

## Trade diversification, income, and growth: what do we know

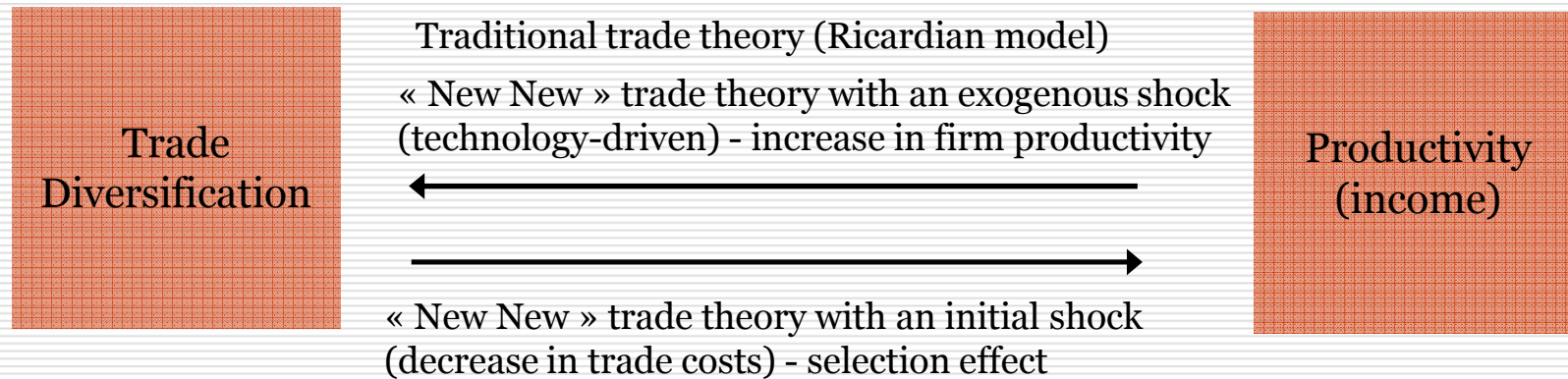
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- Measures of exports diversification
- Determinants of exports diversification
- Diversification and growth; the natural resource curse revised
- Imports diversification

# Diversification and productivity (GDP): chicken or egg?

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*What do Trade Theories tell us?*



*What does Empirical Literature tell us?*

Evidences at the aggregate level for the income-drives-export-diversification conjecture

# Measuring concentration

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Three conventional indices:

- Herfindahl
- Gini
- Theil

Different « margins » of export growth, each of which can contribute to concentration/diversification:

1. Intensive margin: more volumes on existing export lines
2. Extensive margin: more export lines
  - New-product margin: more products
  - New-market margin: more destinations

Mapping:

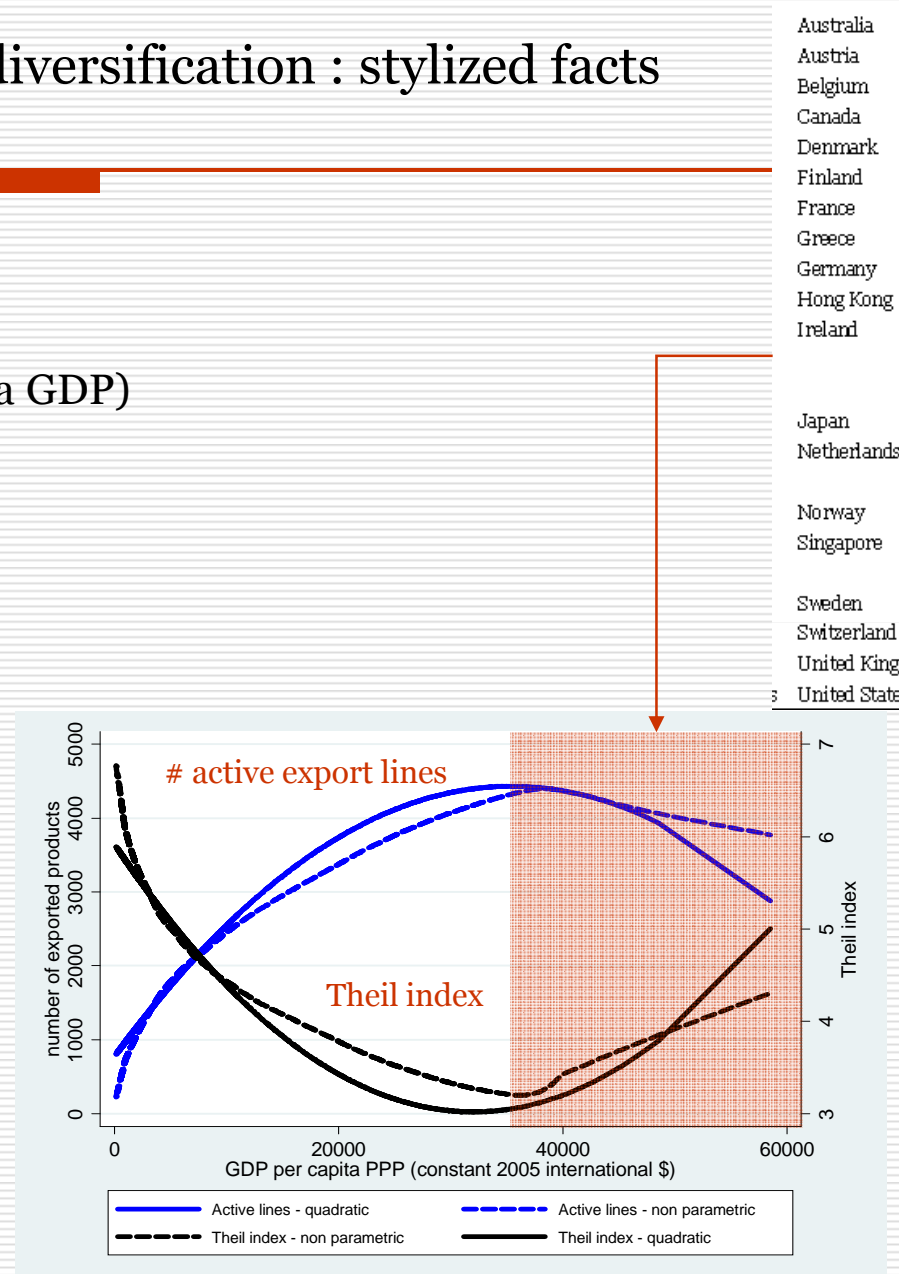
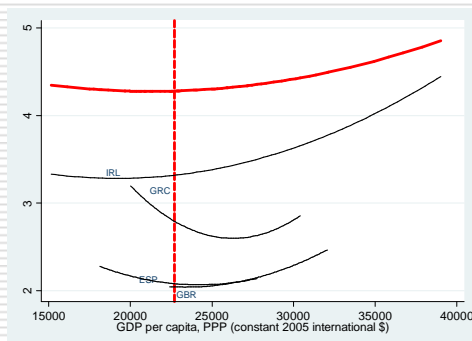
Intensive margin  Within component of the Theil  
Extensive margin  Between component of the Theil

