INVESTIGATION ON SOURCES OF GROWTH FOR TURKEY,
1968-1998

A Master's Thesis

by
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July 2001

To My Parents

INVESTIGATION ON SOURCES OF GROWTH FOR TURKEY, 1968-1998

The Institute of Economics and Social Sciences
of
Bilkent University

by

BAHAR BAYRAKTAR

In Partial Fulfillment of the Requirements for the Degree
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I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Economics.

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ABSTRACT

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M.A. in Economics

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The purpose of this thesis is to analytically evaluate the correlations between growth and selected macroeconomic indicators under the dynamic macroeconomic adjustments of a globalizing developing economy, Turkey, 1968-1998. First, I illustrate the development patterns of investment, fiscal, trade and monetary variables under the post-1968 path. Within the boundaries of this fragile macroeconomic environment, I discuss how much confidence should one have on the relationship between various macroeconomic indicators and growth. Next, I present the sensitivity analysis for basic growth variables, and fiscal, trade and monetary variables by using a variant of the Extreme Bounds Analysis (EBA). I found that very few economic indicators are robustly correlated with growth rates or the share of investment in GDP. Consequently, among the variables which are always included in the growth regressions, only human capital indicator is robust. Interestingly, in spite of the "dramatic" shift against productive sectors, the share of housing investment is positively and significantly correlated with growth. I found that none of the fiscal and trade indicators that I studied is robustly correlated with growth or the investment share. My econometric investigation further suggests that monetary indicators have not provided a statistically robust impetus on GDP growth.

ÖZET

TÜRKİYE'DE BÜYÜMENİN KAYNAKLARI,
1968-1998

BAHAR BAYRAKTAR

Mastır, Ekonomi Bölümü

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Bu calışmanın amacı büyüme ve secilmiş makroekonomik göstergeler arasındaki korelasyonu Türkiye'de 1968-1998 dönemi içinde değerlendirmektir. İlk olarak, yatırımların, mali, ticaret ve parasal değişkenlerin incelen dönem üzerindeki gelişmeleri incelenmistir. Bunun üzerine bu ekonomik çatı altında, ceşitli makroekonomik değişkenlerle büyüme arasındaki ilişkiye ne kadar güvenebileceğimiz "Sınırların Analizi" yöntemiyle araştırılmıştır ve incelenen değişkenlerin hemen hemen hepsi kırılgan olarak belirlenmiştir. Büyüme modellerinde en cok kullanılan değişkenler içinde sadece insan kapitali sağlam cıkmıştır. Bunun yanında konut yatırımları da pozitif ve anlamlı bir sekilde büyüme modeline girmistir. Ticaret ve mali politika değişkenleri kırılgan bir yapıya sahip olmakla beraber aynı zamanda yatırımlara karşı daha duyarlı cıkmışlardır ve ekonometrik araştırmam para politikası göstergelerinin hem ekonomik büyümeye hem de yatırımlara karşı kırılgan olduğunu ortaya cıkarmıştır.

ACKNOWLEDGMENTS

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CHAPTER I

Introduction

Developing country economic policy in the 80s focused on structural adjustment, a combination of macroeconomic stabilization measures to restore domestic and external equilibrium, and structural changes in policies and institution designed to make the economy more efficient and flexible, and thereby increase growth (World Bank, 1988, 1990a). As the decade progressed, and the consequences of macroeconomic disequilibria became clearer, development economists and practitioners increasingly accepted the view that broad macroeconomic stability is indispensable for sustained growth[1].

The 80s were also the decade in which macroeconomists returned to the study of growth theory in the context of development. In addition to this, the new growth theory returned to the roles of technology, international trade, human capital, economies of scale, and the possible need for a coordinated big investment push to break the constraints of low income equilibrium[2]. In short, during the past decade, there has been a tremendous advance in our understanding of economic development. On the other hand, the theoretical understanding of economic growth has progressed on various fronts, including among other topics of concern, the investigation of endogenous technical innovation and increasing returns to scale (P.Romer, 1986); the interaction of population, fertility, human capital, and growth; international spillovers in technology and capital accumulation; and the role of institutions.

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[1] See Williamson (1990), Fischer and Thomas (1990) and the World Development Report 1991.
[2] See, for example, Romer (1990), Grossman and Helpman (1990).

On the other hand, with the increasing availability and use of standardized data sets there emerged a vast empirical literature on cross-country growth, especially following the path-breaking work of Robert Barro (1991)[3]. Thus, the clearest distinction between the growth theory of the 1960s and that of the 1980s and 1990s is that the recent research pays more attention to empirical implications and to the relation between theory and data. The empirical work characterizes the high growth countries; for instance, they invest a lot, they have higher school enrollment, they are more open. However, Fischer (1991) argued that further studies require a switch away from simple cross-sectional regressions to time series studies of individual countries.

The conflicting claims in this large and growing literature are yet to be sorted out, which is understandable given the rapid increase in studies in recent years: for example, Romer (1989a), Levine and Renelt (1990), Barro (1991), Hall and Jones (1997), Sachs and Warner (1997), Sala-i-Martin (1997), Durlauf and Quah (1998). The literature suggests that authors study different sets of countries, over different years, and use different explanatory variables. The great diversity of studies makes it difficult both to discern consistent relationships and to compare the results of studies. Furthermore, the analytical problems that plague growth regressions make it difficult to consider any set of findings reliable. Notwithstanding these difficulties, the basic methodology consists of running regressions of the form:

$$Y=\alpha+\beta 1 x 1+\beta 2 x 2+....+\beta n x n+\in \qquad (1)$$

Where Y is the vector of rates of economic growth, and x1,x2,........,xn are vectors of explanatory variables, which vary across researchers. But the main problem faced by empirical growth economists is that growth theories are not explicit enough about

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[3] See, Barro (1989a), Mankiw, D.Romer, D.Weil (1990) and P.Romer (1989a).

what variables xj should belong to the "true" regression. That is, even if it is known that the "true" model looks like (1), one does not know exactly what particular variables xj should be used. If one starts running regressions combining various variables, variable x1 will soon be found to be significant when the regression includes variables x2 and x3, but it becomes insignificant when x4 is included. Since the "true" variables that should be included are not known a priori, one is left with the question: what are the variables that are really correlated with growth? Levine and Renelt (1992) have provided an initial answer by using extreme bounds analysis to identify "robust" empirical relations in the economic growth literature. Sala-i-Martin (1997) moved away from "extreme test" and wanted to assign some level of confidence to each of the variables by looking at the entire distribution of the estimators.

Kormendi and Meguire (1985) presented empirical evidence for a set of macroeconomic hypotheses relating to economic growth across a sample of forty seven countries. Quah and Durlauf (1998) provided an overview of recent empirical research on patterns of cross country growth indicating new empirical regularities that differ from earlier ones, e.g., the well known Kaldor stylised facts. However, many of these studies are inflicted with the methodological, conceptual and statistical problems as indicated by Levine and Renelt (1990), who show that there does not exist a strong independent relationship between almost every existing economic performance measure and long-run growth.

It is the purpose of this thesis to evaluate the analytical findings on the correlations between growth and selected macroeconomic indicators under the dynamic macroeconomic adjustments of globalizing developing economy, Turkey, 1968-1998. The main motivation behind this work is the Levine and Renelt's

influential paper which examines whether the conclusions from existing growth studies are robust or fragile to small changes in the conditioning information set[4]. To provide evidence on the sensitivity of macroeconomic indicators to small alterations in the explanatory variables, I used a variant of EBA (Extreme Bounds Analysis) discussed in Leamer (1983, 1985) and Leamer and Leonard (1983).

The period under analysis is known to span the overall transformation of the Turkish economy from domestic demand-oriented import-substitutionist industrialization to one with export-orientation and integration with the global commodity and financial markets. After following a rather long period of inward looking, import substitutionist pattern of growth, Turkey suffered a foreign exchange crisis in 1977-1980 which was tackled with the introduction of a structural adjustment programme in January, 1980 under the auspices of the international institutions such as the World Bank and the IMF. The period 1981-1987 was marked with commodity trade liberalization and export promotion along with a price reform aimed at reducing the state's role in economic affairs. The existing system of fixed exchange rate administration was replaced by a flexible regime of crawling-peg. The export orientation phase was driven by commodity trade liberalization and real depreciation under conditions of wage suppression. In 1989, capital account liberalization was completed with the recognition of full convertibility of the Turkish Lira and the elimination of all controls on foreign capital flows and Turkey entered a process of short-term foreign capital-led growth associated with mini booms and crises throughout the 1990s. In this setting many of the instruments of monetary and fiscal control have been transformed, and the constraints of macro equilibrium have undergone major structural change (Metin-Ozcan, Voyvoda, Yeldan, 1999).

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[4] See Levine, R. and D. Renelt (1992) "A Sensitivity Analysis of Cross-Country Growth Regressions", American Economic Review, 82: 942-963.

The paper is organized under five sections: Next section provides a broad overview of the development path of the Turkish economy. Section III introduces the methodology used in this study, Section IV presents the quantitative results and Section V summarizes and concludes.

CHAPTER II

II. Structure of the Turkish Economy

In this section, I provide a broad overview of the development path of the Turkish economy. The story of the Turkish economic development, 1968-1998, has not followed a linear and smooth pattern, various turning points alternately resulted with development patterns of different characteristics. I portray the 1968-1998 evolution of the Turkish economy in Table (1). Overall, it is seen that the Turkish economy has experienced three distinct cycles of growth crisis-and adjustment under the post 1968 path. Hence it is convenient to decompose this path into three major sub-periods: (i) import substitutionist industrialization, 1968-1979, (ii) commodity trade liberalization and export promotion, 1980-1988; and (iii) post-financial liberalization, 1989-1998. I present the determinants of growth corresponding to these three sub-periods.

Import Substitutionist Industrialization, 1968-1976

During the 1960-1978 period, two major and interrelated developments are discernible in the expansion of the Turkish economy. One is the impact of five year development plans on industrialization and capital accumulation. The other is the adoption of import substitutionist industrialization strategy, which is often identified as the second phase of import substitution (Cecen, S. Dogruel and F.Dogruel, 1994). This period is characterized by the replacement of imported intermediate and capital goods, consumer durables and the domestic production of related technologies-by domestic production. The main trust of the planning years originated from inward-looking import substituting program that relied heavily on public investments in both

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manufacturing and infrastructure through State Economic Enterprises (SEEs). Hence, the state was both an investing and producing agent with SEEs serving as the major tools for fostering the industrialization targets (Metin-Ozcan, Voyvoda, Yeldan; 1999).

With the implementation of the first three five year development plans, the economy continued to expand throughout this period, thanks to the unprecedented growth in the manufacturing and service sectors. Moreover, for each five year plan an overall, growth rate was chosen as the key social target. Given assumptions about the productivity of capital, the growth target would imply a particular investment rate (Dervis and Petri, 1987). More specifically, the growth rate of real Gross Domestic Product (GDP) was 5.8 during the 1968-1976 period.

In order to investigate the contribution of different factors to economic growth, one can decompose the proportional increase in total value added by using a neoclassical aggregate-production-function approach[5]. Based on the aggregate data for the 1963-1975 period, the results obtained by Chenery (1986) indicate that more than half of the 6.4 percent average annual growth rate of value added was due to capital accumulation. On the other hand, technological change accounts for almost one-third of the growth rate of output. The contribution of labor growth was a modest one, which may seem to be directly related to the emergence of a highly capital intensive manufacturing sector in the economy.

