(3)	(4)	(5)	(6)
D_f^W	-0.002 (0.001)	-0.002 (0.001)				
$\Delta \ln \text{RER}_{ct}$	-0.032*** (0.011)	-0.032** (0.012)	-0.029*** (0.009)	-0.029** (0.011)	-0.030** (0.013)	-0.030* (0.015)
$\times D_f^W$	-0.022** (0.011)	-0.022** (0.010)	-0.031** (0.013)	-0.031** (0.013)	-0.041** (0.018)	-0.041** (0.018)
Year FE - γ_t	Yes	Yes	Yes	Yes	Yes	Yes
Country FE - γ_c	Yes	Yes	Yes	Yes	No	No
Product FE - γ_p	Yes	Yes	No	No	No	No
Firm-Product FE - γ_{fp}	No	No	Yes	Yes	No	No
F-P(HS4)-C FE - γ_{fpc}	No	No	No	No	Yes	Yes
Clustering Country-Year	Yes	No	Yes	No	Yes	No
Clustering Country	No	Yes	No	Yes	No	Yes
Adj. R-squared	0.002	0.002	0.033	0.033	0.010	0.010
Observations	4,008,339	4,008,339	4,008,339	4,008,339	4,008,339	4,008,339

Robustness

- Interm. display 100% increase in price adjustm. (Col. 3)
- Control for possible shift of exports to other countries in response to RER change, $\ln nce_{ft}$, and interaction, Col 1
- Control for the fact that the sunk entry-costs can be at country-product level, $\ln npc_{fct}$, Col. 2
- Control for productivity differences across firms (particularly between M and W)
 - Size (number of empl) as proxy for productivity, Col. 3
 - TFP measured using the Levinsohn and Petrin's (2003) technique, Col. 4 and 5 on restricted sample
 - The results of Berman et al. (2012) also holds for Italian firms
 - We control for the interaction between TFP and RER

Firms' export price elasticity: Robustness (Tab.3 in the paper)

Dep. Var	$\Delta \ln \text{UnitValue}_{ict}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta \ln \text{RER}_{ct}$	-0.031** (0.017)	-0.026** (0.016)	-0.026** (0.014)	-0.032** (0.013)	0.138 (0.088)	-0.188*** (0.040)	-0.029*** (0.009)	-0.028** (0.010)
$\times D_t^W$	-0.030** (0.013)	-0.020** (0.010)	-0.048*** (0.014)	-0.062** (0.029)	-0.060** (0.029)	-0.042*** (0.013)	-0.035** (0.013)	-0.034** (0.013)
$\times \ln \text{Nce}_{it}$	0.001 (0.004)							
$\times \ln \text{Npc}_{ict}$		-0.009** (0.004)						
$\times \ln \text{Empl}_{it-1}$			-0.010** (0.003)					
$\times \ln \text{TFP}_{it-1}$					-0.035** (0.013)			
$\times \text{Market Costs}_c$						0.017 (0.016)		
$\times \text{Govern. Indic.}_c$						-0.017 (0.017)		
$\times \min(\text{entry}, \text{exit})_p$						-0.054 (0.055)		
$\times \text{Relation Spec.}_p$						0.205*** (0.050)		
Year FE - γ_t	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE - γ_c	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Product FE - γ_{fp}	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering Country-Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.034	0.033	0.034	0.035	0.034	0.033	0.064	0.041
Observations	4,008,339	3,852,915	4,008,339	2,136,352	2,136,352	3,843,906	2,205,518	3,807,225

Empirical analysis of the extensive margin adjustment (I)

