

# International Relocation of Production and Growth

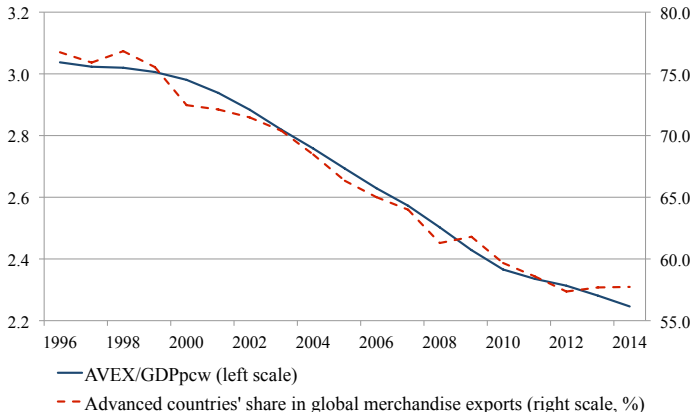
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# International relocation of production (*IPR*)

- *IPR*: changes of market shares in global product markets across countries with different income levels
  - ▶ Large *IPR* to the **South** over the last 25 years.
  - ▶  $AVEX_t \equiv \sum_{c=1}^C s_{ct} GDP_{pc_{ct}}$  ;  $s_{ct}=c$ 's share in global merchandise trade



# The Paper

- *IPR*: potentially, many important **effects**:
  - ▶ considerable impact on relative output, employment & wages across countries (e.g. loss more than 3.5 millions jobs in US manufacture betw. 2001 and 2007: Pierce&Schott 2016).
  - ▶ notable social and political distress in some rich countries.
  - ▶ precipitating some return to protectionism.
- **What do we do in this paper?**
  - 1 Describe the *IPR* process over the 1996-2014 period using data on 5,000 HS 6-digit products.
  - 2 Estimate the impact of *IPR* on cross-country growth.
  - 3 Explore adjustment and export upgrading by countries affected by *IPR*.

# Literature

- Connections with many strands of trade and growth literature:
  - ▶ Product life-cycle: Vernon 1966, Krugman 1979, Dollar 1986, Jensen&Thursby 1986, Grossman&Helpman 1991, Antrás 2005.
  - ▶ Offshoring and production fragmentation: e.g., Feenstra 1998, Hummels, Ishii&Yi 2001, Hummels, Munch&Xiang 2016.
  - ▶ Impact on occupations and wages: e.g., Autor, Dorn, and Hanson 2013, Ebenstein et al. 2014, Acemoglu et al. 2016, Pierce & Schott 2016; Autor, Dorn, and Hanson 2016.
  - ▶ Relocation specific industries and impact on particular countries: e.g., Lall et al. 2004, Marin 2006, Sturgeon et al. 2008; Timmer et al. 2015
  - ▶ Sophistication, complexity & growth: Lall et al. 2006, Hausmann, Hwang & Rodrik 2007, Hidalgo, Hausmann et al. 2009, 2011.
  - ▶ Product shocks & growth: Barro and Sala-i-Martin 1992.
  - ▶ Stoch. dynamics comparative advantage: Hanson Lind&Muendler 2017
- No global assessment of the impact across all products and countries.

# Main result

- *IPR* to the South has a **negative impact** on the **previous exporting countries** of the relocated products.
  - ▶ However, **this effect decreases with income** and becomes zero or not significant for the richer countries.
    - ★ At the first quartile of the country income distribution, a one-standard negative deviation of a country's *relocation impact index* reduced its annual growth by **0.61 percentage points**.
- High-income countries facing increased competition from developing economies **reshaped and upgraded their export baskets**. Their aggregate output was not hurt by *IPR* to the South.
  - ▶ Low-income countries in the same circumstances **failed to do so**.
- Advanced economies appear to **adjust** much more effectively than developing economies **to changes in comparative advantage** by reallocating resources to new productions and exports.

# Some examples and anecdotal evidence

- Bangladesh, Honduras, Philippines, Malaysia, and Thailand: large low- and middle-income economies that relatively **underperformed** over the period,
  - ▶ given their growth fundamentals: initial GDPpc, human capital, rule of law, openness, size, diversification, complexity, and continent.
- These countries specialized in the products that **experienced the most intense relocation** towards the South
  - ▶ Textiles, footwear, and leather products: 84% of Bangladesh's and 45% of Honduras' exports in 1996
  - ▶ Electrical equipment and mechanical appliances: 57% of the Philippines' exports, 56% of Malaysia's, 38% of Thailand's.
  - ▶ **Among rich countries**, South Korea, Singapore and Hong Kong also strong specialization in textiles and electrical equipment in 1996. However, they do not exhibit a negative but positive growth residual. They were able to re-specialize and upgrade their export basket.

