

Royaume du Maroc



A Practitioner's Guide for Building the Interregional Input-Output System for Morocco, 2013

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* . This structure of this report draws on Haddad et al. (2011).

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Abstract

This paper reports on the recent developments in the construction of an interregional input-output matrix for Morocco (IIOM-MOR). As part of an ongoing project that aims to specify and calibrate an interregional CGE (ICGE) model for the country, a fully specified interregional input-output database was developed under conditions of limited information. Such database is needed for future calibration of the ICGE model. We conduct an analysis of the intraregional and interregional shares for the average total output multipliers. Furthermore, we also show detailed figures for the output decomposition, taking into account the structure of final demand.

A Practitioner's Guide for Building the Interregional Input-Output System for Morocco, 2013

1. Introduction

This paper reports on the recent developments in the construction of an interregional input-output matrix for Morocco (IOM-MOR). As part of an ongoing project that aims to develop an interregional CGE (ICGE) model for the country, a fully specified interregional input-output database was developed under conditions of limited information. Such database is needed for future calibration of the ICGE model. This research venture is part of a technical cooperation initiative involving researchers from the Regional and Urban Economics Lab at the University of São Paulo (NEREUS), in Brazil, the OCP Policy Center and Studies and Financial Forecasts Department¹, in Morocco.

The IOM-MOR provides the opportunity to better understand the spatial linkage structure associated with the Moroccan economy in the context of its 12 regions, and 20 different sectors/products (Figure 1).²

This report describes the process by which the IOM-MOR was constructed under the conditions of limited information for the regions in Morocco. In what follows, we will summarize the main tasks and working hypotheses involved in the treatment of the initial database that was used in the construction process of the system.

Figure 1. Schematic Structure of the IOM-MOR

		ABSORPTION MATRIX				
		1	2	3	4	5
		Producers	Investors	Household	Export	Government
Size		J x Q	J x Q	Q	1	Q
Basic Flows	I x S	BAS1	BAS2	BAS3	BAS4	BAS5
Margins	I x S x R	MAR1	MAR2	MAR3	MAR4	MAR5
Taxes	I x S	TAX1	TAX2	TAX3	TAX4	TAX5
Labor	1	LABR				
Capital	1	CPTL				
Other costs	1	OCTS				

J sectors; Q regions; I products; S sources; R margins

1. Attached to Moroccan Ministry of Economy and Finance.

2. See the Technical Appendix for the list of regions and sectors.

2. Initial Data Treatment

In this section we present the main hypotheses and procedures applied to estimate the interregional input-output matrix for Morocco (IIOM-MOR). As mentioned before, the IIOM-MOR was estimated under conditions of limited information. We used data of national and regional accounts provided by the following sources:

- High Commission for Planning for national accounts which consist mainly in the Supply and Use Tables (SUT), employment and final consumption of households at the regional level.
- Studies and Financial Forecasts Department from Ministry of Economy and Finance for data on sectoriel value added and production at the regional level.
- Ministry of Industry, Investment, Trade, and Digital Economy for data on exports of the industrial sector at the regional level.
- Exchange Office for data on exports at the regional level.

The first step was to estimate an input-output matrix for the whole country from the SUT. The main aspect in this procedure is to transform the economic flows of the SUT, which are valued at market prices, into economic flows valued at basic prices. We adapted the methodology developed by Guilhoto and Sesse Filho (2005) for a similar exercise applied for Brazil. There are at least two main advantages of this method: (i) first, it requires only data from the SUT; and (ii) second, the production multipliers are not significantly affected by these procedures when compared with the “real” input-output matrix. The procedure used in this work is described as follows:

1. The allocation of margins and indirect taxes for all users (intermediate consumption, investment demand, household consumption, government consumption, and exports) was estimated based on shares calculated from the sales structure of the Use Table. The underlying hypothesis is that margins coefficients and tax rates on products are the same for all users.

2. Similarly, the allocation of imports for all users (except exports) was also estimated based on shares calculated from the sales structure of the Use Table.

3. These values were then deducted from the Use Table originally evaluated at market prices to obtain a new Use Table now evaluated at basic prices.

4. The structure of the Make Table was then used to transform the new Use Table from a commodity by sector into a sector by sector system of information.

All these economic flows can then be organized in the form of an Absorption (Use) Matrix as presented in Figure 2.

Figure 2. Structure of the National Input-Output System for Morocco: Summary Results, 2013
(in million DHS)

			Intermediate consumption				Investment demand	Household consumption	Exports	Government consumption	Statistical discrepancies	TOTAL			
			Dim.	1	2	... 20	1	1	1	1	1				
Basic flows	Domestic	1													
		2													
		...													
		20		384,216		180,257		416,546		209,975		174,771	51,478	1,417,242	
	Imported	1													
		2													
		...													
		20		252,210		60,248		117,216		0		1,951	0	431,626	
Margins	Trade	1													
		2													
		...													
		20		42,594		9,859		28,566		15,142		411	0	96,572	
	Transport	1													
		2													
		...													
		20		3,967		610		1,506		1,159		31	0	7,273	
Ind. taxes	Total	1													
		2													
		...													
		20		16,244		22,418		24,570		7,386		1,145	0	71,763	
	Labor payments				293,755		0		0		0		0	293,755	
	Capital payments				517,364		0		0		0		0	517,364	
	Other costs				10,737		0		0		0		0	10,737	
	Total				1,521,087		273,392		588,404		233,662		178,309	51,478	2,846,332

The second step was to disaggregate the national data into the 12 regions of Morocco. The details of such procedures are described in the technical appendix. We focus the subsequent discussion on some of the relevant summary figures embedded in the IIOM-MOR.

Given the regional macroeconomic identity, the components of the Gross Regional Product (GRP) are the usual components of GDP (at the national level) plus the interregional trade balance. In the case of Morocco, the information at the regional level consists only of sectoral activity level variables, such as gross output, value added, final household consumption and employment. The components of the regional macroeconomic identity had to be estimated.

$$GRP = C + I + G + (X - M)_{ROW} + (X - M)_{DOM} \quad (1)$$

where

C = household consumption

I = investment demand

G = government consumption

$(X - M)_{ROW}$ = international trade balance with the rest of the world

$(X - M)_{DOM}$ = interregional trade balance with the domestic economy

We used shares calculated from specific variables to estimate the regional value of some components of equation (1): household consumption, investment demand and government consumption. For each component, the variables used to calculate the shares were the following:

1. Household consumption: *Household final consumption expenditure (by 12 regions)*

2. Investment demand: *Production of building and public works (In millions of dirhams)*

3. Government consumption: *Employed labor force by branch and for general administration*

The values for international exports for manufactured products were obtained directly from the *Ministry of Industry, Investment, Trade, and Digital Economy*. For the remaining products/sectors, we have relied on the location quotient approach to distribute exports across regions.

Table 1 presents these shares, including those for international exports. A general result is the spatial concentration of aggregate demand, which is very likely influenced by the distribution of economic activity and population over the regions. Grand Casablanca-Settat, together with Rabat-Salé-Kénitra, Tanger-Tetouan-Al Hoceima and Marrakech-Safi, concentrate almost 60% of the national household consumption and investment demand. Export demand is concentrated in Grand Casablanca-Settat (close to 50% of national exports) while government demand is concentrated in Rabat-Salé-Kénitra (about 30% of the total).

Table 1. Shares used to Estimate the Components of the GRP of Morocco, 2013

	<i>Investment demand</i>	<i>Household demand</i>	<i>Exports</i>	<i>Government demand</i>
R1 Tanger-Tetouan-Al Hoceima	0.1207	0.1189	0.1639	0.0499
R2 Oriental	0.0959	0.0802	0.0393	0.0635
R3 Fès-Meknès	0.0890	0.1171	0.0482	0.0984
R4 Rabat-Salé-Kénitra	0.1276	0.1291	0.0787	0.3046
R5 Béni Mellal-Khénifra	0.0670	0.0614	0.0670	0.0518
R6 Grand Casablanca-Settat	0.2005	0.2234	0.4915	0.1511
R7 Marrakech-Safi	0.1470	0.1176	0.0461	0.0934
R8 Drâa-Tafilalet	0.0587	0.0392	0.0075	0.0338
R9 Souss-Massa	0.0593	0.0759	0.0257	0.0451
R10 Guelmim-Oued Noun	0.0093	0.0116	0.0071	0.0398
R11 Laayoune-Sakia El Hamra	0.0228	0.0114	0.0129	0.0558
R12 Dakhla-Oued Eddahab	0.0022	0.0143	0.0120	0.0128
TOTAL	1.0000	1.0000	1.0000	1.0000

Source: Calculations by the authors.

In order to regionalize the national IO table, we have relied on an adapted version of the Chenery-Moses approach (Chenery, 1956; Moses, 1955), which assumes, in each region, the same commodity mixes for different users (producers, investors, households and government) as those presented in the national input-output tables. For sectoral cost structures, if data availability allows, value added generation may be different across regions. Trade matrices for each commodity are used to disaggregate the origin of each commodity in order to capture the structure of the spatial interaction in the Moroccan economy. In other words, for a given user, say agriculture sector, the mix of intermediate inputs will be the same in terms of its composition, but it will differ from the regional sources of supply (considering the 12 regions of the model and foreign imports).

The strategy for estimating the trade matrices (one for each sectoral commodity in the system) included the following steps.

1. We have initially estimated total supply (output) of each sectoral commodity by region, excluding exports to other countries. Thus, for each region, we obtained information for the total sales of each commodity for the domestic markets such that:

$Supply(c,s)$ = supply for the domestic markets of commodity c by region s

2. Next, we have estimated total demand, in each region, for each sector. To do that, we have assumed the respective user's structure of demand followed the national pattern. With the regional levels of sectoral production, investment demand, household demand and government demand, we have estimated the initial values of total demand for each commodity in each region, from which the demand for imported commodities were deducted. The resulting estimates, which represent the regional total demand for Moroccan goods, were then adjusted so that, for each commodity, demand across regions equals supply across regions, i.e.:

$$\sum_s Supply(c, s) = \sum_d Demand(c, d) \quad (2)$$

where Demand(c,d) = demand of commodity c by region d

3. With the information for Supply(c,s) and Demand(c,d), the next step was to estimate, for each commodity c, matrices of trade (12x12) representing the transactions of each commodity between origin and destination, SHIN(c,s,d). We have relied on the methodology described in Dixon and Rimmer (2004). The procedure considered the following steps:

a) For the diagonal cells, equation (3) was implemented, while for the off-diagonal elements, equation (4) is the relevant one:

$$SHIN(c, d, d) = Min \left\{ \frac{Supply(c, d)}{Demand(c, d)}, 1 \right\} * F(c) \quad (3)$$

$$SHIN(c, o, d) = \left\{ \frac{1}{(Time(s, d))^\beta} \cdot \frac{Supply(c, s)}{\sum_{k=1}^{12} Supply(c, k)} \right\} * \left\{ \frac{1 - SHIN(c, d, d)}{\sum_{j=1, j \neq d}^{12} \left[\frac{1}{(Time(s, d))^\beta} \cdot \frac{Supply(c, j)}{\sum_{k=1}^{12} Supply(c, k)} \right]} \right\} \quad (4)$$

where c refers to a given commodity, and s and d represent, respectively, origin and destination regions.

The variable Time(s,d) refers to the travel time between two trading regions.³ The factor F(c) gives the extent of tradability of a given commodity. For the non-tradables (usually services), typically assumed to be locally provided goods, we have used values close to unity for F(c), adopting a usual assumption (0.90), while for tradables, the value of F(c) was set to 0.5.

It can be shown that the column sums in the resulting matrices add to one. What these matrices show are the supply-adjusted shares of each region in the specific commodity demand by each region of destination.

Once these share coefficients are calculated, we then distribute the demand of commodity c by region d

3. See "Technical Note 1: Morocco GIS Data".

(Demand(c,d)) across the corresponding columns of the SHIN matrices. Once we adopt this procedure, we have to further adjust the matrices to make sure that supply and demand balance out. This is done through a RAS procedure (for specific details of this method, see Miller and Blair, 2009).

