Determinants of Turkish Sovereign Spreads: Fundamentals and Global Liquidity*

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Abstract

This paper analyzes empirically the determinants of Turkish sovereign risk as proxied by Chase-JP Morgan's Turkish Composite Emerging Market Bond Index spread for the period 1996-2005. Specifically, the paper explores the relative importance of country specific fundamentals, called the "pull factors", compared to global liquidity conditions, called the "push factors", in explaining movements in the Turkish sovereign spreads. We use stance and predictability of U.S. monetary policy as an important indicator of global financial climate. Specifically, making use of the effective fed funds rate and the fed funds futures rate, we decompose U.S. monetary policy into its anticipated and unanticipated components. We also used Turkish credit ratings and alternatively a number of macro-variables to account for the pull factors. Using monthly data and controlling for the 2001 crisis, we uncover that country-specific fundamentals/ratings and the *unanticipated* component of the U.S. monetary policy are significant in explaining the movements in the Turkish sovereign bond spreads.

JEL classification: E43, F36, G15

Keywords: Eurobonds, News Effects, Sovereign Credit ratings, Emerging market countries.

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1 Introduction

Following the financial account liberalizations at the end of the 1980s, the number and value of external debt raised by emerging market economies in the form of Eurobond issues increased significantly, albeit non-monotonically. The cost of raising capital by issuing Eurobonds depends on country risk and varies among countries since other than global liquidity, idiosyncratic factors referred to as "country-specific fundamentals "also matter. The spread on each emerging market country's sovereign bond -the premium that is offered to investors above the yield paid on the U.S. government bonds with the same maturity- is a proxy for that country's sovereign risk. During the 2001-2005 period, annual average spreads on emerging market bonds tightened by 520 basis points, from 837 basis points to 317 basis points approximately. Improving country-specific fundamentals clearly played an important role in reducing the spreads. However, abundance of global liquidity and increased risk appetite of investors stemming from the looseness of monetary policy in the financial centers and the recent inflow of institutional investors such as the pension funds were also influential. Whether the significant decline in interest rate spreads since the beginning of the 2001, is sustainable or not, is a non trivial issue. To put it differently, whether worsening fundamentals and/or worsening market sentiment would trigger a sudden reversal in capital flows from emerging market economies and the timing of such a reversal is very critical both to lenders and the policymakers of the borrowers.

A number of relatively recent papers have addressed the issue of how emerging market sovereign bond spreads can be explained. One may broadly categorize the factors that effects movements in spreads into two. The first category includes country specific fundamentals labeled as the "pull factors"[1]. The pull factors include indicator variables for fiscal sustainability, current account sustainability and financial stability. Alternatively one may use the credit ratings of the rating agencies for each country as a proxy for these pull factors. The second category includes market sentiment or global liquidity labeled as the "push factors"[2]. Push factors may be proxied by indicator variables for global liquidity availability such as the U.S. federal funds target rate[3] or the volatility of the difference between the U.S. fed funds rate and U.S. treasury bill yields.

[1]Country specific fundamentals are referred to as the pull factors since borrowers compete and attract financial flows based on these variables.

[2]Global liquidity increases are referred to as the push factors since lower returns in financially mature countries pushes excess liquidity to emerging market economies.

[3]The federal funds rate is the interest rate at which depository institutions lend balances at the U.S. Federal Reserve to other depository institutions overnight.

