

CENTRAL BANK BALANCE SHEET AND PREDICTABILITY OF  
FINANCIAL CRISES: 2001 TURKISH CASE

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İSTANBUL BİLGİ ÜNİVERSİTESİ  
SOSYAL BİLİMLER ENSTİTÜSÜ  
ULUSLARARASI FİNANS YÜKSEK LİSANS PROGRAMI

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2009

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Tezin Onaylandığı Tarih : 25 Haziran 2009

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## ÖZET

Globalleşen ekonomide sermayenin serbest dolaşımı finansal piyasarda gerginliğin artmasına neden olmuştur. Geçmiş dönemlerde gelişmekte olan ülkelerde finansal kriz önemli bir olgu olarak ortaya çıkmakta ve bu durum finansal krizlerin önceden tahmin edilebilirliği yönündeki endişeleri doğurmaktadır. Uzmanlar olabilecek finansal krizleri önceden tahmin edebilmek için çeşitli yöntemler geliştirdiler. Bu çalışmada Merkez Bankası Bilançolarının finansal krizlerin tahmin edilebilirliği yönünde önemli sinyaller verdiği ve belli başlı bazı ekonomik göstergelerin kriz dönemi öncesinde farklılaştığı tartışılmaktadır. Öncü göstergeler kriz döneminden 24 ay öncesinde eşik değerinden farklı değerler almaktadır ve bu durum ekonomi için bir tehlike olarak kabul edilebilir. Bu açıdan, Türkiye Cumhuriyet Merkez Bankası bilançoundaki öncü göstergeler incelenmiş ve finansal kriz için kanıtlar olduğu fakat Türkiye'nin yapısal problemleri nedeniyle bu sinyallerin göz ardı edildiği anlaşılmıştır.

## ABSTRACT

In the recent decades the financial crises started to be a common phenomenon among the developing countries and this raised the concerns of predictability of financial crises. Scholars aimed to develop certain approaches in order to predict future financial crises. This paper argues that Central Bank Balance Sheet may provide the necessary signals for predicting a financial crisis and certain economic indicators tend to behave differently prior to the crisis period. The leading indicators may take values different than the threshold starting from two years ahead (or 24 months) and this may be perceived as a threat for the economy. In this respect, the leading indicators of Turkey Central Bank Balance Sheet is investigated and it is understood that there are evidences for the financial crisis but it was underestimated due to the structural problems of the Turkish economy.

**BAHAR AKAN ULUSLARARASI FINANS 2009**

## **DEDICATION**

For my family; my mother Sultan Yıldız and my grandfather Mehmet Yıldız, who offered their greatest support, trust and love throughout my work and my life.

## **ACKNOWLEDGEMENTS**

Foremost, I would like to thank my supervisor Prof. Dr Ahmet Süerdem who did not withhold his support, time and knowledge in this work.

I appreciate Prof. Dr. Oral Erdoğan for his encouragement and guidance from the beginning until the end of my study.

I am thankful to my dearest friends; Berrak Karadeniz for her enthusiasm and sarcasm , Elif Avcı for her presence and undeniable help through out this process, Pınar Aksoğan for her optimism and friendship and Sibel Bal for her motivation and laughter. Their continuous support enables this work to be finalized and their invaluable contributions will never be forgotten.

I am grateful to Hasan Basri Tarman for his belief in me from the beginning and this work would not even be existed without his contributions and presence in my life.

Lastly but not least, I want to thank to my colleagues Hüseyin Gayde and Alper Özdamar for listening me everyday throughout this process and their invaluable engagement in my data collection process.

To the each person above, I extend my greatest appreciations and this thesis cannot be completed without presenting my indebtedness to them.

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# 1 INTRODUCTION

The last decades witnessed several financial crises across the globe and search for the solution for predicting the crises started to be a common problem among the scholars. Starting with the 1980's several theories and models were discussed in order to find a signal for predicting the crisis. The objective of this work is to focus on the Balance Sheet of the Monetary Authority in order to see if there are any signals available which can be used in predicting crises. The focus will be on the Central Bank of the Republic of Turkey's and the subject of the study will be limited with Turkey's 2001 crisis. Two different methods will be used in order to analyze whether or not macroeconomic indicators and as well as the monetary aggregates may or may not be accepted as an indicator for the crisis.

Turkey experienced twin crises at the beginning of the New Millennium but can this crisis be explained with the crisis models in the literature? In order to find an answer to this question crisis framework will be discussed firstly. Then in the third section Central Bank Balance Sheet items will be discussed in detail. In the fourth section Analytical Balance Sheet will be presented and in the fifth section the IMF (International Monetary Fund) based program Turkey applied in the years 2000 and 2001 will be discussed in order to understand the background of the monetary decisions. Later the Signals Approach and certain Monetary Aggregates will be discussed in order to find an answer whether or not financial crisis is predictable from the balance of the Central Bank.

## **2 FINANCIAL CRISIS MODELS**

Up until 1990's First Generation Models (FGM) used to be adequate in order to explain the Currency Crises whereas this situation changed afterwards. In this respect, the model argued by Krugman which is the FGM could not explain the dynamics of the crises 1990s onwards. Therefore the necessity of other approaches occurred. In this respect, the Financial Crises models will be discussed in order to show their inadequacy in explaining Emerging Market Currency Crises that happened in the last decade.

### **2.1 First Generation Models**

First Generation Models (FGM) were first discussed by Krugman in 1979 and later by Flood and Garber in 1984. It is argued that a government attempting to keep its currency from depreciating may find its foreign reserves exhausted and its borrowing approaching a limit. A government attempting to keep its currency from appreciating may find the cost in domestic inflation unacceptable. When the government is no longer able to defend a fixed parity because of the constraints on its actions, there is a "crisis" in the balance of payments.<sup>1</sup> Then Krugman defined the balance of payments crisis when the government is no longer able to defend its exchange rate regime.

Then what are the standards for a crisis? A country will have a pegged exchange rate; for simplicity, assume that pegging is done solely through direct intervention in the foreign exchange market. At the exchange rate the foreign reserves of the government gradually decline. Then at some point, generally well before the gradual depletion of the reserves would have exhausted them, there is a sudden speculative attack that rapidly

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<sup>1</sup> Krugman P. (1979) "A Model of Balance of Payments Crises." Journal of Money, Credit and Banking, Vol. 11, pp. 1

eliminates the last of the reserves.<sup>2</sup> The main rationale behind this model was macroeconomic vulnerabilities. They argued the presence of a loose fiscal policy and high budget deficits are financed by printing money.

The main reason of the crisis is argued as the weak macroeconomic fundamentals which cause an attack to the reserves of Central Banks and then currency collapses. At the end, controlled exchange rate was abandoned by the Monetary Authorities. In the FGM, there is a loose monetary policy. FGM's also introduced additional factors that may help to explain the dynamics of a crisis, such as Current Account Imbalances, Real Exchange Rate Misalignments, Output Effects of Misalignments; Effect on the Debt Servicing Costs of the Government When Expected Evaluation Occurs and Implications of Borrowing to Defend a Peg.<sup>3</sup>

The FGM's explain currency crisis as a result of unsustainable developments in fundamental macroeconomic variables-such as excessively Expansionary Monetary Policy, significant currency depreciation in real terms, large and growing Balance of Payments Current Account Deficit, excessive investments in risky and low profit projects, as well as deficiencies in regulation and Banking and Financial system supervision.<sup>4</sup>

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<sup>2</sup> Krugman P. (1979) "A Model of Balance of Payments Crises." *Journal of Money, Credit and Banking*, Vol. 11, pp. 1 -2

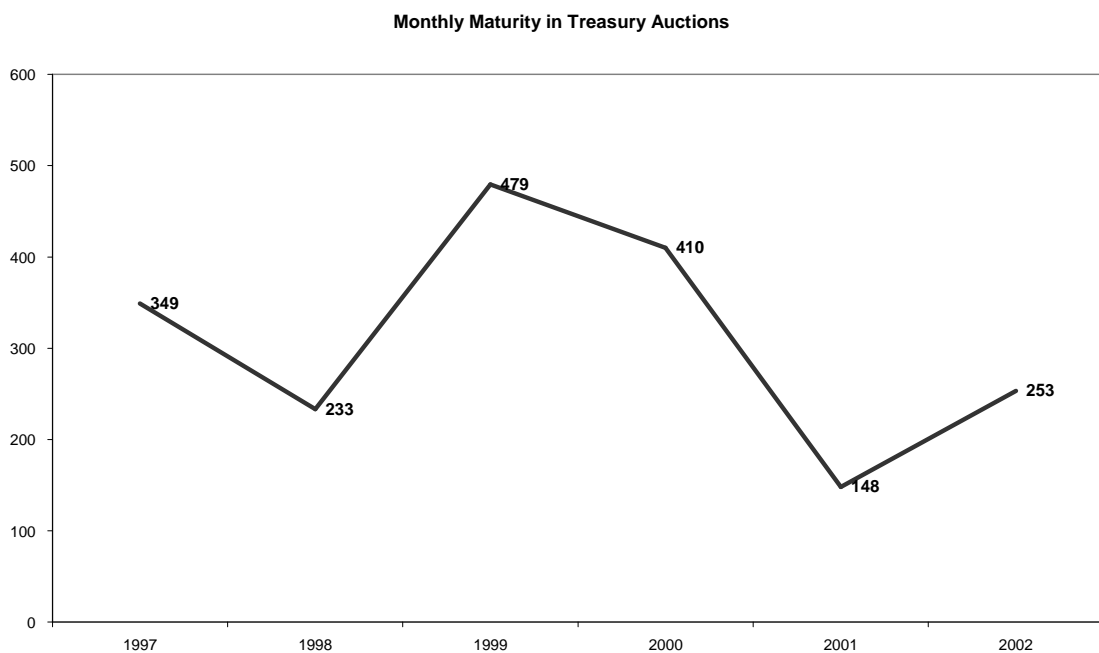
<sup>3</sup> Allen M., Rosenberg C., Keller C., Setzer B., and Roubini N. (2002) "A Balance Sheet Approach to Financial Crisis" IMF Working Papers. WP/02/210.

<sup>4</sup> Babic, A and Zigman A. (2001) "Currency Crises: Theoretical and Empirical Overview of the 1990s", Surveys, Croatian National Bank.

In Turkey, Central Bank's resources did not finance the budget deficit but the deficit was financed with domestic borrowing. Therefore when it is looked to the picture;

- Domestic Debt Maturity is increasing
- Net Foreign Borrowing is negative
- Increase in the interest rate and decline in the reserves are sudden but not gradual.
- The collapse was not natural but as a matter of fact it was a speculative attack.

**Figure 1: Monthly Maturity in Treasury Auctions**



Source: Treasury, SPA

This model does not give a role to the government before or after the financial crisis. As Yilmazkuday argues the most unrealistic assumption in the Krugman-Flood-Garber model concerns the passive role of the government assumes before and during the crisis.

Even though it is obvious that financing a permanent budget deficit by domestic credit extension will lead to an inevitable crisis, the government does nothing either to prevent the crisis or smooth out its negative effects.<sup>5</sup> These assumptions of FGM's are not applicable to the Turkish case because the government was active during the crisis period.

Also in the FGM's the seigniorage financing of the budget deficit<sup>6</sup> is the reason of abandoning fixed exchange rate whereas in Turkish case the sudden attack on the currency was the reason of the abandoning Pegged Exchange Rate Regime.

Thirdly, the crisis was not expected and supported by the fundamentals but it occurred suddenly. Therefore, FGM is not adequate for explaining Turkish 2001 case.

## **2.2 Second Generation Models**

Second Generation Models (SGM) occurred because FGM failed to explain the 1992 EMS crises. In those economies, not all of them were experiencing poor macroeconomic fundamentals. Also, the reactions the governments gave to the currency attacks also differ. Therefore, for those economies it is not possible to argue that government is passive on the contrary governments took measures in order to avoid further deteriorating.<sup>7</sup> Therefore, it was understood that FGM could not be adequate to explain the crisis.

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<sup>5</sup> Yılmazkuday H. "Twin Crises in Turkey: A Comparison of Currency Crisis Models". The European Journal of Comparative Economics. Vol. 5, n.1, pp.111

<sup>6</sup> Özatay F. and Sak G. (2003) "Banking Sector Fragility and Turkey's 2000-2001 Financial Crisis." Central Bank of Turkey: Ankara. pp. 6

<sup>7</sup> Yılmazkuday H. "Twin Crises in Turkey: A Comparison of Currency Crisis Models". The European Journal of Comparative Economics. Vol. 5, n.1, pp.113

The SGM of Currency Crises focus on expectations coherence and a “trigger” causing expectations to move in the same direction, rather than on fundamental macroeconomic variables and their developments. In other words, instead of focusing on government economic policies, emphasis is put on the market itself.<sup>8</sup>

In the SGM’s governments take action in order to leave the Pegged Exchange Rate Regime. SGM’s argue that the Exchange Rate Systems can collapse because of the attack of the speculators who anticipate that the government would abstain from taking necessary measures to defend the currency against an attack. A high public debt or high unemployment may lead to such anticipations. It is further argued that in the SGM’s there should not be decline in the economy and there should be expansionary policies in the post crisis period.<sup>9</sup> Therefore this approach cannot be applicable to the Turkish case neither because Turkish economy did not grow in 2001 but on the contrary the economy shrank by 9.5 %.

Also, the Turkish government did not change the Exchange Rate Regime for the reason of the weak fundamentals but the reason was the speculative attack on the currency. And lastly SGM’s assume an inconsistency between the macroeconomic policies and the exchange rate regime<sup>10</sup> whereas Turkey was implementing Disinflation Program

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<sup>8</sup> Babic, A and Zigman A. (2001) “Currency Crises: Theoretical and Empirical Overview of the 1990s”, Surveys, Croatian National Bank.

<sup>9</sup> Özatay F. and Sak G. (2003) “Banking Sector Fragility and Turkey’s 2000-2001 Financial Crisis.” Central Bank of Turkey: Ankara. Pp. 6

<sup>10</sup> Özatay F. and Sak G. (2003) “Banking Sector Fragility and Turkey’s 2000-2001 Financial Crisis.” Central Bank of Turkey: Ankara. Pp. 3

supported by IMF and therefore the Macroeconomic Policies and the Exchange Rate regime was in harmony contrary to the Second Generation Models.

### **2.3 Third Generation Models**

With the Asian crises, the agenda once more shifted to the question of explaining financial crisis. But this time there are different dynamics that needs to be considered.

Balance Sheet Approach (BSA) may be defined as the approach which focuses on the examination of stock variables in a country's sectoral balance sheets and its aggregate balance sheet (assets and liabilities).<sup>11</sup> From this perspective, a financial crisis occurs when there is a plunge in demand for financial assets of one or more sectors: creditors may lose confidence in a country's ability to earn foreign exchange to service the external debt, in the government's ability to service its debt, in the banking system's ability to meet its deposit outflows, or in corporations' ability to repay the bank loans and other debt.<sup>12</sup>

When this fact this applied to Turkish case, it is seen that the problematic balance sheet of Turkish Banking sector triggered the November 2000 crisis and the confidence to the program was hurt in 2000. This increased the fragility of the Turkish Banking Sector. Therefore there was mistrust in Turkish banking system and this created pressure on the economic balances. (I.e. as a result of the sell of Demirbank government securities in the Secondary Market caused interest rates to rise above 100 % and this triggered the

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<sup>11</sup> Allen M., Rosenberg C., Keller C., Setzer B., and Roubini N. (2002) "A Balance Sheet Approach to Financial Crisis" IMF Working Papers. WP/02/210. pp. 13

<sup>12</sup> Allen M., Rosenberg C., Keller C., Setzer B., and Roubini N. (2002) "A Balance Sheet Approach to Financial Crisis" IMF Working Papers. WP/02/210. pp. 5



capital outflow and increase the demand on foreign currency and some foreign banks cut the credit lines of Turkish banks in order to avoid from the risk.)<sup>13</sup>

Allen, Rosenberg, Keller, Setser and Roubini (2002) argued five general types of risks in order to explain the balance sheet weaknesses which are Maturity, Currency, Capital Structure, and Solvency. They argued the fact that analyzing those risks may be helpful in order to understand the dynamics of crises such as Mexico (1994), Thailand (1997), Indonesia (1997), Korea (1997), Russia (1998), Brazil (1999), Turkey (2001), Argentina (2002) and Uruguay (2002).

Allen, Rosenberg, Keller, Setser and Roubini (2002) defined Maturity Mismatch when Long Term Assets are Long Term and Liabilities are Short Term. They argued that Maturity Mismatch risk was significant in all recent crisis episodes. Often the Maturity Mismatch in Foreign Currency led to a rollover crisis, as Short-Term Foreign Current Debts exceeded liquid reserves. In some cases, pressures came through Short-Term Government Debt (Mexico, Russia, Turkey, and Argentina) while in others they arose from the Short-Term Liabilities of the Banking System (Korea, Thailand, Russia, Turkey, Brazil, Uruguay, and Argentina). In yet other cases (Russia, Turkey, Brazil, and Argentina) the Interest Rate on Short-Term Government Debt increased sharply in the period before the crisis, reflecting a higher perceived currency and country default risk, as well as worsening the debt dynamics of the government.<sup>14</sup> In Turkish case as argued by the authors there was three different problems when the issue is Maturity Mismatch:

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<sup>13</sup> TCMB November 2001: Monetary Policy Report. Ankara

<sup>14</sup> Allen M., Rosenberg C., Keller C., Setzer B., and Roubini N. (2002) "A Balance Sheet Approach to Financial Crisis" IMF Working Papers. WP/02/210. pp. 16

Short Term Government Debt creates pressure, Short Term Liabilities of the banking system creates vulnerability and Short-Term Government Debt increased right before the crisis therefore in the Turkish case a Maturity Mismatch was apparent. Total Outstanding Debt of Turkey increased from US \$ 103.123 million in 1999 to US \$ 118.602 million in 2000 and to US \$119.775 million in 2001.<sup>15</sup> Therefore total Outstanding Debt of Turkey increased approximately 16% in one year in nominal terms. The increase resulted mostly from the increase in the Short Term Debt which was increased approximately 27% in 2000. Therefore it may be argued that Short Term Government Debt increased right before the crisis.

Second risk mentioned in the Balance Sheet Approach is the Currency Mismatch Risk and this was also present in the Turkish case. Allen, Rosenberg, Keller, Setser and Roubini (2002) defined Currency Mismatch Risk as the disparity in the currencies in which assets and liabilities are denominated. They further argued that the presence of currency mismatch risk is present almost in all of the episodes. At the government level, currency mismatch risk was important in Mexico, Brazil, Turkey, Argentina and Russia (even if in some cases the government debt was only foreign currency-linked rather than directly foreign currency-denominated). Currency mismatches were large in the banking system in Korea, Thailand, Indonesia, Turkey, Russia, and Brazil (in early 1998). Currency mismatches were large in the nonfinancial private sector (corporations and households) in Korea, Thailand, Indonesia, Turkey, Argentina, and Brazil (before the

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<sup>15</sup> TCMB EDDS

private sector increased its holdings of foreign currency denominated assets in 1998) and probably also in Uruguay.<sup>16</sup>

Yilmazkuday argued that in the period preceding the crisis, an open Foreign Exchange position was a structural feature of the Turkish banking system as well as the Maturity Mismatch. The banking sector problem in Turkey was basically as a result of a mechanism chosen to finance a very high public sector requirement. First, this led to an increase in government debt instruments especially in balance sheets of private banks. Second, it caused a significant deterioration in state-owned banks by accumulating duty losses. Risk accumulation in bank balance sheets in order to carry the domestic debt stock, looks to be an important element to understand crisis dynamics. When due to excessive risks accumulated in the balance sheets, credit lines to some banks that were acting as market makers in the government debt instruments market were cut off, the banking sector problem turned into a debt rollover problem increasing interest rates. The rise in interest rates turned the problem into a debt sustainability issue directly making rollover impossible.<sup>17</sup> Therefore in Turkish case the maturity mismatch was present both at the public and private banking level. Central Bank was a net borrower in the domestic market in order to roll over the debt and this increased the ratio of the government debt securities in the balance sheets of the banks.

