

A financial computable general equilibrium model for Turkey: Policy analysis with 1990 data

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Abstract

Although the financial reform experiments of the 1980s have been different for each specific country that was under taken such reports, in each case the increasing interaction between the real and financial sectors has been note worthy.

The objective of this study is to analyze the interactions between the real and financial sectors of the Turkish economy within the framework of a financial Computable General Equilibrium (CGE) model based on 1990 data. The model simulates the production, consumption, foreign trade and financial portfolio allocation processes of the economy within a simultaneous system of equations.

The model is constructed by linking the interactions of the real and financial sub-models which are related through various channels such as flow of funds, interest rates and monetary policy. The real side of the model follows the standard Walrasian specification of CGE models.

In the financial side, portfolio choice of income groups and the financial activity by private sector firms and the public sector are identified. These agents' financial decisions are mediated through the financial system, composed of the Central Bank and depository banks. In the financial side nine financial assets and their returns are identified.

In the study, to determine the effects on the economy three experiments under two different adjustment mechanisms in the labor market (either the nominal or the real wage of formal labor is assumed to be fixed) are looked at. These experiments are: 25% increase in the share of the Central Bank advances to the public sector; 50% increase in total nominal public investment expenditure; 20% nominal devaluation of the exchange rate. One of the main conclusions to be drawn from the exercises is that in the case of fixed real wages, the adverse effects of policy changes on the economy is much larger compared to the case of fixed nominal wages. Therefore, in the former state, the adjustment becomes more costly for all sectors of the economy.

1. Introduction

Until the 1990s the existing literature did not fully reflect the global nature of the financial liberalization process. The experience of developing countries or developed countries are considered separately.¹ Financial liberalization in developing countries is generally analyzed in terms of its macroeconomic implications.² However, since financial reforms have been implemented within the framework of stabilization policies, their effects on the economy cannot be evaluated separately.

Individual country experiences reveal that the effects of financial reform experiments have been different for each country. However, in all cases, the increasing interaction between the real and financial sectors and their microeconomic and macroeconomic implications have been noted.

The objective of this study is to analyze and evaluate the interactions between the real and financial sectors of the Turkish economy within the framework of a financial Computable General Equilibrium (CGE) model based on 1990 data. With the aid of the financial CGE model, the channels of interaction between real and financial sectors, microeconomic and macroeconomic effects of different financial policies can be quantified and evaluated. An empirically-based general equilibrium framework has been developed in this study in order to evaluate the effects of changes in the financial sector on the economy as a whole.

The remainder of the study comprises four sections. Section 2 briefly overviews the objectives and phases of the Turkish financial liberalization experience and provides data about the state of the Turkish financial system. The discussion here will be brief, since different aspects of the Turkish financial liberalization process have been studied extensively³.

A static financial CGE model for Turkey, TFCGE is presented in section 3. This section also provides details on the construction of the data used to solve the model.

Section 4 presents the simulation experiments and their results under two alternative closure rules for the labor market. These experiments are done

¹ Among others, Dornbush and Edwards (1995) can be cited as one of the recent studies on the liberalization experiences of developing countries. Caprio (1994) provides a summary on the liberalization experiences in developed countries.

² Atiyas *et al.* (1994b) and Akyüz *et al.* (1993) can be cited among the literature evaluating specific country experience.

³ Akyüz (1988), Ekinci (1996), Ançanlı *et al.* (1990), Balkan *et al.* (1996) and Yeldan (1992) can be cited among other studies.

mainly with the aim of showing the effects of (1) a change in the mode of financing the public sector deficit, (2) an increase in public sector expenditures, and (3) devaluation on the economy.

The final section concludes with a discussion on the major results and implications of the study for policy purposes.

2. The Turkish experience of financial liberalization

In January 1980, Turkey embarked on a stabilization-cum-liberalization program under the auspices of the IMF. The foreign debt crisis that emerged in the 1977-1979 period can be cited among the most important reasons that necessitated the implementation of a comprehensive stabilization program. The program has both short-run and long-run objectives. Şenses (1988:11) and Uygur (1993:14) summarize the objectives as: (1) eliminating the disequilibria present in various markets; (2) reducing inflation and attaining price stability; (3) attaining financial liberalization; (4) reducing the role of the public sector in the economy; and (5) liberalizing foreign trade and payments as a necessary condition for a shifting to an export-oriented development strategy and toward attaining a sustainable balance of payments position. This program can be classified as an orthodox gradualist one in terms of the classifications of stabilization programs. As far as sequencing is concerned, liberalization policies were implemented in the following order: product, foreign trade, financial markets and external capital transactions. In this section, only the financial liberalization aspects of the program will be presented briefly, as the rest is beyond the scope of the study.

Before 1980, the Turkish financial system could be cited as a typical example of a financially repressed economy. The organization and workings of the financial system was an important impediment to the allocation of financial savings into investments.

Financial liberalization attempts basically aim to end the financial repression and the disintermediation present in the system. It is believed that as the McKinnon-Shaw hypothesis implies, this will increase savings and investments, and in turn stimulate growth. The measures taken for this purpose in accordance with the stabilization program is mainly directed to reduce state intervention in the financial system and allowing market forces to determine relative prices such as interest rates and the exchange rate. It is proposed that, in this way, both allocational and operational efficiency of the markets will be

enhanced. In most studies⁴ the Turkish liberalization experience is divided into two phases: 1980-1982, the infancy of the liberalization program, and the 1983-1987 period. In the first phase, authorities believed that deregulation alone would suffice to achieve efficiency in the financial system. However, the financial crisis of 1982 taught that the creation of an institutional framework was necessary for the smooth operation of the system. Therefore, the second phase was devoted to the formation of necessary legal and institutional framework.

According to Atiyas *et al.* (1994), the third phase of the liberalization process, 1989-1990 was characterized by a general reform fatigue. "In fact, during this period there was a noticeable decline in the appetites of the reformers for consolidating the achievements of the previous attempts, which manifested itself in the postponement of the much needed regulatory changes" (Atiyas *et al.* 1994: 108) In this period, the developments that took place in the foreign exchange and capital account were mainly applications of previous decisions.

It can be claimed that the Turkish experience indicates that public policies toward financial liberalization show the characteristics of a trial-error process. There have been drawbacks from policies according to the responses of policies adopted in many fields such as liberalization of interest rates.

Table 2.1 and Table 2.2 present financial assets as percentage of GNP and the composition of financial assets for the 1980-1995 period. Both M2/GNP and M2Y/GNP appear to exhibit substantial increases after 1980. This is the case also for total deposits/GNP and total financial assets/GNP.

The financing requirement of public sector has played a crucial role in the development of financial markets, even more so perhaps than policies adopted for the development of these markets. In the mid-1980s there occurred a policy change in the financing pattern of the public sector borrowing requirement towards domestic borrowing. By then, there were attempts to control Central Bank advances to the public sector, which had been identified as the most important source of money growth. The reserve monetary targeting has put an upper limit to these credits and the amount above this limit has had to be financed by borrowing. It was hoped that, in this way, monetary policy would be relieved from being subordinate to fiscal policy. As can be observed from Table 2.3, especially after the start of auctions of government instruments in 1985, the share of domestic borrowing in financing of public sector borrowing requirement increases.

⁴ See, for example, Atiyas *et al.* (1994b), Gökçe (1993) and Altinkemer *et al.* (1992)

Table 2.1
Financial Assets / GNP, (%), 1980-1995

| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| BANKING SECTOR | 13.2 | 18.1 | 21.4 | 20.4 | 21.0 | 21.6 | 24.6 | 26.6 | 24.3 | 22.7 | 20.9 | 25.5 | 23.2 | 19.8 | 28.7 | 31.1 |
| - Sight Deposit | 9.0 | 8.5 | 8.6 | 9.7 | 6.5 | 6.0 | 6.8 | 8.3 | 5.8 | 5.3 | 5.0 | 4.5 | 3.3 | 2.5 | 3.3 | 3.3 |
| - Time Deposit | 3.4 | 8.5 | 11.8 | 9.8 | 13.4 | 14.2 | 13.2 | 11.7 | 11.8 | 11.7 | 10.1 | 11.4 | 8.6 | 6.9 | 10.3 | 11.1 |
| - Official Deposit | 0.7 | 1.0 | 0.8 | 1.2 | 1.1 | 1.3 | 1.3 | 1.3 | 1.1 | 0.7 | 0.8 | 0.8 | 0.8 | 0.7 | 0.4 | 0.4 |
| - Foreign Exchange Deposit | | | | | | | 3.1 | 4.9 | 5.3 | 4.6 | 4.4 | 8.2 | 90.8 | 9.0 | 14.3 | 15.9 |
| - Private Finance Companies | | | | | | | | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 |
| CAPITAL MARKETS | 4.2 | 3.7 | 3.9 | 3.7 | 4.4 | 5.1 | 5.7 | 8.4 | 7.1 | 8.4 | 9.6 | 12.7 | 16.9 | 13.8 | 18.6 | 17.8 |
| - PUBLIC SECTOR | 3.5 | 3.0 | 3.1 | 2.9 | 3.8 | 4.6 | 5.1 | 7.0 | 6.2 | 6.5 | 6.4 | 7.1 | 11.3 | 9.8 | 15.3 | 14.8 |
| - Government Bonds | 2.6 | 1.9 | 1.7 | 2.5 | 2.3 | 2.8 | 2.9 | 3.1 | 3.6 | 4.6 | 4.7 | 3.9 | 6.8 | 4.5 | 5.9 | 6.5 |
| - Treasury Bills | 0.9 | 1.1 | 1.4 | 0.4 | 1.5 | 1.3 | 1.5 | 2.5 | 1.9 | 1.5 | 1.3 | 2.9 | 3.9 | 4.6 | 7.7 | 8.0 |
| - Revenue Sharing Cert. | | | | | 0.0 | 0.4 | 0.7 | 0.8 | 0.4 | 0.2 | 0.2 | 0 | 0 | 0 | 0.5 | 0.1 |
| - For Exc. Ind. Bonds | | | | | | | | 0.5 | 0.3 | 0.1 | 0.0 | 0.2 | 0.5 | 0.4 | 0.1 | 0.2 |
| - PRIVATE SECTOR | 0.6 | 0.7 | 0.8 | 0.7 | 0.5 | 0.5 | 0.5 | 1.4 | 0.8 | 1.8 | 3.2 | 5.5 | 5.6 | 4.3 | 3.3 | 3 |
| - Share (**) | 0.1 | 0.1 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.8 | 0.3 | 1.3 | 2.8 | 5.2 | 4.5 | 3.1 | 2.7 | 2.8 |
| - Corporate Bonds | 0.5 | 0.5 | 0.4 | 0.4 | 0.2 | 0.2 | 0.2 | 0.5 | 0.4 | 0.3 | 0.3 | 0.2 | 0.1 | 0 | 0 | 0 |
| - Finance Bills | | | | | | | | 7.3 | 4.7 | 2.7 | 1.6 | 0 | 0 | 0 | 0 | 0 |
| - Asset Backed Securities | | | | | | | | | | | | | 0.8 | 0.1 | 0.5 | 0.2 |
| TOTAL | 17.4 | 21.9 | 25.3 | 24.5 | 25.5 | 26.8 | 30.3 | 35.1 | 31.4 | 31.1 | 30.5 | 38.3 | 40.2 | 33.7 | 47.3 | |
| M1 12.1 | 10.1 | 11.4 | 11.8 | 8.7 | 7.4 | 8.0 | 8.2 | 6.9 | 7.7 | 6.9 | 7.5 | 6.3 | 5.0 | 5.9 | 4.9 | |
| M2 15.1 | 16.9 | 21.9 | 21.6 | 21.2 | 21.0 | 20.5 | 18.9 | 17.8 | 19.7 | 17.4 | 18.8 | 16.7 | 12.0 | 16.2 | 16.1 | |
| M2Y | | | | | | | 23.7 | 24.2 | 23.4 | 24.3 | 22.1 | 26.9 | 26.5 | 21.1 | 30.7 | 30.7 |