As to the accumulation of capital and investment patterns, one can distinguish two subperiods 1963-1979: capital accumulation during the 1963-1973 period relied to a large extent on domestic savings, where as under the post-1974 period reliance on foreign financial resources increased substantially. With the implementation of

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[5] See H.D.Chenery, S.Robinson, and M.Syrquin, Industrialization and Growth (London: Oxford University Press, 1986).

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the first three five year plans, the proportion of gross fixed investments in GDP rose rapidly from 16 percent in 1962 to 27 percent in 1977. The sectoral distribution of investments are given in Figure (1). Furthermore, the data on the sectoral distribution of investments reveals that the manufacturing sector absorbed the largest portion of total investment, followed by the construction, transportation and communication sectors. Actually, realized investments on housing and transportation sectors exceed the targeted level, and the share of private sector on these activities reached 41.6 percent due to the expected high profits in housing (Kepenek and Yenturk, 1999). Meanwhile, investments in the areas of health and education showed a steady decline. Morever, Krueger and Tuncer (1980) found that total factor productivity growth in the public manufacturing sector was around 2.65 percent whereas that of the private sector was only 1.84 percent. One can therefore argue that, despite their chronic deficits and losses, the public sector enabled important contributions to productivity growth during these years.

For the 1970-1976 period, increase in the growth rate of domestic credit stock was not able to provide a determined growth path for the economy since the rise in credits were not used efficiently in the production areas. It is argued that the main reason of using credits in non-production areas is the high inflation rate disturbing the profitability of production (Kepenek and Yenturk, 1999). However, the distribution of credits was to be mostly arranged by these development plans.

Another official aim of this period was to increase government revenues by raising the taxes. However, the government revenues were not increased as expected because of the lack of arrangements in the tax system. Furthermore, inefficient and weak tax structure have placed the tax burden on the wage earners. Hence, on the revenue side, fiscal policy was not viable in the sense of reducing income inequality

and reserving revenues for attractive use of social resources. One of the most important issues in economics is the role of government expenditures and taxation in economic growth and there are different growth effects of different types of government expenditure. Government expenditures, which include current, transfer and investment expenditures, were the direct tool for the implementation of development plans, to achieve targeted level of employment, production and price level. However, the planned level of public investments was not realized because of the problems in financing of the SEEs, which realized 40-45 percent of public investments. Financing difficulties in the SEEs emerged since the goods and services of the SEEs were priced under their costs, hence, investments of SEEs were not completed according to schedule or they were completed years after, with a higher cost than initially forecasted.

The decomposition results of Chenery (1986) also demonstrate that the contribution of exports to the growth of GNP was very modest at the beginning of the planning period and tended to increase between 1968 to 1973, figure (2). Furthermore, the foreign trade regime was heavy protectionist via quantative restrictions along with a fixed exchange rate regime which, on the average, was overvalued given purchasing parity terms. The average share of exports in GDP was 3.5 percent during 1968-77 period. In addition to this, it should be mentioned that while the 1963-70 period corresponded to a "positive" import substitution, mostly financed by domestic savings, the 1971-1977 period can be defined as a "negative" import substitution era, which gave rise to increasing current account deficits over time[6]. Thus, these policies became gradually ineffective in promoting the domestic production of consumer durables and investment goods. Hence ISI policy was

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[6] See S.Pamuk (1987) "Ithal Ikamesi, Döviz Darbogazları ve Turkiye: 1947-1979 Krizin Gelisimi ve Alternatif Sorunu, 36-38.

intensively implemented initially by using workers' remittances and finally short term debts in the period 1970-1977. In spite of high growth rates of GDP, the average annual ratio of X/M decreased from 68 percent in 1962-70 to 44 percent in 1970-77. On the other hand the average annual ratios of M/GDP increased from 7.1 percent in 1968-1976 to 8.5 percent in 1977-80.

The Turkish economy entered the 1970s with rapid growth, a current account surplus and a relatively high rate of inflation. In the second part of the 1970s the import substitutionist development strategy was observed to reach its limits when financing of the balance of payments and industrial investments became difficult. Turkey had to resort to short-term foreign borrowing to finance current account deficits in the face of falling workers' remittances and stagnant export proceeds. Hence, the foreign exchange crisis of 1977-80 brought together the cessation of the civilian democracy and imposition of a new constitution under a military regime.

Stabilization and adjustment programs were introduced on 24 January 1980, under the aegis of the international institutions such as the World Bank and the IMF. The program aimed to curb inflation and alleviate balance of payments difficulties by eliminating the excess demand in domestic markets in the short-run and to restore equilibrium and economic growth in the long-run[7]. All of these measures were consistent with the spirit of orthodox IMF anti-inflationary measures. In practice, contractionary demand policies which depended heavily on monetary targets, implied a drastic reduction in the central bank credits extended to the public sector, hence a sudden drop in public investments and spending.

The reduction of inflation from its peak rate of 104 percent in 1980 to 28 percent in two years; the restoration of positive growth rates; the elimination of

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[7] See Boratav and Turel (1993), Senses (1994), Celasun and Rodrik (1989), and Celasun (1994) for a through overview of the post-1980 Turkish structural adjustment reforms.

foreign exchange bottlenecks; and the unprecented growth in exports are numerated as the successful results of the 1980 programs. However, as will be examined in the rest of this section, the non-conformity between the stated foreign trade objectives towards manufacturing exports and the realized patterns of accumulation away from manufacturing constituted one of the main structural deficiencies of the export-oriented growth strategy of the 1980s, which had played a crucial role in the failure of maintaining the export promotion programme as a sustainable strategy of development (Metin-Ozcan, Voyvada, Yeldan, 1999). This unbalanced structure was not able to generate the necessary accumulation patterns for achieving sustained growth, that is, all economic indicators of 1988 signal a stagflationary macro environment.

Hence, commodity trade liberalization had reached its limits and the next steps would necessarily involve administration of new policies towards liberalization of the financial markets and of the full exchange transactions. With full liberalization of the capital account and the recognition of full convertibility of the Lira in 1989, there has been a massive inflow of short-term capital into the domestic economy, flows of hot money (Boratav, Turel, Yeldan, 1996). In this setting, many of the macroeconomic indicators have changed. The ready availability of foreign exchange enabled the Turkish Lira to appreciate against the major currencies in real terms and led to a rapid expansion of import demand. Moreover, it made possible the financing of the rapidly growing fiscal deficit of the public sector and also provided relief for the increased pressures of aggregate demand on the domestic markets by way of cheapening costs of imports[8].

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[8] See Balkan and Yeldan (1998); Selcuk (1997); Boratav, Turel, Yeldan (1996); Ekinci (1998); and Yenturk (1999) for an extensive discussion of the post-financial liberalization macroeconomic adjustments in Turkey.

The process of financial deepening had nearly matured by 1990. However, during the early 1990s, the growth rate of the Turkish economy was substantially below the growth path of the earlier decades and fell short of the requirements and expectations of an exceptionally mobile, young and dynamic population. The growth rate of GDP was weak in 1988 and 1989, increased to 7.9 percent in 1990 and then to 1.1 percent in 1991 and fluctuated thereafter. Due to the unsustainable nature of fiscal policy and the external deficit, the economy experienced a major crisis in early 1994, which was followed by real contraction. GDP declined by more than 5 percent that year with the inflation rate soaring to 106 percent. Concurrently, the pace of capital accumulation, both public and private, contracted. In 1995, GDP had recovered and the major trust of the crisis seemed to have been overcome. However, as of 1998, the trade deficit was running at US$20 billion; and the public sector borrowing requirement (PSBR) was approaching 9.6 percent of GDP. In July 1998, another disinflation program was introduced under the guidance of an IMF Staff Monitored Program. Although the program achieved some improvements with regard to the inflation rate and fiscal imbalances, it could not relieve the pressures on the interest rate. The Russian crisis in August 1998, the general elections in April 1999 and two devastating earthquakes in August and October 1999 deteriorated the economic climate severely and several the fiscal balances of the public sector. In the rest of this section, I will focus on the development patterns of trade, investment, fiscal and monetary policies over the years examined above.

The Post-1980 Era and the Determinants of Growth

Export-Oriented Growth policy

The export-led growth strategy of the early 1980s was successful in its export targets, get failed to achieve a comparable success in investments, capital accumulation and in income distribution. More specifically, the average annual growth rate of real GDP was 5.3 percent during the 1981-1987 period; but starting in 1988, the economy entered into a new phase and the growth performance was sluggish since then, the real GDP growth was 2.1 percent in 1988. The exemplary economy of the 1980s became a textbook case of "boom-bust" growth performance with a relatively lower average growth rate and high volatility in the 1990s. The dynamics of the growth performance of the Turkish economy after 1989 can be linked to unsuccessful disinflation efforts and debt financing policies of the government, pronouncing themselves in the exchange rate policy (Ertugrul and Selcuk, 2001). As also witnessed in the Southern Cone experience, such use of exchange rate to attain the inflationary targets led to significant fluctuations in the real economy and was severely deflationary (Dornbusch 1982; Diaz-Alejandro 1985).

Furthermore, the roots of macroeconomic instability in developing countries are both external and internal. Volatility in terms of trade and in financial conditions are directly transmitted to small developing countries that are price takers in international markets both for goods and services as well as for financial assets. Coupled with the inflexibility of domestic macroeconomic instruments and political instability resulting in frequent and discrete changes in policy regimes in a weak institutional setting, the macroeconomic experience of many developing countries have tended to be punctuated by a series of crises. Most importantly, macroeconomic

instability has resulted in unstable growth rates of GDP (Agénor and Montiel, 1999). Together with the export-oriented growth strategy as a key issue for the post-1980 period, both internal and external demand conditions; developments in interest rates, agricultural support and wage setting policies had the serious roles for an unstable growth path (Kepenek and Yenturk, 1999). Considering sectoral growth rates, growth rate of industry and services sector were less volatile than the growth rate of agricultural sector.

The period 1981-87 was marked with commodity trade liberalization and export promotion along with a price reform aimed at reducing the state's role in economic affairs. After a 33 percent nominal devaluation of the Turkish Lira in 1980, a flexible exchange rate regime together with the introduction of a complex system of direct export subsidization acted as the main instruments for the promotion of exports and pursuit of macroeconomic stability. During the decade, export revenues increased at an average annual rate of 15 percent and GDP rose at annual rate of 4.2 percent in 1981-82 and 6.5 percent between 1983-1987.

Turkish export performance has been impressive during most of the 1980s. Considering the fact that export growth of the 1980s was based predominantly on industrial goods, one should look into changes in the degree of competitiveness of the manufacturing sector in analyzing the export performance of the Turkish economy. Since Turkish manufactured exports compete essentially on the basis of prices and not on the basis of product innovation, the main determinants of competitiveness are movements (i) in the real exchange rate (including subsidy components) for industrial exports, (ii) in real wages, and (iii) in labor productivity (Boratav, Turel, Yeldan, 1995). However, the "export-led industrialization" policy which has been pursued in Turkey since 1980, has not been a complete success since

the rise in exports was not related to new capital formation and improvement in the productive capacity of industry between 1980 and 1988. Thus, one can only speak of an "increase of exports" which is mostly linked to a shift of industrial capacity toward international markets via a siginificant contraction of wages and real devaluation (Kepenek and Yenturk 1999; Yenturk 1992).

