Employment implications of India's international trade – A macro view based on Input-Output analysis

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Employment implications of India's international trade – A macro view based on Input-Output analysis[1,2]

Abstract

Often trade policy of a country is evaluated for its employment effect and a liberal import policy is criticised for its adverse impact on domestic employment in a more explicit manner. However, for reasons such as low worker reallocations due to trade and employment creation from a concomitant export expansion, what bears relevance for employment outcomes is the aggregate effect, and not the sector-level effects of trade.

In this paper, we focus on the aggregate employment effects of trade by accounting for the interdependencies among sectors of the economy. We make use of the Input-Output model and integrate the Reidel's method to account for differential employment intensity of exports and imports and also the import-sourcing countries; to improve precision of the estimated employment effect of trade in Indian economy.

Computations show that employment intensity of exports continues to remain higher than of the imports; suggesting the employment potential of the aggregate exports in the economy. At an aggregate level, the proportion of export supported employment has more than doubled over a period of two decades. On the import front, the proportion of employment forgone has more than trebled. While the net trade generated an employment surplus during 1993-94, an employment deficit is observed during 2013-14. The employment foregone due to imports has increased faster than the employment supported by exports. The analysis in the paper registers increasing employment opportunities foregone at an aggregate level as a net effect of trade. Under an aggressive liberalisation, two opposing forces have been in place. Greater exports support more employment, while higher imports have costed employment in the domestic economy.

The relative employment intensity of exports underscores their role in employment generation and hence the continued impetus. On the import front, the increasing

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employment forgone noted from the analysis, as also through its stronger indirect impact should not be interpreted to advocate for (continued or higher) import protection in the long run. Past experiences have shown that import protection through a trade policy, without an industrial policy in place, can be only a temporary guard for employment. Although raising tariffs can be a source of interim employment relief, an industrial policy must be used in parallel to strengthen the domestic industry.

Also, not only are the indirect employment effects stronger, they can also be more complicated to address due to their embodied effects (which are manifested through inter-sector linkages) which are generally difficult to track explicitly. This highlights that any shocks in the external sector would have employment affects on the upstream supplier and downstream buyer sectors. And, that such effects are relatively stronger on the import side.

It must be made explicit here that the present paper does not related the trade deficit as the cause of a corresponding employment deficit. However, few suggestions have been brought forward to strengthen employment opportunities from trade.

Keywords: Trade, Employment effect, Input-Output, India.

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Introduction

The emergence of GVC and their deep integration into the world trade and economy has changed the changed the paradigm of international trade. Trade is increasingly realised at intermediate level as compared to trading of final goods earlier. The overall employment effect for the economy is expected to have undergone change. On one hand, the reshuffling of activities to developing countries like India offers employment opportunities in the labour intensive and service sectors. On the other hand, the import-competing manufacturing of intermediate goods faces employment displacement. With growing trade in intermediate goods, as compared with the earlier trade contribution into finished goods, the labour demand (employment creation) is affected in industries using imported intermediates, in addition to the import-competing industries. Thus, a net effect at the aggregate level is difficult to predict ex-ante. Given the differences in employment sensitivity, it becomes important to empirically test for the effect of trade through a study of these changing patterns over time (Lureg at al, 2010). Simultaneously, expansionary activities are expected to establish in competitive sectors that are able to benefit from technological change catering to the world demand; while some import-competing sectors would be disadvantaged.

Often trade policy of a country is evaluated for its employment effect. Although different studies observe a mixed response of employment to trade policy, greater evidence tends to support the positive impact of trade in the long run. At a product-level, if a product-specific trade policy, e.g. tariff, is used to protect jobs, a counter response is observed elsewhere in the economy.[3] Given the low worker mobility across sectors (due to mis-match in skills and limited movement to other regions), the labour market adjustment to a liberal import policy is generally slow and tends to show an immediate loss of jobs. However, the adverse effect can be more than offset through employment opportunities from a concomitant export expansion or worker

[3] The words employment and jobs have been used synonymously here. However, technically a worker who is employed could be preforming multiple jobs. This can be easily related to gig economy, from which the present work abstracts.

absorption through skill-up gradation programmes. Ubalos and Winter (2020) argue that in view of weak evidence on inter-sectoral worker allocations, the policy should be concerned on the aggregate employment levels. Thus, what bears relevance for employment outcomes is the aggregate effect, and not the sector-level effects. The adjustment process should be left to the labour market institutions which can be designed to address the issue in a more specific manner.

