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CONTRIBUTION OF HOUSEHOLD FINAL CONSUMPTION TO GROWTH AND JOB CREATION IN MOROCCO: SIMULATION USING AN INPUT-OUTPUT MODEL

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ABSTRACT

Final demand, particularly household final consumption, is seen as a stimulus to economic activity. This study aims to measure the effect of a change in final consumption of households on, both global and sectoral, value added. Particular interest is given to determining the effect on demand of primary creditors, especially labor, in order to measure the contribution of household final consumption to the reduction of unemployment.

Input-output models, by their multiplier concept, allow us to quantify and measure the direct and indirect effects, sectoral and global, of an exogenous variation of the final demand or of one of its components including Households' final consumption.

Empirically, we used the GAMS-MINOS software as a tool, based on the SUT of the Moroccan economy for the year 2013.

Our results show that all other things being equal, an increase in household final consumption of 25% can lead to an increase in the GDP and the wage bill estimated at 19.3% and 13.4% respectively.

Keywords: Growth, Input-output analysis, multiplier, SUT, GAMS-MINOS.

INTRODUCTION

Final demand is considered, in economic theory, as one of the engines of growth (the principle of effective demand). The final consumption of Moroccan households accounts for a large share of domestic final demand, almost 54%, although its weight has fluctuated somewhat in recent years, from 58.3% in 2000 to 53.54% in 2007 and 53.60% in 2015. In terms of GDP, household final consumption expenditure accounted for more than 57% in 2015 (with 61% in 2000 and 58% in 2007). In addition, the Office of the High Commissioner for Planning (HCP) states that domestic

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demand contributed 3.3 percentage points to growth in the first quarter of 2016 and that household final consumption expenditure contributed 1.6% point.

In this paper, we propose to study and evaluate the impact of a change in the final consumption of Moroccan households on the value added of each industry as from the Morocco SUT of 2013 On the overall added value on the one hand, and on job creation at sectoral and global level on the other.

To do this, we used the input-output analysis and the multiplier concept used by Leontief that we applied to the data of the Morocco SUT of 2013 using the GAMS-MINOS software as a tool.

Thus, this paper is organized into four sections: a first presents the evolution, the structure and the contribution of household final consumption to the economy of Morocco. The second, gives a reading of the SUT of Morocco in 2013 and deduces the structure of the Moroccan economy in this year. The third recalls the input-output analysis and the Leontief multiplier concept. Whereas the fourth and final section reports the results or effects of shock simulations on household final consumption to draw lessons and recommendations at the conclusion level.

1- Final household consumption in Morocco: contribution, structure and evolution

The study of domestic final demand in the last three years (2013-2015) shows that, although it declined in 2015, its share of GDP remains high, accounting for over 77.5% of GDP Morocco at current prices (rising from 79.8% in 2013 to 80.33% in 2014) with a majority contribution to household final consumption, which alone accounts for more than 57%. Analysis of the latter's evolution shows that it has increased by 6.3% between 2013-2015, even though its growth slowed down by 3.63% between 2013-2014 to 2.58 % between 2014-2015. Moreover, the High Commission for Planning (HCP) estimates that household final consumption contributed 1.1 percentage points to growth in 2015, instead of 1.4 percentage points a year earlier, while the Gross Fixed Capital Formation (GFCF) contributed only 0.5 points. Figure 1 summarizes the evolution of the contribution of final demand components to GDP (in%) between 2013 and 2015 (Table 1 in the appendix shows the data that correspond to the figure).