Tables 2 to 4 show the resulting structure of trade in the IOM-MOR (aggregated across commodities). We have also included regional demand for imported commodities (last row), estimated considering the structure of demand according to the national pattern, and the international exports by region (last column).

In the next section, we continue to evaluate the general structure of the IOM-MOR, described in terms of summary indicators. An evaluation of the production linkages follows, based on the intermediate consumption flows, providing a brief comparative analysis of the economic structure of the regions. Traditional input-output methods are used in an attempt to uncover similarities and differences in the structure of the regional economies.

Table 2. Interregional Trade in Morocco, 2013 (in DHS millions)

		DESTINATION													TOTAL
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	EXP	
ORIGIN	R1	69,980	2,187	3,537	3,911	1,218	12,832	2,171	1,224	1,479	282	565	414	20,098	119,898
	R2	2,681	54,731	3,813	2,401	995	7,686	1,414	1,335	1,068	225	583	409	8,447	85,785
	R3	5,956	5,656	81,361	6,755	2,346	18,203	2,860	2,768	1,956	408	904	636	9,157	138,967
	R4	7,778	3,291	6,460	111,369	2,753	37,929	4,284	2,065	2,505	625	1,117	686	17,403	198,266
	R5	2,018	1,189	2,394	2,673	39,855	18,271	4,089	997	2,038	270	537	359	15,242	89,932
	R6	34,753	18,362	27,080	52,858	19,104	215,240	35,012	10,375	16,944	3,220	4,212	2,862	120,080	560,102
	R7	3,899	2,319	3,308	5,759	4,330	25,670	85,581	1,774	4,588	832	1,360	839	10,513	150,771
	R8	1,056	810	1,655	1,131	693	4,768	1,080	23,678	835	113	287	198	1,466	37,769
	R9	2,974	2,088	2,540	3,767	2,187	12,059	5,128	1,421	55,014	1,923	1,732	983	5,838	97,655
	R10	295	175	257	376	188	1,094	430	131	943	10,547	342	152	1,742	16,670
	R11	438	269	365	437	209	2,729	497	179	540	201	14,457	314	2,847	23,483
	R12	80	63	89	79	43	236	80	38	96	23	90	3,730	2,609	7,257
	IMP	48,842	26,748	37,534	47,529	21,206	160,187	41,340	12,627	23,625	3,651	5,759	2,579	0	431,626
TOTAL		180,749	117,887	170,393	239,045	95,127	516,904	183,965	58,612	111,628	22,321	31,946	14,161	215,444	1,958,182

Source: Calculations by the authors.

Table 3. Interregional Trade in Morocco: Purchases Shares, 2013

		DESTINATION													TOTAL
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	EXP	
ORIGIN	R1	0.387	0.019	0.021	0.016	0.013	0.025	0.012	0.021	0.013	0.013	0.018	0.029	0.093	0.061
	R2	0.015	0.464	0.022	0.010	0.010	0.015	0.008	0.023	0.010	0.010	0.018	0.029	0.039	0.044
	R3	0.033	0.048	0.477	0.028	0.025	0.035	0.016	0.047	0.018	0.018	0.028	0.045	0.043	0.071
	R4	0.043	0.028	0.038	0.466	0.029	0.073	0.023	0.035	0.022	0.028	0.035	0.048	0.081	0.101
	R5	0.011	0.010	0.014	0.011	0.419	0.035	0.022	0.017	0.018	0.012	0.017	0.025	0.071	0.046
	R6	0.192	0.156	0.159	0.221	0.201	0.416	0.190	0.177	0.152	0.144	0.132	0.202	0.557	0.286
	R7	0.022	0.020	0.019	0.024	0.046	0.050	0.465	0.030	0.041	0.037	0.043	0.059	0.049	0.077
	R8	0.006	0.007	0.010	0.005	0.007	0.009	0.006	0.404	0.007	0.005	0.009	0.014	0.007	0.019
	R9	0.016	0.018	0.015	0.016	0.023	0.023	0.028	0.024	0.493	0.086	0.054	0.069	0.027	0.050
	R10	0.002	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.008	0.473	0.011	0.011	0.008	0.009
	R11	0.002	0.002	0.002	0.002	0.002	0.005	0.003	0.003	0.005	0.009	0.453	0.022	0.013	0.012
	R12	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.003	0.263	0.012	0.004
	IMP	0.270	0.227	0.220	0.199	0.223	0.310	0.225	0.215	0.212	0.164	0.180	0.182	0.000	0.220
TOTAL		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Source: Calculations by the authors.

Table 4. Interregional Trade in Morocco: Sales Shares, 2013

		DESTINATION													TOTAL
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	EXP	
ORIGIN	R1	0.584	0.018	0.030	0.033	0.010	0.107	0.018	0.010	0.012	0.002	0.005	0.003	0.168	1.000
	R2	0.031	0.638	0.044	0.028	0.012	0.090	0.016	0.016	0.012	0.003	0.007	0.005	0.098	1.000
	R3	0.043	0.041	0.585	0.049	0.017	0.131	0.021	0.020	0.014	0.003	0.007	0.005	0.066	1.000
	R4	0.039	0.017	0.033	0.562	0.014	0.191	0.022	0.010	0.013	0.003	0.006	0.003	0.088	1.000
	R5	0.022	0.013	0.027	0.030	0.443	0.203	0.045	0.011	0.023	0.003	0.006	0.004	0.169	1.000
	R6	0.062	0.033	0.048	0.094	0.034	0.384	0.063	0.019	0.030	0.006	0.008	0.005	0.214	1.000
	R7	0.026	0.015	0.022	0.038	0.029	0.170	0.568	0.012	0.030	0.006	0.009	0.006	0.070	1.000
	R8	0.028	0.021	0.044	0.030	0.018	0.126	0.029	0.627	0.022	0.003	0.008	0.005	0.039	1.000
	R9	0.030	0.021	0.026	0.039	0.022	0.123	0.053	0.015	0.563	0.020	0.018	0.010	0.060	1.000
	R10	0.018	0.010	0.015	0.023	0.011	0.066	0.026	0.008	0.057	0.633	0.021	0.009	0.104	1.000
	R11	0.019	0.011	0.016	0.019	0.009	0.116	0.021	0.008	0.023	0.009	0.616	0.013	0.121	1.000
	R12	0.011	0.009	0.012	0.011	0.006	0.032	0.011	0.005	0.013	0.003	0.012	0.514	0.360	1.000
	IMP	0.113	0.062	0.087	0.110	0.049	0.371	0.096	0.029	0.055	0.008	0.013	0.006	0.000	1.000
TOTAL		0.092	0.060	0.087	0.122	0.049	0.264	0.094	0.030	0.057	0.011	0.016	0.007	0.110	1.000

Source: Calculations by the authors.

3. Structural Analysis

In this section, some of the main structural features of the economy of Morocco are revealed through the use of indicators derived from the IIOM-MOR. An analysis of output composition, and sales and purchases shares is presented, considering intermediate demand, final demand, and value added transactions.

3.1. Output Composition

Table 5 presents the regional output shares for the regions in Morocco. Grand Casablanca-Settat dominates the national production, with a share of 35.7% in total output, followed by Rabat-Salé-Kénitra (13.0%), Marrakech-Safi (9.9%), Fès-Meknès (9.2%) and Tanger-Tetouan-Al Hoceima (8.8%).

The regional output shares by sectors in Morocco reveal some evidence of spatial concentration of specific activities: agriculture in Fès-Meknès, Marrakech-Safi, Rabat-Salé-Kénitra, Grand Casablanca-Settat, and Béni Mellal-Khénifra (69.7% of total output); fishing in Souss-Massa, Dakhla-Oued Eddahab, Guelmin-Oued Noun and Laayoune-Sakia El Hamra (79.0%); mining in Béni Mellal-Khénifra and Marrakech-Safi (78.0%), manufacturing in Grand Casablanca-Settat, where at least 50% of the output is generated for each of the sectors. Some regions play important role in the production of specific manufacturing sectors, such as food industry in Souss-Massa (12.6%) and Fès-Meknès (9.9%); textile and leather in Tanger-Tetouan-Al Hoceima (21.3%) and Fès-Meknès (11.3%); and mechanical, metal and electrical products in Tanger-Tetouan-Al Hoceima (26.4%). Services, in general, are concentrated in Rabat-Salé-Kénitra and Grand Casablanca-Settat. However, Marrakech-Safi and Souss-Massa concentrate the major part of tourism services (36.8% and 26.4%, respectively).

Table 6 shows the sectoral shares in regional output, revealing the important role of some activities in relatively specialized regions: the dominant role of agriculture in Drâa-Tafilalet (27.5% of total regional output), Béni Mellal-Khénifra (25.6%) and Fès-Meknès (21.7%); fishing in Dakhla-Oued Eddahab (38.6%); mining in Béni Mellal-Khénifra (21.1%); food industry in Souss-Massa (21.1%); and the relevance of the public administration in the more remote regions of the south: Guelmin-Oued Noun (28.0%), Laayoune-Sakia El Hamra (27.7%) and Dakhla-Oued Eddahab (20.7%).

Relative regional specialization can also be assessed by the calculation of the sectoral location quotients, as presented in Table 7. The highlighted cells identify sectors relatively concentrated in specific regions, i.e. sectors for which their share in total regional output is greater than the respective shares in national output (location quotient greater than unit).

Table 5. Regional Structure of Sectoral Output: Morocco, 2013

		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	TOTAL
A00	Agriculture, forestry, hunting, related services	0.078	0.083	0.178	0.123	0.134	0.130	0.131	0.061	0.070	0.011	0.000	0.000	1.000
B05	Fishing, aquaculture	0.098	0.021	0.000	0.012	0.000	0.042	0.038	0.000	0.328	0.122	0.119	0.221	1.000
C00	Mining industry	0.000	0.030	0.005	0.019	0.508	0.002	0.271	0.089	0.001	0.000	0.075	0.000	1.000
D01	Food industry and tobacco	0.053	0.018	0.099	0.056	0.036	0.523	0.058	0.004	0.126	0.007	0.015	0.006	1.000
D02	Textile and leather industry	0.213	0.008	0.113	0.101	0.000	0.540	0.022	0.000	0.001	0.000	0.000	0.000	1.000
D03	Chemical and para-chemical industry	0.027	0.010	0.031	0.051	0.003	0.753	0.093	0.001	0.015	0.000	0.016	0.000	1.000
D04	Mechanical, metallurgical and electrical industry	0.264	0.043	0.044	0.084	0.005	0.541	0.006	0.000	0.011	0.000	0.000	0.000	1.000
D05	Other manufacturing, excluding petroleum refining	0.103	0.019	0.059	0.064	0.012	0.625	0.058	0.001	0.044	0.002	0.011	0.002	1.000
D06	Oil refining and other energy products	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
E00	Electricity and water	0.114	0.069	0.110	0.208	0.053	0.219	0.110	0.023	0.070	0.010	0.013	0.003	1.000
F45	Construction	0.121	0.096	0.089	0.128	0.067	0.201	0.147	0.059	0.059	0.009	0.023	0.002	1.000
G00	Trade	0.096	0.107	0.117	0.133	0.062	0.250	0.116	0.022	0.070	0.013	0.011	0.003	1.000
H55	Hotels and restaurants	0.071	0.028	0.064	0.041	0.009	0.120	0.368	0.028	0.264	0.002	0.002	0.002	1.000
I01	Transport	0.084	0.086	0.109	0.151	0.048	0.291	0.101	0.027	0.070	0.016	0.013	0.004	1.000
I02	Post and telecommunications	0.084	0.086	0.109	0.151	0.048	0.291	0.101	0.027	0.070	0.016	0.013	0.004	1.000
J00	Financial activities and insurance	0.050	0.050	0.063	0.214	0.027	0.436	0.086	0.013	0.049	0.006	0.005	0.001	1.000
K00	Real estate, renting and services to enterprises	0.050	0.050	0.063	0.214	0.027	0.436	0.086	0.013	0.049	0.006	0.005	0.001	1.000
L75	General public administration and social security	0.050	0.064	0.098	0.305	0.052	0.151	0.093	0.034	0.045	0.040	0.056	0.013	1.000
MNO	Education, health and social action	0.067	0.077	0.129	0.158	0.058	0.243	0.120	0.028	0.083	0.016	0.017	0.005	1.000
OPO	Other non-financial services	0.086	0.062	0.088	0.211	0.047	0.269	0.143	0.018	0.060	0.007	0.007	0.002	1.000
TOTAL		0.088	0.056	0.092	0.130	0.058	0.357	0.099	0.025	0.064	0.011	0.015	0.005	1.000

Source: Calculations by the authors.

