

# Destabilizing Effects of Stabilization Programs

## The Case of Turkish Corporate Sector

144714

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Cenktañ Özyıldırım

Boğaziçi University

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The dissertation of Cenktan Özyıldırım is approved by:

Prof. Dr. Özer Ertuna (Advisor, Committee Chairperson)

Özer Ertuna

Prof. Dr. Metin Balcı (Committee Member)

Metin Balcı

Prof. Dr. Vedat Akgiray (Committee Member)

V. Akgiray

Assoc. Prof. Metin Ercan (Committee Member)

Metin Ercan

Prof. Dr. Cudi Tuncer Gürsoy (Committee Member)  
(Doğuş University)

Cudi Tuncer Gürsoy

July 2004

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## **Abstract**

### **Destabilizing Effects of Stabilization Programs The Case of Turkish Corporate Sector**

By

Cenktañ Özyıldırım

This study aims to investigate the effects of stabilization programs on the financial performance of corporate sector. To figure out how the corporate sector is affected through the stabilization programs, a model, which looks into the disparities between exchange rate, interest rate and inflation created by these programs, is developed by combining the interest rate parity and purchasing power parity. It is illustrated that stabilization programs, which implement nominal anchors to tackle inflation and stabilize the economy, intentionally create a disparity among these factors and disturb the balance defined by the model. In other words, the stabilization programs try to stabilize an economy through a destabilizing mechanism. This thesis describes these disparities, illuminates how they are created by stabilization programs, and examines the role of them in the mechanism that generally leads to failures through these programs.

Next, it is shown that Turkish Stabilization Programs implemented in the last two decades are also based on the disparities and try to use disparities to stabilize the economy. It is demonstrated that the weak TL to reinforce the exports in 1980s, the strong TL and high real interest rates to tackle the inflation in 1990s, and

strong TL and negative real interest rates through the 2000 ERBS program, and high real interest rates and accordingly strong TL in the 2001 Strengthening Turkish Economy Program, are the basis or the outcomes of these programs.

The research question of this study is how these disparities affect the corporate sector. Using a panel data set over the 1994-2003 period and covering 198 industrial companies issued in the ISE, it is shown that these disparities have deteriorating effects on the corporate sector. Specifically, an immediate negative effect of appreciation of domestic currency on the operational profitability and asset turnover of the corporate sector is observed. On the other hand, appreciation of domestic currency has a positive impact on the short-term solvency of the corporate sector. Real interest rates also have a negative impact on the profitability of the corporate sector. In addition, primary budget balance, which is crucial for a stable economy, has a negative impact on the profitability and asset turnover, and can be very destructive for the corporate sector when high primary budget surpluses are targeted.

To summarize, this thesis proposes that a stabilization program should not involve mechanisms that lead to disparities. Ertuna (1999) demonstrates that a nominal anchor, violating the interest rate and purchasing power parities, leads to unsustainable mechanisms and vicious circles, and generally ends with economic crisis. This thesis reemphasizes this issue and also finds that the disparities among interest rates, inflation and exchange rate, have deteriorating effects on the financial figures of the corporate sector, even if they don't end with an economic crisis.

It is also recommended that the corporate sector should be aware of the risks and impacts generated by disparities, take precautions, and hedge their risks, if they can, when they observe a disparity among these factors.



## Kısa Özet

Bu çalışma stabilizasyon programlarının reel sektör üzerindeki etkilerini incelemeyi amaçlamaktadır. Bu amaçla, faiz ve alım gücü paritelerini kullanarak, kurlar, faizler ve enflasyon oranları arasındaki dengesizlikleri göz önüne alan bir model kurulmuştur. Nominal çapa kullanan stabilizasyon programlarının enflasyonu kontrol etmek ve ekonomiyi dengeye oturtmak için bilinçli olarak bu faktörler arasında dengesizlikler yarattığı ve model ile tanımlanan dengeyi bozduğu görülmektedir. Başka bir deyişle bu programlar dengeye, dengesizlik yaratarak ulaşmayı hedeflemektedirler. Bu çalışma bu dengesizlikleri tanımlamakta, onların stabilizasyon programları tarafından nasıl yaratıldığını göstermekte ve onların krizlere neden olan mekanizmalar içindeki rollerini araştırmaktadır.

Bunun yanısıra, Türkiye’de uygulanan stabilizasyon programlarında bu dengesizlikler üzerine kurulu olduğunu ve bu dengesizlikleri kullanarak ekonomiyi dengeye oturtmaya çalıştığını görmekteyiz. Örneğin, 1980’li yıllarda ihracatı arttırmak için uygulanan zayıf TL, 1990’lı yıllarda enflasyonu düşürmek için uygulanan güçlü TL ve yüksek faizler, 2000 Kura dayalı Stabilizasyon Program’ı çerçevesinde aşırı değerli TL ve negatif reel faizler, 2001 Yılı Türkiye’nin Güçlü Ekonomiye Geçiş Programı çerçevesinde yüksek reel faiz ve değerli TL’sinin uygulanan programların temelini oluşturduğunu görmekteyiz.

Bu çalışmanın araştırma konusu bu dengesizliklerin reel sektörü nasıl etkilediğidir. 1994-2003 yılları arasındaki dönemi kapsayan, İMKB’de işlem gören 198 sanayi firmasının bu dönemdeki finansal verilerinin içeren bir panel data kullanılarak yapılan analizde, kurlar, faizler ve enflasyon arasındaki dengesizliklerin reel sektör üzerinde olumsuz etkileri olduğu gösterilmiştir. Örneğin, yerli paranın değer kazanmasının operasyonel karlılık ve varlıkların üretkenliği üzerinde gecikmesiz negatif etkisi olduğu görülmektedir. Buna karşılık yerli paranın değer kaybetmesinin ise firmaların likiditesi üzerinde negatif bir etkisi vardır. Reel faizler ise aynı şekilde, operasyonel karlılık üzerinde negatif bir etki yaratmaktadır. Bunların yanısıra, istikrarlı bir ekonomi için şart olan faiz dışı bütçe dengesinin de, karlılık ve varlıkların üretkenliği üzerinde negatif bir etkisi olduğu, ve yüksek faiz dışı fazla hedeflerinin reel sektör için oldukça yıkıcı olabileceği görülmektedir.

Özet olarak, bu çalışma stabilizasyon programlarının, bu tür dengesizliklere neden olan mekanizmaları içermemesi gerektiğini ileri sürmektedir. Nominal çapalar, faiz ve alım gücü paritlerinin oluşturduğu dengeleri bozarak, sürdürülemez mekanizmalara ve kısır döngülere sebep olmakta ve genelde krizle sonuçlanmaktadır. Bu tez, bu konuyu vurgulamakta ve aynı zamanda kurlar, faizler ve enflasyon arasındaki dengesizliklerin, bir krize neden olmasa bile, reel sektörün finansal performansı üzerinde negatif bir etki yarattığını göstermektedir. Bu çerçevede, reel sektöre de, bu dengesizlikler çerçevesinde oluşan risklerin ve sonuçlarının farkında olmaları, ve bir dengesizlik gözlemlenmesi durumunda mümkün olduğu oranda önlemlerini almaları gerektiği, tavsiye edilmektedir.



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## 1. INTRODUCTION

The ultimate goal of a stabilization program is to keep the economy stable, or in other words, to maintain internal balance and external balance. Internal balance simply can be defined as a growing economy at full-employment level with price stability. External balance requires an acceptable trade deficit, so that the economy will be able to pay back its foreign debts, or an acceptable trade surplus that the other economies will be able to pay back their debts to that country.

It has been observed that many emerging economies, including Turkey, haven't been successful to provide these two basic balances. Various different stabilization programs have been implemented, but generally they couldn't improve one without sacrificing the other and have led to economic crisis. Macroeconomic problems of emerging markets, their stabilization policies and the economic crises following these programs have attained a growing attention among economists and a growing number studies have analyzed these issues.

Turkey has become one of the most popular cases to analyze, because not only it applied almost every type of stabilization programs, but also almost all of them have ended with failure. The most recent and notorious example was the 2000 Stabilization Program. Turkish Government implemented an exchange rate based stabilization program at the beginning of 2000. After slightly more than one year,

it withdrew the program and the Turkish Economy went into a severe crisis whose effects lasted more than two years. A new stabilization program, which is based on floating exchange rate regime, has been implemented right after the crisis.

The failure of Turkish economy to maintain stability has been subject to a number of studies. Ertuna (1999) claims that a stabilization program based on a nominal anchor, such as Turkish exchange rate based stabilization program in 2000, is unsustainable, since it would create disparities macroeconomic factors; exchange rate, inflation rate, wages, and interest rate. A stabilization program, which restricts one of these, while letting the others float, would lead to disparities between the values of these factors. Moreover, any disparity between these factors results in an unsustainable mechanism, which is triggered and exaggerated by short-term capital flows. Based on the Ertuna's model, Muslumov et. al. (2003) investigates exchange rate regimes and the effects of exchange rate regimes on the economy, specifically on the financial and real sector. In addition, Ozyildirim and Müslümov (2003) analyze the stabilization programs implemented between 1980 and 2003, and state that, even though Turkey has implemented different stabilization programs after each failure, there are three common features of these programs, which are also the reasons behind the failures:

1. *“Disparities between exchange rates, interest rates, and inflation, which generate illusively stunning days with unsustainable growth rates, which ends with deeper instabilities in a boom-bust pattern.*
2. *Inability to maintain strong financial and fiscal institutions*

3. *Credibility damaging issues such as, crony capitalism, lack of transparency, populist policies by politicians and etc.”*

It concludes that, no stabilization program will be successful, without resolving these problems. Following these studies, this study investigates the effects of the stabilization programs on the corporate sector. The aim is to observe the less-discussed micro effects of the stabilization programs and the disparities they create. In other words, it questions how these disparities affect the financial performance of the corporate sector, and if they are, to what extent they affect. If the stabilization programs, or disparities have serious negative effects on the corporate sector, and the micro level cost is higher than the benefits, if there exist any, it would be unreasonable to implement these programs.

A panel data analysis is used to observe the effects of these disparities on the financial performance of Turkish Corporate Sector. To observe the effects from different views, four financial ratios, namely, return on asset, current ratio, leverage ratio, and asset turnover ratio, are used as dependent variables in the analysis. The real interest rate, real exchange rate, inflation, GNP per capita, and primary budget balance to GNP are used as explanatory variables. It is shown that deviations of these factors from their fair values would deteriorate the financial figures with their immediate and lagged effects.

The remainder of the study is organized as follows: In the next section, exchange rate stabilization program, money based stabilization program and inflation targeting, which has been very popular recently, are discussed. Next, the currency crisis models are described, including the disparities model of Ertuna (1999).



Using modified interest rate and purchasing power parities, Section 3 derives an equation, which represents the equilibrium between the exchange rate, interest rate and inflation. It has been demonstrated that the disruption of this equilibrium by a stabilization program results in an unsustainable mechanism. The stabilization programs in The Turkish Economy and the disparities between the macroeconomic factors through the period between 1980 and 2003 are analyzed in the fourth section. The fifth section describes the data and summarizes the methodology, namely panel data analysis. In Section 6, the empirical findings are summarized. The last section concludes the study.



## 2. LITERATURE REVIEW

The first part of this section reviews the stabilization programs. It is illustrated that all of these programs have some deficiencies, and, more important, lead to disparities between inflation, exchange rate and interest rate. Referring to Mishkin (2003), it is also stated that no stabilization program can be successful without existence of strong fiscal and financial institutions in an economy. The second part discusses the currency crisis models, including the disparities model proposed by Ertuna (1999) and extended by Ertuna (2001).

### 2.1. Stabilization Programs

Inflation has been one of the most important economic issues for especially emerging countries. Most of these countries, including Turkey, suffer a high (compared to developed countries), stable and persistent inflation instead of a sudden and extremely high inflation. This kind of inflation is defined as chronic inflation by Pazos (1972). Agents in a chronic inflation economy, generally “*adopt themselves by creating various indexation mechanisms in financial, labor and goods markets which, by reducing the costs of inflation, tend to perpetuate the inflationary process*”(Rebelo and Vegh 1995). In other words, the indexation

mechanism which creates an inflationary inertia is one of the main sources of chronic inflation. Philips equation, which is given below, states that there is a trade-off between unemployment rate and inflation. According to Philips curve, to decrease the inflation, one should endure an increase in unemployment rate. However, to be able to decrease inflationary expectations, the program should be persuasive and credible. Lack of credibility is accused of failure of ERBS programs in a number of previous researches. Philips equation is,

$$\pi_t = \pi_t^e - B(u - u_n) + v \quad (2.1)$$

where  $\pi_t$  is the inflation rate at time  $t$ ,  $\pi_t^e$  is the expected inflation rate,  $u$  is the unemployment rate and  $u_n$  is the natural unemployment rate and  $v$  is the supply shock.  $\pi_t^e$  represents the inflation inertia. If unemployment rate is lower than the natural unemployment rate as a result of an excess demand in the economy, the second term in the equation increases the inflation. This kind of inflation is defined as “demand-pull inflation”. A supply shock, denoted as  $v$  in the equation, represents a rise in production factor costs such as a rise in wages, increase in oil price or interest rates. Such changes will affect the supply side of the economy resulting in an increase in the inflation which is called as “cost-push inflation”.

Disinflation programs generally consist of one or more nominal anchors to tackle the inflation. The most widely used nominal anchors in disinflation programs are “the exchange rate” and “the money supply (money aggregate)”. There exist other nominal anchors, such as price and wage controls, which are generally used as

supplementary nominal anchors beside the main nominal anchor, which is either the exchange rate or the monetary aggregate. This kind of programs which supplement the main nominal anchor with price and wage controls are called as orthodox programs. Stabilization programs that use only one nominal anchor are called as heterodox programs.

### **2.1.1. Exchange Based Stabilization Programs**

Stabilization programs, in which policymakers set pre-announced limits on nominal exchange rate movements to create a nominal anchor are called “Exchange Rate Based Stabilization Programs” in the literature. In these programs, different exchange rate regimes can be applied, such as currency board in Argentina 1991 and currency peg in Turkey 1999. The aim is to tackle the inflationary expectations, which are believed to be the main stimulus especially in chronic high inflation circumstances. A decrease in inflationary expectations would shift the Philips curve downward and therefore inflation can be decreased without an inflation and unemployment rate trade-off.

Previous economic literature proposes many reasons to choose ERBS Programs, instead of Money-Based Stabilization Programs. The key argument in favor of selecting ERBS programs is that ERBS programs induce greater financial discipline. Since ERBS programs render the foreign reserve holdings under risk, policymakers are expected to maintain a strong financial discipline. If the agents in the economy observe bad signals, then they would quickly substitute their local

money with foreign exchanges. Another point is that an observable anchor such as exchange rate would be more effective to decrease the inflationary expectations. Hamann (1999) analyzes the stylized facts of ERBS by comparing pre and post-stabilization variables. The financial discipline argument is discussed in terms of the behavior of inflation, money growth and central government balance before and after the stabilization in 41 different programs. He states that there is no statistically significant difference between ERBS and NON-ERBS programs in terms of these variables' behaviors. Therefore, he concludes that *“there is no evidence that fiscal discipline is enhanced by the adaptation of an exchange rate anchor”*.

Next, since ERBS puts a price ceiling on “tradable goods” as a result of the law of one price, theoretically it is easier to bring down the inflation rate. In the following section, the effect of ERBS on consumption and price level of tradable and nontradable goods will be studied in detail.

Previous experiences in various countries show that even well designed previously successful programs may *“set in motion a dynamic process that can lead to a financial crisis and the program's collapse”* (Sobolev, 2000). This notorious dynamic process, including a boom-bust cycle, real exchange appreciation, worsening trade balances and etc., has been regularly observed significantly in almost all ERBS programs and identified by a number of articles as “ERBS Syndrome”. Although Hamann (1999) and some other economists disagree, many economists, including Kiguel and Liviatan (1992), Reinhart and Vegh (1995), Rebelo and Vegh (1995), Mendoza and Uribe (1996 and 1999), have documented

a set of empirical regularities that characterize “ERBS Syndrome”. These regularities are summarized in the following section.

### **ERBS Syndrome - Stylized Facts of ERBS**

The major regularities that have characterized the ERBS programs in chronic inflation economies include:

1. **Slow Convergence of the Inflation Rate to the Devaluation Rate:** As mentioned above, one of the reasons why ERBS is preferred is its immediate effect on inflation tradable goods. It is expected that, as a result of a decrease in the price of tradable goods, overall inflation would quickly converge to the pre-announced rate of devaluation. Previous studies show that although the inflation rate decreases substantially just after the ERBS program is implemented, accompanied by a relative rise in the price non-tradable goods, inflation rate stays significantly above devaluation. Actually, in most of the programs, inflation converges slowly leading to exchange rate appreciation during the program, or never converges fully. Analyzing the previous experiences, Calvo and Vegh (1994) states that heterodox programs are absolutely superior to the orthodox programs according to the appreciation of domestic currency. However, although it is less compared to orthodox programs, real appreciation is observed even in heterodox programs.

Hamann (1999) analyzes this issue and finds in his analysis that “*real exchange rates tend to appreciate before and after stabilization when the exchange rate is used as an anchor, but tend to depreciate before and after stabilization*”. Hamann (1999) states that depreciation starts two years before the implementation of the ERBS. Two possible explanations are given: (1) policymakers may have been using exchange rate anchor without announcing publicly, or (2) a tight monetary policy applied before the implementation of the ERBS may have resulted in exchange rate appreciation. Shortly, slow convergence of inflation rate to the devaluation rate is doubtlessly an empirically observed stylized fact of ERBS.

2. An Initial Expansion in Economic Activities Followed by a Later Slowdown (Boom-Bust Business Cycle): Contrary to traditional Philips Curve type relations, there is an initial expansion in economic activity relative to trend while inflation decreases in ERBS. Accompanied by a private consumption boom, output and investment increase in the first stage of ERBS programs. This consumption boom generally is led by an increase in consumption of durable goods. However, this initial boom is generally followed by a recession even in successful programs, such as Israel 1985. This trend is called “Boom-Bust Cycle” in the literature.
3. Although Hamann (1999) states that there is no evidence for Boom-Bust Cycle and rejects the issue, a number of previous articles document the existence of the cycle in many stabilization programs. Using data of 7 high inflation countries, Reinhart and Vegh (1995) show that during the early

phase of the ERBS programs, which is defined as the following two years after the program is implemented, GDP growth is 2.4 % higher and consumption growth is about 5 % higher than their historical average. However, in the following stages of the ERBS programs, GNP growth is 5.4% lower than historical average. Bufman and Leiderman (1995) show that even Israel 1985 ERBS program enters in a post-boom recession. Israel economy presents a high initial growth (5% in 1986-1987) compared to the trend (less than 2% on average between 1981-1985). However, in 1988-1989, GDP growth decreases to 2% on average. Moreover, tradable goods sector output decreases by %1, which is led by a 2.4% decrease in industrial sector production throughout this period.

Another interesting point in Bufman and Leiderman (1995) is that output in the non-tradable sector grows at 7.5%, whereas the output in tradable sector growth remains unchanged throughout the Israel 1985 ERBS program. As stated above, in 1988-1989, tradable goods sector even declines while economy slows down. Similar results are seen in Uruguay 1979 and Mexico 1982 stabilization programs. Rebelo and Vegh (1995) state that “*although not well documented, it also appears that output in the non-tradable sector typically expanded by more than output in the tradable sector, which has even fallen relative to trend*”.

Shortly, previous studies show that in the first stage of the ERBS programs, the increase in private consumption, which is mainly led by tradable goods consumption, augments the GDP growth. However, output in tradable



goods sector generally grows less than the overall growth. This results in an excess tradable good consumption which is satisfied by imported goods. Finally, the boom period is followed by a recession period even in successful ERBS programs.

4. The Current Account and the Trade Balance Deterioration: Another well-documented fact is the trade balance and current account deterioration in ERBS programs. On account of the real appreciation of domestic currency, in most of the ERBS programs, the external accounts deteriorate enormously. Throughout the ERBS, a large increase in imports of tradable goods and capital goods as a result of increase investment can't be covered by the exports, leading to a serious deficit. If there is a capital inflow in terms of foreign investment (mostly indirect investment) and aid large enough to balance the trade deficit, there won't be a current account deficit. A good example for such a phenomenon is Israel 1985. Israel's stabilization program was supported by foreign aid, so that it had a current account surplus of 5% of GDP in the first two years. Another important point is that although NIS seriously appreciated against USD through the program, it depreciated against non-USD currencies because of the changing cross-currency rates. Therefore, the percentage of exports to European and Asian countries increased, helping the economy to cover the trade deficit. Another reason stated in the literature, behind the Israel 1985 program's success is the foreign aid and large credits provided by IMF and USA. Similarly, considering that the European Union is one of the most

important markets for Turkey, TL's enormous appreciation against EURO compared to USD is one of the main reasons behind the failure of 2000 Stabilization program.

Shortly, appreciation of the domestic currency results in increase in the consumption and imports of tradable goods. This leads to a current account deficit, which is generally financed by capital inflows. As a consequence, economy becomes dependent on foreign capital flows and is rendered defenseless to a reversal in capital flows. This process shortly defines how an ERBS may turn out to be an economic crisis.

5. An Ambiguous Response of Real Interest Rates: Calvo and Vegh (1994) and Rebelo and Vegh (1995) claim that real interest rates in ERBS programs present different behaviors according to the type of the program. It is stated that real interest rates fall in orthodox programs, whereas they appear to increase in heterodox programs.

Agenor (1998) presents a model to explain the ambiguous response of real interest rates. The model is based on imperfect world capital markets in which the domestic nominal interest rate equals to marginal cost of foreign borrowing plus a risk premium. Agenor (1998) shows that in ERBS programs independent of whether they are credible or not, an increase in domestic interest rates exists. Therefore it is stated that *“a rise in real interest rates doesn't necessarily signal a lack of confidence in the government's policy decisions, and may instead be the outcome of an optimal portfolio reallocation by forward looking agents.”* The ambiguous

behavior of interest rates afterwards a sharp increase is explained by the degree of public confidence in fiscal policies announced as supplementary to ERBS. Therefore it is concluded that instead of lack of credibility of exchange rate anchor, the lack of credibility of fiscal policy stance announced by the policymakers is the result behind the real interest rate increase.

6. A remonetization of the economy: Previous researches state that a remonetization of the economy in terms of an increase in the ratio of M1 to GDP is observed in ERBS. Sobolev (2000) claims that remonetization is accompanied by "*a strong increase in private sector credit even when measured relative to real economic activity*". This increase in money supply may be explained by the increasing capital inflow, assuming that the central bank doesn't sterilize the capital inflows.
7. A Rise in the Relative Price of Nontradable Goods: While analyzing ERBS programs, previous studies generally use models based on the assumption that two goods are produced in the domestic economy, namely tradable goods and nontradable goods. Tradable goods are defined as homogenous and substitutable goods, which can be imported and exported. Along with, it is assumed that the law of one price holds. Therefore, the price of domestic and foreign tradable goods should be equal. Nontradable goods are defined as "*items (usually services) for which inter-regional price differentials can not be eliminated by arbitrage*" (Copeland, 1994).

Beside service sector such as hairdressing and medical services, some goods like houses are categorized as nontradable goods.

It has been observed in many studies that, in ERBS programs, relative prices of non-tradable goods increase substantially. This is not surprising indeed, considering that ERBS implies a ceiling on the price of tradable goods according to the law of one price. An increase in inside money, which is mentioned above, would rise the demand for both tradable and non-tradable goods. An increase in the demand would drive the prices of non-tradable goods, resulting in demand-push inflation.

8. An Increase in Real Wages Measured in Units of Tradable Goods: Finally, the last well-documented fact in ERBS programs is the increase in real wages. Even in heterodox programs in which wages are also used as nominal anchor, sharp increases in real wages are observed. This phenomenon is directly a result of the increasing demand which is explained in the previous paragraph. Bufman and Leiderman (1995) state that in Israel 1995 stabilization program, as a result of wage controls, real wages decreased at 9% in 1995 which was followed by 7.8%, 7.9% and 6% increase in real wages in 1986, 1987 and 1988 accordingly due to the heating up of the economy.

## **Theoretical Explanations of the Stylized Facts of ERBS Programs**

This part summarizes the theoretical explanations for stylized facts of ERBS.

There are four main approaches stated in the literature to explain these empirical regularities.

### *Sticky Prices or Inflation Inertia Hypothesis*

The argument of sticky prices, proposed by Rodriguez (1982) and Dornbusch (1982) is the oldest theoretical explanation of the stylized facts of ERBS programs. This hypothesis is simply based on inflation inertia. According to this theory, fixing the exchange rate reduces the nominal interest rate as a result of uncovered interest parity (domestic nominal interest rate equals the foreign nominal interest rate plus devaluation expectations). On the other hand, in chronic inflation economies, agents adapt themselves using backward indexation methods. Therefore, inflation doesn't decrease as fast as nominal interest rate, and real interest rate decreases substantially. This delay in real interest rates causes an aggregate demand boom in the first stage of the program. Since the real interest rate declines, people tend to spend more money. This consumption boom combined with a currency peg results in exchange rate appreciation. This appreciation causes output to decline in the second stage of the program, which completes the Boom-Bust Business Cycle.

The main criticism about this hypothesis is based on the increase in real interest rate in the heterodox ERBS programs. Consequently, the basis of the theory is weakened since it explains the consumption boom by the decreasing real interest rates. Besides, as Sobolev (1999) states, “*backward-looking contracts may themselves only persist when the disinflation lacks credibility*”. The next section analyzes the lack of credibility issue.

#### *Lack of Credibility (Temporariness) Hypothesis*

This hypothesis, pioneered by Calvo (1986) and improved mainly by Calvo and Vegh (1993) and Reinhart and Vegh (1995), depends on the lack of credibility of the ERBS programs. According to this hypothesis, stabilization programs are not fully credible at the beginning of the program. Economic agents expect the disinflation program to be withdrawn in the future. Unsuccessful previous experiences and high inflation are presented as natural causes of this issue. High differential between the domestic and international interest rates throughout a program is shown as a basic evidence of lack of credibility of the program.

This hypothesis assumes sticky prices modeled with a forward-looking staggered prices technology (Calvo and Vegh 1995). Since the prices are indexed to future expectations, implementation of a fully credible ERBS program in a steady state economy would bring about an immediate and sharp decrease in inflation at a new steady-state level without a trade-off between output and inflation. Therefore, this

hypothesis states that there won't be a boom-bust cycle if the program is fully credible.

Calvo and Vegh (1993) defines effective spot price of consumption of tradable goods as "*sum of the market price (equal to unity) and the opportunity cost of monetary balances held per unit of traded goods consumed*". As the nominal interest rate decreases in an ERBS program under perfect capital mobility assumption, the effective price of tradable goods declines in conjunction with the decrease in the opportunity cost of holding money. Therefore, in an incredible ERBS program, agents, doubting the continuance of the program, would increase their consumption because they expect that effective price of tradable goods will increase after the withdrawal of the program. In other words, agents substitute present for future consumption (inter-generational substitution) generating a rise in aggregate demand. This demand rise is followed by exchange rate appreciation, output boom and current account deficit.

Calvo and Vegh (1993) state that as the real exchange rate appreciates in such an over-heated economy, increasing the relative price of home goods, aggregate demand for home goods start to decline. This brings about a decrease in the production of home goods accompanied by a fall in the consumption of traded goods. Eventually, temporariness hypothesis explains the boom-bust cycle in successful and unsuccessful programs before the collapse of the program.

Reinhart and Vegh (1995), analyzing the power of this hypothesis, concludes that it is inadequate in explaining the empirical regularities in some of the programs, in which inter-temporal elasticity of consumption is very low so that very sharp

declines in nominal interest rates (larger than the observed values) are required to generate consumption booms.

### *Fiscal Policy Hypothesis*

According to this hypothesis, first proposed by Helpman and Razin (1987), the stylized facts of ERBS programs are set in motion by wealth effects generated by changes in fiscal position. This hypothesis is based on a model where economic agents have finite horizons and therefore Ricardian equivalence doesn't hold.