Goldfajn and Valdes (1997) argued the connection between banking and currency crises as: Deposits at domestic banks constitute an important part of the domestic assets that

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<sup>16</sup> Allen M., Rosenberg C., Keller C., Setzer B., and Roubini N. (2002) "A Balance Sheet Approach to Financial Crisis" IMF Working Papers. WP/02/210. pp. 16

<sup>17</sup> Yilmazkuday Hakan. Twin Crises in Turkey: A Comparison of Currency Crisis Models. pp 27

investors will attempt to convert into foreign assets in a currency crisis. Thus, a run on the currency is typically associated with a run on the banking system. This relationship makes it clear why the banking system will have a crisis when there is a currency crisis.

<sup>18</sup>However, according to Saxena and Wong (1999), during the Asian crisis, the causality ran in the opposite direction; the crisis in the banking sector led to a currency crisis.<sup>19</sup>

This is the case happened in Turkey which a banking crisis of November 2000 was followed by a currency crisis of February 2001. But third generation models are not capable of explaining the Turkish case as the previous generation models.

Third risk is Solvency Risk and it is defined as when an entity's assets no longer cover its liabilities; in other words when the net worth is negative. If this is applied to the balance sheet of the government, the comparison should be made between the discounted values of all future balances in the non-interest current account is greater than the current stock of external debt therefore the emphasis should be on GDP and ratio of debt to GDP. <sup>20</sup>

Fourth risk which is the capital structure mismatch and is defined as relying excessively on debt financing rather than equity. <sup>21</sup>

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<sup>18</sup> Goldfajn and Valdes, 1997 qtd. In Yilmazkuday Hakan. Twin Crises in Turkey: A Comparison of Currency Crisis Models pp. 11

<sup>19</sup> Saxena and Wong (1999), qtd. In Yilmazkuday Hakan. Twin Crises in Turkey: A Comparison of Currency Crisis Models pp. 11

<sup>20</sup> Allen M., Rosenberg C., Keller C., Setzer B., and Roubini N. (2002) "A Balance Sheet Approach to Financial Crisis" IMF Working Papers. WP/02/210. pp. 18

<sup>21</sup> Allen M., Rosenberg C., Keller C., Setzer B., and Roubini N. (2002) "A Balance Sheet Approach to Financial Crisis" IMF Working Papers. WP/02/210. pp. 18

Then if the Turkish case is evaluated from the Third Generation Model it may be said that although there are resemblances, at some point Turkish 2001 case was not fitting to the Third Generation Models. For instance in the Third Generation Models stresses the corporate sector implications of a balance sheet implications of a currency crisis and the model suggests fiscal expansion as one of the remedies to overcome the high exchange rate-low equilibrium of the post crisis period.<sup>22</sup> Therefore Turkish case cannot be accepted as a candidate for Third Generation Models because Turkey experienced tight fiscal policy after the post crisis period.

Evaluation of The Section:

As all of the Financial Crisis Models argued above it is evident that Turkish crisis cannot be explained by any of the models whereas there was the presence of individual episodes in Turkish case triggered by structural background of the country. Therefore in this respect Turkish case needs to be evaluated in detail in order to understand the background of the liquidity crisis because none of the models is capable of explaining the crisis alone.

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<sup>22</sup> Krugman (1999) qtd. In Yilmazkuday Hakan. Twin Crises in Turkey: A Comparison of Currency Crisis Models pp. 21

### 3 CENTRAL BANK OF THE REPUBLIC OF TURKEY

## BALANCE SHEET

Figure 2 Central Bank of the Republic Turkey Balance Sheet

ASSETS		LIABILITIES
I. Gold		I. Currency Issued
A. International Standard		II. Liabilities to Treasury
B. Non-International Standard		A. Gold (Net Gram)
II. Foreign Exchange		B. Reserve Tranche Means
A. Convertible	a. Foreign Banknotes	C. Other (Net)
	b. Correspondent Accounts	III. Foreign Correspondents
	c. Reserve Tranche Position	A. Convertible
B. Non-Convertible	a. Foreign Banknotes	B. Non-Convertible
	b. Correspondent Accounts	IV. Deposits
III. Coins		A. Public Sector
IV. Domestic Correspondents		a. Treasury, General and Special Budget Adm
V. Securities Portfolio		b. Public Economic Institutions
A. Government Securities	a. Bonds	c. State Economic Enterprises
	b. Treasury Bills	d. Other
B. Other		B. Banking Sector
VI. Domestic Credit	a. Rediscount	a. Free Deposits of Domestic Banks
A. Banking Sector	b. As per Art 40/c of Law No. 1211	b. Foreign Banks
	c. Other	c. Required Reserves (Central Bank Law art.
B. Credit SDF		i. Cash
VII. Open Market Operations		ii. Gold (Net Grams)
A. Repurchase Agreements	a. Cash	d. Other
	i. Foreign Exchange	C. Miscellaneous
	ii. Securities	a. Foreign Exchange Deposits by Citizens Ab
B. Other	b. Securities	b. Other
VIII. Foreign Credits		D. International Institutions
IX. Share Participations		E. Extrabudgetary Funds
X. Fixed Assets		a. Savings Deposit Insurance Fund
A. Buildings and Building Sites Depreciation Allowance for Real Estate (-)		b. Other
B. Furniture and Fixtures Depreciation Allowance for Furnitures and Fixtures		V. Liquidity Bills
XI. Claims under Legal Proceedings (Net)		VI. Open Market Operations
A. Claims under Legal Proceedings		A. Repurchase Agreements
B. Provision for Past-Due Receivables (-)		a. Cash
XII. Treasury Liabilities Due to SDR Allocation		
XIII. Revaluation Account		i. Foreign Exchange
XIV. Accrued Interest and Income		ii. Securities
XV. Miscellaneous Receivables		VII. Foreign Credit
XVI. Other Assets		A. Short Term
Total		B. Medium and Long-Term
		VIII. Advances, Collateral and Deposits Collected Against letters of Cre
		A. For letters of Credit
		B. For Imports
		IX. Notes and Remittances Payable
		X. SDR Allocation
		XII. Reserves
		A. Ordinary and Extraordinary Reserves
		B. Special Reserves (CBRT Law Art. 59)
		C. Inflation Adjustment For Reserves
		XIII. Provisions
		A. Provisions for Pension Commitments
		B. Provision for Taxes
		C. Other Provisions
		XIV. Revaluation Account
		XV. Accrued Interest and Expenses
		XVI. Miscellaneous Payables
		XVII. Other Liabilities
		XVIII. Profit for the Period

The primary objective of the CBRT is to achieve and maintain price stability and the Monetary Policy is the main tool in this respect. The balance sheet of CBRT occurs as a reflection of the Monetary Policy tools of the government therefore analyzing the Balance Sheet of CBRT will give important clues regarding the monetary policy.

There are certain dynamics that should be mentioned in order to emphasize the fact that the balance sheet of the Central Bank is different from a regular balance sheet. These differences may be summarized as;

Firstly, according to the Law on the CBRT (Law No 1211) Article 4, the privilege to issuing banknotes in Turkey is given to the Central Bank and different from other firms money is recorded as a liability in the CBRT's Balance Sheet.

Secondly, according to the Article 41 of the same law, CBRT acts as the treasurer of the government and in this respect the liabilities of the government resulted from the fiscal relationship since 1947 can be only followed from the CBRT's balance sheet.

Thirdly, according to the Article 61 of the same law, the unrealized valuation gains and losses, arising from the revaluation of gold and foreign exchange due to a change in the value of the Turkish currency, shall be monitored in a temporary account. In this respect, the realized amounts of the gains and losses resulted from the revaluation shall be transferred to the income statement whereas this issue is different in commercial banks.

Commercial banks show the unrealized losses and gains directly in their profit and loss accounts.<sup>23</sup>

Therefore the Balance Sheet of the CBRT differs from the balance sheets of the commercial banks on three topics as explained above. In this respect, the Balance Sheet of CBRT will be discussed in order to understand the dynamics of the balance sheet.

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<sup>23</sup> CBRT Law. [www.tcmb.gov.tr](http://www.tcmb.gov.tr).



## 4 ANALYTICAL BALANCE SHEET

### 4.1 Introduction

Monetary Authorities which are responsible from conducting Monetary Policy intervenes to the Money Market with different tools. The best tool which can be used in order to monitor those interventions is the CBRT's Balance Sheet because Monetary Policy is about CBRT determining targets for the assets and liabilities that is creating its balance sheet and uses certain aggregates and tools such as Currency Circulated, Disponibility, Rediscount Credits and Open Market Operations in order to achieve those targets because all of those tools both affect the economic activities as well as the CBRT's Balance Sheet. Therefore the easiest way to monitor the Monetary Policy is to monitor Central Bank Balance Sheet<sup>24</sup>. But due to its complicated nature, it is not easy to monitor all of the activities and Analytical Balance Sheet is created for that aim.

Analytical Balance Sheet was created upon summing up and offsetting the CBRT's Balance Sheet in order to represent specific monetary aggregates.

While creating Analytical Balance Sheet from Balance Sheet of CBRT some of the items are offsetted. Those offsets can be summed up in three groups:

- i) Securities Debt or Receivable arising from Open Market Operations  
under the CBRT Portfolio item

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<sup>24</sup> Acar, 1999 page 84 qtd in Ardiç, H. (2004) 1994 ve 2001 Yılı Ekonomik Krizlerinin, Türkiye Cumhuriyet Merkez Bankası Bilançosunda Yarattığı Hareketlerin İncelenmesi. Türkiye Cumhuriyeti Merkez Bankası Muhasebe Genel Müdürlüğü, pp 209

- ii) Cash Debt or Receivable arising from Open Market Operations under the Open Market Operations item
- iii) Other asset and liabilities denominated in TRY are under Other Items in Domestic Assets.<sup>25</sup>

#### **4.1.1 Assets**

##### **4.1.1.1 Foreign Assets**

###### **4.1.1.1.1 Gold Holdings**

###### **4.1.1.1.2 Foreign Currency Fund Holdings in the Vaults of Bank's Branches**

###### **4.1.1.1.3 Foreign Exchange Accumulated in the Foreign Correspondents Account**

###### **4.1.1.1.4 Other FX Receivables**

Increase in the foreign assets item mostly occurs by either FX purchases or foreign credit usage.<sup>26</sup>

##### **4.1.1.2 Domestic Assets**

This item shows the credits extended to the Banking Sector by IMF.

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<sup>25</sup> Çelik A., Evrensel A., Eryol B., Yücel D., İlhan N., Akıncı Ö. and Görmez Y. (2006) Türkiye Cumhuriyet Merkez Bankası Bilançosu Açıklamalar, Rasyolar ve Para Politikası Yansımaları. Türkiye Cumhuriyeti Merkez Bankası. Ankara. pp.44

<sup>26</sup> Çelik A., Evrensel A., Eryol B., Yücel D., İlhan N., Akıncı Ö. and Görmez Y. (2006) Türkiye Cumhuriyet Merkez Bankası Bilançosu Açıklamalar, Rasyolar ve Para Politikası Yansımaları. Türkiye Cumhuriyeti Merkez Bankası. Ankara. pp.44

#### **4.1.1.2.1 Cash Operations**

#### **4.1.1.2.2 Treasury Dept**

i) CBRT Portfolio: is an important aggregate which shows the Government Debt Instruments owned by CBRT. In this item, along with Government Domestic Debt Instruments, the Government Debt Instrument receivables resulted from Repurchase Agreements and debt of the CBRT resulted from Reverse Repurchase Agreements as part of Open Market Operations are shown by offsetting.

1-Government Domestic Debt Inst.Perior No

2-Government Domestic Debt Inst.Purchased

ii) Other: Off-setted amount of the Asset and Liabilities that resulted from the CBRT's own operations.

#### **4.1.1.2.3 Credits to Banking Sector**

#### **4.1.1.2.4 Credits to SDIF**

#### **4.1.1.2.5 Other Items**

#### **4.1.1.2.6 Revaluation Account:**

This account shows the representation of our liabilities to IMF. The FX liability to IMF is shown under the International Institutions Deposit in the CBRT Balance Sheet and is valued at the end of the month whereas it is shown under Foreign Liabilities in Analytical Balance sheet in TRY and valued with Current Exchange rate. Therefore the

reevaluation account of Analytical Balance Sheet is different from CBRT Balance Sheet.<sup>27</sup>

#### **4.1.1.2.7 IMF Emergency Assistance (Treasury)**

### **4.1.2 Liabilities**

#### **4.1.2.1 Total Foreign Liabilities**

##### **4.1.2.1.1 Liabilities to Non-Residents :**

This item mostly composes of Credit Letter and Super FX deposit accounts of public and banks.

##### **4.1.2.1.2 Liabilities to Residents**

- i) FX Deposits of Non-Bank Sector
- ii) FX Deposits of Banking Sector

#### **4.1.2.2 Central Bank Money**

This item shows the CBRT's TL liabilities to the other institutions in the economy.

Receiving FX debt or giving lend does not effect Central Bank Money items.

##### **4.1.2.2.1 Reserve Money**

- i) Currency Issued
- ii) Deposits of Banking Sector

a) Required Reserves

b) Free Deposits

- iii) Extrabudgetary Funds
- iv) Deposits of Non-Bank Sector

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<sup>27</sup> Çelik A., Evrensel A., Eryol B., Yücel D., İlhan N., Akıncı Ö. and Görmez Y. (2006) Türkiye Cumhuriyet Merkez Bankası Bilançosu Açıklamalar, Rasyolar ve Para Politikası Yansımaları. Türkiye Cumhuriyeti Merkez Bankası. Ankara. pp.45

#### 4.1.2.2.2 Other Central Bank Money

- i) Open Market Operations
- ii) TRY Deposits of Public Sector

#### 4.2 Monetary Aggregates in the Analytical Balance Sheet

- i) **Reserve Money:** Currency Issued, Deposits of Banking Sector, Deposits of Non-Bank Sector and fund accounts. When reserve money increases one unit, it affects the other monetary aggregates more than one unit therefore it is an important aggregate.
- ii) **Base Money** is calculated by when the cash receivables from Banking Sector or Cash Debts to the Banking Sector arising from Open Market Operations undertaken by CBRT in order to regulate the liquidity in the market are added to reserve money.
- iii) **Central Bank Money** can be derived by adding TRY deposits to the base money. As indicated earlier, this aggregate shows liabilities of Central Bank denominated in TRY to the other institutions in the economy.

Currency in Circulation + Deposits of Banking Sector + Fund Accounts + Non Banking Sector Deposits = Reserve Money + Open Market Operations = Base Money + Public Deposits = Central Bank Money

### 4.3 Central Bank Balance Sheet Determined in Accordance With the Stand-By Agreement

Stand-By Balance Sheet, which is a summarized version of Analytical Balance Sheet, definition was first introduced with the Letter of Intend signed with IMF in December 1999 which aims to decrease the inflation and remove the instability of the economy.<sup>28</sup>

Stand-By Balance Sheet started to be predicated on the relationship with IMF.

The basic equation of the Stand By balance sheet presented as:

$$\text{Base Money} = \text{Net Domestic Assets} + \text{Net Foreign Assets}^{29}$$

Asset composition of the Stand-By Balance Sheet composed of the sum of main aggregates of Net Domestic Assets and Net Foreign Assets whereas Base Money item takes place in the liabilities.

Base Money composes from the items such as:

- i) Currency Issued
- ii) Required Reserves of TL Deposits of Banking Sector
- iii) Free Deposits<sup>30</sup>

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<sup>28</sup> Çelik A., Evrensel A., Eryol B., Yücel D., İlhan N., Akıncı Ö. and Görmez Y. (2006) Türkiye Cumhuriyet Merkez Bankası Bilançosu Açıklamalar, Rasyolar ve Para Politikası Yansımaları. Türkiye Cumhuriyeti Merkez Bankası. Ankara.

<sup>29</sup> Erçel, (December 9, 1999) "Disinflation Program For the Year 2000: Implementation of Exchange Rate and Monetary Policy." Annex D

<sup>30</sup> Erçel, (December 9, 1999) "Disinflation Program For the Year 2000: Implementation of Exchange Rate and Monetary Policy." Annex D

(Fund Deposits and Non-Banking Sector Deposits will be deducted in the Stand-By Balance Sheet whereas the Reserve Money of Analytical Balance Sheet includes those items)

Net Foreign Assets = Net International Reserves + Medium-Foreign Exchange Credits (net) + other Net Foreign Assets

Net International Reserves = (Gross Foreign Assets –Gross International Liabilities) + Net Forward Position of The Central Bank<sup>31</sup>

Gross International Liabilities = Gross Reserves + FX Deposits of Banking Sector

Net International Reserves is derived from by adding Net Forward Position to the difference of Gross International Liabilities which is derived by adding Gross Reserves to FX deposits of Banking Sector. Net International Reserves (NUR) shows the Short Term Net Foreign Exchange Reserve Position of the CBRT. Whereas Net Foreign Assets show the Total (short, middle and long term) FX position of the bank and reflection of Balance of Payments to FX position of CBRT. <sup>32</sup>

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<sup>31</sup> Erçel, 1999. (December 9,1999) “Disinflation Program For the Year 2000: Implementation of Exchange Rate and Monetary Policy.” Annex E

<sup>32</sup> Çelik A., Evrensel A., Eryol B., Yücel D., İlhan N., Akıncı Ö. and Görmez Y. (2006) Türkiye Cumhuriyet Merkez Bankası Bilançosu Açıklamalar, Rasyolar ve Para Politikası Yansımaları. Türkiye Cumhuriyeti Merkez Bankası. Ankara. pp.58

Net Domestic Assets = Cash Credits To The Public Sector (Net) + Deposit of Public Funds+ Deposits of Non Banking Sector + Open Market Operations + Revaluation Account + IMF Emergency Account + Others<sup>33</sup>

As it can be seen from the formula Net Domestic Assets is a monetary aggregate, which shows the CBRT's credit relationship within the country (i.e. banks, public institutions and revaluation account of IMF)

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<sup>33</sup> Erçel, (December 9,1999) "Disinflation Program For the Year 2000: Implementation of Exchange Rate and Monetary Policy."