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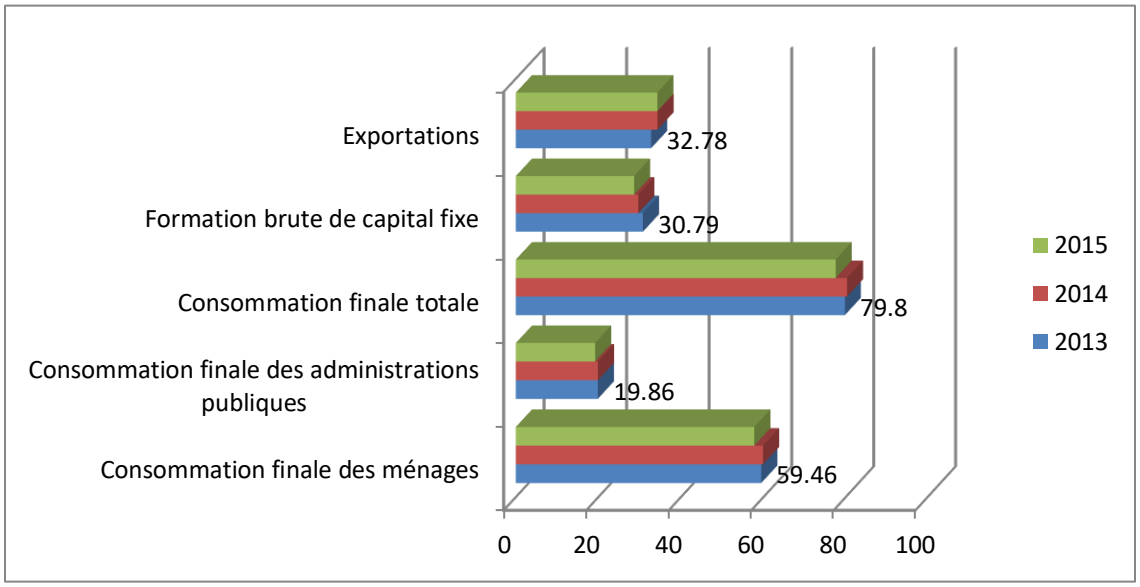
Figure 1: Evolution of the contribution (in%) of the components of the Final demand in GDP



Source: HCP data[1]

In addition, an analysis of household final consumption expenditure by industry shows that the structure of these expenditures is held steady over the period 2013-2015 and that the products of the Food Industry and Agriculture Alone accounts for more than 42% of total household final consumption expenditure in 2013 (27.8% and 14.6% respectively) followed by real estate, rental and business services, almost 9%. It should also be noted that household spending on Education, Health and Social Action does not exceed 3%, while those for Electricity and Water reach 4.2%. Figure 2 shows the structure of household final consumption expenditure in 2013.

[1] HCP: Provisional National Accounts 2015 (base 2007), June 2016.

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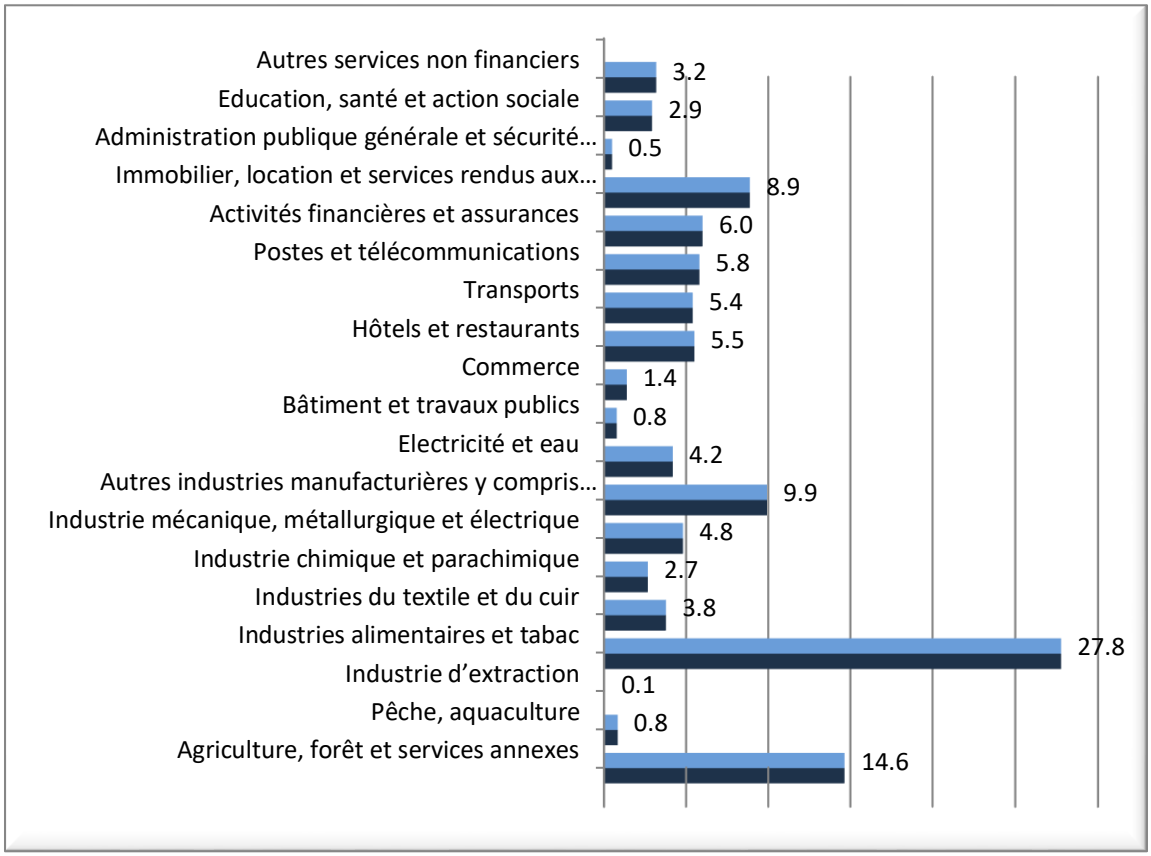
Figure 2: Household final consumption pattern (CFM), by industry (in 2013)