Ricardian equivalence states that given unchanged government activity, a reduction in taxes today implies an increase in taxes of equal present value in the future. Therefore, a decrease in taxes doesn't affect economic activity, because the present value of total taxes doesn't change. Helpman and Razin (1987) assumes that economic agents have finite horizons, therefore instead of them; next generations will be affected from the increasing taxes in the future following a decrease in taxes today. Therefore, using exchange rate as a nominal anchor reduces inflation tax and provides the generation currently alive with a capital gain which will be compensated by the future generations and results in an intergenerational redistribution of wealth. This increase in wealth of current generation results in higher consumption, a real exchange rate appreciation and deterioration of the current account.

Rebelo (1997) proposes a different scenario. A fiscal adjustment in conjunction with ERBS decreases the future financial needs of the government and present



value of expected future tax collection, creating a positive wealth effect. This wealth effect brings about an economic boom, in spite of increasing tax rates in the short run, real exchange rate appreciation and deterioration of current account.

However, as it was argued before, many researchers including Hamman (1999) doubt the generalized concept about the improvement of fiscal discipline in ERBS. Tornell and Velasco (1995) believe that ERBS programs do not provide more fiscal discipline, contrary to the conservative understanding. Therefore, this hypothesis is seriously criticized by previous studies.

#### *Supply-Side Effect Hypothesis*

In this hypothesis, Roldos (1995) argues that a permanent and credible stabilization program, reducing the inflation rate, increases the return on domestic assets. This brings about an increase in the consumption and capital stock in the long run. In the short run, higher consumption and capital stock accumulation (investment) in the tradables sector, result in exchange rate appreciation, current account deficit and an increase in non-tradable goods output. Since domestic production and consumption of non-tradable goods are equal and labor supply is constant in the short-run, to satisfy the increasing demand, there will be a labor flow from tradable goods sector to non-tradable goods sector. According to this model, in the second stage, the increase in the capital stock draws labor to the tradables sector, which raises real wages and further increases the real exchange rate appreciation. Subsequently, the increase in the tradable goods output will

lower the current account deficit in spite of the exchange rate appreciation and the economy reach equilibrium.

However, this model doesn't predict a recession following a boom-period for credible programs and therefore doesn't explain boom-bust cycle in ERBS programs. Agenor and Pizzati (1998) analyze the role of supply side factors in a model which assumes imperfect world capital markets. Therefore interest rates are determined by the equilibrium condition of the domestic money market instead of uncovered interest parity. This model predicts that a temporary reduction in the devaluation rate brings about a boom-bust cycle accompanied by current deficit as suggested by the evidence. One self-criticism for this study is that since it models one-good economy only, it can't explain the real exchange rate appreciation.

#### *An Alternative Mechanism with Imperfect Markets*

Previous hypothesis discussed above mainly depend on classical approach in which markets are complete and perfect. However, it is a well-known fact that especially emerging markets are not perfect. Sobolev (2000) discusses a model *“characterized by imperfections such as incomplete markets and externality in the lending process, an initial increase in the supply of loanable funds resulting from the remonetization of the economy in the wake of disinflation can translate into a rapid expansion of bank credit financed by short-term capital inflows”*.

In the model, banks are the only intermediary between household savings and credit demand of non-financial firms in an incomplete economy where equity and

bond markets are insignificant. With such a special role in the economy, banks have serious problems in evaluating the credibility of the borrowers because of the insufficient legal framework and accounting standards. Therefore, liquidity is major factor analyzed to evaluate the credibility of a borrower. The second imperfection assumed by Sobolev (2000) is that source of liquidity is not observable and when more credit is available, it is easier for borrowers to remain liquid. Therefore, without taking the account of impact of other's banks lendings, banks provide excessive amount of loans. In such a financial environment, decreasing devaluation rate increases the demand for the domestic monetary assets which brings about remonetization in the economy and increasing supply loanable funds. Consequently, bank credits rises enormously because of the reason stated above. High bank lending and remonetization of the economy increases the investment, output and consumption in the economy as suggested by the empirical evidences. The excess demand in non-tradable goods increases the price of non-tradables, resulting in real exchange rate appreciation. Since the increase in demand to non-tradable goods should be supplied, the labor used to produce non-tradables rises. Since the total labor supply increase in the short-run is not sufficient to meet the increasing demand, a shift of labor from traded goods sector to nontradable goods sector takes place. This shift of labor decreases the production of labor. Therefore the excess demand to tradable goods creates a trade deficit which is financed by capital inflows through banking system.

A self-criticism for this study by the author is its inability to explain the recession following the boom in the economy. This model assumes that banks borrow

abroad to finance the excessive credit demand and foreign creditors provide loans as soon as banks were able to pay back in the previous period. An introduction of risk-averse foreign creditor assumption would provide an explanation for the boom-bust cycle.

### **2.1.2. Money-Based Stabilization**

The less popular alternative nominal anchor choice is the money aggregate. These programs, which put a limit on the growth rate of money supply, are called as “Money-Based Stabilization Programs (MBSP)” in the literature. Analyzing the outcomes of five major MBS programs, Calvo and Vegh (1994) lists the stylized facts of MBS;

1. The slow convergence of inflation to the rate of monetary growth: It is observed that although the inflation rate decreases faster compared to ERBS, it shows some persistence, which may be explained by sticky prices. This can be explained by the weak relationship between the inflation and monetary aggregate.
2. An initial contraction in economic activity: Implementation of the monetary anchor reduces inflation instantly and the nominal interest rate, which would lead to an excess demand for real money balances. The excess demand over the targeted level of supply results in a liquidity crunch, and an increase in real interest rates and appreciation of domestic currency. To maintain the equilibrium in the money market, since the

money supply is given and the prices are assumed to be sticky, a downturn in the demand and consumption is observed, which is brought by surging real interest rates (which would curb today's demand and consumption for domestic goods) and appreciation of the domestic currency (which would decrease the demand for domestic goods compared to foreign goods).

3. Real appreciation of the domestic currency: A significant appreciation of the domestic currency is observed in all five programs. This is explained by the excess real money demand right after the implementation of the program.
4. Ambiguous response in the trade balance and the current account: Contrary to ERBS, no significant deterioration in trade balance is observed in these programs, although the domestic currency is appreciated. This is not surprising, since there is a recession in the economy.
5. Initial increase in the domestic real interest rate: The real interest rates surge enormously after the implementation of the MBS in all of the programs. This is explained by the excess real money demand right after the implementation of the program.

The main difference between MBS and ERBS is the consequent business cycles. As discussed in the previous section, ERBS leads to a boom-bust business cycle, an initial economic expansion followed by a recession as the program proceeds. On the other hand, MBS results in an initial contraction and a recovery in the second stage of the program. This well-documented phenomenon is called as "recession-now-versus-recession-later" in the literature (Calvo and Vegh, 1999).

Gould (1999) states that the structure of the economy is the determinant of the appropriate nominal anchor. An economy, with poor initial conditions, such as lack of sufficient international reserves and credibility, should prefer MBS rather than ERBS. In other words, ERBS is preferred in favorable economics conditions, whereas MBS is more appropriate if the economy isn't strong enough. Castro and Veiga (2002) illustrates that politicians would prefer ERBS before an election, without caring too much about the economic conditions, since it leads to an immediate expansion.

Mishkin (1999) states that it is not only "recession-now-recession-later" issue to decide. Some huge economies, such as USA, or European Union, can't peg their currencies to another currency. Therefore, they have to pick one of the monetary policy regimes. What's more, MBS enables the central bank to respond to output fluctuations. Besides, like ERBS, MBS is easily observable and can give immediate signals to economic agents, which increases the credibility of the program.

The crucial deficiency of MBS is its dependence on the relationship between the monetary aggregate and inflation. However, this relation can be weak, if instable velocity exists. If so, holding the monetary aggregate tight wouldn't tackle the inflation as expected. The lack of this relation is shown as one of the major problems of MBS in USA, Canada and England.

Notwithstanding these issues, MBS has been successful in Germany and Switzerland, and the success of these has attained enormous attention among monetary economists. The basic difference of the MBS programs in these

countries is that it allows short-term deviations from the monetary target and provides some discretion to the central bank. The other point is the transparency and communication of the strategies, long-term plans, and explanations of deviations from the target. As it will be clearer in the following section, the MBS in Germany and Swiss is very close to inflation targeting (Mishkin, 1999).

### **2.1.3. Inflation Targeting**

As a result of the failures and ineffectiveness of ERBS and MBS to stabilize the economy and to tackle inflation, policy makers have started to look for a new policy. This led to a new approach, which was first implemented in New Zealand in 1990. This new policy, namely inflation targeting, has attained growing attention among central banks and widely implemented especially by emerging economies, which suffered a currency crises and just had to let its currency float. Each experience has provided a better insight of the design and implementation of inflation targeting, and it has evolved continuously since the beginning of 1990s. Without doubt, it has also attained growing attention among economists through this period. The findings are rather mixed. While some studies have found it very successful, others have criticized it seriously. What is unmistakable is that, although it is too early to reach a strict conclusion, it is not flawless especially to be implemented in emerging economies.

Inflation targeting is a monetary policy framework, in which central bank is committed to price stability and sets an inflation target. Through the program,

central bank makes predictions for the future inflation rate, and reacts to expected discrepancies from the targeted level. If the forecasted inflation rate is higher than the targeted level, then central bank implements a contractionary policy by using appropriate monetary instruments, such as short-term interest rates. In other words, central bank is restricted to follow its priority, price stability, and can't have other sub-objectives that may contradict with inflation target. On the other hand, it is free to use any monetary tool to reach its target, since there aren't any strict policy rules or nominal anchors. This phenomenon is known as "constrained discretion" (Mishkin, 1999).

Svensson (1999) discusses the transmission mechanism, which forms the basis of the inflation targeting. In a closed economy, monetary policy has two channels to effect inflation. The first one, aggregate demand channel, works through the lagged effect of the monetary policy on the aggregate demand. A change in real interest rate due to the monetary policy would have a retarded effect on aggregate demand. Then, the aggregate demand would effect inflation with a lag. The second channel, expectations channel, works through the impact of implementation of monetary policy on wages and prices. This would also lead to a lagged impact on the inflation. On the other hand, in an open economy, the changes in exchange rate due to monetary policy would effect inflation through other channels. A change in real exchange rate due to the interest rate parity condition, would effect the inflation through two different channels. First, the change in real exchange rate will affect the demand for both domestic and foreign goods. Therefore, real exchange rate change would contribute to aggregate demand channel. Second,



there will be a direct impact since the price of imported goods is dependent on the exchange rate. Without doubt, this would be observed without a lag. Mishkin (1999) states that within such a transmission mechanism, the money supply would have a little effect. Therefore, it is concluded that money-growth targets have little power to tackle inflation, and the basis of a stabilization policy should be short-term interest rate.

Mishkin (2000) states that inflation targeting comprises five crucial elements:

1. *"The public announcement of medium-term numerical targets for inflation*
2. *An institutional commitment to price stability as the main goal of monetary policy, to which other goals are subordinated*
3. *An information-inclusive strategy in which many variables, and not just monetary aggregates or the exchange rate, are used for deciding the setting of policy instruments*
4. *Increased transparency of monetary-policy strategy through communication with the public and markets about plans, goals and decision of monetary authorities*
5. *Increased accountability of the central bank for achieving its inflation objectives"*

Mishkin (2000) emphasizes that inflation targeting is not just a public declaration of future inflation targets. It requires independence of central bank, so that it is not exposed to political pressures which may force the central bank to ignore its primary purpose, and transparency monetary-policy strategy, reinforcing the

credibility of the program by informing the economic agents about the developments, the strategies, and the reasons and remedies of deviations from the target. Mishkin and Hebbel (2001) state that many so-called inflation targeters don't meet at least one of the requirements above.

The third feature of inflation targeting, policy instrument independence, enables the central bank to evaluate many variables, such as term structure of interest rate, labor market and credit market, and to react without any restraints. This provides crucial advantages compared to stabilization programs, based on nominal anchors. Compared to ERBS, inflation targeting allows central bank to respond to economical shocks, and relieves the vulnerability of the economy to external shocks. On the other hand, unlike MBS, it is not only based on the relationship between money aggregate and inflation, instead it facilitates all available information to set the stabilization strategy.

Eroğlu (2004) summarizes the critics of inflation targeting documented in the literature. First of all, as Mishkin (1999) states, inflation targeting leads to instability in economic growth. Moreover, Fraga et. al. (2003) show that volatility of inflation targeter emerging economies have higher output volatilities than the developed economies. Second, the lagged effects of monetary policy instruments on the inflation make hard to determine and control the policy, and weakens the credibility of the program since the agents can't observe the signals immediately. As the length of the lag of the relation between the monetary policy and inflation extends, the agents should be more patient to see the effects of stabilization. The third major deficiency is the inability of the inflation targeting to prevent "fiscal

dominance". An irresponsible fiscal policy, which results in large fiscal deficits and increasing public debt, may offset, if not dominate, the stabilizing effects of monetary policies implemented as a part of the inflation targeting. Even if the independence of the central bank is maintained, since the fiscal policy is determined by the government, the lack of contribution of the government may lead to a conflict between fiscal and monetary policies. Therefore, the government should be involved in the inflation targeting plan, not only to achieve necessary reforms in its fiscal system, but also to adjust government controlled prices according to the inflation target.

Next, defining the monetary transmission mechanism and corresponding inflation targets is very difficult. Moreover, collecting enough and reliable data is very crucial to be able to set the inflation target, to predict future inflation and to set the policy to converge them. Many economies don't have the historical data enough to define the monetary transmission mechanism, nor the ability to process them in inflation forecasting.

Finally, the volatility and misalignment in exchange rates may result in serious problems. Inflation targeting requires floating exchange rate regimes. Notwithstanding the general presumption in the literature that the flexible exchange rate regimes are superior compared to so-called unsustainable fixed exchange rate regimes, since they allow responding to economic shocks, Calvo and Reinhart (2000) seriously criticize the flexible exchange rate regimes. Calvo and Reinhart (2000) state that many countries, which declare that they use floating exchange rate, are found to be meddling in the exchange rate regime, because of

high currency swings, positive correlation between interest rates and exchange rates as a result of lack of credibility, and dollarization. This phenomenon is defined as “fear of floating”. Calvo and Mishkin (2003) undermines the flexibility issue by arguing that floating exchange rate regimes let policymakers apply other restrictive strategies such as targeting money supply or inflation rate, by just “*allowing for some exchange rate flexibility*” and nothing more. Hausman, Panizza and Stein (2000) points the effect of capability of borrowing in domestic currency terms and the pass-through effect to explain why countries float the way they float. With empirical analysis, they exemplify that countries that cannot borrow from international markets in their domestic currencies, tend to interfere to control the volatility of the exchange rates, since they can’t hedge their currency mismatch risks. Ozyildirim and Muslumov (2003) discuss that floating exchange rate regimes may lead to large misalignments in real exchange rates, as a result of speculations, overreactions, herding behaviors, and etc., likewise in any other financial market. Parallel to these arguments, Kumhof (2001) states that inflation targeting is vulnerable to speculative attacks, and it performs worse than exchange rate targeting when policy sustainability is limited.

Furthermore, Fraga et. al. (2003) state that inflation targeting performs worse in emerging economies compared to developed economies. They show that the volatilities of exchange rate, inflation, output and interest rate are higher in emerging economies. In addition, both the average inflation and deviation from the target inflation in developed economies after the implementation of the inflation targeting, is significantly lower than those of emerging economies. The solution

proposed is better transparency through the program and development of stable institutions for emerging economies. In his comment on this study, Mishkin (2003) states the differences of emerging economies, referring to Calvo and Mishkin (2003), and stresses that these institutional differences are the major problems and the choice of the policy is less important in a successful stabilization. These institutional differences are;

1. *“Weak fiscal institutions*
2. *Weak financial system*
3. *Low credibility of monetary institutions*
4. *Liability dollarization*
5. *Vulnerability to sudden stops of capital inflows”*

It concludes that without resolving these problems with revolutionary reforms, any stabilization program would have serious problems.

## **2.2. Currency Crisis Models**

The first currency crisis model, then called as “first generation model”, is introduced by Krugman (1979). This model assumes that a fixed exchange rate is applied in the economy, and the central bank tries to defend this rule as long as the amount of international reserves is sufficient. In this model, the government uses seignorage to finance the fiscal deficit it runs. The expansion of nominal money creates a pressure on exchange market and lessens the international reserves. The

investors in this model are fully informed and rational, so they attack to international reserves as they feel that withdrawal of the fixed exchange rate is indispensable. Such an attack would diminish the international reserves and the policy makers abandon the fixed exchange rate. Krugman (1999) states that there are three points to be underlined in this model;

1. The poor performance of policy makers is the basic reason behind the crisis. The fiscal deficit and accordingly the need for seignorage is the cause of the pressure on the exchange rate market. According to this model, if you are able to solve the fiscal deficit problem, there wouldn't be any crisis.
2. The crisis is deterministic and predictable. Under these given assumptions, the crisis is indispensable and, although it is sudden, its timing is almost predictable by analyzing the macroeconomic values.
3. The first generation crisis doesn't harm the supply-side, in other words creates no recession.

The crises in 1970s can be explained with first generation models. However, it was seen that these models were insufficient to explain or predict the crises in 1990s which formed the basis of second generation crisis. The first generation model assumes that the government continuously has budget deficits, which are financed by printing money, and meanwhile central bank defends the exchange rate regime till its foreign exchange reserve depletes. Therefore, it is easy to predict the first generation crisis. However, the crises in 1990s, can't be easily predicted. In these crises, no obvious macroeconomic deterioration signals, which led to figure out

the timing of the crisis in the first generation models, were observed. Besides, neither fiscal deficit, nor the need for seignorage was the basis of the crisis. A new model, pioneered by Obstfeld (1994), asks three questions to explain this new type of crises;

1. Why might a government have a motive to allow its currency to depreciate?
2. Why would a government choose instead to defend a fixed rate?
3. Finally, why would public lack of confidence in the maintenance of a fixed rate have the effect of making that rate more difficult to defend?

According to the answers to the first and second questions, the policy-makers decide whether to try to defend the exchange rate or not. They assess the pay-offs for defending the currency and for not defending, and choose the alternative which is less costly. If the domestic currency is overvalued, the policy-makers have to pay high interest rates to defend the peg and accept high unemployment rates because of increasing interest rates. The policy-makers may be willing to pay this cost, if the peg is still credible anyway and there is no speculative attack. However, if the peg starts to lose its credibility and there exists a danger of speculative attack, which would increase the cost of defending the peg, the policy-makers may choose to abandon the peg without fighting to death. On the other hand, the answer of the third question changes the costs of both alternatives mentioned above and the answers of the first two questions. Investors who doubt the credibility of the peg are eager to pull their money out. Investors who believe that other investors are eager to attack become perceptive. The result is a possible

crisis if something or someone triggers. Therefore, the second generation crisis are also called self-fulfilling crisis. Compared to first type of crisis, the second type is harder to predict. Krugman (1999) states that second generation crisis doesn't lead to a recession, instead it may lead to a growth, since the appreciation of the domestic currency ends.

The Asian crisis called for a new model, since it couldn't be explained by the first and second generation models. Many economists were impressed by the success of the Asian Tigers and there wasn't any signal for devaluation or a financial crisis. Krugman (1999) presents the third generation crisis models which introduces the balance sheet view of crisis. According to this model, Existence of high leveraged firms with massive foreign currency denominated debt leads to multiple stable equilibria. While economy is performing with a normal exchange rate at its original equilibria, a large capital outflow for political instability, an external shock, or any other reason, would lead to depreciation and loss of capital and net worth of firms and take the economy to another equilibria in which the economy is in crisis. Investors who doubt the credit worthiness of the balance sheets would be reluctant to invest in. Such a reluctance, which leads to a capital outflow and bankruptcy of the corporate sector, takes the economy to the crisis equilibria and validates the capital outflow and currency crisis.

Dornbusch (2001) states that *“Balance sheet issues are, of course, fundamentally linked to mismatches; even if there were solvency there would still be vulnerability related to liquidity problems. Exchange rate depreciation, in a mismatch situation, works in an unstable fashion to increase the prospect of insolvency and hence the*



*urgency of capital flight.*” Then, Dornbusch (2001) counts the sources of vulnerability: (1) a substantially misaligned exchange rate, (2) balance sheet problems in the form of nonperforming loans, and (3) balance sheet problems in the form of mismatched exposures.

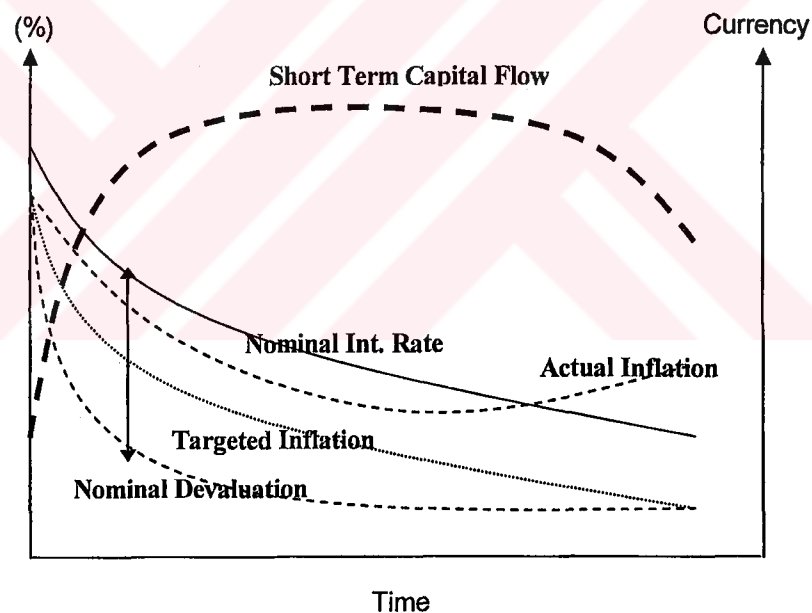
Apart from these series of models, the disparities model, pioneered by Ertuna (1999) and extended by Ertuna (2001), uses asymmetric risk to explain financial crises. This model claims that foreign investors and domestic investors possess different risks when they invest in TL denominated assets. Beside other risks, notably, liquidity risk, default risk and etc., the main risk factor for domestic investors is inflation, whereas the main risk for foreign investors is devaluation. If an economy has bad inflation performance in the past, the domestic investors would demand high returns, since they would perceive high inflation risk. On the other hand, thanks to IMF and other international institutions support, foreign investors don't have devaluation risk at the beginning of a credible ERBS program. This asymmetry in risks explains the short-term capital flows in and out of the economy. Foreign investors, benefiting from high returns although they possess less risk compared to domestic investors, increase their portfolio investments and lead to a short-term capital explosion. This increase in the short-term capital flow results in a remonetization in the economy and rises the level of available loans. The remonetization of the economy, accompanied by the low interest rates (sometimes negative real interest rates), creates an increasing demand even if some additional anchors such as wage control are implemented to tackle the demand. The outcome is the weakening in disinflation. Second, the domestic

currency appreciates, as the exchange rate is used as anchor. This appreciation provides an advantage for imported goods as their prices decrease. Therefore, demand to imported goods rises and the trade balance deteriorates. The increasing trade deficit doesn't create a problem as long as the short term capital flows finance it. However, deterioration of the trade balance, appreciation of the domestic currency accompanied by insufficient disinflation weakens the credibility of the program and leads to devaluation expectations. As the macroeconomic values deteriorates, the risk for foreign investors increase and they start to withdraw their funds out of the economy. These short-term capital movements distort the economy by the well-known boom-bust cycle and bring about a financial crisis.

Müslümov et al. (2003) uses the graph below to illuminate the effect of disparities between exchange rates, inflation, and interest rates through an ERBS program. The first curve shows the change in the exchange rate during the ERBS program. The dashed curve above the exchange rate curve shows the expected inflation as planned by ERBS program. As shown in the graph, it is expected that inflation will converge to exchange rate, which is used as anchor. There is a positive real interest rate at the beginning as shown in the graph. The arrowed line between interest rate and exchange rate presents the return of domestic interest rate in terms of exchange rate. Although the nominal interest rates decrease, the disparity between exchange rates and interest rates attract foreign investors and domestic investors who can borrow from foreign markets and invest in domestic bond market. Correspondingly, short term cash flow (hot money) increases enormously. The

remonetization of the economy accompanied by decrease in the price of imported goods augments the domestic demand and economic growth. However, as domestic demand weakens disinflation, actual inflation starts to diverge from the expected inflation. This results in a higher appreciation of domestic currency and negative real interest rates. These issues along with deterioration of trade balance weaken the credibility of the program and short term cash flow reverses. Subsequently, the unsustainable growth fueled by short term cash flows stops and economy goes into a recession.

Figure 1: The graphical presentation of the disparities model



Reference: Müslümov et. al. (2003)

### **2.2.1. The Mutual Impacts of the Corporate Sector and Financial Crisis**

Till the proposition of the Third Generation Crisis Models, only a few studies analyzed the microeconomic consequences of economic crisis, or in other words, the impact of adverse macroeconomic developments on the corporate sector. One of the pioneering studies on this issue analyzes the corporate behavior through the 1994 economic crisis. Atiyas and Yulek (1997) states that in the crisis year, the sales contracted seriously and therefore, the corporate sector inclined to exports. Notwithstanding the decrease in sales, an increase in profit margins is observed, which is explained by reduction in the real labor costs and general operation expenses. The heterogeneity is observed in debt management. According to their results, bank affiliated companies rely less on bank credit prior to the economic crisis, which indicates that they have a stronger financial structure. Additionally, the bank affiliated companies provided bank credits more easily compared to non-affiliated companies. Therefore, non-affiliated companies were forced to turn towards non-bank resources, such as trade credit.

Following the East Asia Crisis, the mutual relationship between the corporate behavior and economic crisis has attained enormous attention and the developments in the corporate sector in the East Asian countries before, during and after the 1997 crisis took a major role in shaping the third generation crisis models. One of the earlier studies that emphasizes this issue is Pomerleano (1998). Pamerleano (1998) illustrates how the financial leverage has increased continuously in East Asian corporate sector till the crisis year, whereas return on

equity ratio (ROE) was decreasing. Using these analysis, Pamerleano (1998) makes two suggestions; (1) the lack of financial discipline lead to financial distress and startles the free capital flows, and (2) inefficient use of capital (documented by decreasing ROE and ROCE ratios) repels the free international capital to other more efficient and profitable economies. Obviously, a sharp capital outflow, triggered by the facts above, would take the economy to another equilibria, where the domestic currency is devaluated and the economy is in a crisis, as it was in East Asia in 1997.



### 3. THE DISPARITIES MODEL

The international finance theory states that the exchange rates, domestic and foreign interest rates, and the inflation rates are linked by two parities that form the basis of the international macroeconomics. The first one, purchasing power parity (PPP), suggests that there exists a long-run equilibrium exchange rate. In other words, the bilateral exchange rate between two open economies should be adjusted spontaneously as the price level in those economies change, so that the law of one price holds. Equation 3.1 defines the PPP,

$$q_t = s_t - (p_t - p_t^*) \quad (3.1)$$

where  $q_t$  is the logarithm of real exchange rate,  $s_t$  is the logarithm of exchange rate, and  $p_t$  and  $p_t^*$  are the logarithm of the home and foreign price level accordingly. PPP implies that  $q_t$  is constant.

The second is the uncovered interest rate parity (UIP), which suggests that the difference between the foreign and domestic interest rates is equal to the expected depreciation of the domestic currency. UIP can be illustrated in the following form,

$$i_t = i_t^* + E_t s_{t+1} - s_t \quad (3.2)$$

where  $E_t s_{t+1}$  is the exchange rate at time  $t+1$  as expected at time  $t$ , and  $i$  and  $i^*$  are domestic and foreign interest rate. Combined with the PPP, UIP suggests that the expected domestic and foreign real interest rates are equal.