# The Average Exporter of product $k$

## Product- $k$ 's average-exporter income

$$AVEX_{kt} = \sum_{c=1}^C s_{ckt} GDPpc_{ct}$$

- Weighted average of the countries'  $GDPpc$  using each country shares in world exports  $s_{ct}$  as weights.
- The change over time in the  $AVEX$ 
  - ▶ A decreasing  $AVEX$  means that, on average, the product is now exported by a lower-income country.

## Product $k$ 's $AVEX$ Growth from $t - T$ to $t$

$$AG_{k,t-T,t} = \frac{1}{T} \log \left( \frac{AVEX_{kt}}{AVEX_{k,t-T}} \right)$$

# Product $k$ 's Relocation index

- The previous **AG index** has **two components**:
  - 1 changes in market shares:  $s_{ck}$ .
  - 2 changes in the exporting countries'  $GDP_{pc}$ .
- We are interested in component 1  $\Rightarrow$  constant income **AVEX**:  
 $ciAVEX_{k,t-T,t} = \sum_{c=1}^C s_{ckt} GDP_{pc_{t-1}}$ .

## Product $k$ 's Relocation from $t - T$ to $t$

$$R_{k,t-T,t} = \frac{1}{T} \log \frac{ciAVEX_{k,t-T,t}}{AVEX_{k,t-T}} = \frac{1}{T} \log \frac{\sum_{c=1}^C s_{ckt} GDP_{pc_{t-T}}}{\sum_{c=1}^C s_{ck,t-T} GDP_{pc_{t-T}}}$$

- $R$  exclusively captures **changes in market shares** across exporters.



# Large dispersion of *IPR* across products

- Aggregate *IPR* could be 0 despite an ample relocation in different directions across products.
- Because countries exhibit large differences in international specialization, what is important for cross-country differences in growth is the dispersion of the  $R_k$  across products.
  - ▶ To measure relocation dispersion, we use:

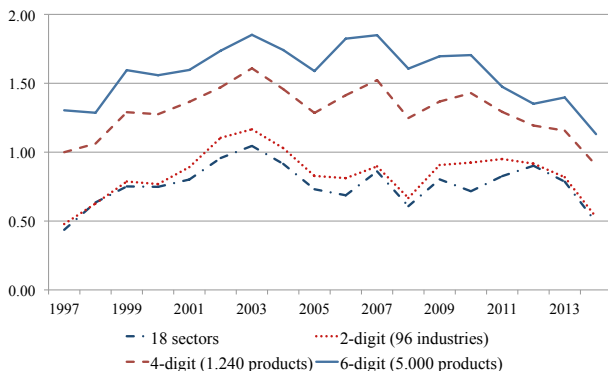
## Mean Absolute Deviation of the $R$ s

$$MAD(R_{t-T,t}) = \sum_{k=1}^K |R_{k,t-T,t} - \bar{R}_{k,t-T,t}| \frac{\omega_{Wk,t} + \omega_{Wk,t-T}}{2},$$

- Data on 6-digit products (about 5,000 products) and 18 industries from **BACI**, provided by **CEPII (Paris)**, which uses COMTRADE.
- PPP *GDP<sub>pc</sub>* from WDI, World Bank.
- Notable non-economic exogenous shocks in the 90s (e.g., civil wars, large ethnic conflicts, traumatic dismemberment of USRR).
  - ▶ Thus, **potential outliers**, whose performance is not explained by economic fundamentals.
  - ▶ Exclude output gap outliers: Azerbaijan, Belarus, Georgia, Guinea Bissau, Equatorial Guinea, Iraq, Kyrgyz Republic, Liberia, Rwanda, Tajikistan, Ukraine, Central African Republic, and Zimbabwe.
  - ▶ Also exclude countries with a population below 500,000 inhabitants.
  - ▶ Consistent sample of 129 countries for the 1996-2014 period.

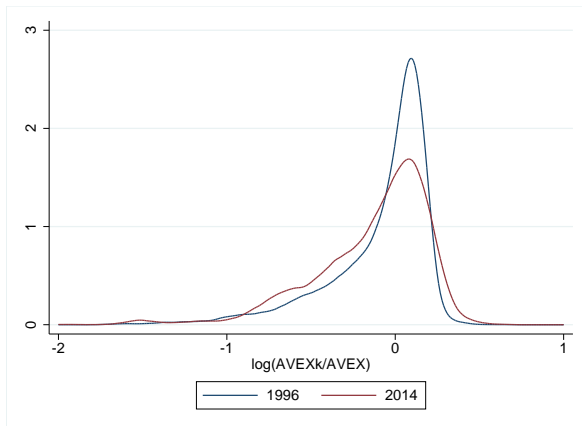
# Dispersion of (annual) product relocation

As measured by  $MAD(R_{t-1,t}) = \sum_{k=1}^K |R_{k,t-1,t} - \bar{R}_{k,t-1,t}| \frac{\omega_{WK,t} + \omega_{WK,t-1}}{2}$ ,



- Aggregate data can miss much of the intensity of relocation.
- The high dispersion of product relocation and large differences in country specialization allows us to identify the cross-country impact of *IPR*.