Beginning with 1990s, in addition to these structural problems, the real appreciation of domestic currency has challenged the policies of export-oriented growth strategy. Appreciation of domestic currency deteriorated the competitiveness of export-oriented sectors, raising profits and investments in the non export-oriented sectors. After 1990 the export import ratio declined rapidly to 58 percent, in 1993 the export/import ratio dropped to 53 percent, the current account deficit widened and reached US$6.4 billion. The current account balance turned into a surplus in 1994 due to the severe decline in import demand. After the crisis was overcome, however, import demand recovered again, and the current account deficit continued to widen, reaching US$ 4.4 billion. What is important to note is that the growth rate of GDP parallels rather closely import availability. The years when GDP slows down are associated with a decline in the volume of imports and vice-versa. In this sense, the availability of imports continued to set the parameters of economic growth in Turkey in the post reform period.

The post-1980 period can thus be characterized by declining rates of investment: from 1981 to 1992 Boratav,Turel and Yeldan (1995) examined the accumulation patterns and compared with the pre-crisis, pre-adjustment period. They argued that there were two upward spurts in private investments: the first was due to the boom in housing investments which attained a 36 percent growth rate during 1985-1988, and the second was a one year "explosion" in real manufacturing gross

fixed capital formation by 64 percent in 1990. As seen from figure (1) share of manufacturing in both public and private investment seriously decreased. Actually, behavior of agriculture, mining and manufacturing investments always play a key role in growth of the economy. However, total investment in agriculture plus mining plus manufacturing sectors declined to 25.2 percent in 1997, whereas they were around 44 percent in the planning period. It is argued that the dramatic shift against the "productive" sectors is what lies behind the decline in potential growth rate in the post-1980 era. Boratav, Turel and Yeldan concluded that without any significant improvement in the efficiency of investments, the rate of capital formation is significantly lower than that of 15 years ago leading to a lower rate of potential growth. The decline in gross fixed capital formation is esentially due to a shortfall in public investments which have been depressed by declining rates of public savings. Private investment performance had been unable to compensate for the real and relative declines of public gross fixed capital accumulation in manufacturing, mining and energy sectors. Crowding-out theses of private by public investments are not validated in the Turkish case by econometric analysis. Boratav, Turel and Yeldan suggests trade offs between private investments in housing versus manufacturing, rather than the public/private dichotomy[9]. As a result, both investment and savings rates are lower than the requirements of a dynamic growth process.

The decline of public sector consumption and investment expenditures were clearly visible during the 1994-1995 crisis. Public investment expenditures experienced a downward trend, with the 20 percent decline of 1988 not being recovered until 1997. Similarly, private investments were not sustained either. The

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[9] In a recent economeric study on the subject, Akıncı (1993: 45) concludes that "during (1963-1991) ..., the complementary character of public and private investments prevails over their substitutability. For earlier studies in the same vein, see Conway (1990), Uygur(1991) (who also finds tradeoffs between private manufacturing and housing investments) and Anand et al. (1990).

annual increase in private investment in 1993 to a peak of 35 percent was immediately followed by a contraction in 1994 to a low of –9.1 percent. Overall, the growth of private capital accumulation was modest and was not able to provide sustained invigoration to the economy as a whole.

Private Investment in Housing versus Manufacturing

During the 1980s, the composition of total fixed investments displayed adverse trends at the sectoral level from the point of view of strategic targets. In fact, as gross fixed investments of the private sector increased by an average of 14.1% annualy during 1983-1987, only a small portion of this amount was directed to manufacturing. The growth rate of private manufacturing investments has been on the order of half of this figure, at a rate of only 7.7% per annum, and could not reach its pre-1980 levels in real terms until the end of 1989. Much of the expansion in private manufacturing investments originated from the pull from housing investments which expanded by an annual average of 24.5% during 1983-1987. This argument contradicts with the export-led growth strategy since outward-orientation strategy was directed to increasing manufacturing exports through significant price and subsidy incentives. Moreover, Voyvoda and Yeldan (1999) report that since the inception of the structural adjustment reforms and outward-orientation, the underlying sources of productivity gains were not significantly altered in the sector. They found that none of the leading export sectors of the 1980s could have generated sufficiently strong productivity contributions, nor admitted strong inter-industry linkages to serve as the leading sectors propelling the rest of the economy. The

changing patterns of sectoral distribution of investment may be summarized as follows:

- The adverse impact of financial liberalization on manufacturing investment could be observed in the allocation and terms of credit. As credits were diverted to short-term uses and to other sectors such as housing, industry was starved of investable funds.

- The failure to get inflation under control meant big nominal changes in interest rates and the exchange rate, together with increased uncertainty for entrepreneurs, given the unstable political environment. The availability of alternative profitable sectors in services as well as the profiteration of new financial institutions with higher rates of return in the short-term had an adverse impact on manufacturing investment (Senses, 1994).

Hence, parallel to the shift of public investment away from manufacturing toward transportation, communication and energy, there was a move in private investment toward such sectors as tourism and housing. In short, it seems that an investment climate characterized by lack of "innovative, entrepreneurship and modern management" and investors' preference for "short-run financial investment in stocks, bonds and other instruments, or deposits with financial institutions, with quick returns at the neglect of long-term real investment in plant and equipment" was not conducive to growth in manufacturing investment (See Senses, 1990a and 1989a).

Fiscal Policy

As indicated above, the export oriented growth policy necessitated a reduction in the role of the public sector in the economy, hence, in this period, there were structural changes on both the revenue and expenditure side. The former is the change in the structure of the taxation system which has been the characteristic feature of the period covered and not the changes in the overall tax burden. The latter focuses on the domestic debt which soared by about 4 percentage points of GDP during 79-92, due to financial deepening under high inflation (Boratav, Turel, Yeldan, 1996). Stagnation in tax revenues and increased transfer and current spending brought pressures for a downward adjustment of public investments. In relative terms, public investments were nearly halved during 1981-92, with a heavy incidence on productive sectors. By downsizing the public sector in the real sectors of the domestic economy, the developmental role of the state seems to have become long forgotten in the Turkish economy of the 1990s (Yeldan, Kose, 1998).

Consolidated budget expenditure in GDP had a tendency to fall in the mid 80s, then it started to rise in the begining of the 90s. However, on the revenue side, the same rate of increase was not observed. There has been an overwhelming deterioration in the fiscal balances of the state during the post-1990 period. Hence, the share of the budget deficit in GDP rose and reached the 8-9 percent in the post-90 period which was greater than the crisis period in 1977-80. The gap between revenue and expenditure in the consolidated budget is the primary deficit, and the gap between primary deficit and total deficit rose because of rising interest rates. Briefly, it is certain that the main reason for persistent budget deficits has been the accumulating debt stock and rising share of interest payments on domestic debt. There is no doubt that the outstanding government debt and its composition create

not only a financial burden but also have adverse effects on the growth trajectory of the Turkish economy in the 1990s. Hence, Turkey ended up with a vicious circle which is rolling with the deficit-debt-interest rate puzzle.

Credits and Prices

During the 1980s the reallocation of credits of the banking system away from agriculture and industry but toward construction, housing, transport, tourism and domestic trade does not signify a move in response to differentials in social rates of returns between sectors (Boratav, Turel, Yeldan, 1996). However, an important event emerged in the beginning of 90s, i.e. , the growth rate of credit stock became greater than the growth rate of deposits. This revealed the independence of the sources of credits from deficits and was financed by borrowing foreign exchange or asset-backed securities. The most important result is the rising consumption. As it is seen from figure (3) except 1989,1991 and 1994, deposit banks growth rate of credit is over the growth rate of deposits.

Furthermore, it is appropriate to examine the effects of the financial liberalization reforms on the credit-financing behavior of the banking system in Turkey. This is an important issue if the financial deepening due to the financial reforms would have a contribution to the availability of loanable funds in the system, leading to an expansion of investments. Conceptually, financial liberalization should be associated with an increase in the size of domestic credits advanced to the sector as the benefits of financial deepening are materialized. The data reveals that neither the financing behavior of the corporate firms nor the banking system as a whole, seems to have been affected much by the financial reforms. Moreover, the data on the share of private and public sectors use of credits as a share of GNP, indicates a

crowding-in type of a relationship between the private and the public's use of the banking sectors credit facilities (Kose, Yeldan, 1998).

High and variable inflation has been a central feature of the Turkish economy since the 1970s. Various stabilization programs implemented over the years have brought only temporary relief and inflation remains a major challenge for policymakers. Turkey experienced an average annual inflation rate of 20 percent in the 1970s, 35-40 percent in the early 1980s, 60-65 percent in the late 1980s and early 1990s and around 80 percent before the government launched yet another disinflationary program. However, the basic elements of disinflation efforts in the late 80s were in various forms of nominal anchoring and monetary tightening without any serious effort to reduce PSBR. One of the main reasons of the continued disequilibrium and persistent inflation rates in Turkish economy has been identified as the deterioration in the fiscal balances of the public sector and the resulting borrowing requirement (Metin, 1995).

The Role of Population and Education on Economic Growth During the 1968-1998 period

Since 1955, the average growth rate of population in Turkey has been approximately 2.5 percent. This high and gradually rising growth rate of population was due to an increase in birth rates and a decrease in death rates, mainly as a result of improved nutrition and the diffusion of health facilities during these years[10]. In spite of the family-planning programs introduced in the five year plans, progress has been dismal in the population planning area.

Although the share of the service sector in total investment has been rising, investment in education did not show any significant rise. In 1968 the share of

education in investment was 5.6 percent, 2.4 percent in 1978 and since 1988 it was around 3 percent. Moreover, the share of the private sector in education rose from 0.4 in 1968 to 0.9 in 1998. The demand for education in Turkey, both at the primary and secondary levels, is rising rapidly as a result of high growth in young population. The effect of increasing young population is also felt in the demand for higher education. However, as a result of social and economic changes, the education sector suffered in quality over the decade. The student–teacher ratio has increased and the qualities of the teachers have not improved as suggested by the falling relative scores of teacher supplying higher education institutions in the general university entrance exams, and diminishing numbers and qualities of those applying for academic carreer in the universities (Zehra Kasnakoglu and Erkan Erdil, 1994). Furthermore, there is an ever growing demand for private education both as a supplement and as a substitute for public schools. The students and their families demand extra education to compensate the quality loss that may limit their chidrens' desires to obtain higher education.

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[10] World Bank, Turkey: Prospects and Problems of an Expanding Economy (Washington D.C.: World Bank Publication, 1975).

CHAPTER III

Methodology and Data

In this section I present the methodology, which is called Extreme Bounds Analysis (EBA) and the data used in this study. The main motivation behind this work is the Levine and Renelt's influential paper called "A Sensitivity Analysis of Cross Country Growth Regressions" to provide evidence on the sensitivity of past findings to small alterations in the explanatory variables, they used a variant of the EBA discussed in Leamer (1983, 1985) and Leamer and Herman Leonard (1983). Hence, I first describe the EBA and then return to study econometric analysis associated with the empirical growth literature.