Table 6. Sectoral Structure of Regional Output: Morocco, 2013

		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	TOTAL
A00	Agriculture, forestry, hunting, related services	0.099	0.166	0.217	0.106	0.256	0.041	0.149	0.275	0.122	0.115	0.000	0.000	0.112
B05	Fishing, aquaculture	0.009	0.003	0.000	0.001	0.000	0.001	0.003	0.000	0.042	0.093	0.064	0.386	0.008
C00	Mining industry	0.000	0.013	0.001	0.004	0.219	0.000	0.069	0.090	0.000	0.000	0.122	0.000	0.025
D01	Food industry and tobacco	0.063	0.033	0.115	0.046	0.065	0.156	0.062	0.017	0.211	0.067	0.106	0.130	0.107
D02	Textile and leather industry	0.086	0.005	0.044	0.028	0.000	0.054	0.008	0.000	0.000	0.000	0.000	0.000	0.036
D03	Chemical and para-chemical industry	0.012	0.006	0.013	0.015	0.002	0.079	0.035	0.001	0.009	0.000	0.038	0.000	0.037
D04	Mechanical, metallurgical and electrical industry	0.210	0.054	0.034	0.046	0.007	0.106	0.004	0.001	0.012	0.000	0.002	0.000	0.070
D05	Other manufacturing, excluding petroleum refining	0.055	0.016	0.030	0.023	0.010	0.083	0.028	0.003	0.032	0.009	0.034	0.016	0.047
D06	Oil refining and other energy products	0.000	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.000	0.000	0.000	0.031
E00	Electricity and water	0.027	0.026	0.025	0.034	0.019	0.013	0.024	0.020	0.023	0.019	0.018	0.012	0.021
F45	Construction	0.112	0.139	0.079	0.080	0.094	0.046	0.122	0.193	0.076	0.070	0.121	0.039	0.082
G00	Trade	0.084	0.148	0.098	0.079	0.083	0.054	0.091	0.068	0.085	0.092	0.054	0.049	0.078
H55	Hotels and restaurants	0.017	0.010	0.015	0.007	0.003	0.007	0.079	0.023	0.088	0.004	0.003	0.010	0.021
I01	Transport	0.040	0.064	0.049	0.048	0.035	0.034	0.043	0.045	0.046	0.062	0.034	0.033	0.042
I02	Post and telecommunications	0.021	0.035	0.027	0.026	0.019	0.018	0.023	0.024	0.025	0.033	0.019	0.018	0.022
J00	Financial activities and insurance	0.023	0.037	0.028	0.067	0.019	0.050	0.035	0.022	0.031	0.021	0.014	0.013	0.041
K00	Real estate, renting and services to enterprises	0.041	0.065	0.050	0.120	0.034	0.089	0.063	0.039	0.055	0.038	0.024	0.023	0.073
L75	General public administration and social security	0.043	0.086	0.081	0.179	0.068	0.032	0.072	0.103	0.054	0.280	0.277	0.207	0.076
MNO	Education, health and social action	0.045	0.081	0.083	0.072	0.059	0.041	0.072	0.067	0.077	0.088	0.064	0.060	0.059
OP0	Other non-financial services	0.011	0.012	0.011	0.018	0.009	0.009	0.016	0.008	0.011	0.008	0.005	0.005	0.011
TOTAL		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Source: Calculations by the authors.

Table 7. Location Quotients: Morocco, 2013

		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
A00	Agriculture, forestry, hunting, related services	0.882	1.482	1.939	0.951	2.290	0.363	1.332	2.457	1.093	1.031	0.000	0.000
B05	Fishing, aquaculture	1.111	0.365	0.000	0.089	0.000	0.116	0.390	0.000	5.139	11.275	7.737	46.896
C00	Mining industry	0.000	0.529	0.056	0.148	8.713	0.005	2.753	3.573	0.012	0.000	4.854	0.000
D01	Food industry and tobacco	0.596	0.312	1.081	0.432	0.613	1.464	0.584	0.158	1.978	0.631	0.999	1.217
D02	Textile and leather industry	2.414	0.149	1.230	0.782	0.008	1.513	0.227	0.000	0.011	0.000	0.000	0.000
D03	Chemical and para-chemical industry	0.310	0.171	0.337	0.395	0.050	2.110	0.938	0.026	0.242	0.000	1.026	0.002
D04	Mechanical, metallurgical and electrical industry	2.995	0.762	0.479	0.649	0.094	1.514	0.063	0.019	0.176	0.000	0.027	0.003
D05	Other manufacturing, excluding petroleum refining	1.171	0.342	0.637	0.492	0.212	1.751	0.584	0.059	0.683	0.192	0.711	0.334
D06	Oil refining and other energy products	0.000	0.000	0.000	0.000	0.000	2.800	0.000	0.000	0.000	0.000	0.000	0.000
E00	Electricity and water	1.286	1.218	1.193	1.601	0.902	0.612	1.120	0.943	1.093	0.880	0.866	0.586
F45	Construction	1.368	1.704	0.968	0.983	1.149	0.562	1.491	2.357	0.928	0.857	1.485	0.473
G00	Trade	1.089	1.905	1.267	1.022	1.069	0.701	1.177	0.879	1.100	1.188	0.697	0.630
H55	Hotels and restaurants	0.810	0.495	0.694	0.316	0.152	0.337	3.735	1.108	4.138	0.174	0.148	0.473
I01	Transport	0.956	1.536	1.183	1.164	0.828	0.814	1.024	1.077	1.097	1.488	0.827	0.794
I02	Post and telecommunications	0.956	1.536	1.183	1.164	0.828	0.814	1.024	1.077	1.097	1.488	0.827	0.794
J00	Financial activities and insurance	0.567	0.897	0.682	1.648	0.466	1.220	0.870	0.541	0.760	0.527	0.334	0.314
K00	Real estate, renting and services to enterprises	0.567	0.897	0.682	1.648	0.466	1.220	0.870	0.541	0.760	0.527	0.334	0.314
L75	General public administration and social security	0.565	1.129	1.069	2.347	0.888	0.423	0.947	1.356	0.706	3.681	3.634	2.715
MNO	Education, health and social action	0.759	1.365	1.402	1.218	0.989	0.682	1.214	1.128	1.299	1.475	1.085	1.018
OP0	Other non-financial services	0.973	1.104	0.956	1.628	0.798	0.754	1.447	0.739	0.932	0.685	0.444	0.417

Source: Calculations by the authors.

3.2. Interregional linkages

The indicators described above are based on sectoral and regional shares of the IIO-MOR, which only measure the regional distribution of economic activity in the country. In this section, a comparative analysis of regional economic structure is carried out. Production linkages between sectors are considered through the analysis of the intermediate inputs portion of the interregional input-output database. Both the direct and indirect production linkage effects of the economy are captured by the adoption of different methods based on the evaluation of the Leontief inverse matrix. The purpose remains the comparison of economic structures rather than an evaluation of the methods of analysis themselves.

The conventional input-output model is given by the system of matrix equations:

$$x = Ax + f \quad (5)$$

$$x = (I - A)^{-1}f = Bf \quad (6)$$

Where x and f are respectively the vectors of gross output and final demand; A consists of input coefficients a_{ij} defined as the amount of product i required per unit of product j (in monetary terms), for $i, j = 1, \dots, n$; and B is known as the Leontief inverse.

Let us consider systems (5) and (6) in an interregional context, with R different regions, so that:

$$x = \begin{bmatrix} x^1 \\ \vdots \\ x^R \end{bmatrix}; A = \begin{bmatrix} A^{11} & \dots & A^{1R} \\ \vdots & \ddots & \vdots \\ A^{R1} & \dots & A^{RR} \end{bmatrix}; f = \begin{bmatrix} f^1 \\ \vdots \\ f^R \end{bmatrix}; \text{ and } B = \begin{bmatrix} B^{11} & \dots & B^{1R} \\ \vdots & \ddots & \vdots \\ B^{R1} & \dots & B^{RR} \end{bmatrix} \quad (7)$$

and

$$\begin{aligned} x^1 &= B^{11}f^1 + \dots + B^{1R}f^R \\ &\vdots \\ x^R &= B^{R1}f^1 + \dots + B^{RR}f^R \end{aligned} \quad (8)$$

Let us also consider different components of f , which include demands originating in the specific regions, v^s , $s = 1, \dots, R$, and abroad, e . We obtain information of final demand from origin s in the IOM-MOR, allowing us to treat v as a matrix which provides the monetary values of final demand expenditures from the domestic regions in Morocco and from the foreign region.

$$v = \begin{bmatrix} v^{11} & \dots & v^{1R} \\ \vdots & \ddots & \vdots \\ v^{R1} & \dots & v^{RR} \end{bmatrix}; e = \begin{bmatrix} e^1 \\ \vdots \\ e^R \end{bmatrix}$$

Thus, we can re-write (7) as:

$$\begin{aligned} x^1 &= B^{11}(v^{11} + \dots + v^{R1} + e^1) + \dots + B^{1R}(v^{1R} + \dots + v^{RR} + e^R) \\ &\vdots \\ x^R &= B^{R1}(v^{11} + \dots + v^{R1} + e^1) + \dots + B^{RR}(v^{1R} + \dots + v^{RR} + e^R) \end{aligned} \quad (9)$$

With (9), we can then compute the contribution of final demand from different origins on regional output. It is clear from (9) that regional output depends, among others, on demand originating in the region and, depending on the degree of interregional integration, also on demand from outside the region.

In what follows, interdependence among sectors in different regions is considered through the analysis of the complete intermediate input portion of the interregional input-output table. The Leontief inverse matrix, based on the system (8), will be considered, and some summary interpretations of the structure of the economy derived from it will be provided.

3.2.1. Multiplier Analysis

The column multipliers derived from B were computed (see Miller and Blair, 2009). An output multiplier is defined for each sector j , in each region r , as the total value of production in all sectors and in all regions of the economy that is necessary in order to satisfy a dirham's worth of final demand for sector j 's output. The multiplier effect can be decomposed into intraregional (internal multiplier) and interregional (external multiplier) effects, the former representing the impacts on the outputs of sectors within the region where the final demand change was generated, and the latter showing the impacts on the other regions of the system (interregional spillover effects).

Table 8 shows the intraregional and interregional shares for the average total output multipliers in the 12 regions in Morocco as well as the equivalent shares for the direct and indirect effects of a unit change in final demand in each sector in each region net of the initial injection, i.e., the total output multiplier effect net of the initial change. The entries are shown in percentage terms, providing insights into the degree of dependence of each region on the other regions. Grand Casablanca-Settat, Fès-Meknès, Marrakech-Safi, Souss-Massa and Oriental are the most self-sufficient regions; the average flow-on effects from a unit change in sectoral final demand is among the highest. The average net effect exceeds 40% for Grand Casablanca-Settat, Fès-Meknès, Marrakech-Safi, Souss-Massa (it exceeds 55% for Grand Casablanca-Settat). For some regions, such as Guelmin-Oued Noun, Laayoune-Sakia El Hamra and Dakhla-Oued Eddahab, in the south of the country, the degree of regional self-sufficiency is much lower, and the intraregional flow-on effects, on the average, are much lower than the total interregional effects. Lower degree of self-sufficiency also appears in more specialized regions, such as Drâa-Tafilalet and Béni Mellal-Khénifra.