## Kernel of $\log(AVEX_{kt}/AVEX_t)$ for 1996 and 2014



- The larger spread in 2014 suggests that international specialization has intensified in the sense that more products are now exported by only a group of countries that have a similar income level (which can be high or low).

# Transition matrix of $\log(AVEX_{kt} / AVEX_t)$ , 1996-2014

Intervals	$(-\infty, -0.45]$	$[-0.45, -0.35]$	$[-0.35, -0.25]$	$[-0.25, -0.15]$	$[-0.15, -0.05]$	$(-0.05, 0.05]$	$[0.05, 0.15]$	$[0.15, 0.25]$	$[0.25, \infty)$
$(-\infty, -0.45]$	74.8	11.2	5.6	4.4	2.0	0.7	0.9	0.2	0.3
$[-0.45, -0.35]$	43.7	14.7	15.8	13.7	7.4	3.7	1.1	0.0	0.0
$[-0.35, -0.25]$	32.2	16.5	19.1	12.7	8.6	6.4	2.6	1.1	0.8
$[-0.25, -0.15]$	22.2	13.7	14.6	15.5	16.1	11.7	3.8	1.8	0.6
$[-0.15, -0.05]$	8.8	11.3	14.8	19.4	20.4	14.8	8.3	2.3	0.0
$(-0.05, 0.05]$	3.9	4.5	7.0	12.9	24.4	22.0	17.1	5.8	2.5
$[0.05, 0.15]$	2.0	1.1	3.0	3.9	10.6	23.2	33.1	18.8	4.3
$[0.15, 0.25]$	0.9	0.9	0.4	1.1	1.4	9.9	21.5	38.9	25.1
$[0.25, \infty)$	1.9	1.9	0.0	0.0	0.0	9.3	9.3	25.9	51.9
Initial distribution	12.1	3.9	5.5	7.0	9.9	17.9	31.1	11.5	1.1
Final distribution	16.4	6.2	7.0	8.4	12.0	15.2	17.3	12.1	5.4
Ergodic distribution	40.8	10.1	8.7	8.4	7.9	7.5	6.8	5.5	4.4

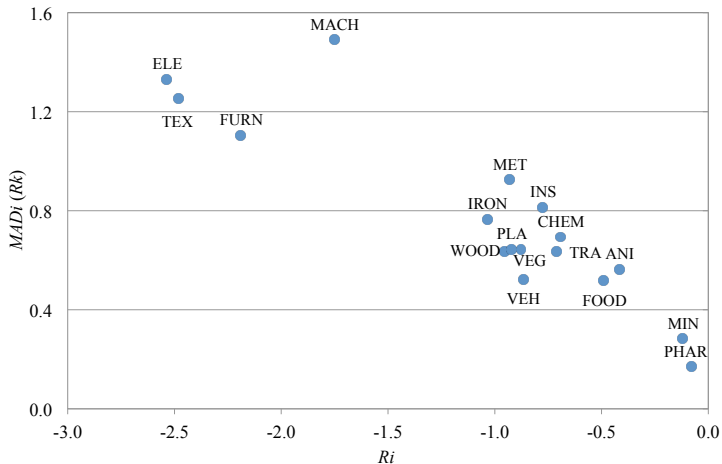
Note: Element  $a_{mn}$  ( $m, n = 1, \dots, 9$ ) indicates the frequency (in %) with which a 6-digit product whose  $\log(AVEX_{kt} / AVEX_t)$  was included in the interval  $m$  in 1996 shifted to interval  $n$  by 2014.

- Almost no zeros: all sorts of relocation dynamics in terms of sign and intensity.
- Current distribution far away from steady state ergodic distribution.

