

# “TRADE AND ECONOMIC GROWTH: DOES THE SOPHISTICATION OF TRADED GOODS MATTER?”

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Work-in-Progress Paper by  
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# Motivation for the Study

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The income effects of trade openness cannot easily be inferred from aggregated trade data as done in the literature, because the growth effects of trade is likely to depend on the sophistication of the traded goods and, therefore, that aggregate data may wash out opposite productivity effects...

# What this Study Attempts to Answer?

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This study attempts to show that the income elasticities of trade differ widely across traded goods, essentially because of the hierarchical structure of learning by doing...

# Selected Literature which Supports Our Hypothesis ...

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- Exported and imported high-tech products that embodies a large R&D component are likely to enhance productivity.

(Rivera-Batiz and Romer, 1990; Grossman and Helpman, 1991; Coe and Helpman, 1995; Madsen, 2007; Buera and Oberfield, 2020)

- Trade in low-tech goods, may impact negatively on productivity because it discourages investment in R&D, education and sectors producing sophisticated products.

(Grossman and Helpman, 1991; Young, 1991; Matsuyama, 1992, 2019; Yanikkaya, 2003; Galor and Mountford 2006; Hausmann et al., 2007; Andersen and Babula, 2009)

# Research Question

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Do countries export and import high-tech products would benefit from trade more than the countries who trade in low-tech and agri products?

# Empirical Strategy

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Income regression model, the coefficients of trade openness is the focus variable:

$$\ln Y_{it} = \alpha_0 + \alpha_1 T_{it}^k + \alpha_2 \ln N_{it} + \alpha_3 \ln A_{it} + X' \alpha + e_{it} \quad (1)$$

To address the endogeneity,  $T_{it}^k$  will be instrumented with a constructed trade share using gravity variables.

# Empirical Strategy

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To find an instrument for trade openness, bilateral trade openness is regressed on the following set of geographic characteristics:

$$\frac{\tau_{ijt}^k}{GDP_{it}} = \beta_0 + \zeta_t^{Ai} \ln D_{ij}^{Air} + \delta_t^S \ln D_{ij}^{Sea} + \beta_1 \ln N_{it} + \eta_t^{Ar} \ln A_i + \vartheta_t^L (L_i + L_j) + \iota_t^B B_{ij} + \gamma_i + \gamma_j + \gamma_t + \varepsilon_{ij} \quad (2)$$

$$\hat{T}_{it}^k = \sum_{j \neq i} e^{\ln \left( \frac{\tau_{ijt}^k}{GDP_{it}} \right)} \quad (3)$$

# Sub-division of Trade in Goods

<b>1. Category: High-tech Industries - HT</b>	<b>3. Category: Medium-low-tech Industries - MLT</b>
Aircraft and spacecraft	Building and repairing of ships and boats
Pharmaceuticals	Rubber and plastics products
Office, accounting and computing machinery	Coke, refined petroleum products and nuclear fuel
Radio, TV and communications equipment	Other non-metallic mineral products
Medical, precision and optical instruments	Basic metals and fabricated metal products
<b>2. Category: Medium-high-tech Industries - MHT</b>	<b>4. Category: Low-tech Industries - LT</b>
Electrical machinery and apparatus, n.e.c.	Manufacturing, n.e.c.; Recycling
Motor vehicles, trailers and semi-trailers	Wood, pulp, paper, paper products, printing and publishing
Chemicals excluding pharmaceuticals	Food products, beverages and tobacco
Railroad equipment and transport equipment, n.e.c.	Textiles, textile products, leather and footwear
Machinery and equipment, n.e.c.	

**Bilateral annual trade data from 1996 to 2015 from COMTRADE database for 224 countries**

# Empirical Results – OLS results of Actual Trade Openness

	Dependent Variable ln(RGDP_pc)				
Goods Category	TT	THT	TLT	AG	MQ
actual trade openness	0.011	0.210***	-0.235***	-0.088**	0.015
	(0.043)	(0.046)	(0.056)	(0.040)	(0.019)

	Dependent Variable ln(RGDP_pc)				
Goods Category	TT	THT	TLT	AG	MQ
actual export openness	0.034*	0.030*	-0.028	-0.045**	0.017**
	(0.020)	(0.018)	(0.020)	(0.022)	(0.008)

	Dependent Variable ln(RGDP_pc)				
Goods Category	TT	THT	TLT	AG	MQ
actual import openness	-0.099*	0.211***	-0.255***	-0.052	-0.034
	(0.059)	(0.053)	(0.069)	(0.035)	(0.028)

