Trade and Jobs - An Input-Output analysis for Morocco

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Abstract :

The aim of this paper is to test the effect of trade exposure on employment in Morocco. To do this, we examine three main research questions: 1) the impact of trade growth on overall and sectoral employment, 2) the impact of trade exposure in a particular sector on overall and sectoral employment, and 3) whether sectors with a significant effect on trade-induced employment also have a comparative advantage. In order to provide answers, and given the lack of disaggregated data, we apply an input-output approach, which, despite its limitation by a set of hypotheses, provides the opportunity to explore the relationship between trade and job creation and destruction. Excluding the primary and tertiary sectors, our estimates for 2015 show a positive effect, especially in manufacturing industries. In addition, the use of RCA analysis has allowed us to identify a comparative advantage for Morocco in terms of 15 products in the food and tobacco industries, 16 mineral products, 12 products in the chemical or related industries, 61 products in the textile and leather industries, and 21 products in the mechanical, metallurgical and electrical industries.

Key words: input-output, openness, trade, labour market, RCA

JEL Classification: F16, C67, O3

Introduction:

The aim of our paper is to identify the impact of trade on employment in Morocco. This link between trade and employment exposure is of great interest for at least two reasons. The first is linked to the slowdown observed at the level of Morocco's growth model, which is based on domestic demand, and therefore the obligation to place the rest of the world at the heart of any growth and employment policy. The second, older and well documented, relates to high unemployment rates, especially among youth and graduate populations, which implies the presence of mismatch situations and, perhaps, an impact of trade on workers' allocation between sectors. A third motivation is analytical. While seeking to fill gaps in understanding the impact of economic growth models on job creation in a developing country, this theme seeks to improve our understanding of the interactions between the Moroccan labour market and trade exposure.

Then, the interest of the proposal is to know the effect of foreign trade exposure on jobs in Morocco through the adoption of four overlapping research questions:

1. *What impact does growth have on overall and sectoral employment?*
2. *What impact does the growth of a particular sector have on overall and sectoral employment?*
3. *What impact does trade exposure have on global and sectoral employment?*
4. *What impact does the trade exposure of a particular sector have on overall and sectoral employment?*

In order to provide answers, and given the lack of disaggregated data, we apply an input-output approach, which, despite its limitation by a set of hypotheses, provides the opportunity to explore the relationship between trade and job creation and destruction (Gregory, Zissimos and Greenhalgh, 2001; Los, Timmer and de Vries, 2014). Indeed, the structuralist, or neo-structuralist, economic literature argues that an analysis based on input-output models allows the effect on employment to be taken into account through at least three channels:

1. *The final consumption channel, but also the intermediate one (Autor & Dorn, 2013 ; Goos & Manning, 2007) ;*
2. *The productivity, reallocation and technology channel (Autor, Levy & Murnane, 2003 ; Goos & Manning, 2007) ;*
3. *The trade exposure channel under the prism of comparative advantages and the new international division of labour (Blinder, 2009) ;*

Why an Input-Output analysis?

This is the detail of the reasons mentioned above.

By design, Input-Output tables plot production flows within the economy over a given period for each of the sectors represented in the table, depending on the adopted aggregation. The production of each sector is distributed throughout a row of the table on sectors each occupying a column. The box at the corresponding intersection shows the input requirements of the sector. As a result, an Input-Output table could be used to visualize the product flow circuit between sectors. A response as to the links between

the production of a particular sector and the production of other economic sectors is therefore established.

Another feature of Input-Output tables is that they allow to group the production destination of a particular sector by type of demand. In addition to the intermediate demand of the different sectors (see above), final demand to a particular sector is expressed in total and by type (demand for final consumption, investment and export). Thus, the chosen method makes it possible to establish the link between the large demand blocks, on the one hand, and what is happening at the sector level, on the other hand[1].

The productivity, reallocation and technology channel could only be perceived through the use of a time-based analysis. While the theoretical impact of productivity, reallocation and technology on overall employment is ambiguous, the Input-Output analysis sheds more light on the issue from a sectoral perspective: technological changes that may influence the composition of employment and imply a significant reallocation of the workforce as well as sectoral development.