# Economic development and export diversification : stylized facts

Along the path of income growth, countries

- First diversify (up to \$25'000 PPP per capita GDP)
- Then re-concentrate

and this is true even for individual country trajectories :

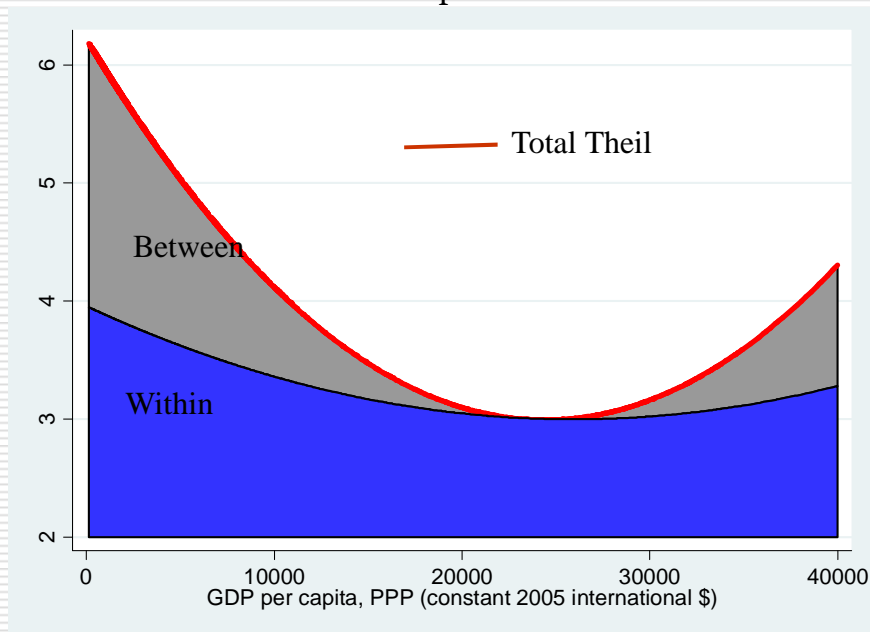


# Which margin matters? The extensive margin

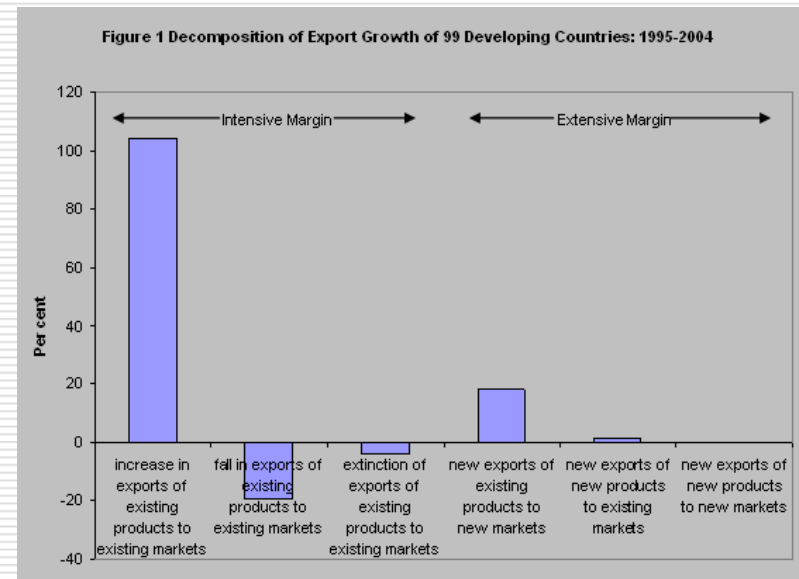
Cadot, Carrere and Strauss-Kahn (2009):  
 The between component explains the evolution of the Theil. That is:  
 Diversification/re-concentration occurs at the extensive margin.

Brenton & Newfarmer (2007):  
 New-markets margin more active than traditional extensive margin (new products)

Within and between components of Theil's index



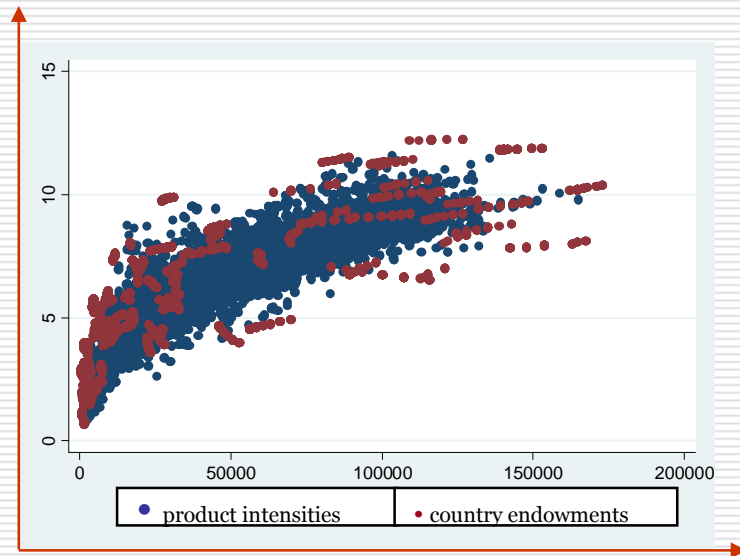
Source: Cadot et al. (2009) using COMTRADE



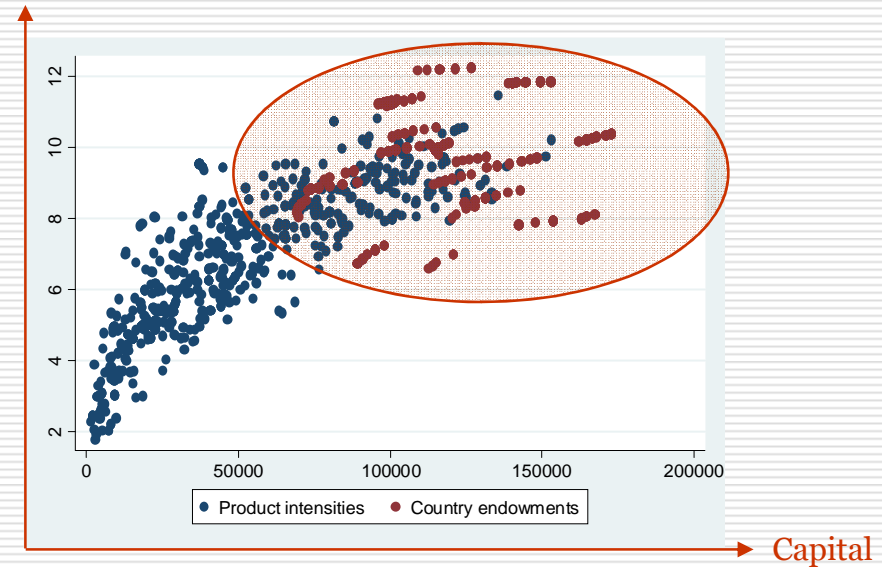
# How and why do rich countries reconcentrate their exports?

Countries close many export lines as part of normal churning...

Human capital



... but past the \$25'000 turning point they close export lines that are out of tune with their endowments.



... that is, part of the diversification observed at middle income levels may be **inefficient**

## What drives export diversification? Non-income determinants

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In Recent Empirical literature, among a wide range of country characteristics tested, the keys determinants of export diversity (once GDP per capita) is controlled for seems to be:

- distance from major markets
- country size
- market access (bilateral and multilateral trading arrangement)

What about unilateral trade reforms? Never considered in empirical literature

However, import liberalization can be taken as a positive shock on TFP which should raise the number of industries with an upper tail of firms capable of exporting—and thus overall export diversification.

