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Using GARCH to Measure the Effect of the Central Banks Intervention in the Foreign Exchange Market

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Abstract. This paper examines the effect of the official intervention by the Reserve Bank of Australia and the Central Bank of Turkey on the Australian and on the Turkish exchange rates; respectively. The data series used in this paper covers the daily Australian intervention over the period January 2, 1998 to December 22, 2006 and the daily Turkish intervention over the period March 1, 2002 to April 30, 2007.

This paper uses a GARCH (1, 1) model to estimate the effect of intervention on the mean and volatility of the Australian dollar and Turkish lira. The empirical results found that official intervention is associated with a significant increase in exchange rate uncertainty. This finding supports the view of those who argue that exchange rate intervention serves to disrupt exchange rate markets.
Key Words: GARCH, central banks, official intervention, foreign exchange, Australia, Turkey.

1. Introduction

Central banks intervene frequently in foreign exchange markets even if they do not have adopted explicitly some form of an exchange rate target regime. Most central banks use foreign exchange market intervention as a policy tool for macroeconomic stabilization. However, there has been a lot of debate in the literature on the question of whether intervention may affect the local exchange rate of the currency. It is of policy interest because, if sterilized intervention has an effect on the exchange rates, this offers the monetary authorities an additional policy tool that is independent from general monetary policy.

For large disruption of the foreign exchange market, a central bank might back off from its normal intervention strategy. This may be because there is a very large probability that intervention will be ineffective at best. Schwartz (1996) called this kind of intervention "an exercise in futility" that at best can have short-term effect on exchange values and at worse it brings uncertainty and volatility in foreign exchange markets. If central banks intervene, it must be true that they believe these actions are effective. However, intervention in the foreign exchange market is still a controversial issue. For example, Baillie and Osterberg (1997) conclude "there is little support for the hypothesis that intervention can consistently influence the exchange rate".

How can we determine the best time for the central bank to intervene? Friedman (1953) suggests a simple way to determine the desirability of an official intervention: test if intervention is profitable; that is monetary authorities will sell (buy) currencies when they are above (below) their equilibrium values. Kim and Sheen (2002) judged the central bank to be effective in the sense of stabilizing the foreign exchange market if its intervention can be seen to return the exchange rate towards an underlying trend, or to reduce the conditional volatility of that rate and the associated trading turmoil. Sarno and Taylor (2001) concluded that interventions tend to impact the exchange rates, especially if the intervention is publicly announced and concerted and provided it is consistent with the underlying stance of monetary and fiscal policy.

In our study, the main objective is to examine the effectiveness of the official intervention in foreign exchange market for two different economies; Australia and Turkey. This paper chooses two different types of countries; a well developed country (Australia) and a developing country that makes all its efforts and economic reforms in order to fulfil the European Union criteria in order to join that union. Basically, the paper tries to answer the following two questions: has intervention influenced movements of Australian and Turkish exchange rates, and, has it dampened and smoothened the volatility of the Australian and Turkish exchange rates? To answer these questions, this paper uses the Generalized Auto-Regressive Conditional Heteroskedasticity (GARCH) method to measure the impact of intervention on exchange rate uncertainty. GARCH is an efficient way to model volatility in high frequency econometric time series.

This paper proceeds as follows: Section 2 presents statistics on the history of intervention in the foreign exchange in both Australia and turkey. In section 3 we discuss and review some recent methodologies and results in the literature regarding the effectiveness of central bank intervention. Section 4 presents the data and their sources. Section 5 illustrates the methodology used in this paper. Section 6 summaries the main findings of the empirical model. Finally, section 7 concludes the paper.

2. Intervention Statistics

Australia

This section gives thorough details on the history of interventions in Australia and Turkey. Tables (1-a) and (1-b) present basic statistics on the Reserve Bank of Australia's purchases and sells activities, respectively. These two tables cover the period (1998-2006). They give, for each year, the maximum value of intervention, the average daily of intervention (the mean), total value of interventions in each year, number of days in which there were intervention, number of days with no intervention, the total number of working days in each year, and the percentage of days intervened to working days. However, A positive value of intervention represents purchases of the US dollar by either the Australian or the Turkish central bank, while a negative value for the intervention represents sales of the US dollar by either the Australian or the Turkish central bank.