Table 8. Regional Percentage Distribution of the Average Total and Net Output Multipliers: Morocco, 2013

		Total output multiplier		Net output multiplier	
		Intra-regional share	Interregional share	Intra-regional share	Interregional share
R1	Tanger-Tetouan-Al Hoceima	82.9	17.1	34.2	65.8
R2	Oriental	83.7	16.3	38.6	61.4
R3	Fès-Meknès	84.8	15.2	40.6	59.4
R4	Rabat-Salé-Kénitra	83.5	16.5	37.5	62.5
R5	Béni Mellal-Khénifra	82.6	17.4	31.6	68.4
R6	Grand Casablanca-Settat	87.8	12.2	55.6	44.4
R7	Marrakech-Safi	83.9	16.1	39.1	60.9
R8	Drâa-Tafilalet	83.1	16.9	28.8	71.2
R9	Souss-Massa	84.2	15.8	40.6	59.4
R10	Guelmim-Oued Noun	84.2	15.8	31.2	68.8
R11	Laayoune-Sakia El Hamra	84.1	15.9	32.6	67.4
R12	Dakhla-Oued Eddahab	80.0	20.0	14.1	85.9

Source: Calculations by the authors.

3.2.2. Output Decomposition

A complementary analysis to the multiplier approach is presented in this section. Regional output is decomposed by taking into account not only the multiplier structure, but also the structure of final demand in the 12 domestic and the foreign regions (Sonis et al., 1996).

According to equation (9), regional output (for each region) was decomposed, and the contributions of the components of final demand from different areas were calculated. The results are presented in Table 9. On average, the self-generated component of output in each region, i.e. the share of output generated by demand within the region, is lower in those regions that present higher dependency upon the rest of the world (Grand Casablanca-Settat, Tanger-Tetouan-Al Hoceima, Béni Mellal-Khénifra and Dakhla-Oued Eddahab). The demand for foreign exports is very relevant not only for Grand Casablanca-Settat but also for other resource-based economies. Its contribution to the regional output can reach more than one-third of the regional output (20.9% for the country as a whole), as is the case of Dakhla-Oued Eddahab (39.9%) and Tanger-Tetouan-Al Hoceima (33.8%). There are also some cases of stronger dependency upon the rest of the country, as it is the case of the dependency of Marrakech-Safi, Rabat-Salé-Kénitra, Souss-Massa and Béni Mellal-Khénifra on Grand Casablanca-Settat's demand, and the dependency of Grand Casablanca-Settat on Rabat-Salé-Kénitra's demand.

A more systematic approach to look at the influence of final demand from different areas is to map the column original estimates that generated Table 9. The results illustrated in Figure 3 provide an attempt to reveal the spatial patterns of output dependence upon specific sources of final demand. Figure 3 presents for each demanding region, the distribution of their influence on output of all other regions in Morocco. The 12 regions are grouped in six different categories in each map, so that darker colors represent higher values.

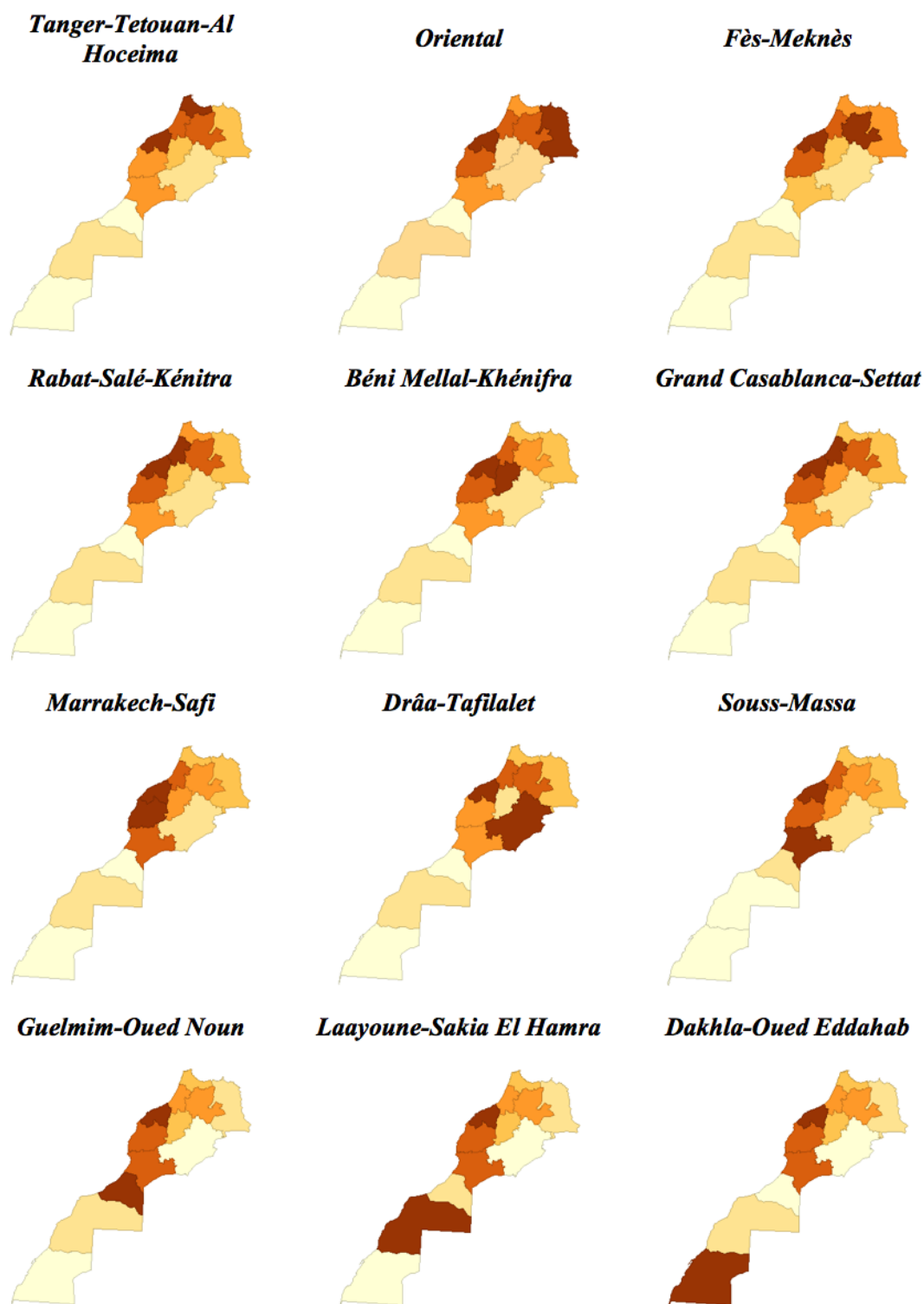
Moreover, one can also look at the data that originated Table 9 from a row perspective. That is, one may be interested in evaluating the main sources of domestic demand that affect the output of a specific region. The results are illustrated in Figure 4.

Table 9. Components of Decomposition of Regional Output Based on the Sources of Final Demand: Morocco, 2013 (in %)

		ORIGIN OF FINAL DEMAND												ROW
REGIONAL OUTPUT		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	
	R1	44.3	2.1	2.9	3.6	1.2	6.4	2.2	1.2	1.2	0.3	0.5	0.4	33.8
	R2	3.5	59.2	4.5	3.7	1.4	5.9	2.3	1.9	1.3	0.3	0.7	0.6	14.6
	R3	5.0	4.8	51.3	6.1	2.1	9.4	3.0	2.5	1.6	0.4	0.7	0.6	12.5
	R4	4.8	2.4	4.0	52.1	1.9	13.1	3.2	1.5	1.6	0.4	0.7	0.5	13.6
	R5	3.6	2.5	3.6	4.8	39.4	9.8	5.5	1.8	2.5	0.5	0.7	0.6	24.7
	R6	6.3	4.0	5.2	10.0	3.6	28.5	6.9	2.4	3.2	0.7	0.9	0.7	27.8
	R7	3.7	2.4	3.1	5.3	3.3	10.0	52.2	1.7	3.0	0.7	1.0	0.7	12.8
	R8	3.6	2.9	4.4	4.0	2.1	6.2	3.6	59.4	2.1	0.4	0.8	0.7	9.8
	R9	4.1	3.0	3.5	5.3	2.8	10.7	6.1	2.0	47.2	2.2	1.9	1.2	10.0
	R10	2.4	1.6	2.0	3.2	1.4	5.3	3.2	1.1	4.3	59.1	2.0	0.9	13.5
	R11	2.4	1.8	2.2	2.9	1.3	4.8	2.8	1.2	2.2	0.9	57.8	1.3	18.4
	R12	1.3	1.1	1.4	1.5	0.7	2.6	1.3	0.7	1.0	0.3	1.1	47.1	39.9
MOROCCO		8.4	6.4	8.5	12.7	4.8	16.2	9.5	3.4	5.3	1.3	1.8	0.9	20.9

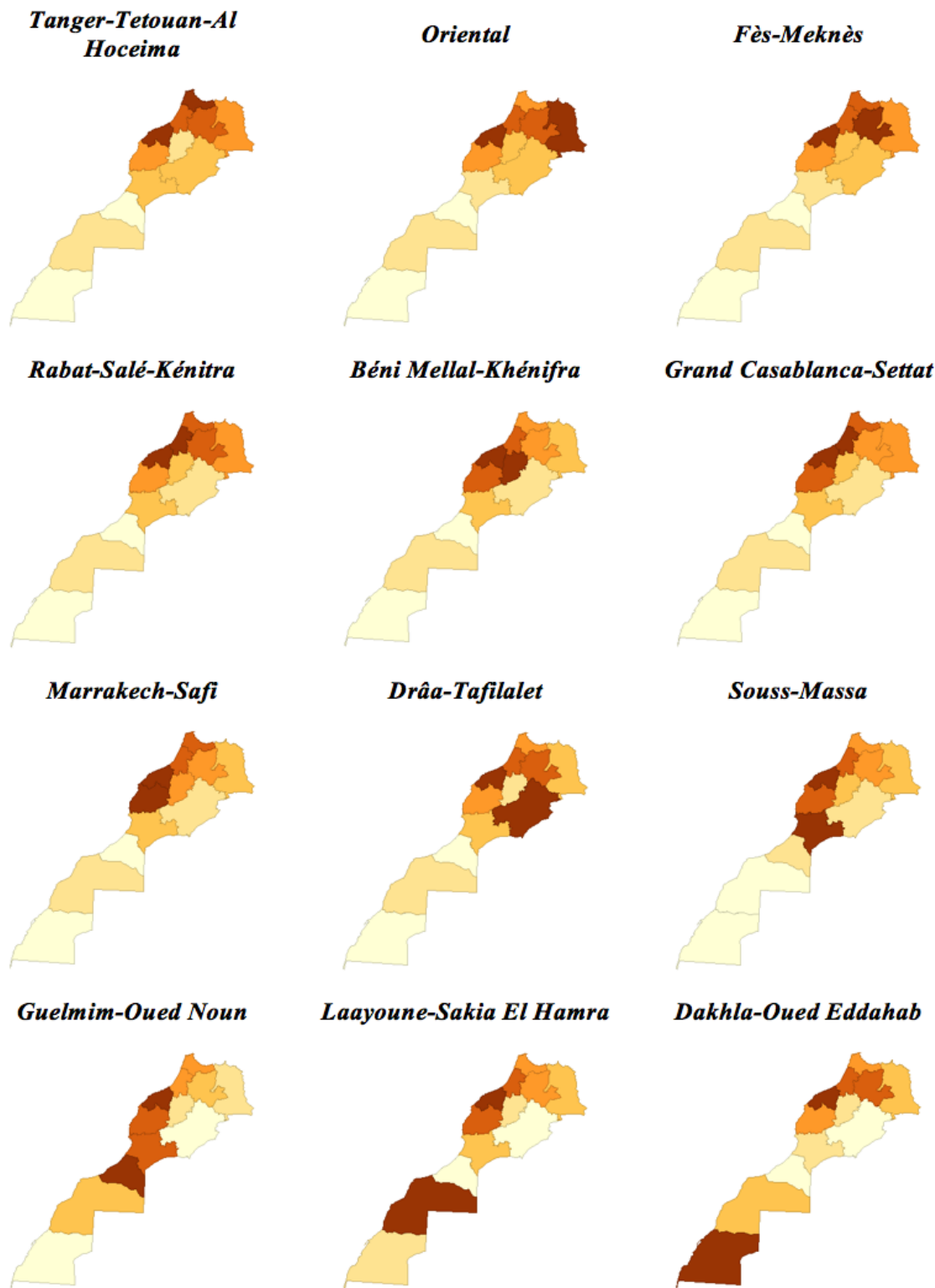
Source: Calculations by the authors.

