

---



---

**OCCASIONAL MACRO NOTE**


---



---

May 9, 2008

YKB/OMN/08-04

**Author(s)**

 Cevdet Akçay (*Chief Economist*)  
 Eren Ocakverdi (*Economist*)

**Phone**

 +90 (212) 319 84 30  
 +90 (212) 339 71 25

**E-mail**
[cevdet.akcay@yapikredi.com.tr](mailto:cevdet.akcay@yapikredi.com.tr)  
[eren.ocakverdi@yapikredi.com.tr](mailto:eren.ocakverdi@yapikredi.com.tr)


---



---

**(In)Visible Hand of the Central Bank**

Short after the introduction of floating exchange rate regime following the crisis in 2001, the Central Bank of the Republic of Turkey (CBRT) intervened in the currency markets from time to time in order to ensure the stability of exchange rates. Although any kind of intervention does not fit into the nature of “pure” floating exchange rate regime, it occurs as an “inevitable option” under certain circumstances.

The main intention behind these interventions have almost always been disputed by financial markets and the usual take has been that the CBRT had some level concerns in mind all the time despite their rhetoric which focused on mitigating volatility in the FX market. It has for quite some time been a matter of credibility, and probably still is, for the CBRT as to what it executed aimed at something different than it preached, but very little has come out as verifying or contradicting analytical work.

Another YKB research (*by Cevdet Akçay and Murat Can Aşlak, forthcoming*) is supportive of the CBRT’s stated intentions, but different analytical approaches should be more than welcome to gain an insight into the decision making process of the CBRT. This piece is a very modest attempt at that.

Given the fact that CBRT can buy or sell some predefined (*usually small*) amounts of foreign currency with its auctions, intervention is not perceived as a favorable policy option due to its non-market nature. Moreover, continued interventions explicitly or implicitly aiming at “managing” the exchange rate inevitably fall into the realm of “impossible trinity”.

The CBRT clearly states in its press releases regarding these interventions that it has no intention of affecting the level of exchange rates, and that its sole objective is to smooth out the volatility in either direction. The rationale behind these interventions appears to be intuitive and sensible since internal and/or external developments can cause significant volatility in currency markets. Even if one sides with the CBRT in this regard, when it comes to prediction of the trigger behind and timing of interventions, one faces a not so easy task.

In this study, we attempt to explore the CBRT’s reaction to certain level and volatility measures of the exchange

rate with respect to its intervention policy, and we admittedly stretch the definition of “policy” here. Since the intervention decision is a nominal variable with three categories (Sell=-1, Hold=0, Buy=1), we employ a Multinomial Logit model. In this discrete choice model, the probability of each decision is expressed as follows:

$$P_i = \frac{\exp(\beta_{i1} + \beta_{i2} * deviation + \beta_{i3} * volatility)}{\sum_i \exp(\beta_{i1} + \beta_{i2} * deviation + \beta_{i3} * volatility)}$$

Here, *deviation* is defined as the difference between the log level of exchange rate (YTL/\$) and its 20-day moving average. *Volatility* is defined as the 20-day moving standard deviation of log return of exchange rate (YTL/\$). These are the chosen measures of level and volatility using which, we attempt to investigate the CBRT’s reaction to perturbations in the exchange rate. It is a rudimentary exploratory step, and results should thus not be taken as decisive and/or conclusive.

Since the above model is based on a reference group, the decision of “hold (*no intervention*)” is chosen as the comparison category. In other words, we create two binary dependent variables for each of “buy” and “sell” intervention decisions. These variables take the value of “0” when the decision is to “hold” and “1” otherwise. In order to estimate the unknown parameters, we maximize the log likelihood equation below:

$$(1 - y_{buy} - y_{sell}) * \log(p_{hold}) + y_{buy} * \log(p_{buy}) + y_{sell} * \log(p_{sell})$$

Estimation results are given in the table below:

Parameters	Coefficient	t-value	Probability	Intervention
$\beta_{11}$	-3.51	-4.46	0.0000	Buy
$\beta_{12}$	-43.39	-2.97	0.0030	vs.
$\beta_{13}$	-231.65	-1.69	0.0915	Hold
$\beta_{21}$	-10.58	-3.04	0.0024	Sell
$\beta_{22}$	34.65	1.68	0.0930	vs.
$\beta_{23}$	376.11	2.06	0.0399	Hold
Sample Period	1/1/2002 – 5/5/2008			
Log Likelihood	-105.31			
<i>Convergence achieved after 17 iterations.</i>				

---



---

All coefficients appear to be statistically significant at the 10% level. For instance, coefficient of *deviation* in the “buy” intervention model,  $\beta_{12}$ , means that, when the level of exchange rate falls below its 20-days moving average it increases the likelihood of a “buy” intervention vis-à-vis the “hold” decision.