Source: HCP data

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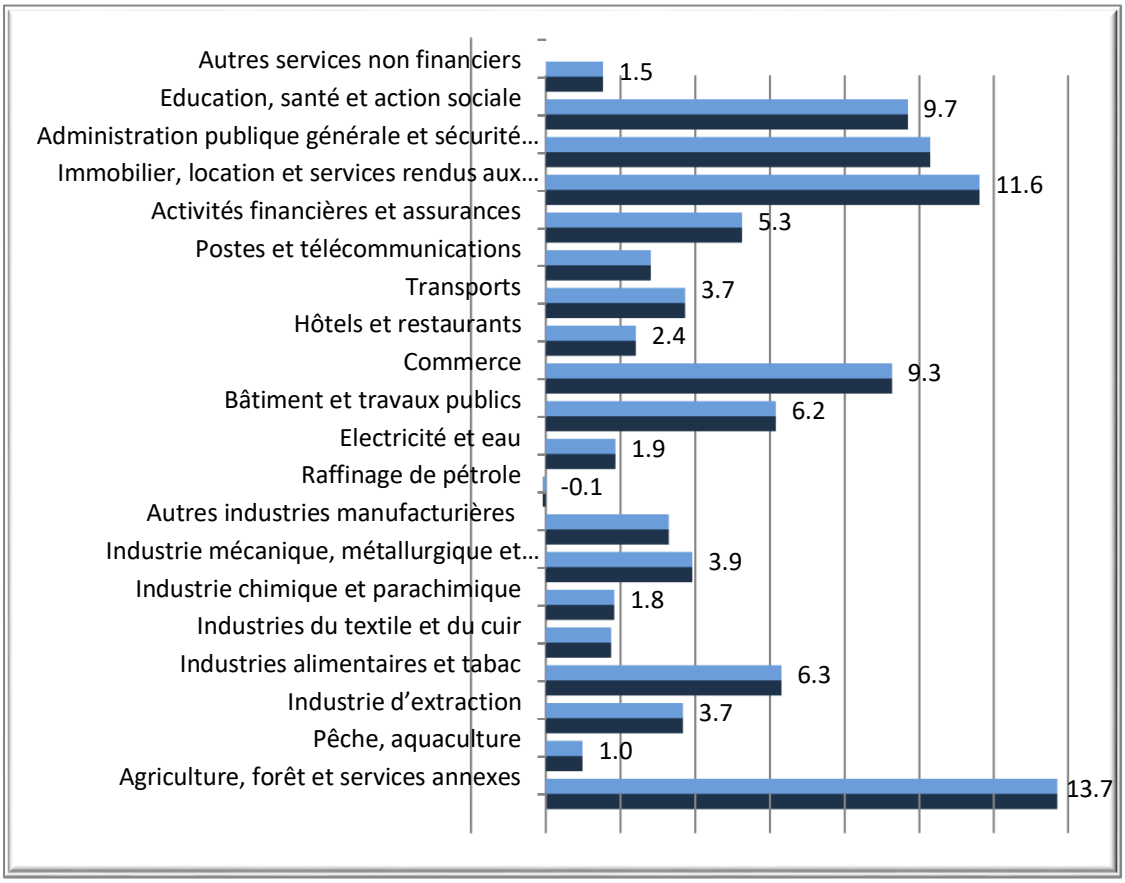
2- Structure of Morocco's economy in 2013:

The data from the ERR in 2013 show that the overall added value realized by the Moroccan economy amounted to 818 413 million dirhams whereas the overall GDP (added value increased by margins and taxes and adjusted for subsidies on products) Amounted to MAD 897,923 million, a growth rate of 4.5% compared to 2012. The contribution of each of these industries to this overall value added is shown in figure 3.

