A REGIONAL SOCIAL ACCOUNTING MATRIX IN TURKEY: SAMSUN 2000

(To be revised)

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1. Introduction

In Torkey, without a formal planning authority three industrial development plans was framed in the 1930s and 1940s. They were the set of industrial projects to take off a backward country. More comprehensive national economic planning started in 1962 by the establishment of State Planning Organization (SPO). Then the first five-year-national development plan covering 1963-1967 was framed and implemented. A Horrod-Domar type growth modeling technique was employed in this first plan. In the second-five-year (1968-1972) development plan a consistency modeling technique based on a 35 sector input-output table was used. Thereafter the Sate Institute of Statistics (SIS) started to construct large-scale input-output tables of the Turkish economy. By now seven input-output tables have been complied and published on a comparable basis.

The last I-O table of he Turkish economy for 1998 was published in May 2004. The table comprises 97 sectors of production. The relevant document includes the use and supply tables, matrices indicating trade and transportation margins, matrix of net indirect taxes on goods, import matrix, and finally a symmetric domestic input-output table. Thus the 1998 I-O table is the best of all of compiled for the economy so far.

Concerning the social accounting matrix there has been a limited number of attempts in Turkey. To my knowledge three main previous attempts to construct a SAM for Turkey can be cited. Günlük-Şenesen (1991) presented a SAM for 1973. Her study is a straightforward extension of the 1973 I-O table with the addition of a couple of rows and columns. Özhan (1998) constructed a SAM for 1993 using a framework developed by Richard Stone in the early 1960s. This SAM was also published in detail by the SPO. Finally, a large scale SAM for Turkey is constructed by De Santis and Özhan (1997). This SAM is also published in a working paper of Inforum in full detail (De Santis and Özhan, 1995).

When it comes to regional input-output tables in Turkey, again, a limiyted number of examples can be found in the from of academic thesis. They, however, are not based on a sound theory of the relevant technique. To say the least they are full of conceptual and numerical errors. One careful study is carried out by us for the Eastern Anatolian Region. An the sequent regional I-O table for Eastern Anatolia is published by the SPO (2000).

Although national economic planning has a long history in Turkey regional planning has not been on the agenda of the national governments. To some extent this reflects the lack of concern with the issue of regional disparities across the country. So far there has been only four regional development initiatives. The first and most important one is the South east

Anatolia Project, best known with its initials in Turkish, GAP (Güney doğu Anadolu Projesi). This name suits well with the word *gap* in English since it aims to close the gap between the region and the national average in terms of economic and social wellbeing. The other three regional development projects are Zonguldak regional development project, which I can call it BAKAP (West Black Sea Project), DOKAP (East Black Sea Project) and DAP (East Anatolia Project). None of them except for the last one mentioned above based on a regional I-O tables.

In 1999 the European Council decided that Turkey is a candidate country destined to join the Union. Among many forms of adoption and economic transformation programs, Turkey has now defined 26 regional statistical units (NUTS II regions) for the statistical purposes as required by the EU. We believe that, from now on, along with two other class of regional statistical units, 12 NUTS I (macro or larger regions) and 81 NUTS III (micro regions or provinces), this new form of statistical units at regional level can stimulate rigorous regional studies.

Samsun region, with its shortened name on the list TR83, comprises four provinces, Amasya, Çorum, Samsun, Tokat. The region is placed between two long rivers, namely Yeşilırmak (Greenriver) and Kızılırmak (Redriver, the longest one in Anatolia) in the northern coast of Turkey on Black Sea. The Turkish government has initiated a development project for the concerned region (TR83). The SPO delegated the formulation of the program (project) under the name "Yeşil-ırmak Havza Gelişim Projesi (Green-river valley development project)" to DOLSAR, an engineering consultancy firm situated in Ankara.

Our aim in this paper is to build a regional social accounting matrix (SAM) for the region TR85 (Samsun). The first set of data is mainly the I-O table constructed for the region by us as part of the project. The second set of

data was the Population Census of 2000 (SIS, 2000), and Household Income and Expenditure Survey of 1994 (SIS, 2001). Thirdly, numerous data collected and collated at regional level by DOLSAR, as well as those of SPO and SIS were also made use of.