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Empirical Results – IV results

	Dependent Variable ln(RGDP_pc)				
Goods Category	TT	THT	TLT	AG	MQ
actual trade openness	<b>0.302**</b>	<b>0.833***</b>	<b>-0.718***</b>	<b>-0.466***</b>	<b>0.103**</b>
	(0.139)	(0.127)	(0.175)	(0.086)	(0.045)

	Dependent Variable ln(RGDP_pc)				
Goods Category	TT	THT	TLT	AG	MQ
actual export openness	<b>0.239***</b>	<b>0.326***</b>	<b>-0.111*</b>	<b>-0.211***</b>	<b>0.003</b>
	(0.071)	(0.044)	(0.067)	(0.034)	(0.021)

	Dependent Variable ln(RGDP_pc)				
Goods Category	TT	THT	TLT	AG	MQ
actual import openness	<b>0.003</b>	<b>0.990***</b>	<b>-0.880***</b>	<b>-0.388***</b>	<b>0.092</b>
	(0.187)	(0.172)	(0.217)	(0.131)	(0.093)

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Overall Observations from this Sub Section

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- 1) Trade in sophisticated goods promotes growth whereas trade in unsophisticated goods, reduces income;
- 2) Semi elasticities for high-tech goods are higher for imports than exports
- 3) Negative income-effects of imports of low-tech manufactures and agricultural products are significantly larger for imports than exports, which indicates that specialization is not only factor explaining the negative income effects of trade in these goods; population pressure and crowding out effects matter.

# Composition of Trade and Growth

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$$\begin{aligned} \ln Y_{it} = & \gamma_0 + \gamma_1 \ln \left( \frac{T^{TT}}{GDP} \right)_{it} + \gamma_2 \ln \left( \frac{T^{THT}}{T^{TT}} \right)_{it} + \gamma_3 \ln \left( \frac{T^{TLLT}}{T^{TT}} \right)_{it} + \gamma_4 \ln \left( \frac{T^{AG}}{T^{TT}} \right)_{it} \\ & + \gamma_5 \ln \left( \frac{T^{MQ}}{T^{TT}} \right)_{it} + \gamma_6 \ln N_{it} + \gamma_7 \ln A_{it} + \mathbf{X}' \boldsymbol{\alpha} + e_{3,it}, \end{aligned} \quad (4)$$

# Income effects of the composition of trade, IV estimates (1996-2015)

Total trade openness/trade share (1)	Income effect (2)	Total export openness/ export share (3)	Income effect (4)	Total import openness/ import share (5)	Income effect (6)
$\ln \frac{T^{TT}}{GDP}$	-0.192 (0.121)	$\ln \frac{E^{TT}}{GDP}$	0.022 (0.065)	$\ln \frac{M^{TT}}{GDP}$	-0.147 (0.155)
$\ln \frac{T^{THT}}{T^{TT}}$	0.395 (0.328)	$\ln \frac{E^{THT}}{E^{TT}}$	0.290*** (0.053)	$\ln \frac{M^{THT}}{M^{TT}}$	0.280 (0.570)
$\ln \frac{T^{TLT}}{T^{TT}}$	-0.971*** (0.334)	$\ln \frac{E^{TLT}}{E^{TT}}$	-0.149 (0.125)	$\ln \frac{M^{TLT}}{M^{TT}}$	-1.721** (0.792)
$\ln \frac{T^{AG}}{T^{TT}}$	-0.507*** (0.094)	$\ln \frac{E^{AG}}{E^{TT}}$	-0.218*** (0.037)	$\ln \frac{M^{AG}}{M^{TT}}$	-0.324** (0.141)
$\ln \frac{T^{MQ}}{T^{TT}}$	-0.037 (0.084)	$\ln \frac{E^{MQ}}{E^{TT}}$	-0.001 (0.022)	$\ln \frac{M^{MQ}}{M^{TT}}$	-0.071 (0.168)

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Conclusion

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- Returning to the recurring theme, ‘does trade cause growth’, our results show that it is the composition of goods traded and not the overall level of trade openness that matters for income
- Economies who trade in high-tech products that embodies a higher level of R&D will be benefited through trade
  - technology diffusion
  - access to foreign intermediate inputs with embodied knowledge.
- Trade in low-tech products negatively affect growth
  - low-tech trade discourages investment in R&D.
- Low-income countries are trapped in trade in low-tech and agricultural products.

**Thank You!**

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