(**) Total nominal capital of all listed in the ISE.

Source: Capital Market Board, Monthly Bulletin, various issues.

The Central Bank of the Republic of Turkey, Monthly Statistical Bulletin, various issues.

State Planning Organization, Main Economic Indicators, various issues.

Table 2. 2
Financial Assets (Composition, %), 1980-1995

| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| BANKING SECTOR | 75.8 | 82.7 | 84.4 | 84.9 | 82.5 | 80.6 | 81.1 | 75.8 | 77.4 | 72.9 | 67.4 | 66.1 | 57.7 | 51.4 | 60.5 | 61.7 |
| - Sight Deposit | 51.5 | 38.8 | 34.1 | 39.6 | 25.6 | 22.5 | 22.6 | 23.8 | 18.6 | 17.3 | 16.5 | 11.9 | 8.3 | 6.6 | 7.7 | 5.9 |
| - Time Deposit | 19.8 | 39.0 | 46.8 | 40.2 | 52.5 | 53.0 | 43.7 | 33.5 | 37.6 | 37.6 | 33.3 | 29.9 | 21.5 | 18.9 | 21.3 | 21.8 |
| - Official Deposit | 4.4 | 4.8 | 3.4 | 5.0 | 4.4 | 5.0 | 4.3 | 3.7 | 3.5 | 2.3 | 2.9 | 2.2 | 2.0 | 2.1 | 2.3 | 0.9 |
| - Foreign Exchange Deposit | | | | | | | 10.4 | 14.1 | 16.8 | 14.7 | 14.2 | 21.5 | 24.3 | 22.7 | 27.5 | 31.1 |
| - Private Finance Companies | | | | | | | | 0.5 | 0.7 | 0.9 | 0.9 | 1.09 | 1.4 | 1.1 | 1.7 | 1.8 |
| CAPITAL MARKETS | 24.1 | 17.2 | 15.6 | 15.0 | 17.4 | 19.3 | 18.8 | 24.1 | 22.5 | 27.0 | 32.6 | 33.9 | 42.2 | 48.6 | 39.5 | 38.3 |
| - PUBLIC SECTOR | 20.2 | 14.0 | 12.4 | 12.0 | 15.1 | 17.3 | 17.0 | 19.9 | 19.9 | 21.1 | 20.0 | 19.1 | 29.1 | 34.3 | 32.4 | 29.2 |
| - Government Bonds | 15.0 | 9.0 | 6.8 | 10.4 | 9.1 | 10.6 | 9.5 | 8.9 | 11.5 | 14.8 | 14.8 | 10.6 | 18.6 | 24.7 | 12.6 | 12.7 |
| - Treasury Bills | 5.2 | 4.9 | 5.6 | 1.6 | 5.8 | 5.0 | 5.2 | 7.1 | 6.0 | 4.8 | 4.3 | 7.8 | 9.1 | 8.4 | 16.8 | 15.7 |
| - Revenue Sharing Cert. | | | | 0.1 | 1.5 | 2.3 | 2.3 | 1.3 | 0.9 | 0.6 | 0.6 | 0 | 0 | 0 | 0 | 0.3 |
| - For Exc. Ind. Bonds | | | | | | | | 1.4 | 0.9 | 0.5 | 0.2 | 0.7 | 1.3 | 1.2 | 3.0 | 0.5 |
| - PRIVATE SECTOR | 3.9 | 3.1 | 3.1 | 3.0 | 2.3 | 2.0 | 1.7 | 4.1 | 2.6 | 5.9 | 12.7 | 14.7 | 13.1 | 14.4 | 7.1 | 9.1 |
| - Share (**) | 0.9 | 0.7 | 1.3 | 1.3 | 1.1 | 1.0 | 0.9 | 2.3 | 0.9 | 4.2 | 11.4 | 13.8 | 10.6 | 9.2 | 5.9 | 9.5 |
| - Corporate Bonds | 2.9 | 2.4 | 1.8 | 1.7 | 1.1 | 1.0 | 0.8 | 1.6 | 1.2 | 1.0 | 1.1 | 0.7 | 0.4 | 0.2 | 0.1 | 0 |
| - Finance Bills | | | | | | | | 0.1 | 0.4 | 0.6 | 0.2 | 0.2 | 0.2 | 0.2 | 0 | 0 |
| - Asset Backed Securities | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4.7 | 1.1 | 0.4 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

(**) Total nominal capital of all listed companies in the ISE.

Source: Capital Market Board, Monthly Bulletins, various issues.

The Central Bank of the Republic of Turkey, Monthly Statistical Bulletins, various issues.

Table 2.3
Consolidated Budget and Domestic Borrowing (% of budget deficit), 1990-1995

| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
|---------------------------------|------|-------|-------|-------|------|-------|------|-------|-------|-------|------|------|------|------|-------|-------|
| Domestic borrowing | 8.8 | 32.4 | 107.0 | 148.9 | 67.4 | 124.8 | 89.3 | 110.3 | 92.43 | 102.5 | 99.6 | 94.2 | 93.2 | 83.2 | 144.2 | 127.6 |
| -Government bonds | -8.6 | -10.8 | 120 | 92.3 | 13.3 | 54.3 | 26.3 | 34.8 | 59.76 | 71.9 | 64.2 | 6.8 | 25.9 | 23.8 | -42.2 | 29.1 |
| -Treasury bills | 26.4 | 10.5 | 38.5 | -52.7 | 27.6 | 25.2 | 36.9 | 35.4 | 9.5 | 11.9 | 15.6 | 38.2 | 40.3 | 17.6 | 160.7 | 67.0 |
| -Central Bank Advances | 68.2 | 10.5 | 19.2 | 39.5 | 18.5 | 29.0 | 14.2 | 13.7 | 16.5 | 5.4 | 2.6 | 32.0 | 29.2 | 49.9 | 34.1 | 32.1 |
| -Other | 1.9 | -16.4 | 36.7 | 69.2 | 7.9 | 16.0 | 11.7 | 26.2 | 6.5 | 13.0 | 17.0 | 17.1 | -2.3 | -0.2 | -4.3 | -0.6 |
| Memo items: | | | | | | | | | | | | | | | | |
| Budget Deficit /GNP | -3.1 | -1.5 | -1.4 | -2.1 | -4.4 | -2.2 | -2.7 | -3.5 | 3.0 | -3.3 | -3.0 | -5.3 | -4.3 | -6.7 | -3.8 | -3.8 |
| Domestic interest payments /GNP | 0,4 | 0,5 | 0.3 | 0.6 | 0.8 | 0.7 | 1.3 | 1.7 | 2.4 | 2.2 | 2.4 | 2.7 | 2.8 | 4.6 | 6 | 7.3 |

Source: Undersecretariat of Treasury and Foreign Trade, Main Economic Indicators, various issues.

As a result of the dominance of the public sector in financial markets, crowding-out of private investments is observed as an important phenomena⁵. Another effect is the change in the portfolios of banks. Besides their obligations, banks view public sector equities as safe investments and change their attitude towards holding them instead of engaging in productive investments.

After external liberalization in 1989, the economy became much more responsive to changes in financial variables such as interest rates and exchange rates. All agents in the economy are affected to some degree from financial openness. For the public sector, policy autonomy has decreased as a result of the liberalization process. Changes have occurred in the financing patterns of both the private and public sectors, market signals becoming much more important. In this context, given the state of the economy, it may be useful to analyze the interactions between the real and financial sides of the economy in response to disturbances. In order to be able to quantify these effects, the need for a financial CGE model that will simultaneously incorporate them is apparent.

3. Financial CGE model for Turkey

The Turkish Financial Computable General Equilibrium Model (TFCGE) is a static model which incorporates both real and financial variables. In the model, real and financial sub-models are interrelated through various channels such as flow of funds, interest rates and monetary policy. Price level behavior, which is an integral component of financial CGEs, is explicitly modelled. This, in the face of a disturbance, allows simultaneous adjustments to occur in both the real and financial spheres of the model toward equilibrium. The product and financial markets are cleared through endogenous changes in prices, interest rates and the exchange rate. In simulations, either the nominal or real wage of one of the labor categories (i.e., formal labor) is kept fixed. Therefore, quantity adjustments for this labor category is relevant in some of the model experiments instead of price adjustments.

In the following subsections, only the salient features of the model are discussed. For the complete equation listing, refer to Tunç (1997).

3.1. *The real side*

The real side of the model follows the standard neoclassical specification

⁵ See Uygur (1993), Rittenberg (1988), Celasun and Tansel (1993).

of CGE models⁶. Following the SIS aggregation three productive sectors, agriculture, industry and services, are identified.

