The Effects of Changes in the Anticipated and Unanticipated Fed Funds Target Rate on Financial Indicators: The Case of an Emerging Market Country-Turkey

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Abstract

This paper puts forward the thesis that neither the changes in FED Funds anticipated target rate nor the FED Funds unanticipated target changes can be expected to affect the financial indicators of all emerging markets. The paper supports this thesis using the original framework developed by Kuttner (2001) for Turkey. Its basic argument is that FED's decisions become relevant for an emerging market only after it becomes sufficiently open both on the capital and current account, has established the prerequisite institutional framework, its financial markets have been sufficiently developed and has established economic and political stability. Moreover, the paper shows that the unanticipated component of the FOMC decisions affect the financial indicators more than the anticipated component.

Key Words: Emerging markets, Fed funds rate and Monetary policy.
JEL Classifications: C22, E43 and E52

1. Introduction

The effects of the changes in international financial conditions on small open economies have long been debated in monetary economics. The majority of the studies on this issue focus on the impact of foreign shocks on the real and nominal variables for industrial countries. Only a few studies deal with

the emerging markets. The recent studies which examine the case for the industrial countries such as Cushman and Zha (1997), Kim (1999), and Kim and Roubini (2000) find the effects consistent and coherent with conventional theory. The recent studies regarding the small open economies (see, Cushman and Zha, 1997; Berument and Kilinc, 2004, Hoffmaister, Roldos, and Wickham, 1997) have shown that these economies are affected by foreign shocks. Borensztein, Zettelmeyer and Philippon (2001) have investigated the effect of US monetary policy shocks on various countries. They find that 1 unit shock to US interest rates causes the interest rates of Austria, Canada and New Zeland by 0.5 to 0.6 points contamporaneously. When the period is extended to 12-24 months, the effect becomes 1.0 to 1.0. Similar effect is observed for Hong-Kong and Singapor as 0.6 and 0.3 respectively. A 0.3 effect is observed for Chile. According to Huizinga and Mishkin (1986), and Kinal and Labiri (1988), the changes in the reel interest rates for different countries cannot be attributed to country-specific factors. Rather they are due to monetary policy implemented by the Federal Reserve System since 1979.

Similar to these studies, Tzavalis (1999) remarks that the big changes in the interest rates in Germany, France, Italy, Japan and England are not a consequence of country specific factors but are direct results of the US monetary policy implemented by FED since 1979. In another work related to industrialized countries, Rapallo (1998) has examined the effect of US monetary policy shocks on European stock markets (Austria, Belgium, France, Germany, Italy, Holland, Norway, Spain, Sweden and Switzerland) by using a structural VAR model. The impulse response functions and variance decomposition indicate a significant relation. They have incorporated the country-specific factors into the model to examine the effect on stock markets. In one of the few studies on emerging market countries, Hsing (2003) has examined the effect of potential responses of interest rates in Mexico to the change in the U.S. federal funds rate by using LARCH or ARCH models. He concluded that there exist a long run relationship between the variables and that the treasury bonds are affected by the FED interest rates.

This paper examines the effects of the changes in the FED's short term target interest rates on Turkish interbank rates, Turkish bond rates, the exchange rate, the spread between the interbank rate and depreciation, and Istanbul Stock Exchange using a regression analysis similar to Kuttner (2001). This contrasts with those studies, which employ VAR models such as Bernake and Blinder (1992), and Campbell and Ammer (1993). Using the model suggested by Kuttner (2001) keeps us away from the puzzles (see, Kim and Roubini, 2000; Parrado, 2001) that VAR models involve[1].

In the paper we use Federal Funds target rate changes as an indicator of a change in the foreign financial market conditions given that, it and the announcements of the FOMC meetings target changes are expected to influence the financial markets of other countries. In these meetings, FED Board's decision to change (or not change) the federal funds target rates is screened by the financial markets of several countries. The increase or decrease in the FED funds target rate signal the expected performance of the U.S. economy, which by its size and the fact that USD is an international reserve currency affect almost all economies. Kuttner (2001) points out that the effects of anticipated and unanticipated target change in the FED funds rate on interest rates are different. He points out that the response of interest rate target to an anticipated change is small, but to an unanticipated change is big. In accordance with Kuttner (2001), in this study the effect of anticipated and unanticipated target changes in FED funds rate are also considered while making the analysis.