Nevertheless, employment concerns arising from trade patterns are particularly important and grave for labour intensive economies, like India, that have not been successful in capitalising on their traditional sectors. There have been views on a differential employment effect felt across the manufacturing and services sectors of the economy. In India, although manufacturing was liberalised before services, the internationalisation of services has been greater. While changes in manufacturing are more due to cost advantages, essentially on account of abundance of low skilled labour, the service advantage has been due to the skill set and a policy setup with limited role for regulations. Despite being the fastest growing economy it has not made a break through in labor-intensive manufacturing. It has liberalized on many fronts including foreign direct investment and exchange rate, but has not gained through increased employment opportunities or through skill up-gradation.

In this paper, we focus on the aggregate employment effects of trade by accounting for the interdependencies among sectors of the economy. The interaction of employment multiplier of a given sector with the trade flow is used to assess the economy-wide employment effects. The exercise is done separately for exports and imports.

Methodology

We make use of the Input-Output model for an economy-wide assessment of the effect. The edifice is constructed on the premise that sectors (or activities) do not lead to job creation for self but also have an induced effect on other sectors due to their input relationships.

Typically, in an I-O model the production technology for exports and imports are considered identical due to lack of explicit data on sector-wise labour coefficients of all the import sourcing countries. Attempting to address the limitation, Riedel (1975)

argues that factor imports, e.g. employment (embodied in importations), are essentially procured through payments from the export earnings of an equivalent amount. Since exports are produced under domestic technological considerations, therefore it becomes possible to express importations as a function of exports, under the condition of constant trade balance. Although the exports make use of the domestically available employment for production, their corresponding import equivalent provides a measurement of the employment in the importations. Thus, an imported commodity which intensively uses employment is purchased through foreign exchange earned by exporting an amount equivalent. Since export production is of domestic origin, an equivalent (value of) employment use can thus be computed from the technology matrix of the home country. Additionally, the import requirements for export production are also incorporated in Reidel's framework. Even more, the relatively employment-intensive imports from a country 'A' of a commodity in comparison to (the relatively less intensive imports from) country 'B' will have a higher export equivalent; adequately captured in the measurement thus also reflecting on differential use of employment across countries of origin.

For brevity, the final equation for estimating the total employment coefficient is given in Equation (1).[4]

$$\widehat{EMP_j} = EMP_j + M_j\left(\frac{EMP_E}{1-M_E}\right) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{Eq (1)}$$

where EMP_j , is the total (direct and indirect) requirement of the employment through its use in production of all inputs used in one unit output of the j^{th} sector. Expressions used in Eq (1) are defined as follows:

M_j is obtained by summing over all inputs (index *i*) provides the requirement of all imported inputs for a unit output of j^{th} sector. This is given by the following expression:

$$M_j = \sum_{i=1}^{n}\left(M_i s_{ij}\right) = \sum_{i=1}^{n}\left(\sum_{j=1}^{n} m_{ji}\, s_{ij}\right) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{Eq (1)}$$

EMP_E gives employment requirement to meet the overall exports in the economy, F_E^k

$$EMP_E = \sum_{j=1}^{n}\left(\left(\sum_{i=1}^{n} emp_i\ s_{i1}\right) * E_j\right) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{Eq (2)}$$

[4] The derivation and details of the estimation are available upon request.

M_E is the summation over sector-wise requirements and provides total import requirement for the production of exports.

$$M_E = \sum_{j=1}^{n}(M_j * e_j\ ) = \underbrace{\sum_{j=1}^{n}\left(\underbrace{\sum_{i=1}^{n}\left(\underbrace{\sum_{j=1}^{n}\underbrace{m_{ji}}_{A} * s_{ij}}_{B}\right) * e_j}_{C}\right)}_{D} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{Eq (3)}$$

where the expressions have the following representation:

emp_j : direct employment coefficient of the j^{th} sector

$e_{j:}$ export share of j^{th} sector and $E_{j:}$ export value

$s_{ij:}$ domestic requirement of input from i^{th} sector into the j^{th} sector

$m_{ij:}$ imported input from i^{th} sector into the j^{th} sector

A: direct import use of j^{th} input in a unit output of i^{th} sector

B: direct and indirect import requirement of all inputs per unit output of j^{th} sector

C: import requirement for export of j^{th} sector

D: sum of import requirements for all exports

Data

The present study makes of multiple data sources. The I-O for 1993-94 is sourced from Central Statistics Organization (2000). The I-O table for a latest period of 2013-14, as available from an alternate published source (Singh and Saluja, 2018), is used. The KLEMS database (Das et al. 2018) of the RBI is used to source the values for (computations of) direct employment coefficients. In order to account for prices changes over time and for comparability over a longer period of two decade, nominal values of flows (output, export and imports) have been converted in to real flows with the base year of 1993-94, the initial year in reference period.

