A FINANCIAL CGE MODEL FOR TURKISH ECONOMY WITH 1996 DATA

MURAT ASLAN[1]

Preliminary version, please do not quote.

Comments are welcome!

ABSTARCT

The objective of this paper is to outline our research project about the inclusion of supply-side variables into the CGE framework. Although the model is still in progress, this paper will discuss the basic algorithm we are planning to build in order to include supply-side transmission mechanism into the CGE framework. In particular, the empirical studies show that large private firms operating in the real sector in Turkey diverted significant part of their liquid sources in financial assets during the last decade. This implies that high real returns from financial assets (due to significant budget deficits) outweighed real returns from real activities which in turn not only reduced purchase of physical capital (i.e. investment) but also reduced the funds could have been used in purchase of intermediate input and hiring factors of production. In other words, the firms in real sectors shifted from their primary field of operation and became a banker(s) of government. The objective of this research is to shed some lights on this issue by using CGE framework as an analytical tool. By differentiating between financial returns and real returns, the capacity utilization is no longer operating as exogenous nor is consistent with Keynesian tradition.

1. Introduction

In 1990-2002 period, two major economic crises (1994, 2000-2001) and two major earthquakes (in August-1999 and November-1999) caused severe economic and social consequences in Turkey. In addition to these, high and volatile inflation, large swing in output growth, growing consolidated budget deficit, imbalance in current account, high domestic and foreign debt of the public sector were considered the other structural problems influenced the society.

The political instability exacerbated the economic problems. During the period of 1993 to 2002, five different governments came to the power with an average stay of two years. Moreover, the governments during the last decade were weak coalition governments which were constructed by political parties with different economic and social agendas. The ruling parties in those coalition governments pursued populist and myopic policies to distribute rants to their own constituents. Therefore, the political instability impaired macroeconomic stability by reducing private capital formations and thus economic growth.

The objective of this research is to construct a recursive dynamic Financial Computable General Equilibrium (FCGE) model which includes for Turkish economy from 1996 to 2000. In order to achieve this objective, the construction of a financial social accounting matrix (FSAM) is the first step. The real SAM constructed in Aslan (2004) will be expended by adding financial institutions and financial instruments.

Among others, the main starting point of the research is based on the empirical findings of Agenor et al. (2000)] study. That study distinguished the importance of the

---

[1] Osmangazi University, Faculty of Economic and Administrative Sciences, Department of Public Finance, Eskisehir, Turkey. E-mail: maslanim@yahoo.com

supply side variables in creation of business cycle in Turkey. The second inspiration for the research is based on a survey-based report by the Istanbul Chambers of Commerce in 1997. In particular, according to that report, more than 50 percent of gross profits of Turkey's top 500 industrial companies came from interest earnings (Istanbul Sanayi Odasi, 1998: p. 86).

In other CGE models for Turkish economy [i.e. Yeldan 1996, 1997], the capacity utilization (implicitly) is determined by the countercyclical (or fixed) mark up pricing assumption and therefore, those models tend to support Keynesian prediction. Different from those studies, Aslan (2004) study investigates the historical pattern of the capacity utilization and demonstrates that the volatility in the observed capacity utilization is correlated with government deficits. Therefore, that model describes the capacity utilization as a function of government deficit according to estimated coefficients. Different from our earlier work i.e. Aslan (2004), in this new research we will extend that model through incorporating financial variables into the real model. In other words, our objective is to build a model which takes capacity utilization as an endogenous variable. That is, firms (particularly large firms) make a decision over real and financial activities by comparing the returns from these two activities. As returns from financial activities i.e. interest rates offered by government debt instruments and REPOs, increases, the firms divert more and more of their liquid sources including working capital holdings to financial instruments instead of purchase of intermediate input and hiring other primary factors.

The objective of this paper is to briefly discuss about our model. Our purpose is to share our thoughts about the transmission mechanisms we offer for Turkish economy.

The paper consists of four sections. In the first part of the paper, problems observed in Turkish public finance and Turkish economy will be discussed. In the second part, the paper will discuss about the importance of supply-side variables in Turkish business cycle. In the third part, the paper will outline the possible way to include this supply-side issue into the CGE model. The paper will end with a conclusion.

2. The Last Two Decades: Turkish Economy and Public Finance

In 1980 Turkey embarked upon a liberal economic policy. In January 24, 1980 the government introduced an unorthodox economic program to solve the severe economic problems of Turkey. Until that date, the Turkish economy remained an inward-oriented closed economy. The program, also commonly known as "January 24 Decisions," was prepared by technocrats to change the shape of the economy, and the general political environment from an inward-oriented to an export-oriented, private sector-driven, dynamic economy. The program, which was also supported by various international institutions, such as OECD, IMF, and the World Bank, became the backbone of the internal economic policy until the military relinquished authority to the civilians.