# Unilateral trade reforms and export diversification : stylized facts

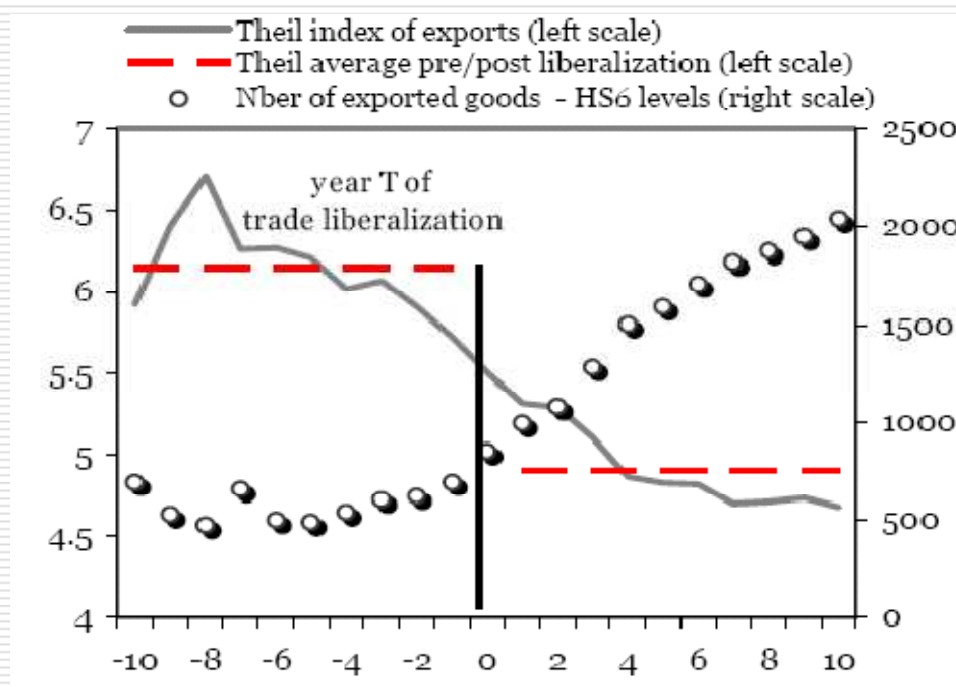
## Time pattern of exports diversification pre and post liberalization

Sample: 95 countries

Event: permanent (non-reversed) liberalization in  $t=0$

Results:

1. A strong diversification trend (shrinking Theil index) is apparent over the entire post-liberalization windows, and particularly strong in the 5 years following it.
2. More exported products: export diversification along the extensive margin.
3. An anticipation effects in the three years preceding liberalization





## So, why do we care about export diversification?

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High export concentration—typically on primary products—may mean

1. Volatility of export earnings and overall growth
2. Slow productivity growth (no spillovers)
3. Deteriorating terms of trade

Well... How true is all this?

Volatility:

- Jansen (2004) showed that **export concentration** raises **ToT volatility**,
- Ramey and Ramey (1995) showed that countries with higher **GDP volatility** grow less,  
But
- Raddatz (2007) and others found that **ToT volatility** contribute only weakly to **GDP volatility** (domestic shocks dominate).

## Technology and spillovers: what you export matters

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Hausmann, Hwang and Rodrik (2007) defined an index of « revealed product sophistication ».

Suppose product  $k$  is exported by two countries: Germany and Malaysia

$$\text{PRODY}_k = \omega_1 Y_1 + \omega_2 Y_2$$

Germany's GDP/capita    Malaysia's GDP/capita

Balassa indices (RCA)

Assumption: Higher  $\omega_1$  (weight on Germany) means product  $k$  more sophisticated

Hausmann et al.'s result:

A higher share of high-PRODY goods in a country's export portfolio is associated higher future growth.

Easy conclusion: use industrial policy to diversify out of low-tech commodities (agricultural and primary products) into high-tech manufactures.

## Productivity growth: time-honoured clichés are sometimes wrong

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A running theme in development literature since Adam Smith: productivity growth in agriculture is slower than in manufacturing

« The impossibility of making so complete a separation of all the different branches of labor is perhaps the reason why the improvement of the productive powers of labor in this art does not always keep pace with the improvement in manufactures »

Adam Smith, 1776 (quoted in Martin and Mitra, 2001)

But... Is this true?

