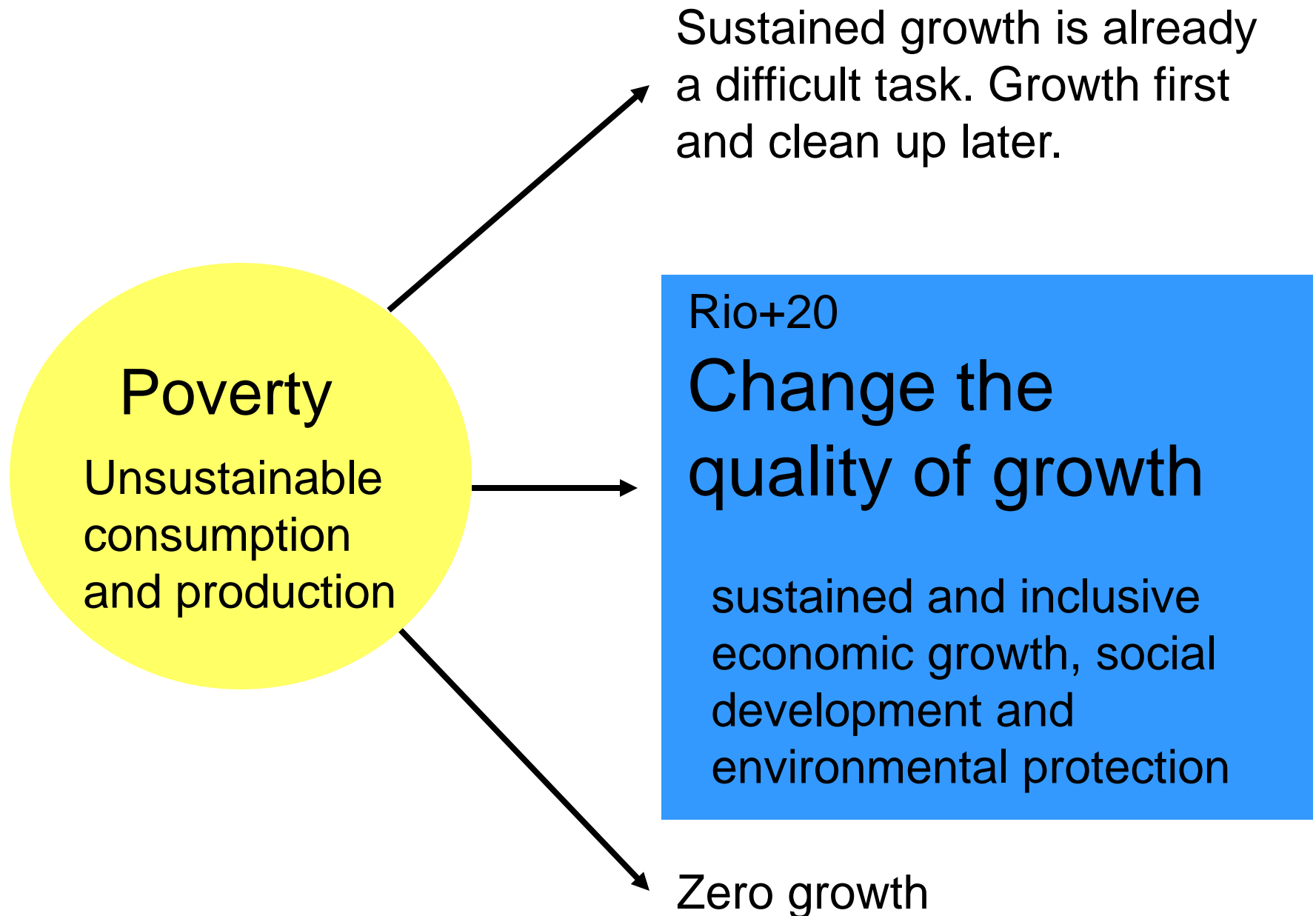




# **Structural change for growth with quality**

**Expert Dialogue on the Quality of Growth  
14-16 November 2012, Bangkok**

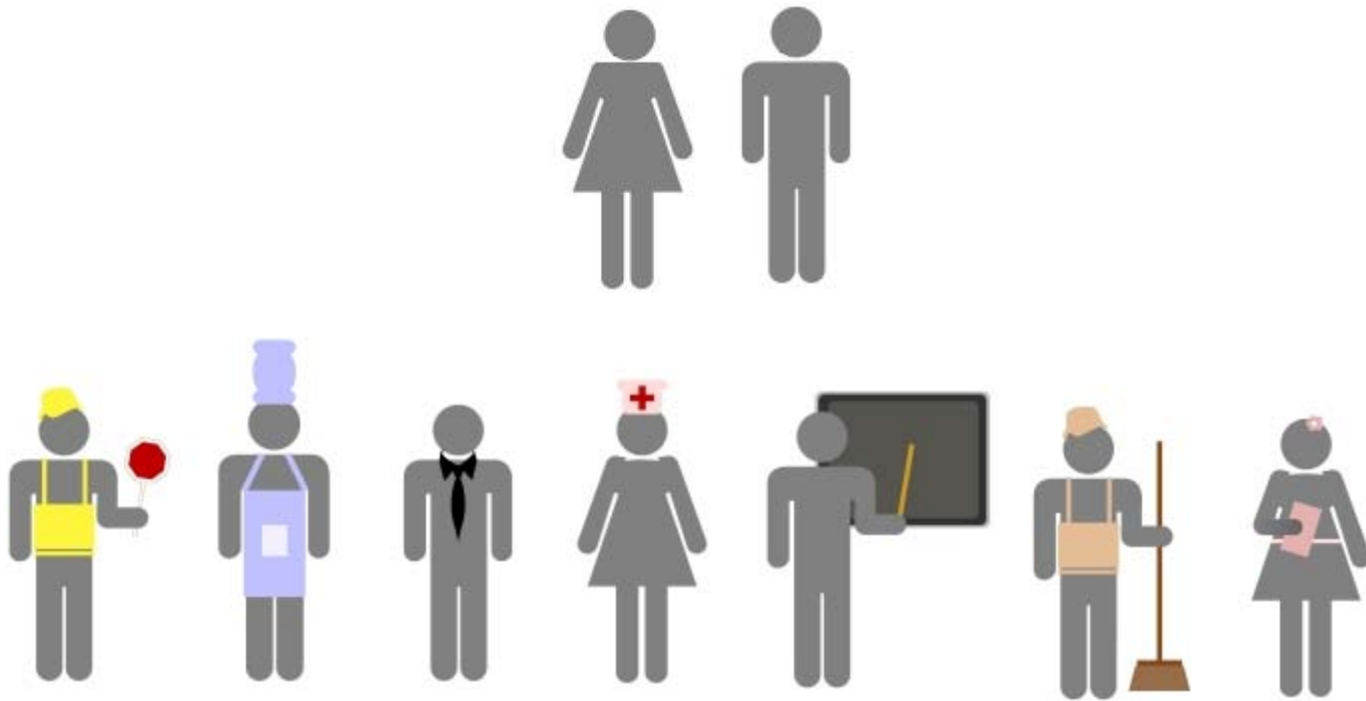
Clovis Freire  
Economic Affairs Officer  
Macroeconomic Policy and Development Division (MPDD)  
Economic and Social Commission for Asia and the Pacific (ESCAP)



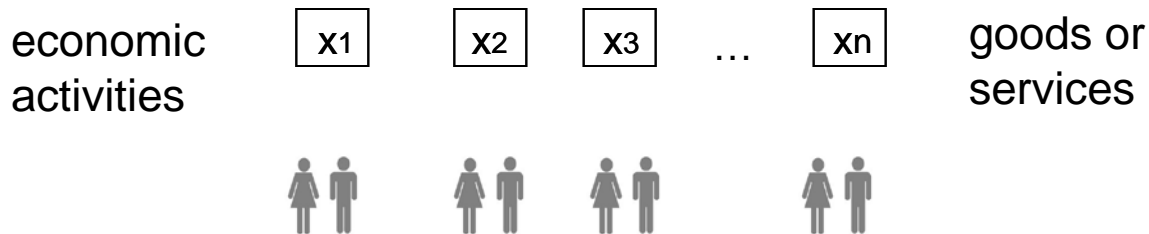
“We recognize that **people** are at the  
centre of sustainable  
development” (para 6)



# People's living standards depends on how they make a living



# Economy as a set of different economic activities (how people make a living), each producing a single product ( $x$ )



Each with different employment ( $e$ ),  
productivity ( $q$ ) and output ( $y$ )

economic activities       $x_1$        $x_2$        $x_3$       ...       $x_n$       goods or services



employment       $e_1 + e_2 + e_3 \dots + e_n = L$

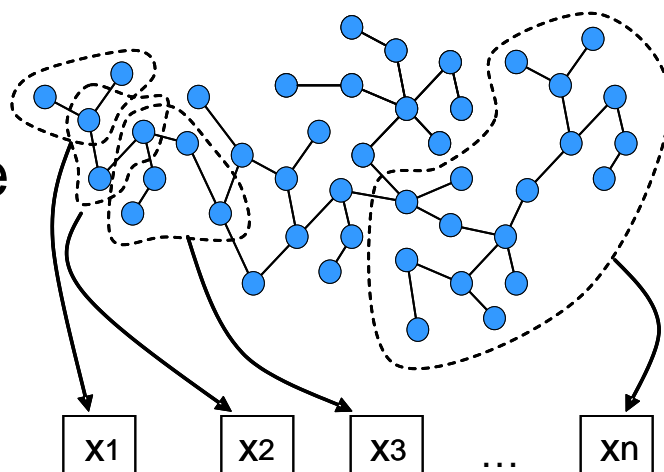
productivity       $q_1 < q_2 < q_3 \dots < q_n$

output       $y_1 + y_2 + y_3 \dots + y_n = Y$

$e_0$  = unemployed

Productive capacities

Technologies



economic activities

x1

x2

x3

...

xn

goods or services



employment  $e_1 + e_2 + e_3 \dots + e_n = L$

productivity  $q_1 < q_2 < q_3 \dots < q_n$

output  $y_1 + y_2 + y_3 \dots + y_n = Y$

$e_0$  = unemployed

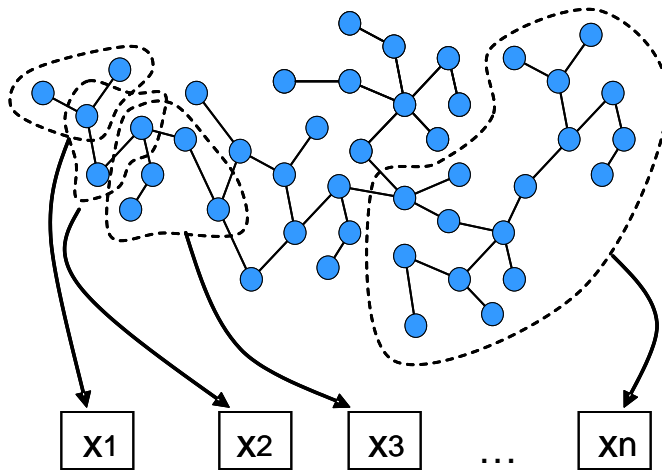


Each product requires a specific combination of productive capacities to be produced

Capital-embodied technologies  
(infrastructure, machines)

Labour-embodied technologies  
(methods, processes)

## Technologies



economic  
activities

goods or  
services



employment  $e_1 + e_2 + e_3 \dots + e_n = L$

productivity  $q^1 < q^2 < q^3 \dots < q^n$

output  $y_1 + y_2 + y_3 \dots + y_n = Y$

$e_0$  = unemployed



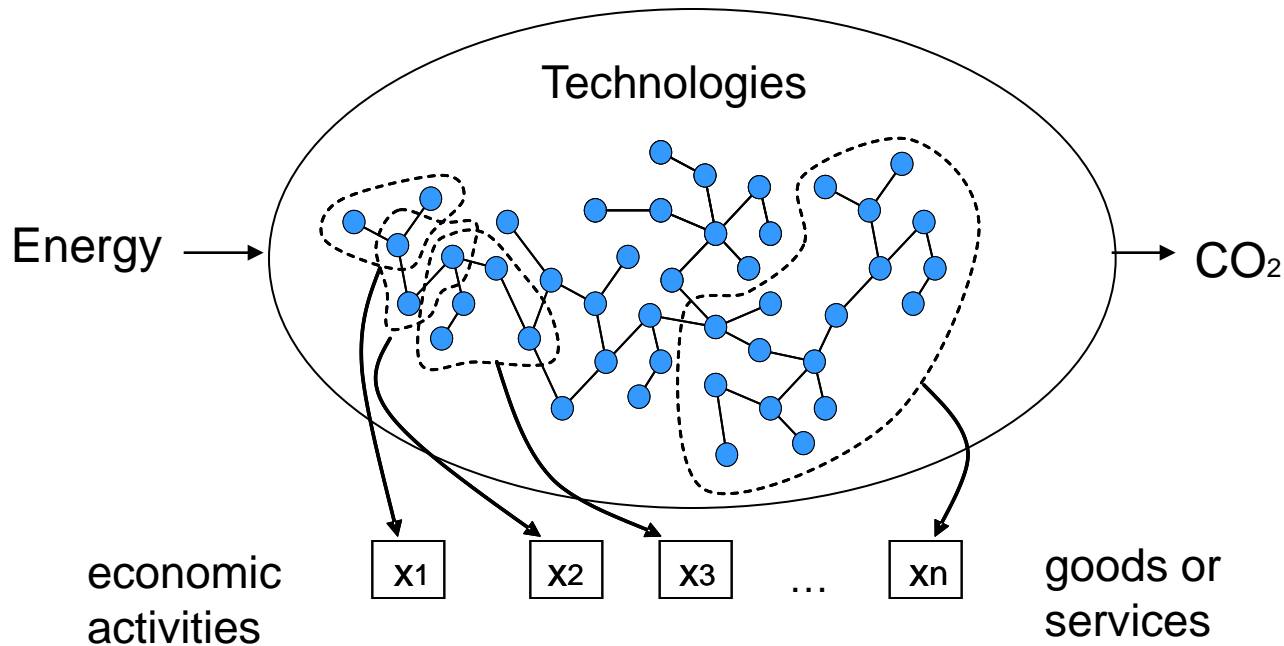
Constant labour  
productivity of each  
economic activity:

- $q_j = (y_j / e_j)$
- Function of the  
unique technologies  
used in the  
production

Changing Average  
productivity of the  
economy as a  
whole:

- $q = \sum (e_j / L) q_j$
- changes with shifts  
in employment and  
rate of growth by  
economic activity
- changes with  
creative destruction





