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Spotting Export Potential and Implications for Employment in Developing Countries

David Cheong, Yvan Decreux, Julia Spies



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Preface

Employment is a key driver for development as it constitutes a bridge between economic growth and poverty reduction. People and households moving out of poverty most often do this through moving into more productive and decent jobs or improving existing jobs. Placing the aim of achieving full and productive employment at the heart of development policy is therefore critical for reducing and eventually eliminating poverty, reducing inequality and addressing informality. This is also now globally recognized with the adoption of Sustainable Development Goal (SDG) 8 “Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all”

The European Commission (EC) and the International Labour Organization (ILO) recognize that achieving this goal will require an approach where the goal of more and better jobs is also integrated into sectoral and trade policies. However, this requires a shared understanding among policymakers and social partners about the positive interaction between sectoral, trade and employment policies and the elaboration of a policy framework allowing sectoral and trade policies to be formulated and implemented in a coherent way to achieve employment and development objectives.

The ILO clearly recognizes that putting the aim of full and productive employment at the heart of development policy is critical in creating decent work and fostering social justice. These perspectives reflect a commitment to the objective of creating quality jobs globally and to pursuing cooperative solutions to this challenge. In the “New European Consensus on Development”, the EC emphasizes the importance of targeted policies and appropriate investment in developing countries to promote the engagement of citizens - especially the youth, women and potential migrants - in social, civic and economic life and to ensure their full contribution to inclusive growth and sustainable development. To this end, the EU External Investment Plan, adopted in 2017, is trying to mobilize and leverage sustainable public and private investments to improve economic and social development with a particular focus on decent job creation.

In order to build a shared understanding among policymakers through policy dialogue and contribute to a coherent policy framework that is centered on generating and upgrading employment, the EC and ILO have jointly initiated the project entitled “Strengthening the Impact on Employment of Sector and Trade Policies”. This project, being implemented in nine partner countries and working with national governments and social partners, aims to strengthen the capabilities of country partners to analyze and design sectoral and trade policies and programmes that would enhance employment creation in terms of quantity and quality.

This innovative project entails developing new methods and capacities to assess how sectoral and trade policies impact on both the qualitative and quantitative dimensions of employment. It requires new processes to bring together different Ministries, public and private stakeholders to have evidence-based dialogue about how their respective policies do, and could, better impact on employment.

This series of project publications aims to capture the tools, methods, and processes developed under this project, as well as the findings from implementing these in the ten partner countries. By doing so, the experience and learning of the project can be disseminated to other countries and partners for their benefit, thus supporting the integration of global and national employment objectives into sectoral and trade policies and consequently supporting the elevation of the global employment agenda and achievement of SDG 8.

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Contents

	<i>Page</i>
Spotting Export Potential and implications for Employment in Developing Countries	i
Preface.....	1
1. Background	5
1.1 Targeting specific export activities as a development strategy	5
1.2 Why do developing countries still need to focus on (specific) exports?.....	5
1.3 Which export activities should be targeted?	5
2. Export potential assessment methodology	6
2.1 Data Source	6
2.2 The Export Potential Indicator (EPI)	6
<i>Supply</i>	7
<i>Demand</i>	7
<i>Ease of exporting</i>	7
<i>Aggregating results</i>	8
2.3 The Product Diversification Indicator (PDI).....	8
2.4 Related targeting criteria: Technological innovation, stability of export revenue and child labour9	
<i>Technology intensity</i>	9
<i>Stability of export revenue</i>	9
<i>Child labour</i>	9
3 Estimating employment effects from export potentials.....	10
3.1 Data sources of employment statistics	10
<i>Key Indicators of the Labour Market (KILM)</i>	10
<i>World Bank Enterprise Surveys</i>	10
<i>UNIDO Industrial Statistics</i>	10
<i>Country Input-Output (IO) matrices</i>	11
3.2 Direct and indirect employment effects of increased exports	11
<i>Assumptions</i>	11
<i>Direct impacts of export expansion</i>	13
<i>Indirect impacts of export expansion</i>	13
<i>Possible extension: computing a multiplier using a social accounting matrix</i>	14
3.3 Discussion of the method and interpretation of results	15
<i>Working with different sector classifications and time periods</i>	15
<i>Effects on relevant demographics: female, youth and skilled employment</i>	15
4 Application in six developing countries	16

<i>Macroeconomic situation</i>	16
<i>Production factors</i>	16
<i>Labour</i>	16
<i>Female labour</i>	16
<i>Youth labour</i>	16
<i>Skilled labour</i>	17
<i>Natural resources</i>	17
<i>Effects on consumption</i>	17
5. Conclusions and policy implications.....	18
References	19
TECHNICAL APPENDIX.....	20
Computation of the direct impact of export expansion	20
Computation of the indirect impact of export expansion	20
Vectors	20
Matrices.....	21