Figure 3: Relative contribution of each industry to the aggregate value added (in 2013)



This graph shows that in 2013, agriculture, forestry and ancillary services remains the most important sector, in terms of contribution to value added, accounting for almost 14%, followed by real estate, rentals and services (11.6%) and Commerce and repair (9.3%). It should also be noted that the general public administration and security and education, health and social work alone account for nearly 20% of the total added value. Oil refining, on the other hand, is negatively impacted by the difficulties experienced by the sector and the cessation of SAMIR's activities.

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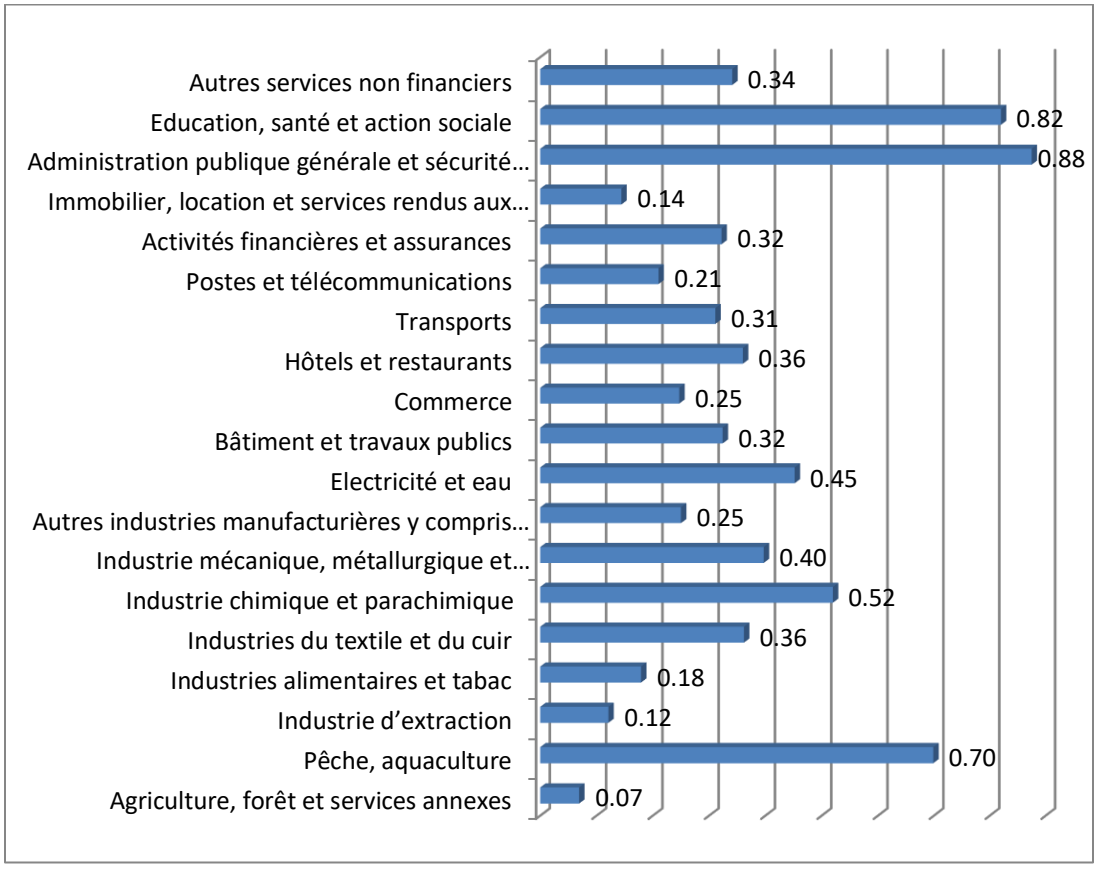
In addition, the calculation of the contribution of each branch in the remuneration of primary factors and mainly labor (more than 35% of the total added value) shows that the General Public Administration and Education, Health and Social Action respectively 25% and 22.2% of the total payroll, followed by Commerce and Repair (6.5%) and Construction and Public Works (5.6%).

