The Construction of a Financial Social Accounting Matrix for the Turkish Economy with 1996 Data

Türkiye Ekonomisi İçin 1996 Dataları İle Finansal Hesaplar Matrisi Oluşturulması

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Abstract: *In this study, the objective is to integrate both financial institutions and financial instruments into the social accounting matrix (SAM) in order to build a coherent financial social accounting matrix for Turkey by using 1996 data. The SAM became popular and has been frequently utilized by both the developing and the developed countries in analyzing the possible effects of alternative economic policies over different segments of the society. Therefore, the objective of this study is to construct a financial SAM which can be employed by modelers in construction of such models for Turkish economy.*

Key words: *Financial social accounting matrix, computable general equilibrium models, financial fragility.*

Öz: *Bu çalışmanın amacı finansal kurumlar ve finansal yatırım araçlarını da içine alacak şekilde Türkiye için bir sosyal hesaplar matrisi (SHM) oluşturmaktır. Sosyal hesaplar matrisleri, gelişmiş ve gelişmekte olan ülkeler tarafından ekonomik politikaların ve politika önerilerinin sosyal katmanlar'ı nasıl etkilediğini göstermek amacıyla oldukça yaygın olarak kullanılmaktadır. Türkiye ile ilgili bu tip modeller kuracak araştırmacılar için bir veri seti yaratmak amacı ile 1996 yılı datalarını kullanarak finansal sosyal hesaplar matrisi oluşturulmuştur.*

Anahtar sözcükler: *Finansal sosyal hesaplar matrisi, Hesaplanabilir denge modeli, finansal kırılganlık.*

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1. INTRODUCTION

Sir Richard Stone (1962) and his numerous studies after that on social accounting matrix (SAM) extended the input-output framework by including: 1) the creation of value added in the production process, 2) the distribution of value added among factors of production, 3) distribution of factor and other incomes generated from unrequited transfers among social and institutional groups. Pyatt and Thorbecke's (1976) work conceptualized the SAM. The SAM framework has had significant impact on data analysis and the applied modeling on development policy analysis (Round 2003, p.18).

With the help of advances in the computing technologies, the applied models e.g. computable general equilibrium and social accounting matrix (SAM) multiplier models after the works of Pyatt and Thorbecke (1967) for the former and Dervis et al. (1982) for latter, became popular and have been frequently utilized by both the developing and the developed countries in analyzing the possible effects of alternative economic policies over different segments of the society. The successful implementation of these applied models in addressing the policy issues depends both on the quality of the model and the quality of the data. Therefore, the construction of a coherent SAM is one of the most important prerequisites for building an applied CGE and SAM multiplier models.

A SAM elegantly shows various interdependencies in a socioeconomic system as a whole by recording, as comprehensively as practicable, the actual and imputed transactions and transfers between various agents in the system for a given period of time (usually a year) (Round, 2003, p. 3).

Although State Planning Organization (SPO) whose establishment was based on the Constitution was given duty to prepare development plans since 1962, the Institution did not attempt to construct a SAM for Turkish economy, and therefore, the construction of SAMs has been carried by scholars from the universities and other non-governmental institutions. In general, scholars tended to construct relatively small SAMs according to their modeling needs.[1] There are only a few studies whose main objective is to construct a disaggregated SAM for Turkey.[2] Kose and Yeldan (1996) and DeSantis and Ozhan (1997) have authored the most recent academic works about the construction of SAMs. In terms of the level of disaggregation, DeSantis and Ozhan (1997) work is the most comprehensive study for Turkey. Kose and Yeldan (1996) reproduced the input-output table and supplement additional data for applied research, but they did not give comprehensive analysis for household accounts. These two studies were aimed at constructing a SAM for 1990 for Turkish economy, and both studies constructed a real SAM and did not integrate financial institutions and financial instruments into their real SAM. In a more compact study, Tunc (1997) constructed a financial SAM for Turkey with 1990 data.

In this study, the objective is to integrate both financial institutions and financial instruments into the real SAM in order to build a coherent financial social accounting matrix for Turkey by using 1996 data. In construction of SAM, the input-output tables are

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1   For example, Dervis et al. (1982), Celasun (1986), Lewis and Urata (1988), Yeldan (1988), Tunc (1997), and Harrison et al. (1996).