## **5 IMF BASED DISINFLATION PROGRAM: 2000 AND 2001 MONETARY POLICY REALIZATIONS**

### **5.1 Background**

Monetary Policy of the Central Bank was shaped in 2000 and 2001 with the Disinflation Program introduced in 1999 as a result of the Letter of Intend signed by IMF on 9 December 1999. The program aimed to reduce the inflation to single digits via Pegged Exchange Rate Policy with presentation of liquidity generation mechanism: in order to sustain the exchange rate regime, the Central Bank set Net Domestic Assets, and the growth of balance sheet was determined by the increase in Net Foreign Assets. This quasi currency board policy framework ruled out the possibility of sterilization, the liquidity expansion was linked to the reserve build-up and restricted the flexibility of the Central Bank on short term interest rates.<sup>34</sup>

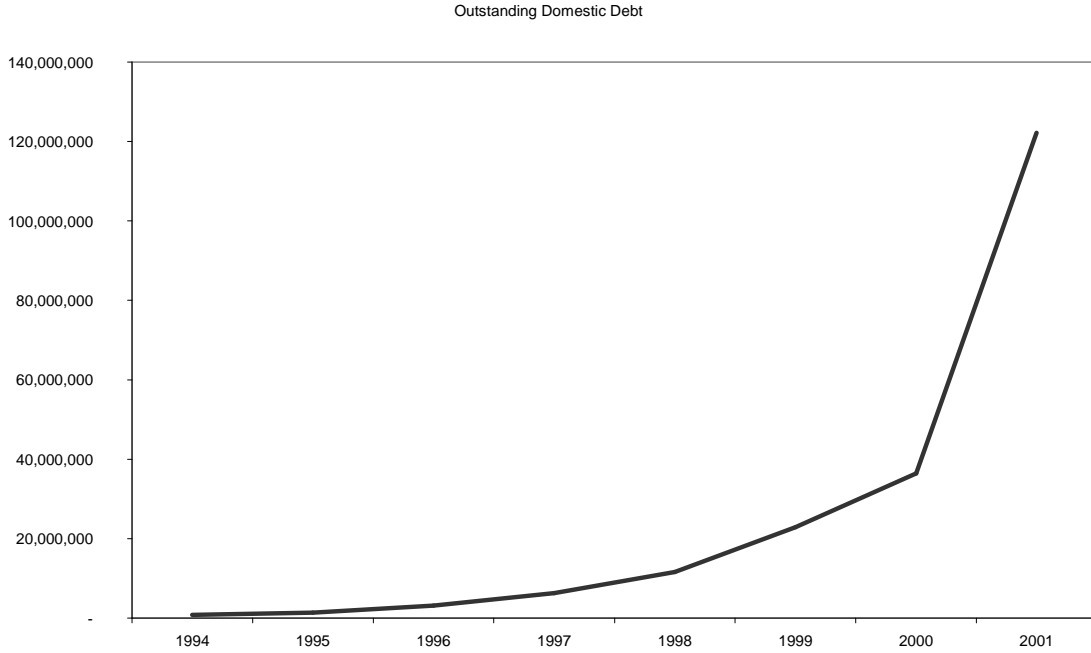
The necessity of this program was argued by Yükseler as; the reason of this program was related with the fact that the high Real Interest Rates in the country and the burden that interest rates created on the public balance. Starting from 1994, in Turkish economy Public Sector was a Net Foreign Debt Payer. In other words, Public Sector is a Net Borrower from the domestic market and in order to pay the net foreign debt it had make additional borrowing from the domestic market. Outstanding External Debt reached to 119,692 millions of US Dollars in the year 2000 whereas Outstanding Domestic Debt reached to 36,420,620 Billions of TL which the share in GDP is 29%. The high levels of the debt prevent the decrease in the Interest Rates and Inflation. For this reason in order

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<sup>34</sup> Monetary Policy Report: November 2001. TCMB: Ankara.

to convert the Domestic Debt to Foreign Debt Turkey needs to increase its credibility with a Stabilization Program.<sup>35</sup>

**Figure 3 : Outstanding Domestic Debt**



Source: SPA

The goals of the program in summary:

- To bring inflation to single digits by the end of 2002
- To decrease the domestic interest rates
- To achieve sustainable growth

## 5.2 Disinflation Program

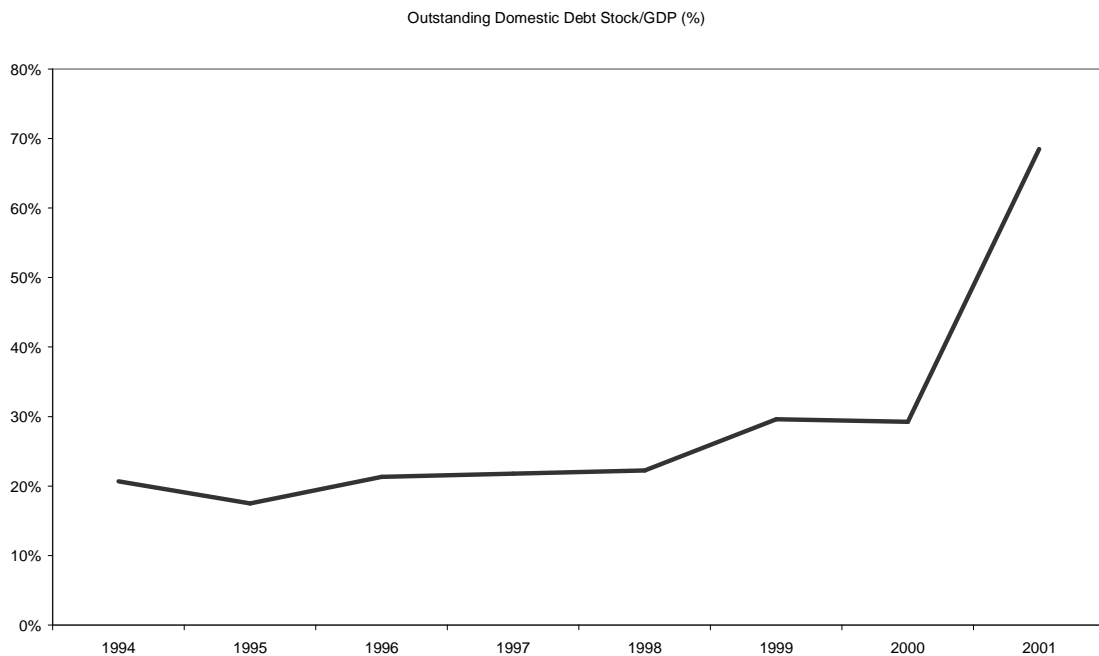
On 9 December 1999, Gazi Erçel announced the details of the Disinflation Program for the year 2000. The aim of the program is to decrease the chronic inflation in Turkey and

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<sup>35</sup> Yükseler, Z. (2000) qtd. in Ardıç, H. (2004) 1994 ve 2001 Yılı Ekonomik Krizlerinin, Türkiye Cumhuriyet Merkez Bankası Bilançosunda Yarattığı Hareketlerin İncelenmesi. Türkiye Cumhuriyeti Merkez Bankası Muhasebe Genel Müdürlüğü, pp 209

the effects of decreasing inflation will be on many grounds in the Turkish economy as stated in the Letter of Intent of 1999. Turkey asked SDR 2,892 million stand-by arrangement from IMF in order to support the Disinflation Program for the three year period. The support from IMF will be dependent on certain performance criteria's introduced by the program. If the details of the program are discussed, the first point is the importance given to the high inflation in Turkey.

**Figure 4: Outstanding Domestic Debt Stock /GDP (%)**



Source: SPA

The biggest problem of the Turkish economy was the inflation for the last 25 years and this program aims to bring down the consumer price inflation to % 25 by the end of 2000, %12 by the end of 2001 and to 7% by the end of 2002.<sup>36</sup> CPI in 1999 was realized as 68%. The primary effect of the inflation is accepted as the unstable growth dynamic of Turkish economy. This unstable growth trend occurred in an inflationary

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<sup>36</sup> Erçel 1999

environment in the country in order to recover the depression followed by the rare growth periods. The chronically high inflation also decreased the amount of the both domestic and foreign investment which also affected the growth potential of the country. The inflation also had affected the credibility of TL and this caused high interest rates in the country. Therefore with the first aim of decreasing the inflation, the second goal of the program is to reduce the real interest rates to plausible levels. Thirdly, disinflation program aims to increase the growth potential of the economy because with decreasing inflation and decreasing interest rates and a credible national currency, Turkey will be able to attract both foreign and domestic investment.

In the Letter of Intent it was mentioned that the program will rest on three pillars: up-front fiscal adjustment, structural reform, and a firm exchange rate commitment supported by consistent incomes policies.<sup>37</sup> (Letter of Intent 1999) Tight Fiscal Policy is a must because the weakness of public account can be accepted as the main reason of the high inflation. Secondly, without Structural Reforms Turkey cannot achieve a sustainable fiscal adjustment and a decline in the public debt. Thirdly, without a firm Exchange Rate Turkey cannot support Disinflation Process and therefore Monetary and Exchange Rate Policy should support the first two pillars.<sup>38</sup> Then the program will work with three tools and all of the three tools will work in harmony with each other and will support each other for entering a disinflation stage in the country. If one of the pillars fail to operate then there will be domino effect which will prevent the success of the program because as it is discussed the pillars are dependent on each other.

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<sup>37</sup> Letter of Intend. (December 9, 1999)

<sup>38</sup> Erçel, G. (December 9, 1999) "Disinflation Program For the Year 2000: Implementation of Exchange Rate and Monetary Policy."

IMF previously adopted same kind of monetary policies with currency baskets but they did not achieve to success. The Disinflation Program of 2000 was different from the previous attempts of IMF because there was a exist strategy, the program will come to an end after 1,5 years and the Exchange Rate will be let to float with the introduction of a widening band. The reason of the exit strategy may be attributed to the fact that it is expected a worsening in the Current Account Balance with a Pegged Currency Strategy therefore in order to smoothen the process the program was created with a time table which gives the exact date of the exit.

The program adopted the Monetary Approach to Balance of Payments in its theoretical foundations on the determination of the liquidity generation mechanism and the resolution of the balance of payments equilibrium. This approach which provides the underlying frame of reference to almost all IMF-style austerity programs, expects the Real Exchange Rate to be in long run equilibrium at its purchasing power parity level, and maintains that the domestic supply of money be endogenized in a regime of open capital account.<sup>39</sup>

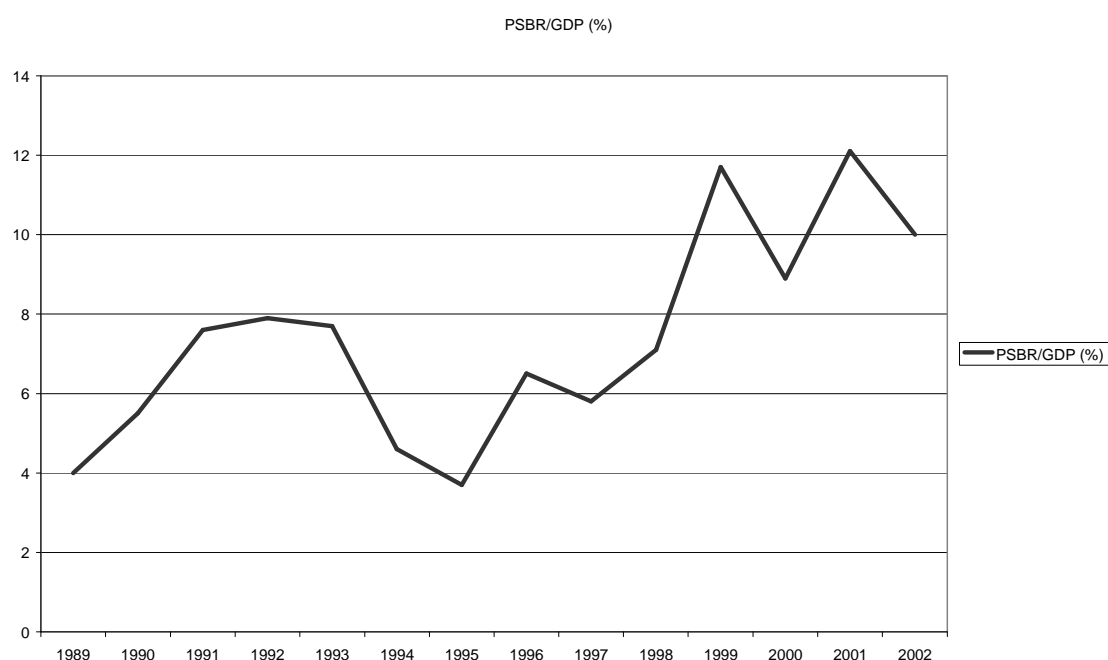
Exchange Rate Policy introduced by the program is as follows; the Exchange Rate basket which composes from 1 US Dollar + 0.77 Euro will be announced on a daily basis covering one-year period and will be valid throughout this program.

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<sup>39</sup> Yeldan, Erinç. (2001) "On the IMF- Directed Disinflation Program in Turkey: A Program for Stabilization and Austerity or A Recipe For Impoverishment and Financial Chaos?" pp.5

The consequences of the Pre-announced Exchange Rate can be summarized as Decreasing Risk Premium and naturally decreasing Domestic Interest Rates. As a result of the improvement in the Public Sector Borrowing Requirement and the shift in the Exchange Rate Policy from the “managed float” to a “Pre-Announced Basket determined according to the targeted inflation” will lead to the elimination of the substantial amount of the risk premium on interest rates.<sup>40</sup>

**Figure 5: PSBR/GDP (%)**



Source: CBRT EDDS

### 5.2.1 Exchange Rate Policy Outlined in The Disinflation Program

Erçel while outlining the details of Exchange Rate Policy in his speech, he mentioned the channels that the policy will effect the economy. Preannounced Exchange Rates Policy will affect the economic framework through many channels. If inflationary expectations are decreased, then the inflation will be reduce with minimum cost but in the economies where there is chronic inflation, past inflation is the most important

<sup>40</sup> Erçel G. (December 9, 1999). “Disinflation Program for the Year 2000: Implementation of Exchange Rate and Monetary Policy”.

indicator for determining future inflation. Any backward indexed contract (like wage, rent etc.) for protecting from inflation is called *inertia* and it is very important for the program.<sup>41</sup> Because backward indexation will not be helpful for decreasing inflation and it will affect the credibility of the program. Erçel indicated that the success of the program lies in its credibility, continuity and acceptance and later Demiralp while explaining while the program failed he gave the reason of the lack of the support from the government to the program.<sup>42</sup>

With a Pre-announced Exchange Rate, backward indexation will be given up and it will have positive effects on the goods and financial markets in the long run because uncertainties will disappear for the future. The openness of the Turkish Economy to capital movements makes the commitment to an Exchange Rate Anchor particularly effective in affecting nominal interest rates. Accordingly, the Exchange Rate Regime has been designed to provide clear signals as a basis for price and interest rate expectations, while avoiding the medium-term drawbacks experienced in the medium term by some of the other countries pursuing exchange rate based stabilization.<sup>43</sup>

The price of the Tradable Goods in International Terms will be determined by the Foreign Inflation and Preannounced Exchange Rate Basket. Therefore, the companies in that sector will be in competition because of the prices (if they leave their habits and

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<sup>41</sup> Erçel (December 9, 1999). "Disinflation Program for the Year 2000: Implementation of Exchange Rate and Monetary Policy".

<sup>42</sup> Aydoğdu, H. And Yönezer N.(2007) "Krizin Sözlü Tarihi: Kasım 2000-Şubat 2001 Ekonomik Krizinin Tanıkları Anlatıyor. Dipnot Yayınları. Ankara. pp.41

<sup>43</sup> Erçel, G. (25 January 2000) "Disinflation Program of Turkey: What We are Doing and Why?" Merhant Taylor's Hall, London.

adjust their price policies in accordance with the program and this will only occur if they believe in the program) and private manufacturing sector constitutes 55% of WPI.

Secondly, in CPI index Non Tradable Goods have the largest share therefore there occur a necessity of confidence to the program. The firms in Tradable Goods Market and Non Tradable Goods market will make the necessary price adjustments because of the improvement in the financial structures of the public sector because they will eliminate the pressure that will come from Public Sector by achieving Performance Criteria. As it is seen so far, the program's success is very much dependent on the success of the all economic actors and they are all interrelated. And the domino effect can be easily seen, if one of the actors fail then the program will fail. To continue Pre-Announced Exchange rate is also affecting the financial markets because the determination of Domestic Interest Rates are dependent on many factors in a financially liberalized economy.

The factors are:

- Foreign Interest Rates
- The Expected Rate of Increase in The Exchange Rates
- Risk Premium

Risk Premium is affected from the high level of Public Sector Requirement, volatility in Inflation Rate, Exchange Rate Risk, Political Risk and other Institutional Factors. If there is a decrease in Public Sector Borrowing Requirement and with an implementation of Pre-Announced Exchange Rate, the Country's Risk Premium will automatically decrease and that will lower the domestic interest rates.<sup>44</sup>

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<sup>44</sup> Erçel (December 9, 1999). "Disinflation Program for the Year 2000: Implementation of Exchange Rate and Monetary Policy".



In 1999 the Public Sector Borrowing Requirement's ratio to GDP was realized as 11.7 whereas the Average Simple Interest Rate in the Treasury auctions was 94 %.<sup>45</sup>

This will have several impacts:

- Capital inflows will increase and this will further decrease the interest rates.
- Lower interest rates will support the investment because firms will be able to find credit with a lower cost and this will decrease the production costs.
- Unemployment rates will decrease
- Sustainable economic growth will be achieved.

#### **5.2.1.1 The Implementation of the Program:**

- 1) The Exchange Rate Policy of the Central Bank of the Republic of Turkey will be implemented according to the Targeted Inflation Rate.<sup>46</sup> (WPI target for 2000 is 20%)
- 2) During the implementation there will be two different Exchange Rate regimes for two different time periods. It is planned that in the first 18 months of the program (January 2000-June 2001), nominal value will be escalated according to the targeted inflation rate. The targeted WPI inflation rate for the period of January 2000- December 2000 is 20%.

In the first 18 months period, CBRT will announce the rate of increase in the Exchange Rate at the end of every three month period for the next three months

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<sup>45</sup> SPO

<sup>46</sup> Erçel (December 9, 1999). "Disinflation Program for the Year 2000: Implementation of Exchange Rate and Monetary Policy".

period and it will leave the previous Pre-Announced rates unchanged. The below presented table is presented to the public on December 1999 before the implementation of the program began. As Erçel states that; “The daily value of the values of the basket as a table for the purpose of removing uncertainty and sustaining a yearly perspective to all the agents of the economy.”<sup>47</sup>

**Figure 6: The Rate of Increase of The FX Basket Consisting of 1 US Dollar + 0.77 Euro**

RATE OF INCREASE OF THE FX BASKET CONSISTING OF 1 US DOLLAR + 0.77 EURO

	Value of the Basket in the End of The Month (1 USD +0.77 Euro)	Percentage Changes in The Basket		
		Monthly Rate of Increase (%)	Cumulative Rate of Increase (%)	Daily Rate of Increase (%)
December 1999	959,020.46			
January 2000	979,159.89	2.1	2.1	0.067
February	999,722.25	2.1	4.244	0.072
March	1,020,716.42	2.1	6.433	0.067
April	1,038,068.59	1.7	8.243	0.056
May	1,055,715.76	1.7	10.083	0.054
June	1,073,662.93	1.7	11.954	0.056
July	1,087,620.55	1.3	13.41	0.042
August	1,101,759.61	1.3	14.884	0.042
September	1,116,082.49	1.3	16.377	0.043
October	1,127,243.31	1.0	17.541	0.032
November	1,138,515.75	1.0	18.717	0.033
December 2000	1,149,900.90	1.0	19.904	0.032

Source: CBRT

As it can be seen from the table, at end of December 2000 the Cumulative Rate of increase will be limited with 20% which is the target WPI rate for 2000.

Whereas in the second term which is the period between July 2001- January 2002, Progressively Widening Band will be used for the Exchange Rate Policy. Exchange

<sup>47</sup> Erçel (December 9, 1999). “Disinflation Program for the Year 2000: Implementation of Exchange Rate and Monetary Policy”.

Rate will fluctuate within the limits of the band and this band will be widened; by the end of 2001 to % 7.5, by July 1, 2002 to % 15 and by the end of 2002 to %22.5. In this program, Central Bank will not intervene to the Exchange rate within the band.

## **5.2.2 Monetary Policy Outlined in The Disinflation Program**

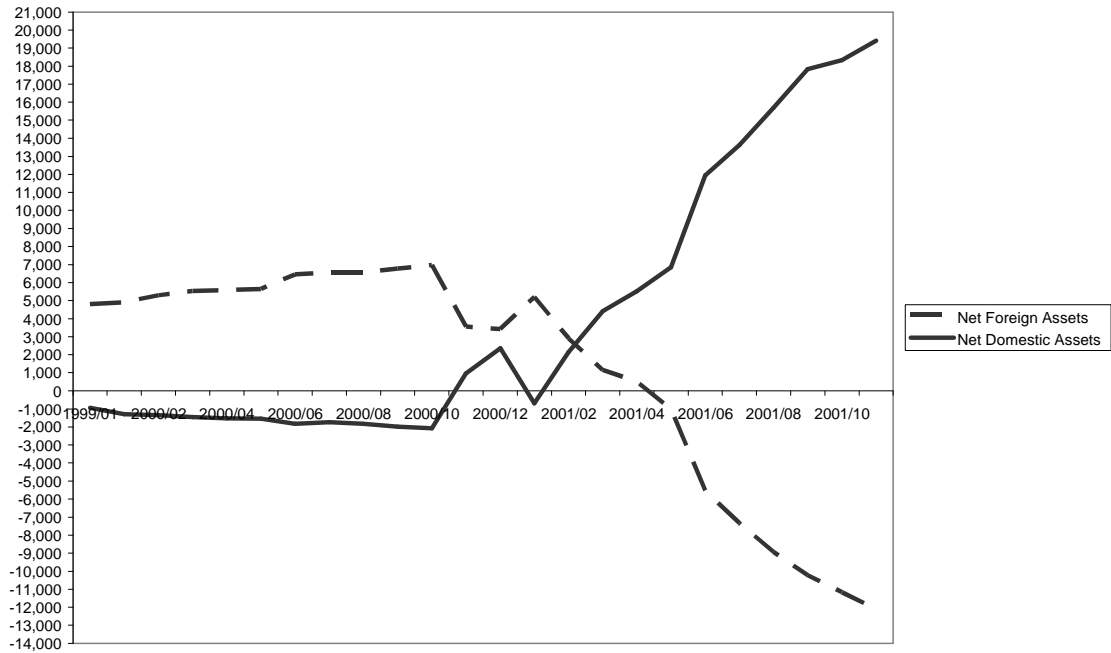
### **5.2.2.1 Aims of the Monetary Policy**

- Banks will manage their liquidity positions more actively because Central Bank will reduce the amount TL liquidity injection in return of TL transactions, but it guarantees injecting liquidity through Foreign Exchange Operations. Secondly, CBRT will decrease the Liquidity Ratio.
- Base Money will change in return to the changes in Net Foreign Assets in order to keep Net Domestic Assets unchanged.
- A mechanism will be created in order to keep Foreign Exchange Reserves above a certain level. (Because when there is an excess demand for foreign exchange, the withdrawal of Turkish lira from the market will not be compensated by an increase in Net Domestic Assets.)
- Interest rates will be the factor that will bring the system into equilibrium.

