



Assessing the Employment Impact of Exports



International
Trade
Centre

STRENGTHEN: Global Knowledge Sharing Workshop



Methodology

- Assessing the potential for export increase
 - Export Potential Map project (International Trade Centre)
- Assessing the employment creation impact of reaching this potential in a Keynesian framework
 - Assumptions, presented later, to be checked for every country



Export Potential Map

- One of the trade intelligence tools developed at ITC
- Consists of two main indicators, one for products that countries already export, and another for diversification possibilities
- For this employment potential work, the first indicator – export potential indicator (EPI) – is used



Export Potential Indicator

- What is EPI?
 - EPI is a dollar value of what trade could be in 2023 under some assumptions
 - By country or territory (226), market (226) and product (~4,400)
- Products
 - Product definition is based on the harmonised system (6-digit), but some products are grouped together to ensure that product definition is stable across HS revisions 2 to 5
 - A few products excluded when not relevant for trade promotion



EPI in a nutshell

- For a given product and market, import demand is projected till 2023 based on GDP and population growth projections (sources: IMF World Economic Outlook, ILOSTAT)
- The market share of a given exporter in that market is estimated from a projection of market share to the world, a measure of ease of export to that market, and tariff preferences
- The underlying theoretical model and assumptions are described in a document written with Julia Spies
 - Downloadable from EPM online tool, Resources, Publications



More on EPI

<http://exportpotential.intracen.org/>

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Use of EPI for the project

- Whenever current exports are lower than the EPI, we consider that exports could grow as a result of export promotion activities and reach its potential
- The second step consists in calculating employment creation that would result of such activities



From exports to employment

- In a Keynesian framework, additional exports require additional production and thus more labour
- Based on an input-output matrix and information about labour content of every activity, the number of jobs resulting from increased exports can be computed



Data need

- Additional exports: from EPI or other sources
- Input-output matrix of the country: generally easy to find, though sometimes a bit old
- Labour content ($\frac{L}{Y}$) by sector: often the most difficult to obtain at a detailed level
- Correspondence between sectors of the three databases above



Assumptions

The method works under some specific conditions

- Keynesian framework
 - Production factors are available
 - Labour: skills in line with demand are available
 - Land, natural resources
 - Capital: financial resources can be mobilised
 - Sticky prices
 - Increased exports should not translate into higher prices
 - The exchange rate should not appreciate as a result of increased exports
- Constant returns to scale at sector level
 - Exporting companies similar to those supplying the domestic market



Three levels of effects

- **Direct effects:** more exports imply more production, thus more labour
- **Indirect effects:** more production also imply more input demand, and thus triggers a multiplier effect if those inputs are produced locally
- **Induced effects:** more production implies more revenue that is also mostly spent domestically



Direct effects

Input-output matrix not needed

Increased exports triggers increased production

$$dY = dX$$

Constant returns to scale

$$\frac{dL}{dY} = \frac{L}{Y}$$

$\frac{L}{Y}$ is the labour content of production

Thus

$$dL = \frac{L}{Y} dX$$



Indirect effects

- More production implies more demand for inputs, part of which are produced locally; triggers a multiplier effect
- Total effect (direct + indirect)

$$dy = (I - BA)^{-1}dx$$

- A: matrix of technical coefficients
- B: diagonal matrix, whose coefficients are the shares of domestic products in domestic demand



Induced effects

- Methodology developed as a result of this project, but not used during the project
- Considers demand increase resulting from increased income
- Sometimes done by inverting a full social accounting matrix, but this implies pretty strong assumptions
- We developed an improve but still simple way to do it, based on matrix calculation



Recap

What matters for a sector to trigger employment creation?