2   See Kose and Yeldan (1996). These studies are Senesen (1984), Ozhan (1989), and DeSantis and Ozhan (1996)).

the backbone of the process and scholars tend to employ more recent data. In Turkish context, although SIS released input-output tables in 1998 and 2001, there are at least two problems with the more recent input-output tables. Firstly, the interview with SIS staffs indicated that 1998 input-output table was calculated simply inflating 1996 values with price index and therefore was not based on original data collection and organization process. Secondly, since most of the applied models use SAM in calibration process, the year for which the data is collected should be stable in both macro and microeconomic sense so that the calibrated parameters portrays the general economic outlook of the economy. Both 1998 and 2001 were unstable years for Turkish economy, and this study did not pursue using these more recent data in the construction of SAM.

Since the real SAM already constructed for Turkish economy for 1996 by Aslan (2005), the objective of this paper is to reorganize his study by including financial institutions and financial instruments so that it can help researchers in building applied models with financial variables. The construction of financial SAM for the Turkish economy for 1996 closely follows Emini's (2002) paper which constructed a financial SAM for Cameron.

The common problem in the construction of SAM is inconsistent data. Since the construction involves gathering data from various sources with different numeration[3] the SAM constructed from using these raw data would generate some problems. This study also encounters ill-behaved data released by official institutions, and therefore, the study employs Cross-Entropy method in order to overcome the data problems.[4,5]

In the following section, we will first discuss about a real and financial SAM and then we will construct a financial-macro SAM for Turkish economy. In the fourth section, the paper discusses about the details of disaggregated financial SAM. The final part of the paper provides some concluding remarks. The fully disaggregated financial SAM is given in the appendix.

2. THE REAL AND FINANCIAL SOCIAL ACCOUNTING MATRICES

Double-Entry Bookkeeping logic constitutes the theoretical backbone in the construction of a SAM. Since each account in a SAM contains both expenses [recorded on the column] and receipts [recorded on the row], a SAM is a square matrix whose internal consistency guarantees that , for each account, the sum of the expenses is identical to sum of receipts.

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3   For example, exchange rates display significant differences in different statistics. Another example is due to large inflation where if the data is collected in different time, the data become contaminated.

4   As in other SAM construction effort for Turkey [i.e., Kose and Yeldan (1996), DeSantins and Ozhan (1997)] and for other countries [i.e., Thurlow and Seventer (2002) for South Africa, Emini (2002) for Cameroon, we also encounter two problems related to data: inadequate data and inconsistent data. In order to overcome the data problems, we will us the Cross Entropy (CE) method. A recent study by Golan, Judge and Miller (1996) suggests that by using "maximum entropy econometrics" techniques, researchers might be able to handle the data problems. Golan, Judge and Robinson (1994), Robinson, Cattaneo and El Said (2000), developed the CE method, which is aimed at solving "ill-defined" data in constructing a SAM.

5   (Due to space limitation, the Cross Entropy Method is not discussed in the study. The interested readers can look the references in (4). The GAMS algorithm can be found in Aslan (2004).

The SAM can be classified as real SAM and financial SAM, where the former records only the transactions of the real activities of the economic institutions and the latter not only records the real transactions but also the transactions taking place in the financial markets. Therefore, in the financial SAM, households, government, financial and non-financial firms and agents from rest of world not only engage in transactions related to real-side of the economy but also they own assets and incur liabilities. In a broad sense, a financial SAM requires two additional sub-modules, namely the financial supply-demand module and financial instrument module.

The real SAM might consist of five major accounts each of which will be further disaggregated. Activity account describes the production sectors [denoted by where A_i is used as activity and i is the index showing the sectors (i = 1,..4)]. The column of activity account shows the payments of sectors to: intermediate input, primary inputs [i.e. labor and capital], and taxes [payments to government as production related taxes]. The total of the column in the activity account is sent to the column of the commodity account. The commodity account [denoted by where C_i is used as commodity and is the index specifying particular commodity; i = 1,..4] describes the total marketable commodity sold in the domestic market. Therefore, the column of the commodity account consists of the sum of the activity account, total import, and taxes on imports and other indirect taxes. The purchase of commodity by the economic agents e.g. households (as final good demand), government (as final and investment demand), firms (as intermediate input, stock changes and investment demands), and rest of world (as exports) is recorded on the row of the commodity account. The third account is the primary inputs. The primary inputs i.e. capital and labor receives income (on the row account) in the production process and they distribute the income to other economic institutions e.g. to households [dividend and labor income]. Economic institutions consists of households, firms (enterprises operating in real sector), government, and the rest of world. These accounts record the income of each institution on the rows and the expenses on the columns. Finally, the saving-investment account, on the row, shows the savings of each institution and, on the row, it shows the payments of each account in acquiring physical capital.