These justifications therefore support the use of Input-Output tables as a coherence framework and as a tool to generate knowledge on employment, as well as projections. Nevertheless, it is necessary to recall certain limitations related to the accounting decomposition. The Input-Output framework is based on the assumptions of homogeneity and proportionality. Homogeneity implies three premises: (i) each sector produces a single output (i.e. the products are either perfect substitutes for each other or are produced in fixed proportions); (ii) each sector has an input structure that is fixed; and (iii) there is no substitution between products from different sectors. Proportionality implies that, in any sector, all inputs are used in a fixed proportion, so that any change in inputs will lead to a corresponding change in the level of production. From these point of view, our results should be interpreted in terms of short-term effects.

<u>Literature review:</u>

Increasing trade liberalization has raised many concerns and several theoretical and empirical contributions exploring the interdependencies between such an expansion and changes in certain economic and social indicators in both developed and developing countries. Particular attention was paid to the relationship between the increase in countries' trade exposure and labour market outcomes, including employment. Although linking trade growth to employment is a complex task, such a relationship is at least theoretically plausible.

In the trade and employment literature, there are generally three main transmission channels: demand, prices of goods and factors, and the productivity underlying a production technique that results from the combination of factors of production in given proportions and that captures concepts such as technological progress, innovation or returns to scale.

A review of the literature on the effect of trade on employment through demand channels suggests an unequal effect on different categories of work, sectors, and firms within the same sector. The example of work based on measuring the employment intensity of growth considers employment trends as a

[1] Input-Output tables are used to determine the relative importance of a sector as a buyer of inputs from other sectors. In addition, knowing the relative importance of a sector as an input supplier to other sectors is possible with this methodology.

reaction to exports that are a source of demand and therefore a vector of jobs in export-oriented sectors and firms, but also to imports that are a leakage of demand and therefore a job destroyer (Wood, 1994). However, this approach is open to discussion at several levels. First, such an approach does not allow for the direct and indirect effects of trade expansion to be counted. We illustrate this through the case of imports of intermediate goods and/or complementary inputs which are not produced locally. In this case, the negative effect will not be observed, and even a positive effect is possible. In addition, competition in the global market may push exporting companies to more efficient labour-saving practices, the expected positive effect of exports on employment may not materialize and even a negative effect may occur. This approach is also criticized by trade theorists since it takes as its starting point the evolution of trade volumes and not relative prices of both products and inputs. Indeed, according to Heckscher-Ohlin's theorem, traditional trade theory indicates that trade effects on demand should be understood in terms of changes in the relative prices of exportable and imported products. The example often mentioned is the increase in unskilled employment, and employment in general, in the export sectors in a country rich in unskilled labour because of the comparative advantage of its economy in more labour-intensive sectors.

The other channel for concretising the trade and employment relationship is that of the prices of goods and factors. A commercial exposure favourable to the fall in the prices of locally consumed goods is able to have a positive impact on real wages and therefore on disposable income and consequently on the consumption of goods. In addition, the ratio of workers' wages in companies exporting a product to the wages of import-competing companies is often mentioned to explain the decline in unskilled jobs in developed countries[2] (Freeman, 1995). Thus, certain categories of workers may benefit from the dynamic effects of trade in their sector, particularly if they are employed in sectors with a comparative advantage.

Finally, there is a vast literature that explores the relationship between trade, productivity and employment (Balassa, 1967; Rodrik, 1997; Acemoglu 2002; Melitz, 2003; Achy and Sekkat, 2004; Goldberg and Pavcnik, 2004; Bottini and Gasiorek, 2009). Trade expansion can lead to a reallocation of labour across sectors, but even more so between firms within sectors, as Balassa (1967) and more recently Melitz (2003) have pointed out. According to the latter, increased exposure to trade is likely to lead to a reallocation of productive resources and market shares from the least productive to the most productive firms in a sector[3] (Melitz, 2003). Import penetration is also expected to lead to technical changes (Pamukçu 2003). Here, defensive innovation stimulated by international competition can have an indirect negative effect on employment (Ghosh, 2003). Acemoglu (2002)[4] suggests that an interaction of international trade with technological change amplifies the direct effect of technological change and the redistribution of jobs[5]. In general, four possible ways in which trade can have an impact on productivity levels can be identified: more efficient allocation of resources, greater division of labour, better return on investment and technological spin-offs (Lurweg et al, 2010).