As discussed before, deviation from PPP, leading to changes in the real exchange rate, is a widely-observed fact that has attained attention among economists. One possible explanation for the deviation in PPP is local currency pricing, which suggests that the price of a good is independent of nominal exchange rates and determined by the supply and demand in the market, and the shifts in the supply and demand curves as a result of financial shocks and real shocks would lead to deviations from PPP. Another explanation is the imperfect substitutability between domestic and foreign goods, which results from transaction costs, trade impediments, and consumer tastes. The modified PPP utilizes a model with two kinds of goods, which defines the general price level as follows,

$$p_t = ap_t^T + (1 - a)p_t^N \quad (3.3)$$

where  $p^T$  and  $p^N$  are the logarithm of the price level of tradable goods and nontradable goods. “ $a$ ” is the share of tradable goods in total consumption. By definition, tradable and nontradable goods are at the two extremes of the substitutability. For tradable goods, under the law of one price,

$$p_t^T = p_t^{*T} + s_t \quad (3.4)$$

Combination of (3.3) and (3.4) gives, under the assumption that the shares of two kinds of goods are identical in the domestic and foreign countries,

$$s_t = p_t - p_t^* - (1 - a)(\rho_t - \rho_t^*) \quad (3.5)$$

where  $\rho_t$  is the logarithm of the relative price of nontradable goods ( $\rho_t = p_t^N - p_t^T$ ). Then, the real exchange rate is,

$$q_t = -(1 - a)(\rho_t - \rho_t^*) \quad (3.6)$$

Equation (3.6) illustrates that real exchange rate is a function of domestic and foreign shocks that lead to changes in the relative prices of nontradable goods. Dibooglu (1995) illustrates how real shocks lead to deviations from PPP. By definition, the consumption of nontradable good equals its production. A financial shock, which lead to remonetization in the economy, would trigger a consumption boom. An increase in the demand of tradable goods can be covered by imported goods, whereas an increase in demand of nontradable goods would lead to a rise in the relative prices of nontradable goods. As it is, by leaving all other factors intact



(no real shocks and no change in  $\rho_t^*$ ),  $\rho_t$ , the relative price of nontradable goods and accordingly the real exchange rate is a function of a financial shock.

The second component of the international finance theory, UIP also doesn't hold, since it doesn't take into account the risk premium. UIP is based on the presumption that an investor should be indifferent between investing in domestic and foreign asset. However, since some economies, e.g. developing economies, are riskier than the others, the assets denominated in risky economies' currencies should bear a risk premium. A modified UIP, to cover this issue, can be defined as follows,

$$i_t = i_t^* + \alpha_t + E_t s_{t+1} - s_t \quad (3.7)$$

where  $\alpha_t$  is risk premium, in other words, the reward to an investor for carrying risk by investing domestic asset instead of foreign asset at interest rate " $i^*$ ". To define the risk premium, the risk of the domestic asset should be determined. For a foreign investor, there exist the risks of default, in other words, whether he/she can get her money back, and devaluation, in other words, how much he/she will get in terms of his/her currency. A government debt instrument's default risk can be ignored, since a government can always pay its debt in terms of its currency. Therefore,  $\alpha_t$  consists of only the devaluation risk. For a domestic interest rate higher than the right side of Equation (3.7), would create an arbitrage and attract foreign investors, leading to a massive capital inflow.

On the other hand, for a domestic investor, there exists inflation risk instead of devaluation risk. A domestic investor would be interested in the return in terms of domestic currency. Therefore, utilizing the Fischer effect, the domestic interest rate can also be defined as,

$$i_t = r_t + E_t p_{t+1} - p_t \quad (3.8)$$

where  $r_t$  is the real interest rate. By combining (3.7) and (3.8),

$$i_t^* + \alpha_t + E_t s_{t+1} - s_t = r_t + E_t p_{t+1} - p_t \quad (3.9)$$

Using the Fischer effect, the foreign interest rate is,

$$i_t^* = r_t^* + E_t p_{t+1}^* - p_t^* \quad (3.10)$$

where  $r_t^*$  is the logarithm of the foreign real interest rate. Using (3.10) and (3.1), we can rewrite (3.9),

$$r_t^* + \alpha_t + E_t q_{t+1} - q_t = r_t \quad (3.11)$$

If  $E_t q_{t+1}$  equals  $q_t$ , in other words there is no expected change in real exchange rate, then (3.11) would turn into,

$$r_t^* + \alpha_t = r_t \quad (3.12)$$

which suggests that the domestic real interest rate equals the sum of risk premium and the foreign real interest rate in equilibrium. By combining (3.11) and (3.6), the disparity equation that will be used in the model is obtained,

$$r_t^* + \alpha_t = r_t - \left[ - (1 - a) \left( (E_t \rho_{t+1} - \rho_t) - (E_t \rho_{t+1}^* - \rho_t^*) \right) \right] \quad (3.13)$$

To simplify (3.13), it is assumed that there are no financial or real shocks for the foreign countries ( $E_t \rho_{t+1}^* = \rho_t^*$ ). To observe the effects of stabilization program, it is also assumed that no real shocks exist for the domestic country through the stabilization program. Therefore,  $E_t \rho_{t+1}$  is a function of financial shocks that result from the stabilization program.

To illuminate, let's assume that an ERBS is implemented in a hypothetical open economy, which is in equilibrium at time 0 (Equation (3.12) holds). It is announced that an ERBS will be implemented at time 1. In a credible program,  $\alpha_1$  should be zero. Using equation (3.13),

$$r_1^* = r_1 - \left[ - (1 - a)(E_1\rho_2 - \rho_1) \right] \quad (3.14)$$

If the right side of (3.14) is higher than the left side, this would lead to a substantial cash inflow, since the domestic assets provide a higher return than the level obtained from modified UIP. Therefore, to maintain the equilibrium,  $r_1$ , real interest rate has to decline, after the implementation of the program, at time 1. This is obvious, since the exchange rate risk is eliminated in a credible stabilization program; domestic assets will provide an arbitrage opportunity, which would attract short-term capital flow. The increase in the demand of domestic assets would lead to a decline in interest rates. However, the amount of the decline is dependent on the value of  $E_1\rho_2$ . As the domestic interest rate decreases, leading to a financial shock, the difference between  $E_1\rho_2$  and  $\rho_1$  would increase. This is consistent with the empirical observations. As it is mentioned before, the fact that inflation rate can't decrease as fast as the devaluation rate, leading to appreciation of the domestic currency, is one of the key syndromes of ERBS. What is more interesting is that domestic real interest rate is lower than the foreign real interest rate, since  $E_1\rho_2$  is bigger than  $\rho_1$ . This is also consistent with the negative real interest rates observed in some ERBS programs, including Turkey. Therefore, the economy sets in an equilibrium, where domestic currency is appreciated and real interest rates are even lower than the foreign real interest rates. Without doubt, this equilibrium is not sustainable. The decreasing real interest rates would trigger a consumption boom, leading to a growth in the economy, increases in trade deficits

and the other syndromes of ERBS. The deterioration of the macroeconomic indicators would damage the credibility of the program and the investors would demand  $\alpha_2$  at time 2, as a result of increasing devaluation risk. As it is,  $\alpha_2$  is a function of the expected depreciation of the domestic currency.

$$\alpha_2(E_2\rho_3) + r_2^* = r_2 - \left[ - (1 - a)(E_2\rho_3 - \rho_2) \right] \quad (3.15)$$

The addition of the risk premium,  $\alpha_2$ , would increase the interest rates and result in a negative financial shock. This would result in depreciation of the domestic currency (i.e.  $E_2\rho_3 < \rho_2$ ). The amount of the increase in domestic real interest rate is dependent on the value of  $E_2\rho_3$ , which is also a function of the real interest rate change. The higher the expected decrease in the real exchange rate, the higher is the increase in domestic real interest rate. Moreover, the risk premium is also a function of devaluation risk, which would increase as the expected depreciation increases. Therefore, the higher the depreciation, the higher the risk premium and accordingly the higher the real interest rate increase. The probable outcome of such a spiral is a sharp devaluation, huge increases in interest rates and accordingly an economic crisis.

This model illustrates how an ERBS program creates financial shocks, leading to disparities between the interest rates, exchange rates and inflation. As demonstrated, these disparities would result in all symptoms of ERBS, which are defined in the previous chapters.

Similarly, if an excessive domestic real interest rate is generated through a monetary policy, under floating exchange rate regime, the balance defined by Equation (3.13) is disturbed. Since the right side of the equation will be higher because of the disparity created by the stabilization program, an arbitrage opportunity will be generated. The balance will be maintained by appreciation of the domestic currency ( $E_t \rho_{t+1} < \rho_t$ ) to offset the increase at the right side of the equation as a result of the rise in the real interest rate. In other words, high real interest rate will attract short-term foreign capital and the oversupply of the foreign currency leads to appreciation of the domestic currency. Obviously, this is also unsustainable, because appreciation of the currency would increase the trade deficit and the devaluation risk accordingly. Similar to ERBS, this leads to a vicious circle, since increase in the devaluation risk,  $\alpha_t$ , would require higher real interest rates or a devaluation to maintain the balance in Equation (3.13).

Without doubt, the elimination of real shocks in the domestic economy, and real and nominal shocks in the foreign countries to simplify the model ignores the possible effects of these. For example, as shown in Dibooglu (1995), an increase in government expenditure would result in an increase in the relative price of nontradable goods and brings about a domestic currency appreciation. What's more, a shock that hits the foreign economies, which are the trade partners of the domestic economy, may ease or aggravate the effects of the ERBS program. The appreciation of currencies of European economies, through the Israel's 1985 program, relieved the notorious effects of appreciation of Israel's currency,

whereas the depreciation of Euro against USD, has exacerbated the effects of appreciation of TL through the 2000 stabilization program.

To summarize, Equation (3.13) defines a balance among the values of the interest rate, exchange rate and inflation, by combining two major component of the international economics theory. Any disparity that would lead to instability in this relationship, would create arbitrage opportunities, lead to short-term capital flows in and out of the economy, generate a vicious circle and end with an economic crisis. The balance can be disturbed as a result of real shocks in the economy, which would lead to a sharp increase in inflation, or an unexpected deep recession, or by implementing a stabilization program, which creates financial shocks and lead to disparities, as illustrated above. The scope of this section is to illustrate how stabilization programs, which are based on nominal anchors, disturb this balance, and show that's why they are unsustainable.

Next section documents the disparities created by stabilization program in the Turkish economy between 1980 and 2003. The following sections aim to analyze how factors that are described as unbalancing regarding to Equation (3.13), namely real interest rates, real exchange rates, changes in government expenditure, and real shocks that can be observed through inflation and economic growth, affect the performance of the corporate sector.

#### 4. TURKISH STABILIZATION PROGRAMS

Müslümov et. al. (2003), and Özyıldırım and Müslümov (2003), analyzing the exchange rate regimes implemented in Turkey, provide a detailed analysis of performance of Turkish economy. Referring these studies and annual reports of CBTR, this section aims to analyze economic policies, define the deficiencies of these programs, and illuminate how they fit to disparities model of Ertuna (1999).

The last two decades of Turkish economy can be divided into five separate sub-periods according to the implemented stabilization programs in that era. The experience of Turkish economy deserves a credit for attempting different solutions –generally the most popular ones in that era– to stabilize the economy. However, none of them was successful. What is common between these programs are *“unbalanced structures created by disparities between interest rates, inflation, and exchange rates to maintain the stability in the economy, lack of transparency, crony capitalism, and inability to maintain strong fiscal and financial institutions”* (Özyıldırım and Müslümov, 2003). The disparities between macroeconomic factors generate illusory shiny days with unsustainable growth rates, which end with deeper instabilities in a boom-bust cycle pattern. The experience and failures of Turkish economy makes it a very valuable laboratory to analyze the effects of stabilization programs.



#### **4.1. Turkish Economy between 1963 and 1980- The Closed Economy Era**

In the era between 1963 and 1980, Turkish Economy was directed by 5-year plans and annual programs, which were based on inward-looking import substitution strategies. Throughout this period, foreign trade, foreign capital movements, commodities markets and financial markets were under control. A fixed exchange rate and interest rate policy was followed. These 5 year plans implemented a vigorous investment drive which led to high growth rates in the economy between 1960s and mid-1970s. Accordingly, a highly protected inefficient real sector, which was ironically dependent on, imported raw materials and equipment in an inward looking import substitution program, was created. The controls in the financial markets led to negative real interest rates and overvalued exchange rates. As imported good based investment drive continued, these disparities resulted in rising current account deficits. Therefore, the Turkish economy was forced to devalue TL and increase the interest rates periodically. In the mid-1970s, these issues accompanied by the internal and external shocks, namely petroleum shock, took the economy to a serious crisis.

#### **4.2. Turkish Economy in 1980s – Liberalization Era**

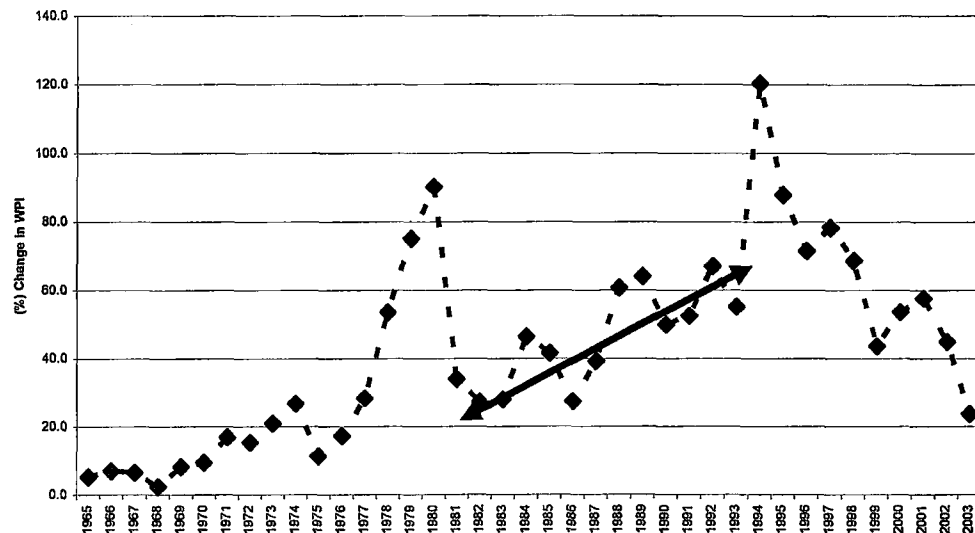
On January 24, 1980, Turkey launched a liberalization program, which was the first step of the process to construct the market economy and integrate with the

global markets. It released the restrictions on the commodities and financial markets and loosened the control over foreign trade. The liberalization of the economy was accompanied by export based growth and orthodox type stabilization program in which a flexible regime of crawling peg was used instead of fixed exchange rates. To increase the export potential of the economy, export subsidization was introduced. In addition, TL and real wages were suppressed to improve the ability of the Turkish Real Sector to compete in the foreign markets. In the 1980s, the share of wages in value added decreased enormously, whereas the profit margin of the corporate sector was increasing. The most important success of this program was the 300% increase in the exports between 1980 and 1987. What's more, the share of industry in total export increased 36% to 76.1% through this period. However, through this period, although the fixed investments increased enormously, most of them were directed to housing investments instead of manufacturing. The major deficiency of this period was deterioration of fiscal policy. The budget deficit/GNP ratio increased to 3.3% in 1989 from 1.5% in 1981. What's more, this deficit was financed by the advances from the central bank, which was under control of politicians. Partly because of pass-through effect of depreciation of domestic currency, and partly because of the increasing fiscal deficit and seignorage used to finance the fiscal deficit, chronic inflation has become the major problem of Turkish economy, as exhibited in Figure 2. The arrow illustrates the increasing trend in inflation in 1980s.

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**Figure 2: (%) Change in WPI between 1965 and 2003**


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*Source: SPO*

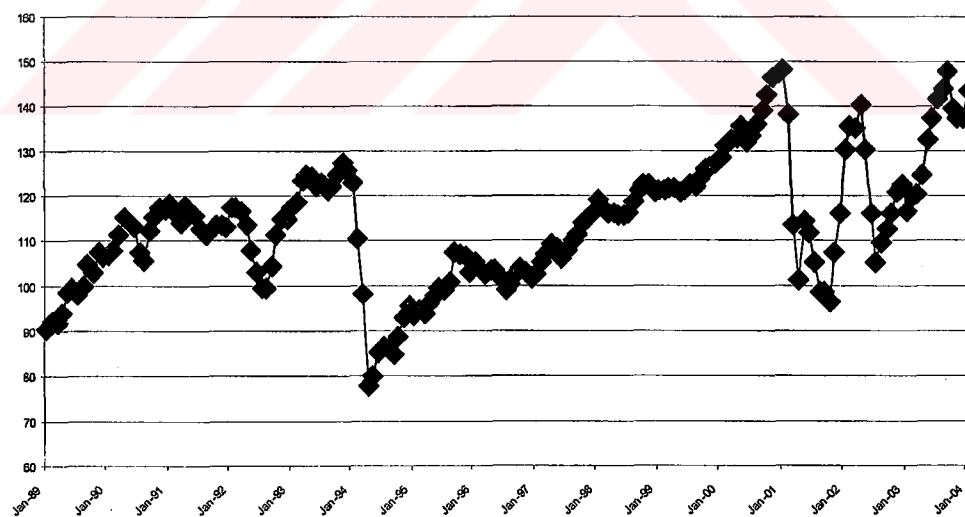
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### 4.3. Turkish Economy in 1990s – The Business Cycles

In 1989, Turkey accomplished capital account liberalization, which completed the liberalization program started in the 1980s. This was the most important step of the liberalization program, because it has permitted the short-term capital flow in and out of the Turkish economy. The major problem, as depicted in Figure 2, was the increasing inflation at the beginning of this era. To tackle the inflation, Turkey implemented a monetary policy with no explicit targets. The new economic policy was based on disparities; to fight against the inflation, the domestic currency was

appreciated under a managed floating exchange rate regime and high real interest rates were used to attract short term capital to finance investments and the current account deficit. The appreciation of TL in 1990 is presented in Figure 3. This economic policy is directly dependent on cash inflows, which provide for the unsustainable growth till deterioration of fiscal balances, and increasing trade deficit disclose the deficiencies of the policy. Besides, with more freedom in trade union bargaining and populist policies, the real wages started to recover in this period. In this period, corporate sector benefited from the increasing domestic demand financed by short-term cash flows, but lost its ability to compete in the foreign markets.

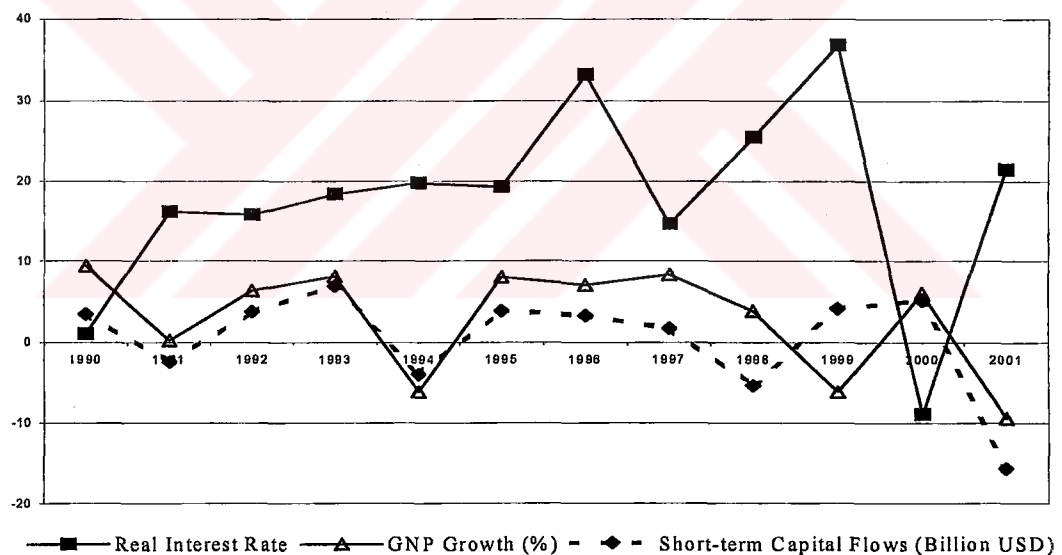
Figure 3: The real value of TL against FX index based on CPI



Source: CBTR

This unsustainable mechanism created two business cycles. Müslümov et. al. (2003) presents the business cycles in a figure, which graphs the real interest rate, short-term capital flow and GNP growth. It is easily seen that interest rates were very high to attract foreign capital and that there is a strong correlation between short-term capital flow and GNP growth. Between 1989 and 1999, Turkish economy was able to grow whenever it could attract short-term capital. Accordingly, whenever capital flow was reversed, Turkish economy went to a recession.

Figure 4: Comparison of real interest rate, GNP growth and SCFs in 1990s

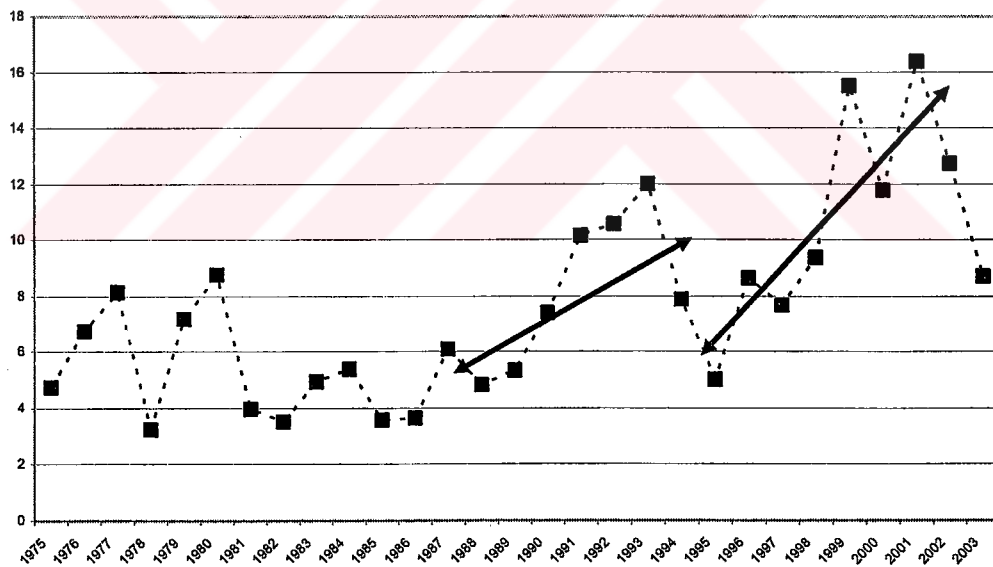


Reference: Müslümov et. al. (2003)

### 4.3.1. 1994 Economic Crisis

As clearly observed from Figure 4, the first business cycle ends in 1994. As a part of the stabilization program, to tackle the inflation, TL appreciated continuously between 1992 and 1994, resulting in an increase in imports and deterioration of trade balance. What's more, populist policies deteriorated the fiscal balance and the borrowing requirement soared enormously (Figure 5). In the fourth quarter of 1993, the erratic structure of the economy reached its peak and the baseless growth ended with a sudden reversal of the cash flows in January 1994.

Figure 5: Public Sector Borrowing Requirement / GNP (%)



Source: SPO

What's interesting is the economy was able to recover very quickly from 1994 crisis. Ersel and Sak (1997) claims that corporate sector had a little damage throughout the crisis and was able to start the recovery. They use the uncertainty induced liquidity preference model to explain the issue. According to this theory, under increasing perceived uncertainty conditions, corporate sector changes the structure of their working capital and increase the share of financial assets by sacrificing production related activities. Therefore, they can survive throughout the crisis by preserving their liquidity. Ersel and Sak (1997) presents, first that working capital structure affects the output level of the corporate, and then that Turkish corporate Sector stayed liquid through the 1994 crisis, by allocating more financial assets in working capital and had a little damage. They also claim that availability of financial markets let corporate sector change the working capital structure and conclude that existence of stable financial markets is very important for maintaining or increasing the economic output.

#### **4.3.2. Pro-crisis Period (1995-1999) – The Second Growth Cycle**

Soon after the 1994 crisis, Turkey resumed to implement exactly the same strategy. As illustrated in Figure 3, the real exchange rate entered its second increasing trend, right after the huge devaluation in 1994. The second short-term capital based growth which augmented by the disparities between the interest, exchange rate, prices and wages started (Figure 4). Through this period, the

economic policy was similar with the pre-crisis strategies. TL appreciated continuously and the real interest rates remained at very high levels.

In the second half of 1990s, Turkish economy couldn't maintain the fiscal discipline, and the borrowing requirement that declined right after the 1994 crisis entered into an increasing trend (Figure 5). Populist policies leading to increasing budget deficits, rising public debt to finance the growing budget deficits and political instability are among the major reasons that soared the interest rates throughout this period.

In 1990s, the external balance of the Turkish economy was also deteriorated. As illustrated in Figure 6, the gap between imports and exports increased enormously. The dashed arrow shows up the decrease in the exports to imports ratio in 1997. Beside the appreciation of TL, the withdrawal of protective tariffs due to the entrance to Customs Union was the major factor that boosted the imports in this period. However, exports showed limited growth compared to imports as shown in Figure 6. The slow down in the growth of OECD countries and the increase in the domestic demand are shown as the explanations for the limited growth in exports in the second half of 1990s.

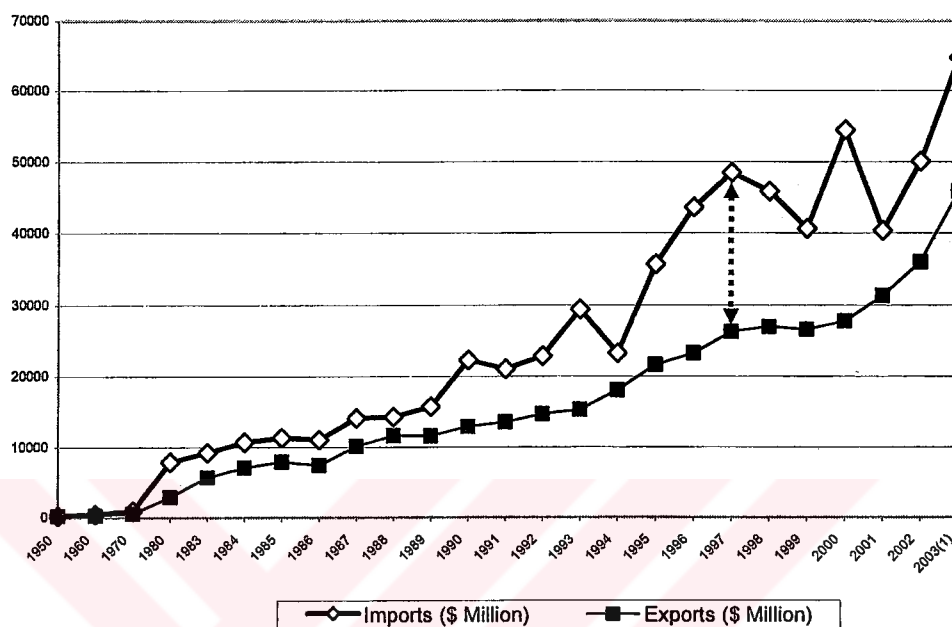
The growth cycle, which started after the 1994 crisis, continued in 1997. The expansionary policies and high domestic interest rate payments continued to reinforce domestic demand and the economic growth. The 10.4% increase in the industrial production was the main source of the economic growth on the supply side in 1997, just as it had in 1996.



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**Figure 6: Comparison of Export / Import level in 1990s**


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Source: SPO

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The decline in imports costs due to the Customs Union and buoyancy in domestic demand led to an increase in the industrial value added between 1995 and 1997. Throughout this period, investments grew at 13.5% annually increasing the capacity of the industrial sector. What's more, the capacity utilization rate increased to 80% from 72.7% at the end of 1994.

In 1998, the economic growth started after the 1994 crisis decelerated, indicating that the second business cycle was coming to an end. CBTR Annual Report of 1998 puts forward two basic reasons for this slow down; (1) the contraction in

domestic markets as a result of strict monetary and fiscal policies and (2) the negative effects of Southeast Asian and Russian Crises.