CO<sub>2</sub>  
emissions as  
a function of  
the structure  
of the network  
and the  
sources of  
energy

employment

$e_1 + e_2 + e_3 \dots + e_n = L$

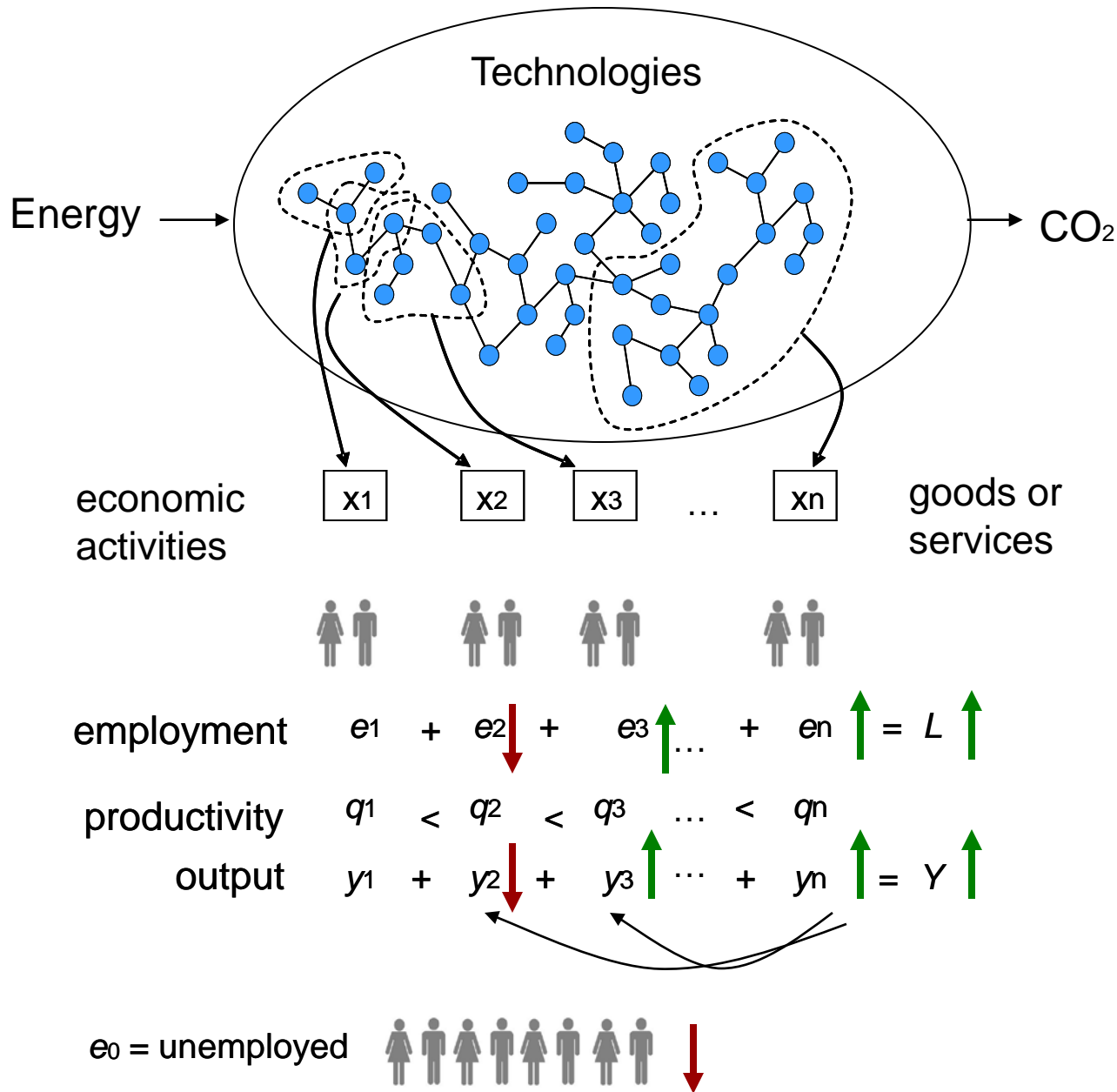
productivity

$q_1 < q_2 < q_3 \dots < q_n$

output

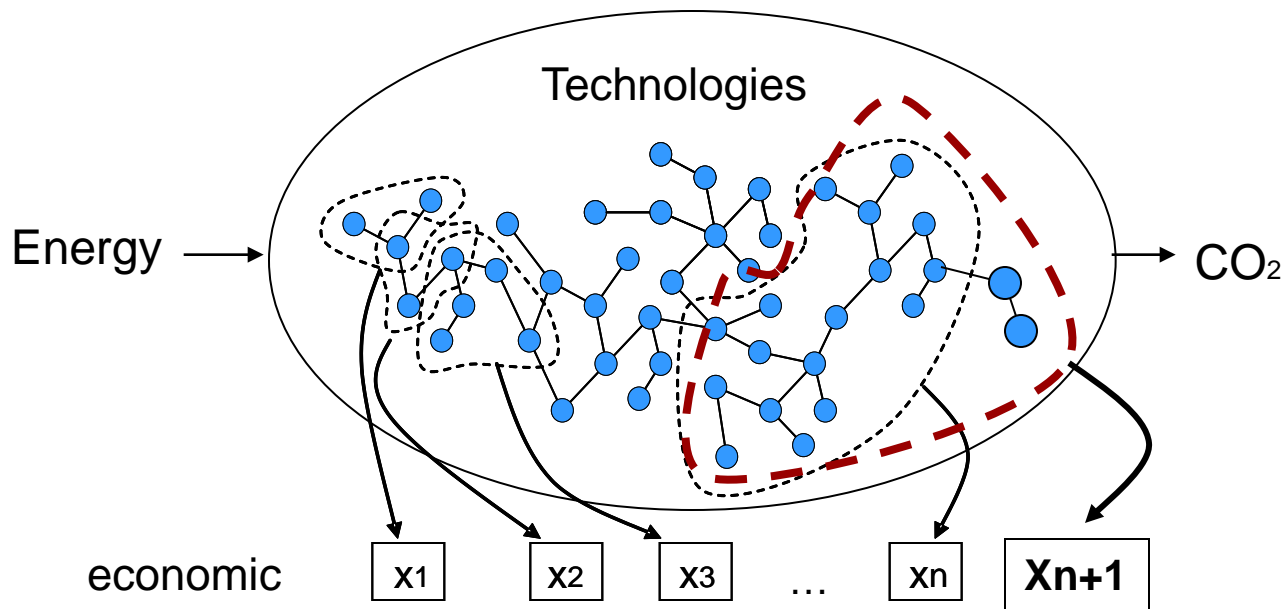
$y_1 + y_2 + y_3 \dots + y_n = Y$

$e_0 = \text{unemployed}$



How the  
economy  
evolves?

(a) by shifting  
employment  
and changing  
rate of growth  
by economic  
activity



employment

$$e_1 + e_2 + e_3 \dots + e_n + e_{n+1} = L$$

productivity

$$q^1 < q^2 < q^3 \dots < q^n < q_{n+1}$$

output

$$y_1 + y_2 + y_3 \dots + y_n + y_{n+1} = Y$$

$e_0$  = unemployed

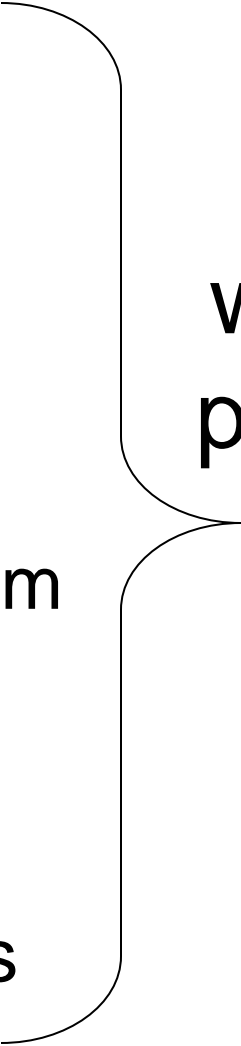


How the economy evolves?

(b) by adding/  
removing  
technologies  
and/or links of  
the network of  
technologies

# Growth with quality

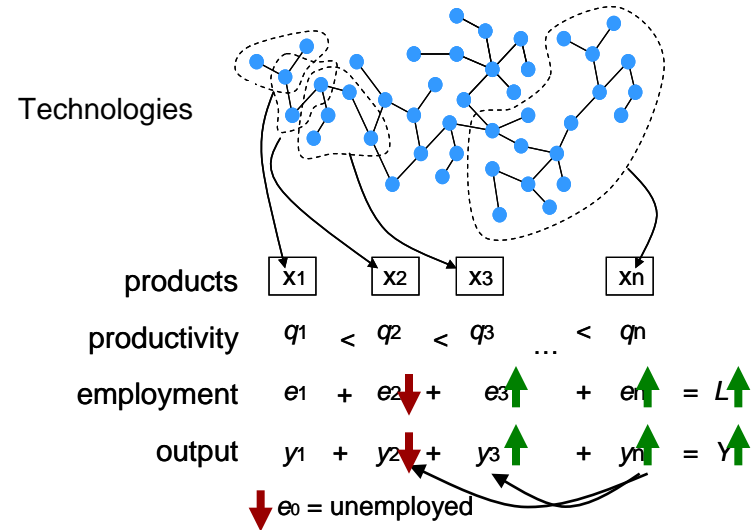
- Economic: Growth
- Social: Reduce Inequality
  - Increase employment
  - Increase productivity (with resulting higher wages)
  - Shift share of employment from low to more productive activities
- Environment: Sustainability
  - Reduce global CO<sub>2</sub> emissions



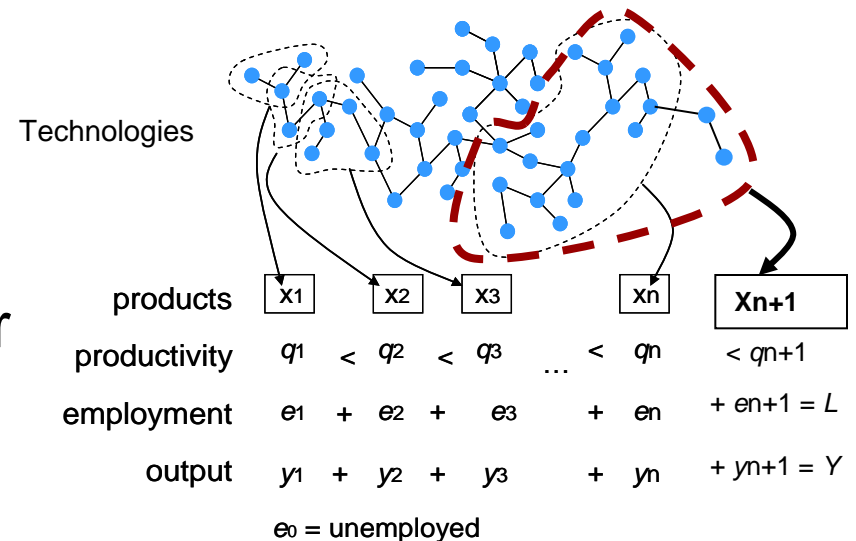
Growth  
with more  
productive  
and  
greener  
jobs

# Two ways to move employment into more productive activities

1) Demand must be increased in existing economic activities that are more productive which, in turn, increases output and associated employment in that activity;



2) Creation of new and more productive economic activities, which would increase the opportunity for more productive jobs.



# First path: quantitative change

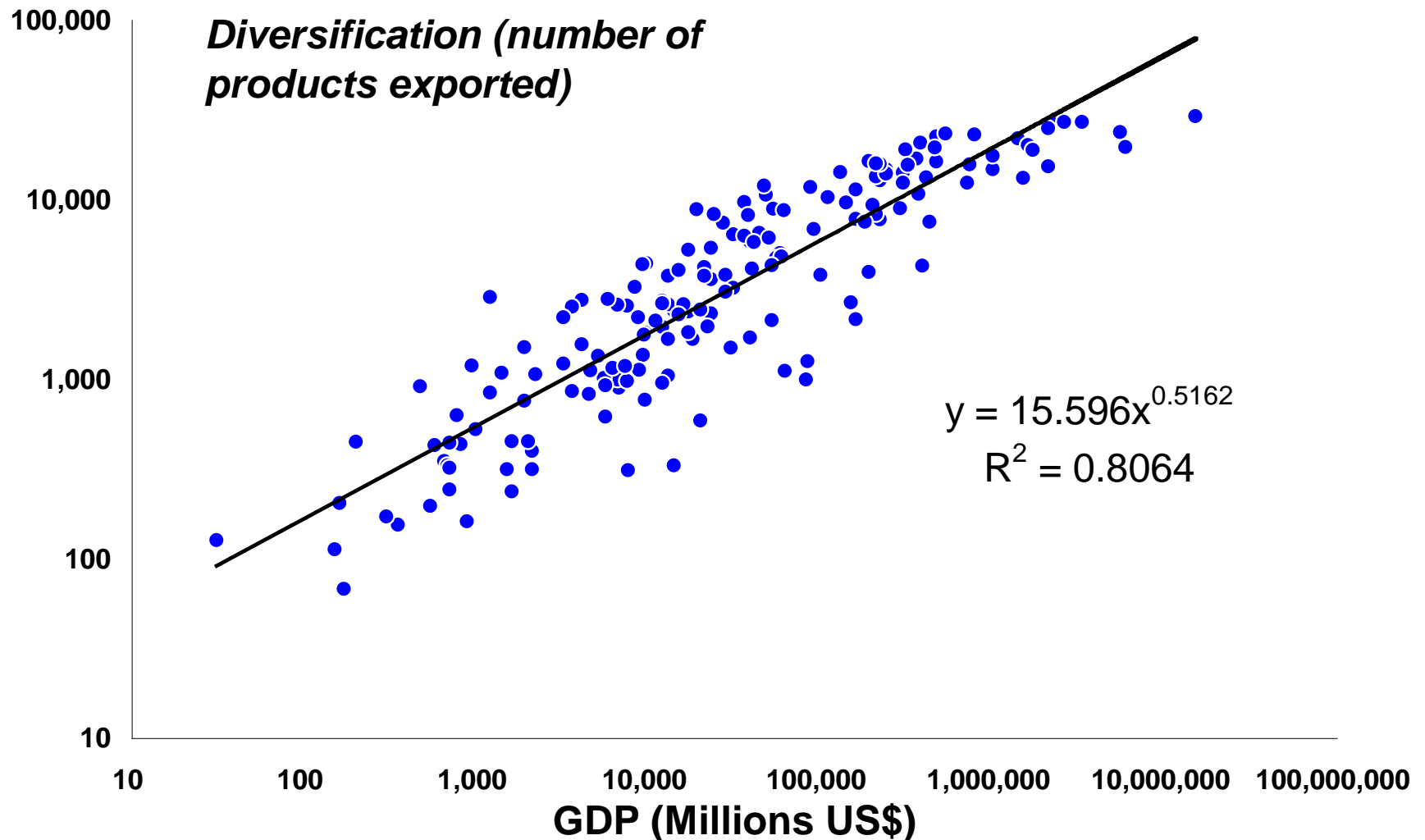
- In economies with **surplus labor**, it gives the opportunity for **reducing unemployment, poverty and income inequality**.
- **But:**
- **Limits on employment** absorption of more productive activities
- Average productivity of the economy as whole would be limited to the productivity of its most productive economic activity. In poor and less diversified countries that would result in **capping the maximum productivity at a low level**.
- It has to **rely on increasing demand for products of more productive activities**, which may not happen, particularly in times of increasing demand for commodities and primary products.