We regress the number of varieties dropped on the direct and indirect channels between years t and $t + 1$, conditional on RER variations

$$\begin{aligned}\ln \# \text{Drop}_{pct}^W &= \beta_0 + \beta_1 \Delta \ln \text{RER}_{ct} + \beta_2 \Delta \ln \text{RER}_{ct} \times D^W + \\ &+ \beta_3 \Delta \ln \text{RER}_{ct} \times \text{FixCost}_c + \\ &+ \beta_4 \Delta \ln \text{RER}_{ct} \times D^W \times \text{FixCost}_c + \\ &+ \beta_5 D^W + \beta_6 D^W \times \text{FixCost}_c + \beta_7 X_t^W + \gamma_t + \gamma_{pc} + v_{pct},\end{aligned}$$

- X_t^W , time-variant control, proxy for the product diversification of the two categories of firms, namely $\ln \text{NP}_{ct}^W$ and $\ln \text{NC}_{ct}^W$
- β_1 & $\beta_1 + \beta_2$ capture the effect of RER movements for manuf. & intermed, respectively, when exporting to a low fixed costs country.
- When exporting to more difficult destinations, the effect of a RER shock is measured by $\beta_1 + \beta_2 + \beta_3 + \beta_4$ for Intermed.; and $\beta_1 + \beta_3$ for Manuf.
- Evidence support the model

Table: Product dropping in the aftermath of exchange rate movements

	ln #Drop ^W _{pct}					
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta \ln RER_{ct}$	0.098*** (0.010)	0.073*** (0.010)	0.036*** (0.007)	0.064*** (0.012)	0.076*** (0.012)	0.067*** (0.007)
$\times D^W$	-0.028* (0.015)	0.006 (0.015)	0.006 (0.010)	-0.041** (0.021)	-0.058*** (0.021)	-0.032*** (0.011)
$\times \text{Market Costs}_c$	0.109*** (0.011)	0.079*** (0.010)	0.015*** (0.003)			
$\times D^W \times \text{Market Costs}_c$	0.082*** (0.017)	0.040** (0.017)	0.010** (0.005)			
$\times \text{Governance Indicator}_c$				0.052*** (0.013)	0.063*** (0.013)	0.045*** (0.005)
$\times D^W \times \text{Governance Indicator}_c$				0.052** (0.022)	0.070*** (0.022)	0.044*** (0.008)
D^W	0.236*** (0.006)	0.281*** (0.005)	0.306*** (0.005)	0.246*** (0.005)	0.229*** (0.006)	0.312*** (0.005)
$D^W \times \text{Market Costs}_c$	0.110*** (0.004)	0.111*** (0.004)	0.084*** (0.003)			
$D^W \times \text{Governance Indicator}_c$				0.135*** (0.004)	0.146*** (0.004)	0.077*** (0.002)
$\ln NP_{ct}^W$	0.274*** (0.003)	0.297*** (0.003)	0.272*** (0.003)	0.286*** (0.003)	0.279*** (0.003)	0.270*** (0.003)
$\ln NC_{pt}^W$	0.309*** (0.002)	0.308*** (0.002)	0.309*** (0.002)	0.309*** (0.002)	0.310*** (0.002)	0.312*** (0.002)
Deviation_{pct}^W	0.129*** (0.001)	0.130*** (0.001)	0.129*** (0.001)	0.128*** (0.001)	0.128*** (0.001)	0.127*** (0.001)
Year FE - γ_t	Yes	Yes	Yes	Yes	Yes	Yes
Product-Country FE - γ_{pc}	Yes	Yes	Yes	Yes	Yes	Yes
Clustering Product-Country	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.715	0.715	0.715	0.714	0.714	0.714
Observations	1,272,941	1,272,941	1,272,941	1,305,283	1,305,283	1,305,283

Avenues for further research

- What are the mechanisms that govern the matching between indirect exporters and intermediaries?
 - Need to go beyond the simplifying assumptions of random matching and symmetric intermediary firms, but this requires an appropriate set of data
- What are the welfare effects of the existence and size of the sector of intermediation in international trade? To what extent is it relevant to promote exports of a country?
- Since an intermediary is less committed to exporting a given variety than a direct exporter... what sort of relationship is established between indirect exporters and intermediaries?