Exports, Imports, and Earnings Inequality: Micro-Data and Macro-Lessons from Ecuador

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How Does Trade Affect Earnings Inequality? This Paper

- **2 questions:**
  - Who is ***exposed*** to international trade, either through exports or imports?
  - What is the ***incidence*** of differences in trade exposure on earnings inequality?

1. ***Sufficient statistics*** *for quantifying distributional effects of trade in a country*
   - *Characterize* ***export*** *and* ***import*** *channels of factor exposure to international trade*
   - ***Domestic factor demand*** *controls the incidence of two exposure channels on domestic factor prices*
   - *Not necessary to know anything else about the rest of the world*
2. ***Measurement of exposure*** *using administrative data from Ecuador:*
   - *Customs + VAT + social security + ownership registry* $\Rightarrow$ ***Individual exposure*** *to exports and imports (labor + capital)*
3. ***Estimation of incidence*** *using observed export and import shocks:*
   - ***Micro estimation of parameters****: impact of trade shocks on factor spending and final sales across firms*
   - ***Macro test of model fit****: Study impact of exposure to export and import shocks on relative prices across factors*
4. ***Main Findings: Largest gains from trade at the top****, mostly through import channel*

Relationship to Existing Literature

- **Inspired by original factor content approach:**
  - Deardorff & Staiger (1988), Borjas, Freeman & Katz (1992, 1997), Wood (1994), Krugman (2000), Leamer (2000)
  - We like: Intuitive supply and demand framework, trade exposure measurement
  - We improve: Robustness of theoretical foundations, granularity of the data fed into the analysis, tighter relationship between theory and data, estimation of incidence of observed trade shocks

- **Related to recent empirical literature:**
  - Autor, Dorn, and Hanson (2013), Kovak (2013), Hummels et al. (2014), Pierce and Schott (2016)
  - We like: Use observed trade shocks to estimate incidence (across firms, industries, regions, education)
  - We improve: Sufficient statistics in trade models, extrapolate from evidence based on observed shocks to recover overall distributional impact of trade

Theory

Environment

- **Two countries: Home and Foreign**

- **Each country has an exogenous endowment of factors**
  - Domestic factors: $f \in F$ with endowment $\bar{L}_f$
  - Foreign factors: $f \in F^*$ with endowment $\bar{L}_f^*$

- **Perfectly competitive factor markets**
  - Agents make decisions taking as given factor prices, w and w^*

- **We impose no restrictions on preferences, technology and good market structure**

Factor Supply and Factor Demand

- ***Proposition 1.*** Consider perfectly competitive factor markets. There exist domestic and foreign factor demand functions, $\boldsymbol{L_f(w, w^*)}$ and $\boldsymbol{L_f^*(w, w^*)}$, such that equilibrium factor prices solve

$$\frac{L_f(w_T, w_T^*) + L_f^*(w_T, w_T^*)}{L_0(w_T, w_T^*) + L_0^*(w_T, w_T^*)} = \frac{\bar{L}_f}{\bar{L}_0} \qquad \forall f \in F \cup F^*$$

  - At equilibrium factor prices, $L_f^*(w_T, w_T^*)$ coincides with **Leontief's (1953)** factor content of exports
  - We define export exposure as $\boldsymbol{EE_{f,T} \equiv \frac{L_f^*(w_T, w_T^*)}{L_f(w_T, w_T^*) + L_f^*(w_T, w_T^*)}}$

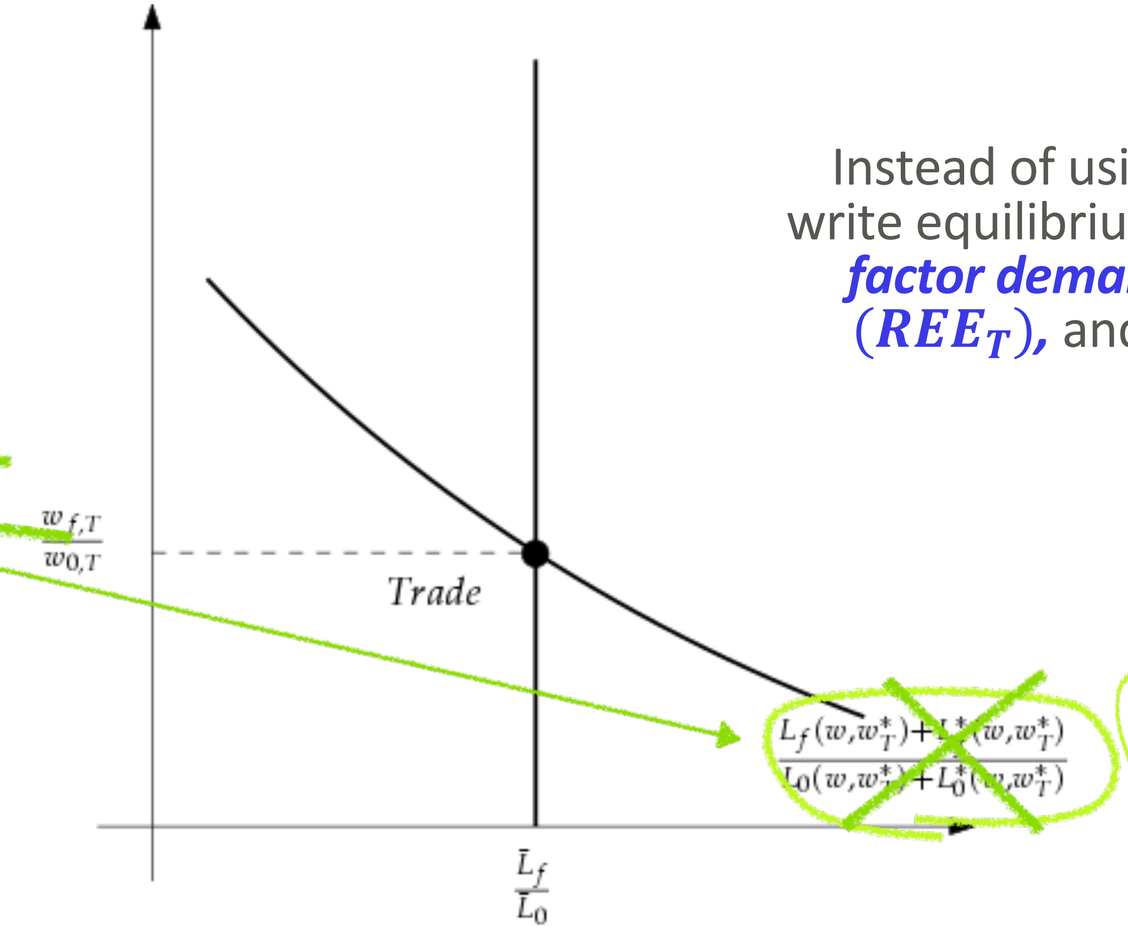
- ***Corollary 1.*** Consider perfectly competitive factor markets. For any foreign factor prices $\boldsymbol{w_T^*}$, there exists a relative domestic factor demand, $\boldsymbol{L_f(w, w_T^*)/L_0(w, w_T^*)}$, s.t. domestic factor prices solve

$$\frac{L_f(w_T, w_T^*)}{L_0(w_T, w_T^*)} \frac{1 - EE_{0,T}}{1 - EE_{f,T}} = \frac{\bar{L}_f}{\bar{L}_0} \qquad \forall f \in F$$