The January 24, 1980 economic program was based on four main pillars: trade account, capital account, financial markets, and the public finance. In the new liberalization program, the government strove to tackle the system failures that had plagued the Turkish economy during the previous planning periods. The new economy administration was aware of the fact that the directly or indirectly adjusted prices in the private sector were causing distortions in the market mechanism. Another system failure was related to the ISI (import substitution) strategy. By adopting the ISI-led industrialization policy after in the early 1960s, the governments had provided protection

for both State Economic Enterprises (SEE) and the private sector. The new program abandoned this strict protectionist policy and the loosening or removal of several import restrictions signified the start of a new export-oriented growth model. Moreover, a number of measures were introduced in order to promote exports. For relevant reform experience, Turkey turned to the success stories of South Asian countries, Korea and Taiwan, with their export-oriented growth models.

The second and third aspects of the reforms focused mainly on the financial system. The main goal was to build an integrated financial system in line with the rest of the world in expectation that it would be instrumental in putting to use both foreign and domestic savings. The easement of capital flows was intended facilitate the fixed capital formation. Therefore, the main objective of the financial reform in the capital account was to attract as much foreign savings and foreign direct investment as possible.

The last aspect of the reforms involved restructuring the public sector in order to create a more market friendly government. This step included a reduction of the size of the government and the public sector, modernization in public finance and restructuring foreign and domestic debts.

In the 1990s, Turkey experienced a series of severe economic problems exacerbated by natural disasters that had a negative effect on its liberalizing economy. Among these events were the 1994 foreign exchange crisis, the 1997 Asian crisis, the 1998 Russian crisis, the1999 earthquake with more than 20,000 casualties, and the 2000-2001 twin economic crises. As an aftermath, Turkey was unable to achieve any significant increase in its per capita income. The negative growth years followed by positive growth rates which were followed another series of negative growth years, and

overall neither did we observe significant real increase in capital stock nor did we observe significant change in total factor productivity. Cycle of positive and negative growth was virtually due to fluctuation in capacity utilization.[2]

During the last decade, the inflation rate was fluctuated on the interval of 50% to 100%. Moreover, the increase in public sector debt stock was remarkable, increased from 50% of GNP in 1990 to around 90% of GNP at the end of the decade. As of 2004, Turkish foreign debt stock (majority of which belongs to public sector) reached 136.1 billion USD; this meant that Turkey placed 7th among 130 developing nations in the world in regard to debt stock according to the Global Development Finance Report by the World Bank.

While the liberal reforms of 1980s aimed at the promotion of the liberal market system, in the 2000's Turkey has remained in a position where the public sector still accounted for almost half of the economy. Today Turkey still has a 60 percent public share in the overall national investment expenditures; public sector employs more than 15 percent of the labor force. The State owns about 40 percent of all manufacturing enterprises (Utkulu, 2001, p. 3-4).

In the traditional Keynesian macroeconomic theory, higher government spending will be expected to induce aggregated demand directly which in turns will lead to higher output. Moreover, if the increase also includes increase in transfer payments and reduction in taxes, the theory argues that these policies will increase households' income so that aggregated demand will increase indirectly. If an economy also displays wage and

[2] The capacity utilization issue is the backbone of the CGE model. Ismihan et al. (2002) argued, for example, that fluctuations in GNP growth were mainly due to fluctuation in capacity utilization. The simple correlation coefficient indicates that these two variables have strong pro-cyclical behavior with %82 correlation during the last decade.

price rigidities, the positive effect of these direct and indirect effects will have long lasting effects.

In Turkish case, empirical studies over business cycle facts [see TUSIAD, (1996), Agenor et al. (2000)], show that : i) there strong negative correlation between budget deficits and current account deficits, inflation and output : ii) the supply side variables are more important in creation of business cycle than demand side variables. In particular, TUSIAD, Turkey's biggest business chamber, prepared a report in 1996 which indicates that : (i) change in national savings over the time is significantly affected negatively by change in public sector's current expenditures: (ii) both current expenditure and investment expenditure of government affect current account balance negatively i.e. twin deficit argument: (iii) the negative effects of public sector deficits do not die out in short period but has long effects on both savings and current account deficits. The report further argued that since manufacture sector heavily depends on imported goods as both capital and intermediate inputs, limited foreign funds if is used by governments to finance budget deficits, it will crowd out private capital investments.