Moreover, at the level of each branch of activity, the coefficient of the payroll in value added varies by more than 0.82 for the general public administration (0.88) and education, health and social work (0, 82) to 0.25 for Trade and Other Manufacturing including Refining and less than 0.07 for Agriculture, Forestry and Related Services. Figure 4 summarizes this information.

Figure 4: Share of the wage bill in the value added of each branch Of activity (in 2013)



Source: HCP data

3- Leontief input-output and multiplier analysis:

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The input-output analysis, in its preliminary version, makes it possible to use the interrelations between the different branches of activity of a given economy in order to simulate the impact of an exogenous variation in final demand, One of its components. It is based on a simple criterion, that of proportionality, in order to deduce multipliers of final demand from a basic accounting framework (the ERR). We can distinguish between direct effects (matrix A(a_{ij}) called Leontief) and indirect effects (matrix $R(r_{ij}) = (I - A)^{-1}$ called the Leontief multiplier or simple input multiplier).

The coefficient a_{ij} of the matrix A is called the technical coefficient and represents the quantity of the product i necessary to produce a unit of the product j either:

$a_{ij} = \frac{CI_{ij}}{XB_j}$ où XB_j: *The production of branch j and*

CI_{ij}: *The intermediate consumption of the branch j into product i*

Whereas the coefficient r_{ij} of the matrix R represents the quantity of the product i directly and indirectly necessary to satisfy a unit of the final demand for product j. This coefficient also makes it possible to measure the link between the branches of activity and to determine, by the linkage techniques, the most anchored and influential branches in a given economy (key branch producing the quota effect) The highest).

Indeed, the basic principle of the input-output model is to respect the resource-employment balance for each product i of the economy (the number of products being equal to the number of branches of activity) taking into consideration the difference Between the base price and the purchase price. This amounts to deducting jobs, margins and taxes from distribution and adding subsidies on products. The resource-employment equation for a product i is then written:

$$\boldsymbol{XP_i = \sum_{j=1}^{n} CI_{ij} + DF_i - M_i - MT_i - MC_i - IT_i + Sub_i \qquad i = 1, \dots n} \quad (1)$$

Où : XP_i = The total internal production of product i, at the basic price ($XP_i = \sum_{j=1}^{n} P_{ij}$);

$\sum_{j=1}^{n} CI_{ij}$ = The intermediate demand, by all branches of activity, of the product i ;

DF_i = The total final demand on commodity i, including exports ;

M_i = Imports of the product i ;

MT_i = The transport margin on the product i;

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MC_i = The margin on the product i ;

IT_i = Taxes and duties on product i, including VAT ;

Sub_i = Subsidies on the product i.

This equation is transformed into a Leontief model, if we introduce the equation that binds the intermediate consumption to the production of the branch. Either the behavioral equation of production:

$$\boldsymbol{CI_{ij} = a_{ij}\, XB_j} \quad With\, XB_j\ the\ total\ output\ of\ branch\ j \quad \textbf{(2)}^2$$

Let us not forget to point out that in this case there is a difference between the production of the branch of activity (XB_j) and the output of the product j (XP_j) since, according to the construction of ERRs, a product j Be manufactured by several branches at once and a branch can produce several products at once. It is then a production matrix $P(p_{ij})$ and not a vector so that:

$$\boldsymbol{XB_j = \sum_i P_{ij}} \qquad et \qquad \boldsymbol{XP_i = \sum_j P_{ij}} \qquad \textbf{(3)}$$

We can prove that XB_j can also be written:

$$XB_j = \sum_i \frac{P_{ij}}{\sum_k P_{ik}} \times \sum_k^i p_{ik} \ , \text{k=1,…,n}$$

From where : $$\boldsymbol{XB_j = \sum_i \left(\beta_{ij} \times XP_i\right)} \text{ et } \beta_{ij} = \frac{\boldsymbol{P_{ij}}}{\boldsymbol{\sum_j P_{ij}}} \qquad \textbf{(4)}$$

Equation (4) makes it possible to deduce XB_j from XP_i _ (i).