With the collaboration of IMF, Turkish policymakers applied contractionary fiscal and monetary policies in 1998. The cumulative growth rate of the foreign exchange basket structured by TCMB was 58.5 percent and the growth rate of the wholesale price index (WPI) was 54.3 percent in the same period. The strict monetary and fiscal policies were successful to tackle the inflation and to maintain the fiscal discipline by sacrificing the growth in the economy. However, the recovery in fiscal discipline was temporary, as illustrated in Figure 5. The effects of these policies were observed starting from the second quarter of 1998, as a sharp increase in tax revenues, a primary surplus over the target value and, on the other hand, a decrease in the disposable income, consumption and investment expenditures accordingly (CBTR, 2000).

The Southeast Asian Crisis in 1997 and the subsequent Russian Crisis in 1998 had a negative impact on Turkey. To start with, the export to South Asian countries decreased enormously in 1998 while import from these countries increased as a result of the devaluation in these economies. However, it is observed that the exports of Turkey to OECD countries weren't affected too much. Naturally, the shuttle trade to Russia decreased enormously as a result of the crisis in this country. Total merchandise export in 1998 decreased to 31.220 million USD from 32.647 million USD in 1997. Although the revenues from exports decreased because of the decreasing export prices as a result of the competition from devaluated South Asian economies, the increase in the export volume presented

that Turkish economy improved its potential to compete in the international markets. Second, as the crisis expanded to Russia, the South Asia Crisis accepted as global crisis and by contagion, it caused short-term capital outflow from other emerging countries including Turkey. This led to not only the contraction of the financial system but also an increase in the interest rate. Increasing borrowing requirement of public sector between 1995-1997, accompanied with the short-term capital outflow worsened the crowding out effect in 1998. These factors decreased consumption and investment in 1998 and caused the economy to slow down.

In 1998, the industrial sector, which was the locomotive of the high economic growth between 1995 and 1997, was the reason of the slow down in 1998. The industrial sector grew 2% in 1998 after the 9.87% average growth between 1995 and 1997. The contraction in the domestic demand and the effects of the South Asia and Russia Crises were the basic reasons of the slow down in the industrial sector. The slow down in the industrial production led to a decrease in the imports. In 1999, the deceleration started in the second quarter of 1998 turned out to be a recession because of the continuing external shocks and internal shocks. Following the Russia Crisis, the capital outflow continued increasingly in 1999 and deepened the recession. In an environment with limited financial resources, the huge borrowing requirement of the public sector worsened the crowding out effect and increased the real interest rates. The average real interest increased to 36.8 in 1999. As the economy was struggling, the August 17<sup>th</sup> and November 12<sup>th</sup> earthquakes caused the entire economy to collapse. To start with, the disaster happened in the Marmara region, which is the most productive and developed area of Turkey. This

shock affected not only by the interruption in the production in this region but also by deteriorating the budget balance because of decreasing taxes and increasing public expenditure to support the casualties. After the disaster, a number of new taxes were introduced and the ratio of available taxes was increased based on the effects of disaster. Without doubt, this increase in taxes is the enduring effect of the disaster, which had a dreadful influence throughout the stabilization program and the economic crisis in 2001.

#### **4.4. 2000 Stabilization Program and the February 2001 Crisis**

In 2000, Turkey started to implement a stabilization program, which was supported by IMF. The stabilization program aimed to decrease the inflation to 7% by the end of 2002, to reduce the interest rates to sustainable levels, to increase the growth potential and to provide more efficient and fair resource allocation in the economy. The basic items of the program were as the followings;

- The program was based on a preannounced fixed exchange rate policy. The program intended to tackle the inflationary expectations by using exchange rate as an anchor. The daily values of a basket which consisted of 1 USD + 0.77 EURO for a one-year period were announced at the beginning of the program. The policy-makers committed that the value of this basket would increase 20% in 2000. This policy would be followed by a progressively widening band policy. The presumption of the program was presented in

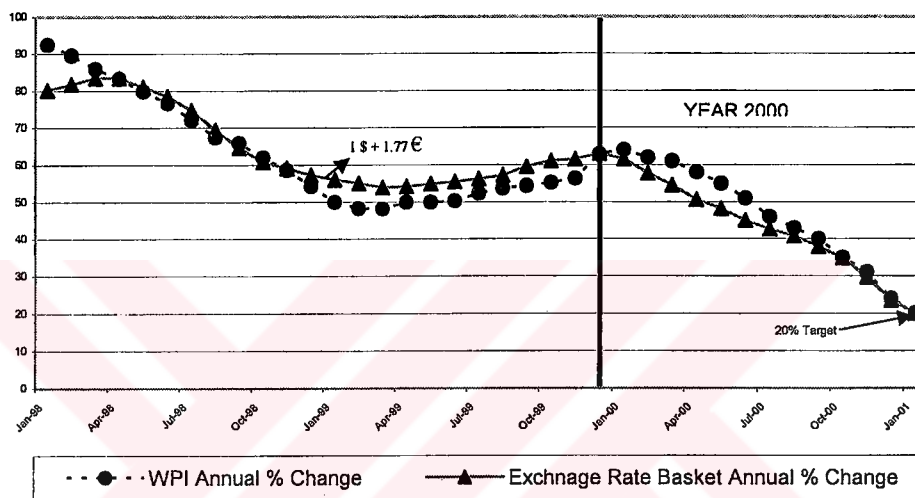
the “Disinflation Program for the Year 2000 Announcement” with Figure 7. It was expected that even though the inflation exceeded the change in the exchange rate basket, leading to appreciation of the TL at the beginning of the program, the inflation and the exchange rate would converge at the end of 2000.

- The exchange rate based stabilization was supported by a strict monetary policy. The policy-makers put a ceiling on net domestic assets and restricted its fluctuation. Besides, the interactions of TCMB in interbank money market were limited, and sterilization operations performed by TCMB were abandoned through the program. This monetary policy was accompanied by a contractionary fiscal policy. It is aimed to slow down the consumption that would boom through the program and to increase the primary budget surplus by decreasing public expenditures, continuing high tax policy started in 1999 and creating revenues by privatization.
- Another crucial item of the program was structural reforms and privatizations. The policy-makers were intended to realize the structural reforms and accelerate privatization.

As a result of disappearance of foreign exchange risk through the program, the short-term capital inflow and foreign portfolio investments boosted. The increasing capital inflow had two important outcomes. First, as uncertainty vanished, the nominal interest rates decreased sharply at the beginning of the program. Second, the increasing capital inflow resulted in remonetization of the

economy and increase supply of loanable funds. Both increased the consumption, which boosted the economic growth and slowed down the disinflation. In other words, Turkish economy started its new short-term capital financed growth cycle.

**Figure 7: Ex-ante WPI and exchange rate basket performance in 2000 ERBS Program**



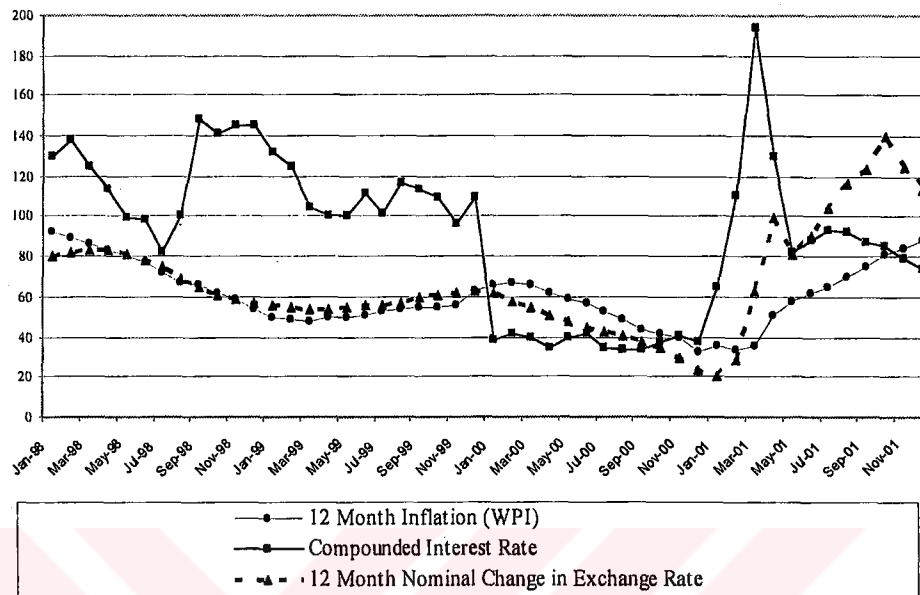
*Reference: 2000 Stabilization Program*

Turkish Lira appreciated more than expected, as shown in Figure 8. The increasing demand accompanied by the decrease in the price of imported goods as a result of appreciation of TL, boosted the level of imports in 2000. However, exports in 2000 didn't perform as well as imports because of the appreciation of TL. Therefore the export/import ratio decreased enormously in 2000, which resulted in unsustainable trade deficit levels.

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**Figure 8: The ex-post WPI, interest rate, and exchange rate between 2000 and 2001**


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Reference: Müslümov et. al. (2003)

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Figure 8 shows ex-post exchange rate, inflation and interest rate through the 2000 Stabilization Program of which presumed inflation and exchange rate levels are given in the Figure 7. By the implementation of the program, the nominal interest rates decreased to around 40% from over 100%, as shown in the Figure 8. However, since inflation didn't decrease as much as expected, this led to 8% average negative real interest rate in 2000. The difficulties in decreasing inflation, real appreciation of lira, and consequently continuous increase in trade deficit, made investors more reluctant to invest in Turkish Economy. Therefore, the short-term capital inflows, which financed the trade deficit through the program, started to slow down in October 2000. The first sign of disaster was seen in November.

Demirbank, which held huge amount of public bonds, went bankruptcy and led to a liquidity crisis in the economy. TCMB was blamed of not providing liquidity at the beginning of the crisis in order to follow the net domestic asset rule.

IMF provided extra funds for Turkey, and Turkish economy could evade the crisis in October 2000. Although some items of the stabilization program were revised, policy-makers followed the program without any major changes. The unsustainable structure of the program increased uncertainty and weakened the credibility of the program. The political crisis in February 2001 brought the indispensable crisis sooner and because of the massive attack to international reserves, the policy-makers and IMF decided to withdraw the program and let the exchange rate to float.

The effect of the crisis was notorious. TL depreciated sharply and the interest rates soared. The financial system, which was vulnerable to shocks because of its feeble financial structure and short position that they were carrying, collapsed and a number of banks went bankruptcy.

Other agents in the economy, who had high debt ratios, hit by the soaring interest rates and the ones who were carrying exchange rate risk, hit by the depreciation of TL. The collapse of the financial system, accompanied by the shrinkage of foreign short-term funds affected the economy and the domestic demand decreased sharply. Therefore, the Turkish economy entered in a severe recession.



#### **4.5. 2001 Strengthening Turkish Economy Program**

To alleviate the notorious effects of 2001 crisis, a new program was implemented. The program first designated the major problems of Turkish Economy. Unsustainable domestic debt and weak financial institutions were named as the fundamental problems of Turkish economy. Since ERBS was blamed for the failures, floating exchange rate regime is put into effect. At the first step, the program targeted to restructure the economic institutions to solve the fundamental problems of the economy. The major targets of the program are to remove defects in the payments system, to make the financial system function again, to accomplish social reforms in public sector, social security, privatization, agriculture and etc. The new program first focused on providing stability in financial markets. The state banks were under control of politicians and had been used to finance their populist activities, which led to huge accumulated losses. What's more, these were not recovered, leading to exhaustion of equities of state banks. A great amount of funds injected to the state banks to reduce their duty losses. Some unsound private banks, which were crashed by the devaluation and unbearable interest rates during the crisis, were confiscated without damaging the depositors. As a part of the structural reform, CBTR law has changed, making the CBTR independent. Next target was the fiscal discipline. The rehabilitation of financial sector increased the debt stock of the government to unbearable levels (Figure 9). To take the increasing public sector debt stock, the primary surplus to

GNP ratio target for 2001 was set as 5.5%. To achieve this target, government expenditures were restricted and tax revenues were aimed to be increased.

The most important pillar of the program is the new monetary policy, which is still implemented as of June 2004. The new monetary policy is 3-year strategy, which is based on two nominal anchors; (1) monetary targeting, and (2) inflation targeting. Monetary base is chosen as the monetary targeting anchor. However, the monetary policy anchor implemented in this program has some basic differences compared to classical MBS, discussed in Section 2. First of all, there isn't any strict money base growth rate targeted in the program. The program aims to *"create money expansion consistent with the macroeconomic targets"* (CBTR, 2001). Monetary base is chosen as performance criteria, and according to changes in money demand, the monetary base target is allowed to be revised, so that no excess money supply is created. To illuminate, in case of reverse currency substitution, which would lead to an increase in TL demand, money supply will be rearranged to maintain liquidity in the market. Second, as a part of inflation targeting, short-term interest rates is to be used against any error in monetary base demand forecasts. Besides, any possible problem that may arise from the weak relationship between the monetary base and inflation, which was discussed as the major problem of monetary targeting in Section 2, will be alleviated by altering short term interest rates. In other words, this program is a combination of monetary targeting and inflation targeting. The sole inflation targeting policy is not considered because of the huge public sector debt stock. An unacceptable level of debt stock impedes the application of inflation targeting. The program requires that

the main issue of CBTR is price stabilization, and that it announce the framework of the monetary policy, forecasts, and the changes in the program, according to the transparency rule of the program.

Table 1 illustrates the developments in the economy through the new stabilization program. The crisis year, 2001, was extremely notorious, due to distracting effects of the turbulence in the economy following the crisis. As the GNP growth and production index rows show the economy couldn't recover quickly following the crisis. What's more, inflation increased enormously, due to the pass through effect following the sharp devaluation at the beginning of the year. Under the floating exchange rate regime, the lack of credibility of the coalition government and external shocks such as terrorist attack on September 11<sup>th</sup>, led to unbearable volatility in exchange rate. The uncertainty in the exchange rate impeded the recovery of the economy. Hoping to utilize the depreciation of TL and the decrease in real wages, the program expected a sharp increase in exports, which would help the economy to recover, as the domestic demand shrank after the crisis. Notwithstanding the expectations, exports increased slightly to 31.3 billion USD from 27.8 billion USD in the same period. On the other hand, imports decreased sharply from 54.5 billion USD to 41.4 billion USD in 2001. However, since exports were far from expected levels, the program couldn't meet the expected targets in trade balance.

A healthy analysis to appraise the performance of the program can be made with the data of the pre-crisis period, between 2002 and 2003. The 2002 targets were set as 35% for inflation, 3% for GNP growth, and 6.5% primary surplus. Inflation was

targeted to decrease to 12% in three years. Despite the internal and external shocks, such as the unprecedented election, illness of the prime minister, and forthcoming Iraq issue, the economy started to recover, as documented in Table 1. The first three rows, the growth in the production and increasing capacity utilization, document the recovery in the economy. What's more, the inflation decreased to 31.6% at the end of the year. The wavering domestic demand forced the corporate sector to focus on exports. The contractionary monetary policies, high unemployment rate, and decrease in real wages held the domestic demand back. The growth in the economy was maintained by the increase in exports. The primary surplus target couldn't be accomplished in 2002, due to the deterioration in the fourth quarter, as illustrated in Table 1. The untimely election in the fourth quarter was the basic reason for this aggravation.

In the third year of the program, 2003, despite the political problems and Iraq war, which resulted in severe uncertainties, inflation continued to decrease in 2003, while economic recovery persists. After the Iraq war, the uncertainties have decreased and auspicious signs of success in some targets, such as inflation and growth, are observed. As of today, inflation rate is even below the target of the program, which was 12% for the third year. In the third year of the program, domestic demand started to recover, as the interest rates decreased. The slow recovery in unemployment was one of the other factors that impeded the increase in domestic demand and inflationary pressures. The increase in the demand and consumption, accompanied by the appreciation of TL, fueled the imports, as shown in Table 1, and led to deterioration of the trade balance. Besides, the excess

labor force has suppressed the real wages, which not only has increased the efficiency, but also has benefited the export potential, which is held back by the appreciation of TL.

Through this program, the disparities between exchange rate, interest rate and inflation also existed. The nominal interest rates, under the control of CBTR, are used to control inflation and decreased a lot since the 2001 crisis (Figure 10), as the inflation decreased. The short-term interest rates have been the major tool of CBTR to control inflation through the program. CBTR decreased the short-term interest rates from time to time, presented in Figure 10, according to developments in the inflation. To hold back the domestic demand and cool the economy, the interest rates were kept well-above the inflation level, leading to unsustainable real interest rates. What's more, the return of domestic assets in terms of foreign currency, calculated by dividing the TL return to the nominal devaluation, was extremely high. This abnormal return attracted short-term capital flow through this year. This led to oversupply of foreign currency and for the most part of 2003, the real exchange rate exceeded even its level at the end of 2000, just before the crisis.

**Table 1: Macroeconomic Figures after the 2001 Crisis**

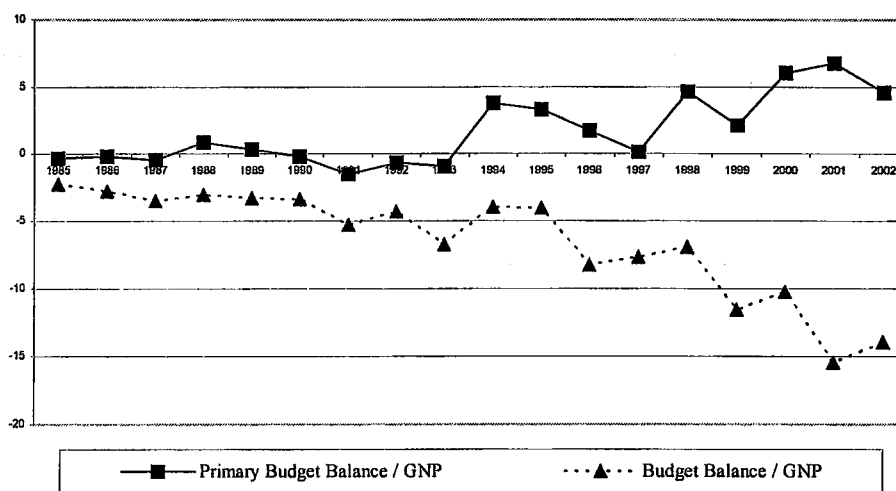
	2000	01/Q1	01/Q2	01/Q3	01/Q4	02/Q1	02/Q2	02/Q3	02/Q4	03/Q1	03/Q2	03/Q3	03/Q4	04/Q1
GNP Growth	6.3	-3.3	-12.3	-9.1	-12.3	0.4	10.4	7.9	11.5	7.4	3.7	4.90		
Production Index (Manufacturing Ind.)	6.4	-0.4	-12.4	-10.6	-12.9	3.4	13.7	11.6	14.7	10.5	4.7	9.20		
Capacity Utilization (Manufacturing Ind.)	76.1	70.7	70.1	71.9	73.8	73.4	75.3	77.9	78	75	78.3	81.20	80.20	
CPI	54.9	35.6	52.3	58.6	67.5	70.3	47	39.5	31.6	27.6	30	25.10	19.40	16.20
WPI	51.4	30.1	56.8	70	84.9	86.7	51.2	43.5	33.2	33.7	32.8	22.40	15.40	10.80
Imports (Billion USD)	-54.1	-10.1	-9.3	-9.7	-9.7	-9.8	-11.7	-12.7	-14.3	-13.5	-15.5	-17.4	-18.9	-19.0
Exports (Billion USD)	31.7	8.1	8.8	8.4	9.1	8.8	9.4	10.4	11.5	11.1	12.3	13.3	14.5	13.9
Trade Deficit (billion USD)	-22.4	-2.1	-0.5	-1.3	-0.6	-1.0	-2.3	-2.3	-2.8	-2.4	-3.2	-4.1	-4.3	-5.1
Interest Rate	38	123.0	100.3	91.2	79.4	73.6	63.3	66.8	56.0	57.1	51.4	40.3	28.9	
Real Exchange Rate	147.6	113.5	111.8	98.5	116.3	138.4	118.9	115.2	125.4	123.5	140.6	151.50	140.60	154.20
Prim. Budget Bal. / GNP	0.06	0.19	0.08	0.06	0.03	0.08	0.11	0.05	-0.02	0.07	0.07	0.06	0.02	
Budget Balance / GNP	-0.10	-0.03	-0.21	-0.18	-0.24	-0.22	-0.10	-0.08	-0.13	-0.18	-0.19	-0.05	-0.09	

Source: CBTR and SPO

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**Figure 9: Budget Balance Figures of Turkish Economy between 1985 and 2002**


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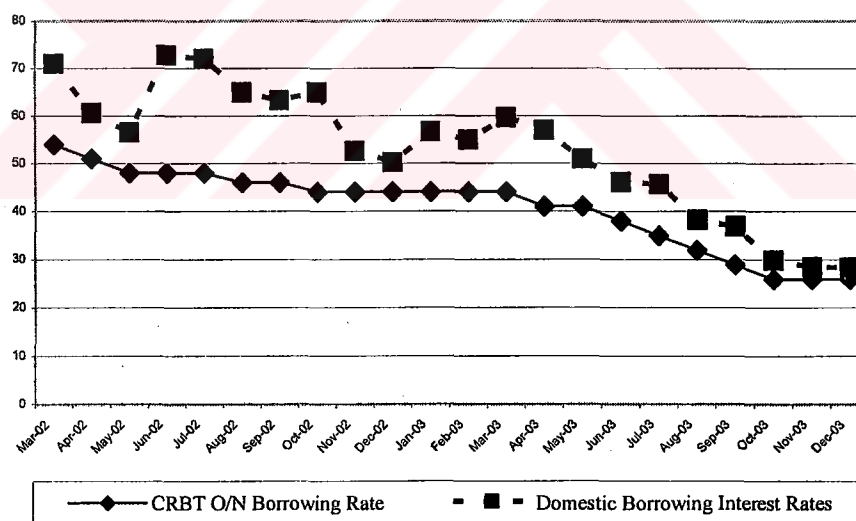
*Source: SPO*

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Obviously, the 2001 Strengthening the Turkish Economy Program, is also based on disparities. Although a floating exchange rate is implemented, TL has appreciated enormously. By keeping the short-term interest rates well-above the inflation, CBTR has been able to take the inflation under control, but at the same time has lead to appreciation of TL. This resemblance with the previous unsuccessful programs leads to doubts about the sustainability of the program. The disparities create arbitrage opportunities, or in other words, extreme returns in terms of foreign currency, and attract short-term capital flow. The favorable developments in 2003 may be a result of the unsustainable mechanism generated by these disparities. Similar to the 2001 and 1994 crisis, whenever the short-term capital flow reverses, a major economic collapse may occur. The deterioration of

trade balance, the overvalued TL and high real interest rates, are the major concerns about the performance of the recent stabilization program. Moreover, the unbearable debt level seems to be the weakest point of the program that concerns the policymakers. The debt burden of the public sector has increased enormously, especially after the reforms accomplished to restructure financial institutions. The program targets 6.5% primary budget surplus to alleviate the unbearable debt burden of the public sector. However, this target is criticized as being extremely tough and difficult to reach, and accused for impeding the economy and corporate sector to recover.

**Figure 10: Interest Rate Developments in the period between 2002 and 2003**



*Source: CBTR*



## 5. RESEARCH DESIGN

### 5.1. Panel Data Analysis

Panel data can be described as pooled observations of a group of individuals over several time periods. Using panel data provides notable advantages compared to ordinary least squares (OLS) method. First of all, it lets the researcher to evaluate the behavior of individuals over time. Second, it allows the researcher to control for individual heterogeneity. A typical panel data regression equation can be illustrated in the following form,

$$y_{it} = \alpha + X'_{it}\beta + u_{it} \quad (5.1)$$

where  $i$  denotes the cross section dimension and  $t$  denotes the time dimension. Most of the panel data analysis is developed on one-way error component model, in which the error term is defined as,

$$u_{it} = \mu_i + v_{it} \quad (5.2)$$

where  $\mu_i$  is the unobserved individual specific effect, whereas  $v_{it}$  is the remainder disturbance. The second advantage of panel data analysis arises at this point. The omitted explanatory variables in a regression equation are collected in the error term. If the omitted variables are correlated with the explanatory variables in the model, error term turns out to be correlated with the explanatory variables, which violates one of the basic assumptions of the OLS. The unobserved effect ( $\mu_i$ ) in Equation (5.2) accounts for any time-constant individual specific effect that is omitted in the equation. The remainder disturbance term would be uncorrelated with the explanatory variables in Equation (5.1). Under the assumption that there exist unobserved effects, the pooled OLS will be inconsistent and biased. A simple example to illustrate given by Baltagi (2001) is a production function in which  $y_{it}$  is the output and  $X$  is the input matrix. Any individual heterogeneity omitted in the equation, or unobservable effects, such as managerial skills, will be captured by  $\mu_i$  (Baltagi, 2001; Wooldridge, 2002).

### **5.1.1. The One-way Error Component Regression Model**

The one-way error component model can be estimated by two different methods according to the structure of the unobserved effect. In the fixed effects model, unobserved effect is assumed to be a fixed parameter. Fixed effect estimator is appropriate when the data consists of a specific set of  $N$  individuals, such as OECD countries, or American states. In fixed effect model, to estimate the equation, we need to eliminate the unobserved effect. To wipe out the unobserved

effect, the average equation for each group is calculated and then subtracted from the original observation. This transformation is known as within transformation, which basically uses time variation within each cross section. Fixed effect estimator then applies OLS to the transformed equation.

The other method is random effects model, which assumes that  $\mu_i$  is IID  $(0, \sigma_\mu^2)$  and is not correlated with  $v_{it}$ . Besides, the explanatory variables are assumed to be independent of unobserved effect and the remainder disturbance. Random effects estimation adds unobserved effect to the pooled OLS and is more restrictive compared to it. The superiority of random effects compared to pooled OLS is that it permits the serial correlation in the error term ( $u_{it} = \mu_i + v_{it}$ ) in a generalized least squares (GLS) framework (Wooldridge, 2002). The variance-covariance matrix ( $\Omega$ ) in the GLS of one-way error model defined by equation 1 and 2, would have a homoskedastic variance on the diagonal,

$$\text{var}(u_{it}) = \sigma_\mu^2 + \sigma_v^2 \quad (5.3)$$

and serial correlation only between the disturbances of the same individual and zero otherwise,

$$\text{cov}(u_{it}, u_{js}) = \sigma_\mu^2 + \sigma_v^2 \text{ for } i=j \text{ and } t=s \quad (5.4)$$

$$\text{COV}(u_{it}, u_{js}) = \sigma_{\mu}^2 \quad \text{for } i = j \text{ and } t \neq s$$

$$\text{COV}(u_{it}, u_{js}) = 0 \quad \text{otherwise}$$

The FGLS estimator that uses the variance-covariance matrix ( $\Omega$ ) is defined as the random effects estimator,

$$\beta_{RE} = \left( \sum_{i=1}^N X_i' \hat{\Omega}^{-1} X_i \right) \left( \sum_{i=1}^N X_i' \hat{\Omega}^{-1} y_i \right) \quad (5.5)$$

Baltagi (2001) states that GLS estimator above can be obtained as a weighted least squares, if  $\Omega^{-1/2}$  can be derived and show that the resulting transformed equation has  $(y_{it} - \theta \bar{y}_i)$  as dependent variable, where  $\theta = \left( 1 - \frac{\sigma_v}{\sigma_1} \right)$  and  $\sigma_1^2 = T\sigma_{\mu}^2 + \sigma_v^2$ .

The random effects model is the right estimator when the individuals are randomly selected from a large sample. A typical example is the household panel studies. Baltagi (2001) states that “*the individual effect is characterized as random and inference pertains to the population from which this sample was drawn*”.

The question at this point is which one to use in a panel data analysis, fixed effect or random effect model. The crucial difference between is the correlation assumption between the unobserved effect and the explanatory variables. Random effect assumes that there is no correlation between the unobserved effect and the regressors. Since within transformation wipes out the unobserved effect, this

assumption is not required in fixed effects model. Baltagi (2001) states that in case of violation of no correlation assumption, wherein fixed effects model is appropriate, fixed effect estimator is best linear unbiased estimator (BLUE), whereas random effects estimator is inconsistent and inefficient. If random effects model is true, in other words no correlation between the unobserved effect and regressors holds, the random effects estimator is BLUE, whereas the fixed effect estimator is consistent but not efficient. One of the drawbacks of fixed effect estimator is that it wipes out time-constant variables, such as gender, sex and religion.