In their empirical study over business cycle facts for several developing countries including Turkey, Agenor et al. (2000) showed for Turkey that there was a robust negative relationship between government expenditure and domestic business cycle. Moreover, they also test (G/T) index to measure fiscal impulse over output, and they find strong negative relations. Evidences (see Rodrik (1991), Metin (1995), Akcay et al. (1997)) showed that there was a strong positive correlation between government budget deficit (measured by either consolidated deficit or PSBR) and inflation in Turkey. Agenor et al. (2000) also found that the price level (CPI) and output, inflation and cyclical

component of output act countercyclical manner in Turkey. Another finding they have is pro-cyclical real wages in Turkey which may suggest supply shocks may be important in terms of business cycle.

Fischer (1993) and Bleaney (1996) defined "*policy induced instability"* in macroeconomic setting. According to the definition: i) inflation level and variance, ii) government budget deficits, and iii) current account deficits are the major variables portraying the instability induced by government policies.

The other reason for the disappointing economic picture was due to political instability. Given the weak democracy in Turkey, we also consider how democratic tradition and economic stability is related. Persson and Tabellinin (2000) and Drazen (2000) survey several papers to investigate between political instability and macroeconomic instability. According these papers, political instability and polarization (e.g. political weak, populist and myopic governments) may impair macroeconomic stability by reducing private capital formations and thus economic growth. Tutar and Tunsal (2001) show that Turkish budget deficit is positively correlated with the number of parties in the coalition government. Ismihan, Ozcan and Tansel (2002) found that macroeconomic instability has severe adverse effects over capital accumulation and growth in Turkey.

The figure 1 portrays the ratio between the government interest payments to total government revenue for 1990-2001 period. The data indicates that interest payments have a significant positive trend and the trend significantly deteriorated after 1998. Figure 2 portrays inflation rate, compounded interest rates and the average maturity of the debt instruments. Short maturity and significant real interest rates are the two striking points

that can be observed from the figure. The significant real interest rates over the debt instruments became apparent especially after 1994 crisis. Moreover, the average maturity of domestic debt was around 240 days for this period.

3. Supply-Side Variables and Turkish Business Cycles

The importance of supply-side variables in business cycles is introduced by Real-Business Cycle literature e.g. Prescott (1986), Kyndland and Prescot (1982), and Long and Plosser (1983). The importance of capacity utilization as an important variable in explaining pro-cyclical productivity is explored by Burnside et al. (1995) and Fay et al. (1985). Agenor et al. (2000) in their empirical study on business cycle regularities in developing countries including Turkey shows that the observed pattern of pro-cyclical behavior of real wages and counter-cyclical behaviors of both price level and inflation suggest that supply-shocks may have been playing significant role in macroeconomic fluctuations during the last two decades for Turkish economy.

Given the importance of the supply side variables in generation of business cycles in Turkey, we investigated feasible mechanisms which are consistent with both Turkish business cycle regularities and CGE framework. Among several variables, during the last decade, we observe both that capacity utilization has displayed significant pro-cyclical pattern and that the capacity utilization has been very sensitive to available funds supplied by banking sector to private sector. One method to reproduce the effects of credit over production is the inclusion of working capital requirement and assuming that