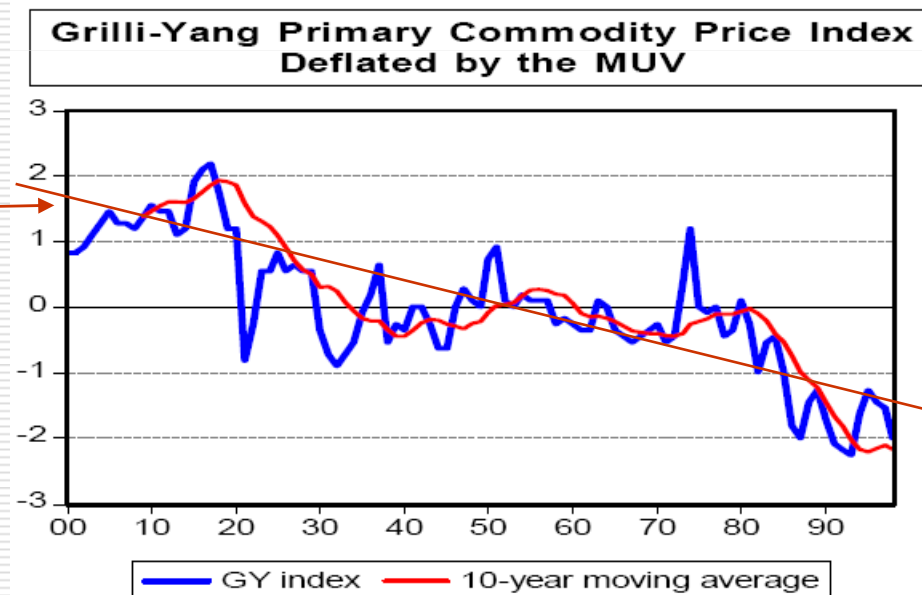
- Martin and Mitra (2001) found total factor productivity growth (TFP) for low income countries ranging between 1.44% and 1.80% in agriculture, against 0.22% and 0.93% in manufacturing;
- Their results, based on new data, confirmed earlier ones
- Anecdotal evidence from Chile and other countries is consistent with this.

## Deteriorating terms of trade for natural-resource exporters: the Prebisch-Singer hypothesis

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- Early work plagued by data problems
- Seminal study by Grilli and Yang (1988), who constructed a time series of primary-product prices over 1900-86 using World Bank data (later extended to 1998 by IMF researchers)

Looks like there is a downward trend,  
but... optical illusion?



## The tricks of non-stationarity: a few simulations

Strong visual impression of

- Upward trend for A
- Downward trend for B
- Cyclical behaviour for C

But... all three were generated by the same stochastic process:

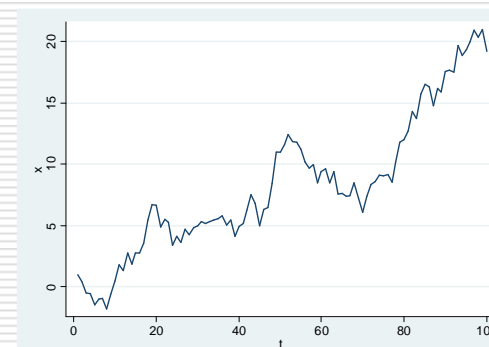
$$x_t = \underbrace{0.999}_{\rho} x_{t-1} + u_t$$

For this process, because  $\rho$  is arbitrarily close to one, the best bet for tomorrow's value is today's—there is no trend, up or down.

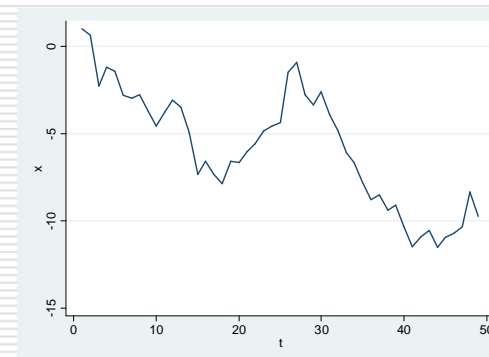
This is the case for commodity prices, relative to manufactures (Cuddington et al. 2002):