### 5.1.2. Dynamic Panel Data Analysis

The one-way error method is a static model. Many economic issues with a dynamic structure have been analyzed by panel data estimators, in which the time dimension enables the researchers to capture the dynamic adjustment. An economic relationship in dynamic nature within various cross-sections can be illustrated by a model in the following form,

$$y_{it} = \delta y_{i,t-1} + x_{it}\beta + u_{it} \quad t = 1, \dots, T \quad (5.6)$$

$$u_{it} = \mu_i + v_{it} \quad i = 1, \dots, N \quad (5.7)$$

Such a model with lagged dependent variables among the regressors leads to some problems that impede the applicability of OLS, and error component panel data

estimators defined above (Baltagi, 2001). The OLS will give biased results since the lagged dependent variable is correlated with the individual specific effects.  $y_{it}$  is a function of  $\mu_i$ . Accordingly,  $y_{it-1}$  is also a function of  $\mu_i$ . Since an explanatory variable in the equation, the lagged dependent variable, is correlated with the error term, the OLS estimator is biased and inconsistent. Bond (2002) states that OLS estimator is upward biased.

Fixed effect estimator eliminates the individual effect by within transformation. However, the variables are expressed as deviations from the group mean in the transformed equations and  $(y_{i,t-1} - \bar{y}_{i,t-1})$  among regressors will be correlated with the error term  $(v_{i,t-1} - \bar{v}_i)$ , since  $y_{i,t-1}$  is correlated with  $\bar{v}_i$ . The correlation increases as the number of periods decreases. Therefore, the fixed effect estimator is inconsistent and biased. Baltagi (2001) states that if only if T goes to infinity the fixed effect estimator becomes consistent. Therefore for large T, fixed effect estimator can be used. Nickel (1981) derives the bias in fixed effects estimator and shows that the bias is negative and increases as T decreases.

Similarly, the random effects model suffers from the same problem. The quasi-demeaning transformation in the weighted least squares obtains an explanatory variable  $(y_{it-1} - \theta \bar{y}_{i,t-1})$ , which is correlated with the quasi-demeaned residuals  $(u_{it} - \theta \bar{u}_{i,t-1})$ , and the GLS estimator will be biased and inconsistent.

Instrumental variable methods have been proposed as a solution to this issue by Anderson and Hsiao (1982), which is followed by Arellano-Bond (1991) GMM

estimator. The GMM model is then developed by Arellano and Bover (1995) and Blundell and Bond (1998). Bond (2002) reviews the recent developments in dynamic panel data models.

Instrumental variables method first eliminates the unobserved effect by taking the first difference. However, the first differenced equation still suffers correlation problem between the first differenced error term  $(u_{it} - u_{it-1})$  and the differenced lags of the dependent variable,  $\Delta y_{it-1} = (y_{it-1} - y_{it-2})$ , among the explanatory variables. Instrumental variable utilizes the second lag of the level,  $y_{it-2}$ , or the first difference of this second lag,  $\Delta y_{it-2} = (y_{it-2} - y_{it-3})$ , as instruments, since they are both correlated with  $(y_{it-1} - y_{it-2})$  but are uncorrelated with  $(u_{it} - u_{it-1})$ . An instrument matrix,  $Z_i$ , a square matrix with dimension of T-2, is created for each cross section, by utilizing these orthogonality conditions. System IV estimation solves the set of these moment conditions;

$$N^{-1} \sum_{i=1}^N Z_i' (y_i - X_i \hat{\beta}) = 0 \quad (5.8)$$

Instrumental variable estimations are consistent but not efficient, since it doesn't utilize all instrumental variables that can be constructed by using all available moment restrictions. These moment restrictions impose that the covariance between the regressors and the error term is zero. Including these moment conditions will make the system overidentified, and  $Z_i$  will have more columns

than needed to solve equation 8. Therefore, Equation 5.8 will not have a solution. GMM estimator tries to obtain the most efficient estimator by minimizing the length of the set of vectors defined in equation 5.8,

$$\min_b \left[ \sum_{i=1}^N Z_i'(y_i - X_i b) \right]' W \left[ \sum_{i=1}^N Z_i'(y_i - X_i b) \right] \quad (5.9)$$

where  $W$  is an symmetric, positive semidefinite matrix. Since there exists a different GMM estimator for any  $W$ , it is important to choose the optimal weighting matrix, with the smallest asymptotic variance (Wooldrige, 2002). First Difference GMM takes the first difference of Equation (5.6), which eliminates the cross-section specific effect. However, similar to the instrumental variables method, first-differenced lag independent variable among regressors will be correlated with the first-differenced error term. GMM uses an instrument matrix constructed by using the moment restrictions on the lagged values of the dependent variables and the error term. For example, for  $\Delta y_{i3}$ ,  $y_{i2}$  is a valid instrument as well as  $y_{i1}$ . Similarly, for  $\Delta y_{it}$ , the valid instrument set is the vector,  $(y_{i1}, y_{i2}, \dots, y_{i,T-2})$ . Utilizing these restrictions, the instrument matrix for the first difference GMM,  $Z_i$ , is

$$Z_i = \begin{bmatrix} [y_{i1}] & & & 0 \\ & [y_{i1}, y_{i2}] & & \\ & & \cdot & \\ 0 & & & [y_{i1}, \dots, y_{i,T-2}] \end{bmatrix} \quad (5.10)$$



and the weighting matrix,  $W$ , in Equation (5.9), is a  $(T-2)$  square matrix with twos in the diagonal, minus ones in the first subdiagonals at both sides of the diagonal, and zeros in the other elements. GMM estimator, which minimizes Equation (5.9) is,

$$\hat{\beta} = [(\Delta y_{-1})' Z(Z'(I_N \otimes W)Z)^{-1} Z'(\Delta y_{-1})]^{-1} [(\Delta y_{-1})' Z(Z'(I_N \otimes W)Z)^{-1} Z'(\Delta y)] \quad (5.11)$$

Arellano and Bond also provides a two-step estimator, in which  $W$  is calculated using the equation,

$$\hat{W} = \left[ \frac{1}{N} \sum_{i=1}^N (Z_i' \overline{\Delta v_i} \quad \overline{\Delta v_i}' Z_i) \right]^{-1} \quad (5.12)$$

where  $\overline{\Delta v_i}$  is the first-differenced residuals from a previous estimator, which can also be Equation (5.11). The two step estimator is criticized due to its dependence on estimated parameters, which makes it less reliable. Moreover, based on simulation analysis, Bond (2002) states that there exists a very little efficiency gains by implementing two-step estimator.

First differenced GMM provides an unbiased, efficient and consistent estimator. Nevertheless, in case of persistent series, the instruments used by first difference GMM becomes weak and the first GMM estimator befalls inconsistent. If the

independent series approaches to random walk, the lagged independent variables used as instruments are uncorrelated with the first-differenced level. The system GMM, exploiting “*an additional mild stationary restriction on the initial conditions process*”, adds level equations and extends the instrument matrix by inserting lagged levels of independent variable as instruments for equations in levels (Baltagi, 2001). The system GMM provides consistent estimates if the independent series are close to random walk (Bond, 2002).

GMM estimators are consistent only if T is fixed and N is large. Therefore, they fit to the data structure of this study, which uses 198 companies with 39 time series observations. In this study, the first differenced GMM and system GMM estimators (as defined in Bond (2002)) are used along with OLS and FE error component estimators.

## **5.2. Research Variables**

This study aims to analyze the effects of stabilization programs on the corporate factor, using the model in Section 3. Stabilization programs create temporary financial shocks and disturb the balance defined by Equation (3.13) in Section 3. Equation (3.13) combines two basic components of international finance theory to define the balance in an open economy. A stabilization program, based on an anchor, disturbs this balance, create arbitrage opportunities, and result in disparities in the economy. This section aims to define the unstabilizing factors

that affect the corporate sector, and the response variables that measure the performance of the corporate sector. First, the factors that disturb the balance in Equation (3.13), which are used as independent variables in this research are defined. Next, the financial ratios to measure the performances of the corporate sector are described.

### **5.2.1. Independent Variables**

#### **Real Interest Rates (rr)**

Interest rates have been used from time to time as a tool to tackle inflation. In 1990s, after the capital account liberalization, under a monetary policy with an implicit nominal anchor, the real interest rates were extremely high, whereas after the implementation of the 2000 ERBS program, real interest rates decreased to negative levels. 2001 Strengthening the Turkish Economy program, uses the short-term interest rates to tackle inflation. Without doubt, such an erratic pattern of real interest rates, or in other words the disparity between the nominal interest rates and inflation, is very destructive for the economy. High real interest rates would harm the economy, by slowing down the investments and impeding the economic growth. On the other hand, lower real interest rates, would cut down the savings and reduce the efficiency of the economy. To summarize, any deviation from an

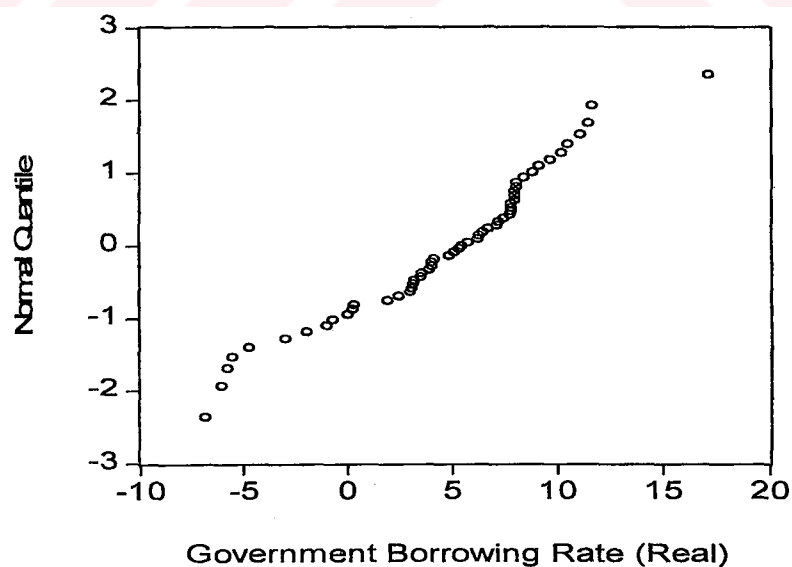
equilibrium level, upwards or downwards, as a result of a stabilization program, would harm the economy and the corporate sector accordingly.

Real interest rate is calculated as,

$$rr_t = \frac{1+i_t}{1+\pi_t} - 1 \quad (5.13)$$

where  $\pi_t$  is the expected inflation rate at time t, and  $i_t$  is the nominal interest rate at time t. The average of compound interest rates on Turkish treasury bills in each month is used as the nominal interest rate. By discounting the average compound interest rate with the annual WPI over the same month of the next year. To calculate the quarterly real interest rates, the average of the real interest rate of the three months in that period is used.

Figure 11: Q-Q plot for  $rr_t$



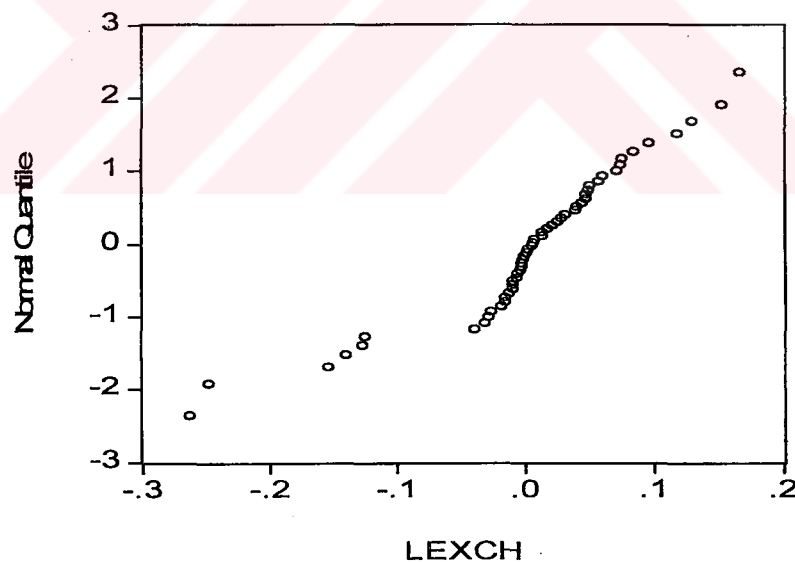
To test the normality, Q-Q plot, one of the most popular graphical tests of normality, is used. Q-Q plot of real interest rate shows that the rr data resembles the normal distribution (Figure 11). Augmented Dickey-Fuller test is used to test for unit root. Unit root is rejected at 5% significance level. The result of the ADF test is given in the appendix.

### **Logarithmic Change of Real Exchange Rates ( $\Delta Q$ )**

Real exchange rate is very important for the external balance of the economy since it determines the price of domestic goods in the foreign markets and the price of imported goods in the domestic market. Crisis models put forward real exchange rate as one of the major indicators of a forthcoming economic crisis. Appreciation of the domestic currency depletes the competitive power of the domestic corporate sector, and decreases the ability of the sector to export its products, leading to recessive effects on the economy. Krugman (1999) even states that devaluation after a period of continuous appreciation of the domestic currency would be revealing, since the economy would be able to grow by increase in exports. A disparity between the inflation and nominal exchange rate can be created by implementing an ERBS. It is a very well-known fact that using nominal exchange rate as an anchor to stabilize the inflation, leads to appreciation of the domestic currency. However, as the capital flows around the world becomes larger and quicker, it has been observed that appreciation of domestic currency can be

observed even under floating exchange rate regimes. Equation (3.13) explains how stabilization programs may lead to deviation of real exchange rate from its equilibrium, even under stabilization programs other than ERBS. The real exchange rate of TL calculated by CBTR is given in Figure 3. In 1990s, TL appreciated continuously, since exchange rate was used as an implicit anchor to tackle inflation. This unsustainable strategy interrupted in 1994 with an economic crisis and a sharp devaluation. In both 2000 ERBS program and 2001 Strengthening Turkish Economy program, TL stayed overvalued, leading to massive trade deficits.

Figure 12: Q-Q plot for logarithmic change of real exchange rate ( $\Delta Q$ )



Normality and unit root tests is performed on the real value of TL to check whether there exists any problems that may lead to trouble in the empirical

analysis. Since ADF test couldn't reject the unit root in the real exchange rate, the logarithmic change of the series is calculated. The ADF test rejects the existence of unit root in the logarithmic change of the real value of TL calculated by CBTR. The result of ADF test is given in the appendix. Figure 12 illustrates the Q-Q plot of the log change of the real exchange rate ( $\Delta Q$ ), which shows that normal distribution for the model is reasonable.

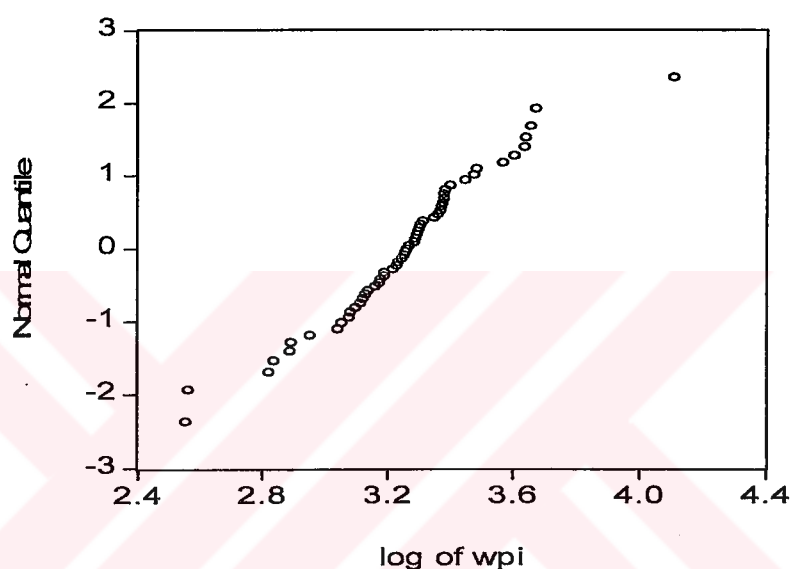
### **Log of Change in WPI ( $\pi$ )**

Figure 2 illustrates the movement of inflation (WPI) in the Turkish economy. Inflation has been extremely volatile, although a number of different stabilization programs have been implemented. Since the second half of the 1990s, inflation is in a downward trend. A volatile change in the general price level is extremely destructive for an economy. To start with, the uncertainty in the future general price level makes it hard to determine the future prices and wages. This not only decreases the efficiency of the economy, but also disturbs the distribution of wealth. The erratic pattern of inflation also impedes long-term investments, since it is impossible to forecast future prices. The unprecedented price changes decrease the efficiency of the economy and lead to volatility in the economic growth.

Quarterly change in WPI is used to measure the general price changes. However, since this series has normality problem, the log of WPI is used as an explanatory

variable in this analysis. The Q-Q plot of log of WPI is given in Figure 13, which shows that the normality assumption is reasonable. The ADF test, reported in the appendix, rejects the existence of unit root in the log of WPI at 1% significance level.

Figure 13: The Q-Q plot of log of WPI Change



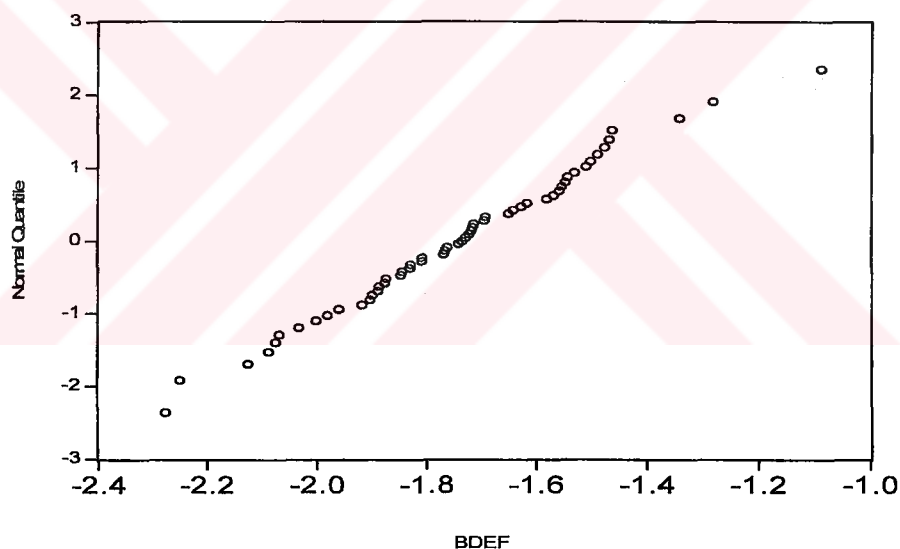
### Primary Budget Balance to GNP Ratio (BDEF)

As discussed before, fiscal policy is one of the most important factors that affect the strength of an economy. Calvo and Mishkin (2003) emphasize the importance of the fiscal policy, stating that no matter which stabilization program is implemented, it can't be successful without strong fiscal and financial institutions. The change in budget deficit, either as a result of a change in government



expenditure, or as a result of a change in tax policy, would result in a financial shock, disturb the balance in Equation 3.13, and result in disparities in the economy. What's more, in economies like Turkey, where public sector is very big, a contractionary fiscal policy would affect the economy seriously. A very strict policy would result in a recession in the economy, whereas a loose fiscal policy will increase the borrowing requirement of the public sector in the future and lead to loss of credibility.

Figure 14: The Q-Q Plot for BDEF

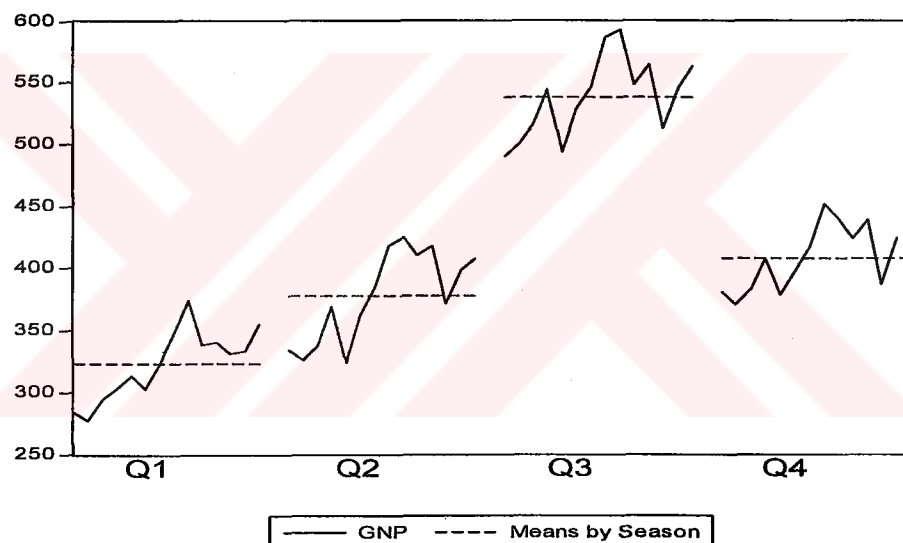


The primary budget balance to GNP ratio has normality problem, therefore the log transformation of this series is used in this analysis. The Q-Q plot of BDEF in Figure 14 shows that normal distribution assumption is reasonable. The ADF test rejects the existence of unit root in BDEF at 1% significance level.

### Logarithmic Change in Real Per Capita GNP (GNP)

The last explanatory variable used in the analysis is real GNP per capita. This factor captures the non-financial shocks that may disturb the balance in Equation (3.13). The quarterly GNP per capita bears seasonality problem, as presented in Figure 15. The seasonality problem is solved by additive seasonal adjustment.

Figure 15: GNP per capita by season

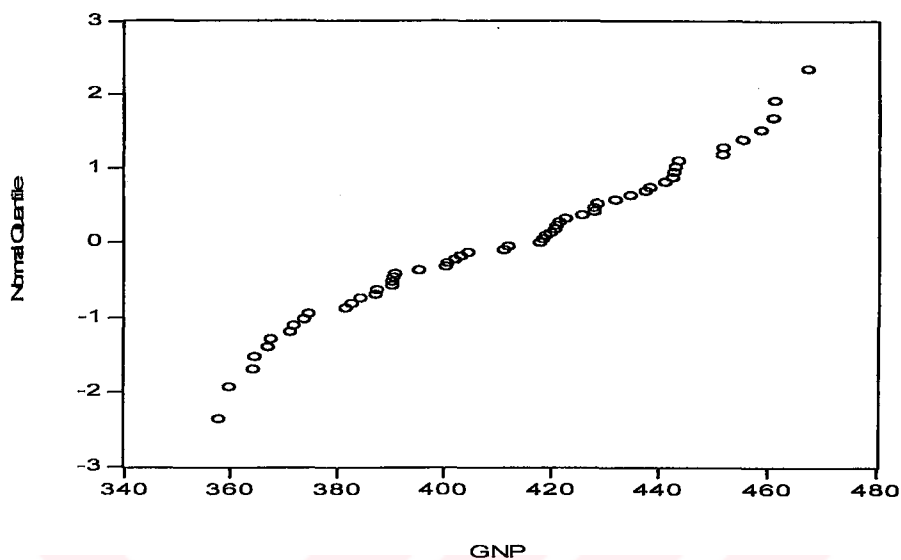


However, since seasonally adjusted real GNP per capita has unit root problem, the logarithmic change of this series is calculated. The transformed series doesn't have unit root problem. The Q-Q plot of the transformed series is given in Figure 16.

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**Figure 16: The Q-Q Plot for logarithmic change of seasonally adjusted GNP per capita**

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### 5.2.2. Dependent Variables

The research question is how the factors defined above affect the performance of the corporate sector. The performance of the companies in the sample is measured from four different perspectives; (1) profitability, (2) leverage, (3) asset turnover and (4) liquidity. Only the companies under the regulation of CMB announce their financial figures regularly, therefore the industrial companies issued in the Istanbul Stock Exchange (ISE) are taken to represent the Turkish corporate sector. The list of the companies is given in the appendix. The sample consists of a panel data, with a cross-section dimension, which consists of 198 companies, and a time series dimension, which covers 39 quarterly financial figures of these companies in the period between 1994Q1 and 2003Q3. Since some of the companies are issued later

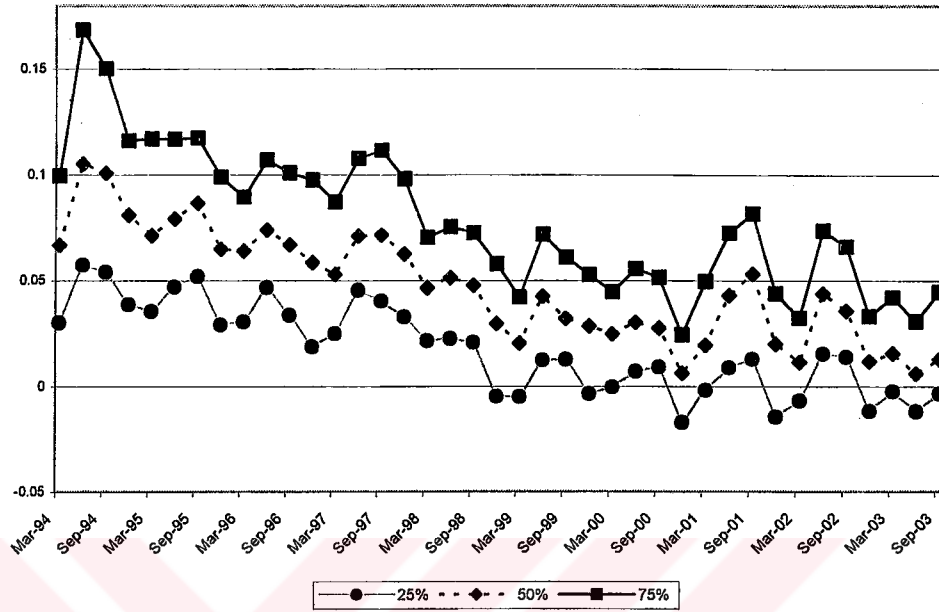
than the beginning of the period and there are some missing observations for some of these companies, the panel data is unbalanced.

Before calculating the financial ratios, the quarterly values of income statement items are calculated by subtracting the value of the income statement item in the quarter  $t-1$  in a year from the value of the same item in the quarter  $t$ . For example, the net sales of Abana in the second quarter of 1994 is subtracted from the net sales of Abana in the third quarter, to calculate the return in the third quarter of 1994. In this way, comparable quarterly values are obtained to be used in the analysis.

To measure the profitability of the companies in the sample, Return on assets ratio (ROA) is used. ROA, the ratio of EBIT to total assets, measures the operational profitability of a company with respect to its total assets. The values of ROA of the companies in the 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentile, for each period are presented in Figure 17.

The operational profitability shows a downward trend in the second half of the 1990s and reaches its bottom-most level in 2000Q4. What's more, it recovers in the crisis year, and resumes its decreasing trend in the last two years, as presented in Figure 17. This figure just looks like the reverse of Figure 3, which presents the real value of TL. Obviously, appreciation of the TL led to competitive disadvantage for the Turkish corporate sector, and forced them to sacrifice their operational profit margins. A negative coefficient is expected for real exchange rate variable in the ROA analysis.