Factor Supply and Factor Demand

Preferences, technology, goods market structure

World factor demand



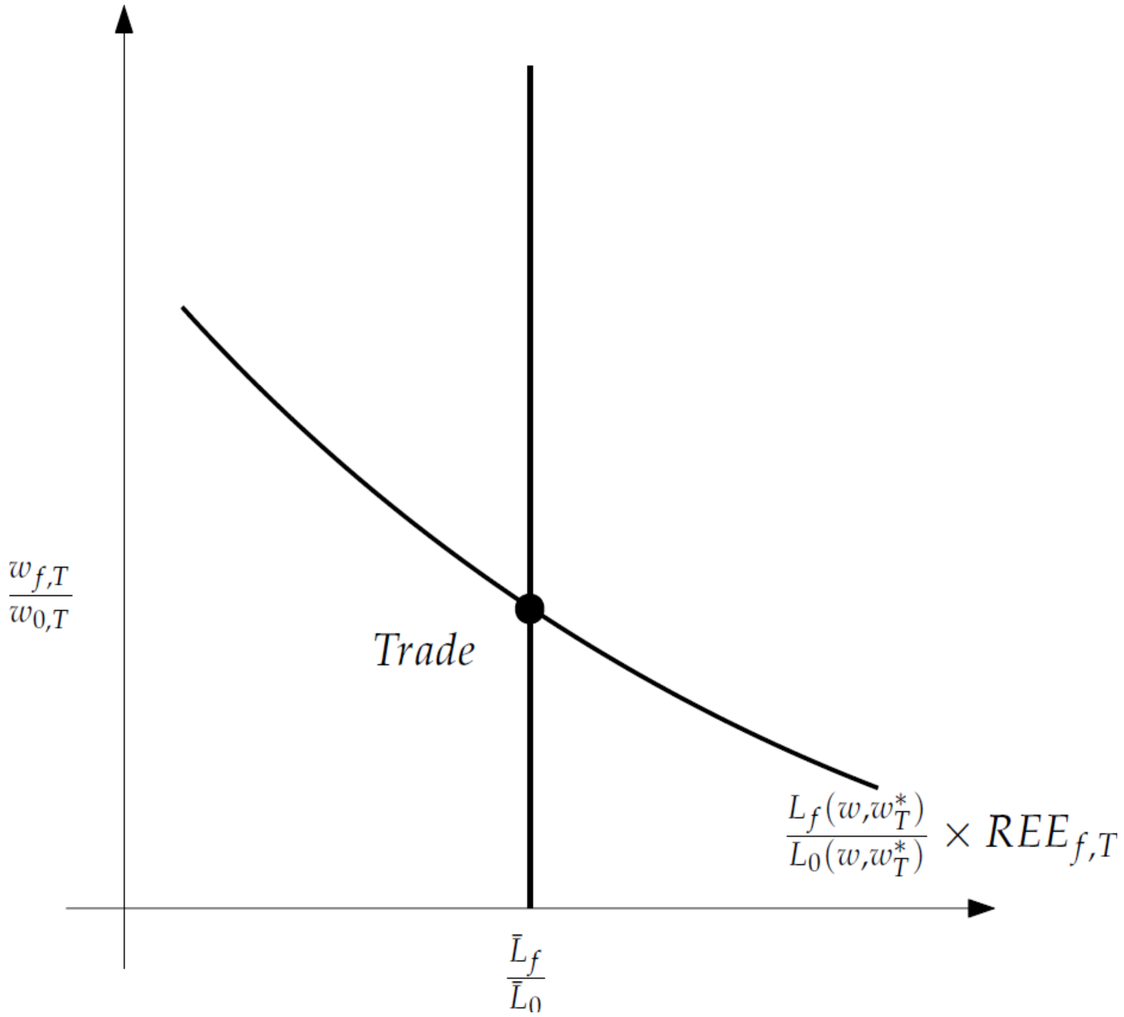
Instead of using foreign factor demand, we write equilibrium in terms of relative ***domestic factor demand, relative export exposure*** (REE_T), and ***foreign factor prices*** (w_T^*):

Relative **Domestic** Factor Demand $RD_f(w, w_T^*)$

$$RD_f(w, w_T^*) \times REE_{f,T}$$

with $REE_{f,T} \equiv \frac{1-EE_{0,T}}{1-EE_{f,T}}$

Exports, Imports, and Domestic factor prices



***Factor prices as a function of relative export exposure and foreign factor prices*:**

$$w_{f,T} = RD_f^{-1}\left(\left\{\frac{1}{REE_{g,T}}\frac{\bar{L}_g}{\bar{L}_0}\right\}_g, w_T^*\right)$$

- *Not necessary to know anything about rest of world, even if country is large.*
- *Testable macro predictions given knowledge of RD.*

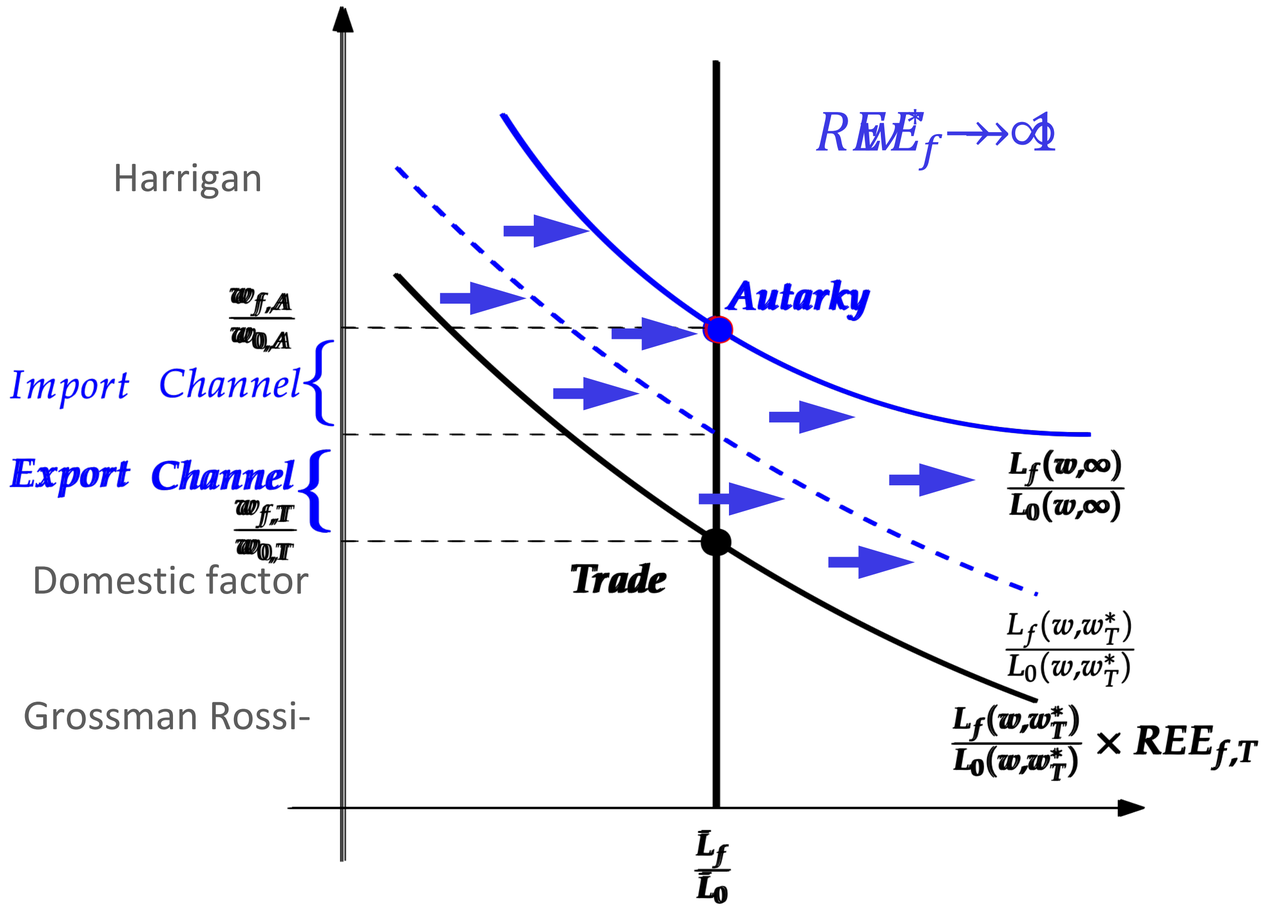
How do exports and imports affect inequality?