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[2] The factor price equalisation theorem stipulates that countries will share the same prices for all factors. However, this is a well-defined situation in which all barriers to trade are eliminated, factors are perfectly mobile from one industry to another and factor endowments in different countries are sufficiently similar.

[3] In reality, adjustment is not automatic since certain rigidities can hinder the movement of work. Examples include the lack of flexibility and information as well as the costs of acquiring new skills and qualifications. (Francois et al., 2011).

[4] See also Acemoglu (1998): "Why Do New Technologies Complement Skills? Directed Technical Changeand Wage Inequality".

[5] The concept of Skill-Biased Technical Change is at the heart of this argument, whereas in developed countries it has been considered a change in production technology that favours skilled over unskilled labour by increasing its relative productivity and, consequently, its relative demand.

In addition to the theoretical aspects of the relationship between trade expansion and employment, the literature identifies some approaches to testing this relationship. In general, the methods can be grouped into the following categories: econometric methods, calculation and simulation methods, factorial methods, partial equilibrium methods, input-output methods, linear programming methods and, finally, qualitative methods. The method adopted in this document is the input-output method.

Methodology and data:

Data:

To determine the effects on employment of international trade flows of specific Moroccan sectors, we use Input-Output matrices.

The High Commission for Planning (HCP) in Morocco provides supplies and uses table that can be transformed into an Input-Output matrix for 22 sectors (2 primary sectors, 9 secondary sectors, 9 tertiary sectors and 2 sectors for statistical correction purposes).

Before working with the data in supplies and uses matrix, it is necessary to process trade and transport margins, distribute taxes, duties and subsidies on the different branches, obtain a uses matrix at basic prices, and produce matrices of domestic and imported uses.

Data on imports and exports, classified by sector, are also available in the supplies and use tables. As data on imports and exports with Morocco's trading partners are only available for certain sectors, some sectors of the original trading partner matrix will be aggregated.

World Integrated Trade Solution (WITS) data provides trade data. The data requires to be classified by trade sector.

Employment data by occupation and sector are published by the High Commission for the Plan with coverage since 1998 (in number of employees).

Methodology:

The central element of our approach is the transformation of the inverse Leontief matrix into an interaction matrix between employment inputs and trade exposure. The following equation is the backbone of our approach:

*(Matrix of labour coefficients) *(Inverse Leontief matrix) *(Trade matrix)*

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Jobs incorporated in foreign trade

The inverse Leontief matrix will be obtained after processing the input-output matrix developed by the National Accounts Directorate of the High Commission for the Plan. The values (i,j) in this matrix show how many intermediate production units in sector i are needed to produce a final demand unit for goods in sector j directly and indirectly. Production is therefore described as a function of final demand. The values of a column correspond to the direct and indirect needs of a specific sector, in order to provide an increase from a production unit to final demand.

The matrix of labour coefficients is a diagonal of sectoral labour coefficients. The labour coefficient for a specific sector i is calculated as follows: jobs (i)/products (i). The matrix of labour coefficients is a diagonal where element (i,i) is equal to[jobs (i)/products (i)]. Employment data are derived from the reports on activity, employment and unemployment, which are published regularly by the Statistics Directorate of the High Commission for the Plan.

By multiplying the diagonal of the [Matrix of labour coefficients] by the [Inverse Leontief matrix], the number of jobs directly and indirectly needed to produce a unit of final demand is calculated for each sector.

$$\begin{bmatrix} a_{11} & a_{12} & \cdot & \cdot & a_{1n} \\ a_{21} & \cdot & & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ a_{n1} & \cdot & \cdot & \cdot & a_{nn} \end{bmatrix}$$