## Second path: qualitative change

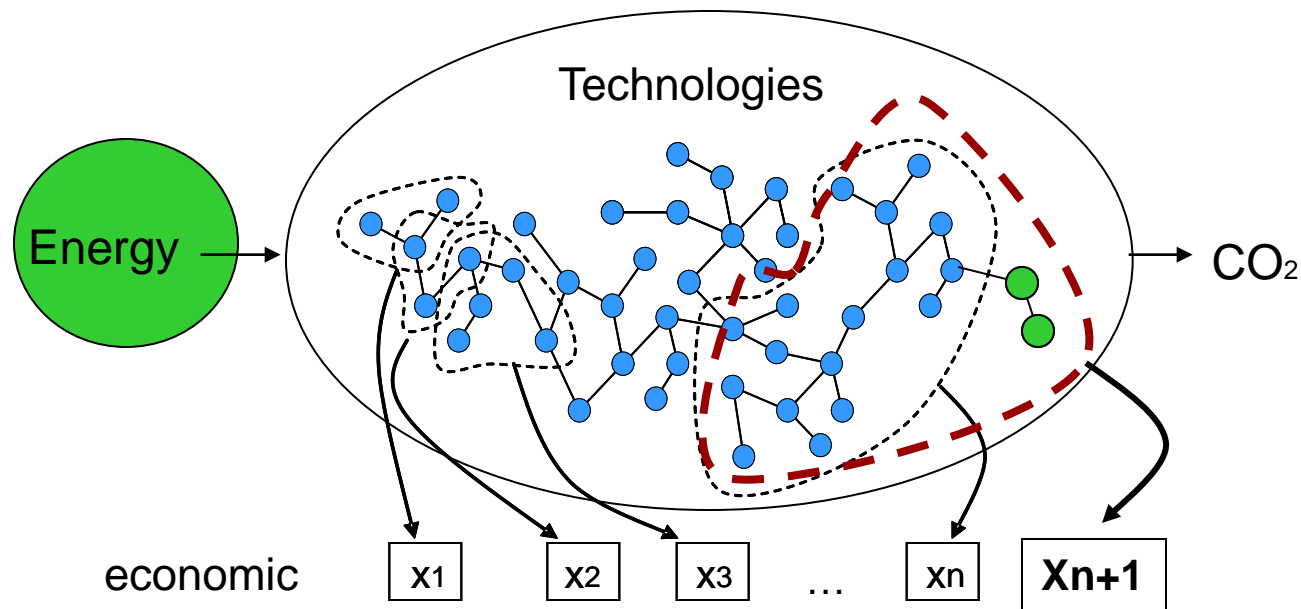
- Transformation of the economy with a qualitative change in the set of technologies used and products produced
- The growth in average productivity of the economy as a whole is limited only by the incentives to innovate towards more productive activities
- Therefore, fostering new and more productive economic activities present a more successful approach towards inclusive growth

# Development is associated with diversification

(Imbs and Wacziarg, 2003; Carrere et al, 2007; ESCAP, 2011)












## Two ways to diversify through a greener path

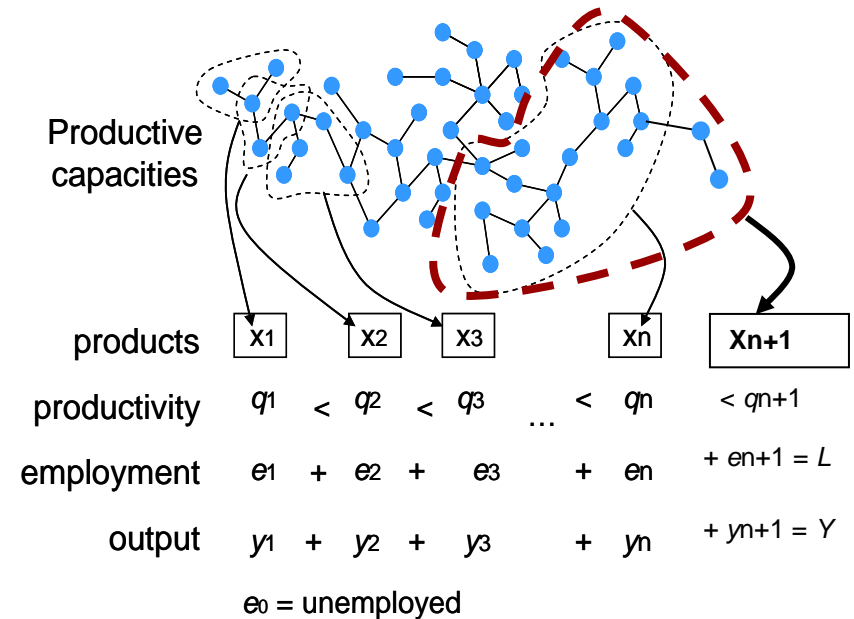
1. Foster new economic activities that in addition of being more productive are also more energy efficient
2. Increase share of renewable energy sources

economic activities	$x_1$	$x_2$	$x_3$	...	$x_n$	$x_{n+1}$
						
employment	$e_1$	$+$	$e_2$	$+$	$e_3$	$\dots + e_n + e_{n+1} = L$
productivity	$q^1$	$<$	$q^2$	$<$	$q^3$	$\dots < q_n < q_{n+1}$
output	$y_1$	$+$	$y_2$	$+$	$y_3$	$\dots + y_n + y_{n+1} = Y$

$e_0 = \text{unemployed}$  

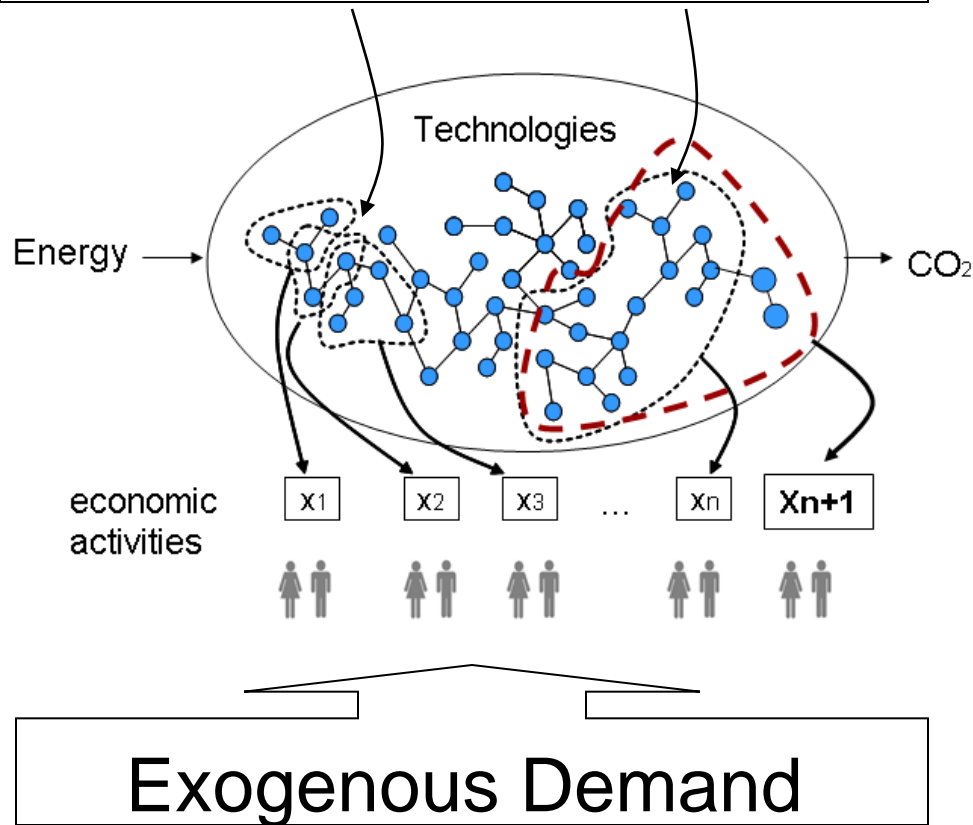
# How diversification would come about?

- Path dependency
  - New activities tend to exploit the productive capacities that were previously developed for other activities
- Emulation vs Innovation
  - Emulation: new to the country
  - Innovation: new to the world



# Economic institutions

Specific rules of the game: set incentives and constraints for acquisition and combination of technologies

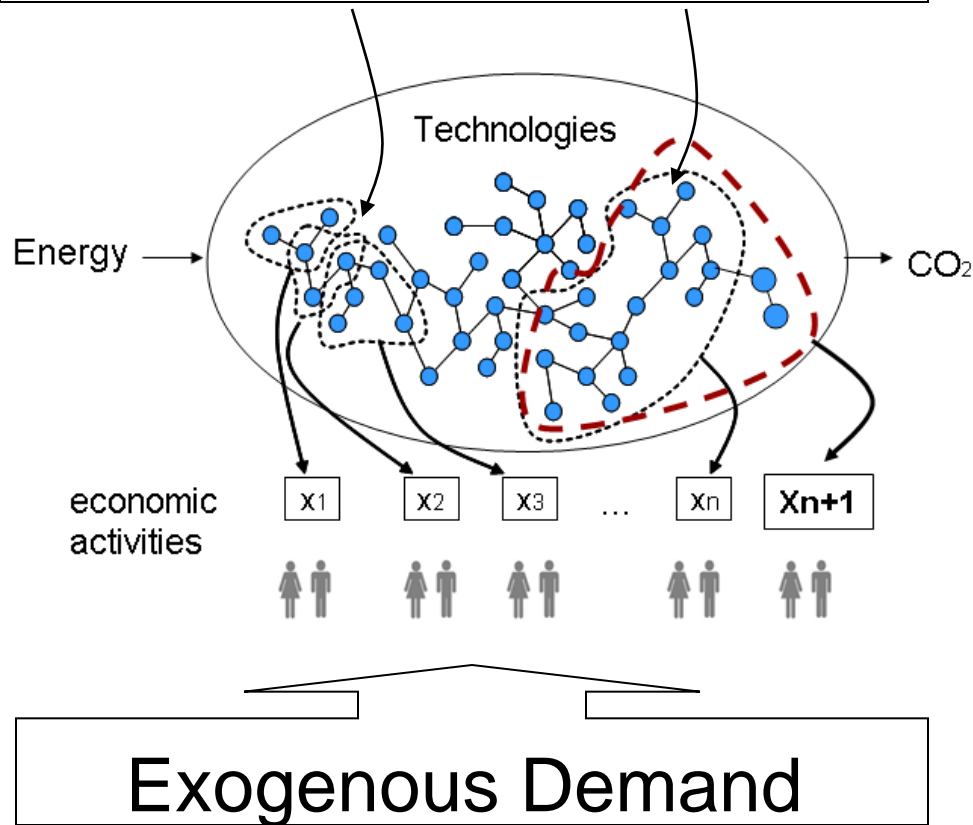


# Emulation

How to facilitate the **emergence** of new technologies that would allow emulation of more productive and greener activities?

# Economic institutions

Specific rules of the game: set incentives and constraints for acquisition and combination of technologies



## What is the role of the Government?

-Facilitate the emergence of new economic activities

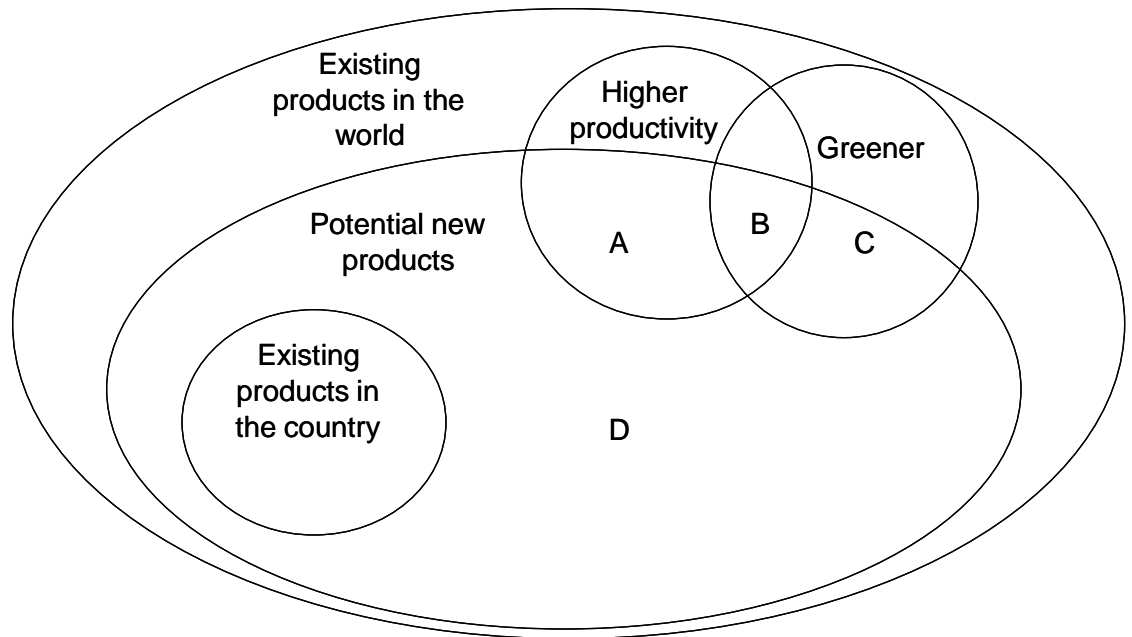
and ?

-Schumpeterian policies

- Keynesian demand management policies

# Laissez-faire vs strategic approach

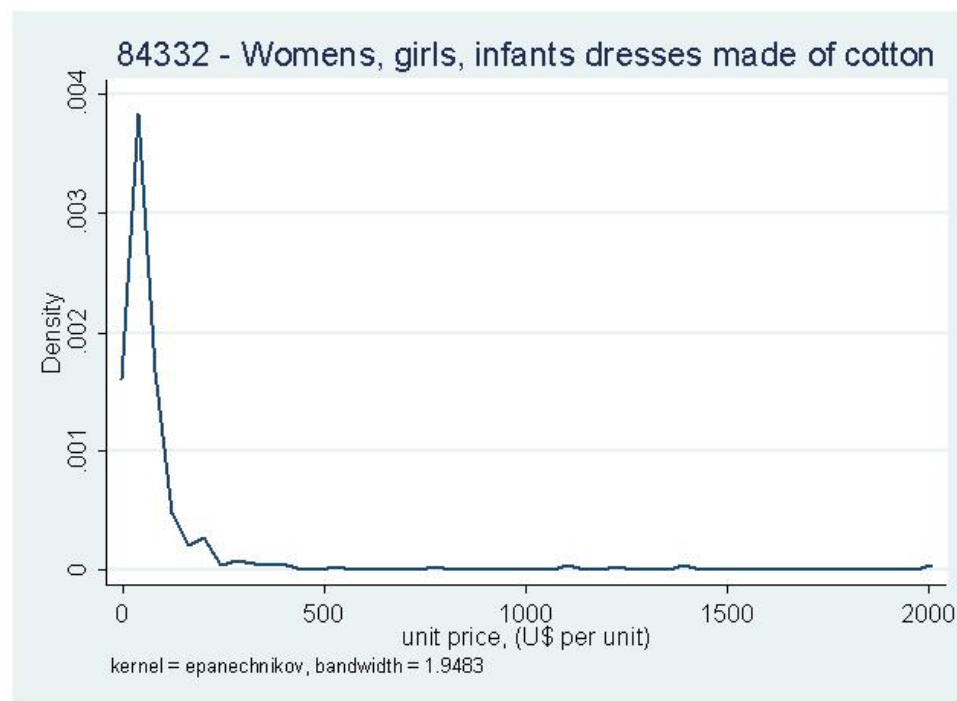
- If economic institutions create an environment that foster economic activity, **what is the probability (P)** that socially desirable outcomes would emerge **given the** existing technologies and market incentives?
- Considering  $D(x)$  as the expected demand for  $x$ :
- $P = D(B) / D(A+B+C+D)$
- $P > 50\% \Rightarrow$  laissez-faire
- $P < 50\% \Rightarrow$  strategic approach



# Empirical question

- Which economic activities are more likely to emerge given the existing technologies in the economy?
  - The Product Space (Hidalgo, Klinger, Barabási, Hausmann, 2007)
- Which of those have higher productivity and are greener?
  - Method of reflections (Hidalgo and Hausmann, 2009)
- What is the probability of those socially desirable activities emerge given the market incentives?
  - Export opportunity (ESCAP, 2012)
  - Import substitution opportunity

- Trade data disaggregated at 6-digit level of HS 2002
- Products are also differentiated based on their unit value
- 43,293 products in 2010

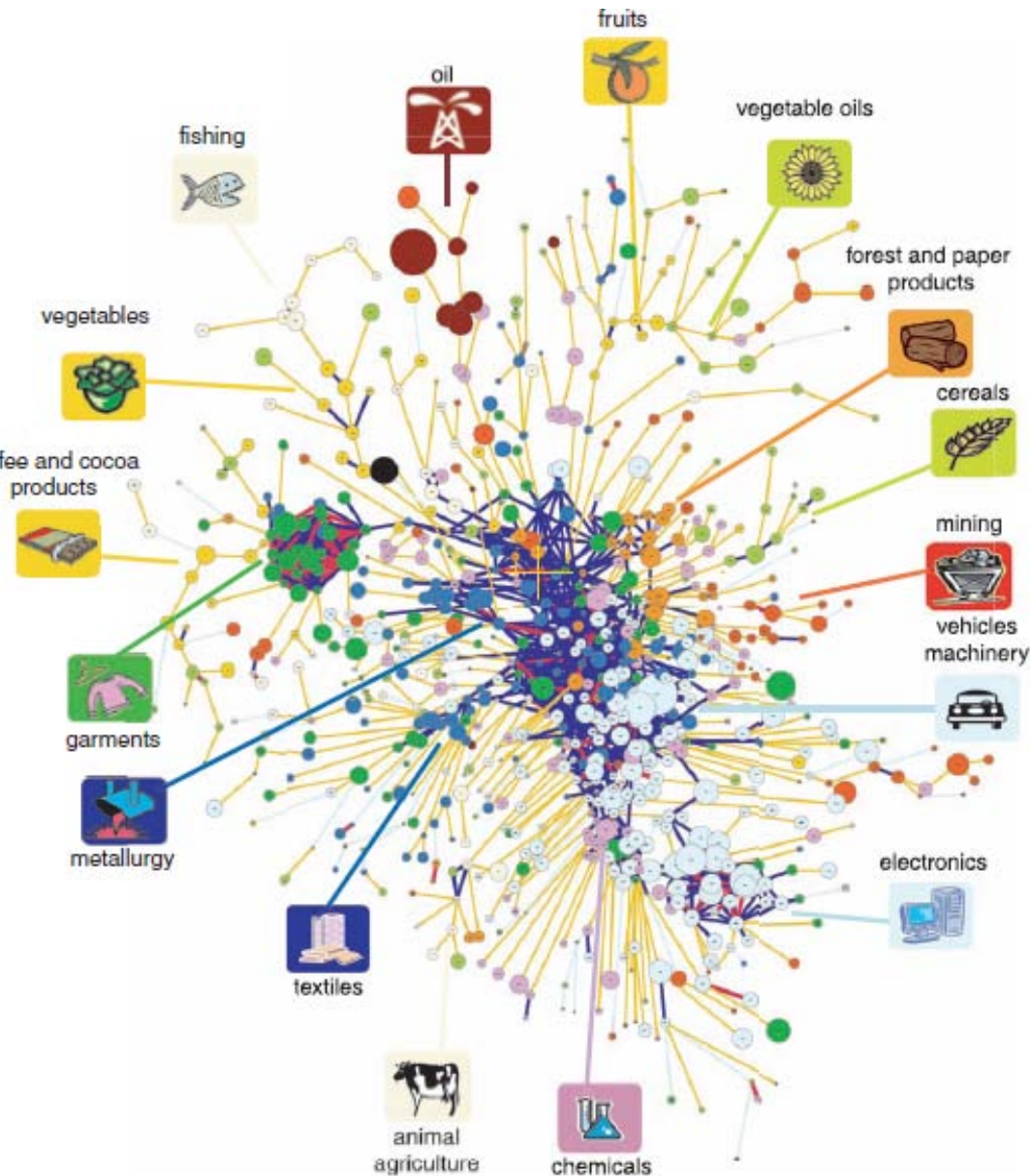


Source: Author based on data from COMTRADE.