Figure 3. Identification of Regions Relatively More Affected by a Specific Regional Demand, by Origin of Final Demand



Source: Calculations by the authors.

Figure 4. Identification of Regions whose Demands Affect Relatively More a Specific Regional Output, by Regional Output



Source: Calculations by the authors.

4. Final Remarks

The main goal of this report is to present the recent developments in the construction of an interregional input-output matrix for Morocco (IIOM-MOR). The understanding of the functioning of the Moroccan regional economies within an integrated system is one of the main goals of the joint project involving NEREUS in Brazil, and the OCP Policy Center, in Morocco. By exploring different methods of comparative structure analysis, it is hoped that this initial exercise benefited from the complementarity among them, resulting in a better appreciation of the full dimensions of differences and similarities that exist among the regions in Morocco.

The analysis suggests that there are some important differences in the internal structure of the regional economies in Morocco and the external interactions among their different agents. Since the absorption matrix used throughout the structural analysis will serve as the basis for the calibration of the ICGE model, knowing the relationships underlying it is fundamental for a better understanding of the model's results.

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Technical Appendix

In this appendix, the methodology used to generate the interregional input-output system for Morocco is provided. The description is organized around the TABLO Input file, used for data manipulation in GEMPACK.⁴ As the final goal of the project is to re-calibrate an interregional CGE model for the country to be implemented using GEMPACK, the choice of the language for the code for generating the IOM-MOR was straightforward. In fact, attention is directed to the different steps undertaken and their underlying assumptions. We present the complete text of the TABLO Input file divided into a sequence of excerpts and supplemented by tables and explanatory text. The presentation draws on the document “ORANI-G: A Generic Single-Country Computable General Equilibrium Model”, by Mark Horridge, March 2006.

A1. Dimensions of the IOM-MOR

Excerpt 1 of the TABLO Input file begins by defining logical names for input and output files. Initial data are stored in the BDATA input file. The RIODATA output file is used to store results for the manipulation of the initial information. Note that BDATA and RIODATA are logical names. The actual locations of these files (disk, folder, filename) are chosen by the user.

The rest of Excerpt 1 defines sets: lists of descriptors for the components of vector coefficients. Set names appear in upper-case characters. For example, the first Set statement is to be read as defining a set named 'COM' which contains commodity descriptors. The elements of COM (a list of commodity names) are read from the input file REGSETS (this allows the model to use databases with different numbers of sectors). By contrast the two elements of the set SRC – dom and imp – are listed explicitly.

! Excerpt 1 of TABLO input file: !
! Files and sets !

```
FILE BDATA # Data File #;  
FILE(NEW) RIODATA # Regional IO data #;  
FILE REGSETS # Sets file #;
```

SET

```
COM # Commodities #  
READ ELEMENTS FROM FILE REGSETS HEADER «COM»;  
MARGCOM # Margin Commodities #  
READ ELEMENTS FROM FILE REGSETS HEADER «MAR»;  
SUBSET MARGCOM IS SUBSET OF COM;
```

SET

```
MARGCOM1 # Margin Commodity 1 #  
READ ELEMENTS FROM FILE REGSETS HEADER «MAR1»;  
MARGCOM2 # Margin Commodity 2 #  
READ ELEMENTS FROM FILE REGSETS HEADER «MAR2»;  
SUBSET MARGCOM1 IS SUBSET OF COM;
```

4. The TABLO language is essentially conventional algebra, with names for variables and coefficients chosen to be suggestive of their economic interpretations. It is no more complex than alternative means of setting out a CGE model and undertaking calculations from an original set of data.

```

SUBSET MARGCOM2 IS SUBSET OF COM;
SUBSET MARGCOM1 IS SUBSET OF MARGCOM;
SUBSET MARGCOM2 IS SUBSET OF MARGCOM;
SET
NONMARGCOM # NonMargin Commodities #
READ ELEMENTS FROM FILE REGSETS HEADER «NMAR»;
SUBSET NONMARGCOM IS SUBSET OF COM;
SET
SRC # Source of Commodities # (dom,imp);
IND # Industries #
READ ELEMENTS FROM FILE REGSETS HEADER «IND»;
REGDEST # Regional destinations #
READ ELEMENTS FROM FILE REGSETS HEADER «REG»;
ALLSOURCE # Origin of goods #
READ ELEMENTS FROM FILE REGSETS HEADER «ASRC»;
REGSOURCE # Domestic origin of goods #
READ ELEMENTS FROM FILE REGSETS HEADER «REG»;
SUBSET REGSOURCE IS SUBSET OF ALLSOURCE;
SUBSET REGSOURCE IS SUBSET OF REGDEST;
SUBSET REGDEST IS SUBSET OF REGSOURCE;

```

The commodity and industry classifications of the ILOM-MOR described here are based on aggregates of the classifications used in the national IO tables published by the High Commission for Planning in Morocco, which considers 20 industries and 20 commodities. Multiproduction is not considered in the 12 domestic regions of the system, since we have built the national absorption matrix based on the sector by sector approach.

Table A1 lists the elements of the set COM which are read from file. GEMPACK uses the element names to label the rows and columns of results and data tables. The element names cannot be more than 12 letters long, nor contain spaces. The IND elements are presented in Table A2 and the ALLSOURCE elements in Table A3.

Elements of the set MARGCOM are margins commodities, i.e., they are required to facilitate the flows of other commodities from producers (or importers) to users. Hence, the costs of margins services, together with indirect taxes, account for differences between basic prices (received by producers or importers) and purchasers' prices (paid by users). In the ILOM-MOR system, we considered two commodities as margin, namely "G00" and "I01".

TABLO does not prevent elements of two sets from sharing the same name; nor, in such a case, does it automatically infer any connection between the corresponding elements. The Subset statement which follows the definition of the set MARGCOM is required for TABLO to realize that the two elements of MARGCOM, "G00" and "I01", are the same as the elements of the set COM.

The statement for NONMARGCOM defines that set as a complement. That is, NONMARGCOM consists of all those elements of COM which are not in MARGCOM. In this case TABLO is able to deduce that NONMARGCOM must be a subset of COM.

Table A2. Industry Classification

Elements of Set Industries	Description
A00	Agriculture, forestry, hunting, related services
B05	Fishing, aquaculture
C00	Mining industry
D01	Food industry and tobacco
D02	Textile and leather industry
D03	Chemical and para-chemical industry
D04	Mechanical, metallurgical and electrical industry
D05	Other manufacturing, excluding petroleum refining
D06	Oil refining and other energy products
E00	Electricity and water
F45	Construction
G00	Trade
H55	Hotels and restaurants
I01	Transport
I02	Post and telecommunications
J00	Financial activities and insurance
K00	Real estate, renting and services to enterprises
L75	General public administration and social security
MNO	Education, health and social action
OP0	Other non-financial services

Table A3. Regional Classification

<i>Elements of Set ALLSOURCE</i>	<i>Description</i>
R1	Tanger-Tetouan-Al Hoceima
R2	Oriental
R3	Fès-Meknès
R4	Rabat-Salé-Kénitra
R5	Béni Mellal-Khénifra
R6	Grand Casablanca-Settat
R7	Marrakech-Safi
R8	Drâa-Tafilalet
R9	Souss-Massa
R10	Guelmim-Oued Noun
R11	Laayoune-Sakia El Hamra
R12	Dakhla-Oued Eddahab
FOR	Imports

A2. Initial Data

The next excerpts of the TABLO file contains statements indicating data to be read from file. The data items defined in these statements appear as coefficients in the initial database. The statements define coefficient names (which all appear in upper-case characters), and the locations from which the data are to be read.

A2.1. National input-output data

This excerpt groups the data according to the information contained in the national input-output system organized as illustrated in Figure A1. Thus, Excerpt 2 begins by defining coefficients representing the basic commodity flows corresponding to the flows of Figure A1 for each user except exports and inventories, i.e., the basic flow matrices for intermediate consumption, investment demand, household consumption and government consumption, and the associated margins and indirect taxes flows. Preceding the coefficient names are their dimensions, indicated using the “all” qualifier, and the sets defined in Excerpt 1. For example, the first ‘COEFFICIENT’ statement defines a data item LABAS(c,i) which is the basic value of a flow of intermediate inputs of commodity c to user industry i, aggregated by source (domestic and imported). The first ‘READ’ statement indicates that this data item is stored on file BDATA with header ‘ABAS’. (A GEMPACK data file consists of a number of data items such as arrays of real numbers. Each data item is identified by a unique key or ‘header’).

Figure A1. Structure of the National Flows Database

		Dim.	Intermediate consumption	Investment demand	Household consumption	Exports	Government consumption
			1 2 ... 20	1 2 ... 20	1	1	1
Basic flows	Domestic	1 2 ... 20	LABAS (DOM)	LIBAS (DOM)	LCBAS (DOM)	LXBAS (DOM)	LGBAS (DOM)
	Imported	1 2 ... 20	LABAS (IMP)	LIBAS (IMP)	LCBAS (IMP)	LXBAS (IMP)	LGBAS (IMP)
Trade Margins	Domestic	1 2 ... 20	LAMR1 (DOM)	LIMR1 (DOM)	LCMR1 (DOM)	LXMR1 (DOM)	LGMR1 (DOM)
	Imported	1 2 ... 20	LAMR1 (IMP)	LIMR1 (IMP)	LCMR1 (IMP)	LXMR1 (IMP)	LGMR1 (IMP)
Transport Margins	Domestic	1 2 ... 20	LAMR2 (DOM)	LIMR2 (DOM)	LCMR2 (DOM)	LXMR2 (DOM)	LGMR2 (DOM)
	Imported	1 2 ... 20	LAMR2 (IMP)	LIMR2 (IMP)	LCMR2 (IMP)	LXMR2 (IMP)	LGMR2 (IMP)
Indirect taxes	Domestic	1 2 ... 20	LATX1 (DOM)	LITX1 (DOM)	LCTX1 (DOM)	LXTX1 (DOM)	LGTX1 (DOM)
	Imported	1 2 ... 20	LATX1 (IMP)	LITX1 (IMP)	LCTX1 (IMP)	LXTX1 (IMP)	LGTX1 (IMP)
Labor payments			LABR	0	0	0	0
Capital payments			CPTL	0	0	0	0
Other costs			OCTS	0	0	0	0
Total			MAKE_I	ITOT	CTOT	XTOT	GTOT

! Excerpt 2 of TABLO input file: !

! Initial data !