Finally, the product of the two matrices at the top is multiplied by the [Trade Matrix]. It is a diagonal matrix that can take three distinct shapes depending on the diagonal elements. First, it is a matrix of net exports for each sector. The other two forms are based respectively on imports and exports from each sector. By multiplying the [Matrix of labour coefficients][Inverse leontief matrix] by [Trade matrix], we obtain a measure of the number of jobs incorporated in net exports, as well as in imports and exports.*

$$\begin{bmatrix} a_{11} * T_1 & a_{12} * T_2 & \cdot & \cdot & a_{1n} * T_n \\ a_{21} * T_1 & \cdot & & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ a_{n1} * T_1 & \cdot & \cdot & \cdot & a_{nn} * T_n \end{bmatrix}$$

In the case of exports, for example, the sum of line 1 represents the number of jobs created in sector 1 through exports from all sectors. The sum of column 1 represents the number of jobs created in all sectors of the economy as a result of exports in sector 1.

The obtained results are then compared with the results of an analysis of revealed comparative advantages (RCA). The aim is to find out whether sectors with a significant effect on trade-induced employment also have a comparative advantage.

Our analysis is, however, limited by the assumptions underlying the input-output tables:

- *We assume constant input shares to calculate the input requirements for each industry. There is therefore no change in technology or increasing economies of scale.*
- *The data do not take into account qualitative differences between traded and non-traded goods.*
- *It is implicitly assumed that the technologies for importing and exporting goods and services are identical. This is due to the fact that the country's manufacturing technologies are assumed to be constant when calculating the jobs incorporated in imports and exports.*
- *Imports and domestic production are supposed to be perfectly interchangeable, without any cost.*
- *Dynamic trade gains, defined as changes in the long-term trade-related rate of productivity growth, are not taken into account.*

Results:

As one of the elements of final demand, an increase in exports of a sector N can be seen as an exogenous demand shock. That said, we will try to determine the effects of an increase in net exports on employment in the various sectors of the Moroccan economy by first assuming an increase in exports in each sector N of one billion dirhams compared to their respective levels in 2015. This will allow the identification of the impact of sectoral interdependencies (backward & forward linkages) in addition to the determination of the effect within the sector concerned (within effects).

The section on the effects on total employment of the results of our estimates shows a strong dynamic, relative to the rest of the branches of the economy, of the trade sectors, the textile and leather industries, hotels and restaurants, the food industries, construction and transport. Indeed, Table 1 indicates that an increase in exports in the commerce sector of 1 billion MAD should lead to an increase in total employment of about 16,198 jobs, 93.2% of which within the sector itself, reflecting the lack of integration upstream and downstream of the sector in question. In contrast, the food and tobacco industries sector shows strong integration, while 91% of the 12,345 jobs resulting from an increase in exports in the sector would be created in other sectors of the economy, such as agriculture with 9,477 jobs or trade and repair with 1,164, and to a lesser extent in the fisheries and aquaculture sector with around 158 jobs.

1. *Effects on total employment resulting from a 1 billion MAD increase in exports from sector N.*

Classification	*Sector N*	*Effects on employment*	*% of jobs created within the sector*
1	*Commerce*	*16 198*	*93,2%*
2	*Textile and leather industries*	*13 779*	*83,9%*
3	*Hotels and restaurants*	*12 422*	*72,0%*
4	*Food and tobacco industries*	*12 345*	*9,0%*
5	*Construction and public works*	*9 616*	*79,2%*
6	*Transportation*	*7 372*	*88,9%*

Sources : authors' calculations; HCP-2015 database

In other sectors, the increase in exports appears to be less employment-intensive. This is the case, for example, in the electricity and water sector with only 1,693 jobs created following an increase in exports from the sector of one billion dirhams. There is also the petroleum refining and other energy products sector with about 1,703 jobs[6]. This may indicate a high degree of mechanization and a low employment intensity of around 0.17 (see Mandri et al, 2018 in 'The challenges of the labour market in Morocco').

Despite their low employment intensity, these two last sectors belong to the most integrated group in the sense that in the first (refining of oil and other energy products) only 8.4% of jobs would be created within the sector itself while about 91.6% of jobs would be created in the other sectors, mainly in extractive industries, commerce and repair as well as transport activities. For the second sector (Electricity and Water), only 47% of jobs would be created within the sector itself, the rest would be mainly created in the extractive industries, commerce and repair activities. Table 2 classifies the sectors

[6] See appendices for detailed results

of activity according to the direct employment induced by an increase in exports of the same sector of 1 billion MAD.