Regarding purchasing activities, Table (1-a) shows that the number of average daily intervention in Australia varies between 15 million in 2000, 2005, and 2006, and 91 million in 1998. The maximum intervention value in a single day was 440 million and that was in January 15, 2004. The number of intervention days to purchase foreign exchange ranged from 4 days in 1999 to 134 days in 2002. As a result, the percentage of days intervened to the year total working days ranged from 2% in 1999 to 53% in 2002. The year 2002 was the only year in which more than 50% of the working days went to purchasing activities.

On the other hand, Table (1-b) reports the Reserve Bank of Australia's selling activities statistics for the period 1998-2006. Opposite to what reported in Table (1-a), the Reserve Bank of Australia was involved in selling activities in 50% and more of the working days in all the sample period except the year 2003 (41%). These activities could be interpreted as the Australian government desires to depreciate the Australian dollar. The highest total value of selling foreign exchange took place in 2003 ($8280 million), where the lowest total value of selling foreign exchange happened in 2004 ($2160 million).

Table (1- a). Australia: purchasing activities statistics (1998-2006).

	Jan. 2 - Dec. 31 1998	Jan. 4 - Dec. 31 1999	Jan. 4 - Dec. 29 2000	Jan. 2 - Dec. 31 2001	Jan. 2 - Dec. 31 2002	Jan. 2 - Dec. 31 2003	Jan. 2 - Dec. 31 2004	Jan. 4 - Dec. 30 2005	Jan. 3 - Dec. 22 2006
Max (million)	96	152	39	60	99	150	440	98	59
Average daily of intervention (million)	91	42	15	17	27	30	43	15	15
Total value of interventions (million)	640	167	618	1,240	3,587	2,079	2,600	960	690
% of days intervened to working days	3%	2%	16%	29%	53%	28%	24%	26%	18%
Days of intervention (purchasing only)	8	4	40	73	134	70	60	66	45
Days with no kind of intervention	12	14	16	15	15	52	66	20	21
# of working days in each year	251	251	250	251	251	251	252	250	247

Source: Author's calculations

Table (1- b). Australia: selling activities statistics (1998-2006).

	Jan. 2 - Dec. 31 1998	Jan. 4 - Dec. 31 1999	Jan. 4 - Dec. 29 2000	Jan. 2 - Dec. 31 2001	Jan. 2 - Dec. 31 2002	Jan. 2 - Dec. 31 2003	Jan. 2 - Dec. 31 2004	Jan. 4 - Dec. 30 2005	Jan. 3 - Dec. 22 2006
Max (million)	-336	-336	-172	-151	-191	-272	-206	-152	-408
Average daily of intervention (million)	-25	-23	-20	-20	-29	-64	-17	-18	-19
Total value of interventions (million)	-5,816	-5,279	-3,930	-3,282	-2,940	-8,280	-2,160	-2,881	-3,397
% of days intervened to working days	92%	93%	78%	65%	41%	51%	50%	66%	73%
Days of intervention (selling only)	231	233	194	163	102	129	126	164	181
Days with no kind of intervention	12	14	16	15	15	52	66	20	21
# of working days in each year	251	251	250	251	251	251	252	250	247

Source: Author's calculations

Turkey

Regarding Turkey, we almost have a different story. Table (2-a), which gives basic statistics for the Central Bank of Turkey purchasing activities for the period (2002-2007), shows that the Central Bank of Turkey involved in only one time purchasing activity in 2002, 2004 and 2006, in six times purchasing activities in 2003 and 2005, and in nothing in 2007. Similarly, Table (2-b), which gives basic statistics for the Central Bank of Turkey selling activities for the period (2002-2007), shows that the Central Bank of Turkey did not involve, in any single year, in more than 3 time activities of selling foreign exchange.

However, from Table (2-a), we can notice that Turkey experiences a heavily single purchasing activities. The maximum purchasing activity in the period (2002-2007) was $5,441 million in 2005, while the maximum selling activity in the period (2002-2007) was $848 million in 2006. If we compare these numbers to the Australian case, we find that the maximum Australian purchasing and selling single activities were $440 and $408 million in 2004 and 2006, respectively. These numbers reveal a stronger intent by the Turkish government to affect the exchange rate more than the Australian government.

Table (2- a). Turkey: Purchasing Activities Statistics (2002-2007).