Figure 1: Government Interest Payments to Total Government Revenue

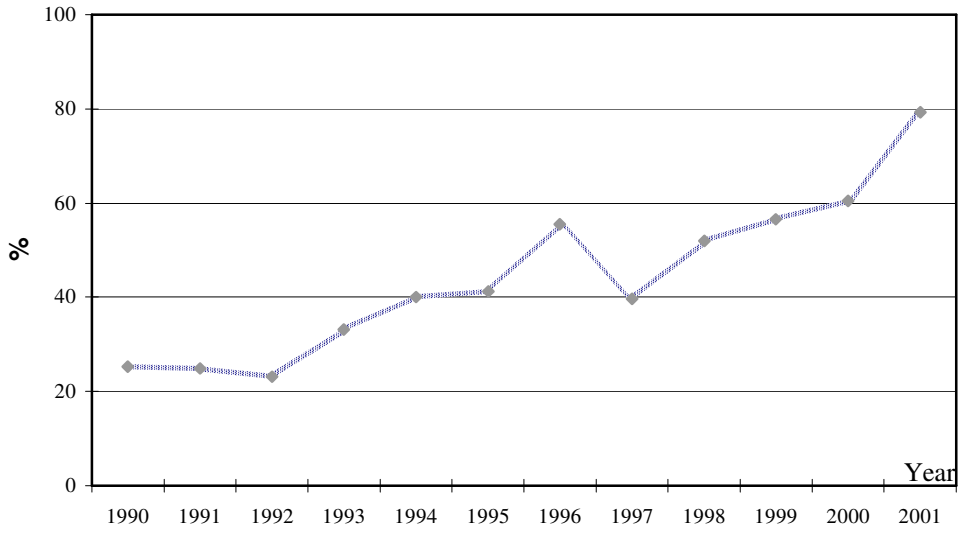
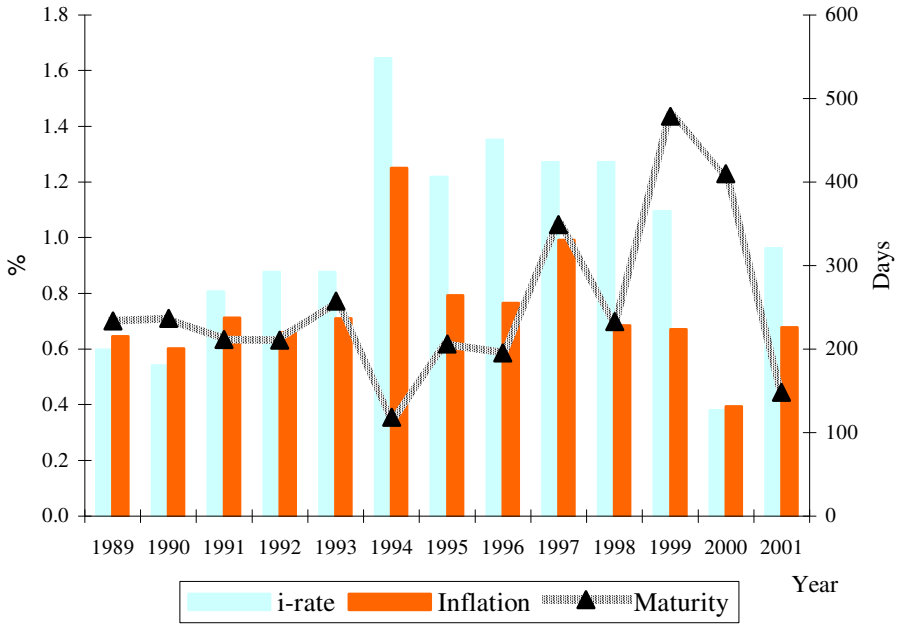


Figure 2: Inflation,Interest Rates and Maturity



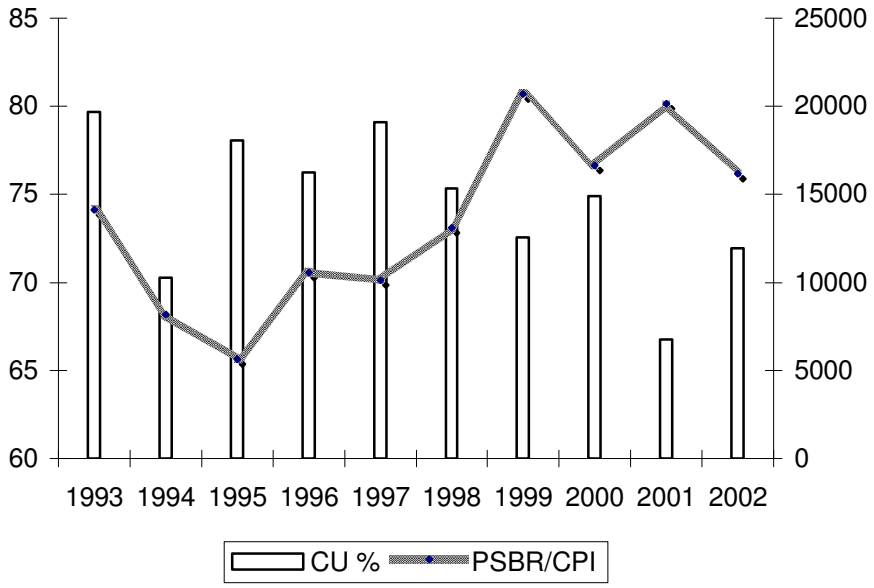
firms need loans not only for investment purposes, but also for their working capital needs[3]. Naastepad (2002) argues that even if aggregate working capital needs financing from retained earnings of the firms, on the micro level each firm faces fluctuations in the need for working capital that can only be met with access to short term credit. When available funds are largely used for financing government deficits, the supply of loans left for the private sector is likely to decline and, therefore, the credit squeeze due to adverse fiscal shocks might reduce the amount of credit available to the private sector and thus reduce the capacity utilization[4].