2. *Effects on employment in sectors N following a 1 billion MAD increase in exports from sector N.*

Classification	*Sector N*	*Effects on employment within the sector*	*% of jobs created*
The largest shares			
1	*Commerce*	*15 103*	*93,2%*
2	*Transportation*	*6 556*	*88,9%*
3	*Real estate, rental and services provided by companies*	*1 692*	*87,9%*
4	*Textile and leather industries*	*11 567*	*83,9%*
The lowest shares			
16	*Petroleum refining and other energy products*	*142*	*8,4%*
15	*Food and tobacco industries*	*1 109*	*9,0%*
14	*Chemical and Para-Chemical Industry*	*592*	*22,5%*
13	*Electricity and water*	*800*	*47,0%*

Sources : authors' calculations; HCP-2015 database

A second type of result issued from our estimates is the assessment of the effect of a generalized increase in exports on employment in a specific sector. For this purpose, we considered an exogenous shock of a simultaneous increase in exports of billion MAD1 in each sector. As a result of such a scenario, the most jobs would be created in the commerce and repair sector, with 25,256 jobs. In terms of job creation, the latter sector far outstrips the others, while the textile and leather industry sector, which is second in the ranking, would only create half of what is in trade and repair, i.e. 11,870 jobs. This gap may indicate strong links between the commerce and repair sector and the rest of the sectors compared to the textile and leather sector, although labour intensity is higher in the latter sector (see Mandri et al, 2018)[7].

The effects on employment that occur, due to a simultaneous increase in exports of billion MAD1, are less pronounced in other manufacturing sectors. In the Other manufacturing industries excluding petroleum refining, we can expect about 4,275 jobs to be created, 3,635 in the mechanical, metallurgical and electrical industries, 1,415 in the food and tobacco industries, and only 765 in the chemical and para-chemical industries. Excluding the primary and non-market sectors, Table 3 gives an image of the sectors that benefit most from a generalized export dynamic, given the current structure of the economy.

[7] In Mandri et al (2018), the elasticity of jobs to growth is estimated at 0.84 in the textile and leather sector, while it is about 0.57 in the commerce and repair sector.

3. *Sectoral effects on employment in sector N induced by a simultaneous 1 billion MAD increase in exports in all sectors.*

Classification	*Sector*	*Effects on employment*
1	*Commerce*	*25 256*
2	*Textile and leather industries*	*11 870*
3	*Hotels and restaurants*	*9 651*
4	*Construction and public works*	*8 061*
5	*Transportation*	*7 928*
6	*Other manufacturing industries excluding refining oil*	*4 257*

Sources: authors' calculations; HCP-2015 database

We conclude our exercise by simulating the effect on employment of a simultaneous 10% increase in exports and imports in a given sector. The calculation assumes that wages, prices and productivity levels will be maintained at their current levels (year 2015). This exercise would make it possible to determine the employment effects of greater exposure to international trade in the Moroccan economy by calculating both the jobs that would be required to produce this supplement of goods imported and exported by Morocco. This provides a measure of the "job loss" due to international trade, assuming that all imported goods are produced in the domestic market. The results of our estimates indicate that the greatest loss would be observed in the mechanical, metallurgical and electrical industries with 66,495 jobs. This motivates to further integrate the value chains of these industries since increasing national content is equivalent to considerable job creation. We can expect a loss of 40,533 jobs in the textile and leather industries, and 28,993 in the food and tobacco industries. The lowest loss should be observed in financial and insurance activities, with 286 jobs. This can be attributed to the level of imports from the latter sector, which represented barely 1.1% of imports from the mechanical, metallurgical and electrical industries or 5.6% of imports from textiles and leather.

We then look at the "employment gain" resulting from a 10% increase in exports relative to their level in 2015. The results indicate the creation of 48,706 new jobs in the textile and leather sector, 33,252 in the mechanical, metallurgical and electrical industries and 31,878 in the food and tobacco industries. The electricity and water sector is expected to generate only 17 jobs, mainly due to low exports levels (102 million dirhams in 2015)

By subtracting the estimated job losses from the estimated gains, we obtain a measure of the net employment effect of a 10% increase in total trade following an increase in imports and exports in the same proportions. According to this methodology, we can expect a positive net effect in the textile and leather industries (8,173 net creations), the food industries (2,885 net creations), real estate, rental and business activities (1,551 net creations), and finally the postal and telecommunications sector (867 net creations). A negative net effect is expected for employment in the mechanical, metallurgical and electrical industries (-33,243) and in other manufacturing industries excluding petroleum refining (-15,041).