Cantor and Packer (1996) analyze the determinants and impact of the credit ratings. Based on a cross-sectional regression for thirty-five emerging countries in 1995, they conclude that sovereign bond spreads are broadly related to the relative rankings of sovereign credit risks made by Moody's and Standard and Poor's. Cantor and Packer also reveal that six factors play an important role in determining country's rating: per capita income, GDP growth, inflation, external debt, level of economic development, and default history and that ratings effectively summarize and supplement the information contained in macroeconomic indicators. Eichengreen and Mody (1998) analyze developing country Eurobond spreads using primary market issue data in the years 1991-1996 and confirm that higher credit quality translates into a higher probability of new Eurobond issuing and a lower spread. They also report that changes in the market sentiment not related to fundamentals have moved the market by large amounts in the short run. Arora and Cerisola (2001) analyzed the impact of changes in U.S. monetary policy on sovereign bond spreads in emerging market countries. Arora and Cerisola utilized the level of effective federal funds rate and ARCH based volatility measure as a proxy for the U.S. monetary policy actions and hence the global liquidity conditions. They report that the level and volatility of U.S. money market returns are important for stabilizing capital flows and capital market conditions in emerging markets. Sy (2001) uses a panel data for 17 emerging market countries from 1994 to 2001 and estimates a simple univariate model of sovereign spreads on ratings. Sy reports that spreads were "excessively low"for most emerging markets prior to the Asian crisis and that the spreads were "excessively high"in 2001 for a number of emerging markets. Finally the *2004 Global Financial Stability Report* of the IMF analyze the 2003 rally in Emerging market debt and report that Global liquidity conditions matter only in the post-September 2001 period which marks the beginning of the monetary easing in the U.S.

This paper presents empirical evidence on how changes in global liquidity conditions and Turkish fundamentals influence Turkish country risk. This paper adds to the literature in three dimensions. First, following the new literature on news effects, instead of simply using the fed funds rate for proxying U.S. monetary policy stance, we follow Rudebusch(1998), Kuttner (2001) and Gurkaynak et al. (2005a and 2005b) and extract the anticipated and the unanticipated component of the U.S. monetary policy by using U.S. fed funds futures rate. Second, our data period also covers the post June 2004 period which marks the start of monetary tightening in the U.S.. Whether this monetary tightening cycle will resemble the monetary tightening of the 1990s is important. Last but not the least, this is the first paper that specifically analyze Turkey and the evolution of Turkish country risk and this is an important issue given

the history of IMF-backed stabilization programs and the current EU membership prospect.

We show that in line with the new literature, words speak louder than actions by showing that the unanticipated and not the anticipated component of U.S. monetary policy is significant in explaining movements in the Turkish sovereign bond spreads along with Turkish country ratings/fundamentals.

We proceed as follows. Section 2 provides data and methodology used in this paper. Section 2 presents the estimation results and Section 4 concludes and gives details for further research.

2 Data and Methodology

Similar to many other developing countries at the time, Turkey opened up its financial account in August 1989, in the hope of attracting foreign money to finance the borrowing requirement of the public sector, which would reduce the prevailing high real interest rate and decrease crowding-out in private investment. However, the 1990s were plagued by frequent capital reversals, high rates inflation and real interest rate and volatile real GDP growth rate. Turkey experienced two balance of payments crises: in 1994 and 2001 and was adversely affected from the Asian crisis of 1997 and the Russian and Brazilian crisis of 1998-1999.[4]. Following the structural and stability program backed by the IMF since 2001 and the prospects of a future membership with the European Union, Turkey achieved structural transformation and the rapid improvement in its macroeconomic fundamentals. Since 2001, the primary surplus of the consolidated budget has averaged 5.6 % and has never fall below 4.2 %. The primary government-sector surplus comfortably exceed the target (and IMF performance criterion) of 6.5% of GDP in 2004. Continued fiscal discipline, the pickup in capital inflows based on the market perception that Turkey has become a convergence economy and lower inflation rates have helped bring down bond yields. Much stronger macroeconomic conditions increased the capital inflow to Turkey. Although the maturity of these inflows improved relative to 2003, Turkey is still exposed to a sudden reversal in the market sentiment. Also, these inflows consisted mainly of foreign borrowing as the level of foreign direct investment remained relatively low. Therefore, the high current account deficit adding to the short-term external debt is a significant risk for the economy.