1. Background

1.1 Targeting specific export activities as a development strategy

“Today’s policymakers can no longer expect export-led production and trade of manufactures that fuelled industrialization in the East Asian tigers to produce similar outcomes. This is not to say that countries should no longer seek export markets; rather, a much more strategic approach is needed in which countries are more selective in their choices of processes, products and product markets.” (UNCTAD, 2016: Trade and Development Report)

1.2 Why do developing countries still need to focus on (specific) exports?

Developing countries can benefit from exports through various channels. First, domestic markets can be too small to allow companies and sectors reach their optimal size. Second, companies can take advantage of price differences between local and international markets increasing their own profits but eventually also national income. This in turn enables the import of products and technologies that cannot be (efficiently) produced domestically. Third, export activity can give rise to learning and technological upgrading. Exporting can trigger structural transformation and the development of value-added industries (steel, shipbuilding, automobiles, and electronics) and services (banking, finance, IT, etc.). As a result, exporting can induce the creation of higher wage jobs.

Horizontal policies aiming to improve the efficiency of border procedures, harmonize regulations on products and services, and increase transparency of these rules are ways to create an environment that is conducive to exports. Nevertheless, governments do not limit themselves to horizontal policies but set up specialized agencies, seek developmental aid and negotiate trade rules that are not sector neutral. Against this reality, Hausmann and Rodrik (2006) state that “interventions that increase the size and profitability of certain activities are legitimate if they contribute to the rest of society through taxes and higher productivity jobs” and conclude “we may be doomed to choose, but we should only choose when the maximum amount of information has been revealed.”

1.3 Which export activities should be targeted?

Scholars have brought forward different criteria for the selection of sectors apt for industrial or trade promotion. Noland (2004) underlines the importance of inter-industry linkages and thereby the capacity of selected sectors to generate growth in the rest of the economy. Lederman and Maloney (2012) express the view that positive (Marshallian) externalities and rents exist, and that there is no reason to believe that they are associated with all goods equally. There is thus an argument for interventions to encourage goods with positive externalities and rents more than the market would naturally do. The rationale for selecting sectors here is increasing returns to scale at sector level. However, because externalities are difficult to measure, in practice they hardly can be used to determine which sectors or products to target. Hausmann, Hwang and Rodrik (2007) argue that specialization patterns determine the economic growth of countries. An externality in this case arises from the productivity gain that is signalled to other entrepreneurs once a new product is

successfully developed. Backed with an empirical assessment, the authors conclude that subsidising new activities and more generally focusing on products that ‘rich’ countries produce is more conducive to economic development.

ITC’s assessment to spot export opportunities focuses on sectors and markets with un- or underutilized potential given supply, demand and trade costs. These unrealized opportunities can be addressed through export promotion interventions that aim to support the private sector in meeting the market’s requirements and preferences. The objective of this approach is not to select sectors that should be subsidized, but to identify and seize export opportunities that have been missed, and in some cases remove the bottlenecks that prevent companies from realizing their export potential. These additional exports require an expansion of production (unless domestic sales or sales in other export markets are reduced), which will result in increased employment directly in the sector and indirectly in upstream industries providing the sector with inputs. This paper outlines a methodology that allows countries to target products and sectors that promise (i) additional export revenues and (ii) new jobs in the sector or in the economy as a whole.

2. Export potential assessment methodology

ITC’s export potential assessment methodology¹ has been developed to spot a country’s products or sectors with export potential in existing or new markets based on detailed trade and market access statistics. It can be applied to compute the extent of unrealized export potential at the sector level with the ultimate objective to measure how its full utilization would translate into the creation of employment in general and for women in particular.

2.1 Data Source

The source of all the trade data used in export potential assessments is ITC’s Trade Map.² Various measures ensure that unreliable data reports do not distort results. First, the indicators are based on five-year averages (2011–2015). All products must be exported at least in the three most recent years and imported in all five years to ensure that only continuously supplied and demanded products are suggested as potential areas for export promotion activities. Second, a mix of the direct (as reported by the country itself) and the mirror (as reported by the country’s trade partners) flow is used to estimate “true” export and import values. Third, a thorough reliability check identifies and disposes of unreliable reporters whose reported trade flows are not used in the analyses. In cases where a country’s reports systematically differ from those of its reliable trade partners, only mirror statistics are used.

Tariff data is taken from ITC’s Market Access Map. All other data comes from external data sources. For an overview, please see Decreux and Spies (2016).

2.2 The Export Potential Indicator (EPI)

The EPI identifies products that the country already exports and that have good prospects of additional export in a given target market. It is based on an assessment of supply, demand and market access conditions. While all the calculations are done at the finest level – i.e. by exporting country, product and target market – results can eventually be aggregated to find export potentials of (sub-) sectors or (sub-) regions.

¹ For a detailed and technical description of the methodology, please see Decreux and Spies (2016).