COEFFICIENT

(all,c,COM)(all,i,IND)
LABAS(c,i) # Technical level matrix - national #;
(all,c,COM)(all,i,IND)
LIBAS(c,i) # Investment level matrix - national #;
(all,c,COM)
LCBAS(c) # Consumption level matrix - national #;
(all,c,COM)
LGBAS(c) # Government level matrix - national #;
(all,c,COM)(all,i,IND)
LAMR1(c,i) # MAR1 1 level matrix - national #;
(all,c,COM)(all,i,IND)
LIMR1(c,i) # MAR2 1 level matrix - national #;
(all,c,COM)
LCMR1(c) # MAR3 1 level matrix - national #;
(all,c,COM)
LGMR1(c) # MAR5 1 level matrix - national #;
(all,c,COM)(all,i,IND)
LAMR2(c,i) # MAR1 2 level matrix - national #;
(all,c,COM)(all,i,IND)
LIMR2(c,i) # MAR2 2 level matrix - national #;
(all,c,COM)
LCMR2(c) # MAR3 2 level matrix - national #;
(all,c,COM)
LGMR2(c) # MAR5 2 level matrix - national #;
(all,c,COM)(all,i,IND)
LATX1(c,i) # TAX1 1 level matrix - national #;
(all,c,COM)(all,i,IND)
LITX1(c,i) # TAX2 1 level matrix - national #;
(all,c,COM)
LCTX1(c) # TAX3 1 level matrix - national #;
(all,c,COM)
LGTX1(c) # TAX5 1 level matrix - national #;
(all,i,IND)
CITO(i) # Total intermediate consumption - national #;
CTOT # Total household consumption - national #;
ITOT # Total investment demand - national #;
GTOT # Total government demand - national #;

READ

LABAS FROM FILE BDATA HEADER «ABAS»;
LIBAS FROM FILE BDATA HEADER «IBAS»;
LCBAS FROM FILE BDATA HEADER «CBAS»;
LGBAS FROM FILE BDATA HEADER «GBAS»;

```

LAMR1 FROM FILE BDATA HEADER «AMR1»;
LIMR1 FROM FILE BDATA HEADER «IMR1»;
LCMR1 FROM FILE BDATA HEADER «CMR1»;
LGMR1 FROM FILE BDATA HEADER «GMR1»;
LAMR2 FROM FILE BDATA HEADER «AMR2»;
LIMR2 FROM FILE BDATA HEADER «IMR2»;
LCMR2 FROM FILE BDATA HEADER «CMR2»;
LGMR2 FROM FILE BDATA HEADER «GMR2»;
LATX1 FROM FILE BDATA HEADER «ATX1»;
LITX1 FROM FILE BDATA HEADER «ITX1»;
LCTX1 FROM FILE BDATA HEADER «CTX1»;
LGTX1 FROM FILE BDATA HEADER «GTX1»;
CITO FROM FILE BDATA HEADER «CITO»;
CTOT FROM FILE BDATA HEADER «CTOT»;
ITOT FROM FILE BDATA HEADER «ITOT»;
GTOT FROM FILE BDATA HEADER «GTOT»;

```

A2.2. National input-output shares

The use of the national aggregates presente in Excerpt 2, disregarding domestic and foreign sources, will allow us to assume the same national technology of production, and the same composition of investment demand and household expenditures in each region (similarly for government demand). However, the associated regional compositions will be region-specific, including the share of foreign imports. Excerpt 3 presents the coefficients that make explicit the national structures.

! Excerpt 3 of TABLO input file: !
! Initial data !

COEFFICIENT

```

(all,c,COM)(all,i,IND)
ABAS(c,i) # Technical coefficient matrix - national #;
(all,c,COM)(all,i,IND)
IBAS(c,i) # Investnent coefficient matrix - national #;
(all,c,COM)
CBAS(c) # Consumption coefficient matrix - national #;
(all,c,COM)
GBAS(c) # Government coefficient matrix - national #;
(all,c,COM)(all,i,IND)
AMR1(c,i) # MAR1 1 coefficient matrix - national #;
(all,c,COM)(all,i,IND)
IMR1(c,i) # MAR2 1 coefficient matrix - national #;
(all,c,COM)
CMR1(c) # MAR3 1 coefficient matrix - national #;
(all,c,COM)
GMR1(c) # MAR5 1 coefficient matrix - national #;
(all,c,COM)(all,i,IND)
AMR2(c,i) # MAR1 2 coefficient matrix - national #;

```

(all,c,COM)(all,i,IND)
IMR2(c,i) # MAR2 2 coefficient matrix - national #;
(all,c,COM)
CMR2(c) # MAR3 2 coefficient matrix - national #;
(all,c,COM)
GMR2(c) # MAR5 2 coefficient matrix - national #;
(all,c,COM)(all,i,IND)
ATX1(c,i) # TAX1 1 coefficient matrix - national #;
(all,c,COM)(all,i,IND)
ITX1(c,i) # TAX2 1 coefficient matrix - national #;
(all,c,COM)
CTX1(c) # TAX3 1 coefficient matrix - national #;
(all,c,COM)
GTX1(c) # TAX5 1 coefficient matrix - national #;
TINY # A very small number #;

FORMULA

(all,c,COM)(all,i,IND)
ABAS(c,i)=LABAS(c,i)/CITO(i);
(all,c,COM)(all,i,IND)
IBAS(c,i)=LIBAS(c,i)/ITOT;
(all,c,COM)
CBAS(c)=LCBAS(c)/CTOT;
(all,c,COM)
GBAS(c)=LGBAS(c)/GTOT;
(all,c,COM)(all,i,IND)
AMR1(c,i)=LAMR1(c,i)/CITO(i);
(all,c,COM)(all,i,IND)
IMR1(c,i)=LIMR1(c,i)/ITOT;
(all,c,COM)
CMR1(c)=LCMR1(c)/CTOT;
(all,c,COM)
GMR1(c)=LGMR1(c)/GTOT;
(all,c,COM)(all,i,IND)
AMR2(c,i)=LAMR2(c,i)/CITO(i);
(all,c,COM)(all,i,IND)
IMR2(c,i)=LIMR2(c,i)/ITOT;
(all,c,COM)
CMR2(c)=LCMR2(c)/CTOT;
(all,c,COM)
GMR2(c)=LGMR2(c)/GTOT;
(all,c,COM)(all,i,IND)
ATX1(c,i)=LATX1(c,i)/CITO(i);
(all,c,COM)(all,i,IND)
ITX1(c,i)=LITX1(c,i)/ITOT;
(all,c,COM)

$CTX1(c) = LCTX1(c) / CTOT;$
 (all, c, COM)
 $GTX1(c) = LGTX1(c) / GTOT;$
 $TINY = 0.000000000000000001;$

A2.3. Commodity trade matrices

The coefficients of excerpt 4 are associated with commodity trade matrices, i.e., the intra-regional and the interregional flows, for each commodity, from every possible origin-destination pair (including foreign origin). Tables 2 to 4 in the main text present a synthesis of the aggregate flows for Morocco in 2012.

! Excerpt 4 of TABLO input file: !

! Initial data !

COEFFICIENT

$(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P1(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P2(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P3(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P4(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P5(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P6(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P7(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P8(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P9(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P10(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P11(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P11(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P13(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P14(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P15(s, q)$ # Trade matrix - flows #;
 $(all, s, ALLSOURCE)(all, q, REGDEST)$
 $P16(s, q)$ # Trade matrix - flows #;

```
(all,s,ALLSOURCE)(all,q,REGDEST)
P17(s,q) # Trade matrix - flows #;
(all,s,ALLSOURCE)(all,q,REGDEST)
P18(s,q) # Trade matrix - flows #;
(all,s,ALLSOURCE)(all,q,REGDEST)
P19(s,q) # Trade matrix - flows #;
(all,s,ALLSOURCE)(all,q,REGDEST)
P20(s,q) # Trade matrix - flows #;
```

READ

```
P1 FROM FILE BDATA HEADER «P1»;
P2 FROM FILE BDATA HEADER «P2»;
P3 FROM FILE BDATA HEADER «P3»;
P4 FROM FILE BDATA HEADER «P4»;
P5 FROM FILE BDATA HEADER «P5»;
P6 FROM FILE BDATA HEADER «P6»;
P7 FROM FILE BDATA HEADER «P7»;
P8 FROM FILE BDATA HEADER «P8»;
P9 FROM FILE BDATA HEADER «P9»;
P10 FROM FILE BDATA HEADER «P10»;
P11 FROM FILE BDATA HEADER «P11»;
P12 FROM FILE BDATA HEADER «P12»;
P13 FROM FILE BDATA HEADER «P13»;
P14 FROM FILE BDATA HEADER «P14»;
P15 FROM FILE BDATA HEADER «P15»;
P16 FROM FILE BDATA HEADER «P16»;
P17 FROM FILE BDATA HEADER «P17»;
P18 FROM FILE BDATA HEADER «P18»;
P19 FROM FILE BDATA HEADER «P19»;
P20 FROM FILE BDATA HEADER «P20»;
```

A2.4. Mapping commodity trade matrices

The bi-dimensional coefficients from the initial database related to the original commodity trade matrices (excerpt 4) are mapped into tri-dimensional coefficients. This is necessary only because of the way the initial data were prepared in order to make the calculations more efficient.

! Excerpt 5 of TABLO input file: !
! Initial data !

COEFFICIENT

```
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
TRADE(c,s,q) # Trade matrices, by commodity, regional #;
(all,s,ALLSOURCE)(all,q,REGDEST)
TRADE_C(s,q) # Trade matrices, regional #;
```

FORMULA

(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«A00»,s,q)=	P1	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«B05»,s,q)=	P2	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«C00»,s,q)=	P3	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«D01»,s,q)=	P4	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«D02»,s,q)=	P5	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«D03»,s,q)=	P6	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«D04»,s,q)=	P7	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«D05»,s,q)=	P8	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«D06»,s,q)=	P9	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«E00»,s,q)=	P10	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«F45»,s,q)=	P11	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«G00»,s,q)=	P12	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«H55»,s,q)=	P13	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«I01»,s,q)=	P14	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«I02»,s,q)=	P15	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«J00»,s,q)=	P16	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«K00»,s,q)=	P17	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«L75»,s,q)=	P18	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«MNO»,s,q)=	P19	(s,q);
(all,s,ALLSOURCE)(all,q,REGDEST)	TRADE(«OP0»,s,q)=	P20	(s,q);

A2.5. Regional information

The last piece of information from the initial database is related to regional aggregates. Regional information on sectoral intermediate consumption and value added, as well as on regional aggregates on total investment, total household consumption and total government consumption is also part of the initial database. Finally, the regional distribution of exports by manufactured commodities was made available by the official statistics agency in Morocco, while for the other sectors we have used the location quotient to disaggregate the national values.

! Excerpt 6 of TABLO input file: !

! Initial data !

COEFFICIENT

(all,i,IND)(all,q,REGDEST)
CINT(i,q) # Total regional intermediate consumption, by sector #;
(all,q,REGDEST)
INV(q) # Total investment demand - regional #;
(all,q,REGDEST)
CONS(q) # Total household demand - regional #;
(all,q,REGDEST)
GOV(q) # Total government demand - regional #;
(all,c,COM)(all,q,REGDEST)
BAS4_S(c,q) # Total export demand - regional #;
(all,s,ALLSOURCE)(all,q,REGDEST)

SHIND(s,q) # Diagonal trade share matrix #;
(all,i,IND)(all,q,REGDEST)
CPTL(i,q) # Total regional capital payments, by sector #;

READ

CINT from file BDATA header «CINT»;
INV from file BDATA header «INV»;
CONS from file BDATA header «CONS»;
GOV from file BDATA header «GOV»;
BAS4_S from file BDATA header «EXP»;
SHIND from file BDATA header «SHND»;
CPTL from file BDATA header «CPTL»;

A3. The Chenery-Moses Approach

A3.1. Interregional coefficients

As the basic data are prepared, we can proceed with the application of the adaptation of the Chenery-Moses approach to generate the IIO coefficients for Morocco. The SHIN(c,s,q) coefficient corresponds to showing the proportions of a commodity c in region q that come from within the region and from each one of the other regions (including the rest of the world – s is an element of the set ALLSOURCE). It is assumed that all users in each region share the same importing pattern for a given commodity.

The SHIN coefficients are applied to the national aggregate coefficients for the following users: intermediate consumption, investment demand, household consumption and government consumption. The treatment adopted for exports and changes in inventories are explained later.

! Excerpt 7 of TABLO input file: !

! Regionalization of the national coefficients !