# AVEX<sub>i</sub> growth, relocation indices & within-industry mean absolute deviation of $R_k$ indices ( $MAD_i(R_k)$ )

Industry		AVEX growth		R index		MAD (R)	
		1996-2006	1996-2014	1996-2006	1996-2014	1996-2006	1996-2014
Electrical equipment	ELE	0.02	-0.18	-2.37	-2.54	1.27	1.33
Textiles, footwear, leather	TEX	0.06	-0.01	-2.47	-2.48	1.43	1.25
Furniture, stone, and other manufactures	FURN	-0.10	0.00	-2.44	-2.19	1.46	1.11
Machinery and mechanical appliances	MACH	0.25	0.02	-1.91	-1.75	1.65	1.49
Iron and manufactures thereof	IRON	0.96	0.65	-1.24	-1.04	0.71	0.77
Wood and paper	WOOD	1.41	0.76	-0.92	-0.96	0.68	0.64
Metals and manufactures, exc. iron	MET	0.99	0.63	-1.19	-0.93	0.79	0.93
Plastics	PLA	1.20	0.71	-0.87	-0.92	0.64	0.64
Vegetable products	VEG	1.39	0.71	-0.78	-0.88	0.82	0.64
Motor vehicles	VEH	1.11	0.57	-0.76	-0.87	0.41	0.52
Instruments	INS	1.24	0.89	-0.87	-0.77	0.92	0.81
Transport equipment, exc. motor vehicles	TRA	1.52	0.84	-0.58	-0.71	0.62	0.64
Chemicals exc. pharmaceuticals	CHEM	1.74	1.00	-0.60	-0.69	0.67	0.69
Food, beverage and tobacco	FOOD	1.65	0.99	-0.49	-0.49	0.65	0.52
Animal products	ANI	1.70	1.13	-0.54	-0.42	0.87	0.56
Minerals	MIN	1.36	1.04	-0.29	-0.12	0.40	0.28
Pharmaceuticals	PHAR	2.22	1.37	-0.04	-0.08	0.19	0.17
Miscellanea	MISC	1.50	1.50	-0.29	0.33	1.01	0.73

# Industry relocation ( $R_i$ ) versus within-industry relocation ( $MAD_i(R_k)$ ), 1996-2014



# The Impact of Product Shocks on country $c$ : $PS_{c,t-T,t}$

## Country $c$ 's Product-Shocks Impact Index

$$PS_{c,t-T,t} = \frac{1}{T} \log \frac{\sum_k \omega_{ckt-T} AVEX_{kt}}{\sum_k \omega_{ckt-T} AVEX_{kt-T}}$$

- $PS_{c,t-T,t}$  captures **different types of product shocks**
  - ▶ to identify the impact of **relocation shocks**, we use:

## Country $j$ 's Relocation Shocks Impact Index

$$\begin{aligned} RS_{c,t-T,t} &= \frac{1}{T} \log \frac{\sum_k \omega_{ck,t-T} ci AVEX_{k,t-T,t}}{\sum_k \omega_{ck,t-T} AVEX_{k,t-T}} \\ &= \frac{1}{T} \log \frac{\sum_k \omega_{ck,t-T} \sum_{c=1}^C s_{ck,t} GDPpc_{c,t-T}}{\sum_k \omega_{ck,t-T} \sum_{c=1}^C s_{ck,t-T} GDPpc_{c,t-T}} \end{aligned}$$



# Econometric specification: growth regression

$$\frac{1}{T} \log \frac{GDPpc_{c,t}}{GDPpc_{c,t-T}} = \beta_0 + \beta_1 RS_{c,t-T,t} + \beta_2 RS_{c,t-T,t} * \log (GDPpc_{c,t-T}) \\ + \beta_3 \log (GDPpc_{c,t-T}) + \beta_4 X_{c,t-T} + u_{c,t},$$

# Potential econometric problems

- ① Economic areas with similar sectoral shares could be affected by **other types of common shocks** (e.g., demand shocks) that could be **correlated with  $RS$** .
  - ▶ Response: include a control for “other product shocks”  
 $OPS_{c,t-T,t} = PS_{c,t-T,t} - RS_{c,t-T,t}$ , which reduces potential omitted v. biases.
- ② **Country shocks to large countries** could affect  $RS$  indices
  - ▶ They could affect these countries' market shares and exports'  $ciAVEX$  and lead to spurious correlations between growth and the indices.
  - ▶ Response: **IV** that, for each country, exclude data of this country.
- ③ Country shocks and international specialization could be **correlated across neighboring countries**
  - ▶ Can create a spurious correl. bet. my growth and  $RS$
  - ▶ Response: **IV** for the  $RS$  and  $OPS$  indices that, for each country, exclude data of both this country and its neighbors.
    - ① Difficulty: if data of China are excluded in the calculation of the  $AVEX$ , then we risk missing much of  $IPR$  when analyzing the performance of China's neighbors.
    - ② Strategy: exclude China's neighbors from the sample.