3.1.1. Production and factor markets

In the model, sectoral domestic output is determined by a Cobb-Douglas production function with three different labor categories and capital as arguments. Following Celasun (1986a) three categories of labor (agricultural, formal and informal) are identified. Agricultural labor (AGRL) appears only in agriculture. While formal labor (FL) covers all workers in formal employee status who are under social security arrangements, informal labor (INFL) roughly represents self-employed, small-scale enterprise and family workers. In the base run formulation of the model, it is assumed that the level of labor employment can vary among sectors although the total number of workers in the economy is assumed to be fixed. In the agricultural and informal labor markets, full employment is assumed where wage rates adjust to clear the market. On the other hand, in two sets of experiments, to be discussed later, either the nominal or real wage is assumed to be fixed for the formal labor market. The level of employment in that category, therefore, becomes the adjusting variable with the assumption that there is no restriction on the formal labor supply in the two sets of policy experiments performed.

Following the profit maximization condition in perfectly competitive markets, both agricultural and informal labor are demanded until the wage is equal to the value of its marginal product. This condition can be expressed as:

$$W_{i,lc} * \overline{WDIST}_{i,lc} * L_{i,lc} = X_i * PN_i * \beta_{lc} \quad (3.1)$$

where $W_{i,lc}$, $\overline{WDIST}_{i,lc}$ and $L_{i,lc}$ are the endogenous wage rate, fixed coefficients representing wage differentials, and labor in sector i of the labor category lc , respectively⁷. Naturally, X_i and PN_i are the output of and the value-added price of sector i , and β_{lc} is the labor share parameter in the production function. The value added price is defined as:

$$PN_i = (PX_i * (1 - itax_i + subdy_i) - (\sum_j a_{ij} * P_j)) \quad (3.2)$$

In the formula (3.2), $itax_i$ is sectoral indirect tax rate, $subdy_i$ is the sectoral production subsidy rate, and a_{ij} is the input-output coefficient. PX_i and P_j are the domestic output and composite good prices, respectively.

⁶ See, among others, Derviş *et al.* (1982) and Dinwiddy *et al.* (1988)

⁷ As a convention exogenous variables are denoted by Roman capital letters with a bar while parameters are denoted by lower case or Greek letters with some exceptions.

Although investment demand is modelled, it is assumed that the sectoral capital stock is fixed and new investments do not add to the capital stock in the current period.

3.1.2. Final demand and foreign trade

In the model, sectoral intermediate demands are determined by fixed Leontief coefficients.

Domestic and imported goods are treated as imperfect substitutes, which is a widely-used assumption in the computable general equilibrium literature. Hence, a composite commodity, Q_i , is defined. This composite commodity is a CES aggregation of imports, M_i , and domestic production, D_i , following Armingtonian lines. PM_i , the price of imported good, is defined as:

$$PM_i = \overline{PWM}_i * ER * (1 + tm_i) \quad (3.3)$$

where \overline{PWM}_i , ER and tm_i are exogenous world price of imports, average annual exchange rate (TL/\$) and sectoral tariff rates, respectively.

On the export side, product differentiation is also assumed through a Constant Elasticity of Transformation (CET) function. The domestic price of the exported good is then determined by

$$\overline{PWE}_i = PE_i / ((1 + te_i) * ER) \quad (3.4)$$

where \overline{PWE}_i and te_i are the exogenous world price of exports and the sectoral export subsidy rate, respectively. This formulation reflects the declining shares of exports as domestic prices rise.

On the real side, there are public and private sector institutions. The sources of public sector revenues are endogenous tariff revenues, indirect and direct tax revenues and exogenous sectoral government factor income and other government revenue. Deducting endogenous export and production subsidies and endogenous domestic interest payments, and fixed public foreign interest payments with other fixed current transfers yields the disposable income of the public sector.

It is formulated that the level of endogenous domestic interest payments (DOMINTP) is a certain share of public sector borrowing requirement (PSBR) which is determined in the financial sector.

$$DOMINTP = \alpha \text{ PSBR} \quad (3.5)$$

Public consumption is formulated as fixed expenditure shares for every sector where total nominal public consumption, CGT , and expenditure shares, g_{les} , are predetermined.

$$P_i * CG_i = gles_i * \overline{CGT} \quad (3.6)$$

The difference between public disposable income and total public consumption gives total public savings (GRSAV).

Similar to the determination of sectoral public consumption, total public fixed investment, \overline{TDKG} is specified exogenously and distributed sectorally by fixed shares, ' dkg_i ' to determine sectoral public investment:

$$PK_i * DKG_i = dkg_i * \overline{TDKG} \quad (3.7)$$

where sectoral price of capital (PK_i) is determined as:

$$PK_i = \sum_j imat_{ij} * P_j \quad (3.8)$$

imat being the capital composition matrix.

Private disposable income can be found by subtracting public disposable income from Gross National Product (GNP). In the private sector, three income groups are identified: an agricultural income group covering agricultural labor, an urban labor income group covering formal and informal labor and an urban capitalist income group⁸. The disposable incomes of the first two categories are determined by adding corresponding factor incomes and government transfers and subtracting direct taxes:

$$RURALYD = (\sum_i FACINC_{i,agr} * (1-shxagr)) + shtagr * (\overline{OCTRA} + ESUB + PROSUB) \quad (3.9)$$

$$URBLYD = ((\sum_i FACINC_{i,n} + \sum_i FACINC_{i,inf}) * (1-shxurbl)) + shturbl * (\overline{OCTRA} + ESUB + PROSUB) + shpurbl * DOMINTP \quad (3.10)$$

In the above formulations ' $shxagr$ ' and ' $shxurbl$ ' are tax rates (inclusive of social fund contributions) of agricultural and urban labor income groups, respectively. Also, ' $shtagr$ ' and ' $shturbl$ ' are rates of current transfers received by agricultural and urban labor income groups, respectively. ' $shpurbl$ ' is the share of domestic interest payments received by urban labor households.

The urban capitalists' income (URBKYD) is found as the residual:

$$URBKYD = PRYD - RURALYD - URBLYD \quad (3.11)$$

Total private consumption is determined by deducting private savings PRSAV, from private disposable income. Like public consumption, endogenous private sectoral consumption (CP_i) is determined by a simple linear demand system

⁸ These income groups do not exactly correspond to household groups. Because the latter namely the urban capitalist category includes banking sector and firms. Their retained earnings and depreciation allowances are included in this income group.

with unitary expenditure elasticity expressed as:

$$P_i * CP_i = cles_i * CPT \quad (3.12)$$

where $cles_i$ are fixed expenditure shares.

In this model private investment by sector of destination (DKP_i) is also modelled explicitly.

$$DKP_i/K_i = \overline{BDKP}_i * (PR_i / (PK_i * K_i) * ((1 + RBLN) / (1 + EXPINF)))^{edkp_i} \quad (3.13)$$

In the formula above K_i , \overline{BDKP}_i , PR_i , $RBLN$, $EXPINF$ and $edkp_i$ are sectoral capital stocks, trend level of private investments, endogenous sectoral profit rates, interest rate on bank loans, expected inflation and interest elasticity of private investments, respectively. The sectoral profits are determined as:

$$PR_i = PN_i * X_i - \sum_i FACINC_{i,lc} - \overline{GFY}_i \quad (3.14)$$

As seen in the above formulation, private investments are positive functions of profits and negative functions of the expected real interest rate on bank loans.

The inventory investment (SC_i) is also assumed to be endogenously determined as fixed shares (scr_i) of total output.

The level of private savings, PRSAV, is determined by multiplying the level of disposable incomes for each household group with their respective average propensities to save.

3.1.3. Balance of payments

In the real part of the model, the current account of the balance of payments is given as:

$$\sum_i \overline{PWM}_i * M_i = \sum_i \overline{PWE} * E_i + (\overline{NFI1} + \overline{NFI2} - \overline{NFI3}) - \overline{GFORINTP} - \overline{PRINTP} + \overline{FORSAV} \quad (3.15)$$

where $\overline{NFI1}$ represents workers remittances and interest revenue; $\overline{NFI2}$ is entrepreneurial revenue; $\overline{NFI3}$ is profit transfers; $\overline{GFORINTP}$ and \overline{PRINTP} are public and private interest payments, respectively.

The introduction of financial variables, specifically money, in the model allows the exchange rate to be determined as a nominal variable apart from being the ratio of domestic and world prices. In this way the capital account, and therefore the overall balance of payments system, can be included in the model.

Foreign savings (FORSAV) is defined as the total net accumulation of

financial assets by various agents in the economy⁹.

$$\text{FORSAV} = -(\overline{\text{RES}}_{cb} + \overline{\text{NOFA}} + \overline{\text{RES}}_b + \overline{\text{BLN}}_{row} + \overline{\text{CBLN}}_{row} + \overline{\text{FCC}}_{hh}) + \overline{\text{FORB}}_g + \overline{\text{FORB}}_f) + \overline{\text{DD}}_{row} + \overline{\text{TD}}_{row} + \overline{\text{ODFI}} + \overline{\text{ROWLNB}} \quad (3.16)$$

In the above formulation, $\overline{\text{RES}}_{cb}$ represents changes in reserves at the Central Bank; $\overline{\text{RES}}_b$, changes in depository bank reserves; $\overline{\text{NOFA}}$, the change in net other foreign assets; $\overline{\text{BLN}}_{row}$ and $\overline{\text{CBLN}}_{row}$, changes in depository and Central Bank loans to the rest the world, respectively; $\overline{\text{FCC}}_{hh}$ is the change in foreign currency holdings of income groups; $\overline{\text{FORB}}_{g,f}$ is foreign borrowing by government and firms; $\overline{\text{DD}}_{row}$ and $\overline{\text{TD}}_{row}$ are changes in demand and time deposits held at depository banks; $\overline{\text{ODFI}}$ and $\overline{\text{ROWLNB}}$ are changes in other deposits held at other financial institutions and loans to banks by rest of the world, respectively.

3.2. Financial side

In the financial side, portfolio choice of income groups and the financial activity by private sector firms and the public sector are identified. These agents' financial decisions are reconciled through a financial system composed of the Central Bank and depository banks. The Central Bank and banks determine the level of money supply and amount of credits in the system.

Formally, seven groups of financial decision-making agents namely the Central Bank of the Republic of Turkey, depository banks, the non-financial public sector, firms, income groups, other financial institutions in the financial system, and the rest of the world are identified.

Domestic and foreign currency, demand, time, foreign exchange and other deposits, the Central Bank loans and bank loans are the assets of the financial system. Government bonds and private firms' shares are also presented as means of financing. Following Robinson (1991:1519), the financial side of the model is formulated in terms of flows rather than stocks. As Robinson observes, shallow stock markets, limited use of government instruments and restrictions in foreign exchange markets discourage agents from restructuring their portfolios completely every period. Portfolio allocations are, therefore, made at the margin. In the model, the allocation of financial instruments refer to the current period's savings by all agents.