The details of Monetary Policy was outlined in the Letter of Intent of Turkey dated 1999. In that respect the new Balance Sheet and some additional definitions were introduced with this new program. Actually the only difference in the Balance Sheet introduced by the Staff Monitored Program and new Stand-By Agreement is regarding

the calculation of Net Foreign Assets. But by the Stand-By Agreement New Foreign Assets item is calculated as:

**Figure 7: Net Foreign Assets/Net Domestic Assets**



Source: CBRT

The main monetary tool of the Central Bank will be Exchange Rate Policy and to follow the Pre-Announced Path of the basket which is composed of 1 USD +0.77 Euro. CBRT will continue to follow the reflection of Exchange Rate and Monetary Policy in the context of main aggregates from the Balance Sheet of CBRT. Monetary Policy and Balance Sheet of CBRT are designed by imposing a floor to Net International Reserves in addition to a ceiling restriction for the Net Domestic Assets item, which are fundamental aggregates of the Balance Sheet.

**5.2.2.2 Operational Rules of the Monetary Policy**

→ CBRT will buy all supplied Foreign Exchange at the Pre-Determined Exchange Rate that means injecting Turkish Lira to the market by buying Foreign Exchange. This is the reflection of the Exchange Rate Policy on the Liquidity Policy. CBRT's Turkish Lira funding process will be kept up during the first 18 months period through purchasing foreign exchange. This funding principle will be strengthened by imposing restriction on Net Domestic Assets and by decreasing volatility of Net Domestic Assets. The ceiling to the Net Domestic Assets at the end of each quarter is fixed at -1200 trillion TL as a performance criterion by the end of year 1999 when the effect of Revaluation Account is excluded. During the period, Net Domestic Assets will be fluctuate roughly within a parallel band whose upper and lower limits will be determined as +/- 5 per cent of previous end-quarter base money figures.

CB limited NDA by decreasing the credits to public sector and bank will abandon the policy of decreasing NDA through sterilization that have been implemented during the periods of surge in foreign exchange inflows.

In 2000, the composition of the Net Domestic Assets will be permitted to change, while the Net Domestic Assets will fluctuate between +/- 5 per cent band. Central Bank's strategy in Open Market Operations will tend to compensate the changes in public sector deposit or credit accounts.

### **5.2.2.3 Tools of Central Bank in Conducting Monetary Policy**

#### **5.2.2.3.1 Open Market Operations**

As discussed above, Net Domestic Assets will fluctuate in the band whereas the composition of Net Domestic Assets is subject to change and in that sense Central Bank will use Open Market Operations. CBRT will aim to compensate the changes in public sector deposit and credit accounts.

#### **5.2.2.3.2 Interbank Money Market**

CBRT aims to reduce the volume of its transactions in the Interbank Money Market. The bid and offer quotations will be determined by Central Bank according to the developments that occur in the repo and money market.<sup>48</sup>

#### **5.2.2.3.3 Required Reserves**

The Required Reserve Policy will be conducted in a more flexible way because of the liquidity necessity of the banks. Due to the reason the program creates a liquidity transmission mechanism, the ratio which should be held by banks at blocked account for reserve requirements is dropped to % 6 from %8 per cent. That 2 % will be kept as free deposits for the obligation of liquidity ratio which will enable them to use 2 % of their liabilities freely within the week. (with the figures of 1999, that amount is approximately TL 350 trillion)

#### **5.2.2.3.4 Net International Reserves**

CBRT announced the levels they aim to keep the Net International Reserves above. They are announced quarterly and indicated below.

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<sup>48</sup> Erçel (December 9, 1999). “Disinflation Program for the Year 2000: Implementation of Exchange Rate and Monetary Policy”.

**Figure 8: Net International Reserves Performance Criterion**

Net International Reserves (Million US Dollar)		
		Floor
30 December	1999(Realization)	17,923
31 December	1999	12,000
31 March	2000	12,000
30 June	2000	12,750
30 September	2000	12,750
31 December	2000	13,500

Source: CBRT

If Net International Reserves approach to the floor levels or beyond, CBRT will take the necessary measures in order to reverse the situation.

#### **5.2.2.4 Performance Criteria for Monetary Policy**

There are two targets of the program:

- 1) Net International Reserves (floor)
- 2) Net Domestic Assets (ceiling)

According to the Stand By agreement, Net International Reserves will be accepted as a performance criterion up until the first half of 2000 whereas after that time it will be an indicator. But, Net Domestic Assets will be a performance criterion for the whole 2000 and it will fluctuate within a band. This band will give flexibility to the system.

### **5.2.3 Fiscal Policy Outlined in The Disinflation Program**

#### **5.2.3.1 Fiscal Goals**

The details of the fiscal policy is discussed in the Letter of Intend dated 1999. The government was arguing the importance of fiscal policy in order to support the disinflation process.

The Fiscal Program for the year 2000:

- is to raise the primary surplus of the public sector (which includes the consolidated central budget, the Extrabudgetary Funds (EBFs), the local government, the nonfinancial state enterprises, the central bank, and the so-called duty losses of state banks) from -2.8 % of GNP in 1999 to 3.7 % of GNP in 2000. (The latter figure excludes the expenses related to the earthquake, which are estimated at about 1 ½ % of GNP in 2000)

Risk: Real interest payments on the securities issued at fixed interest rates at the past will increase as inflation levels fall.

Solution: Privatization Revenues

One of the most important components of the Disinflation Program was the Privatization Revenues which will support the Budget Surplus in the coming years.



### 5.2.3.2 Performance Criteria for Fiscal Policy

- A quarterly performance criterion will be set on primary surplus of the primary surplus.

**Figure 9: Primary Balance of the Consolidated Government Sector**

Performance Criterion Set on The Cumulative Primary Balance of the Consolidated Government Sector	
	Floors (In Trillions of Lira)
Cumulative Primary Balance From December 31, 1999 to ;	
March 31, 2000 (Performance Criterion)	1,550
June 30, 2000( Performance Criterion)	2,600
September 30, 2000 (Performance Criterion)	3,900
December 31, 2000 (Performance Criterion)	4,500

Source: IMF Letter of Intend (December 9, 1999)

- An annual performance criterion will be set on the privatization revenues

In the Letter of Intend, it was argued that the target set for Privatization Revenue in the year 2000 is US \$ 7.6 billion from:

- sale of 20% of Turk Telecom
- Transfer of Rights For Electricity Distribution and Power Plants

**Figure 10: Cumulative Primary Balance Including Privatization Proceeds**

	Floors (In Trillions of Lira)
Cumulative Primary Balance Including Privatization Proceeds From December 31, 1999 to	
March 31, 2000 (Indicative Floor)	2,150
June 30, 2000( Indicative Floor)	3,850
September 30, 2000 (Indicative Floor)	5,900
December 31, 2000 (Performance Criterion)	9,100

Source: IMF Letter of Intend (December 9, 1999)

- A ceiling will be set on the overall deficit of the government sector.

**Figure 11: Cumulative Overall Balance**

	Floors (In Trillions of Lira)
Cumulative Overall Balance From December 31, 1999 to:	
March 31, 2000 (Indicative Floor)	-6,000
June 30, 2000( Indicative Floor)	-12,150
September 30, 2000 (Indicative Floor)	-15,850
December 31, 2000 (Indicative Floor)	-18,750

Source: IMF Letter of Intend (December 9, 1999)

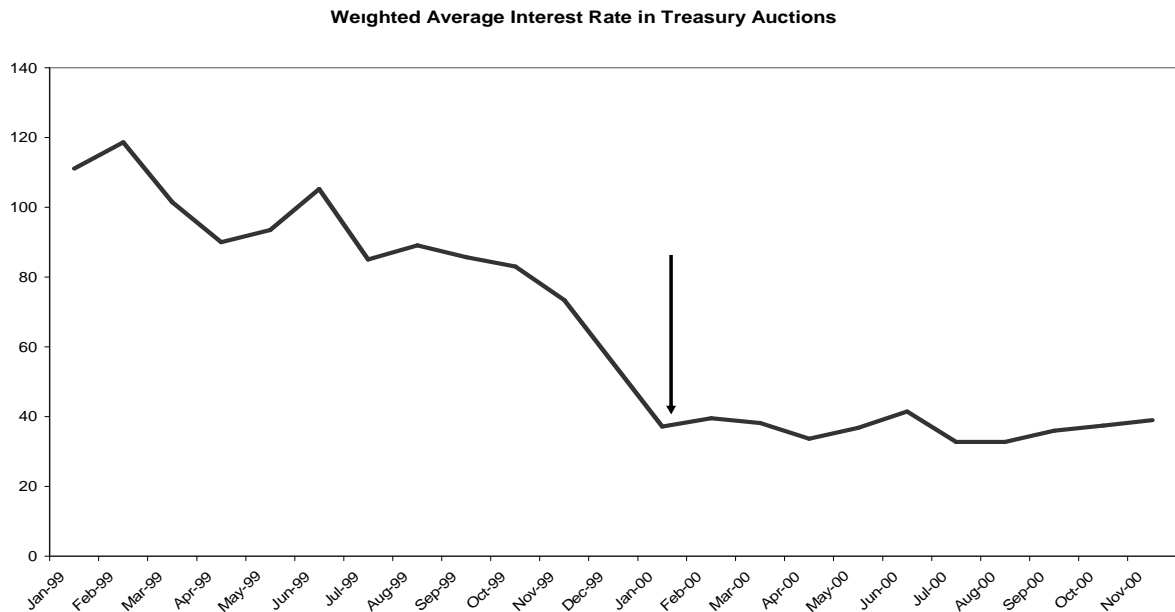
### **5.3 Monetary Policy Realizations and General Economic Outlook for the Year 2000**

At the beginning of 1999, Moody's changed the outlook of Turkey to positive based on the assumptions of the stabilization program with IMF and improving EU-Turkish relations. This created a wave of optimism and the effect of this optimism can be easily seen from the capital inflows by non-residents.

Then what happened after the implementation of the program? Due to the reason Disinflation Program was based on a Pegged Exchange Rate Policy, the possibility of Exchange Rate Risk disappeared. This fact supported the decline in the interest rates.

1) The interest rates declined gradually as expected with the implementation of the program. In December 1999 Average Simple Interest Rate on Domestic Borrowing was 94% whereas one month later in January 2000 Average Simple Interest Rate on Domestic Borrowing was 37.2% in the Treasury auctions. Therefore interest rates declined in the country as it was aimed in the program.

**Figure 12: Weighted Average Interest Rate in Treasury Auctions**



Source: Treasury, SPO

One of the factors causing the rapid decline and the “undershooting” of the interest rates is the aggressive positioning of some banks in expectations of falling interest rates. Endowed with such expectations, these banks purchased “excessive amounts” of government securities, causing the auction price of the government securities to climb further, and hence the interest rates go down. They also offered larger volumes of fixed rate consumer credits. Such banks depended almost exclusively on repo funding and interbank loans for short term financing. In a falling interest rate environment, such a strategic behavior creates capital gain. However, a bank purchasing government securities and engaging repo funding creates a capital gain. However, a bank purchasing government securities and engaging repo funding for short term financing needs, bears the maturity mismatch risk since 99% of the volume of the transactions in the repo

market consists of repos with maturity 1 day whereas the underlying government securities' average maturity is approximately 15 months. Such aggressive positioning led to a boom in consumer lending as well as the undershooting of the interest rates on government securities in the first 12 months of the disinflation program.<sup>49</sup>

Therefore it may be argued that banks got position in accordance with the expectations of the program whereas the fragility of the Turkish Banking System and its weakness become a triggering factor for the crisis. It is been argued that banking sector's practice of carrying government debt instrument portfolios and the delays in reforming the banking sector created the vulnerability in that conjuncture.<sup>50</sup> Therefore the delays in the structural reforms were occurred as an obstacle for Turkey's success in the program.

The Monetary Policy implemented in 2000 presumed that increases in the Base Money will be met by increases in Net Foreign Assets. Within this framework, the banks were sellers or buyers in the Foreign Exchange and Foreign Currency markets by considering the increases in the Short-Term Interest Rates. Accordingly, the banks were sellers of Foreign Exchange in case of increases in the Short-Term interest rates. On the other hand, they were buyers in the Foreign Exchange Market in general at the end of each month in order to close their Foreign Exchange Position.<sup>51</sup> Therefore the positions of the banks in the money market may be accepted as the main determinant of the Monetary Policy because their positions effect the realizations of the Monetary Policy.

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49 Alper E. (2001) "The Turkish Liquidity Crisis of 2000: What Went Wrong..." Russian and East European Finance and Trade (2001). Vol 37, No. 6, pp. 7

<sup>50</sup> Sak, G. and Özatay F. (2003) "Banking Sector Fragility and Turkey's 2000-01 Financial Crisis." The Central Bank of The Republic of Turkey. pp29.

<sup>51</sup> "Monetary Policy and Markets" 2001 Annual Report. CBRT. Ankara page 93

2) The decrease in the Interest Rate resulted in the increase of the Private Consumption. In the first half of 2000 the Private Consumption increased % 4.6 year on year basis whereas in the second half increased 7.0 % year on year basis which resulted in 5.8% increase in the private consumption in the year 2000. This increase in the private consumption was triggered by the Consumer Durables.

**Figure 13: Breakdown of Bank Loans to Private Sector**

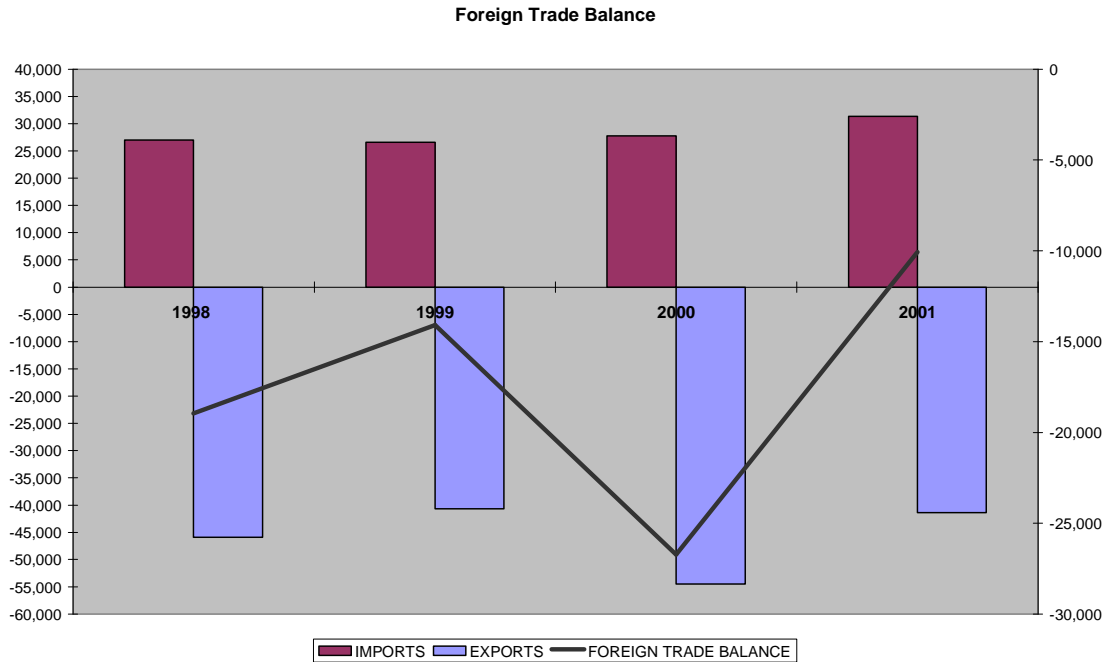
Turkey: Breakdown of Bank Loans to Private Sector	1997	1998	1999	2000
Export Loans	32	27.8	24.4	19.4
Commercial Loans	37.2	38.2	37	33.2
Special Loans	10.1	10	9.7	7.9
Financial Sector Loans	6.1	7.8	10.4	11.7
Consumer Loans	9.8	10.7	11.3	22.3
Export Guranteed Investment Loans	3.2	3.2	3	2.3
Import Loans	0.2	0.2	0.1	0
Other Investment Loans	1.4	2.1	4.1	3.2

3) Imports increased 34 % whereas exports increased 4 % and this resulted in the worsening of the Current Account Balance. Import Coverage of Exports declined from 65.4% in 1999 to 51 % in 2000. The Current Account Deficit rose to 9.9 billion USD at the end of 2000 from 1.9 billion USD.

**Figure 14: Foreign Trade Balance Statistics**

	TOTAL EXPORTS	Yearly Change in Exports	TOTAL IMPORTS	Yearly Change in Imports	FOREIGN TRADE BALANCE
1998	26,974		-45,921		-18,947
1999	26,587	-1%	-40,671	-11%	-14,084
2000	27,775	4%	-54,503	34%	-26,728
2001	31,334	13%	-41,399	-24%	-10,065

**Figure 15: Foreign Trade Balance**



The Treasury issued bonds to finance the Current Account deficit in January-July Period and gave priority to Portfolio Investments. Treasury issued in the amount of USD 7.5 billion International Bond in 2000. In August the Capital Inflow was generally short termed and for the first time, in September, capital outflow was realized.<sup>52</sup>

4) Total Domestic Debt Stock reached to TL 36.4 quadrillion in 2000 December from TL 22.9 quadrillion in 1999 December. Total Outstanding External Debt Stock increased from 102,900 millions USD to 119,700 millions of USD. (16 % increase year on year basis. Short Term increased 23% whereas Medium and Long Term Debt increased 14%.

<sup>52</sup> “The Developments in Turkish Economy and Monetary Policy. 2001 Annual Report. CBRT. Ankara page 16

**Figure 16: Outstanding Domestic Debt**

Outstanding Domestic Debt						
(In Billions Of TL)	1996	1997	1998	1999	2000	2001
Outstanding Domestic Debt	3,148,984	6,283,424	11,612,886	22,920,145	36,420,620	122,157,260
Bonds	1,250,154	3,570,811	5,771,980	19,683,392	34,362,937	102,127,926
Treasury Bills	1,527,837	2,374,990	5,840,906	3,236,753	2,057,684	20,029,334
Central Bank Advances	370,953	337,623	-	0	-	-
Consolidated Debts	40	-	-	-	-	-

Source: DPA, Central Bank

An important implication of the Central Bank taking the Net Domestic Band into consideration in Monetary Policy implementation has been the high level of volatility in the Short-Term Interest Rates. It was observed that the banks tended to sell or buy foreign exchange in the foreign exchange and foreign currency markets of the Central Bank for liquidity adjustments at the end of the day in the framework of predetermined rates depending on the liquidity in the markets.<sup>53</sup>

<sup>53</sup> “Monetary Policy and Markets” 2001 Annual Report. CBRT. Ankara page 84

**Figure 17 : Balance of Payments**

Balance of Payments (In Millions of Dollars)

	1998	1999	2000
A. Current Accounts			
1. Merchandise Exports (FOB)	31,220	29,325	31,667
Exports FOB in Trade Returns	26,973	26,587	27,775
Shuttle Trade	3,689	2,255	2,946
Transit Trade	558	483	946
2. Merchandise Imports (FOB)	-45,440	-39,768	-54,042
Imports CIF in Trade Returns	-45,922	-40,687	-54,503
Imports of Nonmonetary Gold	-1,761	-1,079	-1,900
Transit Trade	-514	-442	-911
Freight And Insurance on Imports	2,757	2,440	3,272
Trade Balance	-14,220	-10,443	-22,375
Other Goods, Services and Income (Credit)	25,802	18,748	22,320
Travel	7,177	5,203	7,636
Interest	2,481	2,350	2,836
Other	16,144	11,195	11,848
Other Goods, Services and Income (Debit)	-15,325	-14,840	-14,989
Travel	-1,754	-1,471	-1,713
Interest	-4,823	-5,450	-6,299
Other	-8,748	-7,919	-6,977
Total Goods, Services and Income	-3,743	-6,535	-15,044
Private Unrequited Transfers (Credit)	5,568	4,813	5,011
Workers' Remittances	5,356	4,529	4,560
Other	212	284	451
Private Unrequited Transfers (Debit)			
Official Unrequited Transfers	159	362	214
Workers' Remittances	41	47	43
Other	118	315	171
Current Account Balance	1,984	-1,360	-9,819

Source: DPA, Central Bank



Therefore banks started to get position suitable to the Pre-Announced Exchange Rate policy. For instance in the OECD report it is stated that Turkish banks became “used to easy profits, via unhedged foreign borrowing to finance the purchase of high-yielding government paper, as well as domestic trading in that paper. These activities led to a significant build-up of off-budget positions in the form of open positions and ‘repos’, which respectively carried high exchange and interest rate risks.”<sup>54</sup> Therefore the fragility of the Turkish banking sector could not support the Disinflation Program but they used the program for their profit maximization which evidently supported the notion of Balance Sheet risk of the Banking Sector.