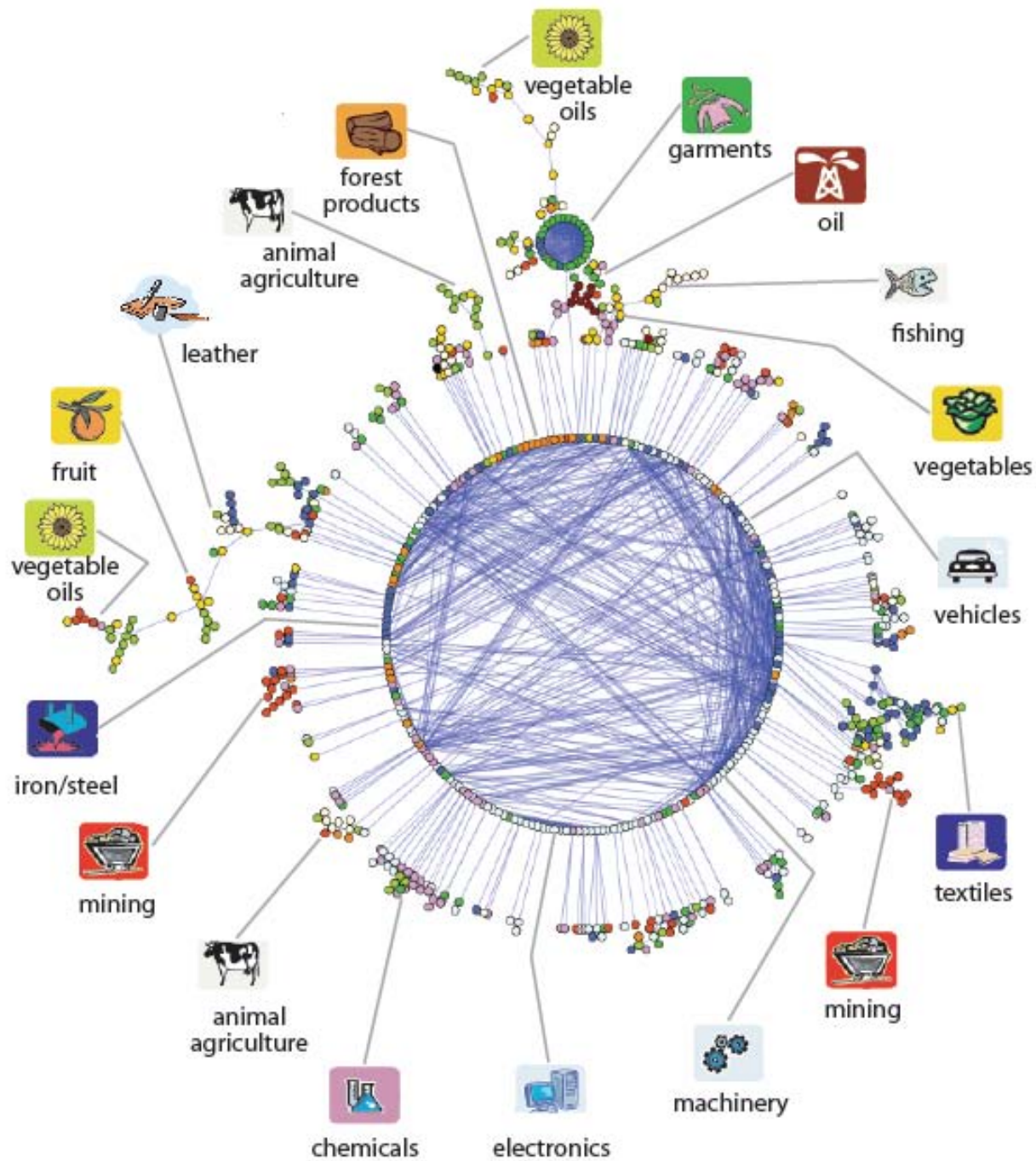
code = 6-digit (HS) + 1digit (quantity unit code) + 1 digit (unit value range)

# Product Space

- Hidalgo, Klinger, Barabási, Hausmann (2007). **The Product Space Conditions the Development of Nations**
- Network in which products are nodes connected to each other if they are usually part of the same product mix
- proximity between products A and B ( $\Phi_{AB}$ )
- $\Phi_{AB} = \Phi_{BA} = \min(P(A|B), P(B|A))$

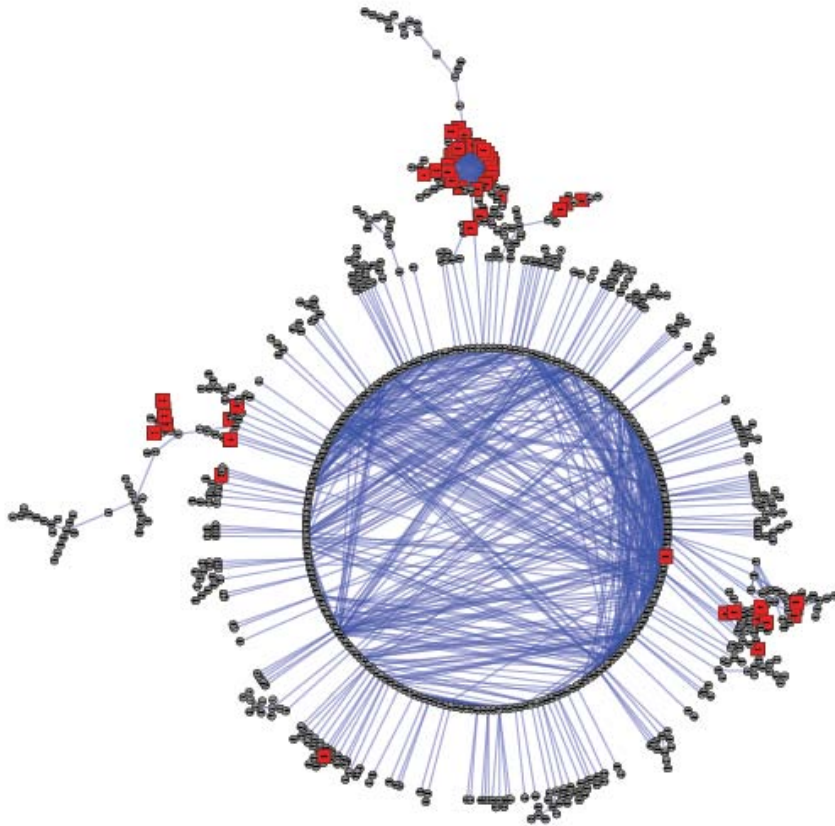




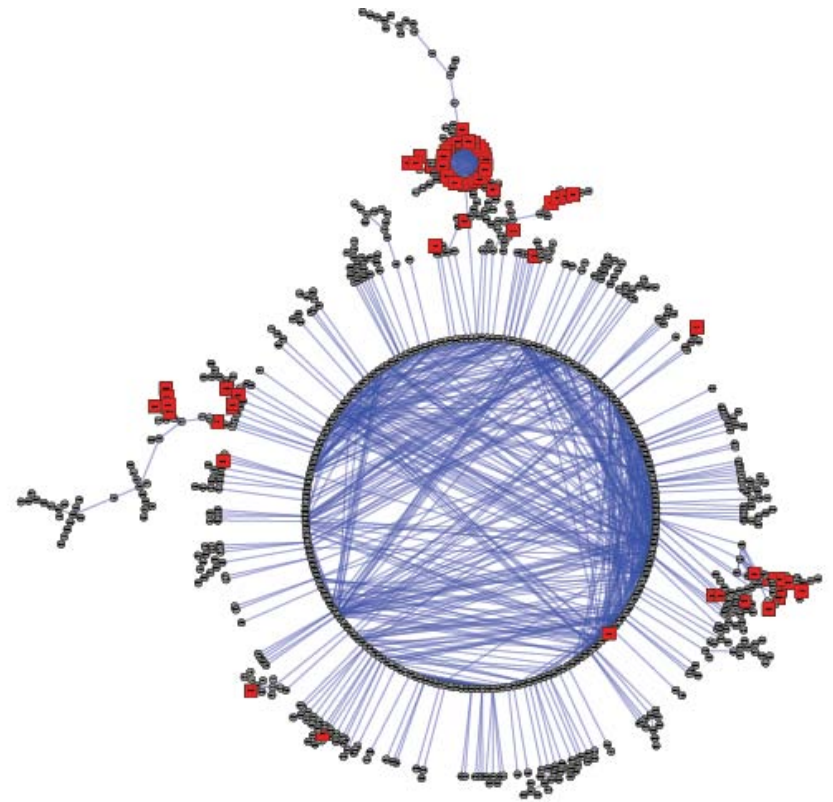


# Bangladesh

1991

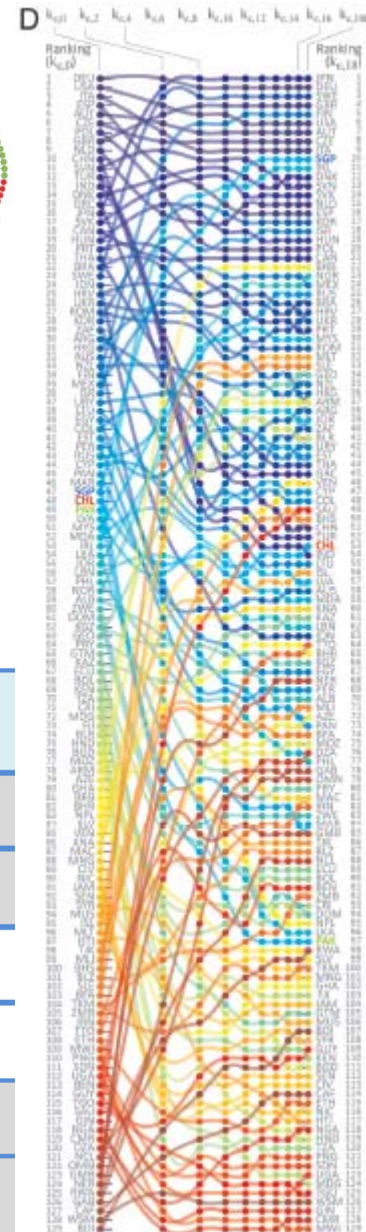
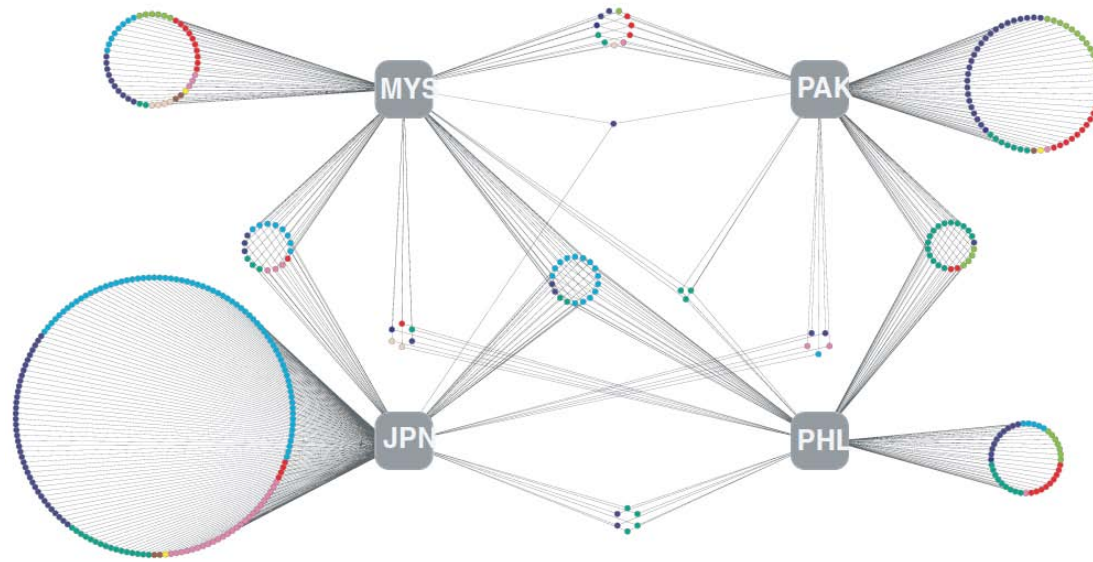