There are some institutions in an economy which has important functions in the financial markets while they are not explicitly included in the real SAM. These agents, although they vary according to their importance, are central bank, commercial banks, pension funds, and other institutions engaging financial transaction. This study adds two additional agents absent in the real SAM. They are commercial banks and the Central Bank of Republic of Turkey (CBRT).

Although each economic agent's savings is shown on the column of saving-investment account on the real SAM, their respective contribution to the gross capital formation (or investment) is not elucidated on the real SAM. Therefore, the first module needed for the construction of the financial SAM is the 'capital module' which shows the net supply and demand for funds by each economic agent. The creation of a distinct 'capital account' for each agent then allows to keep details of the agent's different resources, as well as the various assets (physical and/or financial) he holds as counterparts of those resources or liabilities (Emini 2002, p.16).

The 'capital account' describes whether an agent has excess or shortage of funds. The decision made by each agent on investing his excess funds (on borrowing for his shortage

of funds) over alternative financial instruments (over alternative debt/loan instruments) is described on the financial instrument account. Although there are numerous financial instruments in the financial markets, this study limits 10 financial instruments. Table 1 displays the accounts with respective acronym employed in this study. Table 1 displays the accounts with respective acronym employed in this study.

The financial instruments employed in the study are: 1) currency (CU) , 2) demand deposit where DDH is the demand deposits by households and WKB is the demand deposits by firms , 3) time deposits where TLTD denotes Turkish Lira denominated time deposits and FXTD denotes foreign currency denominated time deposits, 4) private securities i.e. shares and bonds issued by the private sector (PRS), 5)government debt instruments sold in domestic market (GDI), 6) central bank advances to government (CBA), 7) banking sector loans (BL), 8) required reserves of commercial banks at the central bank (RR), 9) net changes in foreign reserves in the CBRT's balance sheet (RES), 10) loans from foreign markets (FL).

Table 1. Description of the Accounts in the Financial SAM

I-II) Activities and Commodities: 4 Sectors;4 Commodities $(A_i);(C_i)$

A1-C1=(agriculture) [ISIC: 1-7], A2-C2=(industry) [ISIC:8-77],
A3-C3=(private services) [ISIC: 78-95], A4-C4=(government services) [ISIC:96]

III-) Factors of Production
LAB= Labor , (CAP) = Capital

IV-) Institutions
A) HH = households (3 Type)
   HHP= low income HH (bottom 30%) , HHM = medium income HH (medium 30-70%)
B) GOV = government
C) ENT = enterprises: private enterprises operating in the
D) ROW = rest of world
E) CB = commercial banks
F) CBRT = The Central Bank of Turkey

V-) Capital Account: Excess (Shortage) of Funds by Institutions

VI-) Financial Instruments
A) CU = currency
B) Demand Deposits
    B-1) DDH = demand deposits of households
    B-2) WKB = demand deposits by firms
C) TD= time deposits
    C-1) TLTD = Turkish Lira denominated deposits
    C-2) FXTD =foreign currency denominated deposits
D) PRS = private securities
E) GDI = government debt instruments in the domestic
F) CBA = CBRT advances to government
G) BL = commercial bank loans to firms
H) RR = required reserves for commercial banks
I) RES = net changes in foreign reserves in the CBRT
J) Foreign Loans/Debts
    J-1) FLG = loans/debt to government
    J-2) FLB = loans/debt to commercial banks
    J-3) FLF = loans/debt to firms

3. BUILDING FINANCIAL MACRO SAM

In order to build disaggregated SAM, the first step is building a macro SAM. The SAM with a highly aggregated format is defined as macro SAM. Basically, each cell in the macro SAM gives the sum of submatrices in the disaggregated SAM. Because the disaggregated data come from various sources with different dates of publication and with different valuation, the macro SAM draws the limit to which the totals of submatrices must be equal. The real macro SAM is one of the three modules of financial macro SAM and is displayed in Table 2.