- No trend
- Statistically significant jump down in 1921

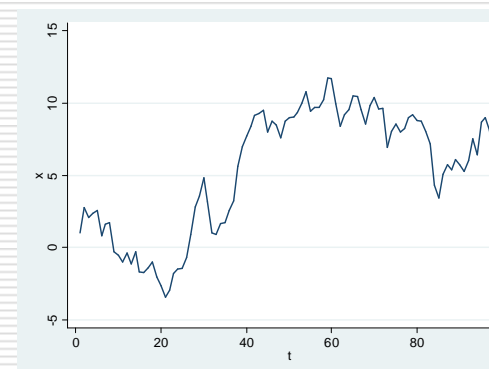
Asset A



Asset B



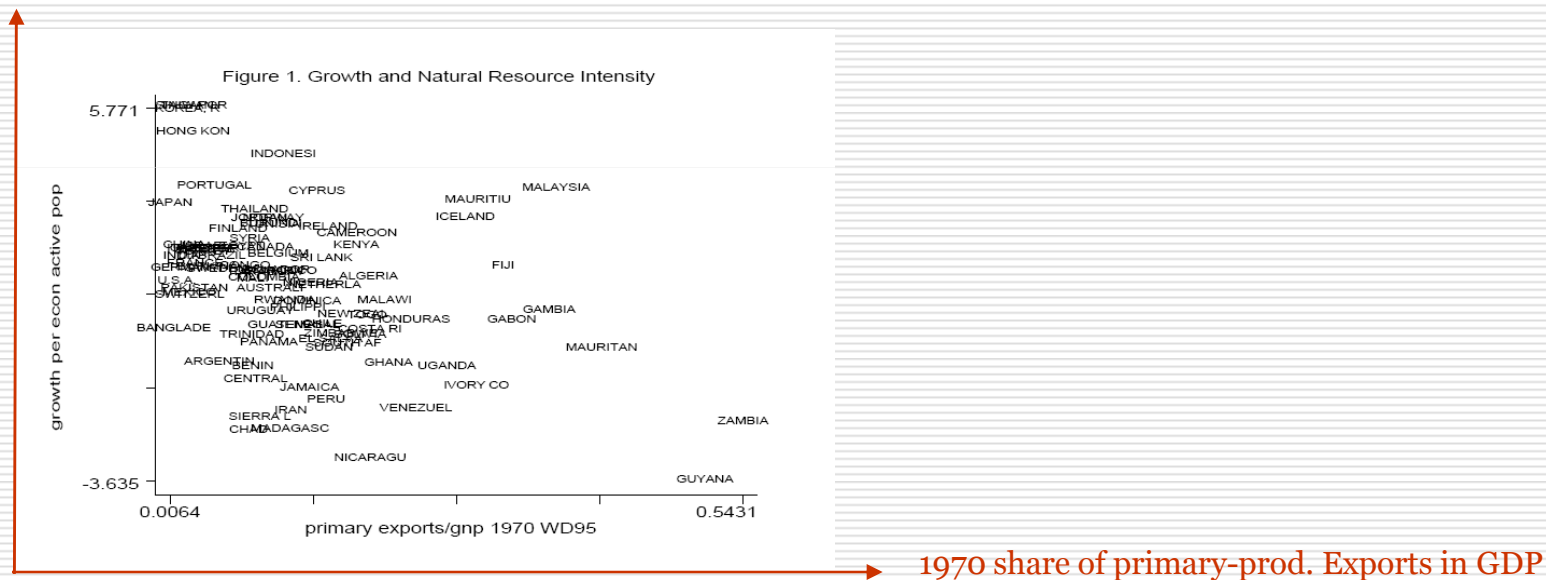
Asset C



# The « natural resource curse »

On a cross-section of countries, growth is negatively correlated with the share of natural resources in exports:

GDP growth 1970-89



Source: Sachs and Warner (1997)

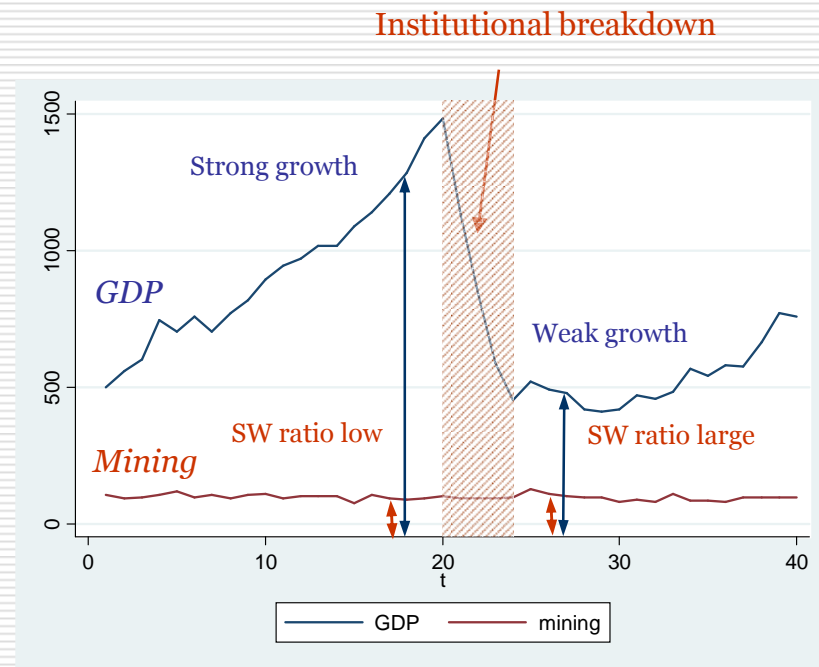
## But... What if causation ran the other way around?

Brunnschweiler & Bulte (2008):

Natural resource extraction is a last-resort activity—less vulnerable than others to institutional breakdown

Thus, negative correlation between growth and Sachs and Warner ratio of NR exports in GDP (NR in exports) can be reflection of omitted factor—like institutional breakdown.