This paper aims to analyze the determinants of Turkey's sovereign risk with a special emphasis on global liquidity conditions. Turkey's bond spreads will be used

[4]Among others see Alper and Saglam (2001) for major developments in the Turkish economy during the 1990s

as a measure of the markets' perception of the risk that Turkey might default and to assess external financing conditions of it. Turkey's sovereign default risk is proxied by the Turkey's bond market spread, EMBI+Turkey calculated by Chase J.P. Morgan. The original frequency of the data is daily, however we convert them to month by taking the arithmetic averages and present them in natural logarithms.

Turkey's sovereign spread is higher than the emerging market's composite index in crises years. However, since the stand-by agreement with IMF in 2001, Turkish sovereign spreads outperformed the composite index.

Insert Figure 1 here

We next consider the determinants of Turkish sovereign spreads under two criteria; "pull"factors and "push"factors.

2.1 Push Factors

The global liquidity conditions matter influence the sovereign spreads in an environment of increased globalization. The emerging markets of today are more dependent to changes U.S . monetary policy, because of its mature financial markets, high reserves and political and economic power in the world. Hence, global liquidity is proxied by U.S. monetary policy actions. Basically there are two variables that explain the so-called "push factors". One of them is the volatility of U.S. monetary policy actions, and the other one is the level of U.S. monetary policy actions.

From a theoretical perspective, the yield on the interest rate spread can be defined as the risky asset minus risk-free asset. Emerging market bonds can be thought as the risky asset since they have a higher probability of default than the yield on government bonds of countries with mature financial markets such as the U.S. It can be easily shown that the rate on risky asset has to rise more than any rise on risk-free asset in order to compensate investors for risk.[5]

The level of U.S. monetary policy actions will be considered under two parts; anticipated and unanticipated. Gurkaynak et al. (2004) showed that the effects of U.S. monetary policy cannot be captured by a single factor, namely federal funds target rate. Instead they found that there are two factors, which have structural interpretation as a "current federal funds rate target"factor and a "future path policy"factor with the

[5]Following Arora and Cerisola (2001), suppose that r and i denote the interest rate on a risk-free asset and a risky asset, respectively for some pre-specified time horizon. Let p denote the probability of default of the risky asset and S, $i-r$, denote the interest rate spread. In equilibrium $(1+r)=p\times(1+i)+(1-p)\times 0$ and the partial derivative of S, with respect to r is $(1-p)/p$, which is positive since $p<1$.

latter closely associated with the Federal Reserve Open Market Committee (FOMC)[6] statements and tried to measure the effects of these two factors on bond yields and stock prices by using intraday dataset going back to 1990 that captures changes asset prices in a 30-minute and one hour window bracketing every FOMC announcement. Gurkaynak et al. (2004) concluded that the effects of FOMC announcements on financial markets as driven by single factor-changes in the federal funds rate target-is inadequate. Second factor which is related to unexpected future path policy is required. The tool for second factor in Gurkaynak et al. (2004) is the federal funds futures rate[7]. Additionally Kuttner (2001) attempted to estimate the impact of monetary policy actions on bill, note and bond yields, using data from the futures market and he showed that interest rates' response to anticipated target rate change is small, while their response to unanticipated changes is large and highly significant. It means that the interest rates' response to the "surprise" component of Fed policy is significantly stronger than the response to the change in the target itself. Kuttner (2001) used daily data, however for robustness check he used monthly data. For robustness check, Kuttner (2001) got the model from Rudebusch (1998). Therefore, we will deal with monthly averages and use the model in Rudebusch (1998) to estimate the anticipated and unanticipated components of U.S. monetary policy. Since, new information coming to the market is more valuable than the known or expected information. Hence, to extract the anticipated and unanticipated components U.S. monetary policy actions two tools are used, namely; effective federal funds rate and federal funds futures rate. Also, ARCH based volatility measure of U.S. monetary policy actions is included in our model in order to represent the preferences of risk averse agents.