The main thesis of this paper is that changes in FED funds target rates cannot be expected to affect the financial markets of a developing economy unless those markets are sufficiently developed and/or have reached a certain level of openness. In the particular case of Turkey, we show that FOMC decisions have tended to affect the Turkish financial indicators only after 2002, when some

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[1] Conventional VAR specifications often produces some empirical puzzles. These puzzles can be grouped into four categories. In liquidity puzzle positive monetary policy shocks, the innovations in monetary aggregates (such as M1, M2, ...), are associated with increases rather than decreases in nominal interest rates. In *price puzzle*, the monetary policy shocks, the innovations in interest rates, are linked with increases rather than decreases in the price level. In *exchange rate puzzle*,positive monetary policy shocks, the innovations in interest rates, are associated with an effect of depreciation rather than appreciation of the exchange rate.

institutional reforms had been undertaken, foreign investors had become interested in Turkish markets and economic and political stability had been reestablished.

The paper is organized as follows: Section 2 briefly examines the efforts towards a more liberal and an open economy in Turkey. The methodology and model specification are explained in Section 3, while the estimation results are reported in the fourth section. Finally, the paper is concluded in the last section.

## 2. Recent Developments in Turkish Economic Policy

After experimenting with an inward-looking, import-substituting development strategy for decades, and after going through several frustrating economic crises, with the January 24, 1980 decrees which have followed a stand-by agreement with the IMF, Turkey adopted a comprehensive reform program. The Program primarily aimed at a more liberal and an open economy. The economic reforms undertaken for these objectives uninterruptedly continued till the death of Mr.Turgut Ozal in 1992.

To attain the objectives of the Program the prices of the state economic enterprises were liberalized, a huge devaluation was undertaken and the economy switched from the fixed exchange rate system to adjustable peg in 1980. Next came the liberalization of the lending and borrowing rates of the commercial banks, and a gradual elimination of the import quotas and reductions in import tariffs. Olgun and Togan (1991) report that economy-wide weighted average nominal protection rates have been sequentially lowered from 70.19% in 1984 to 55.42% in 1988 and finally to 41.16% in 1989. With regard to foreign transactions the reform program reached its apex in 1989 when all import quotas were eliminated, all foreign exchange controls were dismantled and the convertibility of the Turkish lira was established.

The effects of these reforms on selected indicators of the degree of openness of the economy can be traced from Figure 1 and Figure 2 presented below. Figure 1 plots the shares of exports, imports and total trade in GDP from 1970 to 2004. From the underlying data we calculate that the share of exports (imports) in GDP have risen from 6% (7 %) in 1970-1979 to an annual average of 9.8 % (15%) in 1980-1989, to 14% (19%) and finally to 18.8 % (22.5%) in 1990-2004. For exports this is a noteworthy performance. There is no doubt that the bright performance of exports is largely due to the more realistic exchange rate policy followed after 1980 and the generous export incentives. These figures also show that the trade deficit relative to GDP has steadily increased.

With the elimination of foreign exchange controls and the establishment of the convertibility of the Turkish lira several significant developments have occurred. Firstly, foreign direct and portfolio investments into Turkey have tended to steadily increase. According to the Turkish Central Bank data, foreign portfolio investments (direct investments) into Turkey have risen from an annual average of $1163 million ($ 524 million) in 1986-1995 to $7230 million ($2437 million) in 2003-2005. However, there have been substantial capital outflows in 1998, 2001 and 2002. Secondly, a considerable portion of the portfolio investments went to the Istanbul Stock Exchange (ISE). Available data show that, notwithstanding increased capitalization the share of the foreigners went up from 37.9% in 2000 to 40.8% in 2001 to reach as much as 60.4% in December 2005[2]. Thirdly, as the reforms have progressed and the integration of the Turkish economy with the world economy has deepened, the Turkish treasury has tended to borrow more and more broadly by issuing US Dollar and Japanese Yen denominated bonds. The time path of this development from 1988 through 2005 is depicted in Figure 2. We see that foreign exchange denominated treasury bonds stock went up from $501 million in 1990 to $5003 million in 1999 and finally to $6489 million in 2005.