One could ask, how meaningful would be a SAM or even an I-O table for a small region, such as Samsun TR 83, with only about 3 million (2000 Census data) population. We could reply this objection with some difficulty if we have not read the work of Thorbecke (1998) in which it is clearly shown that SAMs can bu built not only for a country or region however small they can even be constructed for villages as well. Thorbecke informs that in a recent study (Parikh and Thorbecke, 1996) they constructed two village-level SAMs to capture the socio-economic effects of industrial decentralization on two relatively similar Indian villages, one close to a factory (Boriya) and another located in a remote area (Aurapelle). This short survey of literature is satisfactory enough for us to say that we have based our theory and practice on a safe ground.

This paper aims to construct a regional social accounting matrix for Samsun and to address some distributional issues at the region. The second part of the paper reviews the structure and growth performance of the region over the period 1987-2000. Section 3 gives a brief description of the SAM structure. A multiplicative decomposition of the SAM multiplier matrix M_a is also presented in this section. Section 4 gives a brief account of the SAM for Samsun region for 2000. Section 5 summeries the results of structurel analysis carried of in terms of three multiplicative components of the general mutplier matrix, dnoted by M_{a1}, M_{a2}, M_{a3}. Finally, section 6 summeries the main findings of the SAM approach to Samsun region.

2. The Size and The Structure of the Economy of Samsun Region.

There are 26 NUTS II (Nomenculator of Territorial Units for Statistics) regions in Turkey defined in 2002. With the data collected for 2000 a sorted list of these regions with respect to their per capita income is given in Table 1 below.

Table 1. Regions and Regional Disparity in Turkey, 2000

	NUTS II Regions	Population million	Share of urban population %	GDP Billions of $	Per capita income 1000 $	Area (1000 M2)	Population density (persons per square kilometer)	Per capita income index above (below) average %	Cum share of GDP %
1	Kocaeli	2,7	57,2	14,3	5,3	20,2	135	78,3	7,1
2	İstanbul	10,0	90,7	44,1	4,4	5,2	1928	49,3	29,2
3	İzmir	3,4	81,1	14,5	4,3	12,0	281	45,9	36,5
4	Ankara	4,0	88,3	16,8	4,2	24,5	163	42,5	44,9
5	Tekirdağ	1,4	60,2	5,0	3,7	18,7	73	25,6	47,4
6	Bursa	3,0	76,4	10,5	3,5	28,6	106	18,0	52,6
7	Adana	3,5	68,5	11,6	3,3	29,4	119	12,0	58,4
8	Aydın	2,5	46,7	8,2	3,3	32,4	78	10,7	62,5
9	Zonguldak	1,0	44,5	3,1	3,0	9,5	108	2,4	64,1
10	Balıkesir	1,5	51,5	4,6	3,0	24,2	64	2,2	66,4
	Turkey	67,8	64,9	199,9	2,9	769,6	88	0,0	
11	Antalya	2,5	55,3	6,8	2,7	35,8	69	-7,9	69,8
12	Manisa	3,1	52,0	7,7	2,5	44,7	68	-14,5	73,6
13	Kırıkkale	1,7	53,0	4,1	2,4	31,2	54	-17,6	75,7
14	Konya	2,4	58,9	5,5	2,3	47,7	51	-23,3	78,5
15	Samsun	3,0	51,5	6,4	2,1	37,5	80	-27,5	81,7
16	Hatay	2,7	52,6	5,8	2,1	23,3	117	-27,9	84,5
17	Kastamonu	0,9	47,8	1,8	2,0	26,4	33	-31,4	85,4

18	Malatya	1,8	58,8	3,4	1,9	35,9	49	-34,9 87,1
19	Kayseri	2,5	58,8	4,7	1,9	59,7	42	-36,4 89,5
20	Gaziantep	2,0	70,3	3,8	1,9	15,3	132	-36,7 91,4
21	Trabzon	3,1	49,4	5,8	1,9	35,2	89	-36,9 94,3
22	Sanlıurfa	2,8	59,1	4,2	1,5	33,8	83	-49,3 96,4
23	Erzurum	1,4	57,3	2,0	1,5	40,7	33	-49,6 97,4
24	Mardin	1,8	59,6	2,2	1,3	26,1	68	-57,5 98,5
25	Van	2,0	49,3	1,9	1,0	41,6	47	-67,2 99,4
26	Ağrı	1,2	44,6	1,1	1,0	30,0	39	-67,2 100,0