Current literature emphasized that the global liquidity conditions by only using federal funds rate. However, this single factor explanation is not adequate to explain the sovereign default risk. Hence, we included the unanticipated component of U.S. monetary policy actions to capture the global liquidity conditions in determining the Turkey's bond spreads. Moreover, Kuttner (2001) estimated the impact of monetary policy actions on bill, note and bond yields, using data from the federal funds futures market. He concluded that interest rates' response to the "surprise" component of

[6]The FOMC holds eight regularly scheduled meetings per year. At these meetings, the Committee reviews economic and financial conditions, determines the appropriate stance of monetary policy, and assesses the risks to its long-run goals of price stability and sustainable economic growth.

[7]Federal funds futures have traded on the Chicago Board of trade exchange since October 1988 and settle based on the average effective federal funds rate that is realized for the calender month specified in the contract. Thus, daily changes in the current-month futures rate largely reflect the revisions to the market's expectations for the federal funds rate over the reminder of the month. Therefore, the surprise component of the FOMC 's announcement for the federal funds rate is captured by federal funds futures rate.

Fed policy is significantly stronger than the response to the change in the target itself. Thus the same methodology with Kuttner (2001) will be applied, but he used daily data whereas we are dealing with monthly dataset. However, the model will be taken from Rudebusch (1998) since we are dealing with monthly data. In Rudebusch (1998) the unanticipated change in the funds rate is defined as the average in month s, minus the 1-month futures rate on the last day of month s-1,[8]

$$\bar{\Delta}\widetilde{r}_s{}^u \equiv \frac{1}{m}\sum_{i\in s}\widetilde{r}_i - f^1_{s-1,m}$$

and the anticipated change in the funds rate target is:

$$\bar{\Delta}\widetilde{r}_s{}^a \equiv f^1_{s-1,m} - \widetilde{r}_{s-1,m}$$

Insert Figure 2 here

The second variable under "push" factors is the volatility. Although people use different methods in modeling the volatility, we preferred ARCH model developed by Engle (1982). Since, two other measures used in Arora and Cerisola (2001), within month based and six-month moving averages have some constraints and limitation which is measured by computing the standard deviation of spread between the yield on the three-month U.S. treasury bill and the U.S. federal funds rate during a month. However, changes in the spread between the three-month treasury bill, is considered as the short-term risk free rate, yield and the U.S. federal funds rate may not capture heightened uncertainty about the expected stance of US monetary policy. Second proxy is based on the six-month moving average of standard deviations for the spread between the three-month yield on the U.S. treasury and the federal funds target rate was highly significant in explaining the fluctuations in sovereign spreads across countries. However, the construction of this proxy using moving averages leads to strong autocorrelation. Hence, we used the fitted values for the conditional standard error from an ARCH model spread between the yield on the three-month U.S. treasury bill and the U.S. federal funds rate in order to avoid these constraints and limitations. ARCH model is very useful because it captures persistence volatility.

Insert Figure 3 here

[8]Note that the $\bar{\Delta}$ is used to refer to the change from the last day of month s-1 to the average of month s.

2.2 Pull Factors

Pull factors are proxied by sovereign credit ratings or country-specific fundamentals.

Credit ratings of Turkey collected from Standard and Poor's web page. Following Sy(2003) we first translate the rating scale into an index spanning from 1 to 58 by treating changes in outlook as intermediate steps between two ratings. We next use a logit-type transformation of this index to account for possible nonlinearities in the rating scale. [9]

Insert Table 1 here

Also, Cantor and Packer (1996) report per capita income, GDP growth, inflation, fiscal balance, external debt, indicator for economic development and indicator for default history are statistically significant in explaining Standard and Poor's ratings. Beside these, there is also an evidence that the sovereign ratings are the key determinants of the pricing of sovereign bonds and that sovereign spreads incorporate market participants' views of expected rating agencies (Sy (2001)).