Figure 17: Return on Assets of the companies in the sample

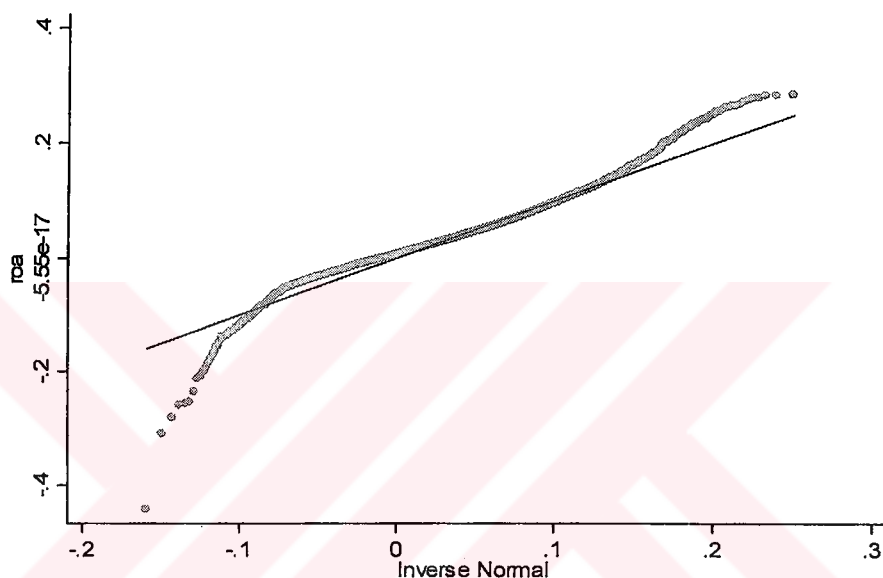


The Q-Q plot of the ROA variable is given in Figure 18. To check the existence of unit root, a GMM first difference regression is used, and reported in the appendix. Since there is no normality or unit root problem, quarterly ROA values are used without any transformations in the following equation to explain the profitability of the Turkish corporate sector.

$$\begin{aligned}
 ROA_{it} = & b_0 + b_1 rr_t + \dots + b_5 rr_{t-4} + b_6 \Delta Q_t + \dots + b_{10} \Delta Q_{t-4} + b_{11} \pi_t + \dots + b_{15} \pi_{t-4} + b_{16} GNP_t \\
 & + \dots + b_{20} GNP_{t-4} + b_{21} BDEF_t + \dots + b_{25} BDEF_{t-4} + b_{26} ROA_{t-1} + \dots + b_{29} ROA_{t-4} + \varepsilon_{it}
 \end{aligned} \quad (5.14)$$

The lags of explanatory variables are added into the equation to observe the retarded effects of them. In addition, the first four lag of ROA is included, considering the dynamic structure of the model.

Figure 18 : The Q-Q plot for ROA

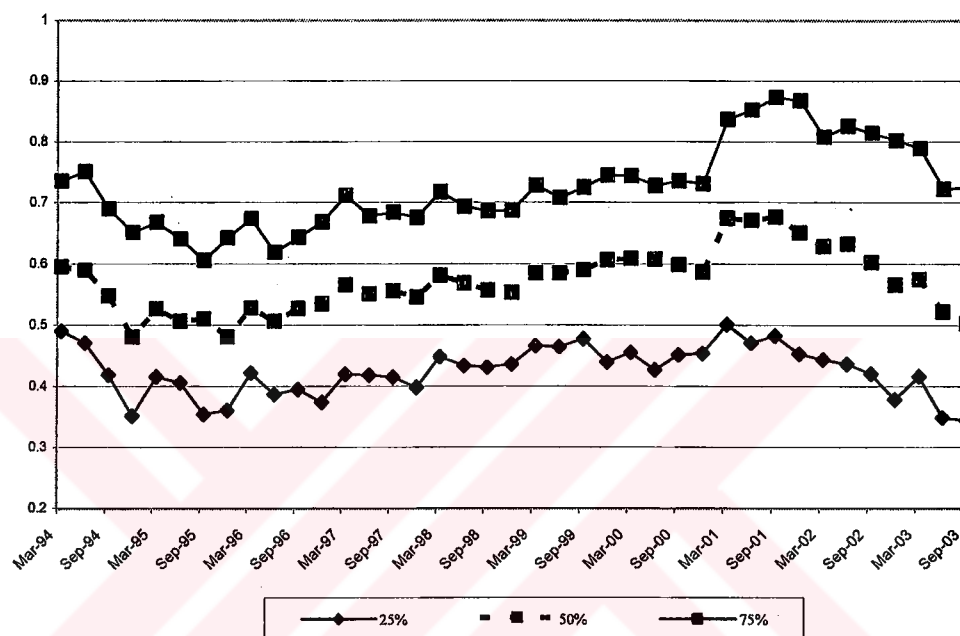


The second phase of this study analyzes the financial leverage. The debt to total assets ratio is used to measure leverage. Figure 19 reports the 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentile of the leverage ratios of the companies for different periods.

The leverage ratio shows an upward trend in the second half of 1990s. This is consistent with the propositions of the Third Generation Crisis Models. The increasing financial risk of the corporate sector and other economic agents, due to high leverage ratios and

short positions, create multiple-equilibria in the economy, and develop an environment for an economic crisis.

**Figure 19: The leverage ratios of the companies in the sample**

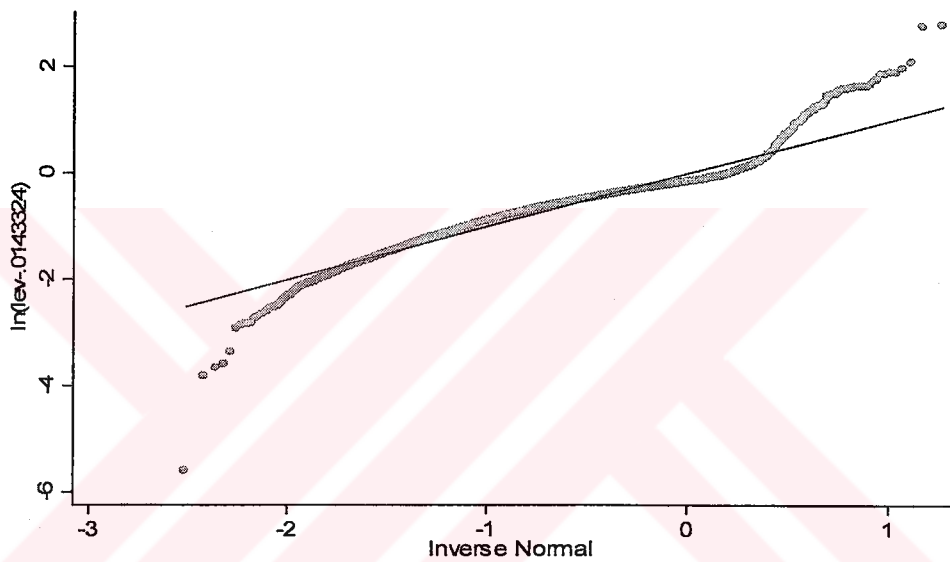


The leverage ratio reaches its peak at the end of the crisis year, probably as a result of short positions and the increase in TL values of foreign currency denominated debts. After the crisis year, the leverage ratio breaks the upward trend, not only because of the conservative behavior of the corporate sector to decrease their financial risk, but also probably because of the decrease in the TL values of foreign currency debts as a result of the appreciation of TL in the last two years.

The logarithmic transformation is implemented to solve the normality problem of the leverage ratio (LEV). The Q-Q plot of the log transformed LEV is given in

Figure 20. To check the existence of unit root, a GMM first difference regression is used, and reported in the appendix. Since there is no normality or unit root problem, log transformed leverage ratio (LEV) is used in the second equation to explain the financial riskiness of the Turkish corporate sector.

Figure 20: The Q-Q plot for LEV



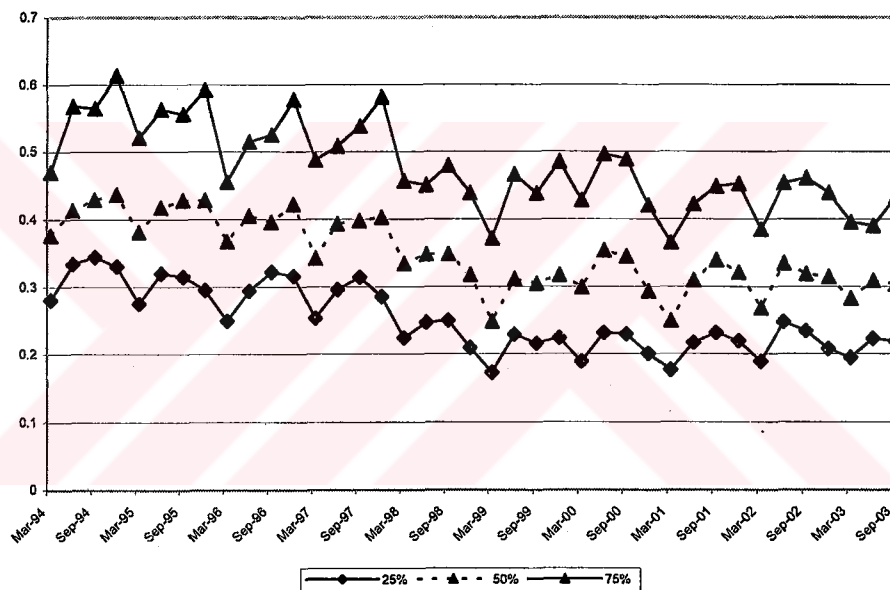
The lags of explanatory variables are added into the equation to observe the retarded effects of them. In addition, the first four lag of LEV is included, considering the dynamic structure of the model.

$$\begin{aligned}
 LEV_{it} = & b_0 + b_1 rr_t + \dots + b_5 rr_{t-4} + b_6 \Delta Q_t + \dots + b_{10} \Delta Q_{t-4} + b_{11} \pi_t + \dots + b_{15} \pi_{t-4} + b_{16} GNP_t \\
 & + \dots + b_{20} GNP_{t-4} + b_{21} BDEF_t + \dots + b_{25} BDEF_{t-4} + b_{26} LEV_{it-1} + \dots + b_{29} LEV_{it-4} + \varepsilon_{it} \quad (5.15)
 \end{aligned}$$



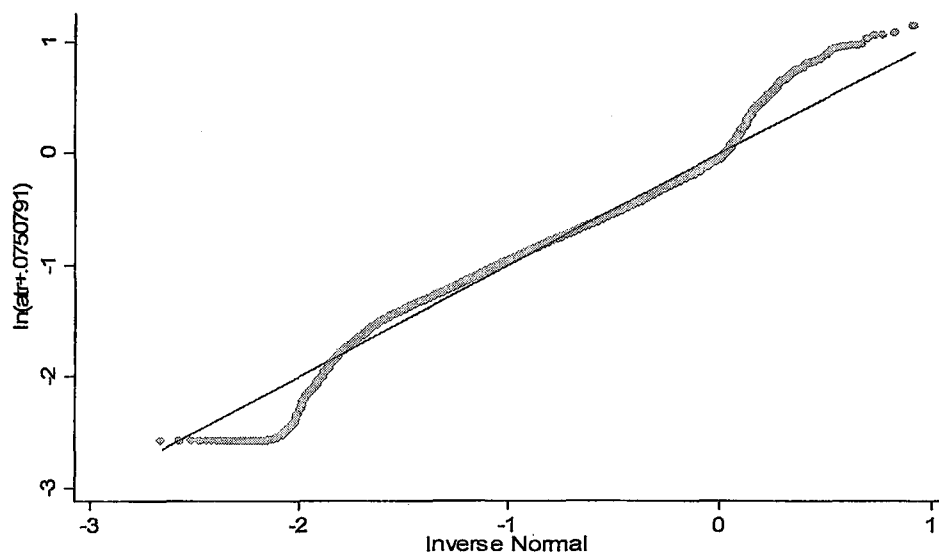
Third, total asset turnover ratio is calculated to measure the efficiency of the corporate sector to generate revenues. The aim is to calculate how the disparities affect the asset turnover of the companies. The total assets to turnover ratio is calculated by dividing sales by total assets. Figure 21 exhibits the 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentile of the total assets turnover ratios of the companies in the sample.

**Figure 21: Total assets turnover ratio of the companies in the sample**



Similarly to profitability, a downward trend is apparent for the total assets turnover ratio, or the asset turnover of the company, in the second half of the 1990s. This phenomenon can be explained by sharpening competition by foreign companies which are backed by the price advantage due to the appreciation of TL through this period.

Figure 22: The Q-Q plot for ATR

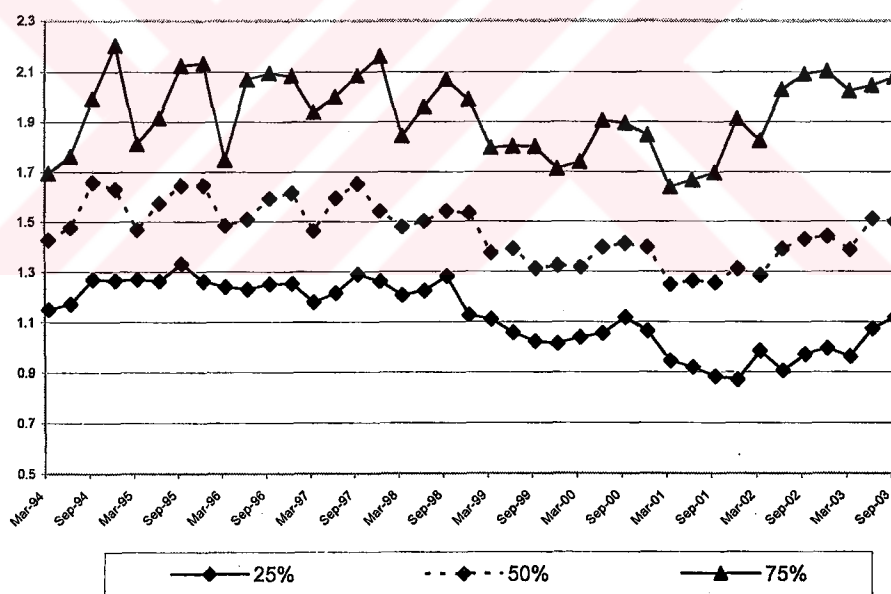


The total asset turnover ratio variables calculated for the sample of this analysis doesn't provide the normality assumption. Therefore, a logarithmic transformation is accomplished to achieve normality. The Q-Q plot of the log transformed total assets turnover ratio (ATR) is documented in Figure 22. To check the existence of unit root, a GMM first difference regression is used, and reported in the appendix. The third equation is constructed similarly, by adding the lags of explanatory variables and the first four lags of ATR,

$$\begin{aligned}
 ATR_{it} = & b_0 + b_1 rr_t + \dots + b_3 rr_{t-4} + b_6 \Delta Q_t + \dots + b_{10} \Delta Q_{t-4} + b_{11} \pi_t + \dots + b_{15} \pi_{t-4} + b_{16} GNP_t \\
 & + \dots + b_{20} GNP_{t-4} + b_{21} BDEF_t + \dots + b_{25} BDEF_{t-4} + b_{26} ATR_{t-1} + \dots + b_{29} ATR_{t-4} + \varepsilon_{it}
 \end{aligned} \tag{5.16}$$

The final analysis is to evaluate the effects of explanatory variables listed in the previous section on the liquidity, which measures the ability of the firms to meet their short-term obligations. A commonly used ratio, current ratio, which is calculated by dividing current assets to current liabilities, is used to measure liquidity. The aim is to observe the impacts of the temporary financial shocks created by stabilization programs on the short-term solvency of the companies. Figure 23 reports the 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentile of the current ratios of the companies in a given period.

Figure 23: Current ratio of the companies in the sample

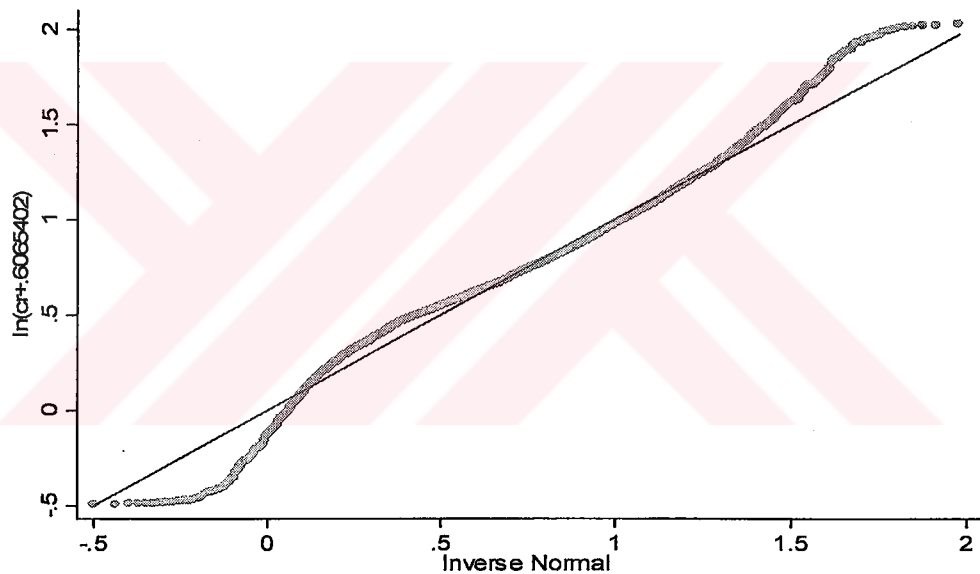


The current ratio of companies in the sample doesn't have a very volatile pattern, contrary to other ratios. The crisis years, 1994 and 2001, when the current ratio decreases to the bottom-most levels, are distinguished among the other years. The

sharp decreases are probably a result of the lack of liquidity and failure of the payment system through the crisis years.

The current ratio series is log transformed, since it isn't normally distributed. The Q-Q plot of the log transformed current ratio variable (CR) is exhibited in Figure 24. The unit root test by implementing GMM regression, which is documented in the appendix, rejects the existence of unit root.

Figure 24: The Q-Q Plot for CR



The last analysis regress the CR over the current and the first four lags of explanatory variables and the first four lags of CR,

$$\begin{aligned}
 CR_{it} = & b_0 + b_1 rr_t + \dots + b_5 rr_{t-4} + b_6 \Delta Q_t + \dots + b_{10} \Delta Q_{t-4} + b_{11} \pi_t + \dots + b_{15} \pi_{t-4} + b_{16} GNP_t \\
 & + \dots + b_{20} GNP_{t-4} + b_{21} BDEF_t + \dots + b_{25} BDEF_{t-4} + b_{26} CR_{t-1} + \dots + b_{29} CR_{t-4} + \varepsilon_{it}
 \end{aligned} \quad (5.17)$$

## 6. EMPIRICAL FINDINGS

To evaluate the unstabilizing effects of the stabilization programs on the corporate sector, four different regression analyses are applied on four different ratios. OLS, FE, GMM – First Difference Methodology, and GMM – System Methodology are implemented for all ratios. This section reports the empirical findings.

### 6.1. Effects on the Operational Profitability

Table 2 analyzes the effects of the factors that destabilize the balance defined in Equation 3.13. The number of panel data observations in the analysis is 5485. There are 198 cross-sectional groups in the panel data. Minimum time series observation per group is 5 and the average observation is 27.70.

The first column reports the OLS regression results. The adjusted  $R^2$  is 42%, and the p-value of F-statistic is zero. The Durbin Watson (DW) statistic is 1.96, indicating no autocorrelation in the residuals. The fixed effects estimator is reported in the second column. The adjusted  $R^2$  is 44%, and the p-value of F-statistic is zero. The DW statistic is 1.96, indicating that there is no autocorrelation in the residuals. As discussed in the 5<sup>th</sup> section, these estimators may be biased when implemented in dynamic panel data models.

**Table 2: Regression results for ROA**

	OLS	FE	GMM - First Diff.	GMM - System
AR(1)	0.330 (16.59)*	0.254 (13.45)*	0.263 (10.13)*	0.025 (0.34)
AR(2)	0.023 (1.11)	-0.031 (-1.55)	-0.009 (-0.26)	-0.222 (-4.27)*
AR(3)	0.094 (4.74)*	0.044 (2.40)**	0.058 (3.13)*	0.122 (1.57)
AR(4)	0.282 (13.41)*	0.240 (11.69)*	0.274 (8.35)*	0.669 (8.82)*
ΔQ	-0.092 (-4.50)*	-0.099 (-4.87)*	-0.135 (-6.76)*	-0.192 (-2.09)**
ΔQ(-1)	-0.038 (-1.77)***	-0.046 (-2.15)**	-0.031 (-1.79)***	-0.248 (-2.03)**
ΔQ(-2)	0.055 (2.34)**	0.055 (2.32)**	-0.025 (-1.17)	-0.073 (-0.56)
ΔQ(-3)	0.031 (1.71)***	0.042 (2.35)**	0.049 (3.40)*	0.033 (0.43)
ΔQ(-4)	0.037 (1.57)	0.029 (1.24)	-0.047 (-2.63)*	0.173 (1.65)
π	0.000 (-0.05)	0.001 (0.13)	0.019 (3.23)*	-0.054 (-1.20)
π(-1)	-0.006 (-0.88)	-0.003 (-0.44)	-0.017 (-3.26)*	-0.071 (-3.07)*
π(-2)	0.028 (3.25)*	0.037 (4.42)*	0.047 (7.64)*	0.023 (0.68)
π(-3)	0.033 (4.20)*	0.032 (4.08)*	-0.016 (-2.72)*	0.089 (2.05)**
π(-4)	-0.016 (-2.43)**	-0.014 (-2.24)**	-0.008 (-1.53)	-0.047 (-1.14)
ππ	0.000 (1.17)	0.000 (0.98)	-0.001 (-1.54)	0.001 (1.17)
ππ(-1)	0.000 (0.42)	0.000 (0.22)	0.001 (1.93)***	0.002 (1.08)
ππ(-2)	-0.001 (-1.82)***	-0.001 (-2.09)**	-0.001 (-2.27)**	-0.003 (-1.18)
ππ(-3)	-0.001 (-2.75)*	-0.001 (-2.66)*	0.000 (0.73)	-0.006 (-2.50)**
ππ(-4)	0.000 (0.19)	0.000 (0.61)	-0.001 (-1.86)***	0.003 (1.50)
BDEF	-0.028 (-4.44)*	-0.032 (-5.24)*	-0.021 (-4.45)*	-0.019 (-0.88)
BDEF(-1)	0.003 (0.46)	-0.003 (-0.45)	0.000 (0.09)	-0.062 (-1.36)
BDEF(-2)	-0.002 (-0.39)	-0.004 (-0.79)	-0.009 (-1.93)***	-0.052 (-1.87)***
BDEF(-3)	-0.023 (-3.93)*	-0.025 (-4.38)*	-0.003 (-0.78)	0.006 (0.23)
BDEF(-4)	0.001 (0.23)	-0.002 (-0.28)	-0.008 (-1.51)	-0.051 (-1.01)
GNP	0.177 (5.34)*	0.181 (5.66)*	0.238 (5.85)*	0.673 (3.27)*
GNP(-1)	0.175 (5.82)*	0.179 (6.29)*	0.189 (6.45)*	0.421 (4.31)*
GNP(-2)	-0.166 (-3.83)*	-0.178 (-4.25)*	-0.048 (-1.32)	-0.286 (-1.29)
GNP(-3)	0.016 (0.42)	0.016 (0.45)	0.011 (0.36)	-0.255 (-0.93)
GNP(-4)	0.040 (1.12)	0.066 (1.88)***	0.011 (0.32)	-0.376 (-2.68)*

\*, \*\*, \*\*\* indicate the significance levels at 1, 5, and 10% respectively

The third and fourth column report GMM estimators. The System GMM estimator, which utilizes the first differenced and level equations to create instruments, is given in the fourth column. As the unit root test for ROA rejects the existence of unit root, First Differenced GMM estimator (GMM-FD) is appropriate for this analysis. However, since there is an ongoing dispute over the strength of panel data unit root tests, the System GMM estimator (GMM-SYS) is also reported.

The p-value of F-statistics for the GMM-FD is zero, and the specification test doesn't reject the validity of the instruments (the p-value of the Hansen J. test is 1.00). Similarly, for the GMM-SYS, the p-value of F-statistics is zero, and Hansen J test is 0.34, indicating the correctness of the model.

The results of the regressions are generally comparable. The first parameter in the analysis is the change in the real value of TL. The regression outputs indicate that there are two different effects of appreciation of the domestic currency on the profitability of the corporate sector. The appreciation of the domestic currency in the current period and preceding period has a negative impact on the profitability of the corporate sector. This is consistent with the expectations. The appreciation of the domestic currency causes a price disadvantage for the domestic companies both in domestic and foreign markets. Faced with an imbalanced competition, domestic companies are forced to sacrifice their profit margins. The retarded effect, observed in the third quarter, is positive. In other words, the appreciation of

the domestic currency three quarters ago has a positive effect. There may be two explanations for such a retarded positive impact. First of all, Turkish corporate sector is highly dependent on the imported raw materials and intermediate products. A decrease in the foreign currencies would reduce the cost of goods sold of the products to be produced and sold and relieve the disadvantage of foreign competition. Second, appreciation of domestic currency is generally accompanied by remonetization and an economic boom. Domestic companies would benefit from the increase in demand with a delay, since the imported goods would reap the increase in the demand first due to their competitive advantage discussed above.

The results for the second variable, inflation ( $\pi$ ), are mixed, if not contradictory. The GMM-FD reports significant positive coefficients for the current inflation and the second lag, and negative coefficients for the first and third lags. This cyclic pattern of the inflation is hard to explain. The positive impact of the current inflation indicates that the inflation has a demand-pull structure. The corporate sector increases their prices, benefiting from the uplifting demand, and acquires an elevated profit in that period. However, the increasing inflation hits the profitability of the company in the next period, as the prices of the factors, such as wages, are adjusted, leading to an increase in the cost of goods sold.

The third factor is the real interest rate. Except the first lag GMM-FD estimator, the findings for the real interest rate are negative and consistent with the empirical theory. Since the operational profit is analyzed, a probable decrease in the financial costs as a result of decrease in interest rates is not observed in this analysis. The real interest rate has a significant retarded negative effect on the



operational profitability. Obviously, real interest rates have a retarded effect on demand and consumption, and accordingly the profitability of the corporate sector. Next, the effect of the primary budget balance to GNP ratio is reported. Consistent with the expectations, the BDEF has a negative impact on the profitability of the corporate sector. The public sector is the biggest customer in the Turkish economy. Therefore, the private sector still is very dependent on the subsidies, credits and the demand provided by the public sector. Consequently, any contractionary policies implemented would deteriorate the operational profitability of the corporate sector.

The last variable is the change in the GNP per capita. The current value and the first lag of the GNP variable have a positive coefficient, consistent with the expectations. An increase in the GNP per capita would indicate an increase in disposable income and result in an increase in demand to the products of the corporate sector and accordingly their profit margins. However, OLS and FE regressions report a significant negative coefficient for the second lag of the GNP. The lag negative impact of GNP increase is hard to explain. A probable explanation can be the pre-consumption of future needs due to the cyclic behavior of the Turkish economy. The economic agents may bring forward their future consumption whenever they are easier to purchase, since they are concerned about the future developments in the economy. A good example to illustrate is the cyclic pattern of the automobile sales in Turkey.

## 6.2. Effects on the financial leverage

Table 3 reports the results for financial leverage. Again, four different types of panel data analysis are implemented. The number of panel data observations in the analysis is 5650. There are 198 cross-sectional groups in the panel data. Minimum time series observation per group is 5 and the average observation is 28.54.

OLS results are reported in the first column. The adjusted  $R^2$  is 0.90, and the p-value of the F-statistic is zero, indicating the significance of the model. The DW statistic is 1.90, which implies that there is no autocorrelation in the residuals.

The FE estimation is given in the second column. The adjusted  $R^2$  is 0.90, and the p-value of the F-statistic is zero. Finally, the DW statistic is 1.90. All the test results are in the acceptable range.

The third and fourth column report GMM estimators. The p-value of F-statistics for the GMM-FD is zero, and the specification test doesn't reject the validity of the instruments (the p-value of the Hansen J. test is 1.00). However, for the GMM-SYS, the Hansen J test rejects the validity of over identifying restrictions at the 1% significance level. Although the p-value of F-statistics for GMM-SYS for LEV is zero, the results should be interpreted carefully, since they may be inconsistent, according to Hansen J test.

The first factor, the change in real exchange rate, has a significant negative correlation in both OLS and FE regressions. On the other hand, the lagged values have positive coefficients. The GMM-FD doesn't give significant coefficients for the current and lagged values of the real exchange rate. Figure 19 depicts this

mixed effect of real value of TL. Obviously, as the TL appreciates, it is profitable to borrow in terms of foreign currencies. What's more, in case of an exchange rate anchor, as discussed in the second section, the devaluation risk is eliminated. In addition, a remonetization is observed, and the amount of loanable funds increases. These factors seduce the corporate sector to increase their leverages. Therefore, appreciation of the currency has a positive effect on the financial leverage. On the other hand, through a crisis, not only because of the short positions that the corporate sector accumulated through the appreciation period, but also the liquidity problem following the crisis, increases the total debt to assets ratio.