Aslan (2004) by using public sector borrowing requirement (PSBR) as a proxy for credit –squeeze, he employed a simple econometric model in order to measure the correlation between the capacity utilization and the PSBR. In order to eliminate the effects of inflation over PSBR, the model deflated PSBR with CPI index calculated as 1993=1TL. The strong correlation between capacity utilization and public sector borrowing requirement is displayed on figure 1. The calculation shows that 1000 TL increase in PSBR (in real value) can lead to 1.26% reduction in capacity utilization of the manufacturing sector for the his modeling period of 1996-2002.

[3] The importance of working capital in the Turkish economy, particularly for the small and medium size enterprises, is studied by Sariaslan (1994) and Sariaslan (1996). Yörük (2002) shows that in response to interest shocks in the financial markets firms tend to not only reduce their investment spending, but also cut their average costs through reducing their capacity.

[4] The effects of fiscal and political variables over macroeconomic performance are also examined in the literature. In particular, Alesina et al. (1995) showed that there is negative correlation between political instability (frequent government change) and economic growth. TUSIAD (1996) investigated the effects of government current and investment expenditure on Turkish economic growth in the 1960-1980 and 1980-1994 periods. They found that not only current expenditures, but also investment expenditures *of* government displayed significant negative correlation, especially after the 1980's. Moreover, both TUSIAD (1996) , TUSAID (2001) and Tutar (2001) showed that the policy volatility and disarray in fiscal policy negatively correlated with the output for the last two decades. See Uyar (1996) for an overview over Turkish Public Finance in the last two decades.

Figure 3: Government Deficits and Capacity Utilization



4. Aslan's (2004) Model and Possible Extensions

In Aslan's (2004) CGE model, the model does not include financial side of the economy. In this part, we will summarize the main properties of his model, and we will discuss possible avenues that this model can be extended through employing financial variables.

The Aslan (2004) model differs from other CGE models built for Turkish economy for at least two reasons. Firstly, the model proposes alternative functional forms reflecting the importance of supply-side response in the creation of the business cycles. In particular, different from other structural models which are parallel to Keynesian tradition i.e. fiscal policy shocks is transmitted into economy through variables related to demand side of the economy, this model elucidates the adverse effect of budget deficits on

variables related to supply side of the economy. In fact, the main inspiration of this research regarding the importance of the supply shocks is based on empirical evidences for Turkish economy for the last two decades. In order to connect the stylized supply-shocks into the CGE model, we hypothesize that the capacity utilization does not necessarily depend on the monopolistic market structure (as in the other structural CGE models), but correlates with supply of funds in the financial markets. Intuitively, there are at least two explanations regarding adverse effects of credit-squeeze and high real interest rates on capacity utilization. Firstly, as the available funds are mainly directed to finance budget deficits, the credit-squeeze will adversely affect firms to borrow from financial markets for their short term credit needs. In particular, the evidences[5] show that when Turkish economy faces an interest shock (i.e. increase in interest rates), banks significantly reduce their loans loan to small and medium size firms which generally depend on these loans in financing their working capital. Secondly, a research shows that during the last decade, high real interest rates offered by government securities became more attractive source of profit than profit generated from real sector related activities. In particular, according to survey-based report by the Istanbul Chambers of Commerce in 1997, more than 50 percent of gross profits of Turkey's top 500 industrial companies came from interest earnings (Istanbul Sanayi Odasi, 1998: p. 86). Combining these two effects (i.e. credit squeeze which significant adverse effects on small and medium size firms and the high real interest rates which encouraged large firms in real sectors to concentrate on financial activities), this research offers a simple model regarding supply-side response of Turkish economy to undisciplined fiscal policies.

[5] See for example Erkumay (2000), Sariaslan (1994) and Yörük (2002) for the adverse effects of credit squeeze on small and medium size firms.

Second modification of that model is to use of the most recent data. One of the most important data set for building CGE model is the social accounting matrix (SAM). The most recent real SAM was constructed by Aslan (2004).

As an extension, in this research, we will build a financial SAM for Turkish economy by extending Aslan (2004) by including financial data to his real SAM. The other extension of this research is to include financial variables into Aslan (2004) model. The objective of this research is to modify Bourguignon et al.(1991) and Forgeix et al. (1991) models through developing a framework which is consistent with supply side effects of budget deficits.