	March 1 - Dec. 31 2002	Jan. 2 - Dec. 31 2003	Jan. 2 - Dec. 31 2004	Jan. 4 - Dec. 30 2005	Jan. 3 - Dec. 29 2006	Jan. 2 - April 30 2007
Max (million)	16	1,442	1,283	3,271	5,441	-
Average daily of intervention (million)	16	705	1,283	2,428	5,441	-
Total value of interventions (million)	16	4,229	1,283	14,565	5,441	-
% of days intervened to working days	0%	2%	0%	2%	0%	0%
Days of intervention (purchasing only)	1	6	1	6	1	0
Days with no kind of intervention	206	245	250	244	245	84
# of working days in each year	209	251	252	250	249	84

Source: Author's calculations

Table (2- b). Turkey: Selling Activities Statistics (2002-2007).

Turkey Selling activities 2002-2007	March 1 - Dec. 31 2002	Jan. 2 - Dec. 31 2003	Jan. 2 - Dec. 31 2004	Jan. 4 - Dec. 30 2005	Jan. 3 - Dec. 29 2006	Jan. 2 - April 30 2007
Max (million)	-9	-	-9	-	-848	-
Average daily of intervention (million)	-6	-	-9	-	-702	-
Total value of interventions (million)	-12	-	-9	-	-2,105	-
% of days intervened to working days	1%	0%	0%	0%	1%	0%
Days of intervention (selling only)	2	0	1	0	3	0
Days with no kind of intervention	206	245	250	244	245	84
# of working days in each year	209	251	252	250	249	84

Source: Author's calculations

Finally, Table 3 gives a brief statistics on selling and purchasing activities by the Reserve Bank of Australia and the Central Bank of Turkey for the above two mentioned periods. From this table, it is noted that Australia was involved in 23% and 69% of the working days of the sample (1998-2006) in purchasing and selling activities, respectively. This means that only in 8% of the sample there was no any kind of intervention (either purchasing or selling). Regarding Turkey, total intervention (purchasing and selling) in the whole sample (2002-2007) did not exceed 2%. This means 98% of the sample has no any kind of intervention.

Table (3). Summary: Australia and Turkey Interventions.

	Australia (Jan. 1, 1998 – Dec. 22, 2006)		Turkey (March 1, 2002 – April 30, 2007)	
	Purchases	Sales	Purchases	Sales
Max (million)	440	-408	5441	-848
Average daily of intervention (million)	25	-25	1702	-354
Total value of interventions (million)	13,381	-38,511	25,534	-2,126
% of days intervened to working days	23%	69%	1%	0.50%
Days of intervention	529	1562	15	6
# of working days of the sample	2,254	2,254	1,295	1,295

Source: Author's calculations

3. Literature Review

In this section, we review some of the empirically oriented papers; our focus will be mainly on the work dealing with the intervention effects on volatility in the foreign exchange markets. Karunaratne (1996) reviewed the rationale and mechanics of exchange rate intervention by the Reserve Bank of Australia (RBA) during the post-float period 02/83-5/93. A main aim of this study was to shed light on the controversy regarding the effectiveness of RBA intervention from a long-run perspective. An optimal control model is conceptualized to test the proposition of ineffectiveness of RBA intervention (the Sisyphus hypothesis). Multicointegration techniques are used to test whether the stochastic process proxying RBA intervention exhibits long-run equilibrium relations or optimal proportional control. The results favor cointegration or optimal control and are on unfavorable to the Sisyphus hypothesis.

Brandner *et al.* (2001) analyzed the effectiveness of intervention in the European Monetary System by using daily data of intervention activity of six European Central banks, covering period from Aug 1993 to April 1998. In order to test the influence of intervention, they use EGARCH and Markov Switching ARCH. Over all, the results show that even in the same institutional framework, intervention does not seem to affect the means and variances in a consistent and predictable manner.

Doroodian and Caporale (2001) provided additional empirical evidence on the topic of the effectiveness and the impact of Federal Reserve intervention on US exchange rates, using daily measure of exchange rate intervention in the yen/dollar and mark/dollar exchange market for the period 1985 to 1997. They find statistically significant impact of intervention on spot rates. By using GARCH model, this paper finds that intervention is associated with a significant increase in the interday conditional variance at both exchange rates.