- **Export Channel (≠ in export exposure):**
  - Foreign factor demand ≠ Domestic factor demand ($REE \neq 1$)
  - Examples: Matsuyama ’07, Verhoogen ’08, Sampson ’14, Reshef ’16, Antras de Gortari Itskhoki ’17

$$(\Delta \ln w)_{exports} = -\int_{(u=0,v=\ln w_T^*)}^{(u=\ln REE_T,v=\ln w_T^*)} [\frac{\partial \ln RD}{\partial \ln w}]^{-1} du$$

- **Import Channel (≠ in import exposure):**
  - Domestic factor demand with access to foreign factors ≠ demand without ($d\ln RD / d\ln w^* \neq 0$)
  - Examples: Stolper Samuelson ‘41, Feenstra Hanson ‘96, Hansberg ’08, Burstein Cravino Vogel ’13

$$(\Delta \ln w)_{imports} = -\int_{(u=0,v=\infty)}^{(u=0,v=\ln w_T^*)} [\frac{\partial \ln RD}{\partial \ln w}]^{-1} [\frac{\partial \ln RD}{\partial \ln w^*}] dv$$



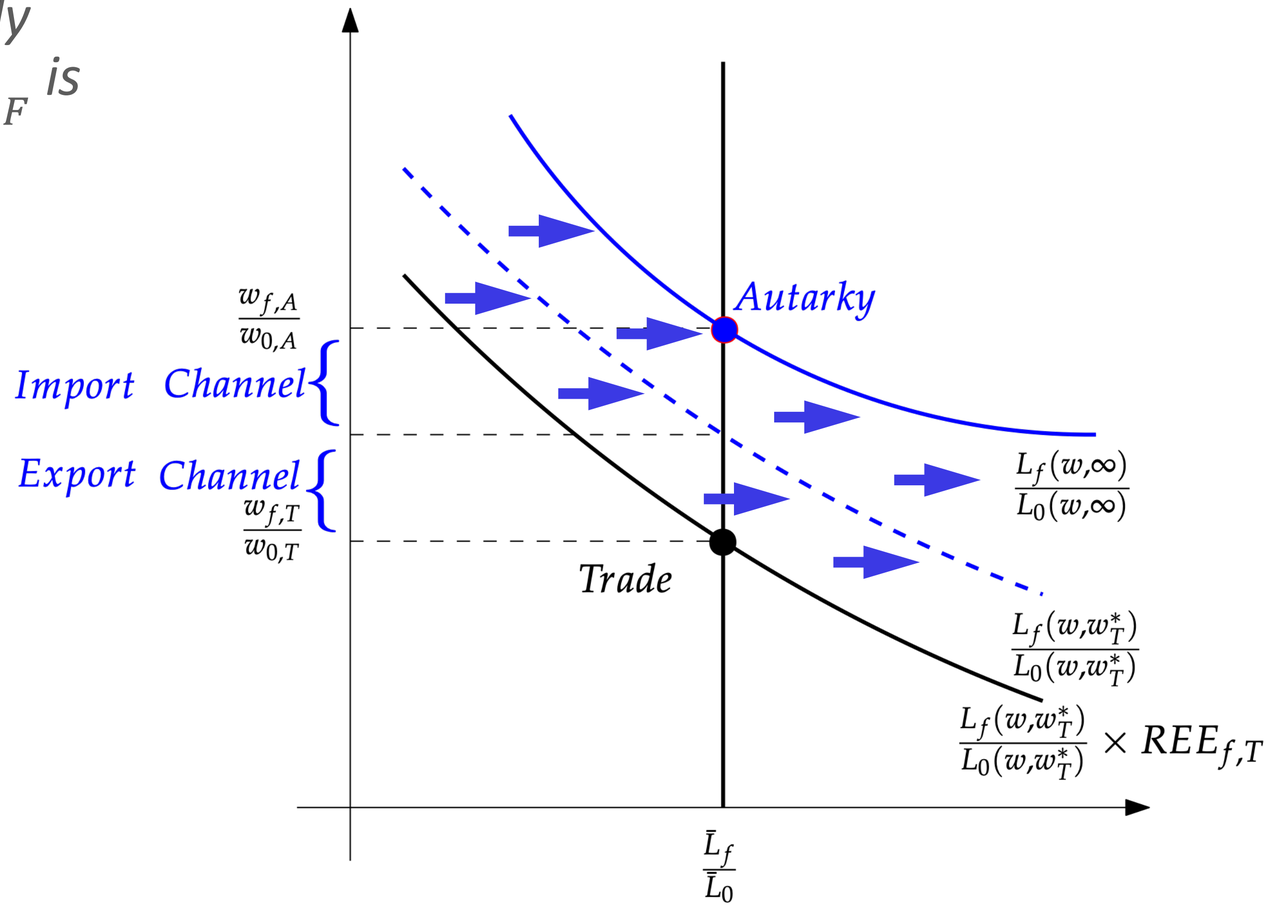
Why does trade shift relative factor demand?