Two thirds of total GDP is generated within the territory of the first ten NUTS II regions locaten to the west of Ankara, except Adana on thr east cost of Mediterranean Sea. Samsun region (TR83) is placed on the 15th row on the list which ranks the regions from the highest to the lowest in terms of their per capita income. Per capita income in the region (TR83) in 2000 is only $2,100 which is 27.5 percent lower then the national average $2,900.

To measure the overall size of Samsun region we have to look at the share of the regional GDP in total GDP in Turkey. This comaprision at sectroral is provided in Table 2. Table 2 also shows the structure of the region's economy in comparision with the structure of the Turkısh economy from 1987 to 2000.

Table 2. The Size and the Structure of GDP, %

		Size		Structure of GDP			
		TR83 (Samsun)/TR		TR83 (Samsun)		Turkey (TR)	
		1987	2000	1987	2000	1987	2000
	Agriculture	5,8	5,6	30,1	24,4	18,1	14,1
1	Farming and animal husbandary	5,9	5,7	28,2	23,8	16,7	13,3
2	Forestry	4,4	3,8	1,4	0,4	1,1	0,3
3	Fischery	4,7	2,0	0,5	0,3	0,4	0,4
	Industry	2,1	2,4	15,8	18,1	26,2	24,1
4	Mining	1,6	0,8	0,9	0,3	2,0	1,1

5	Manufacturing	1,8	2,2	11,8	13,7	22,3	19,9
6	Electricity, gas, water	5,3	4,4	3,1	4,1	2,0	3,0
	Services	3,4	3,0	54,1	57,5	55,7	61,8
7	Construction	3,1	2,9	6,6	4,7	7,4	5,2
8	Wholesale and retail trade	4,1	3,3	21,0	17,0	17,5	16,5
9	Hotels nad restaurants	1,7	1,4	1,3	1,6	2,7	3,5
10	Transportation and communication	3,0	3,1	10,0	13,5	11,7	14,2
11	Finacial institutions	2,1	1,3	1,9	1,5	3,1	3,8
12	Selfemployed	2,4	1,8	1,6	2,2	2,4	3,9
13	Public services	4,3	4,4	6,3	13,8	5,1	10,1
14	Dwellings	3,3	2,2	5,5	3,2	5,9	4,6
	GDP	3,5	3,2	100,0	100,0	100,0	100,0

In terms of the oveall size of GDP the regional income was 3,5 percent of the total GDP of the country in 1987. The size of GDP in Samsun has further declined to 3,2 percent over the period 1987 – 2000. This implies that the GDP growth rate was lower than the growth rate of the Turkish economy. To see that this was the cas to 3,2 percent e the growth rates in 14 sectors are calculated and presented in Table 3. Table 2 also reveals that both Samsun region and Turkey have stiil been maintaining large share of agricultural activities in total GDP.

The SIS started to publish annual data for 14 sectors of GDP at provincial level in 1994 starting from 1987, both constent (1987) and current prices.

Tablo 3. Annual Average Growth Rates, Samsun and Turkey, 1987 – 2000, %

	Samsun	Turkey
Agriculture	1,6	1,6
1 Farming and animal husbandary	1,8	1,7
2 Forestry	-1,9	-1,0
3 Fischery	-1,3	2,0

	Industry	4,2	4,5
4	Mining	-5,3	0,8
5	Manufacturing	4,1	4,4
6	Electricity, gas, water	5,8	7,3
	Services	3,3	3,7
7	Construction	0,7	0,7
8	Wholesale and retail trade	4,0	4,7
9	Hotels nad restaurants	4,9	5,2
10	Transportation and communication	5,1	4,8
11	Finacial institutions	-0,8	1,8
12	Selfemployed	3,2	4,3
13	Public services	1,8	2,1
14	Dwellings	2,0	2,0
	GDP	3,0	3,6

Source: SIS (1994, 2002).