Now we will reconstruct our regression model by excluding credit ratings and including country-specific fundamentals.[10]

Country specific-fundamentals are chosen according to basic three characteristics of Turkey and all of them are obtained from the Central Bank of Republic of Turkey's website. First, we considered the liquidity conditions of Turkey. The best proxy for the liquidity conditions of Turkey is the reserves per short-term debt. Then we looked for a proxy to current account dynamics second and then decided to use import volume and real exchange rate. The third characteristic is the fiscal discipline which is proxied by budget balance per GDP. In addition to current account dynamics, liquidity conditions and fiscal discipline we added the closing prices of Istanbul Stock Exchange (ISE) market is involved. Also, dummy for crises is used for period September 1996 to June 2005. In recent decades Turkey experienced three crises, which caused the outflow of capital and loosening the credibility of Turkey in the financial market. From

[9] $$L_t = ln\frac{I_t}{59 - I_t}$$

[10] We do not include credit ratings and country-specific fundamentals in the same regression because of multicollinearity. Since, Standard and Poor's (1998) reported that the determinants of a country's ratings are country's income, and economic structure, economic growth prospects, fiscal flexibility, and external debt and liquidity, therefore, sovereign credit ratings are used as an indicator to a country's macroeconomic condition.

September 1996 to June 2005, Turkey's EMBI+ spread is greater than 1000 bps in three months. These months are the crises months of Turkey.

Insert Table 2 and Figure 4 here

3 Estimation Results

We attempted to explain the changes in the Turkish sovereign bond spreads as a function of "pull" and "push" factors. First, we ran the regression of Turkish spreads on crises dummy, anticipated and unanticipated component of U.S. monetary policy, ARCH volatility measure, and credit ratings of Turkey. The monthly estimation results for period September 1996 and June 2005 indicates that the credit ratings are crucial in explaining the Turkish spreads. The estimated coefficient of credit ratings is -0.95 and it is statistically significant which means that Turkish credit ratings over this period is important and negatively related to the Turkey's sovereign spreads. This result is consistent with Sy (2001), the higher the Turkey's credit ratings the lower the probability of default. Also, the coefficient of unanticipated component of U.S. monetary policy actions is significant and it is equal to -0.34. However, the anticipated component of U.S. monetary policy actions is statistically insignificant. This supports the view that unanticipated information coming to the market is more important in determining the spreads. Beside this, we replicate the earlier "single component" analysis. Thus, we exclude the anticipated and unanticipated components of U.S. monetary policy and include federal funds rate as the only indicator. However, we have found that federal funds rate is statistically insignificant in determining Turkish bond spreads. Also, we divide data into two subperiods from September 1996 to August 2001 and from September 2001 to June 2005 ,however there is no structural break between these two subperiods.

Insert Table 3 here

In the second part, we redefine our model by excluding credit ratings and including country-specific fundamentals. Hence, our model includes import volume with three lags, reserves per short-term debt, real exchange rate, Istanbul Stock Exchange market closing prices in terms of U.S. dollars, credits of banks per GDP, budget balance per GDP with two lags. In this model, again unanticipated component of U.S. monetary policy actions is statistically significant whereas the anticipated component is insignificant. Dummy for crises has positive sign and is significant in explaining the spreads.

This means that crises implies a higher probability of default and hence spreads will be higher. Reserves per short term debt, which is a proxy for liquidity conditions of Turkey, is also significant and has negative sign. The coefficient of banks credits per GDP is -0.52 and it is significant. We use CPI based real exchange rate and import volume with three lags as the indicators for current account dynamics. Real exchange rate is negatively related with spreads, but we could not find any significant relationship with imports. Fiscal discipline is also important in determining the Turkey's bond spreads. Higher budget balance implies lower probability of default and hence lower spreads. Istanbul Stock Exchange market's closing prices are also important and negatively related to spreads.