2009



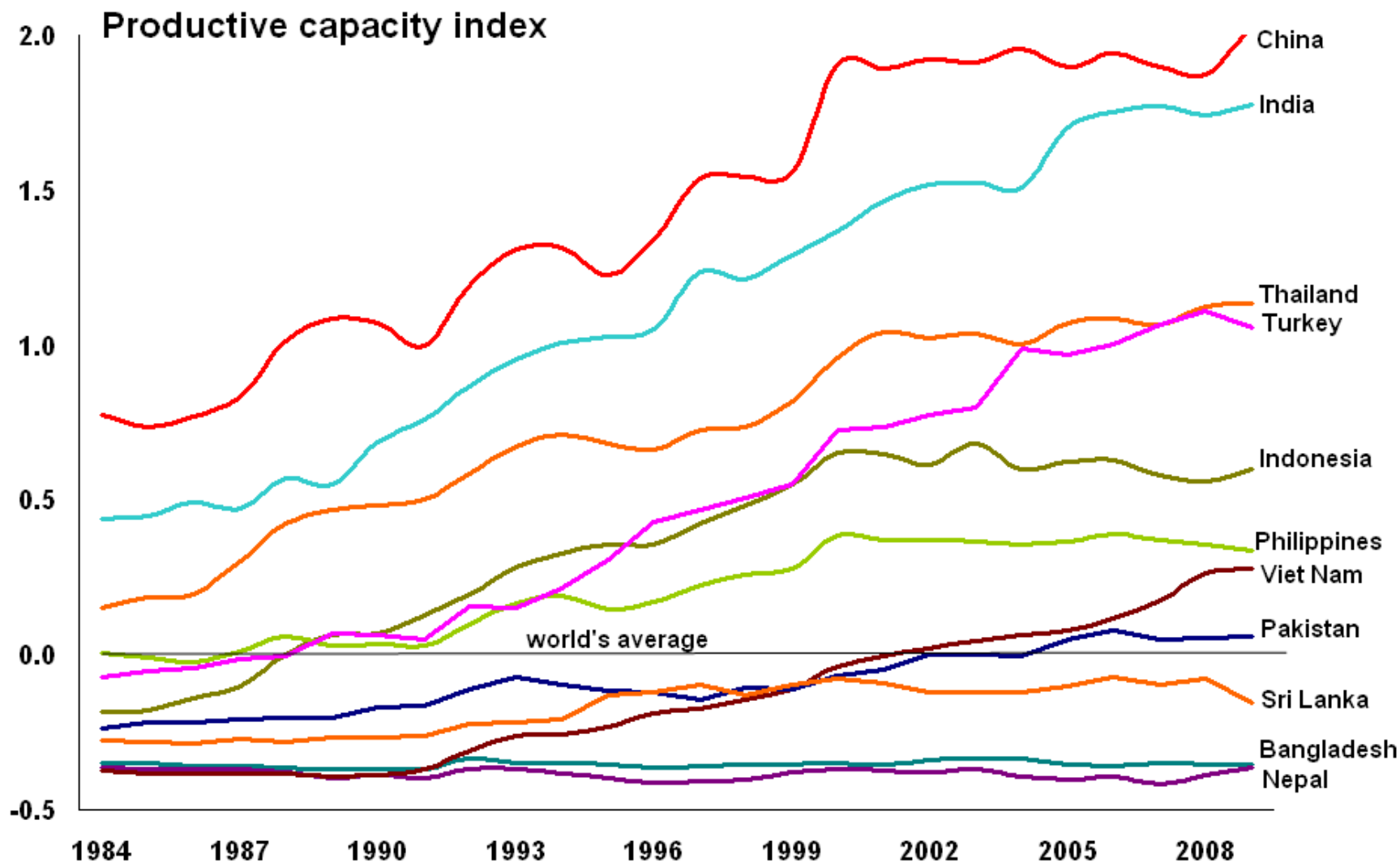
# Method of reflections

Hidalgo and Hausmann (2009). *The building blocks of economic complexity.*



Definition	Working Name	Description: Short summary Question Form
$k_{a,0}$	Diversification	Number of products exported by country $a$ . How many products are exported by country $a$ ?
$\kappa_{\alpha,0}$	Ubiquity	Number of countries exporting product $\alpha$ . How many countries export product $\alpha$ ?
$k_{a,1}$	$k_{c,1}$	Average ubiquity of the products exported by country $a$ . How common are the products exported by country $a$ ?
$\kappa_{\alpha,1}$	$k_{p,1}$	Average diversification of the countries exporting product $\alpha$ . How diversified are the countries that export product $\alpha$ ?
$k_{a,2}$	$k_{c,2}$	Average diversification of countries with an export basket similar to country $a$ . How diversified are countries exporting goods similar to those of country $a$ ?
$\kappa_{\alpha,2}$	$k_{p,2}$	Average ubiquity of the products exported by countries that export product $\alpha$ . How ubiquitous are the products exported by product's $\alpha$ exporters?



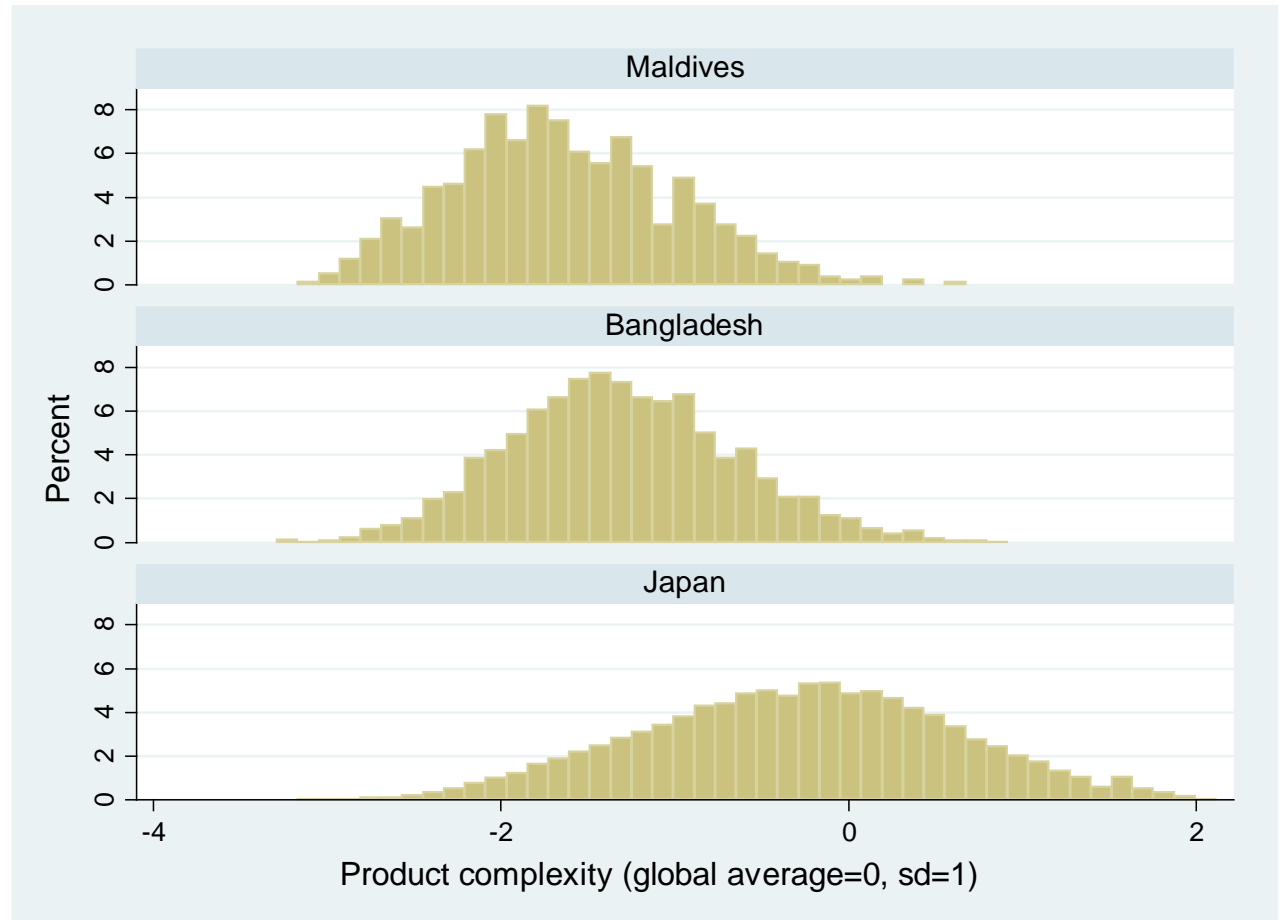


# Product complexity

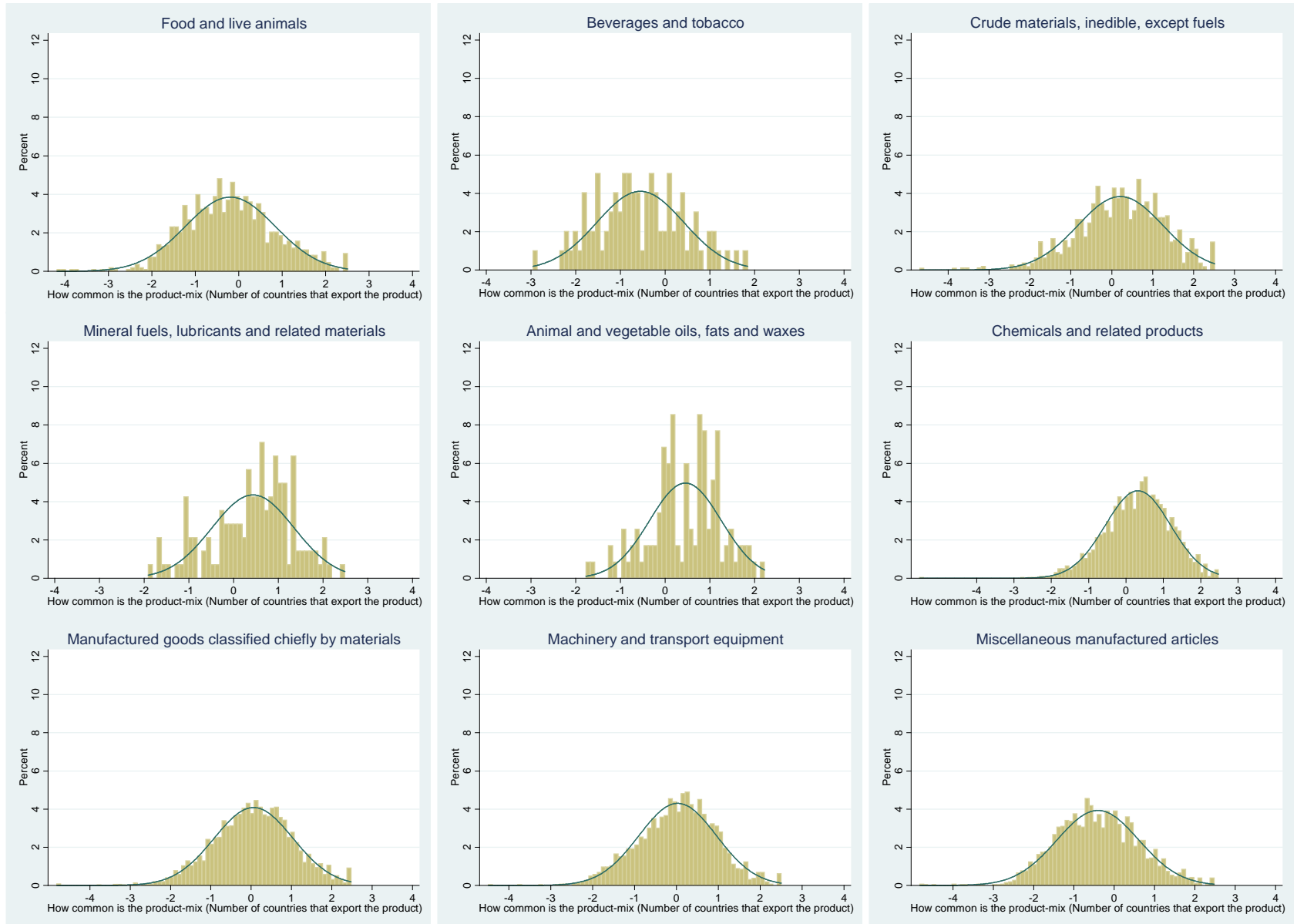
Measure of how ubiquitous the product is and the level of diversification of the countries that produce it

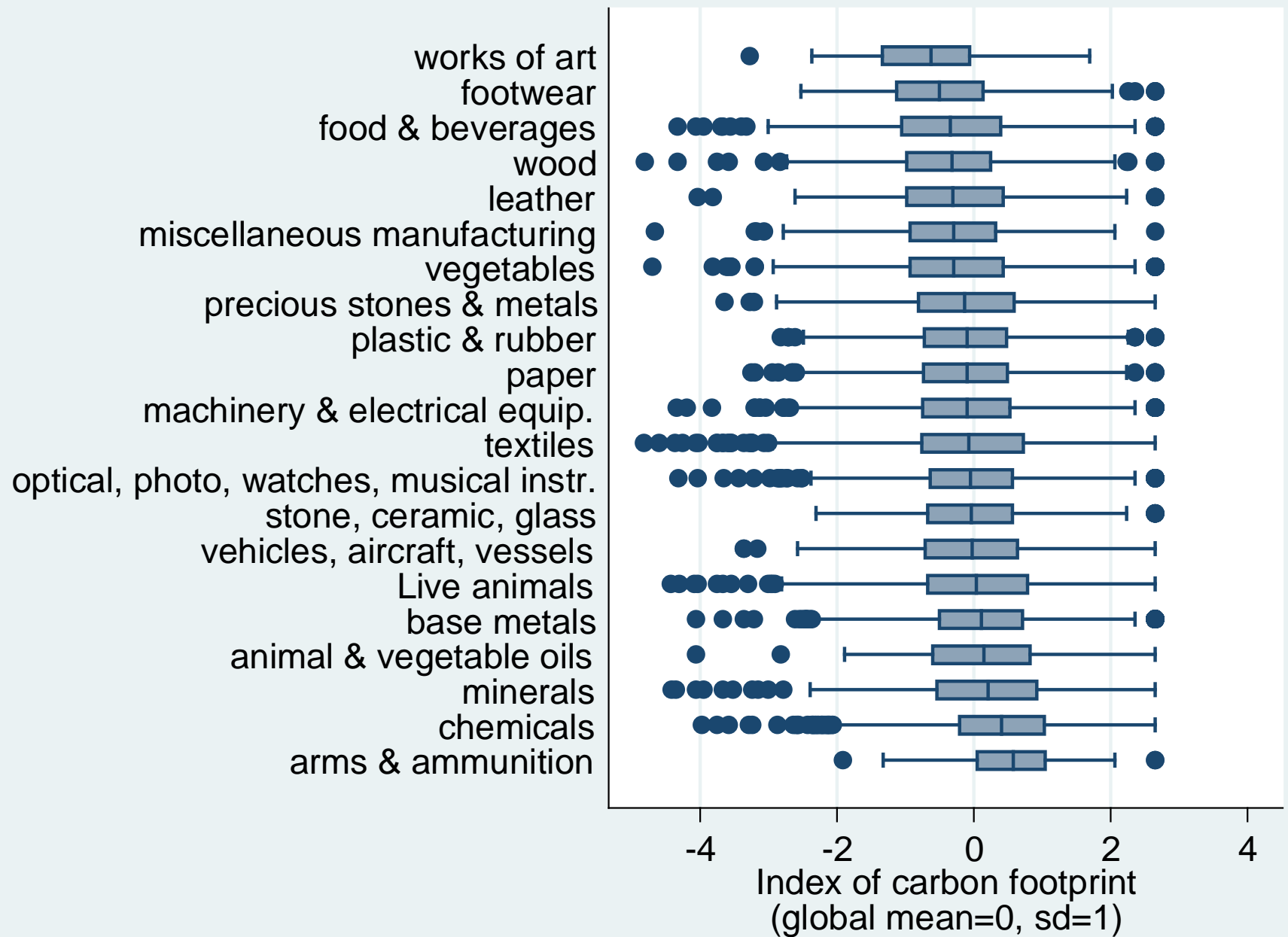
Abdon and others (2010): Major exporters of more complex products are high-income countries and major exporters of less complex products are low-income countries