It is seen that the Samsun region grew at around 3 percnet per year from 1987 to 2000 while national egonomy as a whole grew at a hgher rate, 3,6 percent per anum. The first five sectors that grew with relative high rate are Electricity, gas and water supply (5,8 percent), Transportation and communication (5,1 percent), Hotels and restaurants services (4.9 percent), Manufacuring industry (4,1 percent), and Wholesale and retail trade (4 percent). Some sectors has declined from 1987 to 2000. Banking sector (Financial institutions) at regional level unprecedently showed negative growth rate of 0,8 percent, though it grew by 1,8% at national level. Since Samsun region has grown at a lower rate than Turkey the disparity between the region and the nation gets worse.

3. The Social Accounting Matrix

A SAM is a comprehensive data framework describing the structure of the economy it represents. In addition it helps to check the consistency of the data collected from various sources in the estimation process of national income aggregates. The SAM is build around the input-output table with the

addition of two new blocks, one for factors of production and the second for institutions. A schematic form of the SAM is shown in Table 4.

Tablo 4. Schematic Social Accounting Matrix

				Expenditures				
				Endogenous accounts			External	
				Faktors	Institutions current a/c	Sectors	Other acounts	Total
				1	2	3	4	5
Receipts	Endogenous ac	Factors	1	0	0	T_{13}	T_{14}	y_1
		Institutions (hoseholds & firms)	2	T_{21}	T_{22}	0	T_{24}	y_2
		Sektors	3	0	T_{32}	T_{33}	T_{34}	y_3
	Exog	Other accounts	4	T_{41}	T_{42}	T_{43}	T_{44}	y_4
	Total		5	y_1'	y_2'	y_3'	y_4'	

Since both the final demand section and the value adde block of the I-O system, as well as interindustry deliveries, the SAM must be a sqoure matrix. This property is reflected in the schematic form given in Table 4.

The structure of a SAM is based on the following two basic features, as well as other fundamental features:

(i) the payments for a transaction by one account represent the receipts for the same transection by another account;

(ii) total income is always equal to total expenditure.

In order to have a model structure out of a given SAM some set accounts are designated as exogenous and some as endogenous. Among endogenous accounts we include factors od production, isntitutipns, and sectors of production. Exogenous accounts manily include governmet current account, instutions capital account, the rest of the world account

The most important feature of the SAM is that it incorporates three-way interdependence among production activities, factors of production, and institutions. Accordicgly, the transaction submatrices within the SAM are defined as follows:

T_{13} : shows the factor pyments by sectors of production

T_{14}: shows fhe factor income from the rest of the world and also from other parts of the country, if the SAM is a regional one

T_{21}: It maps the facor income into household and firms

T_{22}: It captures the institutional income transfers, i.e. income from one tye of household to another, or from firns to households.

T_{24}: Nofactor income of hoseholds from the exogenous set of accounts. Like f oreign income transfers and government transfers to hoseholds or firms.

T_{32}: Hosehold expenditures on goods and services produced dometically or locally.

T_{33}: Interindustry transactions, i.e. input-output structure of the economy.

T_{34}: Some parts of the final demand on the production accounts, namely government expenditures, investment, and exports.

T_{41}: Factor income payments abroad, if these are not netted out in T_{14}.

T_{42}: Household current income payment or savings abroad.

T_{43}: Noncompeting imports.

$T_{44:}$ Some balancing entries among external accounts.

t_i: Row totals for the i*th* block, *i = 1, 2, 3, 4*.

Since the row totals must be equal to column totals in a SAM, total expenture vector in row 5 is the transpose of the total income vector shown in column 5.