² Annual data in ITC’s Trade Map comes from UN’s Comtrade database.

Supply

The supply component of the EPI is based on the projected market share, thus the share of a country's exports in total exports of a given product, multiplied by the exporter's expected GDP growth rate (relative to expected GDP growth of other exporters of the same product) to capture the relative increase in overall supply capacity. This indicator is corrected for possible re-exports whenever imports of the product exceed exports. It is also corrected for market access: the supply indicator is meant to capture projected market share in the absence of re-exports and tariffs (the impact of tariffs on exports to a particular market will be taken into account in the demand component).

Demand

The demand component is based on projected imports, thus the market's demand for a given product, augmented by expected population growth (with a unitary elasticity) and expected growth of GDP per capita (subject to estimated revenue elasticities of import demand per capita at sector level). The indicator also considers the tariff advantage in the target market and the bilateral distance as compared to the average distance over which the target market usually imports the product.

Ease of exporting

Ease of exporting is based on a ratio of actual trade between the exporter and the market for products with potential relative to their hypothetical trade if the exporter had the same share in the market as it has in world markets. The numerator captures the actual trade and the denominator captures trade complementarities between the exporter and the market. If $\text{Ease} > 1$, the country finds it easier to trade with the market than with world on average. This can reflect in a high numerator, resulting for instance from the two countries being located in proximity, sharing the same language or culture or having established commercial links in the past. It can also reflect in a low denominator due to a limited complementarity of the countries' export and import baskets. An Ease score > 1 will augment the country's potential to trade any type of product with the market. By contrast, if $\text{Ease} < 1$, the country finds it relatively more difficult to trade with the market, lowering its potential to trade with that market across all products.

Combining Supply, Demand, and Ease gives the total export potential in US\$ terms. The calculated export potential can be compared to actual exports to identify the scope for export growth. This so-called untapped potential is the basis for estimating employment generation.

Box 1. Indicators

Potential export value: The potential value at which a country can export its products to a certain target market given its current supply capacities, and the target market's demand and market access conditions. Note that an increase of export performance, resulting for example from foreign direct investment (FDI), will increase this potential export value.

Untapped potential: The gap between actual and potential exports, if any.³ Reasons for unrealized potentials include lack of information about or difficulties in meeting consumer preferences in the target market, lack of information about or difficulties in meeting market regulations, lack of business contacts or of knowledge about distribution channels, and mismatch of supplied and demanded varieties.

Aggregating results

An export potential value is calculated for every exporter \times market \times product combination. To assess the export potential of sectors or regions, potential values are simply summed up across all countries belonging to a region or all products belonging to a sector. The extent of unrealized potential can be aggregated as well. At the most disaggregated level, by country, product and market, unrealized potential corresponds to the gap between potential and actual exports (in per cent terms) whenever potential exports exceed actual exports and to 100 per cent whenever potential exports are below actual exports. At the aggregate level (e.g. export potential in a regional market or by sector), the realized potential may be below 100 per cent even though actual exports exceed potential exports. This occurs when some exporters, products or markets may have exceeded their potential while others could still have underutilized potential that should not be masked by the exceptional export performance in other products / markets. For the estimation of employment effects, unrealized export potentials have been aggregated across all markets and by sector to match the level of detail available in the input-output tables and the employment data.

2.3 The Product Diversification Indicator (PDI)

The PDI has been developed to assess the chances of export success of products that are not currently exported by a country or have a marginal export potential.⁴ While ease and demand are defined as in the EPI, supply capacities are based on a measure called 'density', calculated using the product space methodology (Hausmann and Klinger, 2007, Hausmann et al., 2007 and Hidalgo et al., 2007). It has been transformed to ensure that the relative dispersion of the indicator is similar to the one of the supply side in the export potential indicator. It has then been normalised, so that total export capacity by country (for all products) corresponds to its expected export value computed based on current exports and expected GDP growth, and that total export capacity by product (of all countries) corresponds to expected world demand for that product, computed as the sum of expected country demands.

The PDI gives a ranking of opportunities for export diversification but the different nature of the density variable does not allow the computation of a potential export value. It can therefore not be used to quantify additional employment resulting from the development of these new exports.

³ When actual exports exceed the potential value, the unrealised potential is assigned a value of zero. See formula below.

⁴ If the total export potential (to the world) of an exporting country in a given product is less than US\$ 200,000, and if the product does not at least partly belong to the top 95per cent of all products in terms of their export potential to the world, the product is considered as marginal and the EPI is not provided. Instead, the product is included in the PDI to assess its prospects for successful export diversification.

2.4 Related targeting criteria: Technological innovation, stability of export revenue and child labour

Products with export potential can be filtered to focus interventions on those that are likely to respond to other objectives – increasing the technology intensity and the price stability of the country’s export basket or avoiding the use of child labour.