# Instruments for *PSI* and *OPS*

- **Problem 2:** for each country, IV excluding data on this country.
  - ▶ **Country-specific AVEX** (exclude country  $c$ 's data):

$$ins\_AVEX_{kct} = \sum_{i \neq c} \frac{s_{ikt}}{\sum_{i \neq c} s_{ikt}} GDPpc_{it},$$

$$ins\_ciAVEX_{kc,t-T,t} = \sum_{i \neq c} \frac{s_{ikt}}{\sum_{i \neq c} s_{ikt}} GDPpc_{it-T}.$$

$$ins\_RS_{c,t-T,t} = \frac{1}{T} \log \frac{\sum_k \omega_{ckt-T} ins\_ciAVEX_{kc,t-T,t}}{\sum_k \omega_{ckt-T} ins\_AVEX_{kc,t-T}}.$$

- ▶ Avoiding potential spurious correlations between growth and the indices due to **country-specific  $c$ 's shocks**.
  - ★ Analogous instruments for  $OPS_{c,t-T,t}$ .

- **Problem 3:** for each country, calculate country-specific AVEX that exclude data on the country and its neighbors to construct IVs.
  - ▶ No-neighbors AVEXs and instruments:  $NNins\_AVEX_{kct}$ ,  
 $NNins\_ciAVEX_{kc,t-T,t}$ ,  $NNins\_RS_{c,t-T,t}$ ,  $NNins\_OPS_{c,t-T,t}$ .

# Table: Relocation and cross-country growth

	(1) OLS	(2) OLS	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV
Relocation shocks ( <i>RS</i> )		7.39*** (1.44)	7.65*** (1.28)	7.18*** (1.96)	6.50*** (1.43)	6.30*** (1.48)	
<i>RS</i> *log <i>GDPpc</i>		-0.74*** (0.17)	-0.78*** (0.15)	-0.82*** (0.22)	-0.67*** (0.17)	-0.63*** (0.18)	
Other Product Shocks ( <i>OPS</i> )		7.04*** (1.21)	4.69*** (1.22)		3.83*** (1.47)	3.80*** (1.49)	
Nat. Res. excl_ Relocation shocks							6.19*** (1.61)
Nat.Res.excl_ <i>RS</i> *log <i>GDPpc</i>							-0.61*** (0.19)
Nat. Res. excl_ Other Product Shocks							4.00** (1.56)
log <i>GDPpc</i>	-1.64** (0.75)	-1.26* (0.65)	-1.15* (0.61)	-1.08 (0.79)	0.28 (0.70)	0.33 (0.75)	0.26 (0.77)
log Human Capital (years schooling)	1.01** (0.49)	1.39*** (0.38)	1.46*** (0.34)	1.67*** (0.39)	1.47*** (0.42)	1.56*** (0.45)	1.62*** (0.49)
Rule of Law	0.40 (0.42)	0.29 (0.31)	0.27 (0.31)	0.26 (0.40)	0.33 (0.28)	0.34 (0.29)	0.34 (0.28)
Share of Oil Exports	1.81 (1.53)	9.31*** (1.79)	7.30*** (1.65)	3.66** (1.58)	7.53** (3.70)	8.94** (4.22)	6.52 (4.21)
log export openness	3.28 (3.79)	5.82* (3.15)	5.76** (2.92)	4.61 (3.48)	5.10* (2.63)	4.52 (2.77)	4.73* (2.71)
log <i>GDP</i>	0.08 (0.39)	0.41 (0.32)	0.41 (0.29)	0.29 (0.34)	0.42 (0.28)	0.37 (0.31)	0.40 (0.31)
log export openness*log <i>GDP</i>	-0.13 (0.14)	-0.23* (0.12)	-0.22** (0.11)	-0.18 (0.13)	-0.20** (0.10)	-0.17* (0.10)	-0.18* (0.10)
International diversification		49.50** (19.18)	61.25*** (18.13)	78.53*** (18.60)	102.98*** (22.39)	103.66*** (23.18)	100.98*** (23.07)
International diversification*log <i>GDPpc</i>		-4.36** (1.93)	-5.59*** (1.83)	-7.53*** (1.89)	-10.01*** (2.27)	-10.06*** (2.35)	-9.79*** (2.34)
Economic Complexity Index ( <i>ECI</i> )	5.37** (2.48)	-0.95 (1.96)	-0.42 (1.85)	1.05 (2.17)	-2.04 (1.72)	-1.90 (1.83)	-1.75 (1.83)
<i>ECI</i> * log <i>GDPpc</i>	-0.48* (0.25)	0.14 (0.19)	0.08 (0.18)	-0.07 (0.21)	0.20 (0.16)	0.18 (0.18)	0.17 (0.17)
Share of natural resource exports						0.10 (1.76)	-0.38 (1.62)
Constant	13.15 (11.04)	-3.42 (10.88)	-13.10 (10.19)	-13.10 (10.19)	-24.77** (10.27)	-23.66** (11.14)	-24.15** (11.16)
Observations	96	96	96	96	83	79	79
R <sup>2</sup>	0.42	0.70	0.68	0.51	0.69	0.69	0.70
Marginal effect of <i>RS</i> at 25th-percentile <i>GDPpc</i>		1.21	1.14	0.33	0.90	1.04	1.09