The first area, at the northwest of the SAM (from account 1 to account 9) represents the real SAM. The shaded cells (with light gray) within the real SAM represent the record locus of financial type current transfers. On the commercial bank (COMB) account, for example, commercial banks received 1383 trillion TL, 1291 trillion TL and 126 trillion TL from government, firms and rest of world, respectively. In the same year, commercial banks made interest payments to households (for their deposits in the banking system amounting 1688 trillions TL) and rest of world (for the foreign debts amounting 268 trillions TL).[6]

Table 2. Current and Capital Accounts for Financial SAM   (in Trillions TL)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1-A		28241											
2-C	11752			10758	2682	779			3653			3205	
3-QF	15247												
4-HH			3274		722	8894	1688		292				
5-GOV	1242	459	675	910		177	48						
6-ENT			11298										
7-COMB					1383	1291			126				
8-CBRT													
9-ROW		4130			17	56	268						
10-HH				3202									
11-GOV					1294								
12-ENT						102							
13-COMB							796						
14-CBRT													
15-ROW									399				
16-CU										111		48	
17-DEP										3091		374	
18-PRS													15
19-GDI													1134
20-CBA													
21-BL													3342
22-RR													69
23-RES													
24-FL													
Tot	28241	32830	15247	14870	3510	11298	2800		4470	3202		3627	4559

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6   The numbers are calculated according to balance of payments statistics, foreign debt statistics and data from Turkish Banking System balance sheet for 1996 from the Banking Association of Turkey's electronic data system.

Table 2 Continued

	14	15	16	17	18	19	20	21	22	23	24	Tot
1-A												28241
2-C												32830
3-QF												15247
4-HH												14870
5-GOV												3510
6-ENT												11298
7-COMB												2800
8-CBRT												
9-ROW												4470
10-HH												3202
11-GOV						1134	180				-19	0
12-ENT					15			3342			168	3627
13-COMB				3465							298	4560
14-CBRT			158						69			227
15-ROW										48		446
16-CU												158
17-DEP												3465
18-PRS												15
19-GDI												1134
20-CBA	18											180
21-BL												3342
22-RR												69
23-RES	48											48
24-FL		447										447
Tot	22	447	158	3465	15	1134	180	3342	69	48	447	

Source: Own calculation

The financial instrument module reflects the asset/liability flows. The southeastern area of the financial macro SAM shows the financial module, where it indicates the flows of financial assets and liabilities. It must be noted here that the data calculated for capital account reflects *"flow"* rather than *"stock"* value of each financial assets/liabilities.

The part of the financial module i.e. on the row, from 10th to 15th accounts and on the column, from 16th 24th shows the financial instruments used by agents to borrow from the financial markets i.e. the liability side of their balance sheet. The other part of the financial module i.e. on the row, from 16th to 24th accounts and on the column from 10th to 15th accounts shows the asset side of the balance sheet for each economic agent. The capital account constitutes the remaining cells where it shows capital expenses and excess (deficit) available funds by the actors.

The data related to deposits e.g. time and demand deposits are calculated from Turkish Banking Association electronic data system. Currency supply data is calculated from the Central Bank analytical balance sheet. The currency is assumed to be held by firms and households and total currency (amount of currency added to money stock in 1996) is distributed between households and the private enterprises as a residual after subtraction of financial holdings from their respective savings.

Due to large differences in official data on government account, and some differences observed between official data in the capital account of balance of payments [i.e. BOP provides data for flow variables such as capital in and outflows] and data about stock variables [i.e. net changes in debt stock of institutions], these points deserve attention. Firstly, total indirect income tax revenue was 1,701 trillion TL, the total direct income tax collection 966 trillion TL, the factor income total 675 trillion TL and other nontax income 168 trillions TL, all of which indicate a total government revenue of 3,510 trillion TL (the row total of government account).[7] In addition to that, public sector overall budget deficit[8] is amounting 1294.5 trillion TL. In the same year, government sector paid 16.8 trillion interests for foreign debt. Moreover, public sector made a payment of 1383.4 trillion TL as interest payments to domestic market and produces a primary surplus of 43.3 trillion TL.[9]

Table 3. Current and Capital Account for Government **(in Trillion TL)**

Current Account			
Income			**Spending**
Total income	3509,8	Interest paid for domestic	1383,4
		Interest paid for foreign	16,8
		Income transfers	722,4
		Current+ investment	2681,7
		Savings	-
Total	**3509,8**		**3509,8**
Capital Account			
Assets			**Liabilities**
		CBRT's advances	179,7
		Foreign borrowing (NET)	-19,2
		Government debt instruments	1134,0
		Savings	-1294,5
Total	**0**		**0**

The current and capital of government is shown in Table 3. After subtracting the Central Bank Advances and net foreign borrowing (taken from Fiscal Statistics of SPO) from government deficits, we assume that the remaining deficit is financed through domestic bonds and also assume that the commercial banks are the only holders of government debt instruments.[10]

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7   Non-tax income contains fees and fines. The fees are charged by the government for some of the public-sector activity. In the SAM, we included non-tax income with direct income tax; that is, we assume that income is proxy for the government services.