Prop 2. *Suppose that* $\ln RD\ (w, w^*)$ *is continuously differentiable and* $\left\{\partial \ln RD_f\ (w, w^*)/\partial \ln w_g\right\}_{f,g\in F}$ *is invertible. Then:*

$$(\Delta \ln w)_{trade} = (\Delta \ln w)_{exports} + (\Delta \ln w)_{imports}$$

$$(\Delta \ln w)_{exports} = -\int_{(u=0,v=\ln w_T^*)}^{(u=\ln REE_T,v=\ln w_T^*)} [\frac{\partial \ln RD}{\partial \ln w}]^{-1} du$$

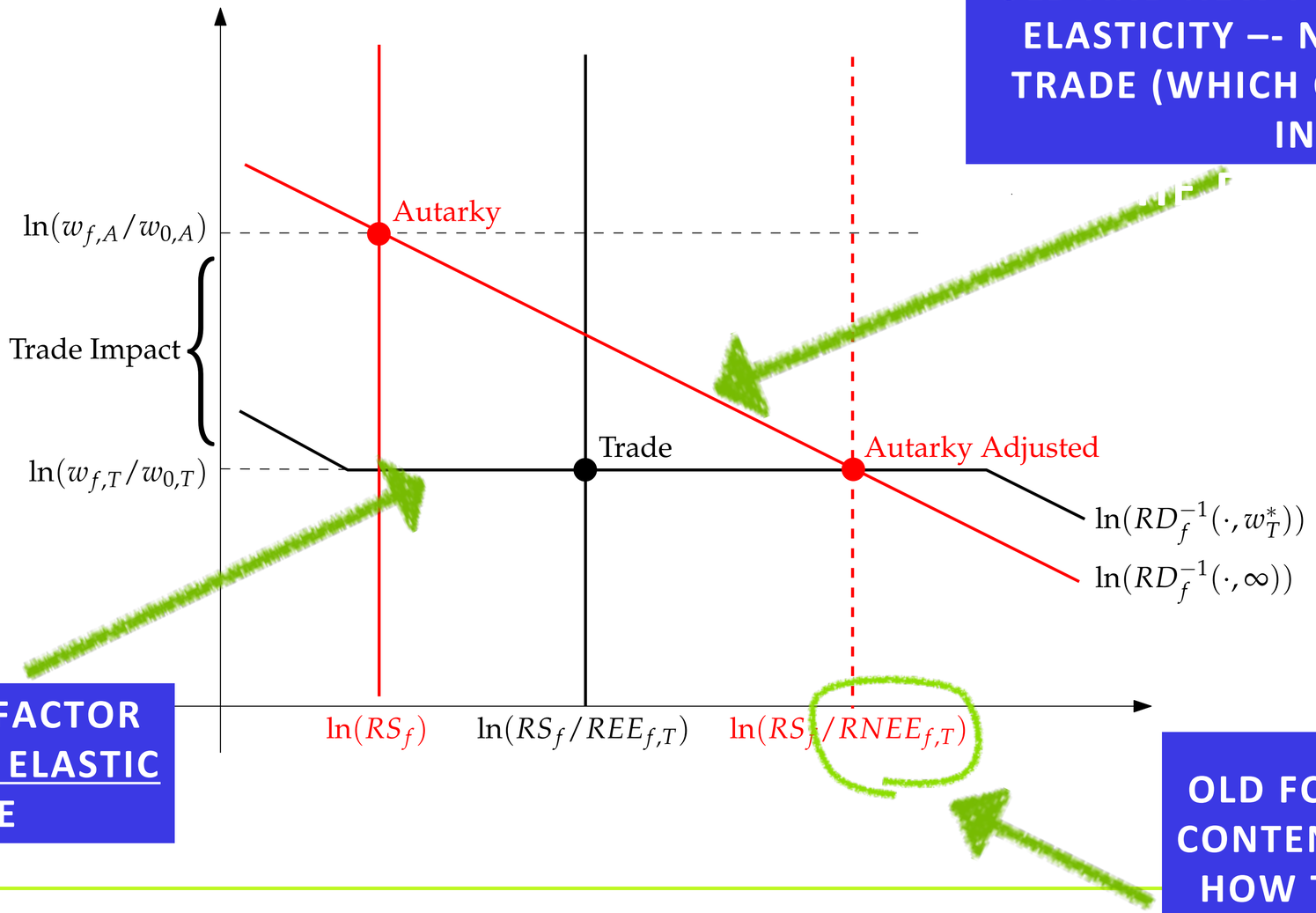
$$(\Delta \ln w)_{imports} = -\int_{(u=0,v=\infty)}^{(u=0,v=\ln w_T^*)} [\frac{\partial \ln RD}{\partial \ln w}]^{-1} [\frac{\partial \ln RD}{\partial \ln w^*}] dv$$



Original factor content approach

Comparison to Original Factor Content Approach (FCA)

OLD AND NEW FCA NEED AUTARKY RD ELASTICITY –- NOT THE ONE UNDER TRADE (WHICH OLD FCA ASSUMES IS INFINITY)



OLD FCA ASSUMES FACTOR DEMAND PERFECTLY ELASTIC UNDER TRADE

OLD FCA NEEDS NET FACTOR CONTENT OF EXPORTS -- BUT HOW TO MEASURE FACTOR CONTENT OF IMPORTS?

Back

Parametric Model of Domestic Factor Demand

- **Goal:** Simple model with both **export** and **import** channels
- **Preferences:** Representative household with nested CES preferences over domestic firms n in different sectors k:

$$U = \prod_{k \in \mathcal{K}} (U_k)^{\alpha_k},$$

$$U_k = \left(\sum_{n \in \mathcal{N}_k} \theta_{nc}^{\frac{1}{\sigma}} c_n^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}$$

  - CES between firms within sectors (σ)
  - Cobb-Douglas between sectors

- **Technology:** Firms have a nested CES production function over domestic factors, goods produced by domestic firms, and goods produced by foreign firms

$$q_n = \varphi_n (l_n)^{\beta_n} (m_n)^{1-\beta_n},$$

$$m_n = \left(\prod_{r \in \mathcal{N}} m_{rn}^{\theta_{rn}} \right)^{\Theta_n} \left(\prod_{r \in \mathcal{N}^*} m_{rn}^{\theta_{rn}^*} \right)^{1-\Theta_n}$$

$$l_n = \left(\sum_{f \in \mathcal{F}} \theta_{fn}^{\frac{1}{\eta}} l_{fn}^{\frac{\eta-1}{\eta}} \right)^{\frac{\eta}{\eta-1}},$$

  - CES within domestic factors (η)
  - Cobb-Douglas otherwise

- **Perfect competition** in good and factor markets

Export Exposure (EE_f)

$$\{EE_f\} = \frac{(Matrix\ of\ Factor\ shares) \times (Leontief\ Inverse) \times (Firm-level\ Gross\ Exports)}{Total\ Factor\ Earnings}$$

- **Share of exports in total factor income**
- Granular version of Leontief's factor content of exports (definition of factor + IO matrix)
- Model does not restrict ***levels*** of firm outside demand and supply (EE_f ***unrestricted***)
- Higher EE_f $\Rightarrow$ Higher relative factor demand $\Rightarrow$ Higher relative price under trade

