Construction of Financial Social Accounting Matrix for Tunisia

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Abstract

In recent years, the world economy faced several economic and financial crisis due to the financial globalization and the introduction of new financial product. The downturn of the US real estate crisis and the transmission of US financial crisis to the whole international financial systems were considered as the most serious crisis that economists haven't anticipated. In order, to avoid such crisis impacts many economists suggest the construction of computable general equilibrium models (CGEM) as an instrument of macroeconomic analysis based on a neoclassical microeconomic foundation which enables us to expect the impact of economic and financial chocks on an economy. This model is based essentially on data provided by the Social Accounting Matrix. The objective of this paper is to present a clear and structured description of an aggregated financial Social Accounting Matrix as a database for a financial CGEM for the Tunisian economy for the year 2006.

Keyword: Tunisia, SAM, F-SAM, financial instruments, flow-of-funds, CGEM

Introduction

In recent years, the Tunisian economy has experienced the emergence of certain real social accounting matrices with the aim of modeling the impact of trade policies on the overall economic activity. As part of the dynamic global finance, economists discovered that the structure of the Social Accounting Matrix (SAM) has been incomplete and unable to reflect the economic reality. Therefore, this paper proposes the introduction of financial transactions into the tunisian SAM for the year 2006.

The main goal of this paper is to provide a consistent methodology for the construction of a financial SAM (F-SAM) for the Tunisian economy in order to produce a CGE model that addresses the link between the real economy and the financial sector. The choice of the year 2006 as a base year is explained by the economic stability of the country and the absence of internal and external shocks. This year is also considered a key year before the period of the last financial crisis.

Subsequently, we will briefly remind in the first paragraph the general characteristics of SAM. The second section is devoted to the economic literature of F-SAM and its features. The third section will present the first F-SAM of Tunisia during 2006.

1. The Real Social Accounting Matrix

Since the 1960s, Sir Richard Stone produced the first Social Accounting Matrix using the input output table for the United Kingdom and some industrialized countries. From the 1970s, many economists and policy makers developed SAMs to analyze poverty and income distribution in different economies.

In fact, many scientific papers have produced a SAM in order to describe and analyze the structure and main features of a Social Accounting Matrix like the papers published by Pyatt and Round (1977), Round (2003), Fofana (2007) and Fall (2011). Others have built a SAM as a basic framework to generate a multiplier analysis such as Thorbecke (1976) and to build   and calibrate general equilibrium models (Robinson 1991).

The use of this tool has considerably extended over the past two decades, both in developed countries and in developing countries aiming to study the impact of all public policies (monetary, budgetary or fiscal policies) and the impacts of external shocks on the whole economic activity.

A social accounting matrix was defined by Pyatt and Round (1985) as "a particular representation of the macro, meso, and micro economic accounts of a socio-economic system, which capture the transactions and transfers between all economic agents and institutions in the system". This matrix consists on a square matrix which provides, through the overall balance between total supply and demand of the nation, a simplified summary of the national income (the row total) and spending (the column total) during a year. The general SAM structure reproduces all economic transactions from circular economic flow and national accounts in order to simplify the complex economic reality make the link between economic actors.

Technically, economists distinguish between two types of matrices: the real SAM and financial SAM, according to the purpose of the research and the matrix uses.

2. The Characteristics of the Financial Social Accounting Matrix

A Financial Social Accounting Matrix is "a combination of the flow-of-funds (FOF) and the social accounting matrix approaches to macroeconomics that provides details of the real-financial transactions and flows occurred between economic agents" (Emini and Fofack (2004)).

The addition of financial transactions (financial institutions and financial instruments) to the SAM allow us to simulate the impact of exogenous economic and financial shocks on economic aggregate of a nation.

The introduction of the financial instruments to SAM has been applied in some developed economies, such as the study of Leung and Secrieru (2010) which seeks to explain the link between the real economy and the financial sector for Canada and Hubic (2012) which produce a F-SAM in order to build a financial CGE model that analyzes the impact of the financial crisis on the economy of Luxembourg.

The developing countries have also been concerned by a number of F-SAM, such as Emini and Fofack (2004), Aslan (2007), Waheed and Ezaki (2008), Hernández (2008), Li (2008) Dakila and al (2013) and Quang Viet et al (2013) which present the F-SAM respectively for Cameroon, Turkey, Pakistan, Colombia China and Philippines. In general, the financial social accounting matrix in developed countries has shown a higher level of accuracy and reliability compared to those in developing countries due to lack of consistency between the different sources of data which remains the major constraint explaining the limited number of F-SAM in developing countries.
The F-SAM provide the advantage of including financial institutions and instruments to the SAM and resume the national account of the different economic agents providing the necessary information about the cash flows.