8   The overall budget deficit includes : deficits in i) consolidated budget, ii) SEE's, iii) local authorities, iv) revolving funds, v) social security institutions, vi) extra-budgetary funds, and vii) the budgets of SEE's under privatization.

9   The public-sector data are calculated from fiscal and financial statistics (2003) and SPO electronic data delivery system.

10 The result is very close to banking sector balance sheet number. Note that Treasury Statistics indicate that 90%, 7-9% and around 1% of government debt instruments are held by commercial banks, other government debt instruments, respectively.

Table 4 shows the current and capital account for the household account. The interest earnings, dividend income are calculated according to share parameters shown on Table 9. In the balance of payment, sum of private and public unrequited transfers are evaluated as total remittance transfers and are assumed to be directed to household accounts.[11]

Table 4. Household's Current and Capital Account   *(in Trillion TL)*

Current Account			
Income			**Spending**
Labor income	3273,5	Consumption	10758,2
Dividend income (firms)	8893,5	Taxes	909,7
Interest income	1446,6	Savings	3202,9
Transfer from	722,4		
Dividend income (banks)	242,0		
ROW transfers	291,6		
Total	**14869,6**		**14869,6**
Capital Account			
Assets			**Liabilities**
Currency	110,7	Savings	3202,9
Demand deposits	125,6		
Time deposits	1602,6		
Time deposits	1363,3		
Total	**3202,9**		**3202,9**

The assets e.g. time and demand deposits etc. are calculated from banking sector balance sheet by subtracting end of 1996 stock numbers from end of 1995 stock numbers. It is assumed that TL and FX denominated time deposits are held only by households. The demand deposit is assumed to be owned by households and firms. The residual from time deposits is distributed between currency and demand deposits 50% for each, and after employing the balancing technique the demand deposits become slightly larger than currency holdings.

Table 5 shows the current and the capital account for the enterprise or firms. Similar to household account, the capital account of private enterprise (or non-financial firm) includes demand deposit (working capital balances), currency holdings, and additional physical capital on the asset side and loans from commercial banks, loans from abroad and savings on the liability side. In order to calculate net foreign loans of private enterprises, the study employs debt stock data of the Central Bank electronic data delivery system which distinguish debt stock according to recipient institutions i.e. government, commercial banks and other private firms. In 1996, the long term debt stock declined by $6,000 billion for banks and $ 5,592 for private firms while short term debt stock

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11 Total unrequited transfers are $3,425 billions and is equal to 2916 trillion TL (with exchange rate of 1$=81,000TL.

increased by $ 8,419 and $7,669 billion for banks and private firms, respectively. That is, the net debt stock of private firms increased by $2,077 billion or 168,2 trillion TL. Commercial bank's loan to firms is calculated from their aggregated balance sheet. The banking system total loan was amounting 3,640 trillion and approximately 298 trillion was to consumer (as consumer credit) and the remaining 3341.8 trillion TL was assumed to be loaned to private firms. In that year, 14,6 trillion TL worth of new private securities were issued.

Table 5. Current and Capital Account for Enterprises   (in Trillion TL)

Current Account			
Income			**Spending**
Capital income	11298,5	Interest paid for foreign	55,6
		Interest paid for bank	1291,2
		Dividend	8893,5
		Taxes	176,8
		Stock	779,1
		Savings	102,3
Total	**11298,5**		**11298,5**
Capital Account			
Assets			**Liabilities**
WK balances WKB	373,9	Loans	3341,8
Currency CU	47,6	Foreign Loans	168,2
Investment	3205,4	Savings	102,3
		Private Security Issue	14,6
Total	**3626,9**		**3626,9**

Table 6. Current and Capital Account for Commercial Banks   (in Trillion TL)

Current Account			
Income			**Spending**
Interest income from	1383,4	Interest payments (to	1446,6
Interest income from	1291,2	Dividend (to HH)	242,0
Interest income from	126,1	Savings	796,7
		Interest payment for	267,8
		Taxes	47,6
Total	**2800,7**		**2800,7**
Capital Account			
Assets			**Liabilities**
Government securities	1134,0	Demand deposit	125,6
Required reserves	68,9	Time-deposits-TL	1602,1
Loans to firms	3341,8	Time deposit-Forex	1363,3
Private securities	14,6	WK balances	373,9
		Savings	796,7
		Foreign loans	297,7
Total	**4559,3**		**4559,3**

Making use of the data set of Turkish Banking Association, balance of payments account and debt stock data, the study calculates the current account of the commercial banks shown in table 6. The asset and liability sides of the capital account follows double entry logic, and are carried from the liability side of government and enterprise accounts (for assets) and household and firms (for liability). The number for required reserves is calculated from the Central Bank analytical balance sheet. Foreign borrowing number, as explained above, is calculated as net increase in foreign debt stock of banking sector.