The very same argumentation holds for the volatility measure, i.e., that the likelihood of a “buy” call increases when volatility measure sails above its 20-day moving average level. Level and volatility turn out to be significant in the “sell option” as well when 20-day moving averages are breached on the upside, but level turns out to be relatively more significant in the buy call and volatility in the sell call. One could infer that low levels are presumably used for reserve accumulation purposes while high volatility triggers FX sales via “volatility drives up the mean” argument.

If a coefficient were insignificantly different from zero, it would not mean that its variable is completely irrelevant, but rather that the variable does not affect the choice between that alternative and the base alternative.

The interpretation of these results is quite intuitive at this point. The crucial point here is that, CBRT do not seem to totally ignore the developments in the level of exchange rate.  $\beta_{12}$  and  $\beta_{22}$  coefficients indicate that, the response of CBRT to the level is stronger when it is below its threshold value (i.e. *appreciation of YTL calls for “buy” intervention*) than it is above the threshold (i.e. *depreciation of YTL calls for “sell” intervention*). The opposite is true for the volatility as CBRT seems more sensitive to volatility when YTL depreciates. The  $\beta_{23}$  coefficient indicates that the rise in volatility increases the likelihood of a “sell” intervention compared to “hold” decision.

We would like to remind that the total number of interventions is very small relative to the sample size. In other words, out of 1511 days, only 15 “buy” and 7 “sell” interventions took place so far. The final intervention (on June 27, 2006) was actually an auction that CBRT sold USD 500 million. Since the amount was huge for the regular auctions of CBRT, the markets then perceived the move as an “intervention”. As a pragmatic approach, we decided to classify it as a “sell” intervention from the point of statistical and practical view.

It is not possible to pin down the status of the accompanying variable in the (level, volatility) space for a given value of one of the variables within this framework when a call is made. That will be the main focus of the *soon forthcoming Akçay and Aşlak piece*.

Strategic Planning and Research Section		
Section	Phone:	E-mail:
Cevdet Akçay <i>Chief Economist of KFS</i>	90.212 - 319 84 30	cevdet.akçay@yapikredi.com.tr
Ahmet Cimenoglu <i>Head of Section</i>	90.212 - 339 71 28	ahmet.cimenoglu@yapikredi.com.tr
Yelda Yuçel <i>Senior Economist</i>	90.212 - 339 71 23	yelda.yucel@yapikredi.com.tr
Muhammet Mercan <i>Senior Economist</i>	90.212 - 339 70 32	muhammet.mercan@yapikredi.com.tr
Cenk Tarhan <i>Senior Economist</i>	90.212 - 339 74 91	cenk.tarhan@yapikredi.com.tr
Eren Ocakverdi <i>Economist</i>	90.212 - 339 71 25	eren.ocakverdi@yapikredi.com.tr
Can Aslak <i>Economist</i>	90.212 - 339 71 22	can.aslak@yapikredi.com.tr

*This document is prepared by the Strategic Planning and Research Section of Yapı ve Kredi Bankası A.Ş. solely for information purposes by using official data and is not in any way intended as a professional advice related to subject thereof. Although utmost care has been taken in their compilation and processing, no responsibility is assumed or no warranties, explicit or implicit, are made for the accuracy or completeness of the information provided in the document, no liability and/or indemnification obligation shall be borne by Yapı ve Kredi Bankası A.Ş. vis-à-vis any recipient of the present document or any third party as to the accuracy, completeness and/or correctness of any information covered in the document or as to the usage of the information for commercial purposes. Yapı ve Kredi Bankası A.Ş. accept no responsibility also for the damages or loss to be incurred as a consequence of an investment made relying on the information in the present document. There may also appear opinions, which are of non-factual nature and subject to change without notice for which Yapı ve Kredi Bankası A.Ş. can in no circumstances be held responsible.*