Therefore with the implementation of the program, Short Term Interest Rates decreased in Turkey. As the below presented shows the average simple interest rate decreased 111.15 % in January 1999 to 37.17 in January 2000.

Following the rise in the confidence after announcement of the program, the Treasury used External Borrowing Opportunities and borrowed Long-Term Securities denominated in major currencies such as the US dollar, the Euro and the Japanese Yen. The improvement in the External Borrowing Conditions of the Treasury and improvement in the Primary fiscal balances helped to control the rate of increase in the Domestic Debt stock, as well as increase the average days to maturity of the Domestic Debt Stock and realize domestic borrowing that is lower than redemption.

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<sup>54</sup> OECD (2001) Economic Survey of Turkey, Paris: OECD (January) qtd in Eichengreen, Barry (2001). “Crisis Prevention and Management: Any Lessons from Argentina and Turkey?” Background Paper for the World Bank’s Global Development Finance 2002. page 6.

**Figure 18: Interest Rates by Securities and Maturity in Treasury Auctions**

	Weighted Interest Rates												Annually
	January	February	March	April	May	June	July	August	September	October	November	December	
1999 -3 Months	0.00	0.00	0.00	0.00	0.00	0.00	75.06	75.56	0.00	73.08	71.66	0.00	0.00
6 Months	0.00	96.59	90.11	0.00	86.08	0.00	80.20	0.00	81.89	0.00	0.00	0.00	85.95
9 Months	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 Year	0.00	0.00	0.00	0.00	0.00	0.00	0.00	97.67	0.00	0.00	0.00	0.00	0.00
<b>Avg-Simple</b>	111.15	118.63	101.44	90.09	93.48	105.25	85.04	89.12	85.73	83.00	73.37	0.00	93.96
<b>Avg-Compound</b>	131.48	125.15	104.48	101.05	100.17	111.70	101.37	116.46	113.18	109.35	96.40	0.00	109.53
2000 -3 Months	34.07	36.40	0.00	33.30	35.02	0.00	28.72	28.20	0.00	35.77	35.20	0.00	33.04
6 Months	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 Months	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 Year	0.00	0.00	0.00	0.00	0.00	0.00	32.55	0.00	0.00	0.00	0.00	0.00	32.55
<b>Avg-Simple</b>	37.17	39.59	38.13	33.71	36.79	41.49	32.74	32.79	36.00	37.53	38.98	0.00	36.60
<b>Avg-Compound</b>	38.28	42.09	39.88	34.53	39.38	41.86	34.51	33.25	33.56	37.97	41.00	0.00	38.04
2001 -3 Months	47.99	57.04	0.00	82.00	69.48	63.61	70.78	74.49	67.25	65.32	59.61	57.42	64.48
6 Months	58.91	0.00	0.00	115.00	64.58	67.85	0.00	0.00	0.00	78.25	0.00	63.25	68.79
9 Months	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 Year	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Avg-Simple</b>	57.69	76.15	124.99	100.90	70.01	70.89	77.12	73.94	70.09	68.60	66.48	63.05	75.85
<b>Avg-Compound</b>	64.95	110.29	193.81	130.31	82.00	88.51	93.55	92.82	87.44	85.42	78.94	73.83	96.23

Source: SPO

In general, the Treasury used Discounted Securities and Floating Rate Notes with coupon yields as the Domestic Borrowing Instruments.<sup>55</sup> The External Debt stock increased from 102,980 Millions of USD in 1999 to 119,692 Millions of USD in 2000. Therefore the decline in the Interest Rates may be accepted as the natural outcome of the program and government was able to borrow from the International Markets as it was intended before the adaptation of the program. This fact improved the Fiscal Balances of the country because in 1999 the Ratio of Foreign Borrowing to GDP used to be 3.8 whereas this ratio increased to 5.3 in 2000 whereas the ratio of Domestic Borrowing to GDP used to be 18.4 but decreased to 14.5 in 2000. Therefore the ratios also support the argument that government started to borrow from International Market instead of Domestic Market as planned by the Disinflation Program. Fiscal discipline

<sup>55</sup> “Monetary Policy and Markets” 2001 Annual Report. CBRT. Ankara page 85

was attained in 2000 whereas the Systematic Risks which were not solved created the pressure on the markets.

**Figure 19: Central Bank Open Market Operations in Volume and Weighted Average Interest Rate**

Central Bank Open Market Operations		
Bil. Of TL	Amount	Weigh.Ave Int.
May-99	1,013,400	90.12
June-99	439,500	90.9
August-99	631,755	75.52
September-99	501,000	71.2
October-99	276,500	75.12
January-00	683,100	17.3
February-00	380,000	32.23
May-00	141,000	49.94
July-00	260,500	16.25
November-00	4,372,400	165.75
December-00	1,973,445	504.98

Source: SPO

As a result of the band application of the Net Domestic Assets item in 2000, Open Market Operations were used to compensate for the developments in the Public Deposits and Credit to the Public Sector until the mid-November. However, the relationship was weakened from the 22nd of November onwards, as a result of the liquidity injected into the markets.<sup>56</sup> As the above presented figure shows the volume of the OMO reached to 4,372, 400 billions of TL. Therefore the dynamics of the program was hurt with the November turmoil and the confidence to the program was hit by the crisis.

<sup>56</sup> “Monetary Policy and Markets” 2001 Annual Report. CBRT. Ankara pp. 78

The Monetary Program that was implemented became the main determinant of credit developments and Credit Volume increased considerably just as has been observed in other countries that implemented similar Monetary Programs.<sup>57</sup> Therefore the increase in the credit volume had reflections in the Money Market. The extensive liquidity demand that was observed together with a high demand for Foreign Exchange in the second half of November and in December resulted in TL injection by the Central Bank via Repo Transactions, Auctions and Quotations, Open Market Operations and the Interbank market, thereby breaching the Net Domestic Assets Ceiling and making the Central Bank a Net Seller in the Foreign Exchange Market.<sup>58</sup> The result was devastating for the economy; the liquidity need of the Middle Sized Banks started the sell of the Government Securities in the Secondary Market which caused the Interest Rates to rise up to 100-200 % and Central Bank and the NDA band was abandoned by the government. This situation resulted in the Capital Outflow from the country whereas the situation worsened on 30 November when the Central Bank announced that it will not provide liquidity to the market. Interest Rates reached to 1000 % in the Repo Market on 30 November 2000. The crisis was prevented with the financial assistance provided by IMF.

### **5.3.1 Main Points of November 2000 Crisis:**

→ Via Open Market Operations Central Bank injected liquidity to the market which amounted 3.9 quadrillion TL.

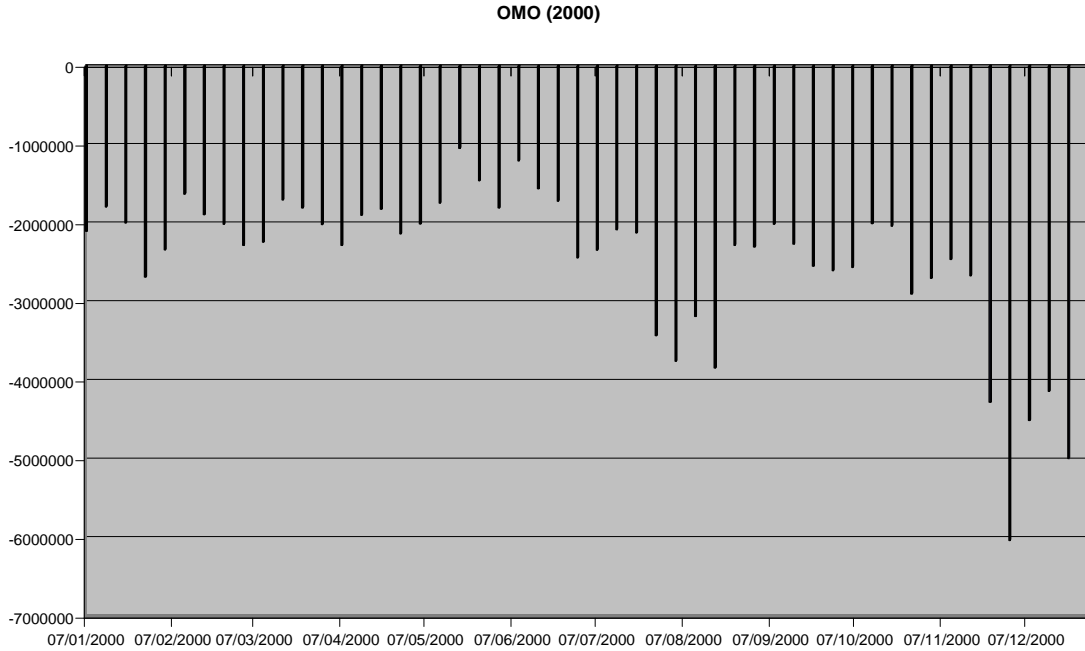
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<sup>57</sup> “Monetary Policy and Markets” 2001 Annual Report. CBRT. Ankara pp. 82

<sup>58</sup> “Monetary Policy and Markets” 2001 Annual Report. CBRT. Ankara page 84

→ Central Bank sold US \$ 6 billion in order to meet the foreign currency demand which caused international reserves to decrease.

**Figure 20: Open Market Operations in 2000**



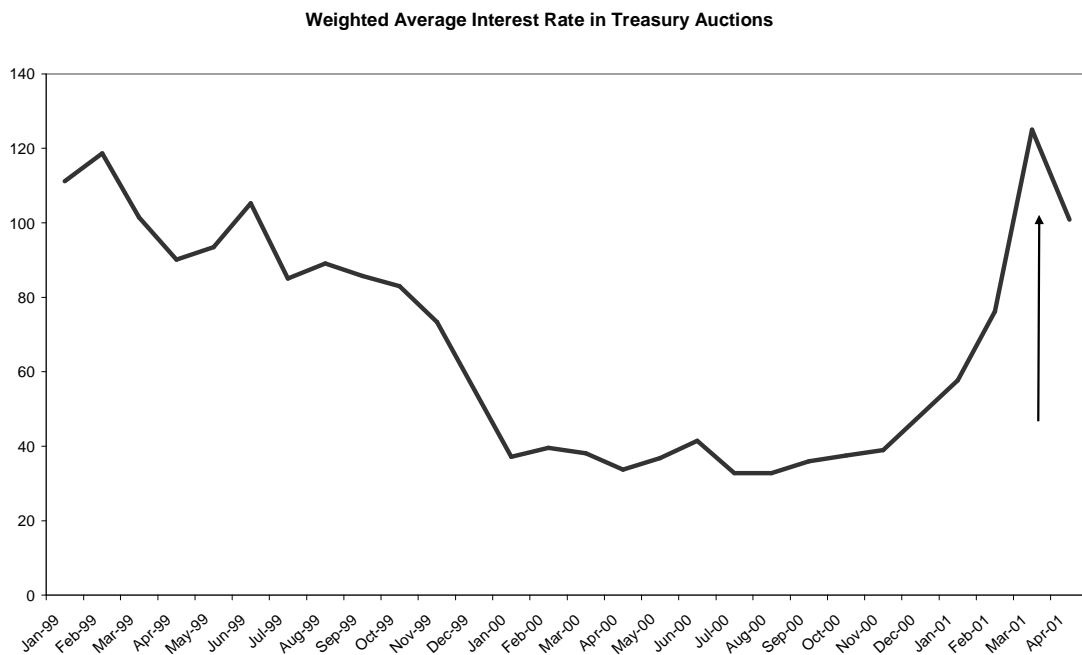
#### **5.4 Monetary Policy Realizations and General Economic Outlook for the Year 2001**

Monetary and Exchange Rate Policy for the year 2001 was announced on 22 December 2000. Due to the reason Turkey experienced a financial turmoil in November 2000, new targets were determined for the Net Domestic Assets and Net International Reserves. The Net Domestic Assets Performance Criteria will be set by taking the average of the stock between 11 December 2000 and 11 January 2001. It was foreseen that, the increased Net Domestic Assets will decrease gradually in line with the increase in the Net Foreign Assets.<sup>59</sup> But the corridor application for Net Domestic Assets which shaped the Monetary Policy in 2000 will be abandon in the year 2001.

<sup>59</sup> Erçel, Gazi. (22 December 2000) “2001 Yılı Para ve Kur Politikası” Türkiye Cumhuriyeti Merkez Bankası. Ankara

When it is looked to the exchange rate policy of the bank, it was announced that the daily exchange rate path which will be carried out without a change and the increase in the basket will be 10.85% in 2001. The exchange rate path will be widened starting from July 2001 as it was declared previously.

**Figure 21: Weighted Average Interest Rate in Treasury Auctions**



Source: Treasury

Towards the end of February, the unfavorable political developments preceding the Treasury auction caused panic in the markets that were already in a restless mood. Confidence in the markets was completely shaken and the Turkish lira faced a serious attack on February 19, 2001.

## 5.5 Historical Analysis of the Analytical Balance Sheet

The equity of the sum between the asset and liabilities side enables the comparison of the historical development of the Balance Sheet items.<sup>60</sup>

When the historical development of the Analytical Balance Sheet is evaluated, there are several consequences that may be derived from and in these section different effects of the Disinflation Program on the CBRT's Balance Sheet will be evaluated.

In the simplest form, the equation of the Balance Sheet may be presented as;

Net Foreign Assets + Domestic Assets = Base Money + Other Central Bank Money

According to the Stand-By Agreement, the basic equation may be presented as:

Base Money=Net Domestic Assets + Net Foreign Assets

The disinflation program put a limit to the Net Domestic Items, and this can be seen from the Analytical Balance Sheet. In the year 1998, Domestic Assets item was recorded as the -4% of the Total Assets whereas this ratio is -6% on 19 February 2001 therefore it may be argued that due to the reason this item fluctuated within a band, liquidity injection of the Bank to the market was prevented. Dayı argues that the credits extended to the public will increase the Net Domestic Assets item, by putting a ceiling to the item funding of the public sector will be prevented as well as due to the reason Open Market Operations is a liability item, increase in OMO will automatically cause an increase in the Net Domestic Assets therefore the limit of the item will prevent Bank's funding the market. By this way Bank will not be able to fund the market and the public sector at the same time.<sup>61</sup>

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<sup>60</sup> Serdengeçti, S. "TC Merkez Bankası Vaziyeti ve Anlamı." pp. 23

<sup>61</sup> Dayı A. "Türkiye Cumhuriyet Merkez Bankası Bilançosu, Para Politikalarının ve Kriz Göstergelerinin Merkez Bankası Bilançolarından İzlenmesi; 2000 Yılı Para Politikası". pp. 10

Liability side of the Balance Sheet is composed of Base Money according to the new definition of the Stand-By agreement.

If the historical development of the sub-items of the Base Money is evaluated,

The Sub-Items composed from

- Currency Issued
- Required Reserves of TL Deposits
- Free Deposits

Starting from the 1998 period, the ratio of Required Reserves to the Total Liabilities decreased due to the reason the Bank lowered the ratio for liquidity purposes whereas the Currency Circulated decreased to its lowest level on 19 February 2001 within the comparison intervals along with the Deposits of the Banking Sector.

It may be argued that the changes in the item of Net Foreign Assets occur as a result of the purchases or sales in the FX market.<sup>62</sup>

Central Bank Money shows TL Liabilities of the Bank to the other units in the economy.

<sup>63</sup> If the Central Bank Money is evaluated throughout the comparison period in order to see the liquidity generation mechanism of the Monetary Policy, it is evident that in the year 2000, the ratio of Central Bank Money was the lowest when it is compared with the other periods therefore in the year 2000 liquidity shortage in the economy was

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<sup>62</sup> Serdengeçti, S. "TC Merkez Bankası Vaziyeti ve Anlamı." pp. 19

<sup>63</sup> Serdengeçti, S. "TC Merkez Bankası Vaziyeti ve Anlamı." pp. 19



evident. Then CBRT was not capable of creating liquidity in the year 2000. But after the 2001 crisis an increase in the Central Bank Money may be observed which resulted from the increase in the Currency Issued Item. In the March 2001, the Currency Issued increased to 4,378,479,000 TL and this shows the increase in the demand for money in the economy.

Serdengeçti argues that liabilities side of the Balance Sheet shows how the assets are financed.<sup>64</sup> If it is looked to the historical development, it may be easily seen that on 19 February 2001 the ratio of Total Foreign Liabilities to the Total Liabilities decreased to 82% from 94% in 2000 and the main reason of this fact may be attributed to the reason that Liabilities to the Residents and Liabilities to the Non-Residents decreased. This shows that financing mechanism of the Bank

Serdengeçti argues that although the sub-items that constituted the Central Bank Money enter into the financial system differently, their liquidity creation effects are same. Therefore in order to investigate the effects of Monetary Policy, Central Bank should be monitored.

## **Conclusions**

→ On 19 February 2001 Balance Sheet, the ratio of Total Foreign Liabilities in Liabilities decreased whereas the ratio of the Central Bank Money increased, this shows the liquidity generation mechanism of the Bank was not compensated from the foreign

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<sup>64</sup> Serdengeçti, S. "TC Merkez Bankası Vaziyeti ve Anlamı." pp. 21

liabilities item but form the Reserve Money. Then if the components of the Reserve Money are recalled, Currency Issued, Required Reserves, Deposits of the Banking Sector, Extra budgetary Funds and Deposits of the Non-Bank Sector is the main financing items of the Bank. Then, on the crisis date liability composition of the Balance Sheet is different form the other comparison periods.

➔ If the asset composition of the Balance Sheet is evaluated, due to the reason Net Domestic Assets item was kept in a band, the asset composition was not subject to a change after the implementation of the program. Whereas at the end of 2001, asset composition of the Balance Sheet was changed, because after the crisis the Disinflation Program was abandoned. In the asset composition, the most important development that can be mentioned is the ratio of Foreign Assets/Domestic Assets. Due to the reason, the Domestic Assets item was a performance criteria for the program, the ratio was determined as a result of the Monetary Policy but at the end of 2001, the ratio of Foreign Assets/Domestic Assets increased to 75% from -6% at the end of 2000. This situation can be attributed to several facts:

➔ Due to a change in the Central Bank Law in 2001, The Treasury Debt account started to be shown under the Net Domestic Assets item as Central Bank Portfolio and Other. If the Figure is evaluated, it may be easily seen that Cash Operations item increased compared to previous year. And the reason of this fact may be attributed to the increase in the Treasury Debt. In November, when the amendments made to the Central Banking Law on 04.22.2001 became effective, the NDA account was redefined and the Central Bank was no longer allowed to purchase T-Bills issued for banking

sector reconstructing, from the primary Market, a practice which had continued until the 5<sup>th</sup> of November 2001. As a result of this practice, the Central Bank's securities portfolio account was respecified in order to monitor the changes in this account. The Treasury debt account, which was previously recorded under the Net Credits to Public Sector account, was recorded as a main item under the NDA account. The Treasury Debt account consists of two sub-items: Central Bank Portfolio and Other. The results of the Central Bank operations in the secondary market can be followed in the "Government Domestic Debt Instruments Prior to November 5, 2001" along with the "Government Domestic Debt Instruments Purchased From the Secondary Market" sub-items of the Central Bank portfolio account. In May, the government bonds which had been previously offered by the Treasury offered by the Treasury for public bank restructuring were purchased. Secondly, IMF credit was utilized by the Treasury through the Central Bank.<sup>65</sup> Therefore the asset combination of the Balance Sheet changed after the crisis whereas before the crisis, the combination was similar because Turkey was implementing Disinflation Program.