Therefore, a F-SAM introduces two additional accounts to the simple structure of the real SAM.

Conventionally, the F-SAM consists of three types of accounts:

• The current account composed of nine sub-accounts: the production account, the goods and services account, two factors of production accounts (capital and labor), and five accounts for economic institutions: households, firms, government, financial institutions and the rest of world (ROW).
• The capital accounts that reflect the financial situation of economic institutions (lender or borrower). This account show the gross savings distributed among the various economic institutions as resources, and their investments as spending.
• The financial flows account: this account describes the financial decision made by each agent (to invest its surplus funds or to acquire loans to cover the amount of money needed). The registration of these financial flows requires the integration of new compartment that are: currency, demand deposits and term deposits of households and companies, securities issued by the government, insurance technical reserves, credit, foreign direct investment, foreign exchange reserves from the balance sheet of the Central Bank and other financial flows.

For building the F-SAM, modelers often refer to Input Output Table and Flow of funds data to build the real part of the matrix. They rely also on statistical data from the financial flows delivered by the central bank and the external balance of payments for building the financial part of the matrix.

3. The Financial Social Accounting Matrix of Tunisia in 2006

This section presents the first aggregated financial social accounting matrix for Tunisia for the year 2006 by integrating financial instruments into the real SAM.

This matrix provides an update of data over the existing real SAM, such as the micro-SAM of 1996 published by the terms of the IEQ in 2002, as well as a value added by introducing the financial transactions to the real SAM. The structure of the F-SAM of Tunisia (see table 1) is inspired from the model of Li (2008), based on national accounts published by the National Institute of Statistics (NIS) of Tunisia for the period 2006- 2010.

The Tunisian F-SAM is composed of three major accounts:

• The first account (Northwest part of the F-SAM) consists of the real operations illustrated by the following accounts: activities, goods and services, factors of production and economic agents. This account presents the balance between total supply and total demand of goods and services. It illustrates the various transactions between agents, and the relationship between production, income, and their distributions.
• The second account (the middle part of the F-SAM) summarizes equity transactions involving savings and investments of different institutional sectors. This account makes the link between real and financial transactions. It includes, on the row, savings and financial liabilities of the institutions and gathers, in the column, their investments and financial assets.
• The third account (South-eastern part of the F-SAM) is the financial account, which represents the distribution of assets and debts of immanent financial instruments.

The current account of the matrix shows that the domestic supply is about 75.5% of the overall supply while the import is 20.7% of this total. The domestic absorption value represents 80% of the total demand and summarizes the intermediate consumption (44.8%), the final consumption (42.5%) and the investment (12.7 %), while the export represent 20% of the total demand. The value added is composed of 38.9% earned income, 60.6% gross operating and 0.5 % net tax surpluses.

The Tunisian national accounts have proved that the economic agents: households, government, financial institutions and ROW have a financial surplus (savings exceed investment), however the firms suffer from a financial deficit.

The financial part of the F-SAM offer a structured classification of the financial instruments depending on the decreasing order of liquidity and the nature of the financial transaction (cash, deposit, credit …).

According to the financial data, we can note that the rest of world deposit the amount of 3.9 million Tunisian Dinar (TND) as a monetary gold and Special Drawing Rights (SDRs) into the financial institutions accounts. The currency and deposit account receives about 53.6% of its total assets from the financial institutions, 30.6% from the households, 11.5% from the non-financial enterprises, 2.8% from the world and 1.5% from the government. These flows of funds are received by financial institutions (50.7%), the rest of the world (47.5%) and the government (1.8%).

The securities account other than shares receives 73.3% of its funds from the financial institutions, and 21.4% of the enterprises while 94.2% of the total account is considered as a Government's assets.

Concerning the loans account, which include long term and short term credits, financial institutions pay the highest part of it (1455.3 million TND). These credits are mostly received by the households (714.9 million TND) and the non financial institutions (573.3 million TND).

For shares and other equity account, the ROW is the major contributor incurring 4439.1 million TND while Government affords 160.3 million TND and the financial institutions pay 103.1 million TND. The total assets of this account are owned by the firms (92.2 %), the financial institutions (6.1 %) and the ROW (1.6%).