⁹ Following State Planning Organization's definition, foreign savings are defined as the sum of the current account deficit and the unrequited transfers to the public sector.

3.2.1. The Central Bank of the republic of Turkey

The Central Bank (CBRT), acts as the banker to the public sector and financial system. Central Bank loans to the public sector are a certain fraction of the PSBR, which can be treated as a policy variable in model experiments.

On the other hand, loans to other institutions are sensitive to the interest rate charged by the Bank.

The monetary base (MB) from both the asset and liability side is defined as:

$$MB = (\overline{CBLN}_g * tn_0) + (\overline{CBLN}_b * tn_1) + ((RES_{cb} + \overline{CBLN}_{row} + \overline{NOFA}) * ER) + NOI \quad (3.17)$$

$$MB = \sum_{fs} CC + RR + \overline{ERES} + \overline{ODCB} \quad (3.18)$$

In the above equations \overline{CBLN}_g and \overline{CBLN}_b ¹⁰ are the Central Bank loans to the public sector and banks, \overline{NOFA} is net other foreign assets, \overline{NOI} is fixed net other items, $\sum_{fs} CC$ is currency issued, RR and $ERES$ are required and excess reserves and $ODCB$ represents other deposits at the Central Bank. Moreover, required reserves are defined as:

$$RR = (1-sbb) * (rrrdd * DDS + rrrtd * TDS + rrrfd * FXDS) \quad (3.19)$$

The required reserve ratio (rrr), which is the most widely used tool for controlling the money supply, is differentiated in terms of demand, time and foreign exchange deposits.

The Central Bank also requires a certain fraction, sbb , of required reserves in the form of government bonds by the banks to finance the public deficit. However, banks can buy more than the required amount depending on the interest rate on bonds.

3.2.1.1. The aggregate price index, PINDEX

In financial CGEs, the treatment of the aggregate price index (PINDEX) deserves special attention. Because it is the numeraire in the model around which prices are normalized, an explicit treatment of its behavior is necessary. The behavioral equation for PINDEX is inferred from the study by Celasun (1980)¹¹.

¹⁰ Central bank advances to both the government and banking sectors are different from the cash credits extended them which are included in the monetary base definition. To account for this difference, the parameters tn_0 and tn_1 are utilized.

¹¹ Celasun (1980) tries to explain the inflation experience of the 1964-1979 period

It is assumed that the price index changes at the rate of inflation, PDOT. In the determination of PDOT, the rate of change in the money supply (M2Y) over real income, the rate of change in the value of nominal exchange rates, and expected inflation, which will be discussed later, are the crucial elements. Therefore, PDOT is formulated as:

$$\text{PDOT} = C1 + C2 * ((\text{MSS}/\overline{\text{LMSS}})-1) + C3 * ((\text{RGDP}/\overline{\text{LRGDP}})-1) + C4 * ((\text{ER}/\overline{\text{LER}})-1) + C5 * \text{EXPINF} \quad (3.20)$$

where $\text{MSS}/\overline{\text{LMSS}}$, $\text{RGDP}/\overline{\text{LRGDP}}$, $\text{ER}/\overline{\text{LER}}$ and EXPINF are the rates of growth of the money supply, real GDP, the exchange rate and expected inflation, respectively.

3.2.2. The depository banks

Both private and public depository banks collect deposits from and provide funds to financial agents. The quantity of available bank loans, QL , is the difference between the amount of funds they collect and dispose. The sources of funds they collect are: the financial surplus of banks ($\text{BSAV} - \text{PBINV}$), the total supply of demand (DDS), time (TDS), foreign exchange (FXDS) and other deposits (OBDS), Central Bank loans to banks (CBLN_b), foreign loans kept in banks (ROWLNB), fixed other liabilities (OLB), and cash in bank vaults (CC_b). Banks dispose these funds as: government bonds (GRBND_b), firm shares bought by the banks (FSHR_b), the amount of required (RR), excess (ERES) and foreign reserves (RES_b), and the part of government domestic borrowing financed by banks ($\text{shrgrdomb} * \overline{\text{OTLGRB}}$).

$$\begin{aligned} QL = & (\text{BSAV} - \overline{\text{PBINV}}) + \text{DDS} + \text{TDS} + \text{FXDS} + \overline{\text{OBDS}} + \text{CBLN}_b \\ & + (\text{ROWLNB} * \text{ER}) + \overline{\text{OLB}} - \text{GRBND}_b - \text{FSHR}_b - \text{RR} - \overline{\text{ERES}} \\ & + \text{CC}_b - (\text{RES}_b * \text{ER}) - \text{shrgrdomb} * \overline{\text{OTLGRB}} \end{aligned} \quad (3.21)$$

$$\text{CBLN}_b = \text{cbln}_b * (1/(1 + \overline{\text{RCBLN}}))^{\zeta_b} \quad (3.22)$$

$$\text{GRBND}_b = (\text{sbb} * \text{RR}) + \text{grbn}_b^{\delta} * (1 + \overline{\text{RGRBND}})^{\delta} \quad (3.23)$$

$$\text{FSHR}_b = \text{fshr}_b * (1 + \overline{\text{RFIRM}})^{\epsilon_b} \quad (3.24)$$

$$\text{CC}_b = \overline{\text{KK}}_b * \text{YB} \quad (3.25)$$

where $\overline{\text{RCBLN}}$, $\overline{\text{RGRBND}}$ and $\overline{\text{RFIRM}}$ are interest rates on Central Bank credits, government bonds and firm shares. Also $\zeta_b, \delta_b, \epsilon_b$ are the banks' demand elasticities for CBLN_b , GRBND_b and FSHR_b .

econometrically. He finds that excess monetary growth is a predominant variable in conjunction with inflationary expectations. Inclusion of domestic price of imports, as an independent variable, accounting for import related cost-push factors, improves the explanatory power of the model.

Both the Central Bank credits to banks ($CBLN_b$) and the firm shares demanded by them ($FSHR_b$) are increasing functions of the respective interest rates.

In addition to the government, banks give credits to firms, income groups, other financial institutions, and the rest of the world. The interest rate on bank loans, $RBLN$, is determined endogenously from the inverse supply function:

$$QL = \overline{QL} * (1 + RBLN)^{\tau_b} \quad (3.26)$$

QL and τ_b are the trend level of bond supply and the elasticity of bank supply respectively.

Similarly, interest rates on demand, time and foreign exchange deposits are endogenously determined within the model. Demand and time deposits are demanded by all agents in the economy as increasing functions of their respective interest rates, while foreign exchange deposits are assumed to be held only by firms and income groups.

In the model, banks' income and therefore savings are determined endogenously while banks' investments are fixed.

$$YB = RGRBND * GRBND_b + RFIRM * FSHR_b + RBLN * QL - (RDD * DDS + RTD * TDS + RFXD * FXDS + \overline{RODB} * \overline{ODBS} + \overline{RCBLN} * CBLN_b) + \overline{REST} \quad (3.27)$$

$$BSAV = (rer_b * (1 - shxb)) * YB \quad (3.28)$$

The part of income accruing to banks which is endogenous in this model is the net interest receipts from holding and issuing financial assets. The level of bank retained earnings, i.e., savings, are found as a certain fraction (rer_b) of after-tax income.

3.3.3. The non-financial public sector

In the financial side of the model, as distinct from the real part, public sector excluding financial State Economic Enterprises, namely public depository banks i.e. non-financial public sector (NFPS) is modelled. Deducting public depository banks' savings and investment from public savings and investments yields the deficit of the NFPS.

$$GRDEF = - (GRSAV - (shbsav * BSAV)) + \sum (PK_i * DKG_i + shscg * P_i Sc_i) - \overline{GBINV} \quad (3.29)$$

where $shscg$ is the share of inventory investment undertaken by the public

sector. Total borrowing requirement of the NFPS, PSBR, is defined as:

$$\text{PSBR} = \text{GRDEF} + \text{DD}_g + \text{TD}_g + \overline{\text{SRF}} + \text{CAPTRA} \quad (3.30)$$

where DD_g and TD_g correspond to changes in cash and bank, $\overline{\text{SRF}}$ to the stock revaluation fund, and CAPTRA to capital transfers. To finance the PSBR, either Central Bank loans or domestic borrowing or external sources are used. NFPS domestic borrowing is composed of loans from the banking system and government bonds sold to financial agents.

$$\text{CBLN}_g = \text{cbln}_g * \text{PSBR} \quad (3.31)$$

$$\text{GRDOMB} = \text{BLN}_g + \text{GRBNDS} + \overline{\text{OTLGRB}} \quad (3.32)$$

$$\text{FORB}_g * \text{ER} = \text{forb}_g * \text{PSBR} \quad (3.33)$$

where cbln_g and forb_g are shares of the PSBR financed by the Central Bank loans and foreign borrowing, respectively.

The interest rate on government bonds (RGRBD) is determined in the model as follows:

$$\text{RGRBD} + 1 = (\text{GRBNDS}/\text{GNP})^{(1/\delta_g)} \quad (3.34)$$

with δ_g being the interest elasticity of government bond supply. Government bond demands are determined by all financial agents as increasing functions of RGRBD.

3.3.4. The firms

In the financial sector, without distinguishing the sectors of production, firms are aggregated as private sector companies. The total amount of firms' required financing is equal to the difference between the value of total private investment (less private banks' investment) and less firms' savings, FSAV:

$$\text{RBF} = \sum (\text{PK}_i * \text{DKP}_i + (1 - \text{shsg}) * \text{P}_i * \text{SC}_i) - \overline{\text{PBINV}} - \text{FSAV} \quad (3.35)$$

Firms' savings are by definition, the retained earnings and depreciation of firms' income after allowing for taxes at a rate of shxf:

$$\text{FSAV} = \text{rer}_f * ((\sum \text{PR}_i - \text{YB}) * (1 - \text{shxf})) \quad (3.36)$$

Firms' shares are demanded by the government, households and other financial institutions as an increasing function of return on those shares. The yield of firms' shares, RFSHR is determined endogenously. Firms' required borrowing has to be financed by bank loans and foreign borrowing. The rest, is financed by share issue.

$$\text{BLN}_f = \text{bln}_f * \text{RBF} \quad (3.37)$$

$$\text{FORB}_f = \text{forb}_f * \text{RBF} \quad (3.38)$$

$$FSHRS = (1 - b \ln r - \text{forb}_r) * RBF \quad (3.39)$$

3.3.5. The income groups

As observed in the real part of the model, interest rates have no role in determining the level of savings. However, allocation of financial wealth among available assets is interest-sensitive. Income groups' financial wealth is defined as private savings less housing investment. The allocation of financial wealth follows a branching decision structure¹². At the first stage currency demand is determined. Currency demand formulation includes the level of respective incomes for each income group and the expected level of interest rate on time deposits as arguments.

$$CC_{hh} = \overline{KK}_{hh} * YD_{hh} * (1 + (RTD/EXPINF))^{ec_{hh}} \quad (3.40)$$

where YD_{hh} , \overline{KK}_{hh} and ec_{hh} are disposable income of each income group, share parameter and interest elasticity of currency demand.