Based on the influential work of Kormendi and Meguire (1985), a common feature growth regression is that the explanatory variables are entered independently and linearly. Thus, the extreme bounds test works as follows:

Imagine that we have a pool of N variables that have been previously identified to be related to growth and we are interested in knowing whether variable Z is "robust" or not. EBA uses equations of the form:

$$Y = \alpha + \beta_1 * I + \beta_z * Z + \beta_x * X + \in$$

Where Y is either percapita GDP growth or the share of investment in GDP, "I" is a set of variables that always appear in the regressions, Z is the variable of interest and $x \in X$ is a subset of variables chosen from a pool of variables identified by past studies as potentially important explanatory variables of growth.

EBA, used in the Levine and Renelt paper, involves varying subset of X variables included in the regression to find the widest range of coefficient estimates on the variable of interest, Z , that standard hypothesis tests do not reject. As a first step, I choose a variable that has been the focus of past empirical studies, Z, and run a "base" regression that includes the only the "*I*" variables and the variable of interest. Then I compute the regression results for all possible linear combinations of up to three X variables and for each model j, one finds an estimate, βzj, and a standard deviation, σzj . Thus, the upper extreme bound is defined to be the largest value of βzj plus two standard deviations, while the lower extreme bound is defined to be lowest value of βzj minus two standard deviations. The EBA for variable Z says that if one finds a regression for which the sign of the coefficient βzj changes, or becomes insignificant, then the variable is not robust. Hence, one might feel less confident in the relationship between Z and Y variables, because alterations in the conditioning information set change the statistical inferences that one draws regarding the Z-Y relationship. In this case, I refer to result as "fragile".

One possible objection to the EBA approach is that it introduces multicollinearity, inflates the coefficient standard errors and exaggerates the range on the coefficient of interest. Leamer (1978 pp.170-181), however, points out that the multicollinearity problem really reflects a weak data problem. If one is unable to find robust correlation, this means that there is not enough independent variation in that variable to explain growth. Only when one identifies a significant correlation while controlling for other relevant variables, should one have much confidence in the correlation. Since the growth literature has not adequately identified the causality

channels, finding a robust correlation certainly does not imply that the variable of interest causes growth.

To convince as wide an audience as possible that certain partial correlations are robust or fragile in as meaningful and noncontroversial a manner as possible, as in the Leamer and Renelt paper, I restrict the EBA in the three ways :

1) I only allow the procedure to choose up to three X variables from the pool of variables identified as potentially important explanatory variables of growth. Hence, total number of explanatory variables included in any one regression are set to be seven or fewer.

2) I limit the EBA by choosing a small pool of variables for X variables. I only search for five indicators to represent a reasonable conditioning set. Thus, I examine the sensitivity of the relationship between growth and more variables than that considered by any other study, thus I restrict X variables to only five.

3) For every variable of interest, Z, I further restrict the pool of variables by excluding the X variables that might measure the same phenomenon. For example, I do not allow the inflation rate to be X variable when I examine the relationship between growth and the rate of domestic credit growth.

Hence, these restrictions make it more difficult to implicate past findings as fragile.

In this study econometric analysis is done by using ordinary least squares (OLS) and coefficients are estimated by White Heteroscedasticity-Consistent Standard Errors and Covariance. Furthermore, autocorrelation is checked by Durbin-Watson test

statistic. There are two dummies for this time period; 1980 and 1994. The annual data used in this study comes from SIS, State Planning Organization and Central Bank of the Republic of Turkey.

CHAPTER IV

Econometric Analysis

Now, I turn in this section to the evaluation of the analytical findings on the correlations between growth and selected macroeconomic indicators for Turkey over the 1968-1998 period. The section is further linked to four seminal studies of growth Kormendi and Meguire (1985), Barro (1991), Levine and Renelt (1992), Sala-i-Martin (1997) and following Robert Barro (1991), the recent emprical literature on economic growth which has identified a substantial number of variables that are particularly correlated with the rate of economic growth. Moreover, Levine and Renelt (1992) examined whether the conclusions from existing studies are robust or fragile to small changes in the conditioning information set. Thus, in the light of empirics of the growth literature, I present the sensitivity analysis for basic growth variables and fiscal, trade and monetary variables for Turkey over the 1968-1998 period.

First, I examine the role of macroeconomic indicators on growth. When the dependent variable is the annual growth rate of GDP per capita, the selected I-variables consist of the investment share of GDP (INV), high school enrollment rate (HEC), and the annual rate of population growth (GPO). The I-variables are chosen based on past empirical studies and economic theory. Of the 41 growth studies surveyed in Levine and Renelt (1991), 33 include investment share, 29 include population growth, 13 include a human capital measure, and 18 include a measure of initial income. Further Sala-i-Martin has collected around 60 variables which have been found to be significant in at least one regression. In addition, the I-variables are consistent with a variety of "new" growth models that rely on constant returns to

reproducible inputs or endogenous technological change (e.g., Barro 1990; Romer 1990a). The underlying problem of establishing causal relationships in economics is familiar: Does economic prosperity foster financial market innovations, or do improvements in financial arrangements stimulate economic activity? The list of such questions is endless. Given the quality of right hand side variables of growth regressions, the problem of interpreting causal linkages is particularly acute. I agree with Romer's (1989a) assertion that growth regressions can only be interpreted within the context of a theory and that causality only acquires economic content when we have a theoretical framework for understanding the observed relationship. While it seems almost self-evident that we need an economic theory to interpret the statistical relationships in an economically meaningful way, the growth literature to date has not optimally integrated econometrics with economic theory (Levine and Renelt, 1991).

There are also problems with including the investment share of GDP as an I-variable. The causal relationship between GYP (Growth rate of real GDP per capita) and INV is ambiguous, and the variables included in growth regressions may explain INV. If we include INV, the only channel through which other explanatory variables can explain growth differentials is the efficiency of resource allocation, thus, to clarify this ambiguity, I also investigate the correlation between INV and the macroeconomic variables of primary interest.

The pool of variables from which I typically allow the EBA to choose X-variables are the ratio of exports to GDP (E), the inflation rate (PI), the growth rate of domestic credit (GDC), the standard deviation of inflation (STDI), the standard deviation of domestic credit growth (STDC). I choose these variables to form the basis of the conditioning information set based on the existing evidence where the

literature used these variables, or closely related variables, as fiscal, trade, monetary indicators. This pool is kept small to make the result more tangible and digestible.

The regression results with the I-variables over the 1968-1998 period are:

GYP= -0.29-3.30GPO+6.83HEC+2.24SHINV

$\quad$ (2.30) $\quad$ (1.12) $\quad$ (8.95) $\quad$ (1.99)

(The t- statistics are in parentheses, R2=0.85)

The I-variables explain about 85 percent of the variance in growth rates. The variables have the signs predicted by a wide class of models and all but GPO are significant at 0.05 significance level. I run this base regression with four different investment shares: share of total investment (STOTINV), share of public investment (SHPUB), share of private investment (SHPRV) and share of housing investment (SHINV) and two different human capital indicators: high school and secondary school enrollment rates (HEC, SEC). Among the various investment shares, the share of housing investment is the only one having positive and significant coefficient, and both SEC and HEC have positive and significant coefficients.

$\quad$ Several papers have included various indicators of macroeconomic instability, finding significant negative effects on investment. Servén (1996) has argued that the interactions between instability, irreversibility and uncertainty played a significant role in the poor investment performance in developing countries during the 1980's and 1990's. Rodrik(1990) examined the macroeconomic performance of Turkey in comparative perspective for the period 1969 to 1986 and in Turkey, the share of investment in GDP has been consistently lower by two or three percentage points than in the other countries, except in 1986 which saw a boom in public investment. Moreover, he found a surprising fact that Turkish recovery has not been accompanied by a resurgence in investment but all the growth came from exports.

Furthermore, among the various investment sectors, De Long and Summers (1990) present evidence that growth is linked primarily to the share of manufacturing investment in GDP.

Table (2) presents the EBA tests for each of the I-variables. The investment coefficient is fragile which means variable of interest enters with a wrong sign when I alter the conditioning set. Moreover, I also examined the differences in βz's rather than the differences in β-bounds, the coefficient of housing investment became robust. In fact, the distribution of sectoral investments revealed a rising trend for housing sector, such as the realized investments on housing sector exceed the targeted level. During the planning period, an overall growth rate was chosen as the key social target and the five year plans set the guidelines for medium-term macro balances and sectoral expansions in a mixed economy (Celasun, 1994). Starting in 1980, as a result of export oriented growth policy the tendency of investments were examined in relation with market conditions and price movements. However, the declining trend of investments was caused by the inconsistent and unstable market and price behavior. The post-1980 period can thus be characterized by declining rates of investment, especially in the manufacturing sector. Moreover, much of the expansion in private manufacturing investments originated from the pull from housing investments. Thus, share of housing investment goes hand in hand with rising inflation and appreciation of the real exchange rate conforming the data, Figure (4). In spite of the "dramatic" shift against productive sectors, the share of housing investment is positively and significantly correlated with growth.

Human capital is another variable, which is always included in the growth regressions. Given the wide range of countries that researchers typically include in their data, these indicators are often unsophisticated. For example, as I used in this

study, high, or secondary school enrolment rates. Life expectancy is also sometimes included as an indicator of human capital. More advanced measures, such as the average number of years schooling in the working age population can be developed if data is available. A major problem with existing measures of human capital is a failure to account for differences in the quality of education. Attempts to take this account have been based on using proxies for school input and output quality; for example, Barro and Lee (1996) use teacher public ratios, per pupil spending and percentages of students repeating their grade as inputs to a measure of human capital. Although empirical studies show a positive link between growth and human capital, this indicator may change sign, in fact may be negative, under different proxies.

A second important finding presented in Table (2) is the robust positive correlation between GYP and HEC for also SEC, which confirms the finding by Barro (1991). As a result of high growth in young population, the demand for education in Turkey is rising rapidly. However, the education sector suffered in quality over the decade because of social and economic changes. Moreover, public investments on education do not show any significant rise but there is an ever growing demand for private education, which, in turn rises the private investment on education. In spite of the debatable quality of the education system in Turkey, the coefficient of high school enrollment rate enters with a significantly positive, thus a robust coefficient.

As illustrated, one should not feel very comfortable assuming that population growth is negatively associated with per capita growth. For some specifications GPO enters with a negative coefficient, but it enters with a positive coefficient with other plausible X-variables. In fact, the coefficient on GPO is insignificantly correlated with growth in the base regression.

While the negative relation between population growth and income is obvious from the data, fully understanding of this relationship is complicated. We have to consider not only population's effect on income, but also the determination of population growth itself.

Table (3) provides the EBA of the I-variables using the investment share as the dependent variable where none of the I-variables is robustly correlated with INV. When the result is fragile, the column indicates how many X-variables need to be added before the variable is insignificant or of the "wrong" sign. This signifies that the variable of interest, GPO, enters with an insignificant coefficient (or a coefficient of the wrong sign) in the base regression. Thus, by selectively adding right-hand-side variables one can find a significant coefficient of the theoretically predicted sign. From table (3), both human capital indicators are positive and significant for all shares of investment. The more detailed table showing the relations between different investment shares and popular growth variables are given in the Table (10).