Technology intensity

Measures of technology intensity of products that rely on trade and GDP data have recently become popular. Hausmann, Hwang and Rodrik (2007) propose one of the most commonly used indicators, the ‘PRODY,’ that calculates the weighted average per-capita income level associated with products, where the weights are Balassa’s RCAs. One of the inconveniences of the PRODY is that products of resource rich economies are associated with high GDP per capita levels even though their production may not be technology-intensive. Furthermore, using uncorrected RCAs gives a high weight to small countries that more often engage in re-exporting than large countries. The result is a product ranking that may overall be correlated with the technology intensity of production but is of limited use for giving specific advice as to which product exactly would help an exporter move up to more complex production stages in the global value chain.

The ITC export potential assessment methodology therefore modifies the original PRODY and indicates products as technology-enhancing if the minimum GDP per capita level of the poorest country exporting them with (i) comparative advantage, (ii) positive trade balance and (iii) above average per capita exports is at least as high or higher than the exporter per capita GDP. Balassa RCA is corrected for overall tariff preferences: if a product is exported with a Balassa RCA only thanks to a preference on world markets, the country is not considered as having a comparative advantage in exporting that product.

This measure is applied to transformed products only. Raw products and products for which no exporter meets all three criteria are not classified.

Stability of export revenue

Concentrating export promotion activities on products with strongly fluctuating prices can be a risky strategy for developing countries as it will confront them with unsecure and hardly predictable export revenues. ‘Desirable’ products therefore feature rather stable prices. CEPII publishes annual trade unit values by HS 6 product and bilateral trading pair for the years 2003-2014. Each product group’s price volatility is measured as the standard deviation of its deflated average unit value in logarithms over the entire timeframe.⁵ A product is said to contribute to stability of export revenues if its prices have fluctuated less than the price of the country’s export basket on average over the considered timeframe.

Child labour

The Bureau of International Labour Affairs (ILAB) is an agency of the United States Department of Labour, whose mission is to promote a fair treatment of workers around the world. Within the agency, the Office of Child Labour, Forced Labour and Human Trafficking has produced a database identifying sectors with reports of child labour or forced labour.⁶ Information is collected through research, public submissions, hearing testimonies and other sources. Sectors will only be indicated as using child or forced labour if there are significant

⁵ Unit values are deflated by the mean unit value of all product groups in a given year.

⁶ List of goods produced by child or forced labour: <https://www.dol.gov/ilab/reports/child-labor/list-of-goods/>

incidents at the production stage to which the sector belongs. Single companies violating international standards or repeated violations at earlier stages of the production process will usually not result in the sector being listed. The database currently covers 75 countries and 139 products or sectors, and can be matched with export potential results to carefully design export promotion activities in areas prone to the use of forced or child labour so that the problem does not aggravate.

3 Estimating employment effects from export potentials

Labour supply in most emerging economies and developing countries is rapidly growing. Sustainable development goals (goal 8) include targets related to job creation, especially for women and the youth. UNCTAD (2016) underscores that export-led strategies should not focus on increasing competitiveness through a reduction of the wage bill, either by a reduction of wages or a capital intensification at the expense of labour demand, because these strategies would have adverse effects on other sectors of the economy, in particular through a reduction of domestic consumption. Industrial policies need to be designed with a view to fostering structural transformation patterns that have the potential to accelerate the generation of not just more jobs, but also more productive and better jobs.

3.1 Data sources of employment statistics

Key Indicators of the Labour Market (KILM)

Issued by the ILO Department of Statistics, the KILM database provides information on the employment by sector for 193 countries going back to 1980. Data is presented by gender at the category level of the International Standard Industrial Classification of all Economic Activities (ISIC), revision 2, 3 or 4. Availability varies greatly, with several countries being represented in only a few years and reporting to outdated revisions of the ISIC. Information comes from a number of international repositories, based on several types of sources including surveys, official estimates and censuses.

World Bank Enterprise Surveys

The World Bank Enterprise Surveys cover a representative sample of the private sector in 139 countries. Data is collected for services and manufacturing at the ISIC revision 3.1 2-digit level. Key variables such as employment by gender are available across the board; others are available only for a small subset of the surveyed countries. Variables of interest include the:

- Number of production / non-production workers
- Number of permanent or temporary employees

broken down by age, skill level and gender. As the data represents a sample of the economy, the variables can help indicating which group of employees would benefit from the realization of export potentials. They are less useful for predicting employment levels.

UNIDO Industrial Statistics

The database contains employment-related indicators at the ISIC revision 4 or revision 3 4-digit level, thus distinguishing over 150 manufacturing industries for 139 countries. The variables of key interest are the following:

- Number of employees
- Number of female employees
- Wages and salaries

Data is available from 1990 onwards. However, some countries have not been covered in recent years. Others are only partly covered and the available figures represent the sum of the data that is available. This limits the usability of the database for predicting employment levels.

