International Review of Economics and Finance 35 (2015) 166–179

Contents lists available at ScienceDirect

International Review of Economics and Finance

journal homepage: www.elsevier.com/locate/iref

Reserve option mechanism as a stabilizing policy tool: Evidence from exchange rate expectations

Ahmet Değerli [a], Salih Fendoğlu [a,b,*]

[a] Central Bank of the Republic of Turkey, Turkey
[b] Center for Economics and Econometrics, Boğaziçi University, Turkey

ARTICLE INFO

Article history:
Received 7 May 2014
Received in revised form 23 September 2014
Accepted 23 September 2014
Available online 2 October 2014

JEL classification:
E52
E58
F31
G13

Keywords:
Unconventional monetary policy
Reserve option mechanism
Options-based exchange rate expectations
Risk neutral density

ABSTRACT

During the recent era, many emerging market economies have implemented unconventional policy measures to mitigate the effect of large swings in short-term capital flows on domestic business cycles. This paper focuses on a novel capital flow management tool, the reserve option mechanism (ROM) introduced by the Central Bank of Turkey, that allows banks to hold a certain fraction of their domestic-currency required reserves in foreign currency. The results suggest that, after the introduction the ROM (i) market expectations leaned towards a significantly lower volatility or skewness in the U.S. dollar/Turkish lira (USD/TL) relative to other emerging market exchange rates; (ii) controlling for a set of domestic and common external factors, the USD/TL expectations have exhibited lower levels of volatility, skewness and kurtosis; (iii) the higher the intensity of ROM (the fraction of ROM-based reserves in total international reserves) the stronger the effect of ROM on exchange rate expectations. Last, we provide evidence that the mechanism acts as an automatic stabilizer of expectations about excessive movements in the exchange rate: the mechanism decreases the sensitivity of expected USD/TL kurtosis to the common external factor (by an estimated decrease of about 85%). In sum, the results provide evidence that the mechanism contains market expectations about excessive fluctuations in the exchange rate, decreasing expected likelihood of an abrupt reversal of capital flows.

1. Introduction

In response to large swings in global capital flows, many emerging market economies have implemented unconventional policy tools to help maintain domestic financial stability, e.g. active use of reserve requirements and macroprudential policies. Turkey stands out as an interesting example in this regard. The Central Bank of the Republic of Turkey (CBRT) has started implementing a novel policy tool, the reserve option mechanism (ROM), to smooth excessive fluctuations in the exchange rate in a market-friendly manner, and to help cushion the economy from short-term volatile capital flows.[1] In this paper, we address how the ROM fares in containing large fluctuations in USD/TL exchange rate expectations. In particular, we empirically study the effect of ROM on the volatility, skewness, and the kurtosis of the USD/TL exchange rate expectations, taking into account domestic variables and a set of external factors common to similar emerging market currencies.

Emerging market economies have a long and only partially successful history of mitigating adverse effects of excessive volatility in short-term capital flows. These flows oftentimes drive large fluctuations in domestic business cycles, creating a boom period associated with domestic credit expansion, higher domestic inflation, and fast economic growth. To the extent that the economy

* Corresponding author. Research and Monetary Policy Department, Central Bank of the Republic of Turkey. Istiklal Cad. No: 10, Ulus, Ankara, Turkey.
E-mail addresses: ahmet.degerli@tcmb.gov.tr (A. Değerli), salih.fendoglu@tcmb.gov.tr (S. Fendoğlu)ahmet.degerli@tcmb.gov.tr (A. Değerli), salih.fendoglu@tcmb.gov.tr (S. Fendoğlu).

[1] For details on these policy tools as well the on the new policy framework, see Aysan, Fendoğlu, and Kılınç (forthcoming, 2014), Fendoglu, Kılınç, and Yörükoğlu (2014), Oduncu, Akçelik and Ermişoğlu (2013), Alper, Kara and Yörükoğlu (2013), Kara (2012), Küçüksaraç and Özel (2012), and Başçı and Kara (2011).

http://dx.doi.org/10.1016/j.iref.2014.09.011
1059-0560/

builds up external mismatches, the prolonged bonanza period may eventually trigger a sudden reversal of current account (sudden stop).[2] The reserve option mechanism is introduced by the CBRT to provide a remedy in this regard. ROM has been introduced by the CBRT in late 2011. The mechanism allows banks to voluntarily hold a certain fraction of their domestic-currency required reserves in foreign currency (USD). For example, if the ROM allows banks to hold up to 50% of their domestic-currency (TL) required reserves in USD, and a bank find it optimal to fully utilize the facility, then the bank could instead hold 50 TL and 50 USD rather than 100 TL.[3] The optimal level of use of the ROM is market-determined: banks choose the optimal use depending on cost of USD funding relative to TL funding.[4]

ROM in principle acts as an automatic stabilizer on the exchange rate in response to large swings in capital flows. Consider for instance the two following cases: During a surge in capital flows, relative cost of USD funding is lower than the TL funding which encourages banks to utilize the facility more. Accordingly, some portion of USD inflow would automatically be retained at the central bank, easing the appreciation pressure. During a capital outflow, on the other hand, banks in general find it harder to borrow in USD, and accordingly would choose to use the ROM facility less. Accordingly, some portion of ROM-based international reserves will be released, reducing the depreciation pressure. In this regard, the ROM can be by-and-large thought as a mechanism that makes banks internalize the social benefit of foreign-currency accumulation during inflow periods.