Table: Relocation and cross-country growth

	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	IV	IV	IV	IV	IV
Relocation shocks ( <i>RS</i> )	7.39*** (1.44)	7.65*** (1.28)	7.18*** (1.96)	6.50*** (1.43)	6.30*** (1.48)	
<i>RS</i> *log <i>GDPpc</i>	-0.74*** (0.17)	-0.78*** (0.15)	-0.82*** (0.22)	-0.67*** (0.17)	-0.63*** (0.18)	
Other Product Shocks ( <i>OPS</i> )	7.04*** (1.21)	4.69*** (1.22)		3.83*** (1.47)	3.80** (1.49)	
Nat. Res. excl_Relocation shocks						6.19*** (1.61)
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Nat. Res. excl_Other Product Shocks						4.00** (1.56)
Observations	96	96	96	83	79	79
R <sup>2</sup>	0.70	0.68	0.51	0.69	0.69	0.70
Marginal effect of <i>RS</i> at 25th-percentile <i>GDPpc</i>	1.21	1.14	0.33	0.90	1.04	1.09

- Controls: initial GDPpc, human capital, rule of law, share of oil exports, export openness and its interaction with GDP, international export diversification and its interaction with GDPpc, economic complexity index and its interaction with GDPpc, share of natural resource exports, continent dummies.

# Average marginal effects of Relocation Shocks on GDPpc growth, 95% c.i. (estimates columns 3 & 7)

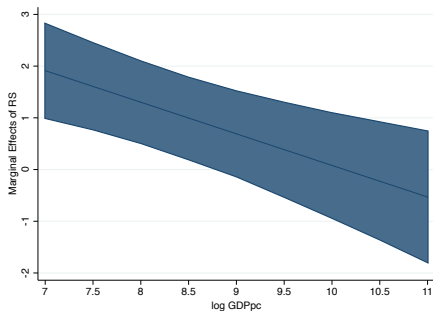
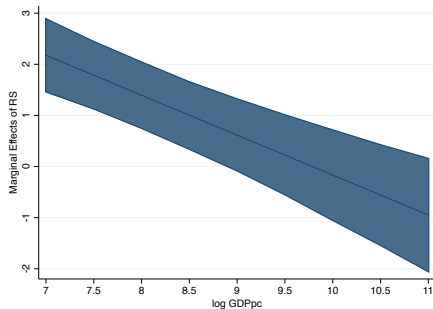


Table: Relocation and cross-country growth: Alternative subsamples

	Excl. America (1)	Excl. Africa (2)	Excl. Asia (3)	Excl. Europe (4)
Relocation shocks ( <i>RS</i> )	8.35*** (1.32)	7.04*** (2.25)	9.03*** (2.11)	7.38*** (1.71)
<i>RS</i> *log <i>GDPpc</i>	-0.86*** (0.16)	-0.64*** (0.23)	-0.99*** (0.28)	-0.78*** (0.22)
Other Product Shocks ( <i>OPS</i> )	4.52*** (1.27)	6.65*** (2.13)	5.02*** (1.38)	3.53*** (1.22)
Observations	75	77	72	66
R <sup>2</sup>	0.72	0.73	0.71	0.63

Table: Relocation and cross-country growth. Panel estimations

	Full sample (1)	Excluding nat. resource exporters (2)	Excl. America (3)	Excl. Africa (4)	Excl. Asia (5)	Excl. Europe (6)	Excl. Europe (7)
Relocation shocks ( <i>RS</i> )	6.03*** (1.27)	6.34*** (1.24)		5.79*** (1.32)	6.28*** (2.18)	6.72*** (1.47)	6.46*** (1.52)
<i>RS</i> *log <i>GDPpc</i>	-0.62*** (0.15)	-0.64*** (0.15)		-0.58*** (0.16)	-0.63*** (0.23)	-0.71*** (0.18)	-0.68*** (0.18)
Other product shocks ( <i>OPS</i> )	1.71* (0.88)	2.46*** (0.80)		1.99* (1.05)	1.23 (1.27)	2.36*** (0.77)	1.31 (0.99)
Nat. Res. excl_Relocation shocks			6.09*** (1.11)				
Nat.Res.excl_ <i>RS</i> *log <i>GDPpc</i>			-0.59*** (0.14)				
Nat. Res. excl_Other product shocks			2.33*** (0.73)				
Observations	192	152	152	150	154	144	132
R <sup>2</sup>	0.61	0.67	0.67	0.68	0.62	0.60	0.51