Table 4 presents the results obtained for selected sectors.

4. *Economy-wide employment effect following a simultaneous increase in exports and imports in sector N of 10%.*

Sectors	*Jobs losses due to imports*	*Jobs gains due to exports*	*Net effect on job creation*
Mechanical, metallurgical and electrical industry	*66 495*	*33 252*	*-33 243*
Textile and leather industries	*40 533*	*48 706*	*8 173*
Food and tobacco industries	*28 993*	*31 878*	*2 885*
Transportation	*20 241*	*17 074*	*-3 167*
Other manufacturing industries excluding refining oil	*18 666*	*3 624*	*-15 041*
Commerce	*16 198*	*16 198*	-
Chemical and Para-Chemical Industries	*10 642*	*10 113*	*-530*
Petroleum refining and other energy products	*7 937*	*790*	*-7 147*

Sources: authors' calculations; HCP-2015 database

A final lesson from our investigation of the employment effects of the country's trade exposure will be the export potential and Morocco's relative advantage (or disadvantage) for goods produced by manufacturing sectors that provide jobs. To do this, we use the Revealed Comparative Advantage Index (RCA), introduced by Balassa (1965) in an attempt to approach David Ricardo's concept of comparative advantage[8]. Under this measure, a country's comparative advantage is "revealed" by the relative export performance of each product category compared to the global export performance of the same product category. Thus, the revealed comparative advantage is expressed as follows:

$$RCA_{ij} = \frac{X_{ij} / X_{it}}{X_{wj} / X_{wt}}$$

Where X_{ij} et X_{wj} respectively represent the values of country i's exports in product j and world exports in product j. X_{it} et X_{wt} refer to total exports of country i and total world exports. If this index is greater than unity, country i can be said to have a comparative advantage revealed in product j. In the case of an index below one, country i has a comparative disadvantage in the export of product j.

If we refer here to the world as a comparator (it is recommended to compare to a smaller and more relevant reference group), to determine whether Morocco has a particularly strong position in the chemical industry, for example, Balassa argued that the share of exports of chemical products in Morocco's total exports should be compared with the share of exports of chemical products in a

[8] Attempted because the central idea of this measure is to identify the country's "strong" export sectors by analysing its actual export flows without taking into account possible sources of benefits.

reference group's total exports. In accordance with this view, Morocco will be considered to have a comparative advantage for a given product when its share in Morocco's exports is higher than its share in the exports of the comparison group (here the world). Otherwise, if the revealed comparative advantage (RCA) for a given product (or industry) is greater than one, we can say that Morocco has a revealed comparative advantage in the exports of that product (or industry).

RCA analysis was conducted using a 4-digit HS-1988/99 classification[9]. At this level of aggregation, Morocco is proving to have a comparative advantage for 166 product groups exported in 2015. Mineral products, products of the chemical or related industries, products of agriculture and fisheries, products of the food industries, beverages, alcoholic liquids and vinegars, tobacco and manufactured tobacco substitutes, products of the textile and leather industries, and products of the metallurgical industries were in first place in 2015 with an RCA between 21.77 and 294.1 as shown in Table 5.