Employment effects

Table 1 reports the average employment intensity of exports and imports. In view of the adoption of a generally more capital-intensive methods of production, the over time decline in employment intensity, of both exports and imports, is a natural observation. However, the decline in employment intensity of the overall export basket is more pronounced in comparison to overall imports; indicating that exports

have turned relatively more capital-intensive over time. Notwithstanding this decline, the employment intensity of exports continues to remain higher than of the imports; suggesting the employment potential of the aggregate exports in the economy.

Table 1: Employment intensity of trade*

	Employment per million Rs.			
	Exports		Imports	
	1993-94	2013-14	1993-94	2013-14
Direct employment intensity	16.5	4.3	8.2	3.1
Total employment intensity	34.3	10.4	22.3	9.1

* aggregate employment intensity of exports (imports) is the weighted average of employment intensity of sectors of the economy. The weights reflect sector significance in the overall exports (imports).

To evaluate the employment effect, it is additionally required to take into account the trade significance of the sectors. A high employment intensity (of an exporting/ importing) sector may not translate into a proportional employment effect if the sector has a low trade volume.[5] An example is the wood product sector which ranks high in its employment intensity, next only to agriculture & allied, and food processing sectors; but is positioned much lower in terms of the employment creation (i.e. number of employment) from exports. This is due to its low significance within the export basket. Similarly, despite a lower employment intensity of basic metals & products, the sector accounts for relatively significant employment foregone in the economy. Thus, employment created (from exports) or foregone (due to imports) depends on the employment intensity and the volume of trade (export/import).

Sector-wise employment effect of exports and imports is presented in Table 2. Also reported in table are the employment effects for the aggregate economy, the focus of the present paper. It needs to be iterated here that the employment effect, as shown here, is taking into account the change in prices. Therefore, it is not possible to compare the estimates from any other source, particularly for the individual sectors. However, the macro evidence is largely consistent with the existing view of net negative employment effect from trade, as also noted in other studies by Sen (2009), Goldar (2009) and Vahishth (2015).[6]

[5] Volume refers to the real value of flows for export and imports.
[6] Authors of the earlier works focus on manufacturing only.

The aggregate employment takes into account the size of the exporting (importing) sector and therefore are jointly reflective of the employment intensity and the volume of trade realised. At an aggregate level, 8.1% of total employment was engaged in export related activity during 1993-94. The proportion of export supported employment more than doubled to 17.8% in the year 2013-14, with an expansive liberalisation over the two decade period. On the import front, the employment forgone is assessed at 5.8% of total employment in the economy during 1993-94. This means that under conditions of domestic production alone, an equivalent employment would have been created in the economy. The measure of proportion has more than trebled to 19.3% during 2013-14. In net terms, the employment creation effect of 8.7 million during 1993-94 has turned into a perverse effect (employment foregone) of 7.1 million during 2013-14. Measured as a proportion of total employment, the net trade generated an employment surplus of 2.3% during 1993-94, and an employment deficit of (-) 1.5% during 2013-14. The employment foregone due to imports has increased faster than the employment supported by exports.

Table 2: Employment effect of trade

	Exports		**Imports**	
	1993-94	2013-14	1993-94	2013-14
	Total employment (thousand)			
Agriculture & allied	5154	15076	2107	11199
Mining	201	372	2910	16789
Food processing	2898	5460	782	5666
Textiles, products, leather and footwear	6434	9503	901	2105
Wood & products	133	70	25	847
Paper, printing & publishing	105	300	577	951
Coke & refined petroleum products	203	5192	1792	2135
Chemicals & products	1198	4110	2330	6439
Rubber & plastic products	306	1664	99	3258
Other non-metallic mineral products	2165	231	593	477
Basic metals & products	623	2982	1287	8243
Machinery, nec.	264	2050	1621	5818
Electrical & optical equipment	406	2185	925	8272
Transport equipment	249	2524	1197	2142
Manufacturing, nec	2216	9620	2553	6540
Financial services	-	946	-	792
Business services	-	354	-	331

Education	3041	4778	-	-
Electricity	1353	-	-	-
Construction	1849	2515	205	2775
Trade	3	310	2	141
Hotels & restaurants	29	642	46	500
Transport & storage	691	11678	784	3712
Post & telecommunication	-	434	-	203
Public administration	-	139	-	960
Health & social Work	-	53		16
Other services	730	2908	828	2876
Aggregate	30255	86098	21564	93186
As % of total	8.1	17.8	5.8	19.3

-: Nill/ Insignificant.

Trade figures as available from the original source (Singh and Saluja (2018)) have been compared with the BOP figures. Accordingly, figures for financial services, telecommunication and health services have been updated during the excercise.