From the production of each branch, one can deduce its added value (VA_j):

$$\boldsymbol{VA_j = XB_j - \sum_{i=1}^{n} a_{ij} XB_j} \qquad \textbf{(5)}$$

The latter makes it possible to calculate the salary remuneration *(RS_j)*:

$\boldsymbol{RS_j = cms_j\, VA_j}$ **(6)** or $\boldsymbol{cms_j = \frac{RS_j}{VA_j}}$ Coefficient of payroll in VA_j

4- Effects of the change in household final consumption

[2] This is a Leontief production technique where the factors are complemenSUTy.

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We consider that all final demand is exogenous, including final household consumption. This is, therefore, the case of an open model of Leontief. The model was solved using the Gams-Minos software and initialized and calibrated on the basis of data from the Morocco SUT for the year 2013 as published by the HCP.

It should be noted, however, that some adjustments to this ERR were necessary in order to adapt it to the requirements of the calculation. This is the processing of the 'territorial correction' line, which has been canceled by adding it to the 'post and telecommunication' line and making all the adjustments resulting therefrom in order to rebalance the ERR.

The results of the shock introduced on household final consumption (25% increase in the CFM of all products) are:

4-1- Change in value added:

The calculation of the change in the value added of the branches of activity shows that all branches of activity have experienced an increase in their value added. The magnitude of this variation is variable and depends on the integration of the branch into the economy and hence the multiplier effect. (72%) followed by Posts and Telecommunications (almost 53%), Oil and Other Refining (over 47%) and Textile and Leather Almost 46%). The lowest effect is experienced by the Buildings and Public Works (1.4%) and General Public Administration (2.6%) sectors.

Gross domestic product, on the other hand, recorded a positive change of 166,761.750 million dirhams, an increase of 19.3%, or, what still means, a GDP increase of 1.15 dh for each additional dirham devoted To household final consumption. Table 1 shows the relative change (in%) in the value added of all industries (Tables 2 and 3 of the Annex give the changes in value added and output of the industries).

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Table 1: Relative change (in%) in the VA of the industries

Code	Industry	ΔVA (en %)	Code	Industry	ΔVA (en %)
A00	Agriculture, hunting and related services	23	F45	Buildings and public works	1
B05	Fishing, aquaculture	21	G00	Trade and repair	20
C00	Extraction industry	72	H55	Hotels and restaurants	24
D01	Food and tobacco industry	25	I01	Transports	30
D02	Textile and leather industry	46	I02	Post and telecommunications	53
D03	Chemical and parachemical industry	20	J00	Financial and insurance activities	22
D04	Mechanical, metallurgical and electrical industry	16	K00	Real estate, renting and business activities	16
D05	Other Manufacturing	17	L75	General public administration ..	3
D06	Oil and other refining	47	MN0	Education, health and social work	5
E00	Electricity and water	25	OPO	Other non-financial services	22

4-2- Change in payroll:

Salary remuneration is an important component of value added (income optics) since each increase in value added generates new income distribution, in particular wages, which could lead to the creation of new jobs.

The linkage of wage earnings of an industry to its added value, by a payroll ratio (equation 6 above), allowed us to deduct the additional wages distributed by the industry for each increase in its wage Added value. This can give an idea of the number of potential jobs that could be created by the branch, if one considers an average wage at the branch level.

Our results show an increase in the wage bill distributed by each branch of activity (Table 2 below). Using the HCP data for the employed labor force enables us to estimate the average wage by industry and to deduce the number of additional jobs created. The result of this estimate is broken down in the column 'Employment' in Table 2. Figure 5 summarizes and better visualizes the same result.