Country Input-Output (IO) matrices

IO tables representing the connectedness of sectors within an economy are needed for the estimation of indirect employment effects that spill over from the sector with unused potential to upstream industries providing inputs to that sector. IO matrices also provide production data at the sector level. A good inventory for IO tables is the GTAP database.⁷ Yet, newer or more detailed IO tables may be available through national sources, such as central banks, ministries, or other government agencies. To the best of our knowledge, the most disaggregated table currently available is from the United States and distinguishes 389 sectors.

IO tables categorize economic activities using the ISIC classification. In order to match data on export potential on the one hand, and data on labour and IO relationships on the other hand, the establishment of a correspondence is needed. The different nature of the ISIC and the HS classification leads to imperfections in the matching.

3.2 Direct and indirect employment effects of increased exports

Export promotion activities can have a strong impact on labour markets when insufficient demand is one of the main explanations of unemployment. Assuming that this is the case, a Keynesian approach to estimate impacts of this policy on job creation is adopted.⁸

The method distinguishes direct effects of increased demand for exports on production and employment, and indirect effects where increased demand in one sector triggers demand for inputs from other sectors. Both methods are described below. A technical description with all formulas is available in the Appendix.

Assumptions

The export potential analysis provides an estimation of untapped export potential by sector and market. The primary assumption is that this potential could be utilized, and that this would be achieved entirely through increased production: supply to the domestic market and to other existing export markets would not be reduced. The demand-based approach relies on a few additional assumptions:

⁷ For an overview, see <https://www.gtap.agecon.purdue.edu/databases/regions.asp?Version=9.211>

⁸ Other explanations of unemployment exist, in particular issues related to the qualification of the labour force, which can be tackled by education and vocational training. While these approaches are also essential, they do not fall within the scope of this project.

1. Production factors are available.

The existence of unemployed labour force is not enough to ensure that labour is available for a given activity, as available and required skills may not match. The method relies on the assumption that labour force is abundant and sufficiently skilled in the country.

Companies can meet limited demand increases by optimizing the utilization of existing production capacity, and by investing in additional capacity. Increasing exports in several sectors to take full advantage of existing potentials requires access to sufficient capital.

Natural resources can also be a limiting factor. The ITC export potential analysis excludes most mineral products partly because of this limitation, but it includes agriculture. Increase of agricultural production will result in labour creation either by cultivating more land or by improving yields or product quality through more labour-intensive techniques. In countries where arable land is limited and production is already labour intensive, the method may overestimate the potential for job creation.

2. Increased exports will not have adverse macroeconomic consequences.

When the exchange rate is fully flexible, rising exports tend to reinforce the value of the currency, and can have an adverse impact on the competitiveness of all economic sectors, both in local and foreign markets. However, several developing countries control their currency, in order to improve or protect the terms of trade. In these countries, increasing exports do not affect real exchange rates significantly. Pressure on the exchange rate is also limited if the country runs a global trade deficit. In these cases, the assumption appears as reasonable.

3. Labour content and technical coefficients are constant and identical in exporting and non-exporting companies.

Labour content corresponds to the number of labour units needed to produce one unit of a product. It is the inverse of labour productivity. The trade literature suggests that exporting companies are on average more productive than non-exporting ones (Bernard and Jensen 2004, Wagner 2005), so that the impact of exports on labour generation may be overestimated. Technical coefficients describe the technical process to produce a good or service. They correspond to the share of an input in the total production value of a good. While production processes may differ from one country to another, technical coefficients are generally considered as relatively stable over time. Labour content is used to compute both the direct and indirect effects of additional sector exports; technical coefficients are used only to compute the indirect employment effects arising from increased demand for inputs provided by upstream industries.

4. For every product used as an input by exporting companies, the share of imports is the same as in the economy overall.

The employment effect in upstream industries depends on the share of domestically produced inputs. This share is assumed equal to the share of demand for domestic products in that sector. The original Leontief model assumes that all inputs are produced domestically. In practice, the share of imported inputs may be larger for exporting companies as they are more exposed to international trade, especially in countries where inputs are exempt of tariffs when the final good is exported (duty-drawback system). Therefore, while imports are taken into account in the calculation, the multiplier effect associated to inputs might still be a little overstated.

Direct impacts of export expansion

The computation of the direct employment effect assumes that the increase in exports implies an equivalent increase of production. Assuming constant returns to scale, employment creation by sector is then proportional to the production increase.

To do this calculation, only data on labour content of production at sector level is needed. Information about female or youth labour content allows the computation of gender or youth-specific employment effects.

Indirect impacts of export expansion

Increased production also affects upstream industries and services through increased demand for inputs. This mechanism has been formalized by Wassily Leontief for a closed economy, and later extended by other authors to describe the situation of an open economy (see, for instance, O'Hagan and Mooney, 1983). It uses an input-output description of the economy.