Import Exposure (IE_f):

$$\frac{\partial \ln RD_f}{\partial \ln w^*} = (\sigma - 1)(IE_f - IE_0)$$

$$IE_f = \sum_{sectors} \sum_{firms:\, n} \begin{pmatrix} Share\ of\ firm\ \ n\ \ in \\ domestic\ demand\ of\ \ f \end{pmatrix} \times \begin{pmatrix} Total\ import\ share\ of\ firm\ \ n \\ relative\ to\ its\ sector\ avg. \end{pmatrix}$$

- **Expenditure switching** in response to cheaper foreign factors. It is proportional to **cross-firm covariance** between import cost share and factor employment for domestic use
- $\{Total\ import\ share_n\} = (Transpose\ Leontief\ Inverse)\ \{Import\ share_n\}$
- If $\sigma > 1$, higher $IE^f \Rightarrow$ Lower relative factor demand $\Rightarrow$ Lower relative price under trade

Exposure Measurement

Administrative Microdata in Ecuador (2009-2015)

Firms

- **Corporate Income Tax**
  - Firm revenues, costs, profits
- **VAT (matched firm-to-firm data)**
  - Transactions between all formal firms
  - Transaction-level imports & exports by firm

Workers

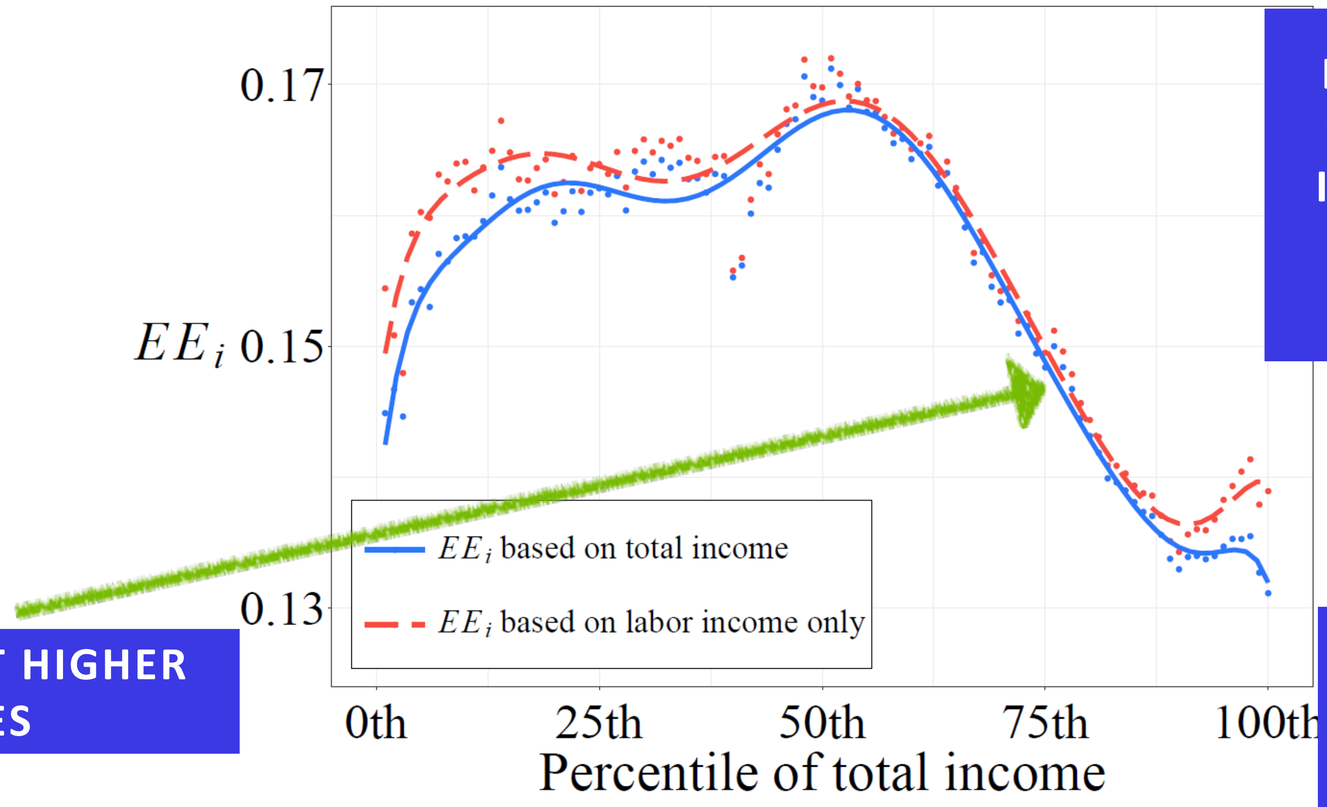
- **Social Security (matched employee-employer)**
  - Income of all formal workers in the economy

Capital Owners

- **Civil Registrar (matched firm-owner)**
  - Share of each private firm owned by each taxpayer
  - Profits of firms = return on “capital” (self-employed treated as labor)

Factors = 73 Labor types (24 Province x 3 Education + Others)
+ 2 Capital types (“Oil” + “Non-Oil”)

Export Exposure (EE_i) Across Income Distribution



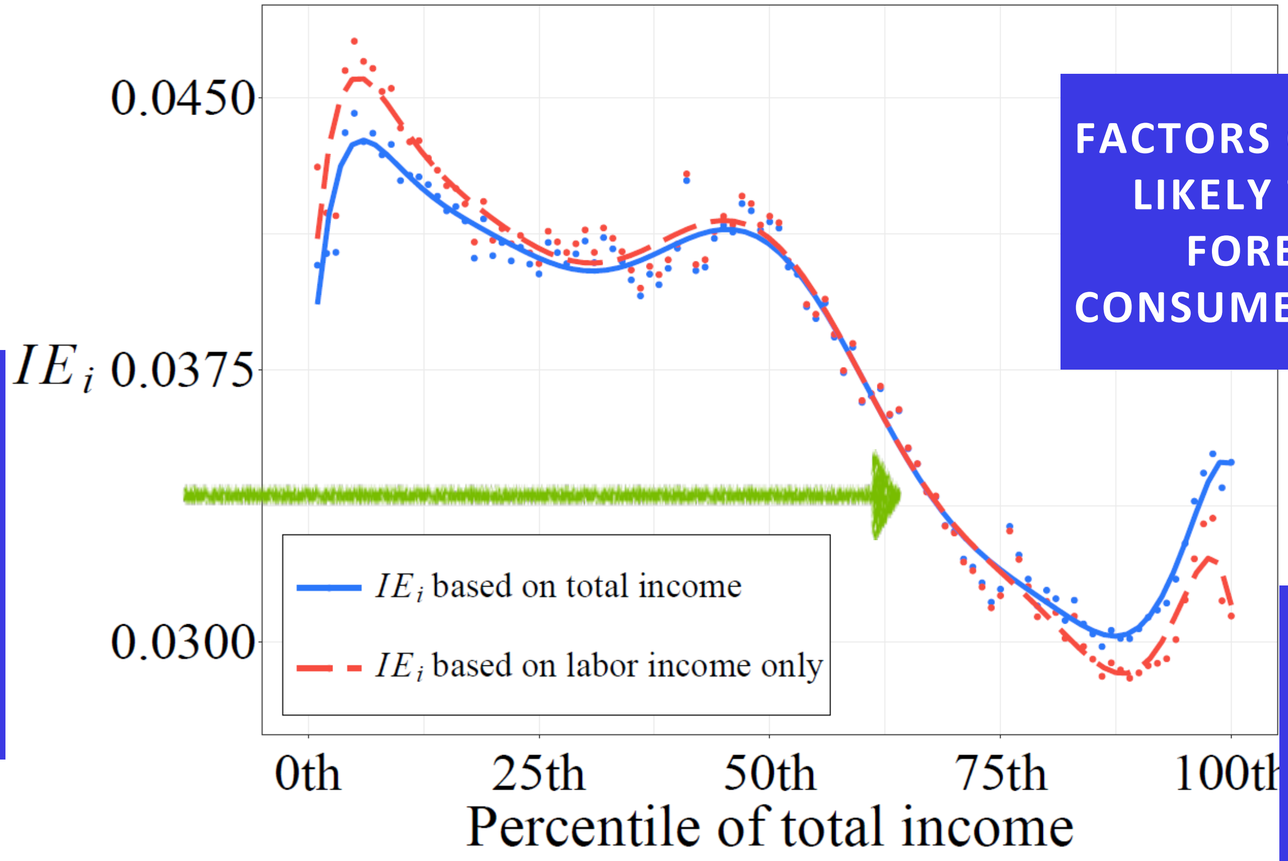
LOWER FRACTION OF FACTOR SERVICES SUPPLIED BY HIGH-INCOME INDIVIDUALS IS SOLD ABROAD (DIRECTLY OR INDIRECTLY)