COEFFICIENT

(all,c,COM)(all,q,REGDEST)
TOTDEM(c,q) # Total regional demand, by commodity #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
SHIN(c,s,q) # Import trade share matrices, by commodity, regional #;
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
RABAS(c,s,i,q) # Technical coefficient, commodity usage, regional #;
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
RIBAS(c,s,i,q) # Investment coefficient, commodity usage, regional #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
RCBAS(c,s,q) # Consumption coefficient, commodity usage, regional #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
RGBAS(c,s,q) # Government coefficient, commodity usage, regional #;
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
RAMR1(c,s,i,q) # Technical coefficient, margin 1 usage, regional #;
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)

RIMR1(c,s,i,q) # Investment coefficient, margin 1 usage, regional #;
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 RCMR1(c,s,q) # Consumption coefficient, margin 1 usage, regional #;
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 RGM1(c,s,q) # Government coefficient, margin 1 usage, regional #;
 (all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
 RAMR2(c,s,i,q) # Technical coefficient, margin 2 usage, regional #;
 (all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
 RIMR2(c,s,i,q) # Investment coefficient, margin 2 usage, regional #;
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 RCMR2(c,s,q) # Consumption coefficient, margin 2 usage, regional #;
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 RGM2(c,s,q) # Government coefficient, margin 2 usage, regional #;
 (all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
 RATX1(c,s,i,q) # Technical coefficient, tax 1, regional #;
 (all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
 RITX1(c,s,i,q) # Investment coefficient, tax 1, regional #;
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 RCTX1(c,s,q) # Consumption coefficient, tax 1, regional #;
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 RGTX1(c,s,q) # Government coefficient, tax 1, regional #;

Formula

(all,s,ALLSOURCE)(all,q,REGDEST)
 TRADE_C(s,q)=sum(c,COM,TRADE(c,s,q));
 (all,c,COM)(all,q,REGDEST)
 TOTDEM(c,q)=sum(s,ALLSOURCE,TRADE(c,s,q));
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 SHIN(c,s,q)=TRADE(c,s,q)/(TINY+TOTDEM(c,q));
 (all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
 RABAS(c,s,i,q)=SHIN(c,s,q)*ABAS(c,i);
 (all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
 RIBAS(c,s,i,q)=SHIN(c,s,q)*IBAS(c,i);
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 RCBAS(c,s,q)=SHIN(c,s,q)*CBAS(c);
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 RGBAS(c,s,q)=SHIN(c,s,q)*GBAS(c);
 (all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
 RAMR1(c,s,i,q)=SHIN(c,s,q)*AMR1(c,i);
 (all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
 RIMR1(c,s,i,q)=SHIN(c,s,q)*IMR1(c,i);
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 RCMR1(c,s,q)=SHIN(c,s,q)*CMR1(c);
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 RGM1(c,s,q)=SHIN(c,s,q)*GMR1(c);
 (all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
 RAMR2(c,s,i,q)=SHIN(c,s,q)*AMR2(c,i);

```

(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
RIMR2(c,s,i,q)=SHIN(c,s,q)*IMR2(c,i);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
RCMR2(c,s,q)=SHIN(c,s,q)*CMR2(c);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
RGMR2(c,s,q)=SHIN(c,s,q)*GMR2(c);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
RATX1(c,s,i,q)=SHIN(c,s,q)*ATX1(c,i);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
RITX1(c,s,i,q)=SHIN(c,s,q)*ITX1(c,i);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
RCTX1(c,s,q)=SHIN(c,s,q)*CTX1(c);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
RGTX1(c,s,q)=SHIN(c,s,q)*GTX1(c);

```

A3.2. Structural flows

A3.2.1. Basic flows

In excerpt 8, the basic flows are calculated for the various users in the system. For producers, investors, households and government, the interregional coefficients described above are transformed into monetary values according to the relevant levels provided by the information on regional aggregates (excerpt 6). Exports are organized in a bi-dimensional matrix according to the COM and ALLSOURCE sets.

Note that the coefficient $S_CPTL(i,q)$ is calculated based on information for total capital payments by sector (excerpt 6). The coefficient is then used for disaggregating investors demand by sector.

! Excerpt 8 of TABLO input file: !

! Basic flows !

COEFFICIENT

```

(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
BAS1(c,s,i,q) # Intermediate consumption - basic values #;
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
BAS2(c,s,i,q) # Investment demand - basic values #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
BAS3(c,s,q) # Household demand - basic values #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
BAS4(c,s,q) # Export demand - basic values #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
BAS5(c,s,q) # Government demand - basic values #;
(all,i,IND)(all,q,REGDEST)
S_CPTL(i,q) # Sectoral share in regional capital payments #;

```

FORMULA

```

(all,i,IND)(all,q,REGDEST)
S_CPTL(i,q)=CPTL(i,q)/(sum(j,IND,CPTL(j,q)));

```

```

(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
BAS1(c,s,i,q)=RABAS(c,s,i,q)*CINT(i,q);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
BAS2(c,s,i,q)=RIBAS(c,s,i,q)*INV(q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
BAS3(c,s,q)=RCBAS(c,s,q)*CONS(q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
BAS4(c,s,q)=SHIND(s,q)*BAS4_S(c,q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
BAS5(c,s,q)=RGBAS(c,s,q)*GOV(q);

```

A3.2.2. Margin flows

Margin demands in monetary terms are calculated here. For each basic flow, there is a corresponding margin demand in the system. The distribution of margins follows the same pattern as in the country.

! Excerpt 9 of TABLO input file: !
! Margin flows !

COEFFICIENT

```

(all,c,COM)
XMR1(c) # Exports - margin 1 #;
(all,c,COM)
XMR2(c) # Exports - margin 2 #;
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
MR11(c,s,i,q) # Intermediate consumption - margin 1 #;
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
MR12(c,s,i,q) # Investment demand - margin 1 #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
MR13(c,s,q) # Household demand - margin 1 #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
MR14(c,s,q) # Export - margin 1 #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
MR15(c,s,q) # Government demand - margin 1 #;
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
MR21(c,s,i,q) # Intermediate consumption - margin 2 #;
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
MR22(c,s,i,q) # Investment demand - margin 2 #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
MR23(c,s,q) # Household demand - margin 2 #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
MR25(c,s,q) # Government demand - margin 2 #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
X_SH(c,s,q) # Export share #;

```

READ

```

XMR1 FROM FILE BDATA HEADER «XMR1»;

```

XMR2 from file BDATA header «XMR2»;

FORMULA

```
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
X_SH(c,s,q)=BAS4(c,s,q)/(TINY+sum(r,ALLSOURCE,sum(t,REGDEST,BAS4(c,r,t))));
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
MR11(c,s,i,q)=RAMR1(c,s,i,q)*CINT(i,q);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
MR12(c,s,i,q)=RIMR1(c,s,i,q)*INV(q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
MR13(c,s,q)=RCMR1(c,s,q)*CONS(q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
MR14(c,s,q)=X_SH(c,s,q)*XMR1(c);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
MR15(c,s,q)=RGMR1(c,s,q)*GOV(q);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
MR21(c,s,i,q)=RAMR2(c,s,i,q)*CINT(i,q);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
MR22(c,s,i,q)=RIMR2(c,s,i,q)*INV(q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
MR23(c,s,q)=RCMR2(c,s,q)*CONS(q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
MR24(c,s,q)=X_SH(c,s,q)*XMR2(c);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
MR25(c,s,q)=RGMR2(c,s,q)*GOV(q);
```

A3.2.3. Indirect tax flows

Tax values associated with the basic flow are calculated here. For each basic flow, the corresponding national tax rate is applied.

! Excerpt 10 of TABLO input file: !

! Tax flows !

COEFFICIENT

```
(all,c,COM)
XTX1(c) # Exports - tax 1 #;
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
TX11(c,s,i,q) # Intermediate consumption - tax 1 #;
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
TX12(c,s,i,q) # Investment demand - tax 1 #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
TX13(c,s,q) # Household demand - tax 1 #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
TX14(c,s,q) # Export - tax 1 #;
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
```

TX15(c,s,q) # Government demand - tax 1 #;

READ

CTX1 FROM FILE BDATA HEADER «CTX1»;

FORMULA

(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
 TX11(c,s,i,q)=RATX1(c,s,i,q)*CINT(i,q);
 (all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
 TX12(c,s,i,q)=RITX1(c,s,i,q)*INV(q);
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 TX13(c,s,q)=RCTX1(c,s,q)*CONS(q);
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 TX14(c,s,q)=X_SH(c,s,q)*CTX1(c);
 (all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
 TX15(c,s,q)=RGTX1(c,s,q)*GOV(q);

A3.2.4. Disaggregation of sectoral value added

This excerpt shows the procedure for the disaggregation of the sectoral value added. Since there is no information available for the regional sectoral aggregates, the specification below is kept only for the purpose of future development of the IIO-MOR.

In our case, we have implemented the system according to the code as shown here. The shortcut was to set the values for the coefficients LABR(i,q) and CPTL(i,q) using the national sectoral shares and using OCTS(i,q) as the residual.

! Excerpt 11 of TABLO input file: !

! Value added !

COEFFICIENT

(all,i,IND)(all,q,REGDEST)
 LABR(i,q) # Total regional labor payments, by sector #;
 (all,i,IND)(all,q,REGDEST)
 OCTS(i,q) # Other costs, by sector #;
 (all,i,IND)(all,q,REGDEST)
 VA(i,q) # Total regional value added, by sector #;

READ

LABR from file BDATA header «LABR»;
 OCTS from file BDATA header «OCTS»;

FORMULA

(all,i,IND)(all,q,REGDEST)
 VA(i,q)=LABR(i,q)+CPTL(i,q)+OCTS(i,q);

A3.2.5. Production aggregates

The coefficient $MAKE(i,c,s)$ refers to the 12 regional make matrices. Given the transformation of the database into a sector by sector framework, the make matrix for each regional is a diagonal matrix. The code is general enough to be adapted for the commodity by sector framework.

This excerpt shows also specific aggregations of the make matrix to be used for balance checking purposes.

! Excerpt 12 of TABLO input file: !

! Gross output !

COEFFICIENT

(all,i,IND)(all,q,REGDEST)

MAKE_I(i,q) # Total regional output, by sector #;

(all,i,IND)(all,q,REGDEST)

MAKE_I2(i,q) # Total regional output, by sector, make version #;

(all,c,COM)(all,s,REGSOURCE)

MAKE_C(c,s) # Total regional output, by commodity #;

(all,i,IND)(all,c,COM)(all,s,REGSOURCE)

MAKE(i,c,s) # Make matrix, by region #;

READ

MAKE from file BDATA header «MAKE»;

FORMULA

(all,i,IND)(all,q,REGDEST)

MAKE_I(i,q)=VA(i,q)+CINT(i,q);

(all,i,IND)(all,q,REGDEST)

MAKE_I2(i,q)=sum(c,COM,MAKE(i,c,q));

(all,c,COM)(all,s,REGSOURCE)

MAKE_C(c,s)=sum(i,IND,MAKE(i,c,s));

A3.2.6. Balancing checks

The first check was undertaken to assure that the information provided in the make matrix was consistent with the information on the absorption (use) matrix, i.e. $MAKE_I(i,q) = MAKE_I2(i,q)$, for every i and q .

The second check refers to the commodity balance check. Changes in inventories are introduced and defined as the discrepancy needed to be inserted in the system for commodity balancing purposes between the use and make tables.

Finally, the third check confirms that total sectoral costs equal total sectoral output.

! Excerpt 13 of TABLO input file: !

! Check 1 - Sector output balance check !

COEFFICIENT

(all,i,IND)(all,q,REGDEST)
 CHECKA(i,q) # Check MAKE_I = MAKE_I2 #;

FORMULA

(all,i,IND)(all,q,REGDEST)
 CHECKA(i,q)=MAKE_I(i,q)-MAKE_I2(i,q);

! Check 2 – Commodity balance check !