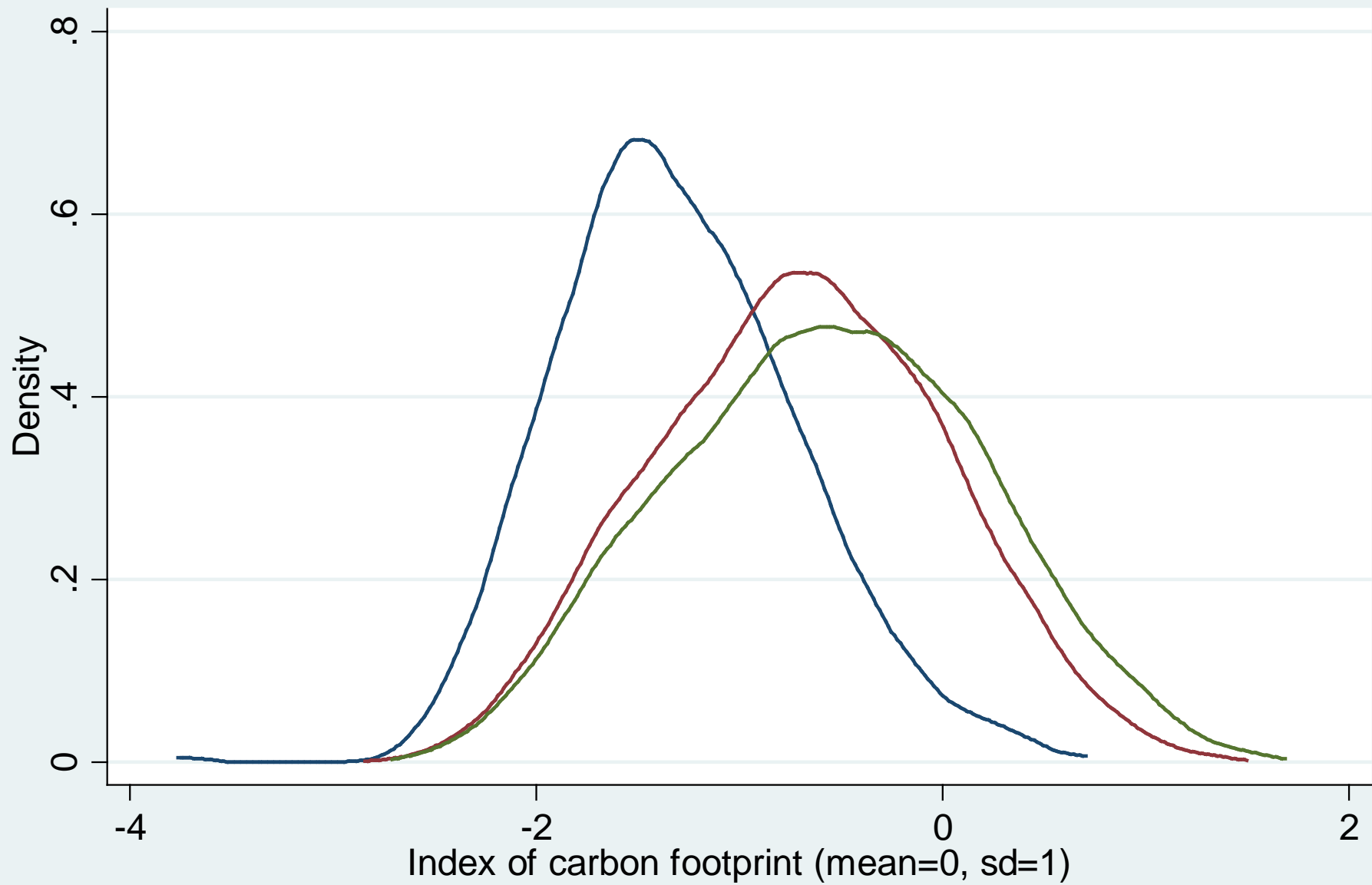
ESCAP (2012): Rich countries export products with a wide range of complexity