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[2] The data regarding the portion of foreign shares in ISE are gathered from the website http://www.yatirimyap.com/pdf/ADOExcel/ypay2.htm and referances given in this page.

Figure 1: The shares of exports, imports and total trade in GDP
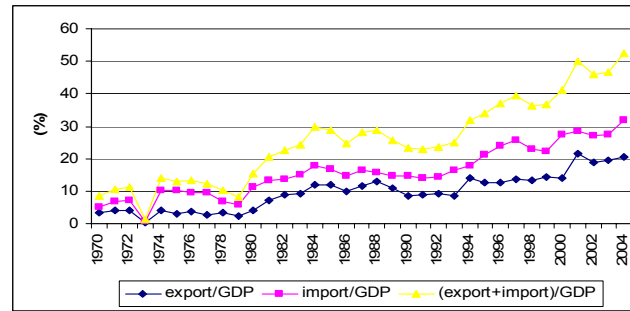
Figure 2: Foreign Exchange Denominated Bonds Stock of the Turkish Treasury.
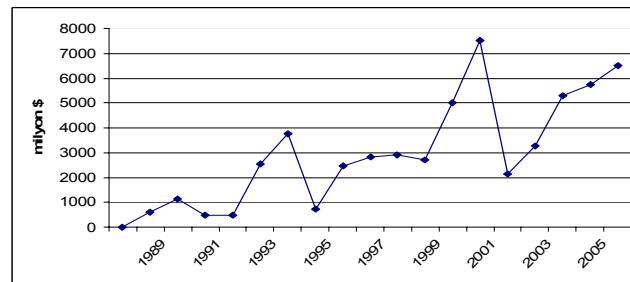
Source: Turkish treasury

3. Methodology and Data

Our data set consists of Federal funds futures rates, Federal Funds target rates, Turkish interbank interest rates, Turkish second hand bond rates, exchange rate and Istanbul Stock Exchange price index (ISE). As the FED funds futures market was not operational till 1989, our dataset covers the post-1989 period, the period between June 6, 1989 and September 20, 2005. Over this period, 68 changes have occurred in the funds rate target by the FOMC.

The data on the Federal Funds Futures Rates have been obtained from Kenneth Kuttner and updated from *Datastream* database. The data of target rate are gathered from Kenneth Kuttner and updated from the website http://www.federalreserve.gov/fomc. The indices of Turkish interbank interest rates have been obtained from the EVDS system of the Central Bank of Turkey, and the second hand bond rates and ISE 100 price index have been compiled from the Istanbul Stock Exchange.

In the empirical methodology of this paper, the model suggested by Kuttner (2001) is used. Similar to this work, in most studies such as Cook and Hahn (1989), Bernanke and Kuttner (2003), Bredin, Gavin and O'Reilly (2003) the monetary policy surprises are generally measured using the event-study approach in which FOMC meeting dates are allowed to create policy surprises. In event study models the observed changes in the short maturity interest rate on event days are considered as an exogenous monetary shock. Similar to Bernanke and Kuttner (2003), Kuttner (2001) and Poole and Rasche (2000) use the change in the FED funds futures rate.