- Direct effects: high labour content
- Indirect effects: use of high labour content domestic inputs
- Induced effects: high value added sectors



Countries

- In the STRENGTHEN project
 - Morocco
 - Benin
 - Philippines
 - Guatemala
 - Myanmar
 - Ghana
 - Rwanda
- Outside the STRENGTHEN project
 - Jordan



Methodological limitations

- Production factors were assumed not fully used (Keynesian framework). When some of them are, the increase of exports may trigger increase of domestic prices or appreciation of the exchange rate: employment can be lost in other sectors
 - Other approaches such as CGE models generally obtain smaller employment impacts, because they do not rely on Keynesian assumptions
- Constant return to scale was assumed. In reality, the labour content of exporting companies may be smaller than the one of non-exporting companies (higher labour productivity)
 - Then, the sign of the impact is correct but estimates of labour creation correspond to an upper bound



Challenges and limitations

- Myanmar: pretty old IO matrix
- Rwanda: the assumption of available natural resources such as land was not met
 - Results were subject to the capacity of the country to significantly increase land yields
 - This was part of Rwanda's official objectives
- Overall, the assumptions proved to be valid in most countries (trade deficit, available labour at various skill levels), but this remains important to check whenever a new case is considered



Follow-up

- Morocco's ministry of trade was interested in recent developments of ITC export potential assessment methodology (2017)
- Staff at the Moroccan ministry of labour were interested in the methodology to compute employment creation (2017, 2018)
- ITC continued working with ILO in 2018 to develop the induced job methodology



APPENDIX

Leontief matrix calculation

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1) Direct + indirect effects



Simplified input-output matrix

	m	y	Sector 1	Sector 2	f	x
Product 1	m_1	y_1	z_{11}	z_{12}	f_1	x_1
Product 2	m_2	y_2	z_{21}	z_{22}	f_2	x_2
Value added			va_1	va_2		
			y_1	y_2		

Technical coefficients a_{ij} are defined as

$$a_{ij} = \frac{z_{ij}}{y_j}$$



Notations

- m imports
- y production
- v total intermediate demand
- f final demand
- x exports
- A technical coefficients' matrix
- d domestic consumption of domestic products



Preliminary

Total intermediate demand for product i

$$v_i = \sum_j z_{ij} = \sum_j a_{ij} y_j$$
$$v = Ay$$

$$m + y = Ay + f + x$$

$$y = d + x$$

$$d = B(m + d)$$



Calculation

$$\begin{aligned}y - x &= d \\&= B(m + d) \\&= B(m + y - x) \\&= B(Ay + f) \\&= B Ay + B f\end{aligned}$$

→

$$(I - BA)y = Bf + x$$

→

$$y = (I - BA)^{-1}(Bf + x)$$

→

$$dy = (I - BA)^{-1}dx$$



2) Direct + indirect + induced effects



Social accounting matrix

	Sector 1	Sector 2	Product 1	Product 2	Labour	Dom. Cap.	For. Cap.	Country	RoW
Sector 1			y_1						
Sector 2				y_2					
Product 1	z_{11}	z_{12}						q_1	x_1
Product 2	z_{21}	z_{22}						q_2	x_2
Labour	w_1	w_2							
Dom. Cap.	k_1^d	k_2^d							
For. Cap.	k_1^f	k_2^f							
Country					$\alpha^w w$	$\alpha^d k^d$	$\alpha^f k^f$		Foreign
RoW			m_1	m_2	$(1 - \alpha^w)w$	$(1 - \alpha^d)k^d$	$(1 - \alpha^f)k^f$		



Result

$$dy = (I - B(A + Eq l F))^{-1} dx$$

New matrices or vectors

- E elasticities of demand
- q composition of final demand
- l shares of factor income (labour, domestic capital and foreign capital) that is used locally
- F shares of factors in value added by sector

The share of factor income that is used locally is generally not available and assumed equal to 1



3) EPI



EPI theoretical assumptions

- The indicator is based on a few assumptions
 - For a given product, preferences across suppliers are the same in all markets
 - Exporters can supply more of the product at current price (infinite elasticity of supply)
 - Trade cost from an exporter to a market (“Ease of trade”) has the same impact for all products; only distance can affect some products more than others