Table 7. Current and Capital Account for Rest of World *(in Trillion TL)*

Current Account			
Income			**Spending**
Import	4129,9	Export	3653,2
Government	16,8	Interest payments	126,1
Bank	267,8	Remittance	291,6
Firms	55,6	Current A. deficit	399,2
Total	**4470,1**		**4470,1**
Capital Account			
Assets			**Liabilities**
Loans to government	-19,2	Current A. deficit	3992
Loans to banks	297,7	Central Bank Reserves	475
Loans to firms	168,2		
Total	**4,467**		**4,467**

Table 8. Capital Account for the Central Bank *(in Trillion TL)*

Assets	**1995**	**1996**	**FLOW**
Advances to government	1939	3736	1797
Foreign reserves	1366	1842	476
Total	**3305**	**5578**	**2273**
Liabilities			
Money	2239	3822	1583
Required reserves	1065	1755	690
Total			**2273**

Source: Own calculation based on analytical balance sheet of CBRT.

The current and capital accounts of rest of the world (ROW) are summarized in Table 7. The current account of ROW is generated from the real SAM. The asset side of the current account is calculated from the liability sides of domestic institutions. The net change in foreign reserves of the Central Bank is shown in the Table 8 where it illustrates the capital account of the Central Bank of Republic of Turkey (CBRT).

4. DISAGGREATED FINANCIAL SAM

The disaggregated financial SAM for Turkey consists of 36 accounts. In the real part of the financial SAM which consists of 19 accounts, four of which are production or activity accounts. Another 4 are commodity accounts. The remaining accounts in the real SAM are two primary factors of production, three households, one government, one enterprise, one commercial bank, one central bank, one stock-change, and one rest-of-world.

The real part of the SAM is based on Aslan (2005). Due to space limitation, this study avoids repeating Aslan's (2005) disaggregated real SAM. In his study, Aslan (2005) constructed a real SAM with 17 sectors and 17 commodities, and in this study, we aggregated the 17 sectors and 17 commodities real SAM into 4 sectors and 4 commodities. These sectors (and commodities) are namely agriculture, industry, private services and government services. There are two primary factors; labor and capital. Six types of institutions is identified; that are three types of households: low income households [HHP], medium income households [HHM], and high income households [HHR]), one account for domestic private enterprises, one account for government, one account for the rest of world. In order to show some important details, the study also employs some dummy accounts such as stock change account.

The data for activity, commodity and factors of production are adopted from Aslan (2005) which uses the SIS input-output table[12] The data for government-related

accounts were derived from the following sources: SIS fiscal and financial statistics (2002b), the electronic data-delivery system of the Central Bank of Turkey, the electronic data-delivery system of the State Planning Organization and the National Income Year Book of the Treasury (2001). In order to calculate the sectorial level of the effective tariff rate, we aggregated Aslan (2005) study which was based on Harrison, Rutherford, and Tarr (1996). The balance-of-payments data also were derived from the same data sources we describe for the government-related accounts. The sectorial level for imports was derived from the SIS supply table (2002a). The sectorial level of exports was derived from the SIS use table (2002a).

We provide household-related data in table 9. In order to calculate household-related variables, we used the following sources: Household Budget Survey Preliminary Results for 2002 (SIS,2003), Household Consumption Expenditure Survey for 1994 (SIS,1997), the TUSIAD (2000) and Yeldan (1997).

With regard to disaggregated data for the households' accounts such as dividend income, government transfers, interest income for financial investments, direct income tax share and their financial investment over various assets, we calculated weights which depend on either their share in factor income, gross income or savings. The weights related to income, consumption and income tax are based on Household Budget Survey Preliminary Results for 2002 (SIS,2003), Household Consumption Expenditure Survey for 1994 (SIS,1997), the TUSIAD report (2000) and Yeldan (1997). The respective share from financial investments for each type of household is calculated from TUSIAD (2000). Since there is no available data for financial investment made by each type of households, we assume that % share of each households in total savings determines their respective investment on alternative financial instruments.[13]

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12 The input-output table is reorganized according to the tax, subsidy and stock-change adjustments we described above (2002a).