Definition.
The matrix of average expenditure coefficients for any T_{ij} is obtained by dividing each and every element by the coulumn total in the whole matrix, i.e. the elements of t_j'. Symbolically,

$$A_{ij} = T_{ij}\hat{t}_j^{-1} \qquad \forall\, i, j \qquad \text{Eq. (1)}$$

Thus the row sum of all acounts in the SAM structure is given by

any block acco

$$t = At + x \qquad \text{Eq. (2)}$$

where
x: the column vector of row sums for the exogenous accounts

$$A = \begin{bmatrix} 0 & 0 & A_{13} \\ A_{21} & A_{22} & 0 \\ 0 & A_{32} & A_{33} \end{bmatrix} \qquad \text{Eq. (3)}$$

The solution to the system of accounting identities for the thre endogenous accounts defined in Eq. 2 is given by

$$t = (I - A)^{-1} x \qquad \text{Eq. (4)}$$

Once the solution to the three sets of endogenous accounts is obtained in Eq. (4), the solution for the leakages to the exogenous account can also be found endogenously, by the following equation

$$t_4 = A_{41}t_1 + A_{42}t_2 + A_{43}t_3 + x_4 \qquad \text{Eq. (5)}$$

Multiplier decomposition:

Te multiplie matrix in the SAM model is given in Eq. (4) above and denoted by M_a, i.e

$$M_a = (I - A)^{-1} \qquad \text{Eq. (6)}$$

Two ways of multiplier decomposition is suggested for the SAM multiplier in defined in Eq. (6). The one is additive form decomposition (Stone, 1978) and the second is multiplicative form of decomposition (Pyatt and Round, 1979). Here we explore the multiplicative form to analyse the interdependencies among three endogenous set of accounts within the SAM structure.

In the multiplicative form of decomposition it can be shown that the general multiplier mtrix Ma can be defined as the product of three sperate multiplier matrices each having its own meaning. These are defined as foolws.

$$M_a = M_{a3}M_{a2}M_{a1} \qquad \text{Eq. (7)}$$

Where

$$M_{a1} = \begin{bmatrix} I & 0 & 0 \\ 0 & (I - A_{22})^{-1} & 0 \\ 0 & 0 & (I - A_{33})^{-1} \end{bmatrix} \qquad \text{Eq. (8)}$$

M_{a1} is called the matrix of transfer effects within the same set of endogenous accounts. It captures the direct transfer effects from households to hoseholds or from firms to households as a result of increase in the exogenous components of the same set of accounts. The main property of Ma1 is that it is block-diagonal. The Leontief inverse $(I - A_{33})^{-1}$ in the SAM structure is contained on the bottom right corner of M_{a1}.

$$M_{a2} = \begin{bmatrix} I & A_{13}^{*}A_{32}^{*} & A_{13}^{*} \\ A_{21}^{*} & I & A_{21}^{*}A_{13}^{*} \\ A_{31}^{*}A_{21}^{*} & A_{32}^{*} & I \end{bmatrix} \qquad \text{Eq. (9)}$$

$$\begin{aligned} A_{13}^{*} &= A_{13} \\ A_{21}^{*} &= (I - A_{22})^{-1} A_{21} \\ A_{32}^{*} &= (I - A_{33})^{-1} A_{32} \end{aligned} \qquad \text{Eq. (10)}$$

M_{a2} is known as the matrix of cross effects. It captures the effects effects of any exogenous change in one set of endogenous account on the other two sets of endogenous accounts of the SAM.

$$M_{a3} = \begin{bmatrix} (I - A_{13}^{*}A_{32}^{*}A_{21}^{*})^{-1} & 0 & 0 \\ 0 & (I - A_{21}^{*}A_{13}^{*}A_{32}^{*}) & 0 \\ 0 & 0 & (I - A_{32}^{*}A_{21}^{*}A_{13}^{*}) \end{bmatrix} \qquad \text{Eq. (11)}$$

M_{a3} measures the full circuler flow effexts of an injection to the system orjinating from one account and travilling through sistem and ending at its orijin again. Since it isolates the other two effects defined previously, M_{a3} is a block diagonal matrix.

4. The SAM for Samsun for 2000

Our estimation for the regional SAM for Samsun for 2000 starts with the estimation of the matrix T_{33}, that is regional I-O table. The regional I-O table for Samsun was based on the regional GDP figures and national I-O table for 1996. The RAS balancing technique is used for this purpose.

The second important sub-matrix of the regional SAM is T_{13}. The SIS publishes the labour force data at different types of occupations by sectors after every sencus of population which takes place in every ten-yea interval. The last census of population took place in 2000 and data provided for 81 provinces were made available in 2003. Given these data together with some additional assumptions we estimated the labour income payments by each industry.