**Table:** Relocation and cross-country growth. Estimations using *no-neighbors* instruments.

	(1)	(2)	(3)	(4)
Relocation shocks ( <i>RS</i> )	7.59*** (1.82)	5.28** (2.32)	7.21*** (1.23)	6.74*** (1.41)
<i>RS</i> *log <i>GDPpc</i>	-0.84*** (0.20)	-0.58** (0.27)	-0.74*** (0.14)	-0.74*** (0.17)
Other Product Shocks ( <i>OPS</i> )	1.97 (2.29)	0.86 (2.17)	3.16** (1.26)	1.10 (1.25)
Observations	88	74	176	142
R <sup>2</sup>	0.63	0.64	0.64	0.65



# Adjusting to relocation: Export Upgrading

- How do economies react to shocks leading to *IPR* to the South?
  - ▶ Standard trade theory:
    - ★ Factors used in declining industries are reallocated to new industries.
  - ▶ However, this reallocation of resources across geographical areas and industries can take a long time and involve substantial adjustment costs (Autor, Dorn, and Hanson 2016).
    - ★ Do countries more affected by *IPR* to the South show higher adjustment and upgrading of their export basket?
    - ★ Do developed and developing economies have the same capacity to reshape their export basket and respond to *IPR* to the South?

# Adjusting to relocation: Export Upgrading

- Measuring the change in the country's export basket:

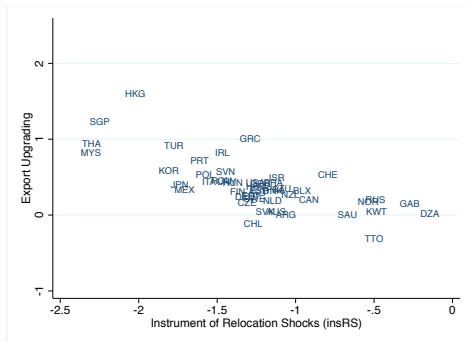
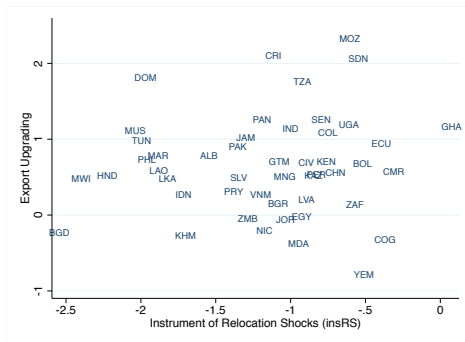
Country  $c$ 's Export Upgrading between  $t - T$  and  $t$ :

$$EU_{c,t-T,t} = \frac{1}{T} \log \frac{\sum_k AVEX_{kt} \omega_{ckt}}{\sum_k AVEX_{kt} \omega_{ck,t-T}}.$$

- ▶ This captures changes in the country's export basket  $\omega_{ckt}$ .

- Do more negative relocation shocks lead to higher  $EU$ ?

# RS & Export Upgrading: poorer vs richer countries



- Do more negative relocation shocks lead to higher *EU*?

# Relocation and Export Upgrading

The dependent variable is the country *Export Upgrading* index

	(1)	(2)	(3)	(4)	(5)	(6)
Relocation shocks ( <i>RS</i> )	4.29*** (1.21)	5.12*** (1.39)	4.69*** (1.35)	0.99 (0.67)	2.02** (0.86)	2.37*** (0.76)
<i>RS</i> *log <i>GDPpc</i>	-0.50*** (0.13)	-0.60*** (0.15)	-0.54*** (0.14)	-0.15** (0.07)	-0.27*** (0.09)	-0.31*** (0.08)
log <i>GDPpc</i>	-0.85*** (0.22)	-0.99*** (0.27)	-0.88*** (0.27)	-0.15* (0.08)	-0.28** (0.12)	-0.33*** (0.12)
Observations	96	83	79	192	163	152
R <sup>2</sup>	0.34	0.40	0.41	0.24	0.27	0.36

Notes: 2SLS. The *RS* variable is instrumented using the instruments explained in the main text. Columns 1-3 report results using cross section data with continent dummies for 1996-2006, whereas columns 4-6 report results using panel data with time-continent fixed effects interacted with the continent dummies for the 1996-2006 and 2006-2014 periods. Robust standard errors are clustered by country in the panel regressions.