Therefore, through the crisis periods, the devaluation of TL has an immediate positive effect, or in other words, the  $\Delta Q$  has a negative coefficient. The data period includes two financial crises, which accounts for at least 8 periods. Therefore, it seems that the latter effect, dominates the former one, which is positive, for the current and first lag observations of  $\Delta Q$ .

The second factor is inflation. All significant coefficients in all regressions have a positive coefficient, which indicates that inflation shocks lead to increases in the financial leverage, and accordingly the financial riskiness of the corporate sector. This is not surprising, since an increase in inflation corrupts the equity of the companies and forces them to use external financial sources. Without doubt, the auditing system, which requires no adjustment for inflationary effects, makes the results look worse than they really are.

The third factor is real interest rates. The basic supply and demand theory would suggest a negative coefficient for the real interest rates. As the borrowing becomes

expensive, the companies would prefer to borrow less, by delaying their investments and project, which require extra funding. Consistently, all significant coefficients in all of the regressions are negative, except the coefficient of the first lag in the GMM-FD. A possible explanation is that corporate sector may have to borrow more to finance the high interest expense incurred in the previous quarter. Ignoring this subtle contradiction, a general conclusion can be reached based on these results, stating that there is a negative relation between the real interest rate and the financial leverage, as expected.

Next, the primary budget deficit to GNP ratio is analyzed. The results of the regression are comparable. Except the first lag coefficients, all coefficients are positive. A strict fiscal policy would decrease the weight of the public sector in the economy, and alleviate the crowding-out effect, by reducing the borrowing requirement of the public sector and its share in the loanable funds that it vanishes. This would increase the ability to corporate sector to borrow and use the financial leverage to grow.

The last factor is the change in GNP per capita. The results of all of the regressions are consistent and indicate a negative effect for both current and the lagged values of change in GNP per capita. This indicates that as the economy grows and becomes stronger, the financial structure of the corporate sector gets healthier and stronger. This is consistent with the fact that the equity structure is generally insufficient in undeveloped economies, whereas it is not in developed economies.

**Table 3: Regression results for LEV**

	OLS	FE	GMM - First Diff.	GMM - System
AR(1)	0.846 (23.31)*	0.768 (21.21)*	0.656 (12.24)*	0.849 (15.46)*
AR(2)	0.013 (0.33)	-0.004 (-0.10)	0.015 (0.52)	0.045 (0.49)
AR(3)	0.037 (1.09)	0.027 (0.82)	0.011 (0.32)	-0.065 (-0.48)
AR(4)	0.098 (4.06)*	0.085 (3.41)*	0.109 (4.21)*	0.257 (1.63)
ΔQ	-0.100 (-1.03)	-0.165 (-1.76)***	-0.128 (-1.50)	-0.020 (-0.11)
ΔQ(-1)	-0.259 (-2.59)*	-0.370 (-3.88)*	-0.023 (-0.22)	0.544 (2.47)**
ΔQ(-2)	0.074 (0.49)	-0.175 (-1.28)	0.044 (0.42)	0.069 (0.23)
ΔQ(-3)	0.220 (1.93)***	0.006 (0.06)	0.078 (0.99)	-0.268 (-1.15)
ΔQ(-4)	0.294 (2.75)*	0.179 (1.78)***	0.064 (0.62)	0.082 (0.31)
π	0.126 (4.24)*	0.080 (2.81)*	0.091 (2.70)*	0.352 (4.88)*
π(-1)	0.163 (3.26)*	0.046 (1.13)	-0.050 (-1.52)	0.077 (1.16)
π(-2)	0.212 (3.91)*	0.113 (2.37)**	-0.043 (-1.43)	0.017 (0.26)
π(-3)	0.074 (1.93)***	0.042 (1.18)	-0.037 (-1.31)	-0.025 (-0.27)
π(-4)	0.103 (4.60)*	0.117 (5.15)*	0.122 (4.79)*	-0.052 (-0.86)
ππ	0.001 (0.60)	0.001 (0.69)	-0.007 (-5.38)*	-0.007 (-2.97)*
ππ(-1)	-0.004 (-1.82)***	0.000 (0.08)	0.004 (2.87)*	-0.007 (-1.46)
ππ(-2)	0.000 (0.08)	0.001 (0.41)	-0.001 (-0.42)	0.003 (0.69)
ππ(-3)	-0.004 (-1.82)***	-0.005 (-2.11)**	-0.002 (-0.93)	0.011 (2.08)**
ππ(-4)	0.008 (2.65)*	0.004 (1.37)	-0.003 (-2.84)*	-0.002 (-0.48)
BDEF	0.077 (3.45)*	0.091 (3.99)*	0.042 (1.76)***	-0.002 (-0.04)
BDEF(-1)	-0.015 (-0.64)	0.008 (0.31)	-0.128 (-4.51)*	0.000 (0.00)
BDEF(-2)	0.046 (1.83)***	0.045 (1.77)***	0.048 (1.84)***	-0.026 (-0.38)
BDEF(-3)	0.092 (3.87)*	0.102 (4.35)*	-0.034 (-1.59)	-0.040 (-0.79)
BDEF(-4)	0.124 (5.86)*	0.136 (6.29)*	0.036 (1.58)	0.125 (1.61)
GNP	-0.273 (-1.64)	0.009 (0.06)	-0.440 (-2.51)**	-1.106 (-3.67)*
GNP(-1)	-0.274 (-1.36)	0.135 (0.78)	-0.347 (-2.42)**	-0.886 (-2.74)*
GNP(-2)	-0.375 (-1.56)	0.017 (0.08)	-0.289 (-1.68)***	0.617 (0.94)
GNP(-3)	-0.354 (-2.32)**	-0.243 (-1.59)	-0.855 (-4.65)*	0.581 (1.02)
GNP(-4)	-0.265 (-1.84)***	-0.326 (-2.30)**	-0.122 (-0.86)	-0.613 (-1.90)***

\*, \*\*, \*\*\* indicate the significance levels at 1, 5, and 10% respectively

### 6.3. Effects on the Short-term Solvency

Table 4 reports the regression results for the short-term solvency, namely current ratio. The number of panel data observations in the analysis is 5604. There are 198 cross-sectional groups in the panel data. Minimum time series observation per group is 5 and the average observation is 28.3.

OLS results are reported in the first column. The adjusted  $R^2$  is 0.81, and the p-value of the F-statistic is zero. The DW statistic is 1.91, which implies that there is no autocorrelation in the residuals.

The FE estimation is given in the second column. The adjusted  $R^2$  for the FE regression is 0.82, and the p-value of the F-statistic is zero. Finally, the DW statistic is 1.92.

GMM estimators are reported in the last two columns. The p-value of F-statistics for the GMM-FD is zero, and the p-value of the Hansen J. test is 1.00, indicating that the instruments used to construct the instrument matrix are valid. However, for the GMM-SYS, the Hansen J test rejects the validity of over identifying restrictions at the 1% significance level. Although the p-value of F-statistics for GMM-SYS for CR is zero, the results should be interpreted carefully, since they may be inconsistent, according to Hansen J test.

The first factor, the change in the real value of TL,  $\Delta Q$ , has a positive effect on the short-term solvency of the corporate sector. This result is not surprising. As stated

before, the appreciation of the domestic currency is generally accompanied by short-term capital inflows and remonetization. Extra liquidity in the economy, would allow the companies to improve their short-term solvency, meaning to a higher current ratio. Besides, a devaluation, which is generally accompanied by a recession and capital outflow, would sweep the funds available in the market, leading to a liquidity problem and even failures in the payment system. This would lead to a general reduction in the current ratio of the corporate sector.

The estimations for the inflation are mixed and hard to interpret. The OLS estimation for the current inflation and GMM-FD estimation for the fourth lag of inflation are negative, whereas GMM-FD estimation for the first lag is significantly positive. The negative impact of inflation on the liquidity of the corporate sector is obvious. In a chronic inflation environment, companies would prefer to have less inventories and cash that would lose value in real terms, deflated by the inflation. As the inflation increases, the companies would try to have less working capital, and stay less liquid, not to lose money in real terms.

The third factor is real interest rates, which also have contradicting results. The current value and second lag of interest rate have a positive coefficient, whereas the first lag has a negative significant coefficient. The real interest rate would affect the short-term assets and short-term liabilities separately, which form the current ratio. An increase in real interest rates would reduce the short-term borrowing ability of the corporate sector and decrease the short-term liabilities, which would increase the current ratio. On the other hand, an increase in real interest rates would decrease the short-term assets, since the opportunity cost of

working capital increases. Therefore, an increase in real interest rates would have a decreasing effect both on the short-term assets and long-term assets, which have converse impacts on the current ratio. The impact on the liabilities side is more direct, and therefore dominates in the current value. The impact on the asset side is rather retarded, leading a negative coefficient for the first lag.

The fourth factor is the primary budget balance to GNP ratio. A contractionary fiscal policy, which would impose a higher BDEF ratio, would decrease the working capital requirement, and accordingly current ratio, as the biggest customer in the market decreases its demand. Therefore, an increase in primary budget surplus would lead to a general decrease in the current ratio of the corporate sector.

The final factor is the change in the GNP per capita. A growth in the economy would boost the operations of the corporate sector, which would require higher working capital. Therefore, an increase in GNP per capita, or disposable income, would increase the current ratio, and accordingly short-term solvency of the corporate sector.



**Table 4: Regression results for CR**

	OLS	FE	GMM - First Diff.	GMM - System
AR(1)	0.799 (36.61)*	0.713 (32.58)*	0.596 (16.05)*	0.533 (4.95)*
AR(2)	0.022 (0.85)	0.002 (0.09)	0.006 (0.28)	-0.395 (-2.36)**
AR(3)	0.024 (1.07)	0.005 (0.22)	-0.012 (-0.64)	-0.108 (-0.55)
AR(4)	0.105 (6.33)*	0.071 (4.32)*	0.104 (3.85)*	0.623 (2.72)*
$\Delta Q$	0.132 (1.48)	0.229 (2.59)*	0.181 (2.80)*	0.348 (1.35)
$\Delta Q(-1)$	0.159 (1.77)***	0.280 (3.25)*	0.045 (0.63)	-0.011 (-0.05)
$\Delta Q(-2)$	0.061 (0.45)	0.306 (2.49)**	0.076 (0.88)	0.390 (1.44)
$\Delta Q(-3)$	-0.176 (-1.75)***	0.016 (0.18)	-0.092 (-1.54)	0.013 (0.08)
$\Delta Q(-4)$	-0.076 (-0.79)	0.049 (0.53)	0.151 (1.99)**	0.304 (1.30)
$\pi$	-0.061 (-2.26)**	-0.034 (-1.27)	-0.027 (-1.21)	-0.068 (-0.99)
$\pi(-1)$	-0.051 (-1.28)	0.045 (1.47)	0.053 (2.47)**	-0.007 (-0.15)
$\pi(-2)$	-0.067 (-1.47)	0.019 (0.48)	0.034 (1.34)	-0.054 (-0.70)
$\pi(-3)$	0.013 (0.37)	0.048 (1.48)	0.034 (1.49)	0.131 (1.86)***
$\pi(-4)$	-0.068 (-3.17)*	-0.087 (-4.00)*	-0.064 (-3.28)*	-0.025 (-0.43)
$\pi\pi$	0.001 (0.38)	0.002 (0.84)	0.003 (2.99)*	0.000 (0.15)
$\pi\pi(-1)$	0.000 (-0.09)	-0.004 (-2.23)**	-0.006 (-3.89)*	0.001 (0.33)
$\pi\pi(-2)$	0.000 (0.34)	0.000 (0.22)	0.004 (2.42)**	0.004 (0.88)
$\pi\pi(-3)$	0.001 (0.60)	0.001 (0.52)	0.000 (-0.16)	-0.011 (-1.98)***
$\pi\pi(-4)$	-0.003 (-1.17)	0.001 (0.48)	0.002 (1.35)	0.000 (-0.02)
BDEF	-0.049 (-2.41)**	-0.056 (-2.69)*	-0.011 (-0.60)	-0.015 (-0.26)
BDEF(-1)	0.033 (1.54)	0.018 (0.85)	0.092 (3.97)*	0.041 (0.65)
BDEF(-2)	0.002 (0.10)	0.009 (0.36)	-0.030 (-1.54)	0.052 (0.88)
BDEF(-3)	-0.078 (-3.55)*	-0.086 (-3.94)*	-0.009 (-0.48)	-0.038 (-0.71)
BDEF(-4)	-0.045 (-2.33)**	-0.049 (-2.48)**	0.013 (0.67)	0.107 (1.51)
GNP	0.070 (0.46)	-0.188 (-1.38)	0.064 (0.52)	0.364 (0.99)
GNP(-1)	0.277 (1.56)	-0.061 (-0.40)	0.240 (2.12)**	0.974 (3.27)*
GNP(-2)	0.304 (1.42)	-0.037 (-0.20)	0.305 (2.24)**	-0.016 (-0.03)
GNP(-3)	0.540 (3.74)*	0.495 (3.50)*	0.510 (3.54)*	0.359 (0.67)
GNP(-4)	0.399 (2.95)*	0.514 (3.91)*	-0.066 (-0.51)	0.141 (0.42)

\*, \*\*, \*\*\* indicate the significance levels at 1, 5, and 10% respectively

#### 6.4. Effects on the Asset Turnover Ratio

Table 5 reports the results for asset turnover ratio. Four different types of panel data analysis are implemented. The number of panel data observations in the analysis is 5511. There are 198 cross-sectional groups in the panel data. Minimum time series observation per group is 5 and the average observation is 27.83.

OLS results are reported in the first column. The adjusted  $R^2$  is 0.79, and the p-value of the F-statistic is zero, indicating the significance of the model. The DW statistic is 1.82, which implies that there is no autocorrelation in the residuals.

The FE estimation is given in the second column. The adjusted  $R^2$  is 0.78, and the p-value of the F-statistic is zero. Finally, the DW statistic is 1.81. All the test results are in the acceptable range.

The third and fourth column report GMM estimators. The p-value of F-statistics for the GMM-FD is zero, and the specification test doesn't reject the validity of the instruments (the p-value of the Hansen J. test is 1.00). The unit root test reported in the appendix can't reject the existence of random walk. In case of random walk, the instruments used in GMM-FD becomes weak, and the estimator falls inconsistent. On the other hand, for the GMM-SYS, the Hansen J test rejects the validity of over identifying restrictions at the 1% significance level. Although the p-value of F-statistics for GMM-SYS for ATR is zero, the results should be

interpreted carefully, since they may also be inconsistent, according to Hansen J test.

Both the current change in the real value of TL,  $\Delta Q$ , and its first lag, have a significant negative effect, depicted by all regressions. This is consistent with the expectations. The appreciation of the domestic currency causes a price disadvantage for the domestic companies both in domestic and foreign markets. Faced with an imbalanced competition, domestic companies lose their market shares to their foreign competitors, or in other words, to imported goods, and the asset turnover ratio decreases, as the sales decreases. This issue is apparently presented in Figure 21 and discussed in Section 5. Following sharp devaluations in TL, there is a quick recovery in asset turnover ratio right after the crisis, both in 1994 and 2001. A decrease in real value of TL, providing a competitive advantage, increases the asset turnover of the companies, even though there is a sharp recession in the domestic market.

The results for the second variable, inflation ( $\pi$ ), are mixed, if not contradictory. The GMM-FD reports significant negative coefficients for the current inflation and the fourth lag, and a positive coefficient for the second lag. Similarly, OLS and FE regressions indicate a negative coefficient for the current inflation shock and its fourth lag, and a positive coefficient for its third and fourth lag. This cyclic pattern of the inflation is hard to explain. The direct negative effect of inflation is obvious. Through supply and demand theory, an increase in prices would diminish demand for goods and consumption immediately. The decrease in demand would weaken the operations and sales of the corporate sector, decreasing its asset turnover.

However, the retarded positive effect is difficult to explain. There may be two feeble explanations for this issue. First, the delayed consumption in the previous periods, as a consequence of general price increases, can't be delayed anymore, increasing the demand and consumption. The increase in consumption to compensate the delayed needs, would improve the sales and operational efficiency of the corporate sector in general. Second, the assets are recorded at their book value and in a chronic inflation environment, as the general level of prices increases, the amount of sales increases, although the quantity sold may not increase. Therefore, the total asset turnover ratio may increase, although the real asset productivity may stay the same, or even decrease. These two factors may lead to a positive relationship between the inflation in the previous periods and the current ATR. What's interesting is that while ROA has a positive relationship with the current inflation, the ATR has a negative coefficient. Considering that the ROA equals the multiplication of ATR and operational profitability ratio, this contradicting result supports the previous interpretation that inflation in Turkey has a demand-pull structure. Although ATR decreases, ROA increases, just because operational profit margin increases.

The third factor is the real interest rate. The findings indicate an immediate positive and a retarded negative impact on the ATR for real interest rates. The coefficient for the current real interest rate is significant and positive for OLS, FE, and GMM-FD regressions. The lagged values of real interest rate that have negative significant coefficients are consistent with the monetary theory. Interest rates have lagged effect on demand, and consumption. An increase in real interest

rates would exacerbate the sales and the total asset turnover ratio of the corporate sector. However, the direct positive impact of real interest rates reported in the analysis is hard to comprehend. A possible, but not very convincing, explanation is that an increase in real interest rates can be perceived as a future increase in inflation and a forthcoming adverse economic period, therefore economic agents may bring forward their future consumptions. This would lead to an immediate and temporary positive effect on the ATR of corporate sector in general.

Next, the effect of the primary budget balance to GNP ratio is reported. Except the first-lag estimator of the GMM-FD, the BDEF has a negative impact on the asset turnover of the corporate sector. The public sector is the biggest customer in the Turkish economy. Therefore, the private sector still is very dependent on the subsidies, credits and the demand provided by the public sector. Consequently, any contractionary policies implemented would deteriorate the demand to the products of the corporate sector and reduce the ATR in general.

The findings for the last variable, change in the GNP per capita, is also cyclic. The positive coefficient of the current value and the first lag of the GNP are consistent with the expectations. An increase in the GNP per capita would indicate an increase in disposable income and result in an increase in demand to the products of the corporate sector and accordingly their total asset turnover. Notwithstanding this presumption, OLS and FE regressions report a significant negative coefficient for the second lag, and GMM-FD points a negative impact for the second lag of GNP. Similar to ROA and GNP analysis, a probable explanation can be the pre-consumption of future needs due to the cyclic behavior of the Turkish economy.

The economic agents may bring forward their future consumption whenever they are easier to purchase, since they are concerned about the future developments in the economy.



**Table 5: Regression results for ATR**

	OLS	FE	GMM - First Diff.	GMM - System
AR(1)	0.478 (17.02)*	0.394 (13.29)*	0.273 (3.98)*	0.090 (0.33)
AR(2)	0.067 (2.71)*	0.010 (0.42)	-0.033 (-0.87)	-0.406 (-2.25)**
AR(3)	0.042 (1.88)***	-0.002 (-0.10)	-0.035 (-1.31)	0.015 (0.06)
AR(4)	0.362 (16.81)*	0.311 (14.51)*	0.331 (10.02)*	0.760 (3.64)*
$\Delta Q$	-0.414 (-4.66)*	-0.436 (-4.86)*	-0.493 (-5.61)*	-0.541 (-1.81)***
$\Delta Q(-1)$	-0.464 (-3.85)*	-0.474 (-3.98)*	-0.386 (-3.82)*	0.104 (0.29)
$\Delta Q(-2)$	-0.010 (-0.07)	0.069 (0.52)	-0.011 (-0.09)	-0.236 (-0.47)
$\Delta Q(-3)$	-0.090 (-0.81)	0.029 (0.28)	-0.131 (-1.19)	-0.072 (-0.18)
$\Delta Q(-4)$	0.185 (1.65)***	0.197 (1.81)***	0.020 (0.20)	-1.230 (-2.79)*
$\pi$	-0.208 (-5.10)*	-0.196 (-4.96)*	-0.125 (-2.90)*	0.101 (0.65)
$\pi(-1)$	-0.069 (-1.56)	-0.025 (-0.69)	0.007 (0.24)	0.047 (0.47)
$\pi(-2)$	0.072 (1.43)	0.132 (2.88)*	0.128 (3.26)*	-0.123 (-0.73)
$\pi(-3)$	0.197 (4.24)*	0.206 (4.57)*	0.025 (0.74)	-0.469 (-2.11)**
$\pi(-4)$	-0.130 (-3.94)*	-0.132 (-4.06)*	-0.095 (-3.31)*	0.227 (1.81)***
$\pi\pi$	0.007 (3.76)*	0.007 (3.35)*	0.004 (2.19)**	-0.008 (-0.99)
$\pi\pi(-1)$	-0.001 (-0.59)	-0.003 (-1.35)	-0.001 (-0.65)	0.000 (0.02)
$\pi\pi(-2)$	-0.008 (-4.23)*	-0.009 (-4.53)*	-0.008 (-3.72)*	0.004 (0.49)
$\pi\pi(-3)$	-0.006 (-2.75)*	-0.006 (-2.63)*	0.002 (0.83)	0.018 (1.38)
$\pi\pi(-4)$	0.001 (0.35)	0.003 (1.10)	-0.001 (-0.26)	-0.022 (-2.01)**
BDEF	-0.178 (-6.46)*	-0.200 (-7.26)*	-0.142 (-5.42)*	-0.126 (-1.36)
BDEF(-1)	-0.005 (-0.17)	-0.040 (-1.20)	0.064 (1.83)***	0.120 (0.89)
BDEF(-2)	-0.054 (-1.87)***	-0.064 (-2.17)**	-0.086 (-2.85)*	-0.115 (-0.99)
BDEF(-3)	-0.113 (-3.71)*	-0.126 (-4.17)*	-0.050 (-1.65)	0.008 (0.09)
BDEF(-4)	-0.163 (-5.70)*	-0.184 (-6.28)*	-0.106 (-3.31)*	-0.425 (-3.23)*
GNP	1.926 (10.15)*	1.855 (10.59)*	2.157 (11.34)*	2.069 (3.26)*
GNP(-1)	0.994 (5.05)*	0.854 (4.94)*	0.663 (2.96)*	0.289 (0.35)
GNP(-2)	-0.409 (-1.74)***	-0.629 (-2.88)*	-0.196 (-0.68)	0.258 (0.34)
GNP(-3)	-0.085 (-0.39)	-0.172 (-0.81)	0.493 (1.87)***	0.850 (1.17)
GNP(-4)	-0.211 (-1.16)	-0.105 (-0.60)	-0.550 (-2.92)*	0.349 (0.42)

\*, \*\*, \*\*\* indicate the significance levels at 1, 5, and 10% respectively

## 7. CONCLUSION

The question of which stabilization program is flawless and appropriate to tackle the inflation and to maintain the external and internal balances with the smallest cost possible has attained enormous attention. The empirical regularities of stabilization programs and previous literature analyzing experiences of economies implementing these programs have shown that none of them is flawless. A critical point that is held accountable for the failures by some studies is the disparities between interest rate, exchange rate and inflation, created by stabilization programs to control inflation.

First, this study develops a model that is built on the disparities model proposed by Ertuna (1999). By combining, interest rate parity and purchasing power parity, Equation 3.13 is derived, which defines a balance between the exchange rates, interest rates and inflation levels in the domestic and foreign markets. It is demonstrated that to use a nominal anchor, which disturbs this balance, result in arbitrage opportunities, creates temporary financial shocks, and leads to unsustainable mechanisms, which ends with vicious circles and economic crisis.

Next, Turkish economy, which is a very interesting laboratory to analyze stabilization programs, is examined to figure out the deficiencies of the programs implemented in Turkey. It is shown that although different stabilization programs with different monetary policies or nominal anchors are implemented, there are



some features, or deficiencies, that are common in all programs. First of all, inability to maintain strong fiscal and financial institutions, and political risks and uncertainties that are stated by Mishkin (2003) as critical for a successful stabilization are underscored. Second, it is shown that all programs were based on disparities; (1) a strong TL and high real interest rates to tackle inflation in 1990s, (2) a strong TL under an ERBS program and negative real interest rates in 2000 Stabilization program, and (3) finally high real interest rates created by utilizing short-term interest rates to control inflation and appreciated TL in 2001 Strengthening Turkish Economy Program.

After illustrating the disparities created by stabilization programs intentionally to tackle inflation and how these disparities are leading to failures and economic crisis, this study analyzes the effects of these disparities on the corporate sector. Panel data analysis is implemented to observe the effects of the factors that disturb the balance defined by Equation 3.13, and create disparities, on the financial performance of the Turkish corporate sector. The financial figures of industrial companies issued in the ISE are used.

The empirical results show that the explanatory variables have multiple effects in a dynamic structure. The explanatory variables generally have different current and retarded effects. While the dynamic structure of the model can be explained by financial economics theories in some cases, somehow the results may not be consistent with the expectations in others. However, the findings illustrates that the upwards and downwards movements of these factors unmistakably disturbs the financial performances of the corporate sector in many ways.

One of the most important results of this study is the negative effect of appreciation of TL on the operational profitability of the corporate sector. It is discussed that, faced with foreign competition in both domestic and foreign markets, Turkish corporate sector has a serious disadvantage with the increase in the real value of TL, and has to sacrifice its profit margin and lose its market shares, decreasing its asset turnover ratio in general. It is illustrated that even through the financial crisis in 1994 and 2001, the return on asset ratio increases in general compared to pre-crisis periods, in which real value of TL reaches its top levels. The appreciation of TL forces the corporate sector to import the intermediary products and materials they use in production. This increases the dependence of the Turkish economy to the imported goods. The operational profit margin recovers two or three periods later, which can be explained by the decrease in cost of goods sold due to the reduction in the prices of imported intermediate goods and materials. Similarly, the appreciation of the domestic currency decreases the asset turnover ratio, indicating that the efficiency of the corporate sector to generate revenues gets worse, as a result of the price advantage of the imported goods.

In addition, although the empirical findings are mixed for the effects of the appreciation of TL on the financial leverage, the results are interpreted as supportive for the argument that appreciation of the domestic currency tempts the corporate sector to increase its leverage and short positions. It is shown that lagged values of appreciation leads to increase in leverage ratios, whereas the coefficients for the current change in real exchange rate are negative. Corporate sector, benefits

from cheap financing by borrowing in terms of foreign currency, which increases the financial riskiness of the corporate sector, due to high leverage ratios and short positions. This issue is one of the pillars of the recent crisis models. The negative coefficients of the current change in real value of domestic currency indicates that a devaluation that hits the corporate sector and sharply increases their leverage ratios, because of the short position that they generated in the previous periods while domestic currency appreciates, has an immediate effect and increase the leverage and financial riskiness of the corporate sector. Shortly, a disparity between the exchange rate and inflation, leading to appreciation or depreciation of the domestic currency, leads to deteriorations in the financial figures of corporate sector.

Second, it is shown that real interest rates have a retarded negative effect on the profitability of the corporate sector. An increase in real interest rates cuts down the consumption and demand, and leads to a decrease in profitability of the corporate sector. Moreover, asset turnover ratio gets a retarded negative impact from the real interest rate increase, consistent with the monetary theory, which presumes a retarded negative effect of real interest rate on consumption and demand. On the other hand, low real interest rates tempt the corporate sector to increase the leverage and financial riskiness. Therefore, a disparity between interest rate and inflation is also damaging for the corporate sector.

Primary budget balance to GNP ratio target, which is generally one of the privileges of the stabilization programs, is also included in the analysis. The findings show that policy-makers face a serious dilemma, when they set a target

for budget surplus or deficits. A strong fiscal policy is indispensable for a strong and powerful economy, as discussed before. However, as the analysis illustrates strict fiscal policies, which targets high primary budget surpluses, deteriorates the operational profitability and asset turnover of the corporate sector. On the other hand, a primary budget surplus alleviates the crowding-out effect of the public sector and let the corporate sector benefit from the credit market.

The effects of inflation and the change in GNP per capita are also included in the analysis. An interesting result is the immediate positive effect of inflation on the profitability of the corporate sector. This issue indicates that inflation has a demand-pull structure.