4 Conclusion

This paper represented an empirical evidence about the determinants of Turkey's bond spreads. In earlier studies the effects of "push" factors, namely U.S. monetary policy actions are proxied by a single variable. Our contribution is to add another variable which is closely related to FOMC announcements. By doing that we have shown that the "surprise" component of U.S. monetary policy is important in determining the sovereign default risk. ARCH based volatility measure is insignificant when the independent variables are fundamentals but it is significant when we use credit ratings. Beside, "pull" factors are considered in two groups, both credit ratings and fundamentals are important in determining Turkey's default risk. Current account dynamics, fiscal discipline, liquidity conditions of Turkey capture the country-specific fundamentals.

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Tables

Table 1: Credit Rating Index (Based on Standard and Poor's Rating Scale)

S&P's Rating	Assigned Score	S&P's Rating	Assigned Score	S&P's Rating	Assigned Score
AAA	58	**BBB+**	37	**B**	16
AA+	55	**BBB**	34	**B-**	13
AA	52	**BBB-**	31	**CCC+**	10
AA-	49	**BB+**	28	**CCC**	7
A+	46	**BB**	25	**CCC-**	4
A	43	**BB-**	22	**CC**	1
A-	40	**B+**	19	**SD**	0

Table 2: Turkey's Credit Rating History (Standard and Poor's)

Date	Rating	Outlook	Date	Rating	Outlook	Date	Rating	Outlook
4/5/92	BBB	S	**21/1/99**	B	S	**29/1/02**	B-	P
3/5/93	BBB	N	**10/12/99**	B	P	**26/6/02**	B-	S
22/3/94	BBB	N	**25/4/00**	B+	P	**09/7/02**	B-	N
16/8/94	BBB	S	**05/12/00**	B+	S	**07/11/02**	B-	S
24/7/95	BBB	P	**21/2/01**	B+	N	**28/7/03**	B	S
18/10/95	B+	S	**23/2/01**	B	N	**16/10/03**	B+	S
18/7/96	B+	N	**17/4/01**	B-	N	**08/3/04**	B+	P
13/12/96	B	N	**27/4/01**	B-	S	**17/8/04**	BB-	S
13/12/96	B	S	**11/7/01**	B-	N			

Table 3: Estimation Results

09/96-06/05	Dependent Variable: Turkey's EMBI+			
	Model 1	Model 2	Model 3	Model 4
Volatility	2.114[a]	-0.749	1.819[a]	-0.778
	(0.715)	(0.549)	(0.575)	(0.484)
Anticipated			0.018	-0.053
			(0.111)	(0.052)
Unanticipated			-0.340[a]	-0.337[a]
			(0.142)	(0.144)
Effect. Fed. Funds Rate	0.045	0.044		
	(0.063)	(0.063)		
Credit Ratings	-1.086[a]		-0.949[a]	
	(0.102)		(0.142)	
ISE (in USD)		-3.478[a]		-3.159[a]
		(0.374)		(0.383)
FX. Res./ST. Debt		-0.680[a]		-0.651[a]
		(0.211)		(0.141)
Banks Credits/GDP		-0.624[a]		-0.528[a]
		(0.135)		(0.110)
REER (CPI based)		2.693[a]		2.803[a]
		(1.047)		(0.963)
Import Volume(t-3)		-0.867		-1.013
		(0.699)		(0.652)
Budget Balance (t-2)		-0.475		-0.496[a]
		(0.269)		(0.233)
Crisis Dummy	0.117[b]	0.318[a]	0.109[b]	0.281[a]
	(0.063)	(0.092)	(0.062)	(0.071)
Constant	5.171[a]	6.037[a]	5.350[a]	6.104
	(0.113)	(0.154)	(0.159)	(0.077)
Adjusted R^2	0.66	0.74	0.67	0.75
Log likelihood	11.621	25.424	13.962	30.023

Newey-West corrected standard errors are given in parenthesis.

[a] Coefficient significant at 5% level of significance.

[b] Coefficient significant at 10% level of significance.