It is relevant here to note that the employment effects are a composite of direct and indirect employment, with the latter being more significant. During 1993-94, exports supported a direct employment of 14.6 million while the indirect employment effect was larger at 15.7 million (Table 3). This translates into the indirect employment–to–direct employment ratio of 1.08, signifying that the indirect employment effects of export are greater and exports benefit other producing sectors through employment support. The ratio increased to 1.4 during 2013-14, emphasising the indirect employment potential of exports which was 40% more than the direct employment. With regard to imports, the indirect employment foregone therein other sectors of the economy has been comparably high at 1.73 times the direct employment during 1993-94. The ratio increased further to 1.94 during 2013-14 indicating that the indirect employment foregone has been nearly double the (direct) employment foregone due to imports. Not only are the indirect employment effects stronger, they can also be more complicated to address due to their embodied effects (which are manifested through inter-sector linkages) which are generally difficult to track explicitly.[7] This highlights that any shocks in the external sector would have (unanticipated) employment affects on the upstream supplier and downstream buyer sectors. And, that such effects are relatively stronger on the import side.

[7] Similarly, in the context of technological changes, Tandon and Ahmed (2016) highlight that indirect effects are generally slow to respond to changes; which can be interpreted to indicate the complexities related to the identification of indirect channels of influence.

Table 3: Direct and Indirect employment effects of trade

	Employment (million)			
	Exports		Imports	
	1993-94	2013-14	1993-94	2013-14
Direct employment	14.6	35.9	7.9	31.7
Indirect employment	15.7	50.2	13.7	61.5
Indirect employment as a % of total	51.9	58.0	63.4	65.8

Discussion and Policy Prognosis

The analysis in the paper registers increasing employment opportunities foregone as a net effect of the employment supported due to exports and the employment foregone on account of imports. Under an aggressive liberalisation, two opposing forces have been in place. Greater exports support more employment, while higher imports have costed employment in the domestic economy.

The relative employment intensity of exports underscores their role in employment generation and hence the continued impetus. An export strategy in future should be carved out for – (i) continued export expansion of the preforming sectors, and (ii) restoration of the traditional exporting sectors in the basket. For the former, addressing non-tariff barriers (NTBs) in the international markets would be a key. In fact, tariff liberalization has minimal role vis-à-vis the NTB challenges faced by Indian exporters, as also noted from the India's sub-optimal export performance even with its free trade partners as also suggested in recent document from the NITI Aayog (Saraswat, Priya and Ghosh, 2018). For the latter, achieving cost competitiveness, (greater) export orientation and brand development are the way forward. The recently initiated production linked incentive (PLI) schemes of the government are a step in this direction as they partially offset the cost un-competitiveness through refund of state levies and fuel taxes. Although the schemes has been expanded for coverage of other sectors, the more labour-intensive sectors are not significant consumers of fuel inputs, and therefore other promotional policies would help where branding and orientation would help along with the price competitiveness of inputs.

On the import front, the increasing employment forgone noted from the analysis, as also through its stronger indirect impact should not be interpreted to advocate for

(continued or higher) import protection in the long run. Past experiences have shown that import protection through a trade policy, without a industrial policy in place, can be only a temporary guard for employment. Although raising tariffs can be a source of interim employment relief, an industrial policy must be used in parallel to strengthen the domestic industry. In fact, resisting imports without a domestic competence can be a severe restraint as observed in the post-Covid period where domestic industries, such as tyres and pharmaceuticals, suffered either from limited or costlier supplies, when the Chinese imports were opposed. Therefore, the domestic industry must be brought on a strong footing; which cannot be expected through raising the tariffs alone. An industrial policy should be operative in tandem. The experience of Indian economy is found in contrast to the experience of smaller economies such a Vietnam where employment in both exporting and importing sectors increased under conditions of increasing liberalisation and greater competition (Kien and Huo, 2009).

Another impact of curtailing imports, without adequate domestic availability, can be through the affect on export-production activities which have turned increasingly import-intensive over time. The possibility that the employment loss from the exports is strong enough to more than offset the possible employment gains from higher tariffs, cannot be ruled out. Also, protecting import-competing activities can adversely impact (through crowding-out) the employment available for export-producing activities. Hence, the import policy requires deep thinking on the multiple channels through which it can impact the economy. The employment shocks, in the short-run, will require active labour market polices in place. An example can be taken from Denmark, where the worker affected from trade has an opportunity to improve the skills before returning to the job market (Utar, 2018).

It must be made explicit here that the paper does not related the trade deficit as the cause of a corresponding employment deficit. However, few suggestions have been brought forward to strengthen employment opportunities from trade. This boils down to the key inquiry where the employment outcomes of exports and imports should not be compared at the sector-level, but whether the present trade structure has effectively created employment in the overall economy over time. The sector-level shocks, that may occur in the short run, should be addressed through labour market institutions

through initiatives on skill enhancements. In the Indian context, this doesn't seem to have happened.

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