Consequently, among the variables which are always included in the growth regressions, only human capital indicator is robust.

Fiscal Policy Indicators

One of the most important and frequently studied issues in economics is the role of fiscal policy in economic development, hence to link aggregate measures of fiscal policy with per capita growth rates, most of the empirical studies have tended to use:

i.   Measures of overall size of the government in the economy,

ii. Disaggregated measure of government expenditures,

iii.   Measures of the growth rate of government expenditures, or

iv.   Disaggregate measure of government taxes and the role of government deficits.

Although many of the growth studies have attempted to link aggregate measures of fiscal policy with growth rates, the literature has not been successful in identifying a robust empirical relationship between growth and aggregate indicators of government expenditures or taxes. There are conceptual complexities and statistical reasons indicating their unsuccessful experience in identifying consistent empirical relationships between existing measures of fiscal policy and growth. First, the institution underlying theoretical linkages between fiscal policy and growth is intuitively appearing and fairly straightforward. Second, studies using separate components of revenue and expenditure in growth regressions seem to imply that the effect of fiscal policy on growth depends importantly on what expenditures are devoted to, and how they are funded. Even putting aside the differential growth effects of different types of government expenditures and the differential growth effects of growth types of taxes, there may be complex trade offs between the beneficial effects of government services and the detrimental effects of distortionary taxes. In Barro (1990) and Easterly (1990b), growth increases with taxation and low expenditure level, and then decreases as the distortionary effects of taxation exceed the beneficial effects of public goods. Government expenditures and growth are positively correlated when government expenditures are below the optimum amount. Ram (1986) finds a positive correlation between the growth rate of government expenditures and output growth. Furthermore, one might find a positive relationship between the growth rate of government expenditures and output growth even if the role of government in the economy falls as the country develops. Barro (1989a, 1990, 1991) and Diamond (1989) use detailed measures of government expenditures

on capital goods, education, defense and found that consumption spending less defense and education expenditures to GDP is negatively correlated with growth. Levine and Renelt (1990), however, show that this negative correlation becomes insignificant for some econometric specifications. Barro (1991) also finds that the coefficient on the ratio of government capital expenditure or education expenditures against growth depends on the specific econometric specification applied. Diamond (1989) tests for separate effects of a number of categories of public expenditures and finds that the different categories of government expenditure are quite fragile to the inclusion of other explanatory variables. As a result, the empirical work on fiscal policy and economic growth has not produced robust empirical relationships. Barro (1991), Fischer (1993) as well as Easterly and Rebelo (1993) report the central government surplus to be a robust variable in growth regressions.

Table (4) reports EBA tests of fiscal variables for the period 1968-1998. Although the estimated coefficient on government deficit is negative and significant at 0.10 level, the coefficient is not robust: the coefficient on government deficit becomes insignificant and positive when I alter the conditioning information set (e.g., by adding GDC). The ratio of total expenditures to GDP (SHEXPND) is insignificant in the base regression, the inclusion of other macroeconomic indicators (e.g., STDC) also induces an insignificant coefficient on SHEXPND.

Table (5) presents EBA tests of the fiscal indicators with INV. Although the share of deficit is negatively and significantly correlated with the share of public investment, combination of different X-variables causes SHDEF to enter insignificantly and change sign. Thus there is a fragile link between SHPUB and SHDEF. In the base regression, there is a positive significant relation between SHEXPND and INV but the coefficient of the variable changes sign as I alter the

conditioning set (e.g. GDC). Hence, the coefficient of both variables changes sign with different X–variables. Thus, I end up with positive and significant link between SHEXPND and SHINV in spite of being fragile. Actually, the rising share of expenditure in GDP was clearly seen from the data, especially for the post-1989 period.

During the ISI period Turkey did not experience serious budget deficit problems. But, by the end of 1977, the crisis hit the Turkey with full force when foreign lending dried up, and the share of deficit rose to 3 percent of GDP. The next two years was disastrous: growth was negative, inflation moved into triple digits, and massive shortages developed. During the 1980s, exports became a source of national pride and proof of international competitiveness, strengthening domestic political cohesion and foreign financial support. Although export led growth strategy can be confidently labeled as a success, this was the starting point for the rising share of deficit in GDP. With the full liberalization of the capital account and the recognition of full convetibility of the lira in 1989, there has been a massive inflow of short-term capital into the domestic economy and it made possible the financing of the rapidly growing fiscal deficit of the public sector. Hence, due to the unsustainable nature of the fiscal policy, the economy experienced a major crisis in early 1994. Hence the rising share of the deficit accompanied the unstable growth path of the economy during the post-1980 era. Interestingly, the share of expenditure in GDP is not significantly correlated with growth, however, in spite of being fragile, the share of expenditure in GDP is significantly correlated with investment in the base regression. Thus the relationship between SHEXPND and growth may be based on resource accumulation not necessarily on the improved allocation of resources.

Thus, in this subsection, I couldn't find a robust relationship between a fiscal policy indicators and growth. Specifically, although there are econometric specifications that yield significant coefficient estimates between specific fiscal policy indicators and growth, the coefficients on these variables become insignificant when the right hand side variables are slightly altered.

These results suggest that the interactions among fiscal policy, investment, and growth may be more complicated than can be captured in simple linear models using fairly aggregate measures of fiscal activity.

International Trade

One of the most important issues in economic growth is the role of international trade. As in the case of fiscal policy, we have conceptual and statistical difficulties associated with growth studies that attempt to link trade policy and growth. First, theory typically analyses the relationship between trade and growth, focusing on the relationship between exports and growth. Although policy makers are concerned about the relationship between trade policy and growth, they mostly examine the correlation between exports and growth. Second, the conclusion of many growth studies can be easily overturned by slightly altering the list of explanatory variables.

Over 200 years ago Adam Smith argued that openness to international markets could enhance productivity by encouraging specialization that would be unprofitable in smaller markets. Recently this argument and other theoretical ties between trade and growth have been formalized by Rivera-Batiz and Ramor (1991), Grossman & Helpman (1990), and Romer (1986, 1990b). Although theoretical discussions frequently focus on the relationship between international trade and

growth, empirical examinations have typically examined the relationship between exports and growth. Moreover, endogenous growth theory has expanded on the notion of scale economies, suggesting that trade may increase the generation and diffusion of knowledge through mechanisms such as: learning by doing, invention and diffusion of knowledge.

Another weakness with growth regressions that focus on the relationship between exports and growth is that they generally do not examine specific proxies for trade policy and yet they tend to draw conclusions concerning trade policy in general and export promotion policies in particular. This is due to a series of factors: (1) these studies do not include proxies for trade policy, (2) the causal relationship between export growth and output growth is ambiguous, (3) all the empirical relationships obtained by these studies using export growth can be obtained using import growth or trade growth, and (4) the empirical result obtained by these studies break down when government spending growth is included (5) the conclusion of these studies are typically not robust to the inclusion of other policy variables.

Empirically, there is a fairly robust two step empirical link between the share of exports in GDP and output growth. For a very diverse set of specifications, Romer (1990b) and Levine and Renelt (1990) demonstrate that the share of exports in GDP is significantly positively correlated with the ratio of investment expenditures to GDP and that the investment ratio is significantly positively correlated with per capita output growth. In Levine and Renelt (1992), the export share is not significantly correlated with per capita growth where the investment share is included in the regression, but the investment share remains significantly correlated with growth where the export share is included, but in particular, these findings do not tell us anything about export promotion policies. However, it should be stressed

that it is also possible to think of mechanisms whereby trade may have a negative influence on growth Grossman and Helpman (1991) cite various examples : (i) intensified competition due to trade could discourage efforts for invention by lowering expected potential profitability of a successful invention, (ii) international competition with a technologically advanced country can bring about a slowdown of innovation and growth in a country with a disadvantage in research productivity; and (iii) a country with abundant unskilled labour may be led by trade to specialize in traditional low tech manufacturing. In this vein, Young (1991) shows that a country which specialize in goods with greater potential of learning by doing can increase its growth rate as a result of international trade, while a country having comparative advantage in goods with less potential of learning by doing can have a slower growth rate owing to trade. While many empirical studies based on cross country regressions (e.g., Balassa, 1985; Barro, 1991; and Dollar, 1992) report a positive link between openness and growth, more recent studies conclude that caution is required when interpreting earlier results. Furthermore, not all papers find a significant statistical link between trade and growth. For example; the widely cited Levine and Renelt (1992) analysis fails to find any of a large number of trade and trade policy indicators to be robustly correlated with growth especially when the estimated equation includes investment share. These results are interpreted as indicating that the relationship between trade and growth may be based on enhanced resource accumulation, and not necessarily on the improved allocation of resources (e.g., Baldwin and Seghezza, 1996).

The major results for trade variables are presented in tables (6) and (7). The ratio of exports to GDP (E) is not robustly correlated with growth, in fact, it is not significant in the base regression. To find a regression in which E enters positively

and significantly one needs to search beyond the five variables considered as potential X-variables by the EBA. I also examined the ratio of imports to GDP and as in the case of E, it is not robustly correlated with growth and it has a positive and insignificant coefficient in the base regression. Moreover, the relationship between RER and growth is positive and insignificant, thus, fragile.

Table (7) shows the link between trade variables and investment, although the share of exports and imports are positive and significant in the base regression, they are not robustly related with the share of investment; the coefficient on share of exports (imports) becomes negative when I alter the conditioning information set (e.g. by adding STDI). The coefficient of RER is negative and significant but it becomes insignificant and changes sign with different combinations of X-variables. In short, both the share of exports and imports are positively and significantly correlated with housing investment; in addition to this RER is negatively and significantly correlated with the share of housing investment in GDP instead of being fragile.

In Turkey, trade policy until 1980 was characterized by import-substituting industrialization under heavy protection. Overvalued exchange rate, quantative restrictions and a strict system of exchange control were used as the main tools of trade policy. In the 1980s the most comprehensive and the most radical steps were taken in the foreign trade sector. Initially they were quite instrumental in promoting exports and hence alleviating current account deficits. Although the first half of the 80s was a remarkable success from the view point of the balance of payments, creditworthiness and growth, stable growth path of the economy was not achieved without any new capital formation and improvement in the industrial productive capacity between 1980 and 1988. Although, Turkey's export expansion was based on

the broad growth of manufactured exports, the necessary improvement in productivity investments in export manufacturing was not achieved. Hence, by the end of the decade, the export gains based only on price incentives and subsidies were exhausted and Turkey faced with exhaustion in 1988 followed by capital account liberalization. Hence this unbalanced structure of trade policy matched the fragile relationship between growth and trade variables. Furthermore, these results indicate that, the relationship between trade and growth may be based on enhanced resource accumulation and not necessarily on the improved allocation of resources. Since, although the link between trade variables and growth is fragile and insignificant, the correlation between trade variables and investment is fragile and significant. Consequently, although Turkey's growth performance was determined by manufactured-export- led-growth, I found positive correlation between trade variables and housing investment. The results also indicate that the rising share of housing in GDP corresponded to the real exchange rate appreciation.