COEFFICIENT

(all,c,COM)(all,s,REGSOURCE)
 DIRSALES(c,s) # Direct usage #;
 (all,r,MARGCOM)(all,s,REGSOURCE)
 MARSALES1(r,s) # Margin 1 usage #;
 (all,r,MARGCOM2)(all,s,REGSOURCE)
 MARSALES2(r,s) # Margin 2 usage #;
 (all,c,COM)(all,s,REGSOURCE)
 SALES(c,s) # All usage #;
 (all,c,COM)(all,s,REGSOURCE)
 LOSTGOODS(c,s) # Discrepancy #;
 (all,c,COM)(all,s,REGSOURCE)
 BAS7(c,s) # Change in stocks - for balancing purposes #;

FORMULA

(all,c,COM)(all,s,REGSOURCE)
 DIRSALES(c,s)=sum(i,IND,sum(q,REGDEST,BAS1(c,s,i,q)))
 +sum(i,IND,sum(q,REGDEST,BAS2(c,s,i,q)))
 +sum(q,REGDEST,BAS3(c,s,q))
 +sum(q,REGDEST,BAS4(c,s,q))
 +sum(q,REGDEST,BAS5(c,s,q));
 (all,r,MARGCOM)(all,s,REGSOURCE)
 MARSALES1(r,s)=sum(i,IND,sum(c,COM,sum(ss,ALLSOURCE,MR11(c,ss,i,s))))
 +sum(i,IND,sum(c,COM,sum(ss,ALLSOURCE,MR12(c,ss,i,s))))
 +sum(c,COM,sum(ss,ALLSOURCE,MR13(c,ss,s)))
 +sum(c,COM,sum(ss,ALLSOURCE,MR14(c,ss,s)))
 +sum(c,COM,sum(ss,ALLSOURCE,MR15(c,ss,s)));
 (all,r,MARGCOM2)(all,s,REGSOURCE)
 MARSALES2(r,s)=sum(i,IND,sum(c,COM,sum(ss,ALLSOURCE,MR21(c,ss,i,s))))
 +sum(i,IND,sum(c,COM,sum(ss,ALLSOURCE,MR22(c,ss,i,s))))
 +sum(c,COM,sum(ss,ALLSOURCE,MR23(c,ss,s)))
 +sum(c,COM,sum(ss,ALLSOURCE,MR24(c,ss,s)))
 +sum(c,COM,sum(ss,ALLSOURCE,MR25(c,ss,s)));
 (all,c,NONMARGCOM)(all,s,REGSOURCE)
 SALES(c,s)=DIRSALES(c,s);
 (all,c,MARGCOM)(all,s,REGSOURCE)

```

SALES(c,s)=DIRSALES(c,s)+MARSALES1(c,s);
(all,c,MARGCOM2)(all,s,REGSOURCE)
SALES(c,s)=DIRSALES(c,s)+MARSALES2(c,s);
(all,c,COM)(all,s,REGSOURCE)
LOSTGOODS(c,s)=SALES(c,s)-MAKE_C(c,s);
(all,c,COM)(all,s,REGSOURCE)
BAS7(c,s)=-LOSTGOODS(c,s);

```

! Sector output balance !

COEFFICIENT

```

(all,i,IND)(all,q,REGDEST)
V1TOT(i,q) # Total cost by sector #;
(all,i,IND)(all,q,REGDEST)
STOK(i,q) # Total cost adjustment by sector #;
(all,i,IND)(all,q,REGDEST)
CHECKB(i,q) # Check MAKE_I = MAKE_I2 #;

```

FORMULA

```

(all,i,IND)(all,q,REGDEST)
STOK(i,q)=CHECKA(i,q);
(all,i,IND)(all,q,REGDEST)
V1TOT(i,q)=VA(i,q)+CINT(i,q)-STOK(i,q);
(all,i,IND)(all,q,REGDEST)
CHECKB(i,q)=V1TOT(i,q)-MAKE_I2(i,q);
Assertion # V1TOT = MAKE_I2 for sectors #
(all,i,IND)(all,q,REGDEST)
ABS(CHECKB(i,q))<SMALL;

```

A3.2.7. Renaming arrays

This excerpt renames some of the arrays in order to be consistent with the notation adopted in the ICGE model code, as presented in Figure A2.

COEFFICIENT

```

(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)(all,r,MARGCOM)
MAR1(c,s,i,q,r);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)(all,r,MARGCOM)
MAR2(c,s,i,q,r);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)(all,r,MARGCOM)
MAR3(c,s,q,r);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)(all,r,MARGCOM)
MAR4(c,s,q,r);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)(all,r,MARGCOM)
MAR5(c,s,q,r);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)

```

```

TAX1(c,s,i,q);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
TAX2(c,s,i,q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
TAX3(c,s,q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
TAX4(c,s,q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
TAX5(c,s,q);

```

FORMULA

```

(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)(all,r,MARGCOM)
MAR1(c,s,i,q,r)=MR11(c,s,i,q);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)(all,r,MARGCOM)
MAR2(c,s,i,q,r)=MR12(c,s,i,q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)(all,r,MARGCOM)
MAR3(c,s,q,r)=MR13(c,s,q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)(all,r,MARGCOM)
MAR4(c,s,q,r)=MR14(c,s,q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)(all,r,MARGCOM)
MAR5(c,s,q,r)=MR15(c,s,q);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)(all,r,MARGCOM2)
MAR1(c,s,i,q,r)=MR21(c,s,i,q);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)(all,r,MARGCOM2)
MAR2(c,s,i,q,r)=MR22(c,s,i,q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)(all,r,MARGCOM2)
MAR3(c,s,q,r)=MR23(c,s,q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)(all,r,MARGCOM2)
MAR4(c,s,q,r)=MR24(c,s,q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)(all,r,MARGCOM2)
MAR5(c,s,q,r)=MR25(c,s,q);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
TAX1(c,s,i,q)=TX11(c,s,i,q);
(all,c,COM)(all,s,ALLSOURCE)(all,i,IND)(all,q,REGDEST)
TAX2(c,s,i,q)=TX12(c,s,i,q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
TAX3(c,s,q)=TX13(c,s,q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
TAX4(c,s,q)=TX14(c,s,q);
(all,c,COM)(all,s,ALLSOURCE)(all,q,REGDEST)
TAX5(c,s,q)=TX15(c,s,q);

```

A3.2.8. Writing the results to the output file

The final step is to write the relevant results for the output file RIODATA, which can then be used to prepare the consolidated IIOM-MOR in Excel format.

WRITE BAS1 TO FILE RIODATA HEADER «BAS1»;
 WRITE BAS2 TO FILE RIODATA HEADER «BAS2»;
 WRITE BAS3 TO FILE RIODATA HEADER «BAS3»;
 WRITE BAS4 TO FILE RIODATA HEADER «BAS4»;
 WRITE BAS5 TO FILE RIODATA HEADER «BAS5»;
 WRITE BAS7 TO FILE RIODATA HEADER «BAS7»;
 WRITE MAR1 TO FILE RIODATA HEADER «MAR1»;
 WRITE MAR2 TO FILE RIODATA HEADER «MAR2»;
 WRITE MAR3 TO FILE RIODATA HEADER «MAR3»;
 WRITE MAR4 TO FILE RIODATA HEADER «MAR4»;
 WRITE MAR5 TO FILE RIODATA HEADER «MAR5»;
 WRITE TAX1 TO FILE RIODATA HEADER «TAX1»;
 WRITE TAX2 TO FILE RIODATA HEADER «TAX2»;
 WRITE TAX3 TO FILE RIODATA HEADER «TAX3»;
 WRITE TAX4 TO FILE RIODATA HEADER «TAX4»;
 WRITE TAX5 TO FILE RIODATA HEADER «TAX5»;
 WRITE LABR TO FILE RIODATA HEADER «LABR»;
 WRITE CPTL TO FILE RIODATA HEADER «CPTL»;
 WRITE OCTS TO FILE RIODATA HEADER «OCTS»;
 WRITE MAKE TO FILE RIODATA HEADER «MAKE»;
 WRITE CHECKA TO FILE RIODATA HEADER «CHKA»;
 WRITE CHECKB TO FILE RIODATA HEADER «CHKB»;
 WRITE STOK TO FILE RIODATA HEADER «STOK»;

Figure A2. Structure of the Interregional Flows Database: The Absorption (Use) Matrix

			User 1			User 2			User 3			User 4	User 5			User 7
			Producers			Investors			Household			Export	Regional Govt.			Inventories
		Size	20	20	20	20	20	20	1	1	1	1	1	1	1	1
	Size	Source/ Destination	R1	...	R12	R1	...	R12	R1	...	R12		R1	...	R12	
Basic Flows	20	R1	BAS1			BAS2			BAS3			BAS4	BAS5			BAS7
	20	...														
	20	R12														
	20	ROW														
Margins	20	R1	MAR1			MAR2			MAR3			MAR4	MAR5			0
	20	...														
	20	R12														
	20	ROW														
Taxes	20	R1	TAX1			TAX2			TAX3			TAX4	TAX5			0
	20	...														
	20	R12														
	20	ROW														
Labor	1		LABR													
Capital	1		CPTL													
Other Costs	1		OCTS													

Table A4. Data Sources Used to Calculate Regional Shares of Sectoral Output and Domestic Absorption

	Supply-use table	Variable used to calculate regional shares
A00	Agriculture, forestry, hunting, related services	Agriculture production for 12 regions (in million dh)
B05	Fishing, aquaculture	Fishing production for 12 regions (million dh)
C00	Mining industry	Mines production for 12 regions (million dh)
D01	Food industry and tobacco	Production in thousands dhs, Food Industry
D02	Textile and leather industry	Production in thousands dhs, Textile and Leather Industry
D03	Chemical and para-chemical industry	Production in in thousands dhs, Chemical and Para-chemical Industry
D04	Mechanical, metallurgical and electrical industry	Production in thousands dhs, Electrical and Electronics Industry + Metal and Mechanical Industry
D05	Other manufacturing, excluding petroleum refining	Industry production for 12 regions (millions dh)
D06	Oil refining and other energy products	Oil refining production for 12 regions (million dh)
E00	Utilities	Electricity and Water production for 12 regions (in million dh)
F45	Construction	Construction and Public works production for 12 regions (in million dh)
G00	Trade	Employed population by industry, Trade
H55	Hotels and restaurants	Hotels and Restaurants production for 12 regions (in million dh)
I01	Transport	Employed population by industry, Transports, Storage and Communications
I02	Post and telecommunications	Employed population by industry, Transports, Storage and Communications
J00	Financial activities and insurance	Employed population by industry, Banks, Insurance and real estate operations
K00	Real estate, renting and services to enterprises	Employed population by industry, Banks, Insurance and real estate operations
L75	General public administration and social security	Employed population by industry, Public administration
MN0	Education, health and social action	Employed population by industry, Social services for the population
OP0	Other non-financial services	Employed population by industry, Personal and household services
	Households	Household final consumption expenditure (breakdown by 12 regions)
	GFCF + inventories changes	Construction production for 12 regions (in million dh)
	GG	Employed population by industry, Public administration

Table A5. Data Sources Used to Calculate Regional Shares of Sectoral Foreign Exports

	Supply-use table	Variable used to calculate regional shares
A00	Agriculture, forestry, hunting, related services	Agricultural value added (in million dh) - LQ
B05	Fishing, aquaculture	Fishing value added (in million dh) - LQ
C00	Mining industry	Mining industry value added (in million dh) - LQ
D01	Food industry and tobacco	Exports in thousands dhs, Food Industry
D02	Textile and leather industry	Exports in thousands dhs, Textile and Leather Industry
D03	Chemical and para-chemical industry	Exports in thousands dhs, Chemical and Para-chemical Industry
D04	Mechanical, metallurgical and electrical industry	Exports in thousands dhs, Electrical and Electronics Industry + Metal and Mechanical Industry
D05	Other manufacturing, excluding petroleum refining	Industry exports for 12 regions (in million dh)
D06	Oil refining and other energy products	Grand Casablanca - Settat - SAMIR
E00	Electricity and water	Employed population by industry, Electricity, gas and water
F45	Construction	Employed population by industry, Construction and public works - LQ
G00	Trade	Employed population by industry, Trade - LQ
H55	Hotels and restaurants	Employed population by industry, Catering and Hotel - LQ
I01	Transport	Employed population by industry, Transports, Storage and Communications - LQ
I02	Post and telecommunications	Employed population by industry, Transports, Storage and Communications - LQ
J00	Financial activities and insurance	Employed population by industry, Banks, Insurance and real estate operations - LQ
K00	Real estate, renting and services to enterprises	Employed population by industry, Banks, Insurance and real estate operations - LQ
L75	General public administration and social security	Employed population by industry, Public administration - LQ
MN0	Education, health and social action	Employed population by industry, Social services for the population - LQ
OP0	Other non-financial services	Employed population by industry, Personal and household services - LQ

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