13 See Emini (2002) for similar treatment.

Table 9. Household Supplementary Data for the Financial SAM

	HHP	HHM	HHR	Total (in Trillion TL)
A. CURRENT ACCOUNT				
1-Labor Income %	14.0	34.2	51.8	3273,7
2-Enterpreneuer %	4.7	26.6	68.7	10581,9
3a-Government %	12.0	22.0	66.0	722,4
3b-Remittance %	50	50	-	292,0
4- Earnings from financial	5.8	26.6	67.5	1446,6
5-Implied Gross Income	1204,6	4242,9	9422,5	14870,0
6a-Witholding Tax (trillions TL)	80,4	196,3	297,3	574,0
6b-Other Income Taxes	26,8	94,3	214,4	335,5
6c-Total Income Tax (a+b)	107,1	290,6	511,8	909,5
7-Disposable Income	1097,4	3592,3	8910,7	13960,4
8-Consumption Expenditures	1029,6	3305,4	6423,2	10758,2
9-Savings	67,8	646,9	2487,4	3202,2
B. CAPITAL ACCOUNT				
1. Income share %	8.1	28.5	63.3	
2. Saving share %	2.1	20.2	77.7	

Source: Our own calculation, based on SIS Household Income Distribution Survey (1997), TUSIAD (2000), SIS Fiscal and Financial Statistics (2002b), SIS Household Budget Survey (2003)

5. CONCLSION

This study was aimed at constructing a financial SAM for Turkish economy by using the 1996 data. Although financial SAM for more recent dates i.e. 1998 and 2001 is possible, the macroeconomic instability observed in those years avert us using these years as good reference points in calibration process. Although Turkish economic outlook in the 1990s and early 2000s displayed significant volatility, we believe 1996 was more stable than other competing years in terms of stability of calibrated parameters for the applied models.

Although the data used in this study, in general, show relatively good consistency, in a few areas we had difficulty. Firstly, as described by DeSantis and Ozhan (1997, p.283), we did not find comprehensive indirect tax rates over the each commodity we included in the system. It is very unfortunate that there is no official published data that portray disaggregated, indirect tax rates according to the ISIC code system.

Secondly, we were unable to find disaggregated data for households for both real and financial modules. In terms of real side of the SAM, SIS Household Budget Survey (2003) are not compatible with the SIS (2002b) input-output table in terms of classification of the commodities. Because in the input-output table there is a single household account and the consumption expenditures are calculated as residual, we had to use the SIS Household

Budget Survey (SIS, 2003) for 2002 in order to calculate disaggregated private expenditures. Although SIS (2003) provides main picture in terms of income distribution, the commodity coverage in this survey does not conform to the input-output classification. Moreover, neither in SIS statistics, nor in the data generated by the Banking Association (or any in other data generation institutions), we were unable to find disaggregated data regarding household-financial instrument space.

Given the fragility of financial markets in the last decade in Turkey, the SAM constructed for this research is aimed at helping other modelers in studying those fragilities and their adverse effects over different segments of society. Particularly, the financial SAM constructed in this study will be used in dynamic financial CGE model for the adverse socioeconomic outcome of the financial crisis in 2001 as a future research agenda. The financial SAM constructed in this study is also hoped to be used by other scholars for their applied models on issues such as the recent social security reforms, initiation of inflation targeting, and integration with European Union. The applied modelers who design dynamic models using the SAM constructed in this study are encouraged to taking account structural transformation which gained pace after 2002.

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Appendix: Disaggregated Financial SAM for Turkey with 1996 Data

Table A Turkish FSAM with 1996									in Trillions TL	
	1	2	3	4	5	6	7	8	9	10
1.A1					4004.6					
2.A2						16419.5				
3.A3							6630.2			
4.A4								1187.0		
5.C1	754.0	780.0	6.0							
6.C2	435.0	6195.0	815.0							
7.C3	271.0	1463.0	1033.0							
8.C4										
9.LAB	281.4	1190.2	615.1	1187.0						
10.CAP	2181.6	5856.4	3935.3							
11.STK										
12.HHP									458.3	
13.HHM									1119.7	
14.HHR									1695.7	
15.GOV	81.6	934.9	225.8		20.4	438.2				675.0
16.ENT										11298.3
17.COMB										
18.CBRT										
19.ROW					171.3	3853.5	105.2			
20.HHP										
21.HHM										
22.HHR										
23.GOV										
24.ENT										
25.COMB										
26.CBRT										
27.ROW										
28.CU										
29.DDH										
30.WKB										
31.TLTD										
32.FXTD										
33.PRS										
34.GDI										
35.CBA										
36.BL										
37.RR										
38. RES										
39.FL										
TOTAL	4004.6	16419.5	6630.2	1187.0	4196.3	20711.1	6735.3	1187.0	3273.7	11973.3