Monetary Indicators

Financial instruments and financial institutions have been integral parts of economic activity for over two hundred years. Furthermore, since Goldsmith (1969) documented the relationship between financial system and economic development, the profession has made important progress. The links between the financial system and economic growth can be thought as operating through financial and monetary policy by altering financial structure, but econometrically it is vey difficult to obtain good measures of financial policy and financial market performance. A number of researchers examined the role of money in economic activity. Early rational expectations models by Lucas (1973) and Barro (1976) predicted a neutral

relationship between anticipated money growth and output. But in recent models, "high money growth, high inflation" environments can elicit behaviors that reduce growth. For example, talented agents may transfer out of productive enterprises and into rent seeking activities, agents may substitute out of simple money exchange and into transactions technologies that require more time and effort, or capital accumulation may be discouraged (Stockman, 1981). Hence, money growth could prevent growth. On the other hand, Tobin (1965) argued a positive influence of inflation on output due to the fact that inflation increases the opportunity cost of holding money, thus increasing incentive to invest. However, Temple (1998) pointed out that the "Tobin Effect" is limited since money balances are only a small fraction of the capital stock and thus the effect could at best be marginal. Empirical evidence on the relationship between money, inflation and growth is ambiguous. Kormendi and Meguire (1985) concluded that the growth rate of inflation is negatively correlated with growth, Bruno-Easterly (1998) demonstrate that growth falls sharply during periods of high inflation (which they define as beind 40 percent or above). But, Grier and Tullock (1989) found that both the sign and significance of the inflation growth correlation depends importantly on the sample chosen. Levine and Renelt (1992) argued that the relationship between growth and inflation and growth and domestic credit growth depend on the inclusion of other policy variables.

Although theory suggests that monetary policy variability should impede the efficient allocation of resources, the empirical relationship betwen monetary policy uncertainty and growth is ambiguous. For example, Hayek (1944), Friedman (1977) and Barro (1976) argue that variable inflation or monetary policy uncertainty can interfere with the ability of agents to extract information from relative prices and may reduce investment and economic performance. Empirically, Kormendi and

Meguire (1985) find a negative correlation between the standard deviation of M1 growth and output growth. Grier and Tullock, again find that both the sign and significance of this correlation depend on the sample of countries chosen; and Levine and Renelt (1992) demostrate that small changes in the explanatory variables can change the sign of the coefficient on the standard deviation of inflation or the standard deviation of domestic credit in growth regressions.

There are two problems with empirical studies: first one is the determining the direction of causality, for example, per capita output growth and technological change may elicit the creation and modification of financial arrangements, thus, a positive relationship between an indicator of financial market activity and growth may not imply that financial markets cause growth. The second one is related to the nature of the time series data. The basic problem in these studies is the separation of a long-term relationship between output growth from interactions between output growth and inflation over business cycles.

Hence, this section examines the empirical relationship between growth and measures of monetary policy for the 1968-1998 period. Each indicator has conceptual and statistical problems. Nonetheless, the wide assortment of indicators that I test produces similar results; none of the indicators is robustly correlated with growth. Moreover, I also examined the differences in βz's rather than the differences in β-bounds, the coefficient of PI became robust when the dependent variable is growth rate of real GDP percapita; STDI also became robust when the dependent variable is the share of housing investment at 0.10 significance level. The inflation coefficient is negative and significant in the base regression but it changes sign and becomes insignificant when I alter the conditioning information set (e.g. by adding STDC). Both coefficients of STDI and STDC are insignificant in the base regression

and I can not find a significant relationship with growth by altering the X-variables. The growth rate of domestic credit stock is positive and significant in the base regression but it becomes negative and insignificant when I alter the conditioning set (e.g. by adding STDC), in fact, STDC is positive and insignificantly correlated with growth, thus fragile.

Table (9) provides the EBA of the monetary variables using the housing investment share as the dependent variable. PI enters with positive and significant coefficient when the dependent variable is the share of housing investment but it changes sign or fails to be significant when I alter the conditioning set. I could find a robust negative correlation between investment and STDI by altering contioning set. In fact, the coefficient on GDC is positively and significantly correlated with SHINV in the base regression but it becomes negative when I run the regression with the different combinations of the conditioning set, (e.g. by adding STDC). Moreover, STDC enters with positive and significant coefficient in spite of being fragile.

As it is indicated in Table (8) and Table (9), among the narrow set of various monetary variables growth rate of domestic credit is significant to both growth and investment however, it changes sign or fails to be significant with different set of variables, thus it is fragile. Following the discussion in section 2 , increase in the growth rate of domestic credit stock was not able to provide a determined path for the economy since the rise in credits were not used efficiently in the production areas for the 1970-76 period. During the 1980s, credits of the banking system were reallocated away from agriculture and industry but toward construction, housing and transportation and in the beginning of 1990s. In spite of being positive and significant, the coefficient of GDC is not robust when the share of housing

investment or the growth rate of real per capita GDP is chosen as the dependent variable.

Recent economic history of Turkey is full of examples of aborted adjustment of seeming success followed by crisis. It is very dangerous to call anything a success when changes in domestic policy or international events can quickly lead to reversals. Although Turkey's macroeconomic performance in the 1980-1985 period can be labeled as success, inflation was relatively high. Inflation has been a striking characteristic of the Turkish economy since 1977. Various stabilization programs implemented over years have brought only temporary relief. Hence, the role of inflation on economic growth is inevitable.

Before I conclude, I briefly summarized my findings as follows:

  i.   I found a positive and robust correlation between the human capital indicator, that is, high school enrollment rate and growth rate.

 ii.   I found a positive and robust correlation between the share of housing investment in GDP and growth rate; and negative and robust link between growth and inflation rate; and negative and significant correlation between standard deviation of inflation and the share of housing investment when I examined the differences in βz's rather than the differences in β-bounds.

iii.   I found that none of the fiscal and trade indicators that I studied is robustly correlated with growth and the investment share. Instead of being fragile, among the fiscal variables, share of deficit in GDP is negatively and significantly related with the real per capita growth rate.

 iv.   In fact, the relationship between monetary variables and the share of housing investment is significant, in spite of being fragile. Moreover, among the trade

variables, real exchange rate is negatively and significantly related with the share of housing investment and the share of exports and imports in GDP is positively and significantly related with the housing investment, instead of being fragile. Among the fiscal variables, share of expenditure in GDP entered with a positive and significant coefficient to the regression when the dependent variable is the share of housing investment, in spite of being fragile.

CHAPTER V

Conclusion

Within the boundaries of this fragile macroeconomic environment, how much confidence should one have in relationship between various macroeconomic indicators and growth? This thesis evaluates the robustness of the correlation between per capita growth rates and selected macroeconomic indicators for Turkey over the 1968-1998 period. I found that very few economic variables are robustly correlated with growth rates or the share of investment in GDP. More specifically, I identified a positive and robust correlation between growth and the human capital indicator, that is, high school enrollment rate. Furthermore, when I examined the differences in βz's rather than the differences in β-bounds, I found positive and robust correlation between growth and the share of housing investment; negative and robust link between inflation rate and growth and the relationship between standard deviation of inflation and the share of housing investment became negative and robust. Sensitivity results for trade variables (share of imports in GDP, real exchange rate, share of exports in GDP) and fiscal variables (share of expenditure in GDP) indicated that the relationship between trade and growth; share of expenditure in GDP and growth may be based on enhanced resource accumulation and not necessarily on the improved allocation of resources. Moreover, growth rate of domestic credit is fragile, that is, it changes sign with the different combinations of conditioning set, indicating the monetary expansion does not provide a statistically robust impetus on GDP growth; hence the transformation between money, capital and production is not achieved. As a result, I could not find any macroeconomic

indicator, except human capital indicator, robustly correlated with growth or investment share.

Empirical growth literature suffers from methodological, statistical and conceptual problems and up to date, growth literature has not optimally integrated econometrics with economic theory. Moreover, Williams and Kelly (2001) and Easterly (2001) documented a significant puzzle in empirical growth research: the former pointed out that the current state of understanding about the causes of economic growth is fairly poor, hence, many of the variables studied were found to be fragile or insignificant in growth regressions and the latter demonstrated that developing country growth should have increased instead of decreased according to the standard growth regression determinants of growth. Fortunately, Easterly (2001) argued that academic studies do not have to predict future but only document the past. Another problem in growth regressions is related to the nature of the time series data such as separation of a long-term relationship between output growth from interactions between output growth and selected macroeconomic indicators over business cycles.

In this respect, a productive area of research would be to focus on the role of econometrics, such as, capturing the causality and mis-specification problems, on empirics of growth.

Table1. Phases of Macroeconomic Adjustment in Turkey, 1968-1998

	Import Substitutionist Industrialization 1968-76	Economic Crisis 1977-80	Post- Crisis Adjustment 1981-82	Export-Led Growth 1983-87	Exhaustion 1988	Unregulated Financial Liberalization 1989-93	Financial Crisis 1994	Reinvigoration of Short-term Foreign Capital - Led Growth 1995-97	Contagion of the World Financial Crisis 1998
I.Production and Accumulation (Real Rate of Growth,%)									
GDP	5,8	0,5	4,2	6,5	2,1	4,8	-5,5	7,2	2,8
Fixed Investment									
Private	11,5	-5,8	-5,3	12,3	12,6	11,5	-9,1	13,6	-6,7
Public	11,8	-3,6	0,2	10,3	-20,2	4,3	-34,8	9	30
2.Prices and Credits									
Inflation Rate (CPI)	16,3	61	33,2	39,5	75,4	66,4	106,3	84,5	92,6
Domestic Credit Growth	10,2	45,8	42,4	51,5	44,1	73,8	70,5	117,4	48,2
3.Public Finance									
As % Share of GDP									
Expenditure	16	21	17	17	15	19	22	25	29
Deficit	0,8	3	1	3	3	4	4	6	7
4.Internationalization									
As % Share of GDP									
Imports	7,1	8,5	13	16	15,7	14,8	17,8	23,4	22,9
Exports	3,5	3,3	7,6	10,8	12,7	9,2	13,9	13	13,4

Sources: SPO Main Economic Indicators, CBRT

Table 2 **Sensitivity Results for Basic Variables**
(Dependent Variable: Growth Rate of Real Per Capita GDP)

M-Variable		B	SE	t	N	R2	Other Variables	Robust/Fragile
INV	High:	5,03	1,42	1,52	29	0,87	STDI,GDC	
	Base:	2,24	1,12	1,99	30	0,87		Fragile(1)
	Low:	-0,68	1,32	1,48	29	0,86	STDI,E	
GPO	High:	6,68	5,58	0,8	29	0,87	STDC	
	Base:	-3,3	2,95	1,12	30	0,87		Fragile*
	Low:	-14,7	5,24	0,81	29	0,87	STDC,E	
HEC	High:	11,7	2,38	2,93	29	0,87	STDI	
	Base:	6,83	0,76	8,95	30	0,87		Robust
	Low:	1,56	2,47	2,63	29	0,87	STDI,GDC	

Notes: The base β is the estimated coefficient from the regression with the variabl
interest (Z-variable) and the always included variables (I-variables). The I variables are
INV(Investment share of GDP), GPO(Growth in population), HEC(High school enrollment
rate. The high β is the estimated coefficient from the regression with the extreme
bound (β+2standard deviations); the low β is the coefficient from the regression wit
extreme high bound. The other variables are the X-variables included in the base
regression that produce the extreme bounds.The robust/fragile column indicates whether
the variable of interest is robust or fragile.* indicates that variable of interest is insignificant
at 0,05 significance level in the base regression.