To summarize, the stabilization programs, based on nominal anchors and disparities between exchange rate, interest rate and inflation, creates arbitrage opportunities, attracts short-term capital flow, and provides temporary unsustainable favorable developments in the economy. This disturbs the balance of the economy, creates a vicious circle, which generally ends with an economic crisis. These disparities not only create macroeconomic turbulences, but also lead to destructive effects on the corporate sector, even before the economic crisis, which generally follows the stabilization programs. Therefore, stabilization programs should take into consideration the micro effects that are generated and avoid mechanisms that lead to disparities and instabilities. Even if these programs maintain the stability in the macroeconomic figures eventually, it is shown that these disparities lead to damages in the corporate sector, whose cost may be higher than the benefits obtained through the stabilization program.

Finally, the corporate sector should be aware of the risks and damages that the stabilization programs generate, and try to hedge their risks as much as possible. A crucial recommendation would be that the corporate sector should be aware of the risks of appreciating domestic currency and avoid over-borrowing and short positions even if it seems very profitable.

This study calls for a further research for a better understanding of the dynamic mechanism of the disparities and its effects on the real sector as well as financial sector. This study uses only the financial figures of industrial companies issued in the ISE. The complexity of the mechanism requires a more profound model to figure out the micro and macro effects of disparities. Another point is that more evolved empirical analysis tools with a balanced data may give more comprehensive results. The empirical tools used in this analysis are the most recent tools to the knowledge of the author of this study. However, panel data analysis is an evolving area of econometrics and new methods developed in the future may provide better results.

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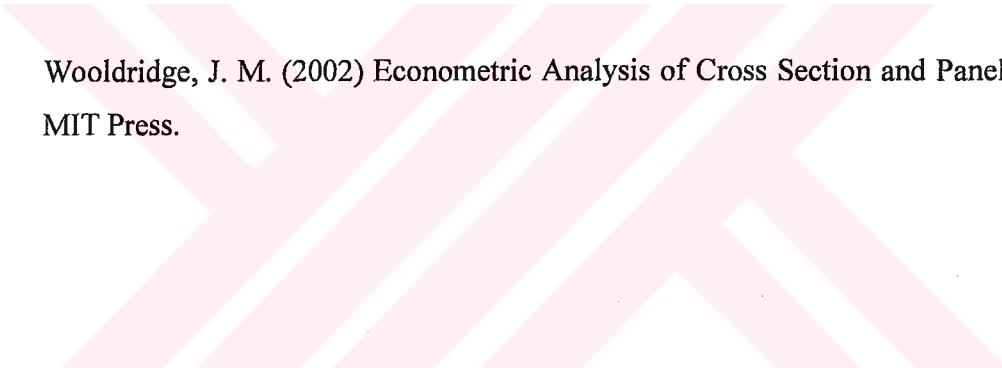
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## APPENDIX A

### THE LIST OF COMPANIES IN THE SAMPLE

ABANA	ABANA ELEKTROMEKANİK SANAYİİ VE TİCARET A.Ş.
ADANA	ADANA ÇİMENTO SANAYİİ T.A.Ş.
ADEL	ADEL KALEMCİLİK TİCARET VE SANAYİ A.Ş.
AEFES	ANADOLU EFES BİRACILIK VE MALT SANAYİİ A.Ş.
AFYON	AFYON ÇİMENTO SANAYİ T.A.Ş.
AGIDA	ANADOLU GIDA SANAYİİ A.Ş.
AKALT	AK-AL TEKSTİL SANAYİİ A.Ş.
AKCİM	AK ÇİMENTO A.Ş.
AKCNS	AKÇANSA ÇİMENTO SANAYİ VE TİCARET A.Ş.
AKIPD	AKSU İPLİK DOKUMA VE BOYA APRE FABRİKALARI T.A.Ş.
AKSA	AKSA AKRİLİK KİMYA SANAYİİ A.Ş.
ALKA	ALKİM KAĞIT SANAYİ VE TİCARET A.Ş.
ALKİM	ALKİM ALKALİ KİMYA A.Ş.
ALTIN	ALTINYILDIZ MENSUCAT VE KONFEKSİYON FAB.A.Ş.
ALYAG	ALTINYAĞ KOMBİNALARI A.Ş.
ANACM	ANADOLU CAM SANAYİİ A.Ş.
ANBRA	ANDOLU BİRACILIK A.Ş.
APEKS	APEKS DIS TICARET A.S.
ARAT	ARAT TEKSTİL SANAYİ VE TİCARET A.Ş.
ARCLK	ARÇELİK A.Ş.
ARDEM	ARDEM A.Ş.
ARSAN	ARSAN TEKSTİL SANAYİ VE TİCARET A.Ş.
ASLAN	LAFARGE ASLAN ÇİMENTO A.Ş.
ASUZU	ANADOLU ISUZU OTOMOTİV SANAYİ VE TİCARET A.Ş.
ATEKS	AKIN TEKSTİL A.Ş.
AYGAZ	AYGAZ A.Ş.
BAGFS	BAGFAŞ BANDIRMA GÜBRE FABRİKALARI A.Ş.
BAKAB	BAK AMBALAJ SANAYİ VE TİCARET A.Ş.

BANVT	BANVİT BANDIRMA VİTAMİNLİ YEM SANAYİİ TİCARET A.Ş.
BEKO	BEKO ELEKTRONİK A.Ş.
BERDN	BERDAN TEKSTİL SANAYİ VE TİCARET A.Ş.
BFREN	BOSCH FREN SİSTEMLERİ SANAYİ VE TİCARET A.Ş.
BISAS	BİSAŞ TEKSTİL SANAYİ VE TİCARET A.Ş.
BOLUC	BOLU ÇİMENTO SANAYİİ A.Ş.
BOSSA	BOSSA TİCARET VE SANAYİ İŞLETMELERİ T.A.Ş.
BRISA	BRİSA BRIDGESTONE SABANCI LASTİK SAN.VE TİC.A.Ş.
BRMEN	BİRLİK MENSUCAT TİCARET VE SANAYİ İŞLETMELERİ A.Ş.
BRSAN	BORUSAN BİRLEŞİK BORU FABRİKALARI A.Ş.
BSOKE	BATISÖKE SÖKE ÇİMENTO SANAYİİ T.A.Ş.
BSPRO	BSH PROFİLO ELEKTRİKLİ GEREÇLER SANAYİİ A.Ş.
BTCİM	BATIÇİM BATI ANADOLU ÇİMENTO SANAYİİ A.Ş.
BUCİM	BURSA ÇİMENTO FABRİKASI A.Ş.
BUGUN	BUGUN YAYINCILIK A.Ş.
BURCE	BURÇELİK BURSA ÇELİK DÖKÜM SANAYİİ A.Ş.
BYRBY	BAYRAKLI BOYA VE VERNİK SANAYİ A.Ş.
BYSAN	BOYASAN TEKSTİL SANAYİ VE TİCARET A.Ş.
CBSBO	ÇBS BOYA KİMYA SANAYİİ VE TİCARETİ A.Ş.
CELHA	ÇELİK HALAT VE TEL SANAYİİ A.Ş.
CEMTS	ÇEMTAŞ ÇELİK MAKİNA SANAYİ VE TİCARET A.Ş.
CEYLN	CEYLAN GİYİM SANAYİ VE TİCARET A.Ş.
CIMSA	ÇİMSA ÇİMENTO SANAYİ VE TİCARET A.Ş.
CMBTN	ÇİMBETON HAZIRBETON VE PREFABRİK YAPI ELE. SAN. VE TİC. A.Ş.
CMENT	ÇİMENTAŞ İZMİR ÇİMENTO FABRİKASI T.A.Ş.
CNKKL	ÇANAKKALE ÇİMENTO A.Ş.
CYTAS	CEYTAŞ MADENCİLİK TEKSTİL SANAYİ VE TİCARET A.Ş.
DARDL	DARDANEL ÖNENTAŞ GIDA SANAYİ A.Ş.
DENCM	DENİZLİ CAM SANAYİİ VE TİCARET A.Ş.
DENTA	DENTAŞ AMBALAJ VE KAĞIT SANAYİ A.Ş.
DERİM	DERİMOD KONFEKSİYON AYAKKABI DERİ SAN.VE TİC.A.Ş.
DEVA	DEVA HOLDİNG A.Ş.
DITAS	DİTAŞ DOĞAN YEDEK PARÇA İMALAT VE TEKNİK A.Ş.
DMSAS	DEMİSAŞ DÖKÜM EMAYE MAMÜLLERİ SANAYİ A.Ş.
DOBUR	DOĞAN BURDA RIZZOLİ DERGİ YAYINCILIK VE PAZARLAMA A.Ş.
DOKTS	DÖKTAŞ DÖKÜMCÜLÜK TİCARET VE SANAYİ A.Ş.

DUROF	DURAN OFSET MATBAACILIK VE AMBALAJ SANAYİ A.Ş.
DYOBY	DYO BOYA FABRİKALARI SANAYİ VE TİCARET A.Ş.
ECILC	EİS ECZACIBAŞI İLAÇ SANAYİ VE TİC.A.Ş.
ECYAP	ECZACIBAŞI YAPI GEREÇLERİ SANAYİ VE TİCARET A.Ş.
EDIP	EDİP İPLİK SANAYİ VE TİCARET A.Ş.
EGBRA	EGE BİRACILIK A.S.
EGEN	EGE ENDÜSTRİ VE TİCARET A.Ş.
EGESR	EGS EGESER GİYİM SANAYİ A.Ş.
EGGUB	EGE GÜBRE SANAYİİ A.Ş.
EGPRO	EGE PROFİL TİCARET VE SANAYİ A.Ş.
EGSER	EGE SERAMİK SANAYİ VE TİCARET A.Ş.
EMKEL	EMEK ELEKTRİK ENDÜSTRİSİ A.Ş.
EMNIS	EMİNİŞ AMBALAJ SANAYİ VE TİCARET A.Ş.
EMPAS	EMSAN PASLANMAZ ÇELİK SANAYI VE TİCARET A.S.
EMSAN	EMSAN BESYILDIZ ÇELİK SANAYI VE TİCARET A.S.
EPLAS	EGEPLAST EGE PLASTİK TİCARET VE SANAYİ A.Ş.
ERBOS	ERBOSAN ERCİYAS BORU SANAYİİ VE TİCARET A.Ş.
ERCYS	ERCİYES BİRACILIK A.Ş.
EREGL	EREĞLİ DEMİR VE ÇELİK FABRİKALARI T.A.Ş.
ERSU	ERSU MEYVE VE GIDA SANAYİ A.Ş.
ESEMS	ESEM SPOR GİYİM SANAYİ VE TİCARET A.Ş.
FENIS	FENİŞ ALÜMİNYUM SANAYİ VE TİCARET A.Ş.
FRIGO	FRİGO - PAK GIDA MADDELERİ SAN. VE TİC. A.Ş.
FROTO	FORD OTOMOTİV SANAYİ A.Ş.
GEDİZ	GİMSAN GEDİZ İPLİK VE MENSUCAT SANAYİİ A.Ş.
GENTS	GENTAŞ GENEL METAL SANAYİ VE TİCARET A.Ş.
GOLDS	GOLDAŞ KUYUMCULUK SANAYİ İTHALAT İHRACAT A.Ş.
GOLTS	GÖLTAŞ GÖLLER BÖLGESİ ÇİMENTO SAN.VE TİC.A.Ş.
GOODY	GOODYEAR LASTİKLERİ T.A.Ş.
GORBN	GORBON İŞİL SERAMİK A.Ş.
GUBRF	GÜBRE FABRİKALARI T.A.Ş.
GUMUS	GUMUSSUYU HALI VE YER KAPLAMALARI SANAYI VE TİCARET A.S.
GUNEY	GUNEY BİRACILIK A.S.
HEKTS	HEKTAŞ TİCARET T.A.Ş.
HURGZ	HÜRRİYET GAZETECİLİK VE MATBAACILIK A.Ş.
HZNR	HAZNEDAR REFRAKTER SANAYİİ A.Ş.



IDAS	İDAŞ İSTANBUL DÖŞEME SANAYİİ A.Ş.
IHEVA	İHLAS EV ALETLERİ İMALAT SANAYİ VE TİCARET A.Ş.
INMDY	INTERMEDYA YAYINCILIK A.S.
IPMAT	İPEK MATBAACILIK SANAYİ VE TİCARET A.Ş.
ISAMB	İŞIKLAR AMBALAJ SANAYİİ VE TİCARET A.Ş.
ISTMP	İSTANBUL MOTOR PİSTON A.Ş.
IZDMC	İZMİR DEMİR ÇELİK SANAYİ A.S.
İZOCM	İZOCAM TİCARET VE SANAYİ A.Ş.
KAPLM	KAPLAMIN AMBALAJ SANAYİ VE TİCARET A.Ş.
KARSN	KARSAN OTOMOTİV SANAYİİ VE TİCARET A.Ş.
KARTN	KARTONSAN KARTON SANAYİ VE TİCARET A.Ş.
KENT	KENT GIDA MADDELERİ SANAYİİ VE TİCARET A.Ş.
KERTV	KEREVİTAŞ GIDA SANAYİ VE TİCARET A.Ş.
KLBMO	KELEBEK MOBİLYA VE KONTRPLAK SANAYİ A.Ş.
KLMSN	KLİMASAN KLİMA SANAYİ VE TİCARET A.Ş.
KNFRT	KONFRUT GIDA SANAYİ VE TİCARET A.Ş.
KONYA	KONYA ÇİMENTO SANAYİİ A.Ş.
KORDS	KORDSA SABANCI DUPONT END. İPLİK VE KORD BEZİ SAN A.Ş.
KOTKS	KONİTEKS KONFEKSİYON ENDÜSTRİ VE TİCARET A.Ş.
KOYTS	KOYTAS TEKSTİL SANAYİ VE TİCARET A.S.
KRDMA	KARDEMİR KARABUK DEMİR ÇELİK SAN. VE TİC. A.S.(A GRUBU)
KRSTL	KRİSTAL KOLA VE MEŞRUBAT SANAYİ TİCARET A.Ş.
KRTEK	KARSU TEKSTİL SANAYİİ VE TİCARET A.Ş.
KUTPO	KÜTAHYA PORSELEN SANAYİİ A.Ş.
LIOYS	L.İ.O. YAĞ SANAYİ VE TİCARET A.Ş.
LUKSK	LÜKS KADİFE TİCARET VE SANAYİİ A.Ş.
MAKTK	MAKİNA TAKİM ENDÜSTRİSİ A.Ş.
MARET	MARET MARMARA BESİCİLİK VE ET SANAYİ VE TİCARET A.S.
MDRNU	MUDURNU TAVUKÇULUK A.S.
MEGES	MEGES BOYA SANAYİ VE TİCARET A.Ş.
MEMSA	MENSA MENSUCAT SANAYİ VE TİCARET A.Ş.
MERKO	MERKO GIDA SANAYİ VE TİCARET A.Ş.
METAS	METAS İZMİR METALURJİ FABRİKASI T.A.S.
MILYT	MİLLİYET GAZETECİLİK A.Ş.
MNDRS	MENDERES TEKSTİL SANAYİ VE TİCARET A.Ş.
MRDİN	MARDİN ÇİMENTO SANAYİİ VE TİCARET A.Ş.

MRSHL	MARSHALL BOYA VE VERNİK SANAYİİ A.Ş.
MTEKS	METEMTEKS TEKSTİL SANAYİ VE TİCARET A.Ş.
MUTLU	MUTLU AKÜ VE MALZEMELERİ SANAYİ A.Ş.
NIGDE	OYSA ÇİMENTO SANAYİİ VE TİCARET A.Ş.
NUHCM	NUH ÇİMENTO SANAYİİ A.Ş.
OKANT	OKAN TEKSTİL SANAYİ VE TİCARET A.Ş.
OLMKS	OLMUKSA INTERNATIONAL PAPER SABANCI AMB. SAN. VE TİC. A.Ş.
OTKAR	OTOKAR OTOBÜS KAROSERİ SANAYİ A.Ş.
PARSN	PARSAN MAKİNA PARÇALARI SANAYİİ A.Ş.
PASTA	PASTAVILLA MAKARNACILIK SANAYI VE TICARET A.S
PENGD	PENGUEN GIDA SANAYİ A.Ş.
PETKM	PETKİM PETROKİMYA HOLDİNG A.Ş.
PETUN	PINAR ENTEGRE ET VE UN SANAYİİ A.Ş.
PIMAS	PİMAŞ PLASTİK İNŞAAT MALZEMELERİ A.Ş.
PINSU	PINAR SU SANAYİ VE TİCARET A.Ş.
PNET	PINAR ENTEGRE ET A.S.
PNSUT	PINAR SÜT MAMULLERİ SANAYİİ A.Ş.
PNUN	PINAR UN A.S.
POLYL	POLYLEN SENTETİK İPLİK SANAYİİ A.Ş.
PRKTE	PARK ELEKTRİK MADENCİLİK SANAYİ VE TİCARET A.Ş.
PRTAS	ÇBS PRİNTAŞ BASKI MÜREKKEPLERİ VE GEREÇLERİ SAN. A.Ş.
PTOFS	PETROL OFİSİ A.Ş.
RAKSE	RAKS ELEKTRONİK SANAYİ VE TİCARET A.Ş.
RKSEV	RAKS ELEKTRİKLİ EV ALETLERİ SANAYİ VE TİCARET A.Ş.
SABAH	SABAH YAYINCILIK A.Ş.
SARKY	SARKUYSAN ELEKTROLİTİK BAKIR SAN. VE TİCARET A.Ş.
SASA	SASA DUPONT SABANCI POLYESTER SANAYİ A.Ş.
SELGD	SELÇUK GIDA ENDÜSTRİ İHRACAT İTHALAT A.Ş.
SERVE	SERVE KIRTASIYE SANAYİ VE TİCARET A.Ş.
SEZGD	SEZGINLER GIDA SANAYI VE TICARET A.S.
SIFAS	SİFAŞ SENTETİK İPLİK FABRİKALARI A.Ş.
SKPLC	ŞEKER PİLİÇ VE YEM SANAYİİ VE TİCARET A.Ş.
SKTAS	SÖKTAŞ TEKSTİL SANAYİ VE TİCARET A.Ş.
SMENS	SIMENS KABLO A.S.
SNPAM	SÖNMEZ PAMUKLU SANAYİİ A.Ş.
SODAS	SODAS SODYUM SANAYI AS

SOKSA	SOKSA-SINOP ORME VE KONFEKSİYON SAN. VE TIC. A.S.
SONME	SÖNMEZ FİLAMANT SENTETİK İPLİK VE ELYAF SANAYİ A.Ş.
TATKO	TAT KONSERVE SANAYİ A.S.
TBORG	T.TUBORG BİRA VE MALT SANAYİİ A.Ş.
TELTS	ALCATEL TELETAS A.S.
TEZSN	CAMIS LOJİSTİK HİZMETLERİ VE TİCARET A.Ş.
TIRE	TİRE KUTSAN OLUKLU MUKAVVA KUTU VE KAĞIT SAN.A.Ş.
TOASO	TOFAŞ TÜRK OTOMOBİL FABRİKASI A.Ş.
TOFAS	TOFAŞ OTO TİCARET A.Ş.
TRCAS	TURCAS PETROL A.Ş.
TRKCM	TRAKYA CAM SANAYİİ A.Ş.
TUDDF	T.DEMİR DÖKÜM FABRİKALARI A.Ş.
TUKAS	TUKAŞ GIDA SANAYİ VE TİCARET A.Ş.
TUMTK	TÜMTEKS TEKSTİL SANAYİ VE TİCARET A.Ş.
TUPRS	TÜPRAŞ-TÜRKİYE PETROL RAFİNERİLERİ A.Ş.
UKIM	UKİ ULUSLARARASI KONFEKSİYON İMALAT VE TİC. A.Ş.
UNTAR	ÜNAL TARIM ÜRÜNLERİ İHRACAT VE SANAYİ A.Ş.
UNYEC	ÜNYE ÇİMENTO SANAYİ VE TİCARET A.Ş.
USAK	UŞAK SERAMİK SANAYİİ A.Ş.
UZEL	UZEL MAKİNA SANAYİİ A.Ş.
VAKKO	VAKKO TEKSTİL VE HAZIR GIYİM SANAYİ İŞLETMELERİ A.Ş.
VANET	VAN-ET ENTEGRE ET SANAYİ VE TİCARET A.Ş.
VESTL	VESTEL ELEKTRONİK SANAYİ VE TİCARET A.Ş.
VKING	VİKİNG KAĞIT VE SELÜLOZ A.Ş.
YATAS	YATAŞ YATAK VE YORGAN SAN. TİC.A.Ş.
YUNSA	YÜNİSA YÜNLÜ SANAYİ VE TİCARET A.Ş.

## APPENDIX B

**Table 6: The ADF test for BDEF**

Null Hypothesis: BDEF has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.009901	0.0001
Test critical values:		
1% level	-3.557472	
5% level	-2.916566	
10% level	-2.596116	

\*Mackinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(BDEF)  
 Method: Least Squares  
 Date: 06/15/04 Time: 17:13  
 Sample(adjusted): 1990:2 2003:3  
 Included observations: 54 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BDEF(-1)	-0.655884	0.130917	-5.009901	0.0000
C	-1.140628	0.230724	-4.943682	0.0000
R-squared	0.325543	Mean dependent var		0.005047
Adjusted R-squared	0.312573	S.D. dependent var		0.271469
S.E. of regression	0.225078	Akaike info criterion		-0.108402
Sum squared resid	2.634336	Schwarz criterion		-0.034736
Log likelihood	4.926848	F-statistic		25.09910
Durbin-Watson stat	2.013034	Prob(F-statistic)		0.000007

Table 7: The ADF test for  $\Delta Q$ 

Null Hypothesis: LEXCH has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.924183	0.0000
Test critical values: 1% level	-3.560019	
5% level	-2.917650	
10% level	-2.596689	

\*MacKinnon (1996) one-sided p-values.

## Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LEXCH)

Method: Least Squares

Date: 06/15/04 Time: 17:27

Sample(adjusted): 1990:3 2003:3

Included observations: 53 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXCH(-1)	-0.975960	0.140949	-6.924183	0.0000
C	0.004970	0.011370	0.437078	0.6639
R-squared	0.484559	Mean dependent var		0.001072
Adjusted R-squared	0.474452	S.D. dependent var		0.114043
S.E. of regression	0.082675	Akaike info criterion		-2.110782
Sum squared resid	0.348597	Schwarz criterion		-2.036431
Log likelihood	57.93572	F-statistic		47.94431
Durbin-Watson stat	1.977493	Prob(F-statistic)		0.000000

Table 8: The ADF for GNP

Null Hypothesis: GNP has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

	t-Statistic	Prob.*
Augmented Dickey-Ftastic	-7.218374	0.0000
Test critical values: 1% level	-3.560019	
5% level	-2.917650	
10% level	-2.596689	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GNP)

Method: Least Squares

Date: 0604 Time: 17:45

Sample(adjusted): 1990:3 2003:3

Included observations: 53 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GNP(-1)	-1.010500	0.139990	-7.218374	0.0000
C	0.003310	0.004808	0.688449	0.4943
R-squared	0.505358	Mean dependent var		2.11E-05
Adjusted R-squared	0.495659	S.D. dependent var		0.049068
S.E. of regression	0.034847	Akaike info criterion		-3.838697
Sum squared resid	0.061930	Schwarz criterion		-3.764347
Log likelihood	103.7255	F-statistic		52.10493
Durbin-Watson stat	2.002099	Prob(F-statistic)		0.000000

Table 9: The ADF test for  $\pi$ 

Null Hypothesis: LTEFE has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.674609	0.0004
Test critical values: 1% level	-3.557472	
5% level	-2.916566	
10% level	-2.596116	

\*MacKinnon (1996) one-sided p-values.

#### Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LTEFE)

Method: Least Squares

Date: 06/15/04 Time: 17:58

Sample(adjusted): 1990:2 2003:3

Included observations: 54 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTEFE(-1)	-0.656865	0.140518	-4.674609	0.0000
C	2.132649	0.460519	4.630971	0.0000
R-squared	0.295889	Mean dependent var		-0.013881
Adjusted R-squared	0.282348	S.D. dependent var		0.303331
S.E. of regression	0.256965	Akaike info. criterion		0.156581
Sum squared resid	3.433616	Schwarz criterion		0.230247
Log likelihood	-2.227685	F-statistic		21.85197
Durbin-Watson stat	1.919830	Prob(F-statistic)		0.000021

Table 10: The ADF test for rr

Null Hypothesis: RR has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.459032	0.0130
Test critical values:	1% level	-3.557472
	5% level	-2.916566
	10% level	-2.596116

\*MacKinnon (1996) one-sided p-values.

## Augmented Dickey-Fuller Test Equation

Dependent Variable: D(RR)

Method: Least Squares

Date: 06/15/04 Time: 18:01

Sample(adjusted): 1990:2 2003:3

Included observations: 54 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RR(-1)	-0.366152	0.105854	-3.459032	0.0011
C	1.813858	0.725402	2.500486	0.0156
R-squared	0.187054	Mean dependent var		0.107296
Adjusted R-squared	0.171421	S.D. dependent var		4.293087
S.E. of regression	3.907840	Akaike info criterion		5.600180
Sum squared resid	794.1032	Schwarz criterion		5.673847
Log likelihood	-149.2049	F-statistic		11.96490
Durbin-Watson stat	1.787278	Prob(F-statistic)		0.001090



**Table 11: The cross correlations between the independent variables**

	<b>BDEF</b>	<b>RR</b>	<b><math>\Delta Q</math></b>	<b>GNP</b>	<b><math>\pi</math></b>
<b>BDEF</b>	1.00	-0.05	-0.24	-0.03	-0.15
<b>RR</b>	-0.05	1.00	0.01	-0.22	0.39
<b><math>\Delta Q</math></b>	-0.24	0.01	1.00	0.49	-0.33
<b>GNP</b>	-0.03	-0.22	0.49	1.00	-0.27
<b><math>\pi</math></b>	-0.15	0.39	-0.33	-0.27	1.00

**Table 12: Unit Root Test for ROA**

Arellano-Bond dynamic panel-data estimation, one-step difference GMM results

Group variable:	company	Number of obs =	5920
Time variable :	period	Number of groups =	198
Obs per group: min =	7		
F(1, 197) =	67.7	avg =	29.9
Prob > F =	0	max =	37

	Robust Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
roa					
L1	0.223941	0.027218	8.23	0	0.170266 0.277617

Hansen test of overid. restrictions: chi2(739) = 197.94 Prob > chi2 = 1.000

**Table 13: Unit Root Test for CR**

Arellano-Bond dynamic panel-data estimation, one-step difference GMM results

Group variable:	company	Number of obs	6036
Time variable :	period	Number of groups	198
Obs per group: min =	7		
F(1, 197)	42.29	avg =	30.48
Prob > F	0	max =	37

	Robust Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
lcr						
L1	0.25059	0.038536	6.5	0	0.174595	0.326585

Hansen test of overid. restrictions: chi2(739) = 197.53 Prob &gt; chi2 = 1.000

**Table 14: Unit Root Test for ATR**

Arellano-Bond dynamic panel-data estimation, one-step difference GMM results

Group variable:	company	Number of obs	5942
Time variable :	period	Number of groups	198
Obs per group: min =	7		
F(1, 197)	0.47	avg =	30.01
Prob > F	0.495	max =	37

	Robust Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
latr						
L1	-0.03084	0.045202	-0.68	0.496	-0.11999	0.058299

Hansen test of overid. restrictions: chi2(739) = 197.82 Prob &gt; chi2 = 1.000

Table 15: Unit Root Test for Leverage

Arellano-Bond dynamic panel-data estimation, one-step difference GMM results						
Group variable:	company			Number of obs		6070
Time variable :	period			Number of groups		198
Obs per group: min =	7					
F(1, 197)	96.68			avg =		30.66
Prob > F	0			max =		37
		Robust				
		Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
Llev						
L1	0.440122	0.044763	9.83		0	0.351847 0.528398
Hansen test of overid. restrictions: chi2(739) = 197.95 Prob > chi2 = 1.000						