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Table 2: Change in payroll (RS) and employment by branch of activity

Code	Branche	ΔRS	Emploi	Code	Branche	ΔRS	Emploi
A00	Agriculture, hunting and related services	1798	399561	F45	Buildings and public works	237	52626
B05	Fishing, aquaculture	1166	259198	G00	Trade and repair	3733	829639
C00	Extraction industry	2620	582293	H55	Hotels and restaurants	1726	383471
D01	Food and tobacco industry	2299	510996	I01	Business	2819	626452
D02	Textile and leather industry	2474	549762	I02	Post and telecommunicatio ns	2562	569268
D03	Chemical and parachemical industry	1652	367073	J00	Financial and insurance activities	3010	668952
D04	Mechanical, metallurgical and electrical industry	1932	429430	K00	Real estate, renting and business activities	2260	502208
D05	Other Manufacturing	1151	255838	L75	General public administration ..	1928	428392
D06	Oil and other refining	278	61688	MN0	Education, health and social work	3032	673789
E00	Electricity and water	1718	381775	OPO	Other non-financial services	942	209326

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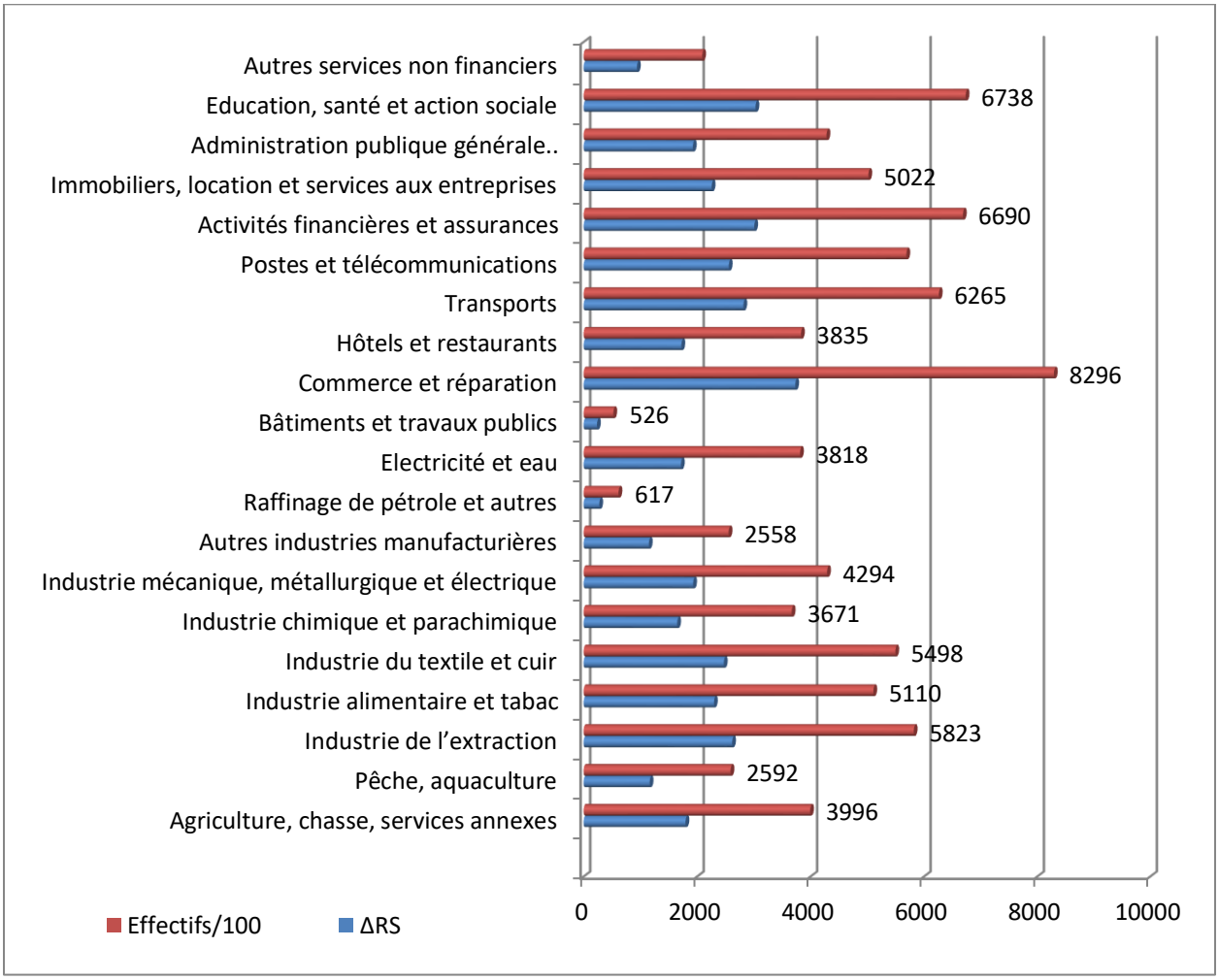

Figure 5: Change in payroll and workforce

By industry

We find that the most creative sectors of employment are, Commerce and repair (9.5%), Transport, financial and insurance activities and Education, health and social work (more than 7%) come after. Food and tobacco, Post and telecommunications and Real estate, rental and services to businesses (6%). Agriculture, the general public administration and the mechanical, metallurgical and electrical industries contributed less than 5%. The sectors with the lowest contribution to job creation are Oil and Other Refining (0.7%) and Construction and Public Works (0.6%).