➔ The liabilities composition also changed after the crisis, liabilities to the non-residents increased which means CBRT's liability to Non- Residents increased which resulted from the increase in the FX Deposits of the Banking Sector. Therefore it may be said that the liabilities composition of the Central Bank changed, previously CB was financing its assets via Foreign Liabilities whereas after the crisis the ratio of Central Bank Money increased and Foreign Liabilities decreased also the composition of

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<sup>65</sup> CBRT Annual Report 2001, pp. 8.

Foreign Liabilities were subject to change; an increase in the liabilities to Non-Residents were evident.

**Figure 22: Change in Net Domestic Assets**

<b>DOMESTIC ASSETS</b>	<b>31.12.2001</b>		<b>29.12.2000</b>	
Cash Operations	25,664,126.70	6269%	-	416,026.00
Treasury Debt	34,403,118.50	2208%		1,490,801.00
CBRT Portfolio	34,459,512.10	2175%		1,514,941.00
Government Domestic Debt Inst. Perior No	34,301,090.10	2164%		1,514,941.00
Government Debt Inst. Purchased	158,422.00			-
Other	- 56,393.50	134%	-	24,140.00
Credits to Banking Sector	16,270.00			-
Credits to SDIF	750,000.00	50%		500,000.00
Other Items	- 9,505,261.80	295%	-	2,406,827.00
FX Revaluation Account	- 174,804.00	-80%	-	875,206.70
IMF Emergency Assistance (Treasury)	190,634.00	0%		190,634.00

**Figure 23: Historical Development of Analytical Balance Sheet (Horizontal Analysis)**

	<b>1998</b>	<b>1999</b>		<b>2000</b>		<b>Feb 19 2001</b>		<b>2</b>
<b>ASSET</b>	6,881,007.80	13,019,440.10	89%	16,903,438.20	30%	19,452,001.10	15%	60,089
FOREIGN ASSETS	7,168,740.20	14,526,524.00	103%	18,004,037.00	24%	20,680,004.00	15%	34,409
DOMESTIC ASSETS	- 287,732.40	- 1,507,083.90	424%	- 1,100,598.70	-27%	- 1,228,002.80	12%	25,679
	92,660.40	- 358,525.40	-487%	- 416,026.00	16%	- 511,140.00	23%	25,664
Cash Operations	768,806.60	901,173.20	17%	1,490,801.00	65%	1,504,774.00	1%	34,403
Treasury Debt				1,514,941.00				34,459
CBRT Portfolio				1,514,941.00				34,301
Government Domestic Debt Inst. Perior No								158
Government Debt Inst. Purchased				- 24,140.00				- 56
Other	7,543.90	7,679.90	2%					16
Credits to Banking Sector				500,000.00				750
Credits to SDIF	- 683,690.00	- 1,267,378.60	85%	- 2,406,827.00	90%	- 2,515,914.00	5%	- 9,505
Other Items		- 1,339,192.40		- 875,206.70	-35%	- 907,496.80	4%	- 174
FX Revaluation Account				190,634.00		190,634.00	0%	190
IMF Emergency Assistance (Treasury)								<b>60,089,</b>
<b>TOTAL</b>								
<b>LIABILITY</b>	6,881,008.30	13,019,440.10	89%	16,903,438.20	30%	19,452,001.10	15%	60,089
<b>TOTAL FOREIGN LIABILITIES</b>	6,352,976.30	11,432,339.60	80%	15,923,554.20	39%	15,889,008.10	0%	50,220
Liabilities to Non-Residents	4,307,295.10	6,696,685.60	55%	10,405,974.20	55%	10,478,728.10	1%	36,733
Liabilities to Residents	2,045,681.20	4,735,654.00	131%	5,517,580.00	17%	5,410,280.00	-2%	13,487
FX Deposits of Non-Bank Sector	670,420.20	1,723,361.60	157%	1,222,177.00	-29%	1,110,912.00	-9%	3,139
FX Deposits of Banking Sector	1,375,261.00	3,012,292.40	119%	4,295,403.00	43%	4,299,368.00	0%	10,348
Central Bank Money	528,032.00	1,587,100.40	201%	979,884.00	-38%	3,562,993.00	264%	9,868
Reserve Money	2,145,691.20	3,932,210.20	83%	5,949,348.00	51%	4,769,393.00	-20%	7,975
Currency Issued	1,328,542.40	2,390,748.30	80%	3,772,411.00	58%	3,087,720.00	-18%	5,282
Deposits of Banking Sector	782,586.30	1,488,653.40	90%	2,015,481.00	35%	1,537,319.00	-24%	2,520
Required Reserves	694,261.30	1,022,571.10	47%	1,404,157.00	37%	983,728.00	-30%	1,626
Free Deposits	88,324.90	466,082.20	428%	611,324.00	31%	553,591.00	-9%	893
Extrabudgetary Funds	16,546.00	31,194.00	89%	115,720.00	271%	113,884.00	-2%	104
Deposits of Non-Bank Sector	18,016.50	21,614.50	20%	45,736.00	112%	30,470.00	-33%	68
Other Central Bank Money	- 1,617,659.30	- 2,345,109.80	45%	- 4,969,464.00	112%	- 1,206,400.00	-76%	1,892
Open Market Operations	- 1,830,590.80	- 2,406,795.20	31%	- 5,218,625.00	117%	- 1,374,467.00	-74%	1,243
TRY Deposits of Public Sector	212,931.50	61,685.40	-71%	249,161.00	304%	168,067.00	-33%	648
<b>TOTAL</b>								

**Figure 24: Historical Development of Analytical Balance Sheet (Vertical Analysis)**

	1998		1999		2000		Feb 19 2001		2001	
<b>ASSET</b>	6,881,007.80	100%	13,019,440.10	100%	16,903,438.20	100%	21,063,615.60	100%	60,089,520.00	
FOREIGN ASSETS	7,168,740.20	104%	14,526,524.00	112%	18,004,037.00	107%	22,406,237.00	106%	34,409,563.30	57%
DOMESTIC ASSETS	- 287,732.40	-4%	- 1,507,083.90	-12%	- 1,100,598.70	-7%	- 1,342,621.30	-6%	25,679,956.60	43%
Cash Operations	92,660.40	1%	358,525.40	-3%	416,026.00	-2%	564,769.00	-3%	25,664,126.70	43%
Treasury Debt	768,806.60	11%	901,173.20	7%	1,490,801.00	9%	1,487,365.00	7%	34,403,118.50	57%
CBRT Portfolio		0%		0%	1,514,941.00	9%		0%	34,459,512.10	57%
Government Domestic Debt Inst. Perior No		0%		0%	1,514,941.00	9%		0%	34,301,090.10	57%
Government Debt Inst. Purchased		0%		0%		0%		0%	158,422.00	0%
Other		0%		0%	24,140.00	0%		0%	56,393.50	0%
Credits to Banking Sector	7,543.90	0%	7,679.90	0%		0%		0%	16,270.00	0%
Credits to SDIF		0%		0%	500,000.00	3%	500,000.00	2%	750,000.00	1%
Other Items	- 683,690.00	-10%	- 1,267,378.60	-10%	- 2,406,827.00	-14%	- 2,552,134.00	-12%	- 9,505,261.80	-16%
FX Revaluation Account	- 380,392.90	-6%	- 1,339,192.40	-10%	- 875,206.70	-5%	- 968,486.30	-5%	- 174,804.00	0%
IMF Emergency Assistance (Treasury)		0%	190,634.00	1%	190,634.00	1%	190,634.00	1%	190,634.00	0%
<b>TOTAL</b>	<b>6,881,008.00</b>	<b>100%</b>	<b>13,019,440.00</b>	<b>100%</b>	<b>16,903,438.20</b>	<b>100%</b>	<b>21,063,615.60</b>	<b>100%</b>	<b>60,089,520.00</b>	
<b>LIABILITY</b>	6,881,008.30		13,019,440.10		16,903,438.20		21,063,615.60		60,089,520.10	
TOTAL FOREIGN LIABILITIES	6,352,976.30	92%	11,432,339.60	88%	15,923,554.20	94%	18,178,741.60	86%	50,220,699.60	84%
Liabilities to Non-Residents	4,307,295.10	63%	6,696,685.60	51%	10,405,974.20	62%	11,396,613.60	54%	36,733,224.20	61%
Liabilities to Residents	2,045,681.20	30%	4,735,654.00	36%	5,517,580.00	33%	6,782,128.00	32%	13,487,475.40	22%
FX Deposits of Non-Bank Sector	670,420.20	10%	1,723,361.60	13%	1,222,177.00	7%	2,480,600.00	12%	3,139,112.80	5%
FX Deposits of Banking Sector	1,375,261.00	20%	3,012,292.40	23%	4,295,403.00	25%	4,301,528.00	20%	10,348,362.60	17%
Central Bank Money	528,032.00	8%	1,587,100.40	12%	979,884.00	6%	2,884,874.00	14%	9,868,820.40	16%
Reserve Money	2,145,691.20	31%	3,932,210.20	30%	5,949,348.00	35%	5,215,801.00	25%	7,975,886.70	13%
Currency Issued	1,328,542.40	19%	2,390,748.30	18%	3,772,411.00	22%	3,260,846.00	15%	5,282,659.90	9%
Deposits of Banking Sector	782,586.30	11%	1,488,653.40	11%	2,015,481.00	12%	1,820,867.00	9%	2,520,198.20	4%
Required Reserves	694,261.30	10%	1,022,571.10	8%	1,404,157.00	8%	1,023,556.00	5%	1,626,371.00	3%
Free Deposits	88,324.90	1%	466,082.20	4%	611,324.00	4%	797,311.00	4%	893,827.10	1%
Extrabudgetary Funds	16,546.00	0%	31,194.00	0%	115,720.00	1%	107,982.00	1%	104,156.60	0%
Deposits of Non-Bank Sector	18,016.50	0%	21,614.50	0%	45,736.00	0%	26,106.00	0%	68,872.00	0%
Other Central Bank Money	- 1,617,659.30	-24%	- 2,345,109.80	-18%	- 4,969,464.00	-29%	- 2,330,927.00	-11%	1,892,933.60	3%
Open Market Operations	- 1,830,590.80	-27%	- 2,406,795.20	-18%	- 5,218,625.00	-31%	- 2,654,920.00	-13%	1,243,969.10	2%
TRY Deposits of Public Sector	212,931.50	3%	61,685.40	0%	249,161.00	1%	323,993.00	2%	648,964.40	1%
<b>TOTAL</b>	<b>6,881,008.30</b>		<b>13,019,440.10</b>		<b>16,903,438.20</b>		<b>21,063,615.60</b>		<b>60,089,520.10</b>	

## **6 METHODOLOGY**

In order to argue if the Central Bank Balance Sheet is a good indicator for predicting financial crisis, two different methodologies will be used. First, the Signals Approach introduced by Kaminsky, Lizondo and Reinhart will be argued in order to discuss five different indicators as crisis prediction. Secondly, the ratios driven from the CBRT's Balance Sheet will be discussed in order to show whether or not there is a worsening in the fundamentals prior to crisis.

### **6.1 Signals Approach**

Kaminsky, Lizondo and Reinhart in the paper "Leading indicators of Currency Crises" argued a warning system for the currency crises. Paper examines the available evidence on currency crises and proposes an Early Warning System.<sup>66</sup> In order to this they made a survey on the empirical literature that examined the different potential indicators of the currency crises and they identified the most reliable ones. They reached to a conclusion that an effective warning system should consider a broad variety of indicators, since the currency crises seem to usually be preceded by a broad range of economic problems.<sup>1</sup> In this respect, the method proposed by Kaminsky, Lizondo and Reinhart will be applied to Turkish case in order to see whether or not the system may have been worked for Turkey.

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<sup>66</sup> Kaminsky, Lizondo and Reinhart "Leading Indicators of Currency Crises." IMF Staff Papers. Vol. 45, No.1 (March 1998). International Monetary Fund. pp. 2.

The “Signals” approach proposed by Kaminsky, Lizondo and Reinhart argues that monitoring the evolution of a number of economic indicators that tend to systematically behave differently prior to a crisis. Every time that an indicator exceeds a certain threshold value, this is interpreted as a warning “signal” that a currency crisis may take place within the next 24 months.<sup>1</sup> Although the authors focused on different economic indicators, only the indicators derived from the Central Bank Balance Sheet will be used in order to discuss the predictability of 2001 case because the scope of this study will be limited with 2001 case and balance sheet of the Central Bank.

Kaminsky, Lizondo and Reinhart examined 76 different currency crises that cover 15 developing countries and 5 developed countries within the time horizon of 1970-1995.

They argued three different points which:

1. calculating the probability of a crisis conditional on a signal from the indicator,
2. the average number of months prior to the crisis in which the first signal is issued,
3. the persistence of signals ahead of the crises,

In this section the “Signals” Approach will be discussed in detail in order to argue its applicability. Approach defines the crisis; as a situation in which an attack on the currency leads to a sharp depreciation of the currency, a large decline in international reserves, or a combination of the two. A crisis so defined includes both successful and unsuccessful attacks on the currency. The definition is also comprehensive enough to include not only currency attacks under a fixed exchange rate but also attacks under



other Exchange Rate Regimes. For example, an attack could force a large Devaluation beyond the established rules of prevailing Crawling-Peg Regime or Exchange Rate Band.<sup>67</sup> If the Turkish case is evaluated then it may be said that, there was a Fixed Exchange Rate System which is the Crawling Peg, a sudden attack on the Currency led to the sharp depreciation of the currency and also a large decline in international reserves. Therefore 2001 Turkish case is a candidate for the Kaminsky, Lizondo and Reinhart approach. In this respect, the details of the approach will be discussed in order to see whether or not their approach is suitable for predicting the Turkish case. The aim of this analysis is to argue whether or not the ratios that are derived from the Central Bank Balance Sheet may predict the crisis with an approach designed specifically for estimating the financial crises. Therefore in the next section, the details of the approach will be discussed in order to show the importance of tracking the right signals at the right time.

Indicators are dictated according to the theoretical considerations and as well as their availability on a monthly basis. In this respect the indicators are

- (1) International Reserves (in U.S. dollars);
- (2) Imports (in U.S. dollars);
- (3) Exports (in U.S. dollars);
- (4) The terms of trade (defined as the unit value of exports over the unit value of imports);
- (5) Deviations of the Real Exchange Rate from trend (in Percentage Terms);

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<sup>67</sup> Kaminsky, Lizondo and Reinhart “ Leading Indicators of Currency Crises.” IMF Staff Papers. Vol. 45, No.1 (March 1998). International Monetary Fund. pp.15

- (6) Differential between Foreign (U.S.) and Domestic Real Interest Rates on Deposits (monthly rates, deflated using consumer prices and measured in percentage points);
- (7) “Excess” real M1 balances;
- (8) Money Multiplier (of M2);
- (9) The ratio of Domestic Credit to GDP;
- (10) The Real Interest Rates on Deposits (monthly rates, deflated using consumer prices and measured in percentage points);
- (11) The ratio of (nominal) Lending to Deposit Interest Rates;
- (12) The ratio of Commercial Banks Deposits (in nominal terms);
- (13) The ratio of Broad Money (converted into foreign currency) to Gross International Reserves; (14) an Index of output; and
- (15) an Index of Equity Prices (measured in U.S. dollars) <sup>68</sup>

### **6.1.1 Definitions**

### **6.1.2 The Indicator on a Given Month**

The indicator on a given month shows the percentage change in the level of the indicator year on year basis. The aim of using yearly data is to avoid seasonality and to enable it comparable across countries.

### **6.1.3 Signals Horizon**

Signals Horizon is the period which the indicators will expect to have the ability to signal a coming crisis. Signaling horizon is defined as the 24 months prior to the crisis.

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<sup>68</sup> Kaminsky, Lizondo and Reinhart “ Leading Indicators of Currency Crises.” IMF Staff Papers. Vol. 45, No.1 (March 1998). International Monetary Fund. pp. 17

If a signal is followed by a crisis in 24 months, then that signal is called as the *good signal* but if the signal is not followed by a crisis that signal is defined as a *false signal or noise*.<sup>69</sup>

- i. An indicator is said to issue a signal whenever it departs from its mean beyond a given threshold value. Threshold levels are chosen so as to strike a balance between the risks of having many false signals (which would happen if a signal is issued at the slightest possibility of a crisis) and the risk of missing many crises (which would happen if the signal is issued only when the evidence is overwhelming).<sup>70</sup>

By evaluating every indicator, an “optima” set of country specific thresholds are calculated. Kaminsky, Lizondo and Reinhart argued that thresholds are calculated in relation to percentiles of distribution of observations of the indicator. For example, a possible set of country-specific thresholds for the rate of growth of imports would be the set of rates of growth (one per country) that would leave 10 percent of the observation (on the rate of growth of imports) above the threshold for each country. The procedure was repeated using a grid of reference percentiles between 10 percent and 20 percent, and the “optimal” set of thresholds was defined as the one that minimized the noise –to-signal ratio; that is the ration of false signals to good signals. Then, if a change occurs above of the mean in the indicators between %10-%20 then, that is accepted as a crisis indicator by the signals approach. The frequency of the signal is

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<sup>69</sup> Kaminsky, Lizondo and Reinhart “ Leading Indicators of Currency Crises.” IMF Staff Papers. Vol. 45, No.1 (March 1998). International Monetary Fund. pp. 17

<sup>70</sup> Kaminsky, Lizondo and Reinhart Kaminsky, Lizondo and Reinhart “ Leading Indicators of Currency Crises.” IMF Staff Papers. Vol. 45, No.1 (March 1998). International Monetary Fund. pp. 17

related with the optima threshold value therefore the lower the threshold value, the more model will issue a signal.

For the variables such as international reserves, exports, the terms of trade, deviations of the real exchange rate from trend, commercial bank deposits, output, and the stock market index, for which a decline in the indicator increases the probability of a crisis, the threshold is below the mean indicator. For the other variables, the threshold is above the mean of the indicator.

In this respect there are two common mistakes done while assigning the threshold value:

1. To assign a high optima threshold value
2. To assign a lower optima threshold value

Karaçor and Alptekin argues that if a high optima threshold value is assigned then there will be a possibility of missing the signal whereas a low optima threshold value will increase the possibility of bad signals.<sup>71</sup>

In this respect, the threshold value will be taken as a band for the Turkish crisis. Kaminsky, Lizondo and Reinhart emphasized on the importance of attaining the right threshold value therefore for Turkey a band of %10-%20 will be used for the chosen indicators.

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<sup>71</sup> Karaçor Z. ve Alptekin V. (2006) “Finansal Krizlerin Önceden Tahmin Yoluyla Değerlendirilmesi: Türkiye Örneği”. Yönetim ve Ekonomi. Celal Bayar University. Manisa.

#### 6.1.4 Empirical Results

The effectiveness of the signals approach can be examined both at the individual indicators and at the level of different sets. Therefore in order to understand how effective an individual indicator may signal a crisis; Kaminsky, Lizondo and Reinhart introduced a matrix in order to consider the performance of every single indicator.

	Crisis (Within 24 months)	No crisis (Within 24 months)
Signal was issued	A	B
No signal was issued	C	D

A: is the number of months in which the indicator issued a good signal

B: is the number of months in which the indicator issued a bad signal or “noise”,

C: is the number of months in which the indicator failed to issue a signal (which would have been a good signal)

D: is the number of months in which the indicator refrained from issuing a signal (which would have been a bad signal)

Then if  $A > 0$  and if  $C=0$ , it is assumed that there will be a crisis in the next 24 months.

Also, it is assumed that if  $B=0$  and  $D>0$ , it may be assumed that there will be no crisis.

It is assumed that none of the indicators are perfect for predicting the crisis but the matrix may be helpful at this point.

The optima threshold value is also calculated from the table which is the ratio of  $B/A$ . In other words, it is ratio of the number of months in which the indicator issued a bad signal or “noise” over the number of months in which the indicator issued a good signal.

### 6.1.5 Summary of The Table

Figure 20 is calculated with the ratio driven from the above presented matrix. Kaminsky, Lizondo and Reinhart applied the various indicators to the crises in order to show the efficiency of the each individual various indicator. In order to understand the rationality behind the table, each column will be discussed in detail.

Column 1: The number of crises for which that data is available

Result: The number of crises range from 33 to 72 and there is an average of 61 crises per indicator.