In Aslan (2004) piece, the theoretical background for the static part of the model is based on the CGE modeling procedures developed by Dervis et al. (1982). The dynamic part is solved recursively. The model uses augmented Cobb-Douglas technology (equation-1) as a value added function and assumes that the value added for particular sector depends on technology parameter, labor, capital and utilization rate of the capital employed in that sector. Moreover, the model uses a simple correlation between the capacity utilization and government savings as a transmission mechanism (equation-2).

$$QVA_{at} = Z_{at} LD_{at}^{\alpha_a} \left(CU_{a,t} \overline{KD}_{at}\right)^{1-\alpha_{at}} \quad (1)$$

$$CU_{at} = f(GSAV) \quad (2)$$

In this research, the objective is to add financial institutions and financial instruments into the model so that the implied transmission mechanism can be expressed more elaborately. Firstly, large firms in Turkish economy shifted their operation from real sectors to financial sectors [as indicated by ISO (1998)]. That is, those firms diverted

their liquid sources from purchase of intermediate input and hiring primary factors to purchase of short-term financial assets such as REPO and government debt instruments. In other words, the large firms in the real sector are assumed to choose among the set of these alternative policies:

Policy Matrix for Large Firms

Low Interest Rates **Policy-I**	**High Interest Rates** **Policy-II**
High capacity utilization	Low capacity utilization
Most of the working capital balances are diverted to real activities	Majority of working capital balances are diverted to REPO and other financial instruments.

In sum, the research will answer this question: including financial variables and instruments, can CGE framework be used as a way to describe ISO (1998) findings and what is the possible way to analyze in this research, the focus is to introduce supply shocks into the CGE model. In order to achieve this objective, the model will establish a link between high interest rates (due to large fiscal deficits) and the endogenous response of firms to these high interest rates. Although the model we previously developed for Turkish economy i.e. Aslan (2004) does not include financial variables, the model tracked Turkish economy with good accuracy. The new research agenda will be presented in the conference will include financial variables in order to expand our earlier work.

5. Conclusion

In the structuralist CGE models, one way to implement the rigidities for an economy is the introduction of the mark-up pricing rule. Micro-structuralist models [i.e., Vos (1998), , Taylor (1991) and Yeldan (1997)] generally employing mark up pricing associated with fixed wages and variable capacity utilization can produce significant output fluctuations in response to changes in aggregate demand, i.e. a positive spending shock by the government. These scholars use either the constant mark-up rule proposed by Kalecki (1971), or the pro-cyclical mark-up rule whose roots go into the Marx-Sraffian analysis of wage profit trade. They show that active government involvement in the economy may be beneficial, particularly if government spending (lower tax collection) is targeting poor families.

A recent empirical paper on the business cycle facts for Turkey, and a few other developing countries by Agenor, McDermott and Prasad (2000) establishes that the observed pattern of procyclical behavior of real wages and countercyclical behavior of both price levels and inflation suggest that supply shocks may have been the main key determination of macro economic fluctuations over the past two decades for Turkey.

The observed fluctuation in output can be modeled through using the pure neoclassical model with or without technological shocks, or through including some frictions in the market i.e., unemployment, fixed wages, mark up pricing etc. In this study, we will build a model with structural elements, but our model will take capacity utilization as an endogenous variable which plays important role in Turkish business cycle.

LIST OF REFERENCES

Agenor, P. R., McDemott, C.J., Ucer, M., "Fiscal Imbalances, Capital Inflows and the Real Exchange Rate: The case for Turkey", IMF Working Paper 97/1,1996.

Agenor, P.R., Montiel, P.J., Development Macroeconomics, Princeton University Press, Princeton, New Jersey, 1996.

Agenor., P.R., McDermott, C.J, Prasad, E.S., "Macroeconomic Fluctuations in Devloping Countries: Some Stylized Facts", The World Bank Review, Vol. 14. No.2 ,p. 251-285, 2000.

Akbostanci E., Tunc I. G., "Turkish Twin Deficits: An Error Correction Model of Trade Balance", retrieved from on February 13,2004, http://www.econturk.com, 2000."

Alesina, A. and R. Perotti , "Fiscal Expansions and Adjustments in OECD Countries", Economic Policy (21): 207-248, 1995.

Aslan, M., Three Essays on Structural Economic Problems and Applied Model Construction for Turkish Economy, unpublished Ph.D. dissertation, George Mason University, 2004.

Barro, R.J. , "Are Governments Bonds Net Wealth?", Journal of Political Economy 82 : 1095-1117, 1974.