The technical insurance reserves account, which correspond to the reserves made by insurance agencies due to the return collected from contributors to cover unexpected risks, receive about 67.6 % of his total assets from the non financial institutions, 27,4% from the householders, 3,5% from the government and 1,5% from the financial institutions. The total of these funds is received by financial institutions.

As a last Account, the other financial instruments include all other financial transactions received and paid by all economic agents. The financial institutions are the most important contributor actor of this account and the most important receiver.

During the construction of the F-SAM, some negligible disparities between the total of expenditures and resources appeared in a few accounts resulting from the unavailability of data, the inconsistencies in some statements published by the INS of Tunisia and the diversity of data sources used, that have led us to make adjustments based on assumptions and judgments to equilibrate the matrix.

The posterior disaggregation of the F-SAM may allow us to present details about assets and liabilities of the economic actors to analyze the strengths and weaknesses of the Tunisian financial sector, and to explain the link between real and financial activity. This matrix illustrates the major macroeconomic balances between the national incomes and spending of the Tunisian economy through aggregated accounts. In addition, the construction of F-SAM offers the opportunity to modelers to study the impact of any domestic or foreign choc influencing the general economic equilibrium.

Conclusion

This paper suggests a detailed methodology for the construction of an aggregated Financial Social Accounting Matrix for Tunisia for the year 2006. It provides a general framework explaining the consecutives steps for the construction of the F-SAM in later years. As it can also afford a reference matrix, to produce a disaggregated F-SAM which will grant the necessary details for a coherent synthesis of the major macro-economic equilibrium.

In general, the macro or micro F-SAM is still considered the best source of data to produce a multiplier analyzes which can estimate the direct, indirect and induced multipliers effects of an exogenous demand shock on all economic sectors. It can provide also a perfect framework to build a financial Computable General Equilibrium Models serving to study the economic inter-linkages, and to show the strengths and vulnerabilities of the economic sectors.

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Table 1: The Aggregated Financial SAM of Tunisia (2006) (in Million of Tunisian Dinar (TND))

		Production		Factors of production		Institutions (Current accounts)				
		1	2	3	4	5	6	7	8	9
1	Commodities		37884			27726,4		8162,2		21060,9
2	Activities	79705,2								
3	Labor		16258,7							90
4	Capital		25332,3							
5	Households			14213,6	15235		1723,6	6721,9	574,3	
6	Firms				7678,9	769,8		1138,1	2419,4	324,5
7	Government	3935	230,2	2135,1	1389,1	5337,7	2684,1		62,1	2304,5
8	Financial institutions				1029,3	562,2	2196,6			
9	Rest of World	21922,9				16,9	2502,2	162,3		
10	Households					4055,4				
11	Firms						3224,2			
12	Government							1893,3		
13	Financial institutions								732,3	
14	Rest of World									824,4
15	Currency									
16	Deposits									
17	Government bonds									
18	Loans									
19	FDI									
20	Foreign Reserves									
21	Other financial flows									
Total		105563,1	79705,2	16348,7	25332,3	38468,4	12330,7	18077,8	3788,1	24604,3

Source: Author's calculations

Note: by referring to the data sources, all blank cells mean: non-defined transactions or transactions with zero value.

Table 1: The Aggregated Financial SAM of Tunisia (2006) (In Million TND) (Continued)

	Capital account of institutions					Financial accounts							Total
	10	11	12	13	14	15	16	17	18	19	20	21	
1	3723,2	5064,4	1802	140									105563,1
2													79705,2
3													16348,7
4													25332,3
5													38468,4
6													12330,7
7													18077,8
8													3788,1
9													24604,3
10			211,2						713,9			99,4	5079,9
11			480					52,4	573,3	2535,6		18,5	6884
12			-498,4				114	838,3	-915,5			750,8	2182,5
13							3188,6	-0,2	-67	169,1	140,6	4365,4	8528,8
14			-192,9				2989,6	3,3	-4,3	44		-232,5	3431,6
15				-3,9	3,9								0
16	1927,1	723,7	89,9	3375,1	176,4								6292,2
17	55	190,3	-7,2	655,7									893,8
18		-5,8	-98,8	1455,3	-1050,3								300,4
19	-684,4	-1270,4	160,2	103,2	4440,1								2748,7
20	39	93,7	5,8	2,1									140,6
21	20	2088,1	230,7	2801,3	-138,5								5001,6
Total	5079,9	6884	2182,5	8528,8	3431,6	0	6292,2	893,8	300,4	2748,7	140,6	5001,6	