#### Figure 25 The Results of Signals Approach

	Number of crises for which there are data (1)	Percentage of crisis called (2)	Good signals as percentage of possible of good signals (3)	Bad signals as percentage of possible bad signals (4)	Noise/Signal adjusted (5)	P(criis/signal) (6)
In Terms of The Matrix In The Text			$A/(A+C)$	$B/(B+D)$	$[B/(B+D)]/[A/(A+C)]$	$A/(A+B)$
Real Exchange Rate	72	57	25	5	0.19	67
Banking Crisis	26	37	19	6	0.34	46
Exports	72	85	17	7	0.42	49
Stock Prices	53	64	17	8	0.47	49
M2/International Reserves	70	80	21	10	0.48	46
Output	57	77	16	8	0.52	49
"Excess" M1 Balances	66	61	16	8	0.52	43
International Reserves	72	75	22	12	0.55	41
M2 Multiplier	70	73	20	12	0.61	40
Domestic Credit/GDP	62	56	14	9	0.62	39
Real Interest Rate	44	89	15	11	0.77	34
Terms of Trade	58	79	19	15	0.77	36
Real Interest Differential	42	86	11	11	0.99	29
Imports	71	54	9	11	1.16	26
Bank Deposits	69	49	16	19	1.2	25
Lending Rate/Deposit Rate	33	67	13	22	1.69	18

Column 2: The percentage of the crises of correctly called (the number of crises for which the indicator issued a signal 24 months preceding to crises).

Result: Various indicators estimated 70 % of the crises correctly.

Column 3: The tendency of the individual indicators to indicate a good signal (the highest the number the better it is)

Result: The real exchange rate is the indicator that issued the highest percentage of good signal. (25%) while imports have the lowest ratio with 9%.

Column 4: The tendency of the individual indicators to indicate a bad signal (the lower the number the better it is)

Result: The real exchange rate has the lowest ratio whereas the ratio of lending to deposit interest rates has the highest ratio with 22% of possible bad signals.

Column 5: The ratio that will show which indicators will be held out of the list as a good signal. In order to do this, a ratio called noisiness is introduced. This column shows the adjusted noise to signal ratio in order to show in order to differentiate the good signals from bad signals. If everything is held constant, lower ratio is better because it will indicate the ratio of false signals to the ratio of good signals. Kaminsky, Lizondo and Reinhart argued that this criterion can be used in order to remove some indicators from the table.

Result: The ratio of lending interest rates to deposit interest rates, bank deposits, imports and real interest rate differential may be dropped from list.

Column 6: shows the conditional probability of the indicators therefore it shows the probability of predicting a crisis. It shows the percentage in which signaled by the indicator is followed by a crisis in the next 24 months.

Result: If the indicator has a higher conditional probability, then the unconditional one, then it may give a useful signal for the crisis.

Column 7: Shows the difference between conditional and unconditional probability of an indicator.

Result: The indicators which have lower conditional probability compared to the unconditional probability also the ones which have higher adjusted noise-to-signal ratio. This proves the two ratios are same.

#### **6.1.6 Timing of The Signals**

In order to be able to understand the signal, the timing of the signal is also important. Therefore, Kaminsky, Lizondo and Reinhart conducted a research in which every indicator was examined in order to see when the first signal occurs prior to the crisis. And it is argued that on average, all indicators send the first signal anywhere between a year and a year and a half before the crisis and this proves Signals Approach may be



used as a warning system. Also, it is also showed that the indicators show more persistent signals 24 months prior to a crisis.

Therefore, in order to apply Signals Approach to Turkish case, first the threshold values for indicators needs to be presented then those indicators (the ones related with the Central Bank Balance Sheet) will be examined individually in order to see whether or not they signal the crisis.

### **Figure 26 Timing of the Signals**

Indicator	Average Lead Time Number of Months in advance of the crisis when first signal occurs
Banking Crisis	19
Real Exchange Rate	17
Real Interest Rate	17
Imports	16
M2 Multiplier	16
Output	16
Bank Deposits	15
"Excess" M1 Balances	15
Exports	15
Terms of Trade	15
International Reserves	15
Stock Prices	14
Real Interest Differential	14
M2/International Reserves	13
Lending Rate/Deposit Rate	13
Domestic Credit/GDP	12

Source: Kaminsky G., Lizondo S. and Reinhart C (1998)

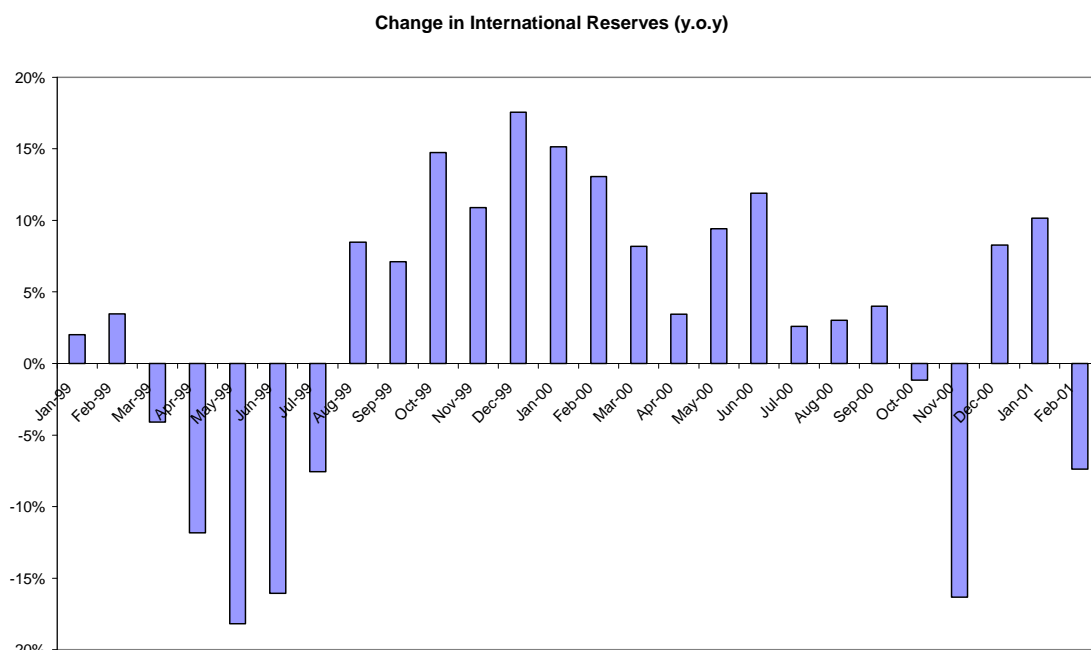
## **6.2 Selective Economic Indicators from Balance Sheet and Application of the Methodology to Turkish 2001 Crisis**

### **6.2.1 International Reserves**

Kaminsky, Lizondo and Reinhart argue that if there is a %10 decrease in the International Reserves, then it may be accepted as a signal to crisis. At the end of 2000,

CBRT had International Reserves 23.7 billion USD whereas at the end of the November this number decreased to 18.9 billion USD which is signaling a 19% decrease in the International Reserves. When February 2000 and February 2001 are compared it is evident that there is 8 % decrease in the reserves. Therefore it may be argued that the International Reserves of CBRT decreased prior to the crisis period, and as it is evident from the figure there were periods of negative increase prior to the crisis which are signaling outflow from the country. In 2001 February crisis the decline in the reserves were not evident if the comparison is made year on year basis. But there were the signals of worsening for this item. But as it is argued 24 months period is an important time period and as the figure shows International Reserves start to decline from March 1999 onwards.

**Figure 27 Change in International Reserves on Yearly Basis**



Source: CBRT

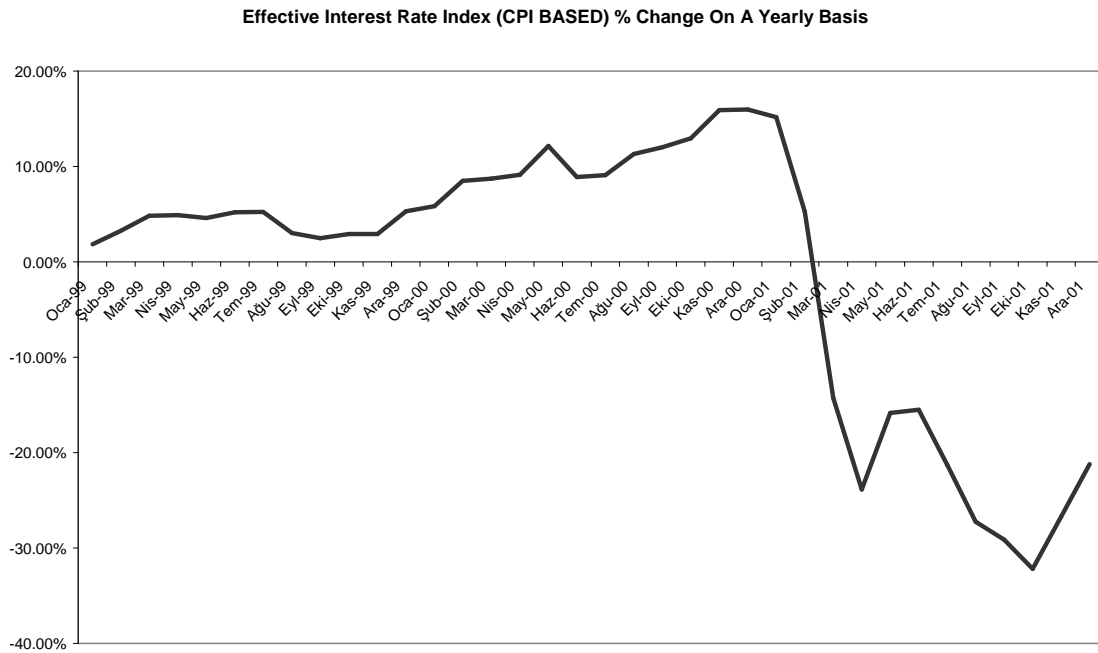
## 6.2.2 Real Exchange Rate

If USD/TL increases more than % 10 in real terms on a year on year basis, this is also accepted as a crisis signal, in order to see if this is valid for Turkish case:

At the end of the January 2001 the value of the Effective Exchange Rate Index (Real)(1995=100) was 148.1 but the value in January 2000 was 128.6 which was indicating a 15% increase .

If the figure is evaluated it may be seen that starting from May 2000 the year on year Informative Exchange Rate increased more than 10% then it may be said that, the signal was evident for the Turkish crisis.

**Figure 28 Effective Interest Rate Index CPI Based**

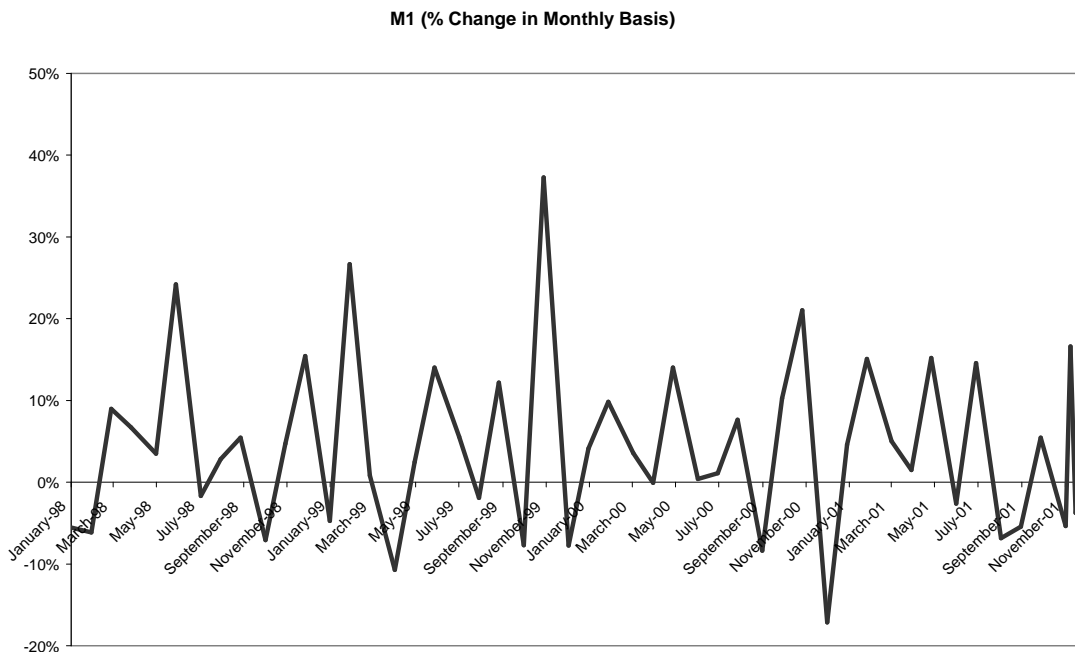


Source: CBRT

### 6.2.3 M1

If there is an increase in the amount of 17% when it is compared to the previous year, then that may be accepted as a crisis signal. When the Turkish case is evaluated it is evident that M1 level was volatile over the years and it reached to 37 % in December 1999 whereas the change was -8% at the beginning of 2000. Therefore M1 signal was evident for the Turkish case and it may be accepted as a signal prior to the crisis.

**Figure 29 M1 Amount ( % Change)**

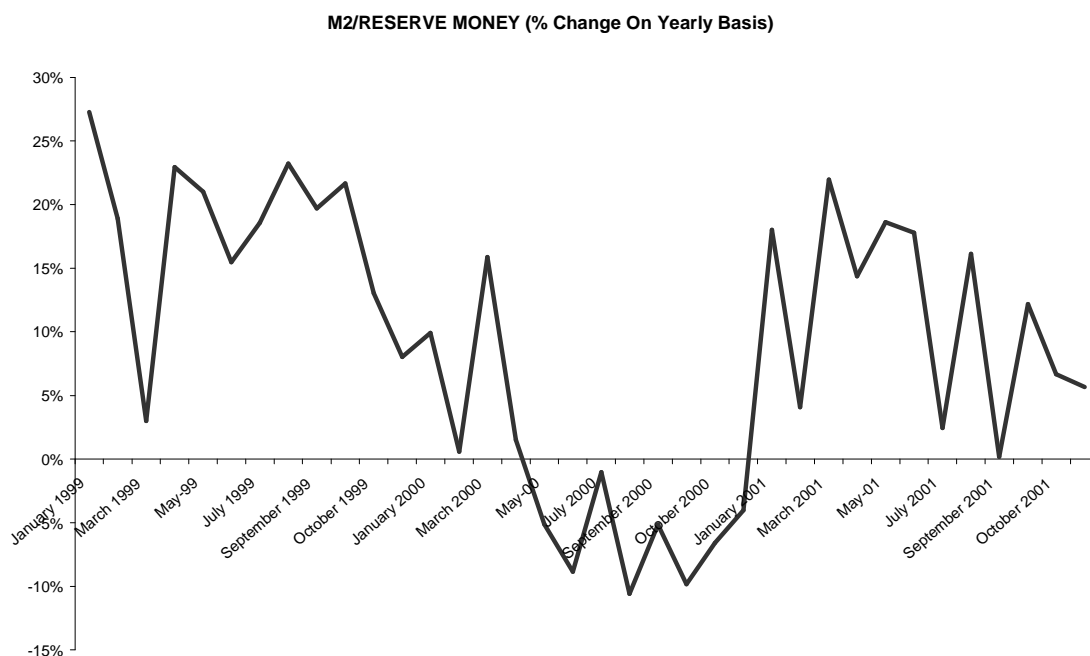


Source: CBRT

### 6.2.4 M2/Reserve Money

17% increase in the M2/Reserve Money ratio is also accepted as a crisis indicator in the Signals Approach. If the Turkish case is evaluated in this respect, the change in the ratio from February 2000 to February 2001 was 18%. Therefore it is evident from the figure that the ratio started to increase two years before the crisis and it gave signal.

**Figure 30 M2/Reserve Money (% Change on Yearly Basis)**



Source: CBRT

## **Conclusions**

Signal Approach aims to present a warning mechanism for the possible financial crises.

### **6.3 Ratios of the Central Bank Balance Sheet**

#### **6.3.1 Monitoring Monetary Policy From the Balance Sheet of the Central Bank**

Balance Sheets of Money Authorities is a tool for monitoring the Monetary Policy and their consequences. In that respect there are some ratios that may derived from the Balance Sheet.

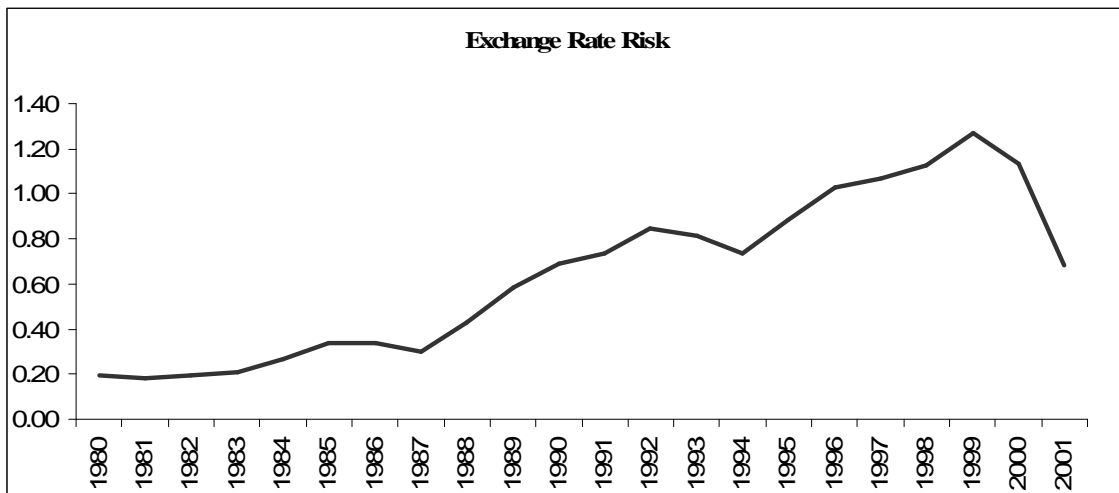
### 6.3.1.1 Exchange Rate Risk

The Exchange Rate risk is calculated by dividing Foreign Assets to Foreign Liabilities. Akgüç indicated that the ideal ratio should be 1 and the balance sheets in which the ratio is more than 1 are accepted as the risky ratios.<sup>72</sup>

#### 6.3.1.1.1 Turkish Case

In the year 1989, the exchange rate risk ratio of the CBRT was 0.59 whereas this figure increased to 1.27 in 1999. In the 1990s the rate increased except the year 1994. The increase in the rate may be explained as the CBRT's aim to increase its Foreign Assets. Until 1999 the increase in the reserves and decrease in the liabilities was occurred as a result of the CBRT's policy. In the year 2000 the ratio decreased 1.13 and in 2001 it reached to 0.69 which is the same level as 1990.

**Figure 31 Exchange Rate Risk**



Source: CBRT

<sup>72</sup> Akgüç, Ö. (1993) "Merkez Bankası ve Finans Sektörü." Merkez Bankası Bilançoların İrdelenmesi. İstanbul: İstanbul Mülkiyeliler Vakfı, 121-140

The reason's of the Decline in 2000 and 2001

- Decline in the Reserves
- Increase in the Foreign Liabilities

### **6.3.1.2 Foreign Assets/Domestic Assets**

This ratio shows the asset combination of the Balance Sheet. Kepenek and Yentürk argued that this ratio should also be equal to 1.<sup>73</sup> Monetary Authorities have begun to address the ways to enhance the transparency of their operations. In particular, they have begun to grapple with the methods used to disclose their financial positions and commitments- including on- and off-balance sheet transactions- and the presentation of the regulations that govern their operations as well as those govern the banking system. Typically, most MA operations are observable on the balance sheet. When the balance sheet is accompanied by clear explanatory notes, changes in a MA's Net Foreign Assets, Net Domestic Assets and its Monetary Liabilities (base money) can be determined. These data, coupled with knowledge of the exchange rate regime, provide a foundation from which a diagnosis can proceed.<sup>74</sup> Therefore, by looking at the transactions in the Balance Sheet within the light of the Disinflation program, it may show a signal to the authorities whether or not Foreign Asset and Domestic Asset combination is threatening for the economy.

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<sup>73</sup> Kepenek, Y. and Yentürk, N. (2000). Türkiye Ekonomisi. Remzi Kitapevi. Ankara

<sup>74</sup> Hanke S. and Sekerke M. (2003)“ Accounting Standards for Central Banks: An Accountancy Standard for Monetary Authorities. Central Bank Publications Ltd.