In this paper, the federal funds futures rate is defined as 100 minus the price of a futures contract. As suggested by Kuttner (2001), the anticipated and unanticipated components of a FOMC decision on the FED funds target is derived from the change in the futures contract's price relative to the day prior to the policy action. To be specific, for an event taking place on day t of month n, the unexpected, or "surprise" target rate change is calculated as the change in the "spot-month" (the month in which the target is changed) futures contract rate on the day of the rate change, which is then multiplied by the number of the days in the month affected by the change:

$$\Delta \tilde{r}_t^u = \frac{m}{m-t}(f_{n,t}^0 - f_{n,t-1}^0)$$

where $\Delta\tilde{r}^u$ is the unanticipated target rate change, $f^0_{n,t}$ is the spot-month futures rate on day t of month n, and m is the number of days in the month. In the case where the rate change occurs on the first day of the month, we replace $f^1_{n-1,m}$, the latter of which denotes the one-month futures rate from the last day of the previous month.

After the unexpected target rate change is computed, the expected component of the rate change $\Delta\tilde{r}^e_t$ is derived by subtracting the unanticipated change from the actual $\Delta\tilde{r}_t$:

$$\Delta\tilde{r}^e_t = \Delta\tilde{r}_t - \Delta\tilde{r}^u_t$$

The marginal contribution of this paper is to extend Kuttner's analysis to five selected financial indicators and repeat the analysis for selected sub-periods for a foreign country (Kuttner (2001) examines the effect of FOMC meeting target changes in the US interest rates only).Our basic equation is;

$$\Delta R_t = \alpha + \beta_1\Delta\tilde{r}^e_t + \beta_2\Delta\tilde{r}^u_{ts} + \varepsilon_t$$

where R represents the yields of the financial indicators. In this paper, we have opted to examine the effects of changes in the FED Funds target rate on five selected financial indicators of the Turkish economy. These indicators are:

i. *The overnight interbank rate of the Central Bank of Turkey*. It is calculated as daily weighted averages. This variable has been included because it is often considered as an indicator of monetary policy (see, Bernanke and Blinder, 1992 and Sims, 1992).
ii. *The exchange rate*. Turkish lira value of the USD has been included in the analysis because it has been frequently used as a monetary policy tool in the recent history of the economy.
iii. *The spread*. Defined as; daily interbank rate of return (Annual interbank rate/360) minus daily depreciation rate of the Turkish lira. Berument (2007) suggests the usage of this variable as a better measure of the monetary policy in Turkey.
iv. *Bond rate*. The interest rate on the benchmark bond in the secondary market. This variable has been chosen because part of the foreign portfolio investments is channeled to the Treasury bonds.
v. *The ISE 100*. The closing value of the Istanbul Stock Exchange index 100. This variable has been chosen because at the moment around 60.4%[3] of the capitalization of the ISE is owned by the foreigners. A substantial increase in US interest rates is likely to lead to capital outflows.

The estimation results for the indicators and selected sub-periods are presented in Table 1. In this table those meetings of the FOMC in which a decision to change the target rate have been considered as a shock or an observation. Thus, we have 64 observations. The sub-periods have been delineated by considering the significant events, such as the crises, taking place in the economy.

In its recent history Turkey has gone through three major financial crises. The first one is in April 5, 1994, the next one is in November 22, 2000, and finally in February 19, 2001. These dates have automatically determined the first three sub-periods. The first one extends from the beginning of our full sample to the first crisis on 05.04.1994. The second sub-period covers the period between the two crises. The third one (20.03.2201-20.09.2005) covers the post 2001 crisis period. After three months the economy has shown signs of recovery. Hence, the fourth sub-period (01.06.2001-20.09.2005) is the post 2001 crisis period with improved economic performance and political stability. The fifth sub-period represents the post September 11, 2001 period. The day of 01.04.2003 is the day the Turkish parliament has refused US to open the north front in Iraq and triggered a financial stress in Turkish markets. Finally, the last one represents the period after Turkey has been granted potential candidacy to the European Union.