Bourguignon, F., de Melo, J. and A. Suwa, "Modeling the Effects of Adjustment Programs on Income Distribution", World Development 19: 1527-1544, 1991.

Burnside,C., Eichenbaum, M., Rebelo, S., "Sectoral Solow Residuals" , NBER Working Papers, W5286, 1995.

Celasun, O., Denizer, C., and He, D., "Capital Flows, Macroeconomic Management, and the Financial System: Turkish Case, 1989-1997", World Banking Working Papers Series, No: 2141, 1999.

Chirinko, R. S., " Business Fixed Investment Spending: Modeling, Strategies, Empirical Results and Policy Implications", Journal of Economic Literature, 31, 1875-1911, 1993.

Debreu, G. ,The Theory of Value: An Axiomatic Analysis of Economic Equilibrium, New York: Wiley, 1959.

Dervis, K., J. de Melo, and S. Robinson,. General Equilibrium Models for Development Policy. Cambridge: Cambridge University Press, 1982.

Dixit, A. and Pindyck, R. S., Investment Under Uncertainty, Princeton University Press. Princeton, New Jersey, 1994..

Dixon, P. B., Parmenter, B.R., Powel, A.A, and Wilcocoxen, P.J.,Notes and Problems in Applied General Equilibrium Economics, North-Holland, Amsterdam, 1992.

Easterly, W., "Portfolio Effects in a CGE Model: Devaluation in a Dolarized Economy, in L. Taylor (ed.), Socially Relevant Policy Analysis: Structuralist Computable General Equilibrium Models for the Developing World, MIT press, Cambridge, pp 269-301, 1990

Easterly,W., Schmidt-Hebbel,K., "The Macroeconomics of Public Sector Deficit: A Synthesis", Working Paper WPS 775. Washington DC,: IMF, 1991.

Elmendorf, D.W., Mankiw, N.G., " Government Debt", in: J.B. Taylor, Woodford, M. eds. Handbook of Macroeconomics Vol. 1 (Elsevier Science: Amsterdam) 1616 – 1669, 1999.

Erden.,L., The Effects of Financial Markets on Private Capital Formation: An Emprical Analysis of Turkish Data over 1968-1998 Period, Mersin University, WP 2002-4. ,2002.

Fay,J. and J Medoff(1985) "Labor and Output over the Business Cycle: Some direct evidence", American Economic Review 75, 638-655

Forgeix, A. and Sadoulet, E., " A financial Computable General Equilibrium Models for the Analysis of Stabilization Programs", in J. Mercenier and T. Srinivisan (eds), Applied General Equilibrium and Economic Development : Present Achievement and Future Ttrends, Michigan University Press, Michigan, pp. 147-181, 1994..

Freeman, J.R., Houser, D.,. "A Computable General Equilibrium Model for the Study of Political Economy", American Journal of Political Science, Vol. 42, p.628-660, 1998.

Giavazzi, F., Jappelli, T., and Pagano, M., "Searching for Non-Linear Effects of Fiscal Policy: Evidence from Industrial and Developing Countries", NBER Working Papers 7460, 2000

Ginsburgh, V. and J.Waelbroeck. Activity Analysis and General Equilibrium Modeling. Amsterdam: North-Holland, 1981.

Grilli, V., Mascianddaro, D., and Tabellini, G., "Political and Monetary Institutions and Public Financial Policies in the Industrial Democracies", Economic Policy, 13: pp. 341-392, 1991.

Kalecki, M., Selected Essays on the Dynamics of the Capitalist Economy 1933-1970, Cambridge, Cambridge University Press, 1971

Keynes, J.M., The General Theory of Employment, Interest and Money, London: Macmillan, 1936.

Kraev, E., "Modeling Macroeconomic and Distributional Impacts of Stabilization and Adjustment Packages: Current Literature and Challenges", CEPA Working Papers, Center for Economic Policy Analysis, New School for Social Research , New York, 2003.

Lewis, J. D., "Financial Liberalization and Price Rigidities on a General Equilibrium Model with Financial Market", Development Discussion Paper No. 211 Harvard Institute for International Development, Harvard University, Cambridge, 1985.

Metin O. K. and Ertac. S., "Determinants of Private Savings Behavior in Turkey", Bilkent University Working Papers: http://www.bilkent.edu.tr/~economics , 2000.

Nastepad, C., The Public Sector Budget and Macroeconomic Performance; A real financial CGE analysis with portfolio choice with reference to India, Thesis Publishers, Amsterdam. Odekan, 9-28, New York Greenwood Press, 2000.