In that respect, Hanke argued three different Exchange Rate Regimes as; Fixed, Flexible and Pegged. With an absolutely Fixed Rate employed by either Orthodox Currency Boards or “Dollarized” regimes, the MA has an Exchange Rate Policy but no Money Supply Policy. Changes in Net Domestic Assets won’t come into picture as Net Domestic Assets will either be zero or frozen.

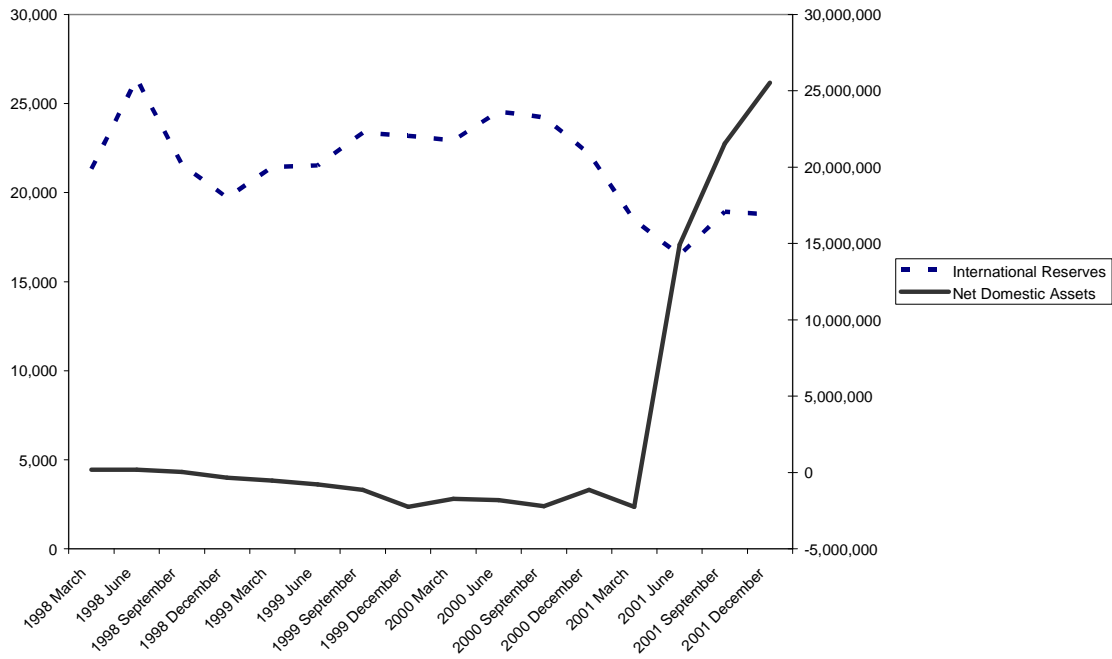
Whereas in the Flexible Exchange Rate Regime; MA will have a Money Supply Policy, but no Exchange Rate Policy. The Exchange Rate is on autopilot. In this case, the Money Supply policy can be observed by looking at the changes in Net Domestic Assets. In both the Fixed and Flexible Exchange Rate Regimes, there cannot be conflicts between Money Supply and Exchange Rate Policies. Therefore, when either two regimes are employed, there will not be a possibility of a Currency Crisis.

In a Pegged Exchange Rate Policy, the MA has both a Money Supply Policy and Exchange Rate Policy therefore conflicts between them can arise contrary to Fixed and Flexible Exchange Rate Regimes.

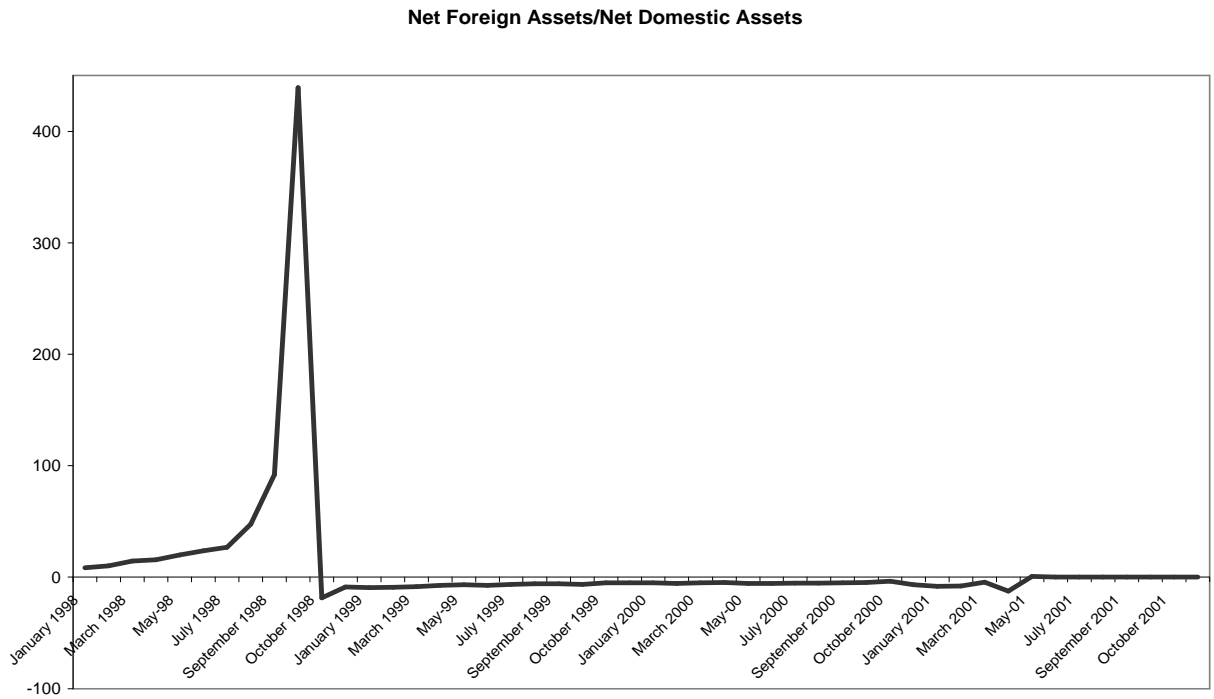
These conflicts can be detected and crises anticipated by a diagnosis a MA’s Balance Sheet. Specifically, the neutralization of Foreign Exchange Flows must be evaluated. When Net Foreign Reserves and Net Domestic Assets are moving in opposite directions conflicts between Money Supply and Exchange Rate Policies ensue, the Balance of Payments move into disequilibrium and it is usually only a matter of time before an Exchange Rate Crisis follows.



**Figure 32 International Reserves v.s. Net Domestic Assets**



**Figure 33 Net Foreign Assets/ Net Domestic Assets**



#### **6.3.1.2.1 Turkish Case**

In proceeding to the 2001 crisis, the exchange rate policy was determined according to the Disinflation Program 1999. In this program, the exchange rate basket was pre announced and it was escalated with the predicted inflation for the 18 months period. As the period is evaluated, it may be said that foreign reserves and domestic assets did not move in the opposite direction due to the reason that Net Domestic Assets moved in the band. Whereas in November 2000, Turkey experienced a currency attack and prior to that attack Foreign Reserves and Net Domestic assets moved in the opposite directions. This situation did not become a permanent case because of the additional reserve of IMF and additional precautions taken by the government. Therefore it may be said that Foreign Reserves/Net Domestic Assets ratio was not an indicator prior to 2001 crisis.

#### **6.3.1.3 Short Term Liabilities/International Reserves**

Short Term Liabilities/ International Reserves are accepted as one of the important indicators of the credibility of an economy. Besides, from the past experiences regarding this ratio, it can be accepted as a crisis indicator.<sup>75</sup> This ratio shows the amount of the liabilities that can be paid without taking additional External Borrowing from International Money Markets.

The ratio of Short Term Debt/International Reserves was accepted as an important indicator of a financial turmoil which the combination of Large-Short Term Liabilities and scarce Internationally Liquid Assets resulted in extreme vulnerability to a

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<sup>75</sup> Kaminsky G., Lizondo S. and Reinhart C. "Leading Indicators of Currency Crises." IMF Staff Papers. Vol. 45, No.1 (March 1998). International Monetary Fund

confidence crisis and a reversal of capital inflows therefore the ratio of short term debt to reserves is a robust predictor of financial crisis.<sup>76</sup>

#### **6.3.1.3.1 Turkish Case**

If it is looked to the ratio of Short Term Liabilities/ International Reserves in Turkish case it may be said that the ratio did not drop under 100% since the liberalization of capital account in 1989. Yeldan argues that Turkish financial system had been operating constantly under the “danger zone” for the past twelve years as far as the indicator is concerned. After the implementation of the Disinflation Program, the ratio reached to 127.6 % in 2000 from 98.9 % in 1999. If the historical data is evaluated, it may be said that it reached to its historical high level. Therefore, one of the most important crisis indicators was present for the Turkish case and it was giving alarm because the ratio above 60% is accepted as dangerous for the economy.<sup>77</sup> Therefore due to the reason the ratio was already at the danger zone it did not give a signal prior to the crisis.

#### **6.3.1.4 Current Account Balance/International Reserves**

The expected result of the Disinflation Program is a rapid increase in the economic activities in the first phases of the program.<sup>78</sup>

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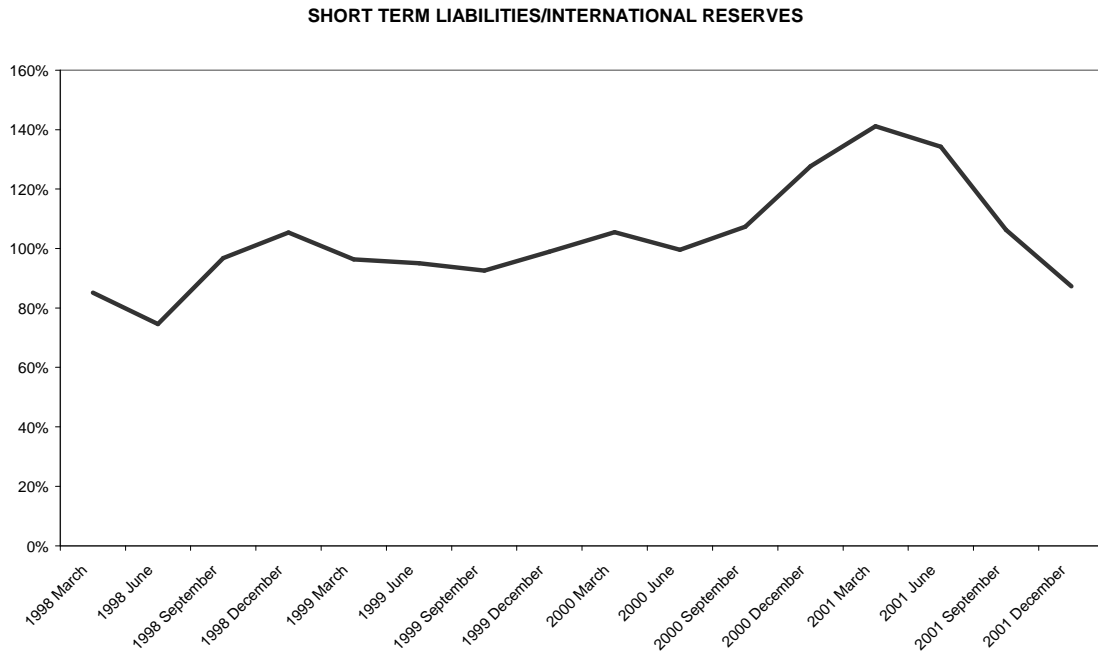
<sup>76</sup> Rodrik D., and Velasco A. (1999) “Short Term Capital Flows” NBER Working Paper No: W7364

<sup>77</sup> Yeldan, Erinç. (2001) “On the IMF- Directed Disinflation Program in Turkey: A Program for Stabilization and Austerity or A Recipe For Impoverishment and Financial Chaos?”

<sup>78</sup> İnan, A. (2002) “Finansal Krizler, Serbest Kur ve Ekonomik Büyüme.” Bankacılar Dergisi. Sayı 14. Türkiye Bankalar Birliği, Bankacılık ve Araştırma Grubu. Pp 5

It takes time to see the reflection of the developments in the Exchange Rate in Manufacturing, therefore local currency in gains value in the amount of the difference between the Exchange Rate and inflation until the balance is established. The valuation of local currency increases exports whereas decreases the imports. If the foreign account balance cannot be established with foreign capital inflows, then the credibility of the program will be hurt. <sup>79</sup>

**Figure 34 Short Term Liabilities/International Reserves**



As it is argued in the literature, countries which are applying stability programs which are dependent on exchange rate regimes first enter into a phase of development but then faces with worsening in foreign account balance. <sup>80</sup>

<sup>79</sup> Dayı A. “Türkiye Cumhuriyet Merkez Bankası Bilançosu, Para Politikalarının ve Kriz Göstergelerinin Merkez Bankası Bilançolarından İzlenmesi; 2000 Yılı Para Politikası”.

<sup>80</sup> Kadioğlu F., Kotan Z. and Şahinbeyoğlu G. (2001) Kura Dayalı İstikrar Programı Uygulaması ve Ödemeler Dengesi Gelişmeleri: Türkiye 2000. Central Bank of Turkey. Ankara.pp 1

If it is looked to the ratio it may be seem that, the ratio increases after the implementation of the program. After the program, Foreign Account Deficit increased whereas the reserves did not increase as it was planned by the program.

Cottarelli argues that Exchange Rate crawling peg worked as expected (or even faster than expected) in lowering interest rates and stimulating economic activity but was less effective in lowering inflation. This led to a rapid exchange rate appreciation and together with a sharp rise in oil prices, brought the external current account deficit to a level that markets did not regard as sustainable under a pegged exchange rate system.

<sup>81</sup>Therefore worsening of the external current account deficit may be accepted as an indicator for the Turkish case. But it was only raised concerns in the economy because it was believed that it came with the program.

Yeldan (2001) argues the role of current account deficit in the Turkish case. The current account deficit which was 1.3 \$ billions in 1999, erupted to reach 9.8 \$ billions in 2000. The deficit in the current account which reached to 4.8% as a ratio to the national product is one of the clearest indicators of the crisis. But Yeldan believes that the worsening in the balance cannot attributed to the fact that government is not undertaking its role in the application of the program but the program itself created the vulnerability for the increase in the current account balance. It is argued that the program turned Central Bank into an “accounting officer” other than a monetary

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<sup>81</sup> Aydođdu, H. And Yönezer N.(2007) “Krizin Sözlü Tarihi: Kasım 2000-Şubat 2001 Ekonomik Krizinin Tanıkları Anlatıyor. Dipnot Yayınları. pp. 96

authority therefore Central Bank could not take the necessary measures for the worsening in the current account balance.

Yeldan argues that within this mechanism the Monetary Policy is restricted to the direction of the Foreign Exchange Flows, and as such, the most important element to be able to sustain the liquidity needs of the economy relied on the continuation of inflows of International Speculative Financial Capital. Thus, operating under the conditions of freely upon and unregulated Capital Account(since 1989), the Domestic Rate of Interest become totally depended upon availability of Foreign Capital, and the Domestic Asset markets were left defenseless against the speculative runs of the financial arbiters.<sup>82</sup>

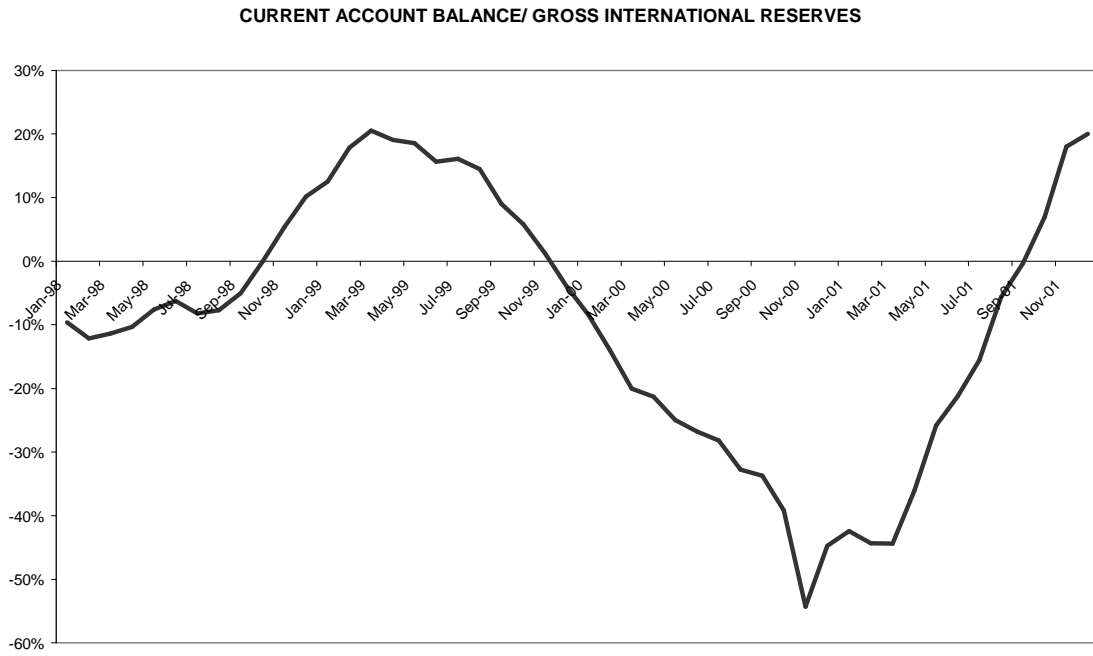
#### **6.3.1.4.1 Turkish Case**

When the the ratio is evaluated prior to crisis, it is evident that the drop in the ratio was attributed to the fact that the Disinflation Program may cause worsening in the foreign account balance and the discussions on that issue supports this fact therefore the signal was evident but it was ignored from the beginning.

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<sup>82</sup> Yeldan, Erine. (2001) "On the IMF- Directed Disinflation Program in Turkey: A Program for Stabilization and Austerity or A Recipe For Impoverishment and Financial Chaos?"

**Figure 35 Current Account Balance/Gross International Reserves**



## 7 CONCLUSION

Turkey adopted a Disinflation Based Stability Program in the year 2000 with the aim of decreasing inflation in the country. This program affected all actors of the economy and it may be argued that political pressures may create inefficiency in the market. Erdoğan argued that when taking the economy aggregately in terms of sectors, it is clear that the development and/or efficiency of each sector will wholly or partially be reflected in the economy. But in certain situations, when some sectors have been forwarded by the political pressures, this may well lead to inefficiency of these sectors, while at the same time may accomplish overall efficiency in the economy. Macro news play a systematic role in the determination of the exchange volume and thus leads to a mutual dependency of volume and prices over the time.<sup>83</sup> The inefficiency of Banking Sector in the economy supported with the low of confidence to the program as a result of the political pressures created inefficiency in the economy which occurred as a pressure for the sustainability of the program because as argued throughout the study; the twin deficits, the weak Banking Sector and political pressures are determinants of the outcome. But the aim of this work was to explore whether or not there are any signals that may be derived from Central Bank Balance Sheet in order to predict a financial crisis. With this respect Turkey's Central Bank Balance Sheet items were introduced in detail as well as the Analytical Balance Sheet and Stand-By Balance Sheet. After that the Signals Approach, presented by Kaminsky, Lizondo and Reinhart, was applied to the Turkish Case and the results show that certain aggregates give persistent signals before the crisis. The change in International Reserves was evident prior to 2001 crisis, Effective Interest

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<sup>83</sup> Erdoğan, Oral. (1997) "Comparable Approach to the Theory of Efficient Markets: A Modified Capital Asset Pricing Model For Maritime Firms." pp. 62



Rate Index increased prior to 2001 crisis, volatility of M1 increased and M2/Reserve Money indicated a persistent increase starting from January 1999. Therefore it may be argued that there were evident signals before the crisis. Whereas when certain aggregates are evaluated prior the crisis; it is seen that the structural problems of Turkey was an obstacle for predicting the crisis because certain ratios which are accepted as a dangerous signal was already evident in Turkey and it was disregarded. Therefore it may be argued that the Signals Approach may be applied to the Turkish Case with the chosen aggregates from CBRT Balance Sheet. Further it may be argued that Signals Approach needs to be emphasized in a much broader level whereas in this study, the scope was kept limited in order to emphasize on the structural problems of Turkey. Those structural problems may be linked to the inefficiency of the financial markets and it may be concluded that there were signals prior to the crisis.

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