The results in Table 1 show that neither the expected not the surprise component of the changes in FED Funds target rate had an statistically significant effect on the selected financial indicators during the 05.06.1989-20.09.2005 period. If we had stopped at this point, we would have to conclude that FOMC decisions are irrelevant for the financial markets of Turkey. This would, of course, be

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[3] This is the portion of foreign shares in ISE by December 2005 calculated by Fortis Investment.

misleading as shown by the results for sub-periods. For instance, FOMC decisions of the 01.01.2002-20.09.2005 period have significantly affected at 1% level the interbank rate, the spread, the bond rate and the ISE 100 index. In addition, during the same period the expected and surprise components of the decisions have affected the exchange rate at 5% and 1% levels respectively. This observation raises the following question. Why the changes in the FED Funds target rate did not significantly affect the selected financial variables prior to 2002. The only plausible answer to this question is that prior to this date, foreign capital was neither sufficiently interested nor had invested in the financial markets of Turkey. As we have already shown above, the participation of the foreign capital in Turkish markets tended to increase and become significant only after 2002.

A second noteworthy conclusion to be squeezed from Table 1 is that, whenever FOMC decisions had significant effects on the financial variables, the magnitude of the effect of the surprise component was invariably greater than that of the expected component. This squarely fits with Kuttner's (2001) findings.

A third conclusion concerns the direction of the effects. We observe from Table 1 that whenever the effects have been significant, increases in the FED Funds target rates have led to increases in the interbank rate, the spread and the bond rate, but to decreases in the exchange rate and the ISE 100 index. These, as have been noted by previous researchers, are in conformity with theoretical expectations.

Table 2 repeats the analysis for all FOMC meetings irrespective of whether a decision has been made or not. Hence, we have 154 observations during the full sample period. The empirical results do not much differ from those of Table 1.

4. Conclusion

We have argued that changes in FED Funds target rate cannot be expected to affect the financial markets of all emerging markets. FED's decisions on changing target rates assume significance to these markets only after they have reached a threshold level which involves several institutional arrangements concerning capital inflows, degree of sophistication of the domestic financial markets and economic and political stability. Our empirical findings support this argument. FED actions have tended to affect the financial variables of Turkey only after January 2002, when the economy had become sufficiently open both on the current and capital accounts, and political and economic stability had been reestablished.

Table 1: The Effects of Change in Fed Funds Target Rate on Some Variables (for 68 observations)

	Interbank Rate		Exchange Rate		Spread		Bond Rate		Ise100	
	expected	surprise	expected	surprise	expected	surprise	expected	surprise	expected	surprise
05.06.1989-20.09.2005	-3.109	-6.633	0.002	-0.000	-0.005	-0.005	2.772	0.781	-0.017	-0.054
	(-0.587)	(-1.252)	(0.421)	(-0.008)	(-0.653)	(-0.478)	(0.820)	(0.244)	(-0.941)	(-1.451)
05.06.1989-01.04.1994	58.800	-3.508	-0.006	0.010	0.054	-0.011	78.653***	7.062	-0.058	0.032
	(1.105)	(-0.090)	(-0.762)	(1.111)	(1.145)	(-0.316)	(3.548)	(0.418)	(-0.980)	(0.400)
18.04.1994-03.10.2000	-12.346	-17.815	0.019	-0.004	-0.029***	-0.011	-1.684	-12.666	0.050	-0.117
	(-1.165)	(-0.540)	(0.901)	(-0.065)	(-3.174)	(-0.229)	(-0.551)	(-0.911)	(1.197)	(-1.530)
20.03.2001-20.09.2005	1.328	1.684	-0.014*	-0.025*	0.015**	0.026**	1.806**	3.163***	-0.049	-0.058
	(1.444)	(1.285)	(-1.807)	(-1.943)	(2.048)	(2.273)	(2.312)	(3.030)	(-1.570)	(-1.210)
01.06.2001-20.09.2005	0.333	0.418	-0.017**	-0.029**	0.017*	0.029*	1.126*	2.297**	-0.034	-0.038
	(1.184)	(1.100)	(-2.134)	(-2.216)	(2.175)	(2.470)	(1.919)	(2.381)	(-1.032)	(-0.732)
01.01.2002-20.09.2005	0.057***	0.090***	-0.031**	-0.046***	0.031***	0.046***	0.700***	1.114***	-0.159***	-0.220***
	(106.757)	(110.417)	(-2.340)	(-2.211)	(7.130)	(12.837)	(3.693)	(8.848)	(-15.968)	(-32.740)
+01.04.2003-20.09.2005	-	-	0.039	0.064	-0.039	-0.064	4.053	6.391	-0.230	-0.332
	-	-	(0.187)	(0.196)	(-0.261)	(-0.272)	(1.019)	(0.999)	(-1.072)	(-0.964)
11.04.2000-20.09.2005	3.847**	5.581*	-0.005	-0.011	0.008	0.016	2.854**	3.576***	-0.045	-0.102*
	(2.552)	(1.850)	(-0.709)	(-1.017)	(1.382)	(1.503)	(2.045)	(4.612)	(-1.600)	(-1.823)