Figures

Figure 1: EMBI+ and Turkish Bond Spreads 1997-2005

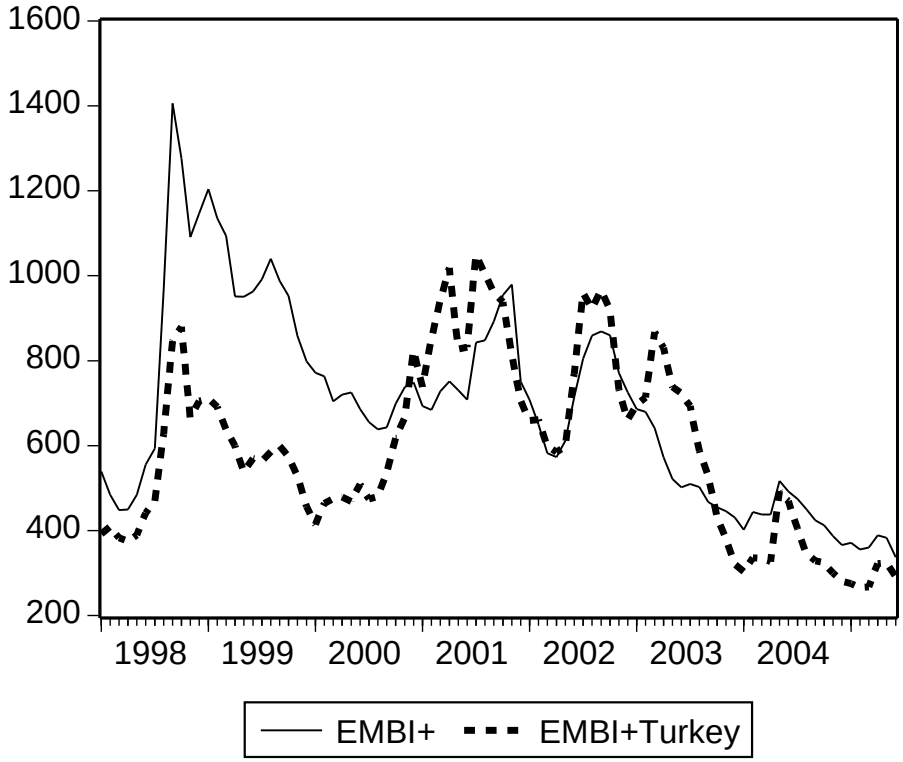

Figure 2: Global Liquidity Measures(1) Level Variables: 1997-2005 (in natural logarithms)