IO analysis helps evaluate the indirect effect that increased exports would have on employment. It arises from stronger demand for inputs that enter into the production of the good for which final demand has increased. The production of these inputs again requires inputs, triggering a multiplier effect on production, and therefore also on employment, in several sectors of the economy.

IO matrices represent inter-sectoral relations. The analysis starts from a transaction table, which represents how domestically produced or imported goods and services are allocated across the different production sectors and final demand (DFD). These data are often displayed as follows:⁹

	Imports	Production	Sector 1	Sector 2	DFD	Exports
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		
Production			y_1	y_2		

To simplify, sectors and products are assumed to coincide: each sector produces a single good or service, and each good or service is produced by a single sector. In some cases, the above table is included in a more comprehensive dataset called a social accounting matrix.

The technical coefficients thereby give the share of each input in the total production of a sector. How additional exports in one sector translate into additional production in all upstream industries then depends on two factors:

- The share of these upstream industries' intermediates in the consumption of the sector (the technical coefficients) and
- The share of imported intermediates.

As explained above, the share of imported intermediates follows the share of imports in the final demand for each sector. The resulting matrix is called the Leontief matrix. Since all

⁹ See the Technical Appendix for more detail

coefficients in this matrix are positive, and diagonal coefficients are at least one, the total increase of production in the economy must at least equal the direct increase.

The effect of exports on production can then be translated into employment using the same approach as for the computation of direct effects. For any increase of exports in a given sector, the method indicates the total number of jobs created in every sector. For instance, increasing exports of olive oil will create jobs in olive oil mills but also in agriculture.

The multiplier effect can be large when production relies on inputs that are produced by a sector where labour productivity is low. On the contrary, it is small when inputs are mostly imported.

In addition to labour contents, the computation of global impacts requires an input-output matrix, in particular the technical coefficients and the share of inputs in total domestic demand (A and B matrices). The analysis relies on the assumption that technical coefficients (the proportion in which inputs are used to produce each unit of the output product) are constant. This implies that the analysis does not take into account input substitution, price changes, technological change or increasing returns to scale in terms of input use.

Possible extension: computing a multiplier using a social accounting matrix

The Leontief approach focuses on the impact of increased demand on upstream industries, but other effects are disregarded. More production generates additional revenues that accrue to households, companies and the government, allowing them to consume and invest more. Social accounting matrices are used to represent all economic flows within an economy. They include the input-output table described above, as well as information about transfers between economic agents. As an extension of the Leontief method, economists sometimes use the full social accounting matrix to compute a more global multiplier.¹⁰ Yet, this requires strong additional assumptions:

1. Proportionality: the Leontief multiplier approach relies on the assumption that technical coefficients do not vary with the scale of production. This assumption is generally well accepted among economists. Such proportionality assumption does not hold however when it comes to public and private consumption. Income elasticity of demand can vary significantly across products, both for households and governments.
2. Investment decisions: the theoretical framework underpinning the overall approach is the Keynesian model, where investment is the result of demand perceived by companies, but a generalized Leontief multiplier approach implies that investment is driven primarily by companies' current profits.
3. Imports: considering the share of imported intermediates as above would become unnecessary because imports are part of the social accounting matrix and thus integrated in the calculation, but this integration would be different. More precisely, imports are assumed to accommodate a fixed share of all types of demand, including exports. This implicit assumption is very strong and corresponds rarely to reality.

The objective to capture indirect effects on public and private consumption is relevant. However, the generalization of the Leontief approach to the full social accounting matrix relies on strong and questionable assumptions, which would come on top of the ones already

¹⁰ See for instance Holland and Wyeth (1993).

described before and weaken the relevance of the analysis. Relying on a smaller set of well-controlled assumptions is preferable.

3.3 Discussion of the method and interpretation of results

As mentioned, the assessment of direct and global impacts of increased exports on job creation is based on Keynesian foundations but other factors than insufficient demand may be the cause of unemployment. If demand increases in sectors where relevant skills are missing in the country, job creation will take time and require export promotion activities to be complemented by specific skill-upgrading programs.

Export promotion activities generally include components to modernise the production system. While this supports exports, it also improves labour productivity. Overall job creation may occur, in upstream industries and because of increased incomes, but employment may rise in sectors different from the ones identified by the method. This is likely to happen in particular in traditional sectors characterised by low labour productivity.

Agriculture relies on arable land that sometimes is scarcely available and is often characterised by low labour productivity. Therefore employment generation in agriculture, either as a direct result of export growth or as an indirect result when agricultural inputs feed into other sectors, is likely to be overestimated by this type of calculation.

On the contrary, employment generation in sectors offering good salaries (“decent jobs”) can have positive impacts on consumption, creating thereby additional jobs that are not captured by the method.