5. Top Moroccan export products according to the RCA, (2015, SH-1988/99 with 4 digits)

Product Code	*Product Name (HS-4)*	*RCA (2015)*
2809	*Pentaoxyde de diphosphore; acide phosphorique; acides polyphosphoriques, de constitution chimique définie ou non*	*294,1*
2510	*Phosphates de calcium et phosphates aluminocalciques, naturels, et craies phosphatées*	*256,42*
3103	*Engrais minéraux ou chimiques phosphatés*	*139,16*
2511	*Sulfate de baryum naturel [barytine]; carbonate de baryum naturel [withérite], même calciné*	*114,76*
0708	*Légumes à cosse, écossés ou non, à l'état frais ou réfrigéré*	*93,71*
3105	*Engrais minéraux ou chimiques contenant deux ou trois des éléments fertilisants*	*54,85*
0711	*Légumes conservés provisoirement*	*44,89*
1504	*Graisses et huiles et leurs fractions, de poissons ou de mammifères marins, même raffinées, mais non chimiquement modifiées*	*42,46*
0307	*Poissons, crustacés, mollusques et préparations*	*38,91*
0702	*Tomates, à l'état frais ou réfrigéré*	*38,59*
4501	*Liège naturel brut ou simplement préparé, c'est-à-dire simplement nettoyé en surface; déchets de liège; liège concassé, granulé ou pulvérisé*	*36,65*
1604	*Préparations et conserves de poissons; caviar et ses succédanés préparés à partir d'oeufs de poisson*	*31,57*
8105	*Mattes de cobalt et autres produits intermédiaires de la métallurgie du cobalt; cobalt et ouvrages en cobalt*	*21,77*

[9] The Harmonized Commodity Description and Coding System (HS) is an international nomenclature for the classification of products. It allows participating countries to classify goods traded on a common basis for customs purposes. The HS includes item/product descriptions that appear as titles and subtitles, arranged chapters, grouped into sections. The four digits can be divided into two parts. The first two digits (HS-2) identify the chapter in which the goods are classified. The next two digits (HS-4) identify the groups in this chapter.

Sources: World Integrated Trade Solution (WITS) - 2015

Outside the primary sector, the use of RCA analysis has enabled us to identify a comparative advantage for Morocco in terms of 15 products in the food and tobacco industries, 16 mineral products, 12 products in the chemical or related industries, 61 products in the textile and leather industries, and 21 products in the mechanical, metallurgical and electrical industries (see annexes).

Conclusion:

We sought to test the effect of trade exposure on employment in Morocco. To do this, we used an input-output approach to answer a number of questions, including:

1. *What impact does trade growth have on overall and sectoral employment?*
2. *What impact does the commercial exposure of a particular sector have on overall and sectoral employment?*
3. *Do sectors with a significant effect on trade-induced employment also have a comparative advantage?*

Our results have identified a positive effect, especially in manufacturing industries. In addition, the use of RCA analysis has allowed us to identify a comparative advantage for Morocco in terms of 15 products in the food and tobacco industries, 16 mineral products, 12 products in the chemical or related industries, 61 products in the textile and leather industries, and 21 products in the mechanical, metallurgical and electrical industries.

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Annexes :

1. *Effects on total employment induced by an increase in exports of MAD1 billion (2015)*

Sectors	*Jobs created in all sectors, thanks to net exports from sector N*	*Effect within sector N*	*% of jobs created in sector N*	*Jobs created in sector N by exporting all sectors*
Agriculture, forêt et services annexes	*28 275*	*27 362*	*96,8%*	*42 263*
Pêche, aquaculture	*9 145*	*7 945*	*86,9%*	*8 216*
Industrie d'extraction	*2 252*	*1 609*	*71,4%*	*3 119*
Industries alimentaires et tabac	*12 345*	*1 109*	*9,0%*	*1 415*
Industries du textile et du cuir	*13 779*	*11 567*	*83,9%*	*11 870*
Industrie chimique et parachimique	*2 636*	*592*	*22,5%*	*765*
Industrie mécanique, métallurgique et électrique	*4 498*	*2 821*	*62,7%*	*3 635*
Autres industries manufac. hors raffinage pétrole	*4 991*	*2 968*	*59,5%*	*4 257*
Raffinage de pétrole et autres produits d'énergie	*1 693*	*142*	*8,4%*	*167*
Electricité et eau	*1 703*	*800*	*47,0%*	*996*
Bâtiment et travaux publics	*9 616*	*7 620*	*79,2%*	*8 061*
Commerce	*16 198*	*15 103*	*93,2%*	*25 256*
Hôtels et restaurants	*12 422*	*8 940*	*72,0%*	*9 651*
Transports	*7 372*	*6 556*	*88,9%*	*7 928*
Postes et télécommunications	*2 585*	*1 623*	*62,8%*	*1 726*
Activités financières et assurances	*1 723*	*1 060*	*61,5%*	*1 517*
Immobilier, location et serv. rendus entreprises	*1 924*	*1 692*	*87,9%*	*2 855*
Administration publique et sécurité sociale *Education, santé et action sociale* *Autres services non financiers*	*7 757*	*6 743*	*86,9%*	*7 218*