Table 3 **Sensitivity Results for Basic Variables**
(Dependent Variable: Investment Share)

M-Variable		B	SE	t	N	R2	Other Variables	Robust/Fragile
GPO	High:	1,64	0,55	0,95	30	0,55	STDI,E	
	Base:	-1,65	0,8	2,04	31	0,27		Fragile(0)
	Low:	-4,84	1,06	2,53	30	0,32	STDC	
HEC	High:	1,02	0,2	1,51	30	0,39	GDC,STDC,E	Fragile(2)
	Base:	0,36	0,06	5,81	31	0,37		
	Low:	-1,16	0,27	2,2	30	0,57	PI, STDI,STDC	

Notes: The base β is estimated coefficient from the regression with the variable of i
(Z-variable). When the dependent variable is the investment share, no I variables are
included. The high β is the estimated coefficient from the regression with the ext
high bound (β+2standard deviations); the low β is the coefficient from the regressi
the extreme high bound. The other variables are the X-variables included in the base
regression that produce the extreme bounds. The robust/fragile column indicates whether
the variable of interest is robust or fragile. If fragile, the number in paranthesis indicates
that how many additional variables need to be added before the variable is included. The
underlined variables are the minimum additional variables that make the coefficient of
interest insignificant or change sign.

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Table 4

<div align="center">

Sensitivity Results For Fiscal Variables
(Dependent Variable: Growth rate of Real Per Capita GDP)

</div>

M-Variable		B	SE	t	N	R2	Other Variables	Robust/Fragile
SHDEF	High:	0,84	0,59	0,56	29	0,66	STDI,<u>GDC</u>,E	
	Base:	-1,06	0,65	1,61	30	0,51		Fragile(1)
	Low:	-2,4	0,71	1,37	29	0,53	STDC	
SHEXPND	High:	1,15	0,52	0,19	29	0,54	STDI,GDC,E	
	Base:	-0,37	0,34	1,09	30	0,49		Fragile*
	Low:	-1,64	0,58	0,82	29	0,54	STDI,STDC,E	

Notes: The base β is estimated coefficient from the regression with the variable of i
(X-variable) and the always included variables (I-variables). The I variables are INV, GPO
and HEC. The high β is the estimated coefficient from the regression with the ex
high bound (β+2standard deviations); the low β is the coefficient from the regressi
the extreme high bound. Z-variable definitions: SHDEF= deficit share, SHEXPND=
expenditure share.The other variables are the X variables included in the base regresion
that produce the extreme bounds. The robust/fragile column indicates whether the variable
of interest is robust or fragile. If fragile, the column indicates how many additional variables
need to be added before the variable is insignificant or of the wrong sign. The underlined
variables are the minimum additional variables that make the coefficient of interest
insignificant or change sign. * indicates that variable of interest is insignificant at 0,05
significance level in the base regression.

Table 5

<div align="center">

Sensitivity Results For Fiscal Variables
(Dependent Variable: Investment Share)

</div>

M-Variable		B	SE	t	N	R2	Other Variables	Robust/Fragile
SHDEF	High:	0,72	0,22	1,17	30	0,38	<u>STDI</u>,STDC,E	
	Base:	-0,22	0,08	2,47	31	0,13		Fragile(1)
	Low:	-0,58	0,19	1,01	31	0,13	GDC,E	
SHEXPND	High:	0,5	0,11	2,38	30	0,23	STDC	
	Base:	0,19	0,06	3,11	31	0,21		Fragile(1)
	Low:	-0,45	0,12	1,61	30	0,64	STDI,<u>GDC</u>,E	

Notes: The base β is estimated coefficient from the regression with the variable of i
(Z-variable). When the dependent variable is the investment share, no I variables are
included. The high β is the estimated coefficient from the regression with the e:
high bound (β+2standard deviations); the low β is the coefficient from the regressi
the extreme high bound. Z-variable definitions: SHDEF= deficit share, SHEXPND=
expenditure share.The other variables are the X variables included in the base regression
that produce the extreme bounds. The robust/fragile column indicates whether the variable
of interest is robust or fragile. If fragile, the number in paranthesis indicates that how
many additional variables need to be added before the variable is included. The underlined
variables are the minimum additional variables that make the coefficient of interest
insignificant or change sign.

Table 6

Sensitivity Results For Trade Variables
(Dependent Variable: Growth rate of Real Per Capita GDP)

M-Variable		B	SE	t	N	R2	Other Variables	Robust/Fragile
E	High:	2,27	0,63	1,57	29	0,57	STDI,GDC,STDC	
	Base:	0,03	0,41	0,07	30	0,47		Fragile*
	Low:	-0,9	0,59	0,48	29	0,56	PI,STDI,STDC	
SHIMP	High:	1,91	0,66	0,9	29	0,52	STDI	
	Base:	0,13	0,46	0,28	30	0,47		Fragile*
	Low:	-0,97	0,55	0,23	29	0,56	PI,STDC	
RER	High:	0,018	0,007	0,49	29	0,5	STDI	
	Base:	1E-04	0,044	0,03	30	0,47		Fragile*
	Low:	-0,013	0,007	0,5	29	0,53	STDI,GDC,STDC	

Notes: The base β is estimated coefficient from the regression with the variable of int
(Z-variable) and the always included variables (I-variables). The I variables are INV, GPO
and HEC. The high β is the estimated coefficient from the regression with the extre
high bound (β+2standard deviations); the low β is the coefficient from the regre
with the extreme high bound. Z-variable definitions: E= Export share, SHIMP= Import
share, RER=Real exchange rate. The other variables are the X-variables included in the
base regression that produce the extreme bounds. The robust/fragile column indicates
whether the variable of interest is robust or fragile. If fragile, the column indicates how
many additional variables need to be added before the variable is insignificant or of the
wrong sign. The underlined variables are the minimum additional variables that make the
coefficient of interest insignificant or change sign.* indicates that variable of interest is
insignificant 0,05 significance level in the base regression.

Table 7

Sensitivity Results For Trade Variables
(Dependent Variable: Investment Share)

M-Variable		B	SE	t	N	R2	Other Variables	Robust/Fragile
E	High:	0,34	0,08	1,99	30	0,2	STDC	
	Base:	0,18	0,05	3,17	31	0,2		Fragile(1)
	Low:	-0,74	0,1	5,01	30	0,7	STDI,GDC,STDC	
SHIMP	High:	0,25	0,06	1,84	30	0,18	GDC	
	Base:	0,12	0,03	3,86	31	0,18		Fragile(1)
	Low:	-0,59	0,06	6,79	30	0,76	STDI,GDC,STDC	
RER	High:	0,004	0,001	0,36	30	0,48	GDC, STDC,STDI	
	Base:	-0,004	0,001	3,76	31	0,25		Fragile(0)
	Low:	-0,203	0,001	0,04	30	0,44	STDI	

Notes: The base β is estimated coefficient from the regression with the variable of int
(Z-variable). When the dependent variable is the investment share, no I variables are
included. The high β is the estimated coefficient from the regression with the ext
high bound (β+2standard deviations); the low β is the coefficient from the regressio
the extreme high bound. Z-variable definitions: E= Export share, SHIMP= Import share,
RER=Real exchange rate. The other variables are the X -variables included in the base
regression that produce the extreme bounds. The robust/fragile column indicates whether
the variable of interest is robust or fragile. If fragile, the number in paranthesis indicates
that how many additional variables need to be added before the variable is included.The
underlined variables are the minimum additional variables that make the coefficient of
insignificant or change sign.

Table 8
Sensitivity Results For Monetary Variables
(Dependent Variable: Growth rate of Real Per Capita GDP)

M-Variable		B	SE	t	N	R	Other Variables	Robust/Fragile
PI	High:	0,04	0,07	1,53	29	0,56	STDI,STDC,E	
	Base:	-0,14	0,06	2,09	30	0,53		Fragile(0)
	Low:	-0,28	0,07	2,08	30	0,53	E	
STDI	High:	2,82	0,81	1,44	29	0,57	GDC,STDC,E	
	Base:	0,08	0,38	0,22	29	0,5		Fragile*
	Low:	-1,08	0,77	0,6	29	0,56	PI,STDC,E	
GDC	High:	0,23	0,06	1,72	29	0,57	STDC,STDI,E	
	Base:	0,07	0,03	1,94	30	0,52		Fragile(1)
	Low:	-0,06	0,06	0,86	29	0,52	STDI,<u>STDC</u>	
STDC	High:	1,44	0,45	1,19	29	0,57	STDI,GDC,E	
	Base:	0,12	0,26	0,48	29	0,5		Fragile*
	Low:	-0,65	0,4	0,37	29	0,58	PI,STDI,GDC	

Notes: The base β is estimated coefficient from the regression with the variable of in
(Z-variable) and the always included variables (I-variables). The I variables are INV, GPO
and HEC. The high β is the estimated coefficient from the regression with the ext
high bound (β+2standard deviations); the low β is the coefficient from the regr
with the extreme high bound. Z-variable definitions: PI=Inflation rate; STDI=Standard
deviation of rate of inflation; GDC=Growth rate of domestic credit; STDD=Standard
deviation of domestic credit growth. The other variables are the X-variables included in
the base regression that produce the extreme bounds.The robust/fragile column indicates
whether the variable of interest is robust or fragile. If fragile, the column indicates that
how many additional variables need to be added before the variable is insignificant or of
the wrong sign. The underlined variables are the minimum additional variables that make
the coefficient of interest insignificant or change sign.* indicates that variable of interest
is insignificant at 0,05 significancelevel in the base regression.

Table 9
Sensitivity Results For Monetary Variables
(Dependent Variable: Investment Share)

M-Variable		B	SE	t	N	R	Other Variables	Robust/Fragile
PI	High:	0,08	0,01	3,78	30	0,48	STDC,E	
	Base:	0,04	0,007	6,5	31	0,47		Fragile(1)
	Low:	-0,04	0,02	0,03	30	0,63	STDI,<u>STDC</u>,E	
STDI	High:	0,05	0,06	1,24	30	0,49	<u>PI</u>,GDC	
	Base:	-0,12	0,02	4,47	30	0,22		Fragile(1)
	Low:	-0,66	0,07	7,18	30	0,7	GDC,STDC,E	
GDC	High:	0,065	0,01	2,01	30	0,33	STDC,E	
	Base:	0,033	0,006	4,91	31	0,32		Fragile(1)
	Low:	-0,066	0,01	2,49	30	0,7	<u>STDI</u>,STDC,E	
STDC	High:	0,15	0,05	0,76	30	0,2	E	
	Base:	0,09	0,03	2,38	30	0,09		Fragile(1)
	Low:	-0,27	0,04	3,73	30	0,7	<u>STDI</u>,GDC,E	

Notes: The base β is estimated coefficient from the regression with the variable of in
(Z-variable). When the dependent variable is the investment share, no I variables are
included. The high β is the estimated coefficient from the regression with the ex
high bound (β+2standard deviations); the low β is the coefficient from the regr
with the extreme high bound. Z-variable definitions: PI=Inflation rate; STDI=Standard
deviation of rate of inflation; GDC=Growth rate of domestic credit; STDD=Standard
deviation of domestic credit growth.The other variables are the X-variables included in the
base regression that produce the extreme bounds .The robust/fragile column indicates
whether the variable of interest is robust or fragile. If fragile, the number in paranthesis
indicates how many additional variables need to be added before the variable is included.
The underlined variables are the minimum additional variables that make the coefficient
of interest insignificant or change sign.* indicates that variable of interest is insignificant
at 0,05 significance level in the base regression.