At the second stage, the residual financial wealth, Fw_{hh} (i.e. the amount left after allowing for currency holdings) is allocated among the available menu of assets according to a CES type portfolio allocation¹³. The income groups are assumed to maximize utility from their expected total earnings on the assets they hold. Because assets are not perfect substitutes due to risk and liquidity concerns, a certain degree of substitution is assumed to exist. RET_{hh} is defined as the harmonic mean return on all assets, with the respective expected returns on each asset (EXPTRFA) each household has, distribution parameters, A_{fahh} and substitution elasticities, Ψ as arguments.

$$FW_{hh} = (1 - \overline{I}_{hh}) * (\text{imps}_{hh} * YD_{hh}) - CC_{hh} \quad (3.41)$$

$$RET_{hh} = \sum_{fa} (A_{hh}^{fa})^{\Psi} * EXPTRFA^{\Psi-1} \quad (3.42)$$

In the determination of expected returns, expected inflation is formulated with adaptive expectations as a weighted average of present and previous years' inflation rates as:

$$EXPINF = (\text{DIL} * ((\overline{PINDEX} / \overline{LPINDEX}) - 1)) + ((1 - \text{DIL}) * ((\overline{LPINDEX} / \overline{LLPINDEX}) - 1)) \quad (3.43)$$

In this model it is assumed that both firms and income groups can hold foreign exchange deposits. In addition, income groups can allocate their financial wealth to foreign exchange. In the calculation of expected returns on

¹² Tobin (1969) pursues the same multi-level portfolio allocation in his study.

¹³ For a similar treatment see Rosenweigh *et al.* (1990).

foreign-denominated assets, the level of expected devaluation is also encountered. For convenience, it is assumed that households do not expect any real devaluation, therefore the expected devaluation is equal to the expected inflation.

Therefore, household demand for each type of financial asset,

$$\text{HFA}_{hh}^{fa} = \text{SHARE}_{hh}^{fa} * \text{FW}_{hh} \quad (3.44)$$

is a certain share of financial wealth where the rates themselves are determined by expected rates of return on each asset and expected harmonic mean return.

$$\text{SHARE}_{hh}^{fa} = A_{hh}^{fa \Psi} * ((\text{EXPTRFA})^{(\Psi-1)} / \text{RET}_{hh}) \quad (3.45)$$

3.3.6 Other financial institutions

In the model, other financial institutions are assumed to have a rather passive role. They hold demand and time deposits and demand both Central Bank and bank loans similar to other agents in the economy. Their demand for those assets is increasing function of interest rates.

3.3.7 Rest of the world

As seen in the balance of payments equation, the rest of the world has demand and time deposits held at the banks that are small percentages of total deposits. They also give credits to other financial institutions and depository banks.

3.4. Model closure

The FTGCE model is closed by assuming that there is equilibrium in all asset markets. As discussed at length by Lewis (1985), financial CGE models normally precludes the necessity of imposing saving-investment balance as an identity over the model. In the present model, private fixed investment has the main burden of adjustment to attain internal balance. In the foreign exchange market, an excess supply resulting from transactions in the current and capital accounts will cause an increase in Central Bank reserves. If fixed exchange rate are assumed, Central Bank reserves will clear the foreign exchange market. If the exchange rate is freely floating, then changes in reserves should be fixed, generally set to zero. The exchange rate is allowed to adjust until excess demand or supply is eliminated.

3.5. Data requirements of the model

As is well known, the Social Accounting Matrix, SAM provides the most comprehensive basis for the creation of a plausible model. It can be claimed that, distinct from real CGE models, financial CGE models merely include a loanable funds market in their specification. It becomes necessary to enlarge SAM to consider the relations in this market. Therefore, in constructing a financial CGE, it is necessary to expand the capital account according to the requirements of the model, which implies integration of balance sheets and flow of funds information into the SAM. In this way the links between the real and financial sides of the economy and the role of financial intermediaries in stimulating savings and allocating them will be explicitly quantified.

In Financial Social Accounting Matrices, FSAMs, in the Capital Account, distinct from Current Account that are active in financial sphere are defined. Each financial agents' savings, additions to loanable funds market, and their disposition in terms of financial assets can be explicitly observed in FSAM. Sectoral investments by each financial agent and their financing through issuance of liabilities are displayed, also.

In tables 3.1 and 3. 2 the schematic and actual forms of the FSAM prepared for the TFCGE are presented. Rows show savings and change in indebtedness, whereas columns provide information about investment and lending in terms of each asset presented.

Apart from the calculation of key parameters where data is available, the main trade and financial sector elasticities utilized in the calibration of the model are presented in table 3.3.

Table 3.1
Schematic representation of FSAM

| CURRENT ACCOUNT | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---------------------------|-----------------------------|------------------|----------------|----------------------|-------------------------|----------------------------------|---------------------------------|
| 1. Activities | | Domestic sales | | | | | |
| 2. Commodities | Domestic intermediate input | | | Domestic Consumption | Exports | Investments | |
| 3. Factors | Wages, profits (GDP at fc.) | | | | | | |
| 4. Institutions | | | Incomes | transfers, net | NFI | | |
| 5. Rest of the World | | Imports | | | | | |
| CAPITAL ACCOUNT | | | | | | | |
| 6. Financial Institutions | | | | Savings | | | Change in financial liabilities |
| 7. Financial Claims | | | | | | | |
| TOTAL | Total cost | Total absorbtion | Factor incomes | Sector outlays | Foreign exchange inflow | Investment + in financial assets | in financial liabilities |

Source: Greenfield, (19859)

Table 3.2
Financial Social Accounting Matrix for Turkey, 1990

| | 1 | 2 | 3ai | 3aii | 3aiii | 3b | 3c | 4a | 4b | 4c | 5a | 5b | 5c | 5d | 5e |
|--|-----------------|-----------------|----------------|----------------|----------------|-----------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------|
| CURRENT ACCOUNT | | | | | | | | | | | | | | | |
| 1. Activities | | 620055.9 | | | | | | | 3568.6 | 52214.6 | | | | | |
| 2. Commodities | 292607.2 | | | | | | | 270065.9 | 39626.8 | | 0.0 | 1556.0 | 34054.1 | 35597.9 | 0.0 |
| 3. Factors | | | | | | | | | | | | | | | |
| 3ai. Agricultural Labor | 31375.8 | | | | | | | | | | | | | | |
| 3aii. Formal Labor | 65879.6 | | | | | | | | | | | | | | |
| 3aiii. Informal Labor | 10520.9 | | | | | | | | | | | | | | |
| 3b. Private Capital | 239003.7 | | | | | | | | | | | | | | |
| 3c. Public Capital | 12369.0 | | | | | | | | | | | | | | |
| 4. Institutions | | | | | | | | | | | | | | | |
| 4a. Private Sector | | | 31375.8 | 65879.6 | 10520.9 | 239003.7 | | | 16454.9 | 13168.8 | | | | | |
| 4b. Public Sector | 24083.0 | 13396.8 | | | | | 12369.0 | 28829.5 | | | | | | | |
| 4c. Rest of the world | | 69042.5 | | | | | | 3703.3 | 5348.1 | | | | | | |
| CAPITAL ACCOUNT | | | | | | | | | | | | | | | |
| 5. Institutions | | | | | | | | | | | | | | | |
| 5a. Central Bank | | | | | | | | | | | | | | | |
| 5b. Depository banks | | | | | | | | | | | | | | | |
| 5c. Non-financial public sector | | | | | | | | | | | | | | | |
| 5d. Firms | | | | | | | | | | | | | | | |
| 5e. Income Groups | | | | | | | | | | | | | | | |
| 5ei. Rural | | | | | | | | | | | | | | | |
| 5eii. Urban labor | | | | | | | | | | | | | | | |
| 5eiii. Urban capitalist | | | | | | | | | | | | | | | |
| 5f. Rest of the world | | | | | | | | | | | | | | | |
| 5g. Oth. Fin. Inst. | | | | | | | | | | | | | | | |
| FINANCIAL CLAIMS | | | | | | | | | | | | | | | |
| (1) Currency | | | | | | | | | | | | 1171.1 | | | -336.1 |
| (2) Demand Deposits | | | | | | | | | | | | | 2122.5 | | 3493.0 |
| (3) Time Deposits | | | | | | | | | | | | | 964.3 | | 2827.3 |
| (4) Foreign Exchange Deposits | | | | | | | | | | | | | | | 3763.7 |
| (5) Other Deposits | | | | | | | | | | | | | 838.8 | | 2623.7 |
| (6) Government Bonds | | | | | | | | | | | | 5834.6 | | | 79.8 |
| (7) Firm Shares | | | | | | | | | | | | 5655.5 | 951.5 | | |
| (8) Bank loans | | | | | | | | | | | | 29929.3 | | | |
| (9) Unclassified | | | | | | | | | | | 11255.3 | 3696.8 | 6197.2 | 1471.3 | |
| TOTAL | 675839.1 | 702495.2 | 31375.8 | 65879.6 | 10520.9 | 239003.7 | 12369.0 | 376404.0 | 78678.3 | 78093.9 | 11255.3 | 47843.2 | 45128.5 | 49520.4 | 0.0 |

Note: Corresponding row and column sums may not be equal to each other due to rounding