Table A (continued)

	11	12	13	14	15	16	17	18	19	20
1.A1										
2.A2										
3.A3										
4.A4										
5.C1	146.0	206.7	659.2	1275.4	197.9				165.5	
6.C2	633.1	577.5	1863.0	3812.8	1111.0				2305.7	
7.C3		245.3	783.2	1335.0	185.9				1182.0	
8.C4					1187.0					
9.LAB										
10.CAP										
11.STK						779.1				
12.HHP					86.7	415.0	98.6		146.0	
13.HHM					158.9	2368.5	449.8		146.0	
14.HHR					476.8	6110.0	1140.0			
15.GOV		107.2	290.6	511.9		176.8	47.6			
16.ENT										
17.COMB					1383.0	1291.2			126.1	
18.CBRT										
19.ROW					16.8	55.6	267.8			
20.HHP		67.8								
21.HHM			646.9							
22.HHR				2487.4						
23.GOV					- 1294.1					
24.ENT						102.0				
25.COMB							796.5			
26.CBRT										
27.ROW									398.8	
28.CU										2.1
29.DDH										2.7
30.WKB										
31.TLTD										34.0
32.FXTD										29.0
33.PRS										
34.GDI										
35.CBA										
36.BL										
37.RR										
38. RES										
39.FL										
TOTAL	779.1	1204.6	4242.9	9422.5	3509.9	11298.3	2800.3		4470.1	67.8

Table A (continued)

	21	22	23	24	25	26	27	28	29	30
1.A1										
2.A2										
3.A3										
4.A4										
5.C1				5.6						
6.C2				2963.0						
7.C3				236.8						
8.C4										
9.LAB										
10.CAP										
11.STK										
12.HHP										
13.HHM										
14.HHR										
15.GOV										
16.ENT										
17.COMB										
18.CBRT										
19.ROW										
20.HHP										
21.HHM										
22.HHR										
23.GOV										
24.ENT										
25.COMB									125.6	373.9
26.CBRT								158.3		
27.ROW										
28.CU	23.2	85.4		47.6						
29.DDH	25.2	97.7								
30.WKB				373.9						
31.TLTD	321.1	1247.4								
32.FXTD	277.4	1056.9								
33.PRS					14.6					
34.GDI					1134.0					
35.CBA						179.7				
36.BL					3341.8					
37.RR					68.9					
38. RES						47.6				
39.FL							446.7			
TOTAL	646.9	2487.4		3626.9	4559.3	227.3	446.7	158.3	125.6	373.9

Table A (continued)

	31	32	33	34	35	36	37	38	39	Total
1.A1										4004.6
2.A2										16419.5
3.A3										6630.2
4.A4										1187.0
5.C1										4196.3
6.C2										20711.1
7.C3										6735.3
8.C4										1187.0
9.LAB										3273.7
10.CAP										11973.3
11.STK										779.1
12.HHP										1204.6
13.HHM										4242.9
14.HHR										9422.5
15.GOV										3509.9
16.ENT										11298.3
17.COMB										2800.3
18.CBRT										
19.ROW										4470.1
20.HHP										67.8
21.HHM										646.9
22.HHR										2487.4
23.GOV				1134.0	179.7				-19.2	0.4
24.ENT			14.6			3341.8			168.2	3626.6
25.COMB	1602.6	1363.3							297.7	4559.6
26.CBRT							69.0			227.3
27.ROW								47.6		446.4
28.CU										158.3
29.DDH										125.6
30.WKB										373.9
31.TLTD										1602.6
32.FXTD										1363.3
33.PRS										14.6
34.GDI										1134.0
35.CBA										179.7
36.BL										3341.8
37.RR										68.9
38. RES										47.6
39.FL										446.7
TOTAL	1602.6	1363.3	14.6	1134.0	179.7	3341.8	69.0	47.6	446.7	