Working with different sector classifications and time periods

To compute the direct impact of increased exports on employment, only data on the labour content of production at sector level is needed. However, the use of different data sources complicates this step. On the one hand, production data can be obtained for instance from an input-output matrix or from other sources, while labour data is generally provided by ILO or local sources, often with a gender dimension and very rarely with a distinction of youth from the overall labour force. Both datasets must be merged, and consequently, a high level of detail on one side is not useful anymore if similar detail is not available on the other side. Besides, data must ideally be from the same year, especially if the structure of the economy is evolving rapidly.

The sector decomposition and year of labour content on one side and the IO matrix on the other side do not need to match (unless the IO matrix is used as a source for production data entering in the calculation of labour content. Technical coefficients are generally considered as rather stable over time, so that a slightly older IO matrix is not an issue. It should not be too old however, because the IO matrix is also the source of import ratios (the *B* matrix). IO matrices coming from national sources can be characterised by quite different levels of detail.

Effects on relevant demographics: female, youth and skilled employment

In order to calculate the direct and indirect effects on female employment, data from the ILO Labour Force surveys on the gender composition of the labour force is essential. This calculation closely follows the previously described methodology, assuming constant returns to scale, and assuming that increases in exports do not displace existing demand, therefore

translating into equal increases in production. It is further necessary to assume that the ratio of female labour participation remains constant as employment increases. If further data distinguishing the employment of other economic actors is available, for instance by skill or age group, direct and indirect effects on their employment can also be computed.

4 Application in six developing countries

The method has been applied in six developing countries, namely Benin, Ghana, Guatemala, Morocco, Myanmar, and the Philippines. This section puts some of the results into the countries' contexts, thus illustrating their usefulness and limitations.

Macroeconomic situation

The six countries have a trade deficit in goods. Morocco, Myanmar and the Philippines have a surplus in services trade, but it does not compensate their deficit in goods trade. As a share of total trade, the deficit is smallest in Ghana and largest in Benin. It has increased sharply in the Philippines in 2016.

This macroeconomic situation indicates that increasing exports should not lead to macroeconomic imbalances that would offset positive outcomes in terms of employment generation. Under our modelling assumptions, imports would increase because of larger demand for inputs, but the real exchange rate and thus the competitiveness of domestic companies in the domestic and in foreign markets should not be affected.

Production factors

Increasing production requires the availability of inputs. Either local or foreign capital investments are needed to realize the market opportunities. Political risks and a difficult business environment may represent real bottlenecks.

Labour

While some countries like Morocco have significant unemployment levels, in which case the total number of jobs that would result from the realization of their export potential is lower than the current number of unemployed people in the country, it is not the case for other countries, where official unemployment rates are lower. In these countries, additional exports would provide new job opportunities for people seeking better working conditions or salaries.

Female labour

The method allows computing employment generation by gender. Overall, the share of women does not vary much by sector, with a few notable exceptions. Forestry and fishery appear to be very male-dominated sectors, while textile and apparel employ many more women than the average.

Youth labour

Data for youth employment were available only in Morocco. Sector differences in terms of youth employment are even smaller in Morocco than in terms of gender. However, the analysis shows that the creation of youth employment is more favoured if export promotion concentrates on exports of electrical equipment, transport equipment and motor vehicles,

communication and medical equipment, while it is less favoured when it concentrates on agricultural goods, food products and chemical products.

Skilled labour

Some of the new job opportunities require highly technical expertise and employment qualifications. For instance, the electronics sector in the Philippines tops the list of sectors in terms of job creation potential. These jobs, however, require specific skills. This implies that seizing this opportunity to expand production, exports and employment goes beyond export promotion activities and implies the development of a broad strategy also addressing education and vocational training.

Natural resources

All six countries have untapped potential in agricultural products, however, the availability of arable land is limited. Labour productivity in agriculture is low in many of these countries, especially on farms that have not been connected to global markets. While yields could be increased through the intensification of agricultural processes, the capacity of agriculture to generate jobs is probably overstated by the methodology.

For the same reason, the Leontief multiplier associated with food products is often very large: total employment generation is more than ten times larger than direct employment generation in Guatemala, Morocco and the Philippines, where the food sector is very productive but agriculture on average remains less productive. In light of possible productivity gains and the limited availability of arable land, the estimated number of new agricultural jobs appears optimistic.

The availability of natural resources may also be a limiting factor for wood, especially in Benin and Myanmar, where untapped export, and thus employment potential, are significant. To a smaller extent, this holds for Ghana and the Philippines as well. In the Philippines, labour productivity is low, and therefore the utilization of the lower levels of export potential is still predicted to create a significant number of jobs. The same limitation applies to fishing, even though employment effects are on average smaller because the sector is not labour intensive.¹¹

Effects on consumption

On the one hand, the methodology likely provides with an upper bound estimate of employment effects in sectors where production factors are scarce. On the other hand, it disregards the effect of increased production on household income, which in turn stimulates demand and eventually employment as well. Adding this effect would require a more advanced modelling framework where income elasticity of demand varies across sectors. This type of exercise remains possible in the current Keynesian framework, where prices are exogenous and employment is driven by demand.