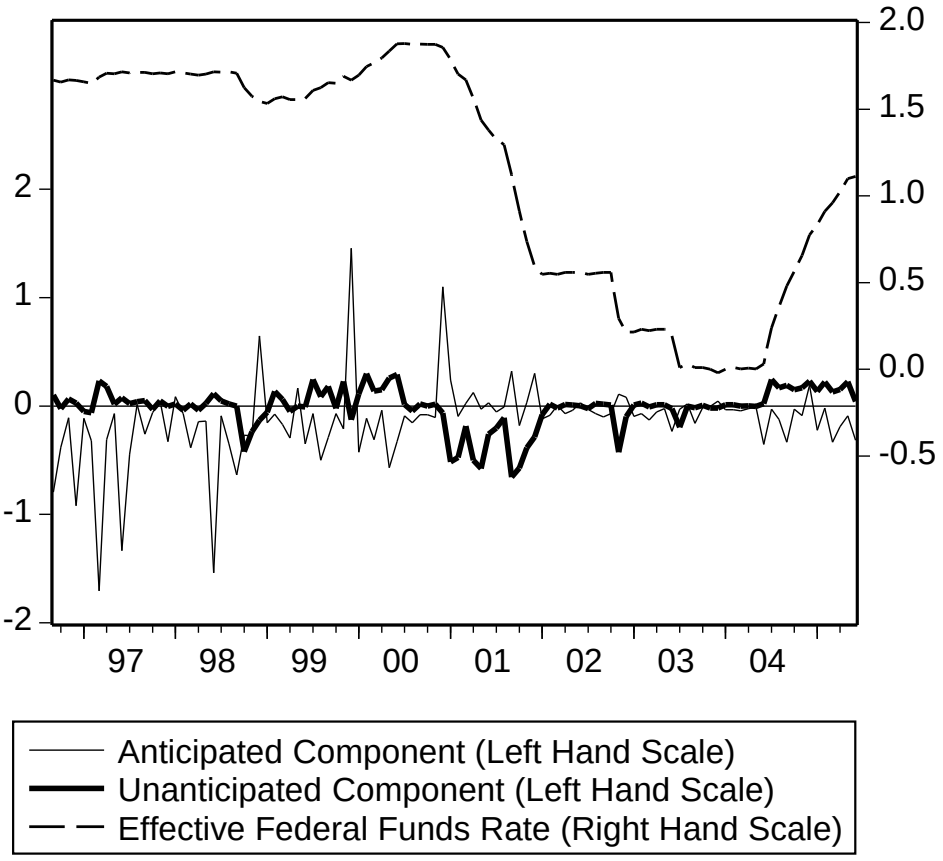

Figure 3: Global Liquidity Measures(2) Volatility Variables: 1997-2005

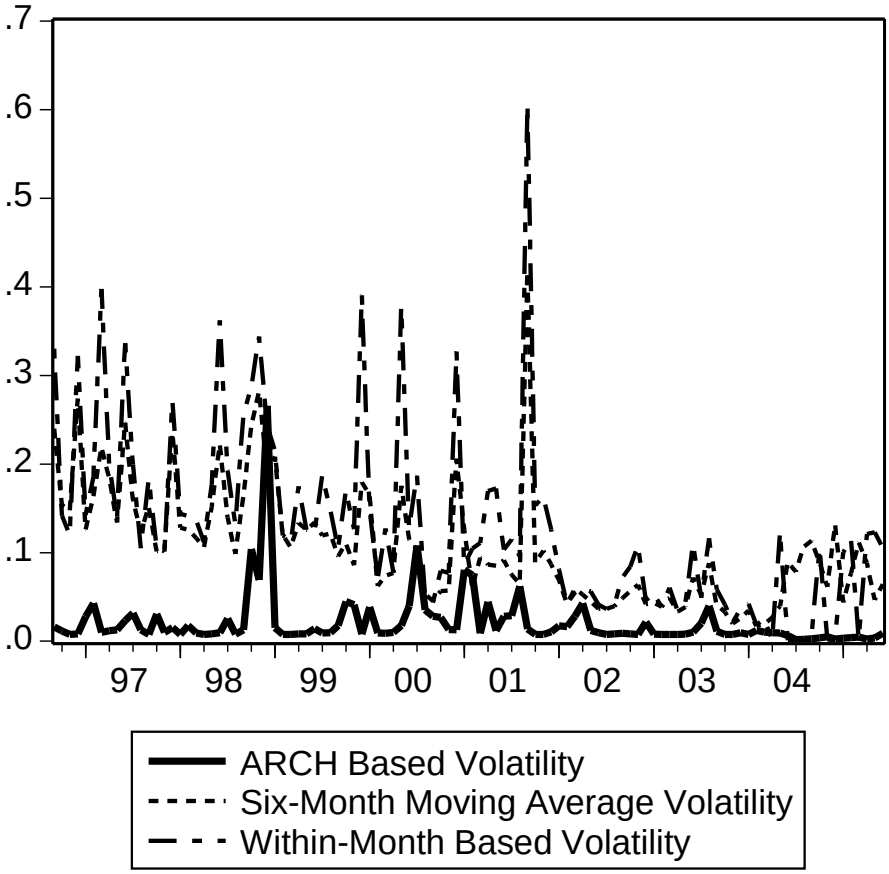

Figure 4: Standard and Poors' Credit Ratings for Turkey: 1997-2005 (logistic transformation)