Some are Own estimates

Table 3.2 (continued)
Financial Social Accounting Matrix for Turkey, 1990

| | 5ei | 5eii | 5eiii | 5f | 5g | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | TOTAL |
|---------------------------------|---------------|----------------|----------------|----------------|---------------|---------------|---------------|----------------|---------------|----------------|---------------|---------------|----------------|----------------|------------------|
| CURRENT ACCOUNT | | | | | | | | | | | | | | | |
| 1. Activities | | | | | | | | | | | | | | | 675839.0 |
| 2. Commodities | 2224.7 | 7699.3 | 19063.0 | 0.0 | 0.0 | | | | | | | | | | 702494.9 |
| 3. Factors | | | | | | | | | | | | | | | 0.0 |
| 3ai. Agricultural Labor | | | | | | | | | | | | | | | 31375.8 |
| 3aii. Formal Labor | | | | | | | | | | | | | | | 65879.6 |
| 3aiii. Informal Labor | | | | | | | | | | | | | | | 10520.9 |
| 3b. Private Capital | | | | | | | | | | | | | | | 239003.7 |
| 3c. Public Capital | | | | | | | | | | | | | | | 12369.0 |
| 4. Institutions | | | | | | | | | | | | | | | 0.0 |
| 4a. Private Sector | | | | | | | | | | | | | | | 376403.7 |
| 4b. Public Sector | | | | | | | | | | | | | | | 78678.3 |
| 4c. Rest of the world | | | | | | | | | | | | | | | 78093.9 |
| CAPITAL ACCOUNT | | | | | | | | | | | | | | | |
| 5. Institutions | | | | | | | | | | | | | | | 0.0 |
| 5a. Central Bank | | | | | | 5709.0 | | | | | | | | 5546.3 | 11255.3 |
| 5b. Depository banks | | | | | | | 8977.3 | 12732.2 | 7527.3 | 10386.1 | | | | 3383.4 | 47843.2 |
| 5c. Non-financial public sector | | | | | | | | | | | 6910.0 | | 4271.5 | 21913.1 | 45128.5 |
| 5d. Firms | | | | | | | | | | | | 8202.3 | 20919.1 | 4575.8 | 49520.4 |
| 5e. Income Groups | | | | | | | | | | | | | | | 0.0 |
| 5ei. Rural | | | | | | | | | | | | | 0.0 | | 5664.3 |
| 5eii. Urban labor | | | | | | | | | | | | | 1205.4 | | 16604.0 |
| 5eiii. Urban capitalist | | | | | | | | | | | | | 2292.2 | | 36020.2 |
| 5f. Rest of the world | | | | | | | | | | | | | 646.6 | 6141.8 | 19498.9 |
| 5g. Oth. Fin. Inst. | | | | | | | | | | | | | 594.5 | 8835.0 | 9429.5 |
| FINANCIAL CLAIMS | | | | | | | | | | | | | | | |
| (1) Currency | 649.7 | 1454.3 | 2770.0 | | | | | | | | | | | | 5709.0 |
| (2) Demand Deposits | 437.9 | 980.3 | 1867.1 | 3.9 | 72.6 | | | | | | | | | | 8977.3 |
| (3) Time Deposits | 1180.3 | 2642.0 | 5032.3 | 8.3 | 77.8 | | | | | | | | | | 12732.2 |
| (4) Foreign Exchange Deposits | 501.7 | 1123.0 | 2139.0 | | | | | | | | | | | | 7527.3 |
| (5) Other Deposits | 669.2 | 2153.6 | 4100.8 | | | | | | | | | | | | 10386.1 |
| (6) Government Bonds | 0.0 | 0.0 | -0.8 | | 996.4 | | | | | | | | | | 6910.0 |
| (7) Firm Shares | 0.0 | 549.9 | 1045.4 | | | | | | | | | | | | 8202.3 |
| (8) Bank loans | | 0.0 | 0.0 | | | | | | | | | | | | 29929.3 |
| (9) Unclassified | 0.8 | 1.7 | 3.3 | 19486.7 | 8282.6 | | | | | | | | | | 50395.7 |
| TOTAL | 5664.3 | 16604.0 | 36020.2 | 19498.9 | 9429.5 | 5709.0 | 8977.3 | 12732.2 | 7527.3 | 10386.1 | 6910.0 | 8202.3 | 29929.3 | 50395.7 | 2652392.4 |

Note: Corresponding row and column sums may not be equal to each other due to rounding

Source: Own estimates

Table 3.3

Values of Some Key Parameters

| | AGR | IND | SERV | | |
|--|--------|-------|-------|-------|-------|
| CES elasticity (ρ) | 1.750 | 1.500 | 1.750 | | |
| CET elasticity (Θ) | 2.750 | 1.28 | 2.750 | | |
| Elasticity of private investm. (cdk_{p_i}) | 2.500 | 2.500 | 2.500 | | |
| | BANK | NFPS | FIRMS | OFI | ROW |
| Firm shares elasticity (ϵ) | 1.000 | 1.750 | 0.000 | 0.100 | 0.000 |
| Supply clas. of bank loans (τ) | -2.500 | 1.950 | 1.500 | 1.500 | 1.500 |
| Elasticity of DD (ω) | 2.000 | 1.500 | 1.500 | 1.500 | 1.500 |
| Elasticity of TD (γ) | 2.000 | 0.050 | 2.800 | 2.000 | 2.000 |
| Elasticity of GRBND (δ) | 0.050 | 0.250 | 0.050 | 0.050 | 0.050 |
| Elasticity of CBRT loans (σ) | 1.800 | 0.000 | 0.000 | 1.250 | 1.250 |

Source: Author's estimates.

4. Experiments

In order to see the changes in the financial structure and transfers among financial agents three experiments under two different closure rules in the labor market are designed. Contrary to the first two, the third experiment assumes fixed exchange rate in the model, so that the reserves at the Central Bank become the adjusting variable.

All three simulation exercises are conducted under two different assumptions about the labor market. In the first set, A, the "nominal formal labor wage", while in the second set, B, the "real formal labor wage" is assumed to be fixed. The detailed description of the simulation exercises are given below:

Experiment 1: 25% increase in the share of the Central Bank advances to the public sector in financing public sector borrowing requirement,

Experiment 2: 50% increase in total nominal public investment expenditure,

Experiment 3: 20% nominal devaluation of the exchange rate. Although this is not a realistic assumption given the policy settings of the economy, the possible impact of devaluations in the adjustment process cannot be ignored, and therefore, it is believed to be a worthwhile experiment.

Here, only the response of macroeconomic and selected sectoral variables will be examined. Also, the stock values for financial instruments together with interest rate changes will be presented, in tables 4.1 to 4.8 that are placed at the end of the section.

In most cases, the response of variables for the same experiments under different labor market closures follow the same route. Therefore, the same experiments under the two different adjustment mechanisms will be evaluated together.

4.1. Experiments A1 and B1

This experiment is designed as a counterfactual exercise against the tight monetary policy implemented as part of the monetary program in 1990.

The effects on the economy are different in experiments A1 and B1. While in both experiments the domestic demand components of absorption, namely consumption and fixed investments decline, there is an expansion in the economy when nominal formal wages are fixed, but a moderate contraction in case of fixed real formal wages.

In both experiments, the increase in public sector disposable income results in an increase in public sector savings as a percent of GNP, while total savings fall. Table 4.3 and Table 4.4 reveal that the decline in foreign resource flow to the economy (FORSAV) is compensated by both the rise in private sector savings surplus and a fall in public sector savings deficit.

From Tables 4.3 and 4.4, it can be observed that the PSBR as a percentage of GNP falls, mainly due to the fall in public investments. As the pace of monetization of the fiscal deficit rises, the share of domestic and foreign borrowing in financing the PSBR fall. Consequently, the burden on government bond finance declines, causing falls in the supply and interest rate on government bonds. (Tables 4.7 and 4.8)

As expected, the increase in the share of Central Bank credits extended to the government has an inflationary effect through the monetary base. The inflation rate increases to 0.619 in A1 and 0.621 in B1, when the base run value is 0.6.

The real depreciation of the exchange rate at about 2.3 percentage points in both experiments, as discussed above results in a rise in exports and a fall in imports. As a result an improvement in the current account deficit about 1% of GNP is observed in both experiments. The response of gross output expansion to the change in the financing pattern of the PSBR is moderate. For A1, output

expands in the agriculture and industrial sectors, while for B1, output expansion is observed only in industrial sector as indicated in tables 4.5 and 4.6. In both experiments, there is a fall in the output of the services sector, while sectoral exports rise in both cases. Because industry is more export-oriented than other sectors, (the share of exports in output produced is 12.4 % in the base run), from tables 4.5 and 4.6 it is observed that the response of industrial output is the largest in other sectors. As a consequence, employment in the industrial sector increases by 2.47% and 1.70% respectively for A1 and B1. In A1, where nominal formal labor wage is fixed, the increase in industrial employment increases economy-wide formal employment since formal labor is predominantly employed in industry (65%). However, in B1 where the real formal wage is fixed, the increase in industrial employment is offset by decreases observed in other sectors, resulting in a fall in formal employment in the economy.

The interest rate on bank loans, RBLN in these experiments increase by 3.51 and 3.3 percents above the actual rate of 0.94 in the base run, respectively, due to the squeeze in the amount of available credits held in the banking sector. Consequently, interest rates on demand, time and foreign exchange deposits rise (Tables 4.7 and 4.8).

Mainly as a result of the high cost of borrowing, total (real) private investments decline together with the fall in the real value of nominally fixed public investments. The higher level of expected inflation, though slight, contributes to the decline in private investments. The fall in private investments results in the decline in borrowing requirements by private firms. The decline amounts to 2.48% and 2.35% for A1 and B1 respectively, below their base run value. This causes the total supply of firm shares and the return on those shares to decrease (Table 4.7 and Table 4.8). as well as other sources of financing, namely bank loans and foreign borrowing.

In A1 and B1, the share of public disposable income (GRYD) increases while the urban labor income groups' income decreases. Therefore, the amount to be allocated among financial assets decreases for that income group. Turning to the income groups' portfolio allocation, it can be claimed that changes in the interest rates play the major role. Because of the higher opportunity cost of holding currency, the real demand for currency decreases. The increase in interest rates can not avoid currency substitution, because of the nominal depreciation of domestic currency by 3.48% and 3.63% in A1 and B1, respectively, causing a portfolio shift towards demand, time and more significantly foreign exchange deposits.

4.2. Experiments A2 and B2

The experiments A2 and B2 aim to capture the effects of rising government expenditure, namely government investment, on the economy.

The increase in real GDP is less in B2 (0.12%) than in A2 (0.62%) compared to the base case. As indicated in Table 4.1 and Table 4.2, although private fixed investments decline due to crowding-out, which will be discussed further, aggregate fixed investment increases in both experiments. The same trend is also observed for aggregate private consumption.

Though government revenue increases due to real sector developments (i.e., increases in tariffs, indirect and direct taxes), government disposable income falls as a percent of GNP in both experiments compared to the base year value of 13.4 %. This can be attributed mainly to the increase in domestic interest payments. The fall in public disposable income causes public sector savings to decrease while overall savings in the economy as percent of GNP rises from 0.252 to 0.264 in A2 and 0.265 in B2. This increase may be attributed to private and foreign savings. In both experiments, the PSBR increases by approximately the same percentage as the rise in government investments.