At the aggregate level, we have resulted in an increase in the total wage bill estimated at DH 39,338 million (13.4%), corresponding to DH 0.27 for each additional dirham of final household

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consumption or 8,742 thousand jobs created, if we consider an average monthly salary of 4,500 DH, less than double the minimum guaranteed inter-professional wage (SMIG) in 2012.

It should also be pointed out that the input-output model in the version we adopt in this paper considers that the final consumption of households is exogenous and consequently does not make it possible to evaluate the effect of the change in income (in The occurrence of wages) on household expenditure, which gives an underestimation of the multiplier effect.

CONCLUSION

Final demand and household final consumption are particularly stimulating economic activity. The input-output model, which we have used, has highlighted the role of household final consumption in stimulating economic activity both at global (GDP growth of 19.5%) and sectorally (increase Of the value added of all industries). As a result, an overall payroll increase of 13.4%.

However, as has been pointed out, the input-output model does not capture the effect of income variation on consumption and does not take into account agent behavior. This constitutes a major limitation of this type of model. Furthermore, the SUT, the source of our data, has not been corrected for imports, which does not fail to affect the results.

Conflict of Interest: None.

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Annex:

Table 1: Trends in final demand components and their contributions to GDP between 2013-2015

Valeurs en 10^6 dhs courants

% par rapport au PIB

	2013		2014		2015	
	Valeur	**%**	**Valeur**	**%**	**valeur**	**%**
Household final consumption	533903	59,46	553287	59,90	567535	57,78
Government final consumption	178309	19,86	183841	19,90	188720	19,21
Final Consumption	**716454**	79,80	**742051**	80,33	**761694**	77,55
Gross fixed capital formation	276496	30,79	274028	29,67	281492	28,66
Exports	294318	32,78	317129	34,33	336846	34,29
PIB	**897923**	-	**923696**	-	**982223**	-

Source: HCP data

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Table 2: Change in VA of Industries

Code	Branche	ΔVA	Code	Branche	ΔVA
A00	Agriculture, hunting and related services	25670,75	F45	Buildings and public works	727,72
B05	Fishing, aquaculture	1660,10	G00	Trade and repair	14904,41
C00	Extraction industry	21603,58	H55	Hotels and restaurants	4787,38
D01	Food and tobacco industry	12767,87	I01	Business	9003,70
D02	Textile and leather industry	6545,49	I02	Post and telecommunications	12149,75
D03	Chemical and parachemical industry	2941,88	J00	Financial and insurance activities	9351,72
D04	Mechanical, metallurgical and electrical industry	5160,94	K00	Real estate, renting and business activities	15601,78
D05	Other Manufacturing	3119,41	L75	General public administration ..	2208,43
D06	Oil and other refining	-317,18	MN0	Education, health and social work	3696,13
E00	Electricity and water	3782,00	OPO	Other non-financial services	2763,97

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Table 3: Change in Production (Prod.) By Industry

Code	Branche	ΔProd.	Code	Branche	ΔProd.
A00	Agriculture, hunting and related services	38743	F45	Buildings and public works	1795
B05	Fishing, aquaculture	2586	G00	Trade and repair	22880
C00	Extraction industry	27560	H55	Hotels and restaurants	7829
D01	Food and tobacco industry	40132	I01	Business	18665
D02	Textile and leather industry	23575	I02	Post and telecommunications	18045
D03	Chemical and parachemical industry	10949	J00	Financial and insurance activities	13486
D04	Mechanical, metallurgical and electrical industry	17793	K00	Real estate, renting and business activities	18143
D05	Other Manufacturing	12577	L75	General public administration ..	3039
D06	Oil and other refining	22556	MN0	Education, health and social work	4213
E00	Electricity and water	7969	OPO	Other non-financial services	3786