Kim and Sheen (2002) analyzed intervention by the Reserve Bank of Australia on foreign exchange markets from 1983 to 1997. This intervention is assumed to be determined by exchange rate trend correction, exchange rate volatility smoothing, the US and Australian overnight interest rate differentials, profitability, and foreign currency reserve inventory considerations. Using Probit and friction models, they show that these factors were of significant influences on intervention behavior.

Simatete (2004) investigates the effect of central bank intervention on the Zambian kwacha. She used a GARCH (1, 1) model in order to estimate the effect of intervention on the mean and variance. She found that central bank intervention in the foreign exchange market increases the mean but reduces the volatility of the Zambian kwacha. This finding supports the 'speculative bandwagon' and a 'leaning against the wind' strategy. Although there is no attempt to distinguish through which channel intervention works, she argues that this is more likely to be a signalling affect rather that a portfolio balance.

Égert and Lang (2005) studied the impact of daily official foreign exchange interventions on the exchange rates of two EU candidate countries, namely Croatia and Turkey for the periods from 1996 to 2004 and from 2001 to 2004, respectively. Using a variety of GARCH models, the results reveal that both the Croatian and the Turkish central banks were in a position to influence, to some extent, the level of the exchange rate during the period studied. These results support the view that foreign exchange intervention may be effective to a limited extent in emerging market economies.

Beine *et. al.* (2006) analyzed the relationship between interventions and volatility at daily and intra-daily frequencies for the Japanese yen and the Deutsche mark (Euro after 1998) against the US dollar. The data analysis includes 17 years of intradaily data covering the period 1987-2004. They employed the bipower variation to decompose the exchange rate volatility into a continuously varying and jump component. Analysis of the timing and direction of jumps and interventions imply that coordinated interventions tend to cause few, but large jumps.

Simwaka and Mkandawire (2006) analyzed the effectiveness of foreign exchange market interventions carried out by the Reserve Bank of Malawi. The paper uses monthly data of net sales of foreign exchange and exchange rate data over a four year period. The results prove the presence of ARCH effect. In addition, they found that net sales of dollars depreciate, rather than appreciate the Malawian national currency (kwacha). Moreover, the paper also finds that the Reserve Bank of Malawi intervention reduces the volatility of the kwacha. This implies that the Reserve Bank of Malawi actually achieves its objective of moderating fluctuations of the kwacha.

4. Data

This paper uses a daily data series of the exchange rates for the Australian dollar and the Turkish lira. The other variable that we need is the daily intervention data. Available data series for intervention by the Reserve Bank of Australia covers the periods January 1, 1998 through December 22, 2006. This sample includes 2254 working days. However, data available for intervention by the Central Bank of Turkey covers a shorter period; March 1, 2002 to April 30, 2007. The sample includes 1295 working days. Intervention data are available on the web site of Federal Reserve Bank of St. Louis (http://stlouisfed.org). The exchange rates for the above two periods are available through the web site of Bank of Canada (www.bankofcanada.ca).

5. Methodology

This paper employs the Generalized Autoregressive Conditional Heteroskedastic (GARCH) methodology. GARCH is an efficient method to model volatility in high frequency econometric time series. This model can simultaneously model conditional mean and conditional variance (Edison and Liang, 1999). In practice, the first-order (p=q=1) GARCH model, suggested by Taylor (1986), has since become the most popular ARCH model. Compared to the Engle (1982); basic ARCH model, the GARCH model is a useful method that allows a parsimonious specification. In this study, the following exchange rate model is employed:

$$\Delta S_t = \alpha + \beta\, int_t + \varepsilon_t \quad (1)$$

$$\varepsilon_t \mid \mathrm{I}_{t-1} \sim N(0,h_t) \quad (2)$$

$$h_t = \gamma_0 + \gamma_1 S_t + \sigma\, \varepsilon^2_{t-1} + \delta\, h_{t-1} \quad (3)$$

where S_t is the log of the exchange rate at time t; Δ is the first difference; I_{t-1} is information set through time t-1; int_t is the intervention variable at time t and to be represented by purchasing activities (*BUY*) and selling activities (*SELL*); h_t is the conditional variance of ε_t; and I_{t-1} and int_t are statistically independent.