# Product complexity by industry

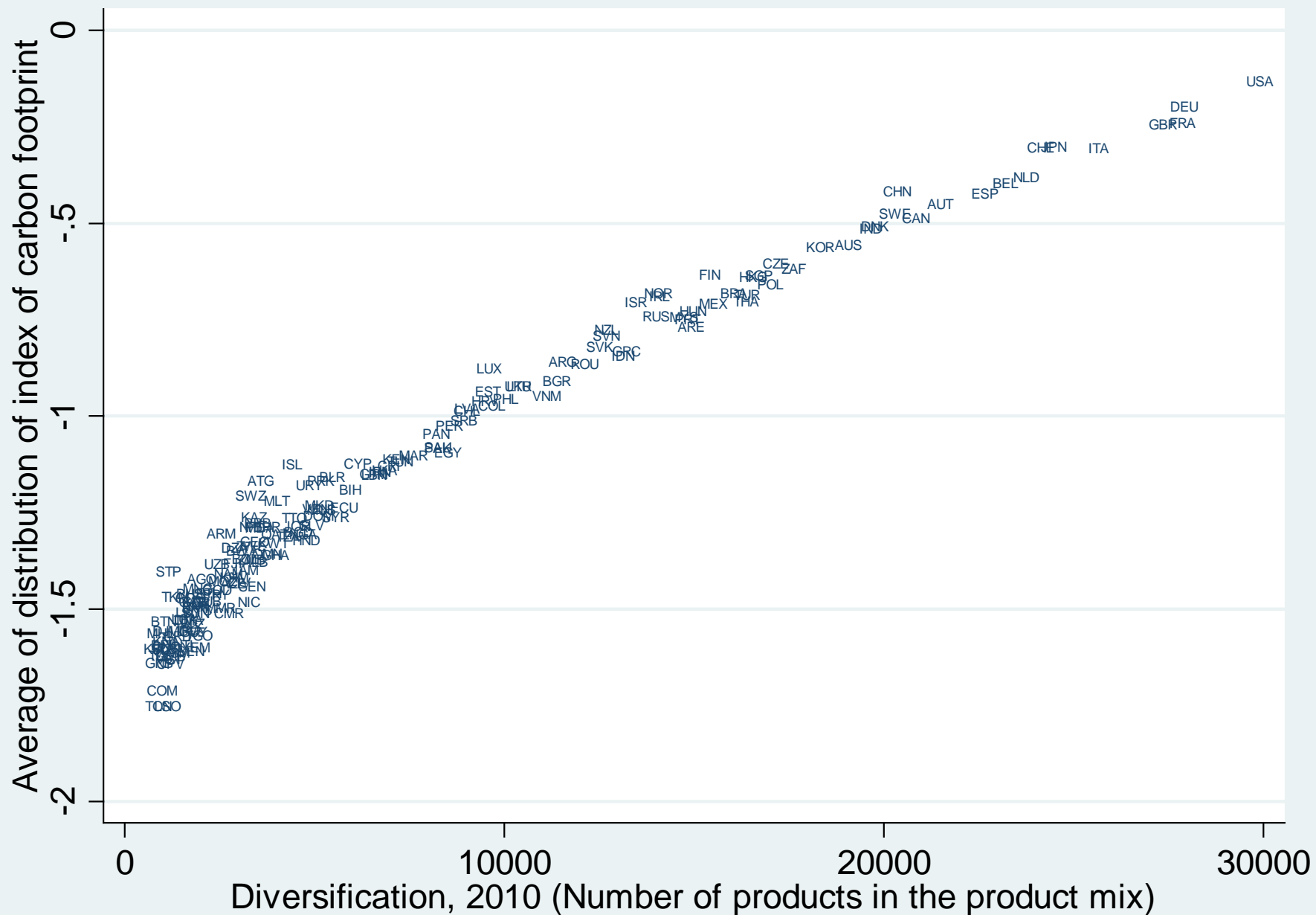




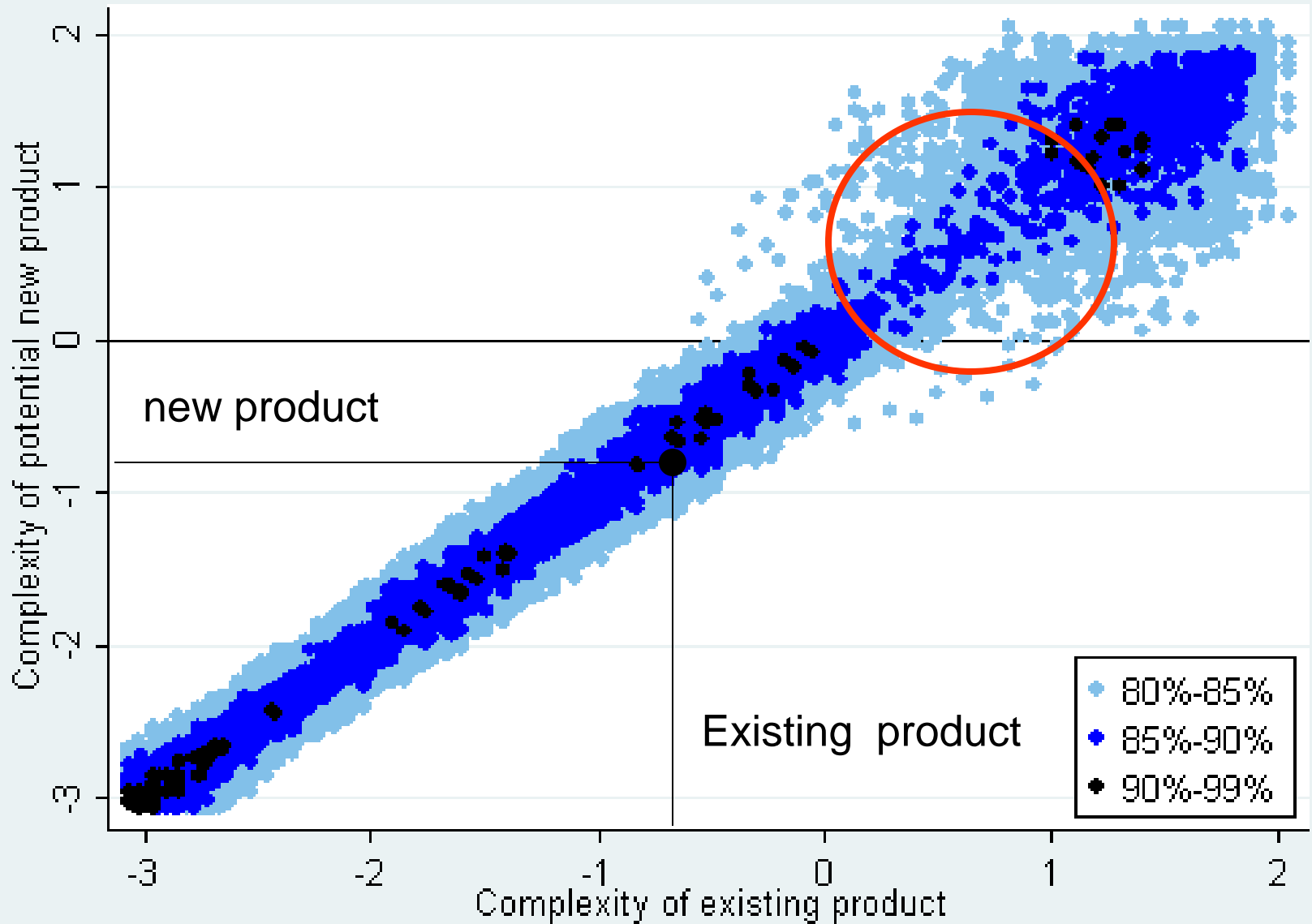


— Bangladesh — Thailand — Republic of Korea

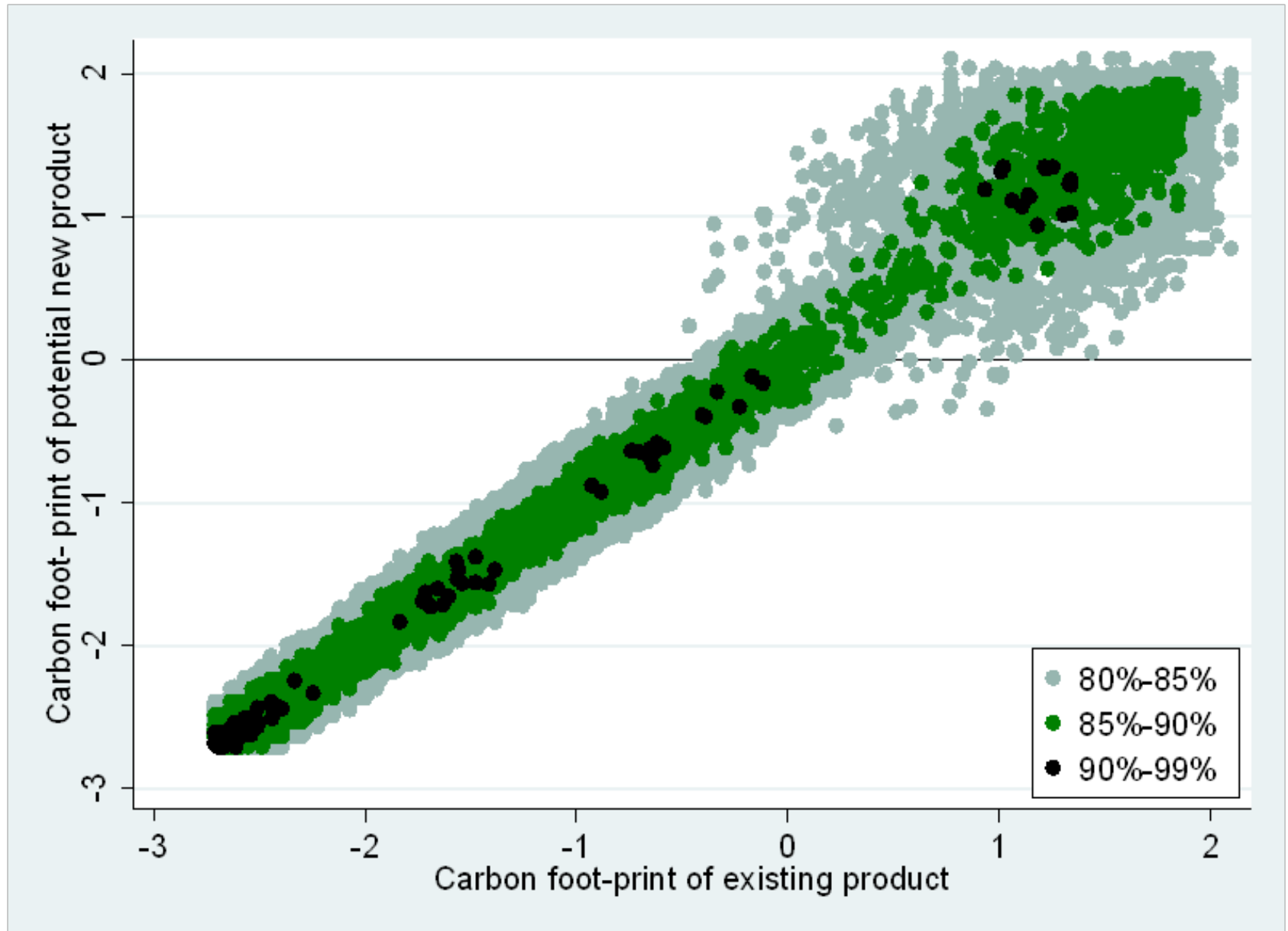




# Map of potential new products

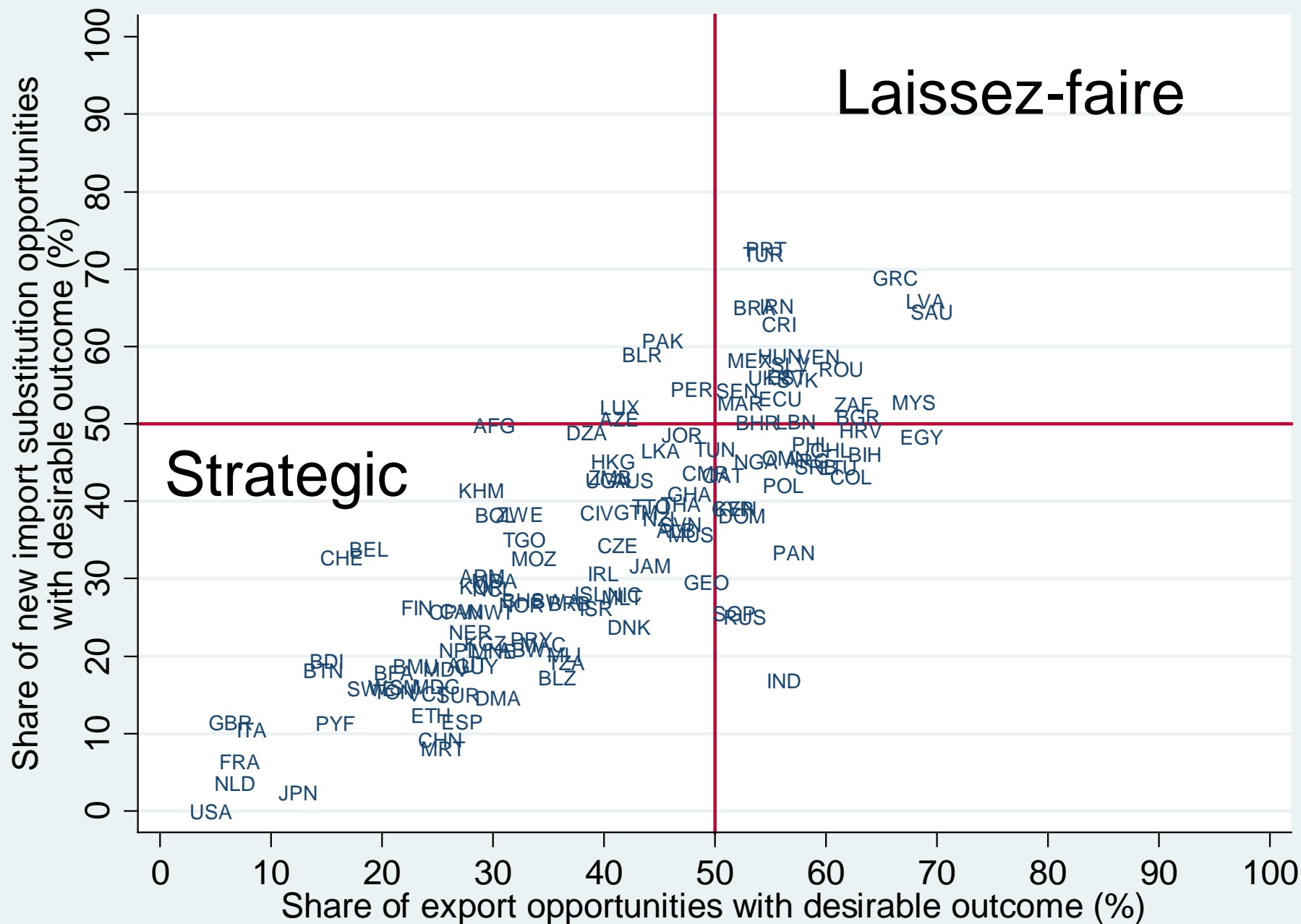


# Map of potential new products

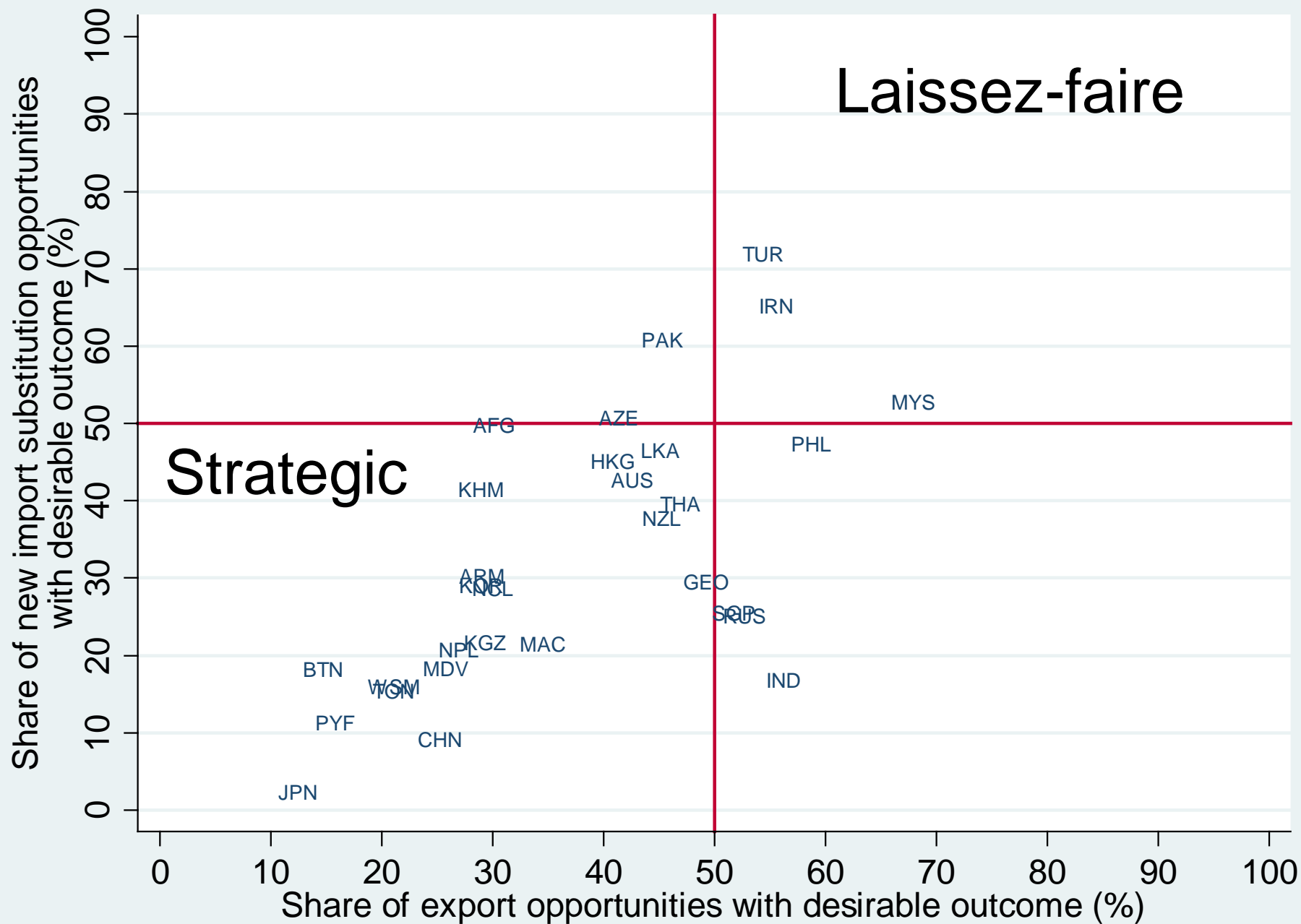


# Market incentives

- Captures expected demand for potential new products
- Export opportunity
  - Overlap indicator designed to measure the degree to which potential new products of one country match the expanding markets of another
  - What is the expected export demand for a potential new product?
- Import substitution
  - Total of country's imports of a potential new product



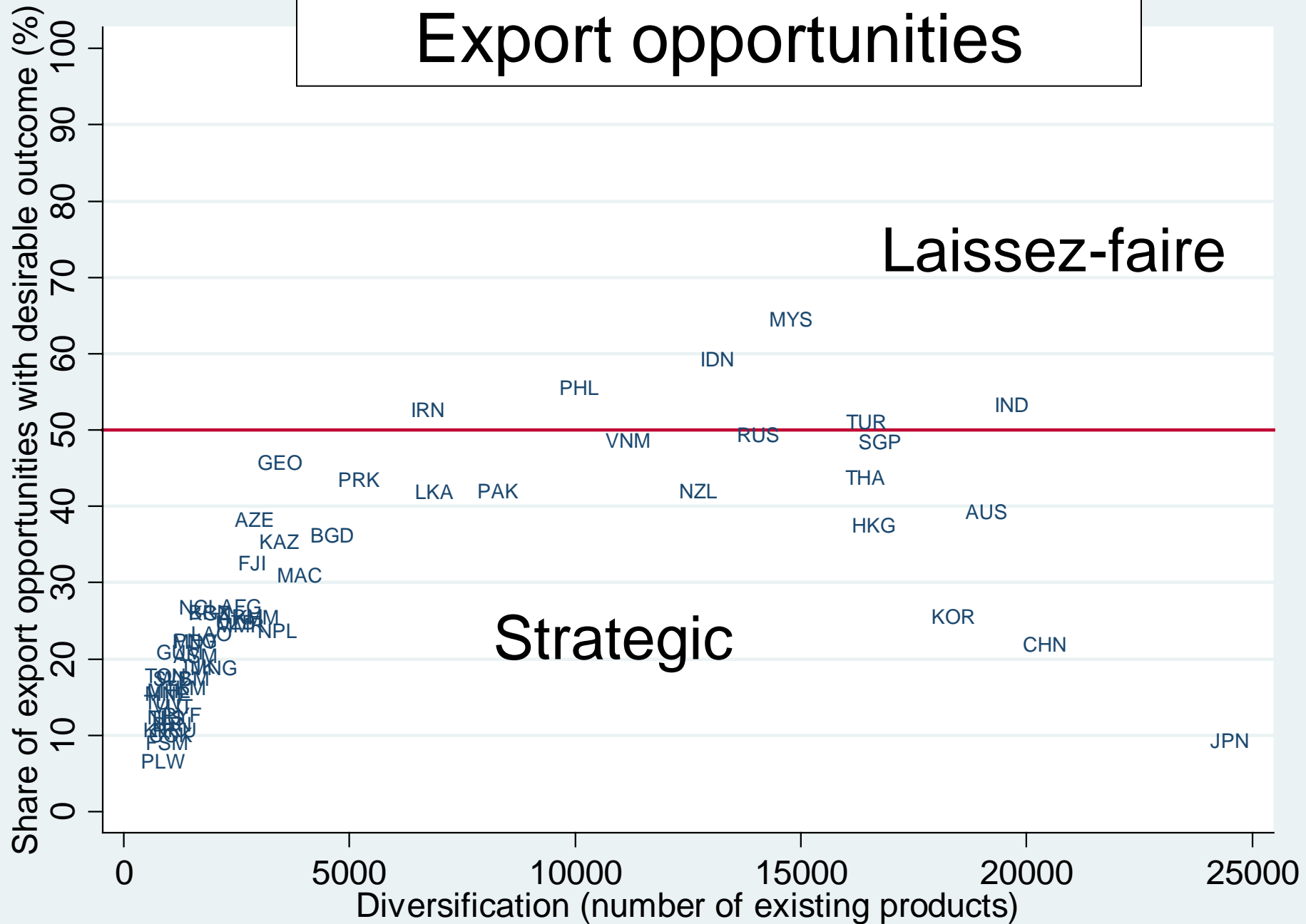
Source: Author based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).



Source: Author based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).

## Export opportunities

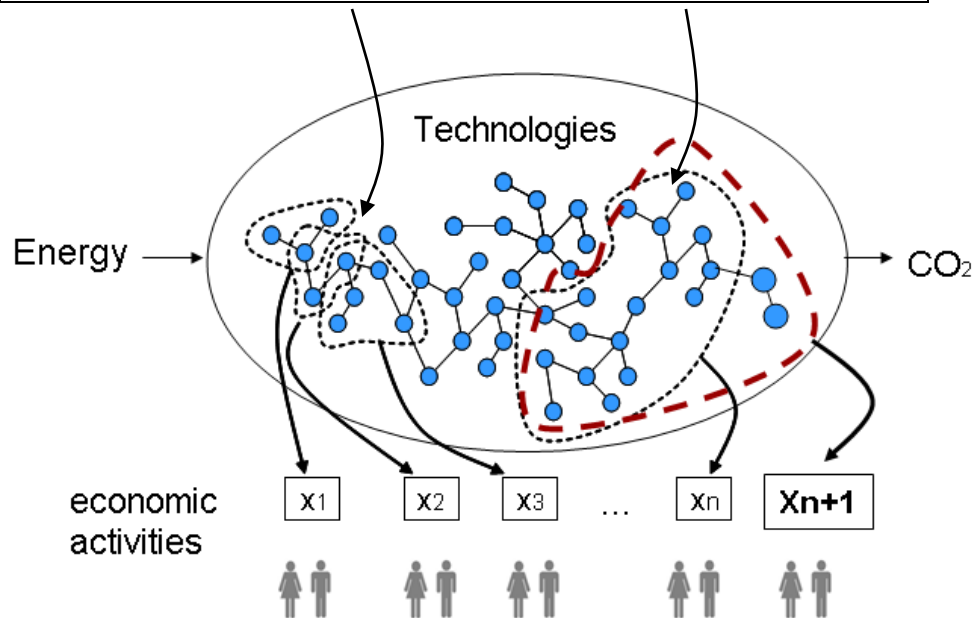
# Laissez-faire



# Strategic

# Economic institutions

Specific rules of the game: set incentives and constraints for acquisition and combination of technologies



## role of the government

-Facilitate the emergence of new economic activities

Schumpeterian policies

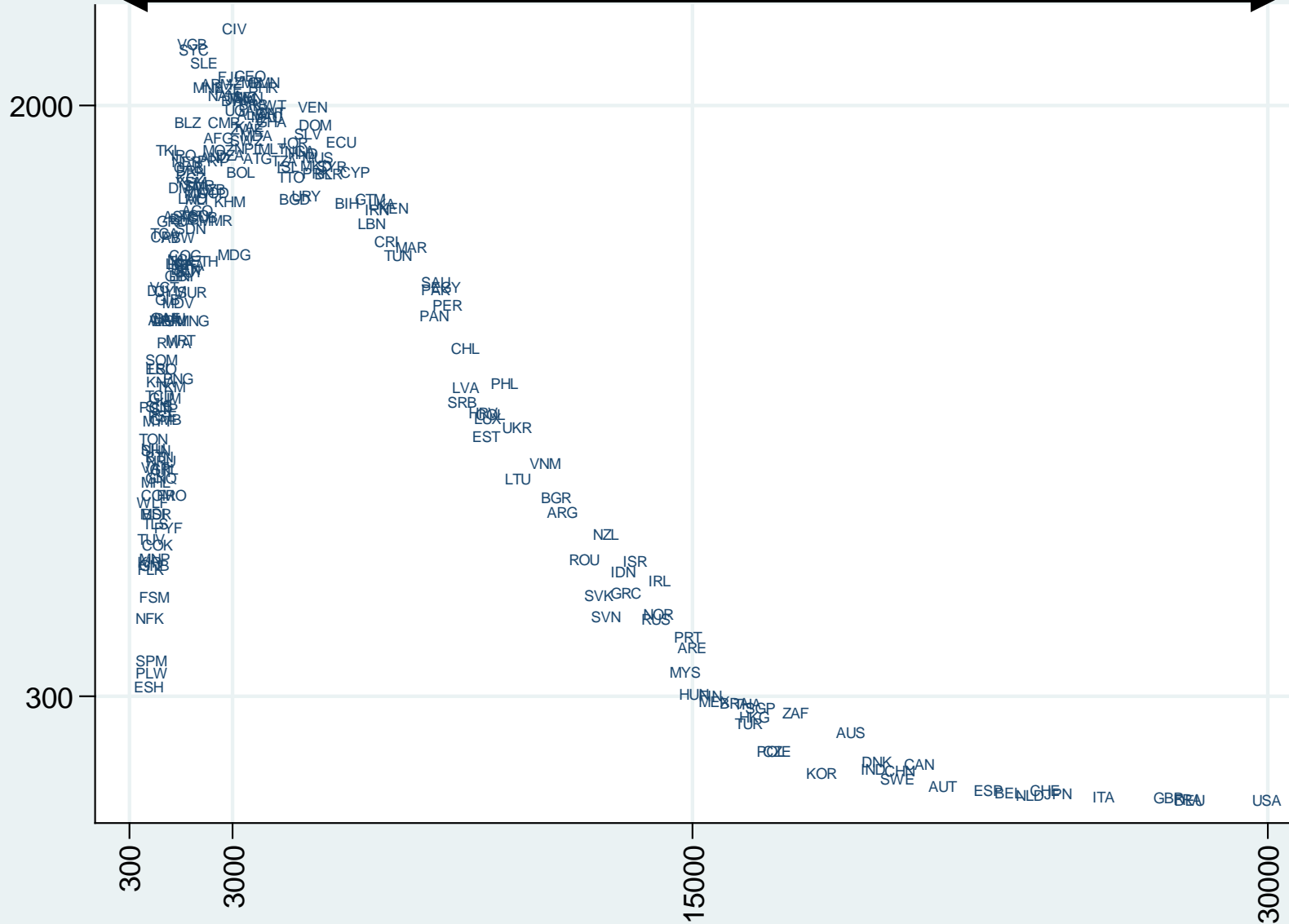
- direction
- investment
- infrastructure
- human capital