***, ** and * indicate the level of significance at the 1%, 5% and 10% significance level respectively.
+The difference between the current day's and next day's interbank interest rates are the same for this period.

Table 2: The Effects of Change in Fed Funds Target Rate on Some Variables (for 154 observations)

	Interbank Rate		Exchange Rate		Spread		Bond Rate		Ise100	
	expected	surprise	expected	surprise	expected	surprise	Expected	surprise	expected	surprise
05.06.1989-20.09.2005	-3.362	-3.375	0.003	-0.001	-0.006	-0.001	2.579	1.404	-0.021	-0.047
	(-0.692)	(-0.783)	(0.624)	(-0.202)	(-0.775)	(-0.102)	(0.795)	(0.503)	(-1.183)	(-1.320)
05.06.1989-01.04.1994	44.012	-15.367	-0.002	0.010	0.037	-0.021	58.668*	-7.837	-0.101*	0.030
	(1.047)	(-1.168)	(-0.361)	(1.502)	(0.986)	(-1.498)	(1.744)	(-0.578)	(-1.959)	(0.442)
18.04.1994-03.10.2000	-20.089**	-5.599	0.016	0.003	-0.033**	-0.008	-4.228	-8.599	-0.003	0.016
	(-2.271)	(-0.265)	(1.650)	(0.127)	(-2.540)	(-0.234)	(-1.110)	(-0.930)	(-0.077)	(0.306)
20.03.2001-20.09.2005	1.059	1.159	-0.008	-0.016	0.009	0.017	3.697**	4.300***	-0.035	-0.065
	(1.332)	(1.184)	(-0.918)	(-1.123)	(1.329)	(1.319)	(2.135)	(3.695)	(-1.123)	(-1.417)
01.06.2001-20.09.2005	0.329	0.435	-0.017	-0.031*	0.017**	0.032**	1.135*	2.499**	-0.033	-0.047
	(1.153)	(1.139)	(-1.649)	(-1.870)	(2.161)	(2.512)	(1.832)	(2.169)	(-1.013)	(-0.841)
01.01.2002-20.09.2005	0.210	0.343	-0.024	-0.039	0.024**	0.039***	0.283	0.745	-0.103**	-0.142*
	(1.004)	(1.013)	(-1.523)	(-1.538)	(2.366)	(2.803)	(0.470)	(0.980)	(-2.030)	(-1.854)
01.04.2003-20.09.2005	0.970	1.529	-0.022	-0.031	0.023	0.033*	-0.711	-1.111	0.023	0.068
	(1.069)	(1.070)	(-1.349)	(-1.243)	(1.590)	(1.668)	(-1.071)	(-1.216)	(0.682)	(1.448)
11.04.2000-20.09.2005	4.140***	5.723*	-0.004	-0.013	0.008	0.017	3.079**	4.038***	-0.047	-0.112*
	(2.577)	(1.839)	(-0.571)	(-1.040)	(1.365)	(1.585)	(2.031)	(5.204)	(-1.558)	(-1.828)

***, ** and * indicate the level of significance at the 1%, 5% and 10% significance level respectively.

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