Naturally, the sources of financing the deficit in the model increase as well. Additionally, it is observed that the composition of government domestic borrowing also changes. The non-financial public sector depends more heavily on bond issuing than bank loans, since the cost of borrowing is greater in the latter use.

Tables 4.3 and 4.4 indicate that the inflation rate increases to 0.642% and 0.644% in A2 and B2 respectively compared to the base run value of 0.6.

In these set of experiments as a result of developments, the trade balance improves by 1.5% over its base year value causing a real appreciation as shown in tables 4.1 and 4.2. The net capital inflow in this experiment causes the adjustment of the exchange rate. Turning to sectoral variables, it is found that sectoral output production expands in the agriculture and services sectors while output production falls in the industrial sector in both experiments. The reason of the fall in industrial output may be the decline in exports due to the appreciation of the exchange rate. As mentioned above, industry is more export-oriented than other sectors, appreciation has adverse effects in that sector. The fall in the industrial sector's output causes employment to fall. This, however, is not reflected in total formal employment figures because it is compensated by increases in employment of other sectors.

Since the larger portion of government bonds issued are held by banks (85

% of total government bonds issued is held by banks in 1990), the rise in the interest rate on government bonds will result in an increasing command of bonds on available funds in the banking system. Therefore, the quantity of loans available shrinks by 1.85% and 1.90% in real terms in A2 and B2 respectively compared to the base year value, causing a significant increase in interest rate on bank loans (Table 4.7 and Table 4.8).

Financial crowding-out in the system is naturally reflected as crowding-out of real private investments. In all sectors, around 8 to 26% falls are observed in A2 and B2, mainly due to the rise in the cost of borrowed funds. As a consequence of the fall in investments, firms' borrowing requirements also fall together with the fall in foreign borrowing, amount of bank credits and issuance of equities by firms. The increasing claim of government bonds on available funds causes a significant increase in the interest rate on bank loans (RBLN) resulting in sharp falls in credit demands of other financial agents.

The increase in RBLN causes parallel increases in interest rates on bank deposits and therefore, increases in holdings by agents. As a result, the monetary base increases, resulting in a 64% inflation rate in both experiments as compared to 60% in the base run.

The increase in private disposable incomes and private savings cause a rise in the amount of funds that are available, to be allocated among the menu of available assets except for the urban capitalists income group. Except for the urban capitalist income group, currency demand by households show a slight fall, although there is a rise in the price level of 2.6 and 2.7% respectively for A2 and B2.

Because of the average rise in interest rates, the average mean return on household holdings of financial assets increase. Since the yield on firm shares falls, income groups decrease their demands for firm shares, and there is a portfolio shift towards demand, time and foreign exchange deposits around 13-18 % away from firms' equities and foreign currency. In this experiment, the appreciation of the nominal exchange rate results in reverse currency substitution is for the rural and urban capitalist income groups. Though expected depreciation rises which will increase demand for foreign currency. Although there occurs an increase in the cost of bank loans, all income groups have increasing comment on loans.

4.3. Experiments A3 and B3

In this experiment, a 20 % nominal devaluation yields different responses under the two different labor market closures. In A3, while real GDP increases

by 1.23%, a slight contraction (0.45%) takes place in B3.

In both of the experiments, private investment falls in real terms because of the increase in cost of borrowing together with the decline in the real value of nominally fixed public investments. While the same trend is observed for consumption in B3, the same claim cannot be made for A3. In A3, in contrast to public consumption, both aggregate and private consumptions rise.

In A3, urban formal employment increases by 6.6% over its base run value. In turn, formal urban employment drops in B3 due to real wage rigidity and output contraction in the services sector.

In both experiments, public sector disposable income (GRYD) and savings (GRSAV) measured as percent of GNP decrease. The difference between two experiments arises from the relatively high level of domestic interest payments in A3 compared to B3. The GNP share of PSBR increased to 14.1% and 10% for A3 and B3 respectively from 6.8 % of in the base year.

The drastic increase of the PSBR in A3, increased the need for financing. The increase in the amount of Central Bank advances to the government exerts pressure on the money supply. This, together with a devaluation causes inflation to soar. Therefore, high rates of inflation may be cited as one of the reasons for the decrease in net capital inflows. The same trend is observed in B3 as well, although the results are moderate. The inflation rate is 74.4% for A3, and 73.9% for B3 compared to the base run value 60%.

After a devaluation, the current account yields a surplus because of the higher sensitivity of exports. Although by the public sector foreign borrowing increases in both experiments, net capital inflow to the economy falls resulting in a loss in reserves in both experiments.

To satisfy export demand, industrial output expands together with production in other sectors in A3. However, in B3 where the real formal wage is fixed, production in service sector decreases by approximately 2 % compared to its base value, resulting in a slight contraction.

As a result of the decline in public sector disposable income, private sector disposable income increases with the rural income group benefitting most from this development. From Table 4.4 and 4.3 it is observed that the saving surplus / deficit of agents change in such a way that the decline in public sector deficit and the current account surplus will activate private sector saving decisions.

Since interest rates on bank deposits increase, demands for deposits and therefore money supply (M2Y) increases. The above scenario indicates that there is a shift towards bank deposits, especially to foreign exchange deposits due to the impact of devaluation. From the monetary policy side, it is hoped

that, the increase in the interest rate is also necessary to maintain demand for domestic currency. However, it is observed that currency substitution cannot be overcome.

As a result of the decline in private investments, firms' borrowing requirements fall. This fall is followed by decreases in the issuance of firm shares and the return on those shares. It should also be noted that foreign borrowing by firms declines. From the above settings, it is clear that demand for firm shares by all financial agents decline.

5. Conclusion

In this paper, a financial computable general equilibrium model for Turkey (TFCGE) is used to analyze the impacts of changes in the financing pattern of the economy, the change in the spending of public sector, and finally a devaluation which is investigated under two different regimes for the labor market. In the first regime, the nominal formal wage, and in the second the real formal wage is kept constant.

It can be argued that when Central Bank resources are used more heavily, the impact on the economy is expansionary under the first closure rule, while it is slightly contractionary under the second. This result is valid also for the devaluation simulation. With regards to the second group of simulations, the economy expands under both closure rules.

Overall, it appears that the response is stonger in the case of the second closure rule compared to the first. This phenomenon may be interpreted in such a way that to cushion the adverse effects of exogenous shocks, wage treatment by authorities is extremely important.

With the formulation of the financial CGE, the effects of financial variables on real variables are captured explicitly. The above results show that in deciding on the level sectoral production, export and investments, producers have to consider the inflation rate, exchange rate and interest rates. Both the public sector and firms have to consider the cost of alternative ways of financing their respective deficits while income groups allocate their portfolios according to interest rate changes resulting from the simulations.

Table 4.1
Real Macroeconomic Indicators, Experiment A
(% change from base run)

| | A1 | A2 | A3 |
|-----------------------------------|--------|---------|---------|
| Real GDP | 0.173 | 0.618 | 1.225 |
| Fixed investments | -1.720 | 6.398 | -15.565 |
| Public | -0.792 | 46.038 | -5.647 |
| Private | -2.132 | -11.211 | -19.971 |
| Consumption | -0.374 | 1.283 | 0.909 |
| Public | -0.536 | -3.097 | -4.255 |
| Private | -0.350 | 1.926 | 1.667 |
| Urban employment | | | |
| Formal | 0.866 | 3.627 | 6.600 |
| Informal | 0.000 | 0.000 | 0.000 |
| Urban real wage | | | |
| Formal | -1.148 | -2.489 | -8.279 |
| Informal | 0.303 | -0.145 | 0.830 |
| Real exchange rate (TL/\$) | 2.300 | -5.300 | 11.000 |

Source: Model estimates.

Table 4.2
Real Macroeconomic Indicators, Experiment B
(% change from base run)

| | B1 | B2 | B3 |
|---------------------------|--------|---------|---------|
| Real GDP | -0.058 | 0.117 | -0.445 |
| Fixed investments | -1.889 | 6.156 | -14.530 |
| Public | -1.028 | 45.456 | -6.353 |
| Private | -2.272 | -11.284 | -18.162 |
| Consumption | -0.587 | 0.861 | -1.282 |
| Public | -0.777 | -3.539 | -5.048 |
| Private | -0.559 | 1.507 | -0.730 |
| Urban employment | | | |
| Formal | -0.405 | 0.841 | -2.654 |
| Informal | 0.000 | 0.000 | 0.000 |
| Urban real wage | | | |
| Formal | 0.000 | 0.000 | 0.000 |
| Informal | 0.224 | -0.329 | 0.619 |
| Real exchange rate | 2.400 | -5.500 | 11.300 |

Source: Model estimates.

Table 4.3
Nominal Macroeconomic Indicators, Experiment A

| | Base | A1 | A2 | A3 |
|--|-----------|-----------|-----------|-----------|
| <i>A. Percent of GNP</i> | | | | |
| Public disp.income (GRYD) | 0.134 | 0.136 | 0.127 | 0.120 |
| Private disp.income (PRYD)* | 0.866 | 0.864 | 0.873 | 0.880 |
| of which Rural (RURALYD) | 0.085 | 0.085 | 0.085 | 0.091 |
| Urban on (URBLYD) | 0.176 | 0.174 | 0.180 | 0.185 |
| Urban cap. (URBKYD) | 0.605 | 0.604 | 0.617 | 0.605 |
| Total investment (TOTINV) | 0.252 | 0.248 | 0.264 | 0.214 |
| Total savings (TOTSAV)* | 0.252 | 0.248 | 0.264 | 0.214 |
| of which Public (GRSAV) | 0.034 | 0.038 | 0.031 | 0.028 |
| Private (PRSAV) | 0.186 | 0.185 | 0.187 | 0.189 |
| Foreign (FORSAV) | 0.032 | 0.025 | 0.046 | -0.003 |
| Saving Deficit/Surplus* | | | | |
| Public | -0.055 | -0.050 | -0.092 | -0.057 |
| Private | 0.023 | 0.025 | 0.046 | 0.060 |
| Foreign | 0.032 | 0.025 | 0.046 | -0.003 |
| PSBR* | 0.083 | 0.068 | 0.119 | 0.141 |
| Central Bank (CBLNg) | 0.014 | 0.015 | 0.021 | 0.024 |
| Domes. borr. (GRDOMB) | 0.062 | 0.048 | 0.088 | 0.104 |
| Foreign borrowing (FORBg) | 0.007 | 0.006 | 0.010 | 0.012 |
| <i>B. Own Units</i> | | | | |
| Price index (PINDEX) | 1.000 | 1.012 | 1.026 | 1.090 |
| Actual inflation (PDOT) | 0.600 | 0.619 | 0.641 | 0.744 |
| Expected inflation (EXPINF) | 0.608 | 0.622 | 0.639 | 0.716 |
| Nominal Exchange Rate (ER) (Thousand TL/\$) | 2.643 | 2.737 | 2.571 | 3.172 |
| <i>TRADE FLOWS (million \$)</i> | | | | |
| Exports (E) | 19756.746 | 20661.263 | 18144.876 | 24289.721 |
| Imports (M) | 26093.790 | 25869.463 | 26987.376 | 25357.462 |
| Current Account Deficit | 2624.476 | 1495.930 | -5129.819 | -2543.017 |

(*) The numbers may not add to total due to rounding.