# Examples of products, countries & export upgrading

## PANEL A: PRODUCT RELOCATION

		HS-240120	HS-271000	HS-610910	HS-611030	HS-620462	HS-847192	HS-847193	HS-847330	HS-854211	HS-854219
		Tobacco, unmanufactured, stemmed or stripped	Oils petroleum, bituminous, distillates, except crude	Cotton T-shirts, knit	Pullovers & cardigans of manmade fibers	Women & girls trousers & shorts, cotton, not knit	Computer input or output units	Computer data storage units	Parts & accessories of data processing equipment	Monolithic integrated circuits, digital	Monolithic integrated circuits, except digital
Changes in global market share 1996-2006	$R_i$ 1996-2006 (%)	-3.1	-0.5	-3.8	-4.2	-3.7	-6.5	-4.1	-3.6	-1.4	-1.3
	$\Delta VEX_k$ growth 1996-2006 (%)	-1.1	1.7	-1.2	-1.1	-0.9	-3.4	-1.1	-0.9	1.1	1.2
	Largest increases (percentage points)	BRA 9.3	RUS 4.3	CHN 6.2	CHN 16.1	CHN 11.3	CHN 42.3	CHN 15.8	CHN 23.2	CHN 7.8	CHN 6.4
		CHN 2.1	IND 3.0	BGD 4.4	BGD 3.9	TUR 2.8	NLD 1.4	THA 7.6	KOR 2.6	PHL 3.4	SGP 3.4
		DEU 2.0	ARE 1.3	TUR 4.2	KHM 2.0	BGD 2.7	SVK 0.8	PHL 3.4	MYS 2.2	SGP 2.8	PHL 2.5
	Largest reductions (percentage points)	DOM -0.7	NLD -1.8	HKG -2.2	HKG -3.7	MEX -4.3	SGP -6.2	USA -6.2	SGP -3.3	GBR -1.8	FRA -1.7
		NLD -1.5	DZA -2.4	GRC -3.3	KOR -5.5	USA -5.3	USA -8.1	JPN -12.5	JPN -5.5	USA -6.2	JPN -7.2
		USA -19.5	SGP -3.1	USA -7.3	ITA -6.7	HKG -5.5	JPN -18.7	SGP -12.8	USA -13.1	JPN -7.4	USA -8.0

## PANEL B: COUNTRY RELOCATION SHOCKS

	<i>RS<sub>c</sub></i> (%)	<i>ins_RS<sub>c</sub></i> (%)	Share of the product in the country's exports in 1996 (percentage)*									
	1996-2006	1996-2006	HS-240120	HS-271000	HS-610910	HS-611030	HS-620462	HS-847192	HS-847193	HS-847330	HS-854211	HS-854219
Malawi	-2.36	-2.40	52.4		1.5							
Bangladesh	-2.50	-2.54			6.5	4.2	2.2					
Honduras	-1.94	-2.22			6.3		1.8					
Philippines	-2.25	-1.96							7.2	6.4	14.3	4.6
Thailand	-2.14	-2.30						2.5	6.0	4.7	2.7	1.3
Malaysia	-2.09	-2.30		1.2				2.2	4.4	5.2	9.0	2.7
Singapore	-2.24	-2.25		9.6				3.1	12.8	7.8	6.2	3.3

## PANEL C: EXPORT UPGRADING

	GDPpc 1996	Export sophisticat. 2014	Change between 1996 and 2014 of the product's share in the country's exports (difference of percentage points)**									
			HS-240120	HS-271000	HS-610910	HS-611030	HS-620462	HS-847192	HS-847193	HS-847330	HS-854211	HS-854219
Malawi	872.2	21,639	-9.2		-1.5							
Bangladesh	1,474.3	15,995			7.2	1.0	5.7					
Honduras	3,384.3	20,448			2.4	5.6	-1.7					
Philippines	4,097.2	27,533							-1.0	-2.3	-13.1	15.5
Thailand	9,847.6	28,673		2.5				-1.6		-3.2	-2.6	2.1
Malaysia	15,483.3	30,647		7.1				-1.8	-2.4	-2.4	-8.9	13.3
Singapore	46,317.7	37,073		10.5				-2.8	-11.8	-6.6	-6.0	13.2
Product's 2014 $\Delta VEX$ (US \$)			19,875	38,527	15,871	15,046	15,434	22,070	24,444	25,153	30,738	34,920

# Concluding Comments: Contributions

- Intense *IPR* to the South over the last decades, causing political turbulences and calls for protectionism.
  - ▶ This paper described the *IPR* process between 1996 and 2014 and investigated its cross-country growth impact.
- **Main result:** specialization at the beginning of a period in product categories that relocate to the South have a negative growth impact on low-income countries but not on high-income countries.
  - ① *IPR* to the South does not have a negative impact on the advanced economies's aggregate output
    - ★ richer countries adjust to relocation by upgrading exports.
    - ★ these economies should have the resources to compensate the workforce groups that were displaced or impoverished by *IPR*.
  - ② Low-income countries appear to be vulnerable to increased competition from other developing countries and may not have the resources to compensate the losers.
- On the grounds of these results, calls for a new protectionism appear unjustified.