The third and the last submatrix which based on a statistical survey is T_{32}. The main source of this matrix which is called household consumption is the Household Income and Expenditure Survey for 1994 carried out by the SIS (1998). In this survey the regional (not the provincial) data for two household types, urban households and rurel households, are published. We assumed that the Black Sea region, now one of the 12 larger regions of NUTS II, can best be represent our smaller region Samsun. Concerning these data, the most important fact to mention at this point their classification does not correspond to list of sectors identied in the national I-O table. Thus we relied on our personel judgment to converting these data to fill gap in the SAM. Exogenous account for

the regional SAM are mainly balancing items since there are no reliable data on fill those cells.

To appreciate the accuracy of these work we presnt labour-actvity matrices both for Turkey and Samsun from Table 5 to 8. The first two matrices (Table 5 and 6) present the actual data for Turkey while the next two (Table 7 and 8) present the same data for the Samsun region (TR83).

Table 5. Eployment by Industry Matrix, Turkey 2000

	1 Agriculture	2 Mining	3 Manufacturing	4 Electricty	5 Construction	6 Trade	7 Transportation	8 Finance	9 Social serv	10 Unidentified	Total
1 Scientists	3756	6247	2	1	38306	94612	5	02	704	5464	39
Entrepreneurs			13423				6270	4232	8309		36634
2 Administrat	605	1835	2	2016	26417	12413	3	1	5	709	6
ors			13705	1930		13618	1170	3687	7388		15434
3 Trade	3896	5589	8	4	13468	9	49	17	53	3376	99
						14229	1407	9579	1060		16033
4 person.	1614	618	55293	425	1387	62	0	6	7	541	13
Service			12637	1168		59189	4919	6220	1049		19394
5 person.	9001	6771	3	5	21275	1	3	6	389	11618	02
	12549								2360		12593
6 Agricultur.	796	181	8804	269	907	7223	1028	963	4	275	050
		7470	26294	3761	10940	24257	5601	3333	1343		60334
7 Nonagric.	8087	9	02	2	65	6	80	5	204	10316	86
8 Unknown	72	85	2669	50	421	4911	3817	486	2079	1716	16306
Total	12576	9603	32761	9815	11962	25127	8532	8081	4545		25997
	827	5	73	2	46	77	55	26	535	34015	141

Source: SIS (2003)

The joint probability distribution for this two-way classification of labour force data ifor Turkey is given in Table 6 below.

Table 6. Joint Probabilties (Eployment by Industry), Turkey 2000

	1	2	3	4	5	6	7	8	9	11
			Manuf						Soci	
	Agricult	Mani	acturin	Electri	Constructi	T	Transporta	Finan	al	Tota
	ure	ng	g	cty	on	rade	tion	ce	serv	l
1 Scientists	0,0	0,0	0,7	0,1	0,1	0,4	0,2	0,8	5,0	7,3
Entreprene										
2 urs	0,0	0,0	0,5	0,0	0,1	0,0	0,2	0,2	0,3	1,4
Administr										
3 ators	0,0	0,0	0,5	0,1	0,1	0,5	0,5	1,4	2,8	5,9
Trade										
4 person.	0,0	0,0	0,2	0,0	0,0	5,5	0,1	0,4	0,0	6,2
Service										
5 person.	0,0	0,0	0,5	0,0	0,1	2,3	0,2	0,2	4,0	7,5
6 Agricultur.	48,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	48,4
7 Nonagric.	0,0	0,3	10,1	0,1	4,2	0,9	2,2	0,1	5,2	23,2
Total										100,
	48,4	0,4	12,6	0,4	4,6	9,7	3,3	3,1	17,5	0

Note: Since the data on the last column and the last row of Table 5 are almost nill they are exluded from this table. The error for this exclusion is about 0.1 percent.

It is clearly seen that a large amount of labour force (48,8) in Turkey is either engaged in Agriculture or they choose agriculture as their main type of employment (occupation).

The corresponding employment-activity tables for the Samsun region are in Table 7 and 8 repectively.