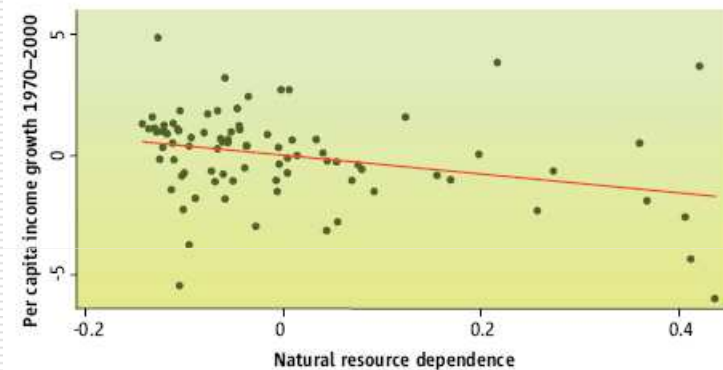
Need to look at some other measure (really exogenous) of NR abundance



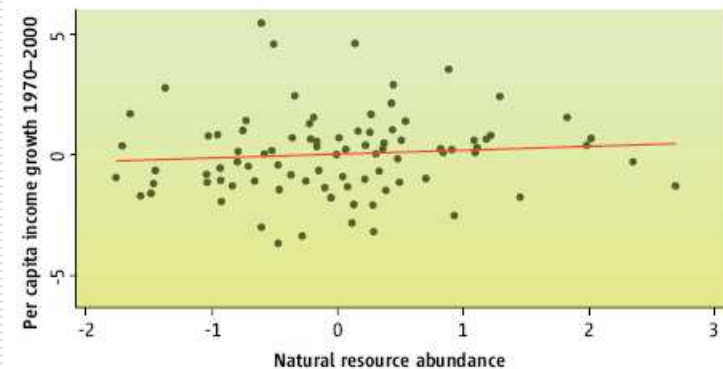
## Another way of looking at the resource curse

Brunnschweiler and Bulte (2008): no resource curse when using WB database on « natural wealth »

Correlation between growth and NR abundance using the Sachs-Warner measure: Now you see a curse...



Correlation between growth and NR abundance using the World Bank's measure: Now you don't.



Natural resource dependence, abundance, and economic growth. Regression fits of natural resources and economic growth 1970–2000. (Top) Natural resource dependence in 1970; (bottom) World Bank total natural wealth data (log values) measured in USD per capita in 1994.



## Does export diversification matter for future growth?

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So much for the resource curse... How about diversification *per se*?

- Lederman and Maloney (2007),
- van Zandt et al. (2008)

all find that **sectoral concentration** of exports is associated with **lower future growth**.

« If there is no « resource curse » but there is a curse of export concentration, [...] policy makers should strive to provide a policy framework conducive to product and market diversification—but not necessarily one that promotes, through subsidies and incentives, diversification away from natural resources areas into manufactures. »

Lederman and Maloney, in Newfarmer et al. 2009

But concentration may be the result of success: Costa Rica and micro-processors or Egypt and “ceramic bathroom kitchen sanitary items not porcelain”

## What to take from all this....

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1. It's complicated
2. Most accepted clichés in the area tend to be wrong, in particular as regards the role of natural resources
3. Not only are the clichés wrong, but the overall focus on the new-product margin seems somewhat misplaced

### What we need to think about (*inter alia*)

1. If the new-markets margin is where the action is, that's what we should think about
2. What are the winning strategies in terms of geographical penetration?
  - First try it out on « friendly », neighboring markets (« regionalist » strategy)
  - Go straight for OECD markets with buyers' assistance (« globalist » strategy)

## Diversification of imports: the other side of the coin.

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### Modest gains from diversity

- Love-for-variety: Krugman (1979), New and New-New Trade Theory but...
- Empirical evidence is scarce and point out modest effect. In the US, 30 1972-2001, # of imported varieties trebled → Consumers are willing to spend only 2,6% of their income to have access to these extra varieties (Broda and Weinstein 2006)

### But productivity gains through “import competition”

- Increased productivity within and across firms (rationalization)
- Evidence of productivity increase by up to 15% more than in protected sectors: Levinsohn (1993) for Turkey, Harrison (1994) for Ivory Coast, Tybout and Westbrook (1995) for Mexico, Krishna and Mitra (1998) for India, Pavcnik (2002) for Chile, Trefler (2004) for Canada or Fernandes (2007) for Columbia

## Diversification of imports: the case of imported inputs

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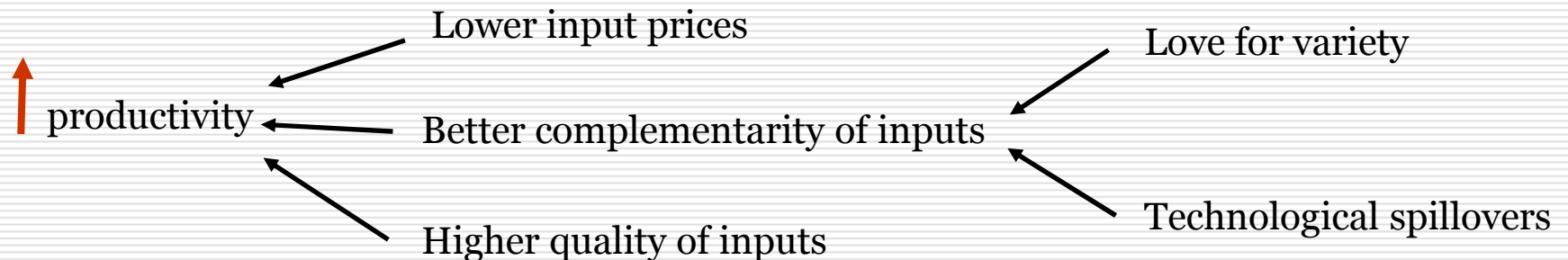
Growth in trade of imported inputs → increased diversification

How does it impact domestic productivity and technological transfert, employment, labor inequalities and exports?