Sources: authors' calculations; HCP-2015 database

2. *Economy-wide employment effect following a simultaneous increase in exports and imports of sector N of 10%.*

Sectors	*Jobs losses due to imports*	*Jobs gains due to exports*	*Net effect on job creation*
Agriculture, forêt et services annexes	*54 943*	*46 065*	*-8 878*
Pêche, aquaculture	*670*	*3 502*	*2 832*
Industries alimentaires et tabac	*28 993*	*31 878*	*2 885*
Industries du textile et du cuir	*40 533*	*48 706*	*8 173*
Industrie chimique et para-chimique	*10 642*	*10 113*	*-530*
Industrie mécanique, métallurgique et électrique	*66 495*	*33 252*	*-33 243*
Autres industries manufacturières hors raffinage pétrole	*18 666*	*3 624*	*-15 041*
Raffinage de pétrole et autres produits d'énergie	*7 937*	*790*	*-7 147*
Electricité et eau	*517*	*17*	*-500*
Hôtels et restaurants	*2 702*	*161*	*-2 540*
Transports	*20 241*	*17 074*	*-3 167*
Postes et télécommunications	*415*	*1 282*	*867*
Activités financières et assurances	*286*	*220*	*-66*
Immobilier, location et services rendus entreprises	*3 844*	*5 395*	*1 551*
Administration publique et sécurité sociale *Education, santé et action sociale* *Autres services non financiers*	*6 840*	*51 638*	*44 797*

Sources: authors' calculations; HCP-2015 database

3. *Codes of Moroccan products with comparative export advantage according to the RCA, (2015, HS-1988/99 with 4 digits)*

Category of products	*Product Code*
Produits de l'agriculture et de la pêche	*0106, 0301, 0302, 0303, 0305, 0306, 0307, 0406, 0504, 0508, 0511, 0701, 0702, 0703, 0704, 0706, 0707, 0708, 0709, 0711, 0804, 0805, 0807, 0809, 0810, 0811, 0813, 0814, 0902, 0909, 0910, 1101, 1211, 1212, 1302, 1504, 1507, 1509, 1510, 1515, 1517*
Produits des industries alimentaires; boissons, liquides alcooliques et vinaigres; tabacs et succédanés de tabac fabriqués	*1604, 1605, 1701, 1703, 1704, 1902, 2001, 2005, 2008, 2101, 2102, 2104, 2301, 2402, 2403*
Produits minéraux	*2501, 2507, 2508, 2510, 2511, 2515, 2520, 2523, 2529, 2530, 2602, 2603, 2607, 2608, 2617, 2619*
Produits des industries chimiques ou des industries connexes	*2809, 2811, 2817, 2835, 2938, 3103, 3105, 3301, 3401, 3602, 3917, 4016*
Produits des industries du textile et du cuir	*4104, 4105, 4109, 4201, 4203, 4501, 4503, 4602, 4803, 4808, 4819, 5112, 5204, 5209, 5505, 5508, 5512, 5515, 5608, 5701, 5702, 5804, 5808, 6102, 6103, 6104, 6106, 6108, 6109, 6110, 6111, 6112, 6114, 6201, 6202, 6203, 6204, 6205, 6206, 6207, 6208, 6209, 6210, 6211, 6212, 6214, 6215, 6216, 6304, 6305, 6307, 6309, 6310, 6401, 6403, 6405, 6406, 6507, 6813, 6910, 6914*
Produits des industries mécaniques, métallurgiques et électriques	*7106, 7326, 7404, 7602, 7612, 7614, 7902, 8101, 8105, 8108, 8409, 8530, 8536, 8538, 8541, 8544, 8547, 8703, 8706, 8707, 8803*

Sources: World Integrated Trade Solution (WITS) – 2015