Table 7. Eployment by Industry Matrix, Samsun 2000

	1	2	3	4	5	6	7	8	9	10	11
			M		C						
			anuf		onst				Soci		
	Agricul	Mani	actur	Elect	ruct	Trad	Transporta	Fina	al	Unident	
	ture	ng	ing	ricty	ion	e	tion	nce	serv	ified	Total
									5643		6793
1	Scientists	127	112	2349	897	738	2490	1086	3546	2	162	9
	Entreprene											1038
2	urs	18	50	2886	58	631	399	2035	959	3325	27	8
	Administr									2422		4321
3	ators	167	102	2759	654	216	2906	3147	8988	7	51	7
	Trade						4857					5176
4	person.	65	12	1057	10	23	2	119	1573	328	6	5
	Service						1553			3676		6014
5	person.	400	157	3191	487	580	5	967	1729	3	335	4
												8357
6	Agricultur.	834350	5	387	5	23	142	34	35	742	8	31
						4						
				5977		130				4935		1790
7	Nonagric.	218	2178	3	1327	8	7300	16724	655	3	251	87
8	Unknown	0	1	79	0	13	160	81	12	84	43	473
	Total					4						
				7248		353	7750		1749	1712		1248
		835345	2617	1	3438	2	4	24193	7	54	883	744

Source: SIS (2003)

The joint probability distribution of the employment structure for the Samsun region is given in Table 8.

Table 8. Joint Probabilties (Eployment by Industry), Samsun 2000

	1	2	3	4	5	6	7	8	9	
									Social	
			Manuf			T			l	
	Agricul	Mani	acturin	Electri	Construc	rad	Transport	Fina	serv	T
	ture	ng	g	cty	tion	e	ation	nce	.	otal
1 Scientists	0,0	0,0	0,2	0,1	0,1	0,2	0,1	0,3	4,5	5,4
2 Entrepreneurs	0,0	0,0	0,2	0,0	0,1	0,0	0,2	0,1	0,3	0,8
3 Administrators	0,0	0,0	0,2	0,1	0,0	0,2	0,3	0,7	1,9	3,5
4 Trade person.	0,0	0,0	0,1	0,0	0,0	3,9	0,0	0,1	0,0	4,1
5 Service person.	0,0	0,0	0,3	0,0	0,0	1,2	0,1	0,1	2,9	4,86
6 Agricultur.	66,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	6,91
7 Nonagric.	0,0	0,2	4,8	0,1	3,3	0,6	1,3	0,1	4,0	4,31
Total	66,9	0,2	5,8	0,3	3,5	6,2	1,9	1,4	13,7	00,0

Note:

To see that the structure of employment in the Samsun region is completely different from that of Turkey's it is suffice to say that two thirds (66,9 percent) of the labour force in the region is engaged in Agricuture. The chi-square between the corresponbing distributions is found to be extremely high (6187976) which supports the hypothesis that region structure of employment-idustry matrix is completely independent of the national one.

The number of accounts defined in the SAM 2000 for Samsun region is 32. The list of these accounts is given below.

FACTORS OF PRODUCTION

1. Scientists and managers
2. Entrepreneurs
3. Administrators
4. Trade person.
5. Service person.
6. Agricultural households
8. Non-agricultural households
9. Capital (operatig surplus)

INSTITUTIONS

10. Urban households
11. Rural households
12. Firms

Sectors

12. Farming and animal husbandary
13. Forestry
14. Fischery
15. Mining
16. Manufacturing
17. Electricity, gas, water
18. Construction
19. Wholesale and retail trade
20. Hotels nad restaurants

21. Transportation and communication
22. Finacial institutions
23. Selfemployed
24. Public services
25. Dwellings

EXOGENOUS ACCOUNTS

26. Government current account
27. Indirect taxes
28. Institutions combined capital account
29. Current account for the rest of Samsun (in Turkey)
30. Capital account for the rest of Samsun (in Turkey)
31. Rest of the world current account
32. Rest of the world capital account

5. The results

The resulting SAM and related multiplier matrices for the region of Samsun are so large that we could not present them here in this word file. Instead they are presented supplied on seperate files both in Lotus123 and Excel format. There are five of them and their numbers and names are given below:

1. Table 9. A Social Accounting Matrix in Turkey, Samsun 2000, in billions of Tl.
2. Table 10. Average expenditure coeffiencients, A matrix
3. Table 11. Multiplier matrix M_a
3. Table 12. Multiplier matrix M_{a1} for the transfer effects
4. Table 13. Multiplier matrix M_{a2} for the cross effects (open-loop effects)
5. Table 14. Multiplier matrix M_{a3} for the closed-loop effects

However to have a sense of the multiplier matrix Ma a shortened and transposed version of it for the first three row accounts is reproduced on Table 15 below.

Table 15. First Four Rows of SAM Multiplier Matrix M_a, Samsun 2000.

	Row 1	Rpw 2	Row 3	Row 4
	Scientists	Enterpreneurs	Administrators	Trading people
1 Scientists	1,02	0,01	0,02	0,03
2 Enterpreneurs	0,02	1,01	0,02	0,03
3 Adminstrators	0,02	0,01	1,02	0,03
4 Trading people	0,02	0,01	0,02	1,03
5 Service employees	0,02	0,01	0,02	0,03
6 Agricultural empleyees	0,02	0,01	0,02	0,04
7 Non-agricultural employees	0,02	0,01	0,02	0,03
8 Operating surplus	0,01	0,01	0,01	0,02
9 Urban households	0,02	0,01	0,02	0,03
10 Rural households	0,02	0,01	0,02	0,04
11 Companies	0,01	0,01	0,01	0,02
12 Agriculture	0,02	0,01	0,02	0,03
13 Foretsry	0,02	0,01	0,02	0,04
14 Fishery	0,02	0,01	0,02	0,04
15 Mining	0,03	0,01	0,02	0,03
16 Manufacturing	0,03	0,01	0,02	0,03
17 Electricity	0,07	0,01	0,06	0,03
18 Construction	0,02	0,01	0,02	0,03
19 Wholesale & retail trade	0,03	0,01	0,03	0,14
20 Hotels-restaurants	0,03	0,01	0,03	0,11
21 Transportation & cmmunic	0,03	0,02	0,04	0,04
22 Finacial inst.	0,05	0,02	0,08	0,04

23	Selfemployed	0,07	0,01	0,04	0,04
24	Publice services	0,35	0,03	0,16	0,04
25	Dwellings	0,02	0,01	0,02	0,03

The first row in Table 15 indicates that for one unit of exogenous change in the income of scientific labour the income of this factor will increase by 1.02 unit, the income of entrepreneurs will increase by 0,01 units, the income of administrative labour will increase by 0.02 units, and the income of trading people (those labour engaged in the wholesale and retail trade) will increase by 0.03 units.

6. Conclusions

1. In this paper it is shown tahat one can build regional I-O tables as well as SAMs for the regions, named NUTS II regions, in Turkey, with the data provided by the SIS for thecalled.
2. To build an I-O tabel and a SAM for the region Samsun we made use of three main source of data. First set of data for 14 sectors of production is provided by the SIS for provincial level. For the time being we have no choice other than RAS method which is used to estimate the regional I-O table indirectly, i.e. using the regional macroeconomic data together with the national I-O data of 1996. However we should add that a current survey is being conducted by a private company (DOLSAR) to compile a reigional I-O table with actual data. The second set of data relates to the labour force classification by industry and this is obtaied from the Census data for 2000. The third set of data which relates to household consumtion matrix is obtained for two sets of hoseholds from the 1994 Survey of Hosehold Income and Consumtion Survey. However the structure (i.e. classification scheme) of the Household Income and Consumption Survey data is hardly comparble with the I-O classification which has been

established since 1967. This makes the researcher to resort for personal judgments in determining the structure of consumption matrix T_{23}.

3. The main purpose in the construction of I-O table and SAM for Samsun region was to build a multisectoral model of the region in order to suggest a definite growth path which may help close the gap between the region and Turkey. But this present paper dwells only on the base year structure of the region under consideration. We, however belive that one can built such a model provided that he/she have a sound statistical base that defines the base year as accurate as possible.

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