Growth in Vertical Specialization	Period	Country	sector	Definition	Source
30%	1970-1990	World (selected countries)		Use of imported inputs in producing goods that are exported	Hummels, Ishii and Yi (2001)
50%	1977-1993	France		Use of imported inputs in production	Strauss-Kahn (2004)
126%	"	"	Apparel	"	"
95%	"	"	Plastic products	"	"
94%	"	"	Textile	"	"
85%	"	"	Aircraft	"	"
83%	"	"	Motor vehicules	"	"
227%	1987-2000	India		Imported Inputs	Goldberg et al. (2008)

## Diversification of imported input: increased productivity?

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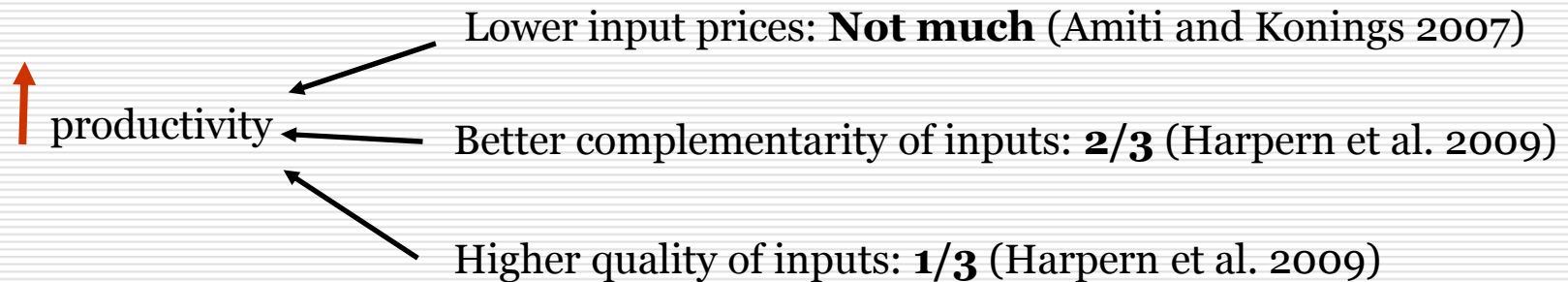
→ 20% of the productivity of a domestic industry can be attributed to foreign R&D, accessed through imports of intermediate goods, Keller (2002).

→ A decrease in inputs tariffs of 10 percentage point increases productivity by 12% in importing firms whereas non-importing firms benefit only by 3%, Amiti and Konings (2007) for Indonesia.

→ Other studies: Coe and Helpman (1995) for selected OECD countries, Coe et al. (1997) for 77 developing countries, Kasahara, and Rodrigue (2008) for Chile and Loof, H. and M. Anderson (2008) for Sweden

## Diversification of imported input and productivity → Implications

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→ **Employment is barely impacted** when complementarities matter. An increase in imported inputs does not affect much the demand for domestic because they must be combined with foreign goods to maximize output (Harpern et al. 2009)

→ **Need absorptive capacities in order to capture technology embodied in imported input**, i.e., human capital and R&D. Skilled labor is a necessary requirement for technology transfer (Augier et al. 2009)

## Diversification of imported input: substitution of local labor?

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The increase in imported intermediate goods may reflect cost reduction strategies → substitution of domestic labor by foreign labor → in developed countries this will impact inequalities between skilled and unskilled workers

✓ First wave of studies investigate the impact on relative demand and/or wage differentials between skilled and unskilled workers in manufacturing sectors : **Growth in imported inputs accounts form 11% to 30% of the observed increase in inequality across skill groups.** Feenstra and Hanson (1996, 1999) for the US, Egger and Egger (2003) for Austria, Hijzen, et al. (2005) for the UK or Strauss-Kahn (2004) for France.

✓ In services: Real wage of the low and medium skilled workers decrease while the real wage of the most skilled increases, Geishecker and Gorg (2008)

→ Also some evidence that imports of new varieties of inputs lead to a substantial increase in the number of domestic varieties produced, Goldberg et al. (2008) .  
Consequences for employment?

## What to take from all this (import diversification side)....

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1. Increased productivity leading to higher export diversification and therefore higher growth
2. Increased productivity with little impact on labor (complementarity of inputs)
3. But also substitution of labor in developed countries

### What we need to think about (*inter alia*)

1. Need to distinguish the impact of import diversification on developed and developing countries
2. Productivity gains requires absorptive capacities