# emulation

# innovation

Number of new opportunities with  
higher complexity and greener

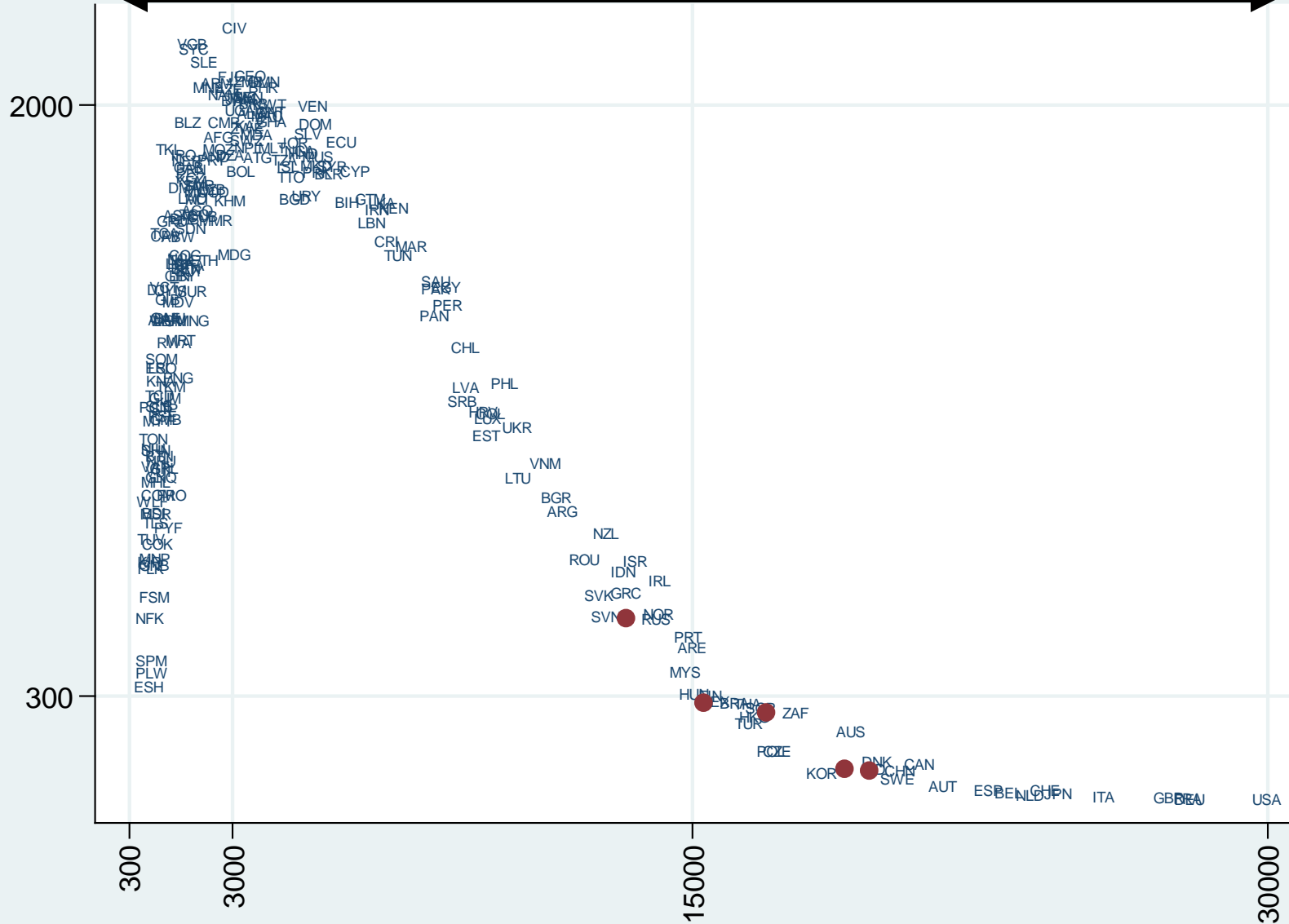


Diversification (number of existing product)

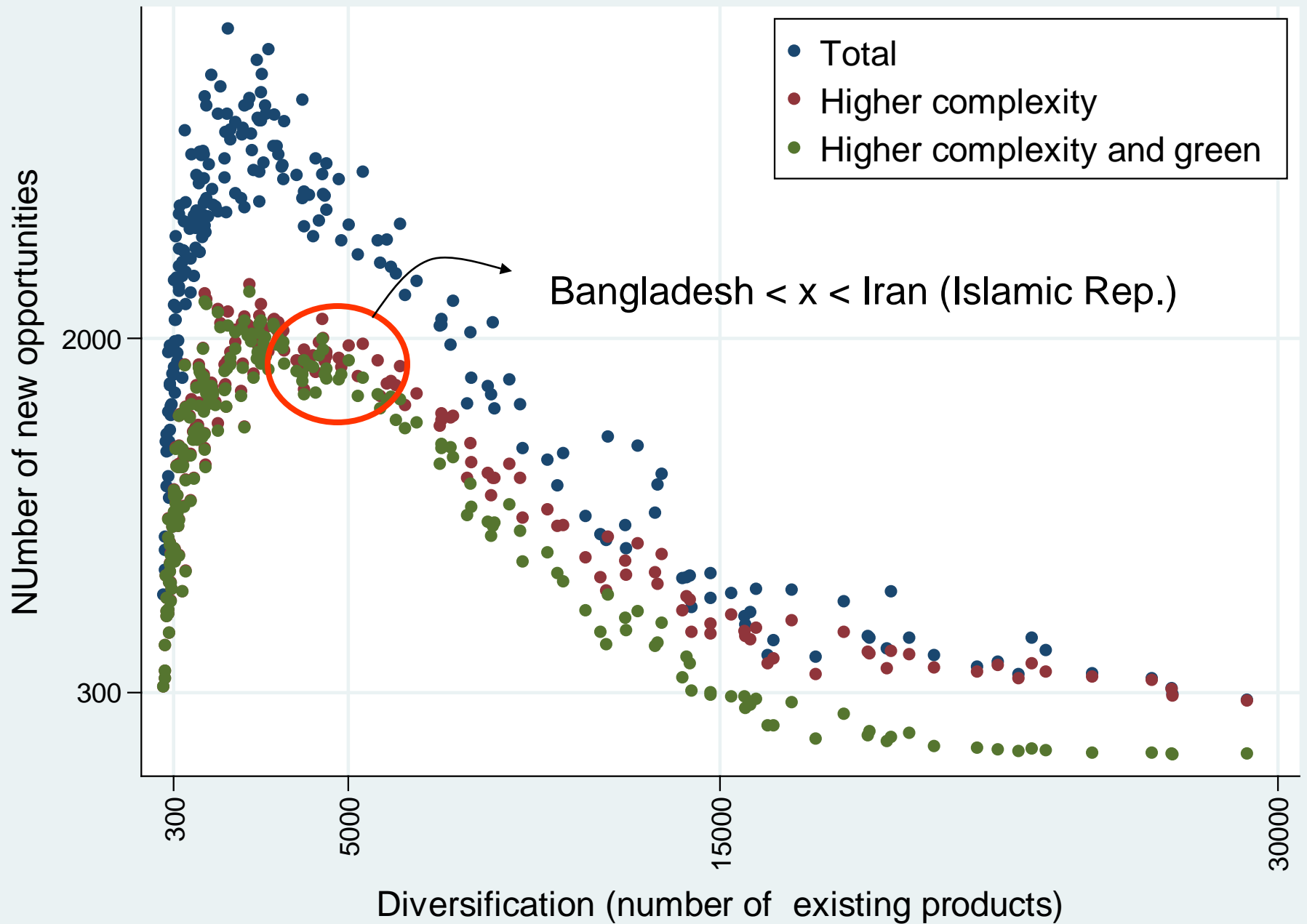
emulation

innovation

Number of new opportunities with  
higher complexity and greener

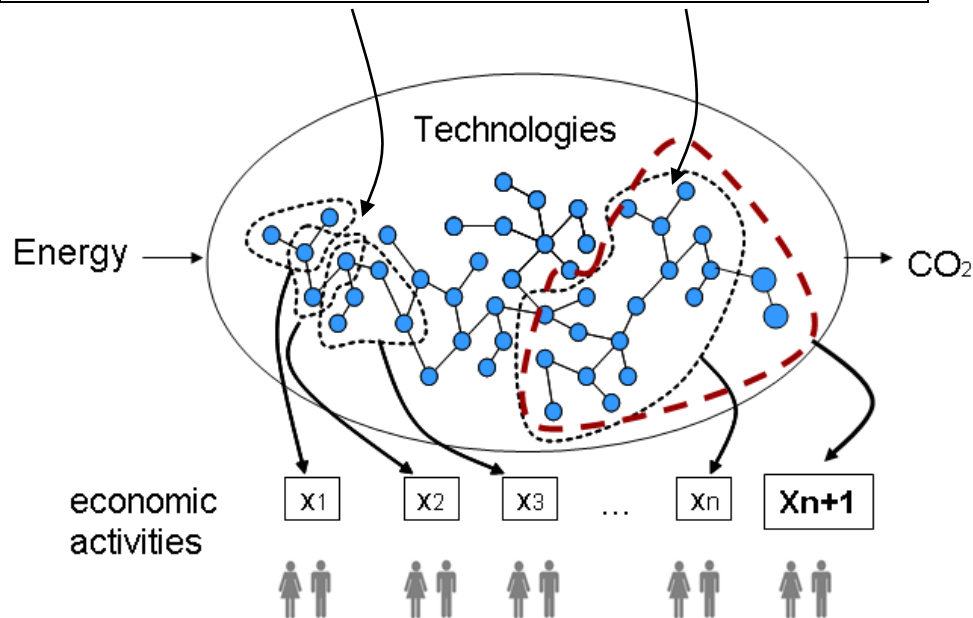


Diversification (number of existing product)



# Economic institutions

Specific rules of the game: set incentives and constraints for acquisition and combination of technologies



# role of the government

-Facilitate the emergence of new economic activities

Schumpeterian policies

- direction
- investment
- infrastructure
- human capital

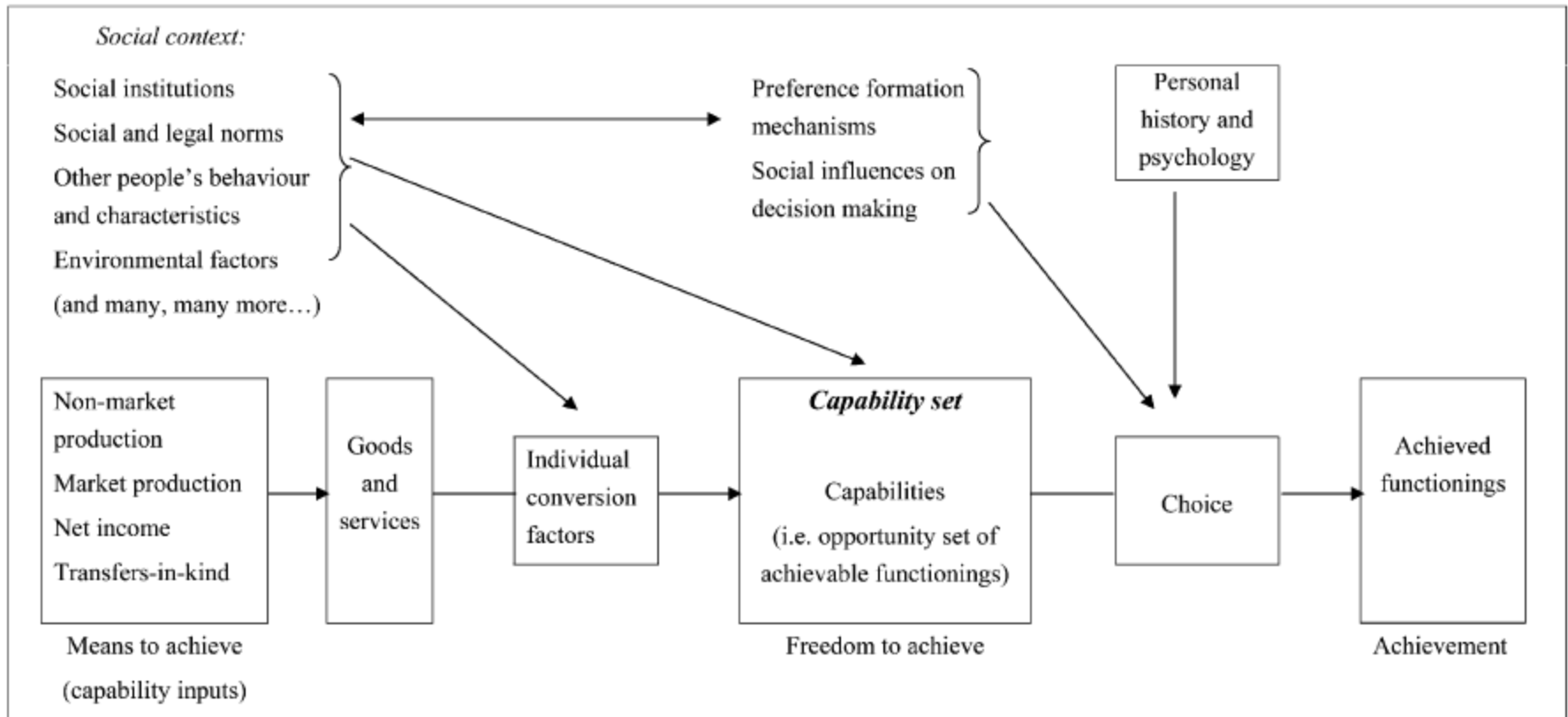
Keynesian demand management policies

- foster demand for greener products **and renewable energy**

# Need for a new aesthetics



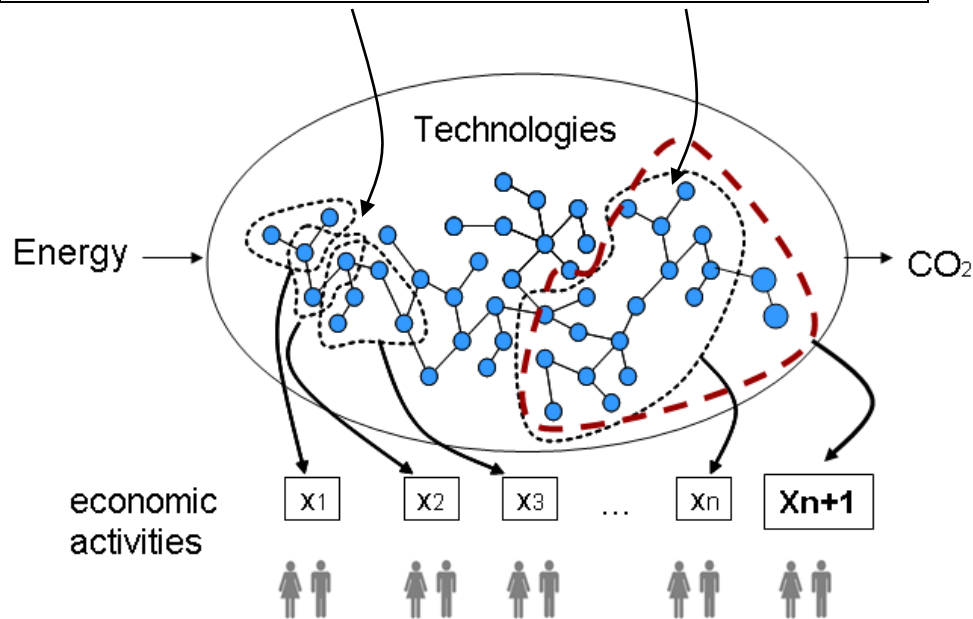
# What are the choices?



Source: Ingrid Robeyns (2005): The Capability Approach: a theoretical survey, Journal of Human Development, 6:1, 93-117

# Economic institutions

Specific rules of the game: set incentives and constraints for acquisition and combination of technologies



## Exogenous Demand

## role of the government

-Facilitate the emergence of new economic activities

Schumpeterian policies

- direction
- investment
- infrastructure
- human capital

Keynesian demand management policies

-foster demand for greener products and renewable energy

**Foster economic opportunities for a broad cross-section of society**



**Thank you**  
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**(freire@un.org)**