Table 10   Share of Investment and Popular Growth Variables

	SHINV	STOTINV	SHPUB	SHPRV
HEC	PS	PS	PS	PS
SHDEF	PS	PS	NS	PS
SHEXPND	PS	PS	NS	PS
E	PS	NI	NI	PS
SHIMP	PS	PS	NI	PS
RER	NS	NS	NI	NS
PI	PS	PS	NI	PS
STDI	NS	NS	PS	NS
GDC	PS	PS	NS*	PS
STDC	PS	PS	NS	PS

Notes: PS= Positive, significant, NS= Negative, significant
PI= Positive, insignificant, NI= Negative, insignificant. HEC=
High school enrollment rate, SHDEF= Share of government
deficit, SHEXPND= Share of government expenditure, E=
Share of exports, SHIMP= Share of imports,PI= Inflation rate,
STDI= Standard deviation of rate of inflation, GDC= Growth
rate of domestic credit,STDC= Standard deviation of domestic
credit growth.* indicates that the variable is significant at 0,10
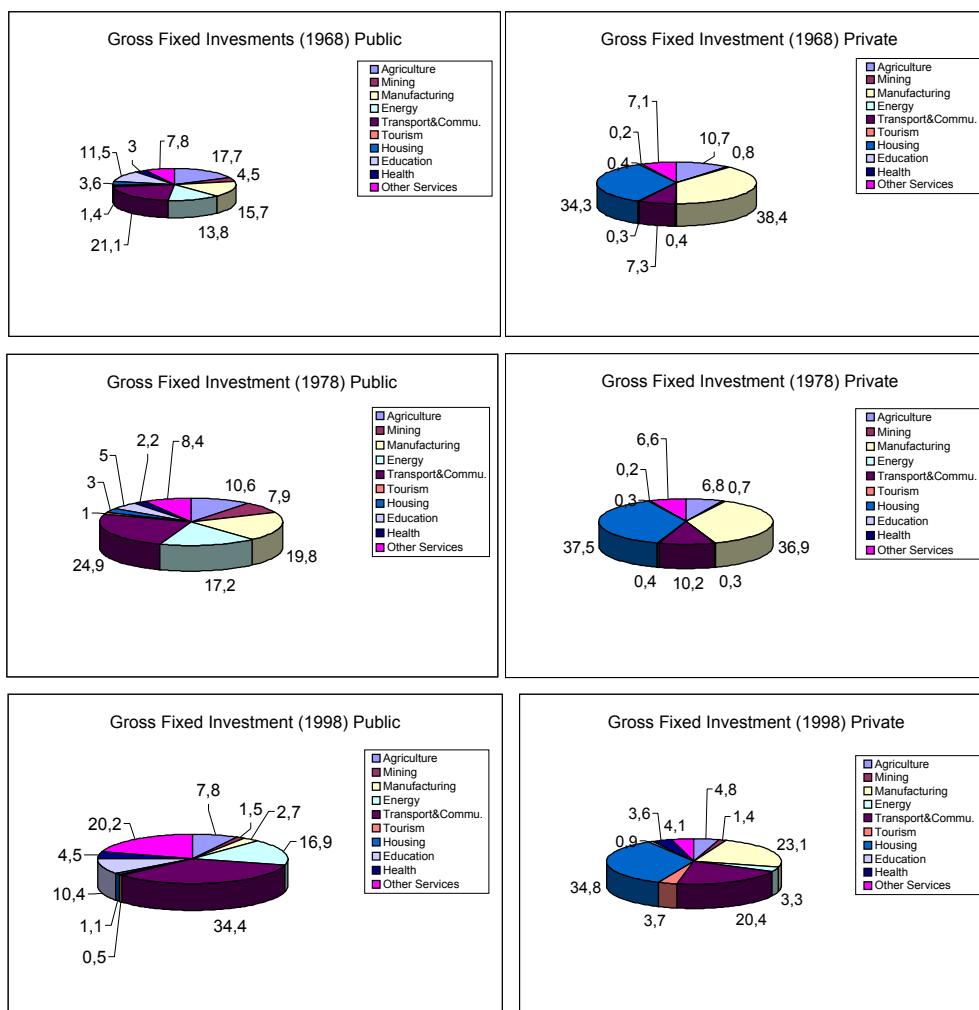significance level.

Figure 1

Gross Fixed Invesments (1968) Public

7,8
3
11,5
3,6
1,4
21,1
13,8
15,7
4,5
17,7

Legend:
- Agriculture
- Mining
- Manufacturing
- Energy
- Transport&Commu.
- Tourism
- Housing
- Education
- Health
- Other Services

Gross Fixed Investment (1968) Private

7,1
0,2
0,4
34,3
0,3
7,3
0,4
38,4
0,8
10,7

Legend:
- Agriculture
- Mining
- Manufacturing
- Energy
- Transport&Commu.
- Tourism
- Housing
- Education
- Health
- Other Services

Gross Fixed Investment (1978) Public

2,2
5
3
1
24,9
17,2
19,8
7,9
10,6
8,4

Legend:
- Agriculture
- Mining
- Manufacturing
- Energy
- Transport&Commu.
- Tourism
- Housing
- Education
- Health
- Other Services

Gross Fixed Investment (1978) Private

6,6
0,2
0,3
37,5
0,4
10,2
0,3
36,9
0,7
6,8

Legend:
- Agriculture
- Mining
- Manufacturing
- Energy
- Transport&Commu.
- Tourism
- Housing
- Education
- Health
- Other Services

Gross Fixed Investment (1998) Public

7,8
20,2
4,5
10,4
1,1
0,5
34,4
16,9
2,7
1,5

Legend:
- Agriculture
- Mining
- Manufacturing
- Energy
- Transport&Commu.
- Tourism
- Housing
- Education
- Health
- Other Services

Gross Fixed Investment (1998) Private

4,8
3,6
4,1
0,9
34,8
3,7
20,4
3,3
23,1
1,4

Legend:
- Agriculture
- Mining
- Manufacturing
- Energy
- Transport&Commu.
- Tourism
- Housing
- Education
- Health
- Other Services

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Source: Main Economic Indicators

Figure 2

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Figure 3

Growth rate of Deposits and Credits in Deposit Banks

— Growth rate of Credits in Deposit Banks   — Growth rate of Deposits in Deposit Banks

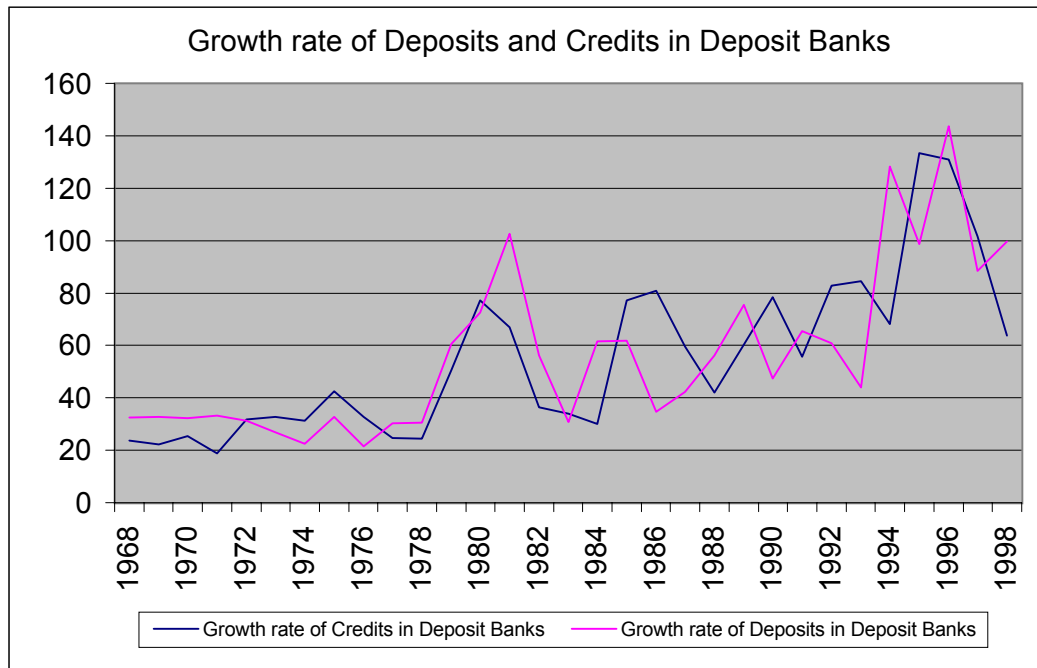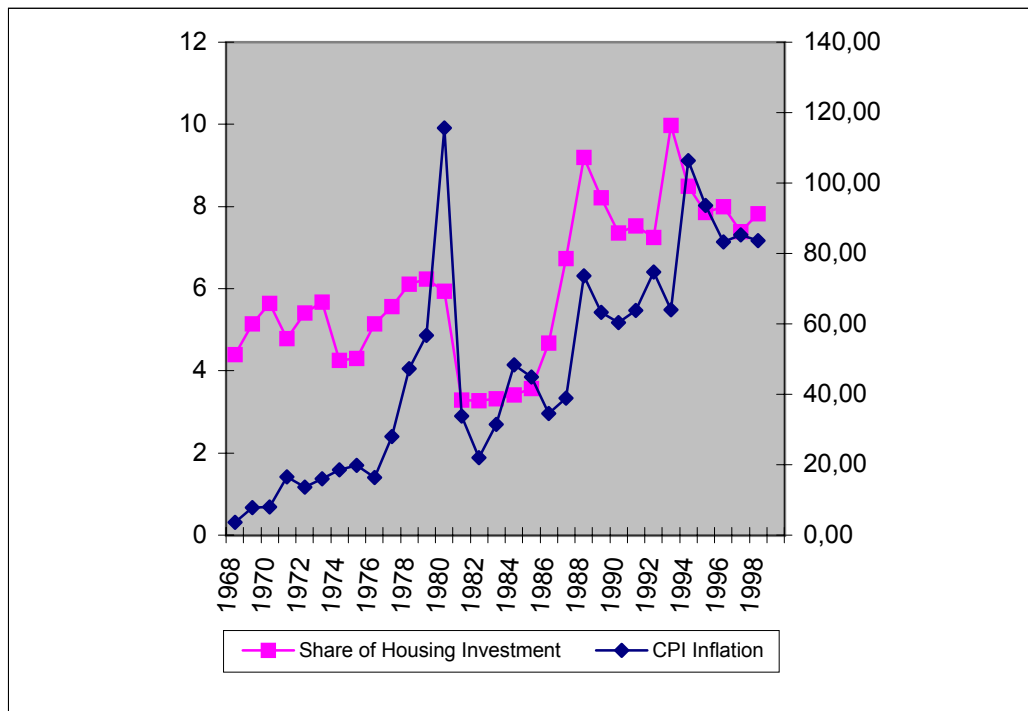Source: CBRT

Figure 4

Source: SPO Main Economic Indicators, CBRT

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