Effects associated with income do not depend on the sector where the additional income is generated. Assuming that the structure of consumption does not depend significantly on the sector in which households are employed, income effects are primarily driven by the additional value added accruing to them because of increased production. Therefore, effects depend on the number of jobs created, as well as wage rates. Therefore, while direct and total employment creation is larger in sectors characterized by low labour productivity, sectors

¹¹ An exception is Myanmar where the use of data from 1998 (labour data) and 2001 (social accounting matrix) likely distorts the estimation.

characterized by high wages have a relatively higher potential for generating jobs through this macroeconomic mechanism. For instance, when the analysis does not include income effects, high technology sectors such as cars do not rank high in terms of their potential for job generation, but they would rank higher if income effects were also considered. Information about value-added is available in input-output matrices and distinguishes returns to labour, operating surplus and taxes.

5. Conclusions and policy implications

Access to information about untapped export opportunities at the sector level can help government officials and other trade support institutions in the design of policies and strategies to use export development as a means to foster inclusive and sustainable growth. The trade-offs they face when picking one sector over another need to be evaluated in the specific context of a country's development priorities, levels of human capital development and labour market circumstances (including levels of underemployment and informality), and the resources to which the country has access.

Among the information that is useful to design a sound development strategy is the impact of expanding exports on job creation. In this document, we explain how the employment impacts of increased exports can be estimated in a Keynesian setting. The method, which has been applied to six countries, allows for distinguishing the impacts across labour categories, including by gender. It also captures direct effects through the expansion of production, and indirect effects associated with increased demand for domestically produced inputs.

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TECHNICAL APPENDIX

Computation of the direct impact of export expansion

The direct impact of an export increase on jobs is defined as the impact resulting from a production increase equal to the export increase.

The following variables are specified:

y Production

x Exports

l Labour

Assuming that the economy is divided into n sectors, each variable corresponds to a vector of n components. For instance:

$$y = \begin{pmatrix} y_1 \\ \vdots \\ y_n \end{pmatrix}$$

Direct impacts are thus based on the assumption that:

$$dy = dx$$

Assuming constant returns to scale, employment creation by sector (indexed by i) can then be calculated as

$$dl_i = \frac{l_i}{y_i} dy_i$$

where $\frac{l_i}{y_i}$ is the labour content of production in sector i . Effects on the employment of specific economic actors, such as women, or on specific age or skill groups can be calculated using the same formula, if employment statistics are available at that level of detail.

Computation of the indirect impact of export expansion

The indirect effect of an export increase on jobs arises from stronger demand for inputs that enter into the production of the good for which final demand has increased. The production of these inputs again requires inputs, triggering a multiplier effect on production, and therefore also on employment, in several sectors of the economy. Wassily Leontief has formalized this mechanism for a closed economy using an input-output description of the economy.

A new set of vectors and matrices is defined, in which the index i refers to the product (input), while j refers to the sector (output).

Vectors

m Imports

v Total intermediate demand

f Domestic final demand (DFD)

x Exports

d Domestic consumption of domestic products

Matrices

Z Intermediate consumption

A Technical coefficients

Technical coefficients are defined as:

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

It implies that:

$$v_i = \sum_j a_{ij} y_j$$

$$v = Ay \quad (1)$$

From the table above, the equilibrium in the goods market is written as:

$$y + m = v + f + x \quad (2)$$

Besides, we assume that all exports correspond to domestically produced goods or services. It follows:

$$y = d + x \quad (3)$$

The Leontief model assumes that all inputs are domestically produced. However, in some countries and sectors this is not true. In order to adopt a more realistic approach, imports are introduced, that are assumed proportional to total domestic demand.¹²

$$d_i = b_i(m_i + d_i)$$

Defining B as a matrix with the b_i coefficients on its diagonal (and zeroes elsewhere), the relation becomes:

$$d = B(m + d) \quad (4)$$

Relations (1) to (4) give:

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

Assuming that final demand is constant, it follows

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

where $(I - BA)^{-1}$ is called the Leontief matrix.

¹² As compared to the original Leontief model, this formulation leads to less demand for domestic inputs. In practice, exporting companies may be more likely to import their inputs than non-exporting ones, so that the multiplier effect associated to demand for domestic inputs obtained with this formula may still be larger than the actual one.

All coefficients of the Leontief matrix are positive, and diagonal coefficients are larger or equal to one. This means that the total effect of an increase in exports on production is always at least as large as the direct effect.

The effect of exports on production can then be translated into employment using the same approach as for the computation of direct effects.

Employment Sector

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