OECD, "OECD Economic Surveys; 2000-2001, Turkey", 2001.

Ozatay, F., "The Lessons of the 1994 Crises in Turkey: Public Debt (Mis) Management and Confidence Crises", Yapi Kredi Economic Review 7:21-38, 1997.

R. Vos. (1998). Aid flows and "Dutch Disease" in a General Equilibrium framework for Pakistan. Journal of Policy Modeling, 20(1):77–109,

Ram, M. "Empirical investment equations for developing countries", in L. Serven and A.Solimano (eds) Striving for Growth after Adjustment, World Bank Regional and Sectoral Studies, 1993.

Ramirez, M. D.," Public and private investment in Mexico, 1950-90: An empirical analysis", Southern Economic Journal, 61, 1-17, 1994.

Robinson, S., Multisectoral CGE Models, In the Handbook of Development Economics, Vol. II, edited by Hollis Chenery and T.N. Srinivasan. Amsterdam: North-Holland, 1989

Robinson, S., "Macroeconomics , financial variables , and computable general equilibrium models", World Development 19:1509-1525, 1991.

Rosensweig, J. A. and Taylor, L. "Devaluation, capital flows and crowding out: A CGE model with portfolio choice for Thailand", in L. Taylor (ed.), Socially relevant policy analysis: structuralist computable general equilibrium models for the developing world, MIT press, Cambridge, pp. 302-332, 1990.

S. Robinson. Macroeconomics, financial variables, and Computable General Equilibrium models. World Development, 19(11):1509–1525, 1991.

Scarf, H. E., The Computation of Economic Equilibrium Models, Yale University Press, New Haven and London, 1973.

Scarf, H.E. and Shoven, J.B. Applied General Equilibrium Analysis, Cambridge University Press, Cambriedge, 1984.

Scarf, H.E., " On the Computation of Equilibrium Prices", in W. Feliner (ed.), Ten Economic Studies in the Tradition of Irving Fisher, Wiley, New York, 1967.

Seater, J.J., "Ricardian equivalence", Journal of Economic Literature 31, 142 - 190.,1993.

Shoven, J.B., and Whalley, J., "A General Equilibrium Model of the Effects of Differential Taxation of Income from Capital in the US", Journal of Public Economics, 1, pp. 281-322, 1972.

Shoven, J.B., and Whalley, J., "Applied General Equilibrium Models of Taxation and International Trade : An introduction and Survey", Journal of Economic Literature, Vol. 22(3) ,pp. 1007-1051, 1984.

Solow,R.M., "A Contribution to the Theory of Economic Growth", Quarterly Journal fo Economics, 70, pp. 65-94, 1956.

Taylor, L., Socially Relevant Policy Analysis: Structural Computable General Equilibrium Models for Developing World, Cambridge (MA), MIT Press, 1990.

Taylor, L., Short Run Model Closure and Steady State Growth, Income Distribution, Inflation, and Growth; Lectures on Structuralist Macroeconomic Theory, MIT Press, London, 1991.

Thissen, M., "Financial CGE models Two Decades of Research in Financial CGE Models", Research Papers, SOM, University of Groningen, 99c26, June 1999.

Tunc, G. I. , A financial computable general equilibrium model for Turkey: Policy Analysis with 1990 data, An unpublished PhD thesis,1997..

TUSIAD, "Turkiye Ekonomisi 2001 Yili Raporu", Yayin No. TUSIAD-T/2001-12-316, 2001

TUSIAD, "Turkiyede Kamu Sektoru Sorunlari" No, TUSIAD-T /1996-36, 1996

Uyar B., “Economy and Public Finances in Turkey in the 1980s”, in The Fiscal System and Economic Development, eds., Sohrab Abizzadeh and Mahmood Yousefi, Nova Science Publishing, 1996.

Vos, R., “Aid Flows and Dutch Desease in General Equilibrium Framework for Pakistan”, Journal of Policy Modeling,20:77-109, 1998.

Walras, L., “Principe d’une theorie mathematique de I’echange ”,Journal des Economistes,1874.

Yeldan, E., “Financial Liberalization and Fiscal Repression in Turkey: CGE Model with Financial Markets”, Discussion paper No: 92-7 ,Bilkent University, 1992.

Yeldan , E.,(1997), “Financial Liberalization and Fiscal Repression in Turkey: Policy Analaysis in a CGE Model with Financial Markets”, Journal of Policy Modeling 19:79-117, 1997.