EE= LOWER AT HIGHER INCOMES

CONSISTENT WITH H–O STORY: LOW–SKILL ABUNDANT ECUADOR EXPORTS MORE SERVICES OF LOW–SKILL WORKERS

Import Exposure (IE_i) Across Income Distribution

IE = PRO RICH 10% IMPORT PRICE INCREASE $\Rightarrow (\sigma - 1) \times 0.16\%$ RISE IN RELATIVE DEMAND FOR LOW-INCOME INDIVIDUALS



FACTORS OWNED BY THE RICH LESS LIKELY TO BE SUBSTITUTED BY FOREIGN FACTORS WHEN CONSUMERS SWITCH EXPENDITURE

INCONSISTENT WITH H-O STORY: IMPORTERS EMPLOY HIGH–SKILL, HIGH–INCOME INDIVIDUALS

Micro Estimation

Ecuador's Factor Demand: Elasticity of substitution across factors (η)

- **CES demand in firm n for factor f at year t:**

$$\ln(\textit{factor spending})_{fn,t} = (1-\eta)\times\ln(\textit{factor price})_{f,t} + \zeta_{n,t} + \delta_f + (\textit{demand residual})_{fn,t}$$

  - Fixed-effects: firm-year and factor

- **Simultaneity bias in OLS ⇒ Shift-share IVs based on model-implied exposure**

$$\hat{E}_{f,t} = \sum_{product:v} Export\ Exposure_{f,v} \times Export\ Shock_{v,t}$$

$$\hat{I}_{f,t} = \sum_{product:v} Import\ Exposure_{f,v} \times Import\ Shock_{v,t}$$

  - Exposure: Same measure, but computed with firm-level trade by product (HS6) – customs data
  - Shocks: Global (log) export total value and import unit values (excluding Ecuador) – BACI data
  - **Identification:** Global shocks uncorrelated with factor-firm demand shocks in Ecuador over time

Ecuador's Factor Demand: Elasticity of substitution across factors (η)

	Baseline
	(1)
Estimate of η	2.09
	(0.35)
First-stage F statistic	10.1
Factor-firm-year obs.	625,024
Number of factors	75
Alternative:	-
	-
	-

Notes: Sample of incorporated firms with positive payments for more than one factor and more than one employee. Baseline specification uses a balanced panel of observations from 2009-2015, uses both export and import IVs, includes firm-year and factor fixed effects, and includes the extra controls comprising of year fixed effect interacted with the factor's exposure at t_0 to exports and imports. Observations are weighted by initial factor-firm payments (winsorized at the 95 percetile). Standard errors in parentheses are clustered by factor.

Ecuador's Factor Demand: Elasticity of substitution across factors (η)

	Baseline	Alternative Specifications						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimate of η	2.09	2.15	2.13	2.02	2.06	2.11	2.10	3.30
	(0.35)	(0.65)	(0.48)	(0.73)	(0.32)	(0.33)	(0.59)	(2.52)
First-stage F statistic	10.1	5.0	19.3	3.0	10.3	8.6	18.3	5.2
Factor-firm-year obs.	625,024	625,024	625,024	625,024	512,915	861,747	536,795	446,169
Number of factors	75	75	75	75	75	75	75	75
Alternative:	-	Drop extra controls	Export IV only	Import IV only	Firms w/ >5 workers	Un-balanced panel	Years 2010-2015	Years 2011-2015

Notes: Sample of incorporated firms with positive payments for more than one factor and more than one employee. Baseline specification uses a balanced panel of observations from 2009-2015, uses both export and import IVs, includes firm-year and factor fixed effects, and includes the extra controls comprising of year fixed effect interacted with the factor's exposure at t_0 to exports and imports. Observations are weighted by initial factor-firm payments (winsorized at the 95 percetile). Standard errors in parentheses are clustered by factor.

Ecuador's Factor Demand: Elasticity of substitution across firms (σ)

- **CES demand in firm n for factor f at year t:**

$$\ln(final\ sales)_{n,t} = (1-\sigma)\times\ln(firm\ price)_{n,t} + \zeta_{k,t} + \delta_n + (demand\ residual)_{n,t}$$

  - Fixed-effects: sector-year and firm

- **Firm price is not observed ⇒ Use model to back it out**

$$\{\ln(final\ price)_{n,t}\} = (Transpose\ Leontief\ inverse)_t \times (firm\ factor\ shares)_t \times (ln\ factor\ prices)_t + \{\rho_{n,t}\}$$

  - We must account for domestic primary factors and foreign imported factors

- **Simultaneity bias in OLS ⇒ Firm-level aggregation of factor shift-share IVs**

$$\hat{E}_{n,t} = \sum_{factors:f} Cost\ share_{fn} \times \hat{E}_{f,t}$$

$$\hat{I}_{n,t} = \sum_{factors:f} Cost\ share_{fn} \times \hat{I}_{f,t}$$

$$\hat{w}^*_{n,t} = \sum_{products:v} Import\ Share_{vn} \times Import\ Shock_{v,t}$$

  - **Identification:** Global shocks uncorrelated with firm demand shocks in Ecuador over time

Ecuador's Factor Demand: Elasticity of substitution across firms (σ)

	Baseline
	(1)
Estimate of σ	1.96
	(0.57)
First-stage F statistic	13.1
Firm-year obs.	180,992
Number of firms	25,856
Alternative:	-
	-
	-

Notes: Sample of incorporated firms with positive final sales and more than one employee. Baseline specification uses a balanced panel of observations from 2009-2015, uses both export and import IVs, includes firm and sector-year fixed effects, and includes the extra controls comprising of year fixed effects interacted with the firm's cost share spent on primary factors and imports. Observations are weighted by initial firm final sales (weights winsorized at the 95 percetile). Standard errors in parentheses are clustered by firm.