Source: Model estimates.

Table 4.4
Nominal Macroeconomic Indicators, Experiment B

| | Base | B1 | B2 | B3 |
|---------------------------------|-----------|-----------|-----------|-----------|
| <i>A. Percent of GNP</i> | | | | |
| Public disp.income (GRYD) | 0.134 | 0.137 | 0.127 | 0.128 |
| Private disp.income (PRYD)* | 0.866 | 0.863 | 0.873 | 0.872 |
| of which Rural (RURALYD) | 0.085 | 0.085 | 0.084 | 0.088 |
| Urban on (URBLYD) | 0.176 | 0.174 | 0.181 | 0.179 |
| Urban cap. (URBKYD) | 0.605 | 0.605 | 0.608 | 0.604 |
| Total investment (TOTINV) | 0.252 | 0.248 | 0.265 | 0.221 |
| Total savings (TOTSAV)* | 0.252 | 0.248 | 0.265 | 0.221 |
| of which Public (GRSAV) | 0.034 | 0.038 | 0.031 | 0.035 |
| Private (PRSAV) | 0.186 | 0.185 | 0.187 | 0.187 |
| Foreign (FORSAV) | 0.032 | 0.025 | 0.047 | -0.001 |
| Saving Deficit/Surplus* | | | | |
| Public | -0.055 | -0.050 | -0.092 | -0.051 |
| Private | 0.023 | 0.025 | 0.046 | 0.052 |
| Foreign | 0.032 | 0.025 | 0.047 | -0.001 |
| PSBR* | 0.083 | 0.068 | 0.119 | 0.100 |
| Central Bank (CBLNg) | 0.014 | 0.015 | 0.021 | 0.017 |
| Domes. borr. (GRDOMB) | 0.062 | 0.048 | 0.089 | 0.074 |
| Foreign borrowing (FORBg) | 0.007 | 0.006 | 0.010 | 0.008 |
| <i>B. Own Units</i> | | | | |
| Price index (PINDEX) | 1.000 | 1.013 | 1.027 | 1.087 |
| Actual inflation (PDOT) | 0.600 | 0.621 | 0.644 | 0.739 |
| Expected inflation (EXPINF) | 0.608 | 0.623 | 0.641 | 0.739 |
| Nominal Exchange Rate (ER) | 2.643 | 2.739 | 2.569 | 3.172 |
| (Thousand TL/\$) | | | | |
| <i>TRADE FLOWS (million \$)</i> | | | | |
| Exports (E) | 19756.746 | 20656.441 | 17885.494 | 23501.387 |
| Imports (M) | 26093.790 | 25806.102 | 26877.810 | 24864.131 |
| Current Account Deficit | 2624.476 | 1526.290 | -5279.411 | -2348.784 |

(*) The numbers may not add to total due to rounding.

Source: Model estimates.

Table 4.5
Sectoral Variables, Experiment A (% change from base year)

| | A1 | A2 | A3 |
|--------------------------------|--------|--------|--------|
| <i>A. Real</i> | | | |
| Gross Output (X) | | | |
| Agriculture | 0.026 | 0.069 | 0.225 |
| Industry | 0.879 | 0.255 | 5.167 |
| Service | 0.035 | 1.176 | 0.131 |
| Labor (L) | | | |
| Agriculture | 0.021 | 0.063 | 0.222 |
| Industry | 2.468 | -1.345 | 14.886 |
| Service | -0.173 | 4.643 | 0.334 |
| Exports (E) | | | |
| Agriculture | 1.176 | -3.672 | 3.098 |
| Industry | 7.375 | -13.67 | 35.996 |
| Service | 1.650 | -2.206 | 8.556 |
| Imports (M) | | | |
| Agriculture | -0.749 | 2.670 | -1.669 |
| Industry | -0.835 | 3.430 | -2.662 |
| Service | -1.310 | 3.817 | -5.999 |
| <i>B. Nominal</i> | | | |
| Gross Output Price (PX) | | | |
| Agriculture | 1.400 | 4.000 | 14.200 |
| Industry | 1.700 | 1.300 | 11.700 |
| Service | 0.500 | 3.200 | 4.200 |
| Value Added Price (PN) | | | |
| Agriculture | 1.551 | 4.513 | 15.515 |
| Industry | 1.935 | -0.323 | 12.581 |
| Service | 0.56 | 3.906 | 1.875 |

Source: Model estimates.

Table 4.6
Sectoral Variables, (Experiment B % change from base year)

| | B1 | B2 | B3 |
|--------------------------------|--------|---------|--------|
| <i>A. Real</i> | | | |
| Gross Output (X) | | | |
| Agriculture | 0.000 | 0.009 | 0.017 |
| Industry | 0.551 | -0.993 | 2.691 |
| Service | -0.312 | 0.583 | -1.826 |
| Labor (L) | | | |
| Agriculture | -0.003 | 0.011 | 0.018 |
| Industry | 1.704 | -3.14 | 8.639 |
| Service | -1.235 | 2.329 | -7.017 |
| Exports (E) | | | |
| Agriculture | 1.375 | -3.414 | 5.193 |
| Industry | 6.733 | -15.436 | 31.300 |
| Service | 1.299 | -3.094 | 5.888 |
| Imports (M) | | | |
| Agriculture | -0.924 | 2.389 | -3.345 |
| Industry | -1.082 | 3.000 | -4.590 |
| Service | -1.534 | 3.466 | -7.457 |
| <i>B. Nominal</i> | | | |
| Gross Output Price (PX) | | | |
| Agriculture | 1.200 | 3.300 | 9.900 |
| Industry | 1.900 | 1.600 | 12.000 |
| Service | 0.700 | 3.700 | 5.100 |
| Value Added Price (PN) | | | |
| Agriculture | 1.128 | 3.526 | 10.155 |
| Industry | 2.258 | 0.323 | 15.161 |
| Service | 0.469 | 4.531 | 3.125 |

Source: Model estimates.

Table 4.7
Selected Financial Variables, Experiment A

| | Base | A1 | A2 | A3 |
|----------------------------------|-------|-------|-------|--------|
| <i>A. Ratios to Base Run</i> | | | | |
| <i>Stocks</i> | | | | |
| Monetary Base (MBS) | 1.000 | 1.006 | 1.060 | 1.079 |
| M1 (M1S) | 1.000 | 0.984 | 1.037 | 1.043 |
| M2 (M2S) | 1.000 | 1.000 | 1.005 | 1.010 |
| M2Y (M2YS) | 1.000 | 1.003 | 1.029 | 1.060 |
| <i>Change in:</i> | | | | |
| Firms' shares supply (FSHRS) | 1.000 | 0.975 | 0.885 | 0.790 |
| Quantity of loans (QL) | 1.000 | 0.993 | 0.968 | 0.939 |
| <i>B. Interest Rates On:</i> | | | | |
| Demand deposits (RDD) | 0.124 | 0.125 | 0.142 | 0.163 |
| Time deposits (RTD) | 0.574 | 0.594 | 0.675 | 0.776 |
| Foreign exchange deposits (RFXD) | 0.108 | 0.111 | 0.127 | 0.145 |
| Bank loans (RBLN) | 0.940 | 0.973 | 1.104 | 1.270 |
| <i>C. Monetary Ratios</i> | | | | |
| M1S/MBS | 1.507 | 1.474 | 1.475 | 1.457 |
| M2S/MBS | 3.264 | 3.264 | 3.185 | 3.2823 |
| MBS/GNP | 0.058 | 0.058 | 0.059 | 0.057 |
| M1S/GNP | 0.087 | 0.085 | 0.087 | 0.083 |
| M2S/GNP | 0.189 | 0.187 | 0.188 | 0.185 |
| M2YS/GNP | 0.243 | 0.241 | 0.241 | 0.237 |

Source: Model estimates.

Table 4.8
Selected Financial Variables, Experiment B

| | Base | B1 | B2 | B3 |
|----------------------------------|-------|-------|-------|-------|
| <i>A. Ratios to Base Run</i> | | | | |
| <i>Stocks</i> | | | | |
| Monetary Base (MBS) | 1.000 | 1.006 | 1.060 | 1.061 |
| M1 (M1S) | 1.000 | 0.984 | 1.038 | 1.020 |
| M2 (M2S) | 1.000 | 1.000 | 1.005 | 1.007 |
| M2Y (M2YS) | 1.000 | 1.002 | 1.028 | 1.045 |
| <i>Change in:</i> | | | | |
| Firms' shares supply (FSHRS) | 1.000 | 0.976 | 0.889 | 0.824 |
| Quantity of loans (QL) | 1.000 | 0.994 | 0.969 | 0.950 |
| <i>B. Interest Rates On:</i> | | | | |
| Demand deposits (RDD) | 0.124 | 1.125 | 1.141 | 1.155 |
| Time deposits (RTD) | 0.574 | 1.593 | 0.670 | 0.737 |
| Foreign exchange deposits (RFXD) | 0.108 | 0.111 | 0.126 | 0.138 |
| Bank loans (RBLN) | 0.940 | 0.971 | 1.097 | 1.207 |
| <i>C. Monetary Ratios</i> | | | | |
| M1S/MBS | 1.507 | 1.474 | 1.476 | 1.450 |
| M2S/MBS | 3.264 | 3.245 | 3.182 | 3.220 |
| MBS/GNP | 0.658 | 0.058 | 0.059 | 0.057 |
| M1S/GNP | 0.087 | 0.085 | 0.087 | 0.083 |
| M2S/GNP | 0.189 | 0.187 | 0.188 | 0.184 |
| M2YS/GNP | 0.243 | 0.241 | 0.242 | 0.237 |

Source: Model estimates.

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