The main questions that we address in this paper are (i) whether the use of ROM makes the volatility, skewness, or kurtosis of USD/TL expectations lower *relative* to other emerging market currencies; and (ii) whether the USD/TL exchange rate expectations become less sensitive to fluctuations in common external factors due to the ROM.

Methodologically, we first extract the risk-neutral probability distribution function (RN-PDF) of USD/TL exchange rate expectations by using option prices. There is a wide range of techniques to estimate RN-PDF, including parametric, non-parametric, and structural models (see, among others, Bahra, 1997; Bliss & Panigirtzoglou, 2002; Campa, Chang, & Reider, 1998; Malz, 1996; Malz, 1997). We use Malz (1997) as it enables us to extract the RN-PDF from a relatively low number of cross-sectional option prices. Based on the estimated RN-PDF, we then calculate the standard deviation, skewness and kurtosis of USD/TL expectations. Similarly, we obtain the moments for a large set of emerging market exchange rate expectations, and estimate a common factor for each moment using standard dynamic factor modeling (Stock & Watson, 1989).[5] Finally, we control for common external factors and other policy actions by the CBRT, and use seemingly unrelated regression (SUR) models to address the questions above.

The results are twofold: First, market expects a significantly lower volatility and assigns a significantly lower relative likelihood of depreciation in USD/TL exchange rate compared to other emerging market currencies after the introduction of ROM. Expectations about excessive movements in USD/TL is lower relative to other emerging market currencies during the ROM period, yet the effect is found insignificant. Second, conditional on common external factors, the market expects a lower volatility, a lower relative likelihood of depreciation, and a lower likelihood of excessive movements in the USD/TL exchange rate during the ROM era (all statistically significant). Furthermore, ROM appears to function as an automatic stabilizer of excessive movements in the exchange rate: the implied kurtosis of USD/TL expectations is significantly less sensitive to fluctuations in the common external factor during the ROM era (by about estimated 85% decrease in the sensitivity).

The contribution of this paper is that we study the effect of an unconventional policy tool as compared to conventional measures such as direct foreign exchange market intervention, on the higher moments of the exchange rate expectations, using a large data set on emerging market exchange rates. Related literature are mostly confined to single-country analyses, and in general examines the effect of an important policy event or a possible change in policy regime or economic announcements on the underlying assets (Aydın, Değerli, & Özlü, 2010; Castren, 2004; Castren, 2005; Gereben, 2002), or credibility of a target zone or a policy regime (Campa & Chang, 1996; Campa, Chang, & Refalo, 2002). This paper, on the other hand, focuses on a novel unconventional policy tool and evaluates its effectiveness from a comparative perspective. Furthermore, we contribute to the literature on the ROM (Alper et al., 2013; Başçı & Kara, 2011; Değerli & Fendoğlu, 2013; Kara, 2012; and Küçüksaraç and Özel, 2012) by empirically assessing the stabilizing role of the ROM in containing asymmetric/excessive fluctuations in the exchange rate. Closely related to our paper, Oduncu et al. (2013) empirically studies the effect of ROM on the realized exchange rate volatility. Our paper differs from Oduncu et al. (2013) mainly on the following dimensions. First, we study the effect of ROM on the volatility as well as on the higher moments (skewness and kurtosis) of USD/TL exchange rate expectations, and not only in absolute terms but also *relative* to other emerging market exchange rates. Second, we empirically test the stabilizing role of the mechanism, whether the mechanism makes the implied moments of the exchange rate more resilient to common external factors. Also, we study option prices to extract the moments, hence the analysis is forward looking in nature.

The paper proceeds as follows: Section 2 presents the reserve option mechanism more in detail and Section 3 the data and the methodology. Section 4 presents the empirical results, and Section 5 concludes.

[2] For such a feedback cycle that entails an amplification of domestic business cycles which may eventually trigger a sudden reversal of capital flows, see Mendoza (2010), and Bruno and Shin (2013). See also Garcia and Gonzalez (2013) who show the relevance of risk premium developments for small open economy business cycles, as well as policy trade-offs that central banks — which are modeled to be endowed with a single tool, the policy interest rate — may experience due to risk premium shocks.

[3] In this example, 1 unit of USD is assumed to cover 1 unit of TL required reserves. This, however, is not necessarily the case. The policy maker can choose the conversion rate, the reserve option coefficient. For details, see Section 2. For further details, see Alper, Kara, and Yörükoğlu (2013), and Aysan et al. (forthcoming, 2014).

[4] For a detailed derivation of threshold level that makes banks indifferent between utilizing and not utilizing the ROM, see Küçüksaraç and Özel (2012).

[5] The advantage of this method is that it handles missing observations (through Kalman filtering) and is immune to measurement errors. Moreover, and importantly for the focus of this paper, it does not rely on restrictive assumptions about the choice of variables that potentially reflect common factors.