Ecuador's Factor Demand: Elasticity of substitution across firms (σ)

	Baseline	Alternative Specifications						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimate of σ	1.96	1.98	1.76	1.91	1.84	2.86	1.48	1.51
	(0.57)	(0.55)	(0.19)	(0.57)	(0.63)	(0.70)	(0.48)	(0.72)
First-stage F statistic	13.1	14.2	1.1	19.4	8.6	15.0	10.4	4.2
Firm-year obs.	180,992	180,992	180,992	180,992	120,050	279,183	155,136	129,280
Number of firms	25,856	25,856	25,856	25,856	17,150	47,413	25,856	25,856
Alternative:	-	Drop extra controls	Export IV only	Import IV only	Firms w/ >5 workers	Un-balanced panel	Years 2010-2015	Years 2011-2015

Notes: Sample of incorporated firms with positive final sales and more than one employee. Baseline specification uses a balanced panel of observations from 2009-2015, uses both export and import IVs, includes firm and sector-year fixed effects, and includes the extra controls comprising of year fixed effects interacted with the firm's cost share spent on primary factors and imports. Observations are weighted by initial firm final sales (weights winsorized at the 95 percetile). Standard errors in parentheses are clustered by firm.

Testing Domestic Factor Demand

Cobb-Douglas Assumptions: A Micro Test

- **We use firm-level prices measured under the null of baseline model**
- **CES final demand for composite good of sector s**

$$\ln(sector\ final\ sales)_{s,t} = \beta_{sector} \ln(sector\ price\ index)_{s,t} + \zeta_t + \delta_s + (demand\ residual)_{s,t}$$

  - We use fixed-effects for years and sectors, and sector average of firm-level cost IVs

- **CES demand of firm n for imported and domestic inputs**

$$\ln\left(\frac{import\ input\ share_{n,t}}{domestic\ input\ share_{n,t}}\right) = \beta_{import}\left(\frac{import\ price_{n,t}}{domestic\ input\ price_{n,t}}\right) + \zeta_t + \delta_n + (demand\ residual)_{n,t}$$

  - We use fixed-effects for years and firms, and firm's import price IV

- **CES demand of firm n for inputs of different suppliers m**

$$\ln(firm\ input\ share_{mn,t}) = \beta \ln(firm\ price)_{m,t} + \zeta_{n,t} + \delta_m + (demand\ residual)_{n,t}$$

  - We use fixed-effects for buyer-year and suppliers, and the same firm-level cost IVs

Cannot reject Cobb-Douglas assumptions in the model

	Sensitivity of expenditure shares to relative prices across:		
	sectors in final demand (1)	imported and domestic inputs (2)	domestic input suppliers (3)
	-0.18	-0.25	0.06
	(0.32)	(0.34)	(0.26)
P-value ($H_0 : \beta = 0$)	[0.57]	[0.47]	[0.80]
First-stage F statistic	14.0	71.3	7.4
Observations	448	19,575	1,476,055
Clusters	64	2,840	33,392

Predicted vs. Observed Changes in Factor Prices: A Macro Test

- **Question:** *Is estimated factor demand model consistent with observed response of domestic factor prices to changes in foreign prices w_t^* and export exposure REE_t?*

- **Testable structural relation between factors prices, export exposure and import prices:**

$$w_{f,T} = RD_f^{-1}\left(\left\{\frac{1}{REE_{g,T}}\frac{\bar{L}_g}{\bar{L}_0}\right\}_g, w_T^* | (\hat{\eta}, \hat{\sigma}), W\right)$$

- **We now know the relative demand using parameter estimates $(\hat{\eta}, \hat{\sigma})$ and micro-data on firms and individuals (W)**

Predicted vs. Observed Changes in Factor Prices: A Macro Test

- **Question:** *Is estimated factor demand model consistent with observed response of domestic factor prices to changes in foreign prices w_t^* and export exposure REE_t?*

- **Model prediction (up to first-order):**

$$\{\ln w_{f,t}\} = -\left(\frac{\partial \ln RD}{\partial \ln w}\right)^{-1}_{t-1}\left[\left(\frac{\partial \ln RD}{\partial \ln w^*}\right)_{t-1}\{\Delta \ln w^*_{n,t}\} + \{\Delta \ln REE_{f,t}\}\right] + \{\ln w_{f,t-1}\} + \{\epsilon_{f,t}\}$$

PREDICTED RESPONSE TO OBSERVED EXPORT AND IMPORT SHOCKS

$$\equiv H_{t-1}(\Delta \ln w_t^*, \Delta \ln REE_t | (\hat{\eta}, \hat{\sigma}))$$

DOMESTIC SHOCKS

- **Micro to Macro Test:**

$$\Delta \ln w_{f,t} = \beta H_{f,t-1}(\Delta \ln w_t^*, \Delta \ln REE_t | (\hat{\eta}, \hat{\sigma})) + \zeta_f + \epsilon_{f,t} \quad \rightarrow \quad \beta = 1?$$

- **IV?** Is used, estimated, or tested in valid under same exclusion restriction

Predicted vs. Observed Changes in Factor Prices

	Δ Log (observed factor price)				
	(1)	(2)	(3)	(4)	(5)
Δ Log (predicted factor price)	1.07	1.59	1.24	1.01	0.85
$\equiv H_{t-1}(\Delta \ln w_t^*, \Delta \ln REE_t \mid (\hat{\eta}, \hat{\sigma}))$	(0.15)	(0.61)	(0.62)	(0.16)	(0.20)
P-value of $H_0 : \beta_{\text{fit}} = 1$	[0.63]	[0.34]	[0.70]	[0.98]	[0.44]
First-stage F statistic	1844.0	198.1	182.9	294.8	124.6
Factor-year observations	525	525	525	525	518
Number of factors	75	75	75	75	74
Includes year indicators times:					
EE_{f,t_0} and IE_{f,t_0}		✓	✓	✓	✓
Capital factors indicator			✓	✓	✓
Province indicators				✓	✓
Education level indicators					✓

CAN'T REJECT NULL THAT BETA=1

Counterfactuals

Distribution of the Gains from Trade

Observed Trade Equilibrium

$$w_{f,T} = RD_f^{-1}\left(\left\{\frac{1}{REE_{g,T}}\frac{\bar{L}_g}{\bar{L}_0}\right\}_g, w_T^* | (\hat{\eta}, \hat{\sigma})\right)$$

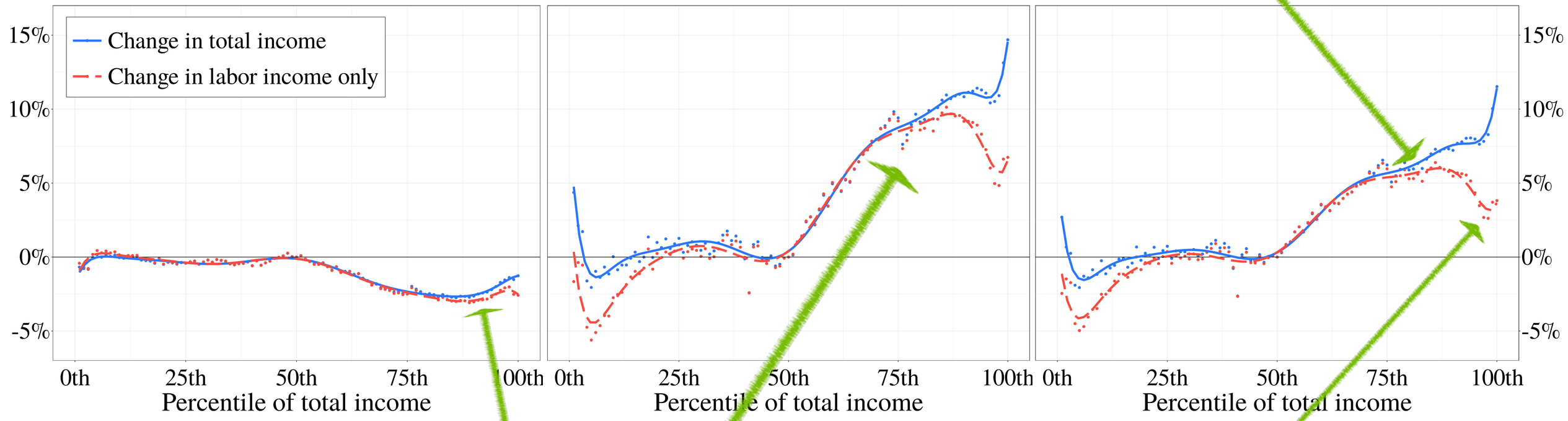
$$REE_T \to 1$$

$$w_T^* \to \infty$$

Counterfactual Autarky Equilibrium

$$w_{f,A} = RD_f^{-1}\left(\left\{\frac{\bar{L}_g}{\bar{L}_0}\right\}_g, \infty | (\hat{\eta}, \hat{\sigma})\right)$$

Distribution of the Gains from Trade



PRO-RICH OVERALL

EXPORT CHANNEL PRO-POOR, BUT IMPORT CHANNEL PRO-RICH

CAPITAL GAINS MORE FROM TRADE THAN HIGH-INCOME LABOR

From Trade Exposure to Trade Impact

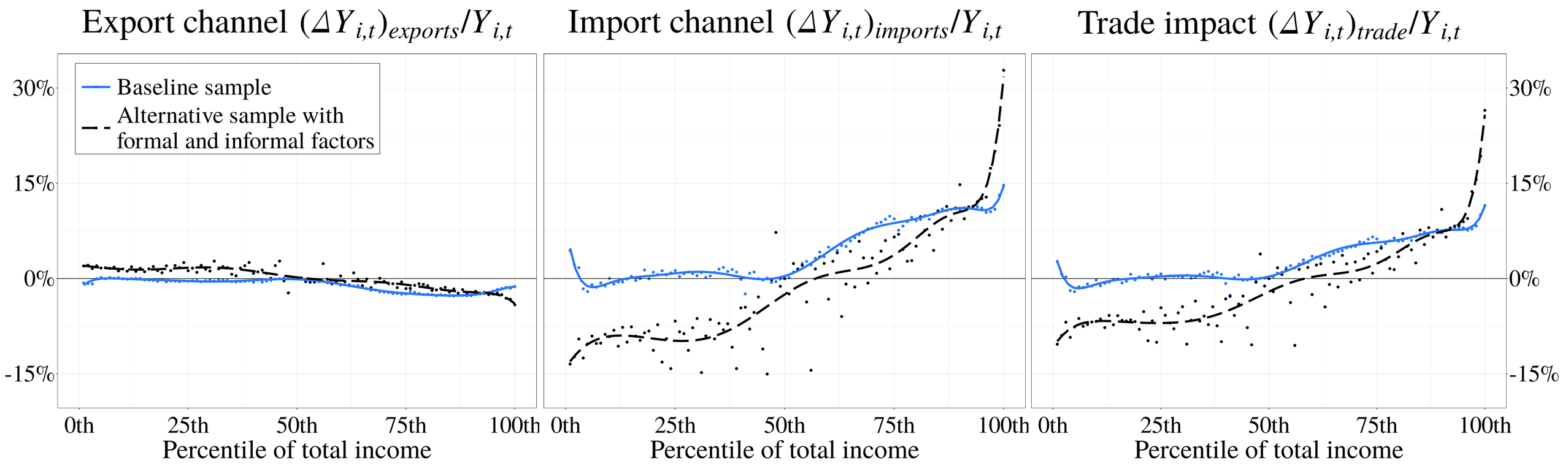
TWO MEASURES OF EXPOSURE HAVE EXPECTED SIGN

R2 IS HIGH…

MOSTLY DRIVEN BY IMPORT EXPOSURE

	Change in total income		Change in labor income	
	Estimates	Shapley % R^2	Estimates	Shapley % R^2
	(1)	(2)	(3)	(4)
EE	1.228	7.5%	1.320	8.1%
	(0.001)		(0.001)	
IE	-8.162	92.5%	-8.217	91.9%
	(0.002)		(0.001)	
R^2	89.6%	100.0%	92.9%	100.0%
Obs.	2,612,867		2,413,683	

Adding Informal Employment (ENIGHUR survey data)



SIMILAR EXPORT CHANNEL, MAGNIFIED IMPORT CHANNEL

OVERALL EFFECT SIMILAR, EXCEPT AT VERY TOP (DRIVEN BY CAPITAL EARNINGS)

Changes in Inequality in a Closed Economy

	Actual change in open economy	Counterfactual change in closed economy
Δ ln (50-10 income ratio)	-0.134	-0.074
Δ ln (90-50 income ratio)	-0.185	-0.098
Δ ln (99-90 income ratio)	-0.046	-0.097

Notes: All calculations are based on augmented sample with informal earnings included. "50-10 income ratio" (etc.) calculated from the ratio of the income of the 50th-percentile earner to that of the 10th-percentile earner, separately in each year and model scenario.

Concluding Remarks

Summary

- **How does trade affect earnings inequality?**
  - *Export channel* — $\neq$ in export exposure — $REE \neq 1$ — simply measure REE
  - *Import channel* — $\neq$ in import exposure — $\frac{d\ln RD}{d\ln w^*} \neq 0$ — estimate $RD(w^*)$ flexibly (IE, η, σ)

- **Estimates from admin. micro-data (formal sector firms, workers, owners) in Ecuador**
  - **Largest earnings gains from trade in the upper-half of the income distribution**
  - Export channel pro poor, but regressive import channel dominates