Equation 1 measures the direct effect of intervention in the foreign exchange market (purchases and sales of foreign exchange (US dollars)) on the exchange rates. Equation 2, states that the regression residuals will be modelled as a GARCH process. Equation 3 describes the conditional variance. Parameters σ and δ in equation 3 are for the ARCH and GARCH terms, respectively. The ARCH term (ε^2_{t-1}) measures volatility from previous period and is measured as the lag of the squared residual from the mean equation. The GARCH term (h_{t-1}) measures the last period's forecast variance.

6. Empirical Results

Unit root test

Variables that enter in our model should be tested first if they are stationary or not (have a unit root). This will be accomplished through applying the Augmented Dickey-Fuller (ADF) test. To perform the ADF test, the following regression should be run for a variable, like Y_t:

$$\Delta Y_t = a_0 + \gamma Y_{t-1} + \sum_{i=2}^{p} \beta_i (\Delta Y_{t-i+1}) + t + \varepsilon_t \quad (4)$$

where Y_t is the variable of interest, Δ is a difference operator, a_0 is an intercept, t is time trend, and ε_t is the error term. The null hypothesis of a unit root (non-stationary series) will be tested against the alternative of stationary series. If the coefficient γ equals zero in equation (4), then the equation is entirely in the first difference (has a unit root). Since the test results might be sensitive to the lag length (p), the optimal lag will be determined using Schwarz Information Criterion (SIC).

The results for the ADF test; as appear in Tables (4-a) and Table (4-b), show that the exchange rates of the Australian dollar and the Turkish lira have unit roots; that is both variables are non stationary on the logarithmic level. This result was confirmed whether we include an intercept or an intercept and a time trend in the ADF regression. When the first difference is taken, both variables appear to be stationary, and the null hypothesis for unit root is rejected at the 1% level.

Table (4-a). Unit Root Test Results (with intercept).

Variables	ADF (in natural logarithms)		ADF (first difference-Rates of growth)		
Log (S_AUS)	-0.7713	[0]	-47.4747	[0]	*
Log (S_TUR)	-1.8883	[1]	-39.5605	[0]	*

Table (4-b). Unit Root Test Results (with intercept and time trend).

Variables	ADF (in natural logarithms)		ADF (first difference- Rates of growth)		
Log (S_AUS)	-1.7571	[0]	-47.4873	[0]	*
Log (S_TUR)	-2.3224	[1]	-39.5547	[0]	*

1. The * indicates rejection the null hypothesis of unit root at 1% significant level.
2. The lag length of the ADF regression is specified in brackets [ ].
3. The lag length of the ADF regression is based on the Schwarz Information Criterion (SIC) for appropriate lag length.

GARCH Results

Tables (5-a, 5-b, 6-a, and 6-b) show the results of the equations of the conditional mean and variance for Australian purchasing and selling foreign exchange, and Turkish purchasing and selling foreign exchange, respectively. The results show that purchasing US dollars by the Reserve Bank of Australia appreciates the Australian dollar; and when selling US dollars, the Australian dollar depreciates. These results contradict the traditional economic theory about the results of the foreign exchange intervention. In other words, we expect purchasing and selling US dollars by the Reserve Bank of Australia to be correspondent to depreciation and appreciation in the Australian dollar, respectively. However, by reviewing literature, we find that this result is not unique. For example, Edison and Liang (1999) found that when the central bank sells foreign exchange with the intention of appreciating the local currency, the local currency depreciates instead. One way to interpret these results is that the Reserve Bank of Australia's sales are simply meant to reduce the rate of depreciation of the Australian dollar.

Simwaka and Mkandawire (2006) interpret this result as 'leaning against the wind'. In other words, the central bank's foreign exchange sales are simply meant to reduce the rate of depreciation of the local currency. Humpage (1988) interpreted the activity of official sales of foreign exchange (selling foreign currencies) that caused the local currency to depreciate as evidence of a perverse response or that official sales prevented a steeper depreciation from occurring.

Table (5-a). GARCH Estimation of the Australian Exchange Rate (purchasing case).

Conditional mean equation				
Independent variable	Coefficient	Std. Error	z-statistic	Probability
Constant	0.0009	0.0002	5.3798	0.0000
BUY_AUS	-0.0038	0.0003	-11.3862	0.0000
Conditional variance equation				
Independent variable	Coefficient	Std. Error	z-statistic	Probability
Constant	9.55E-07	2.25E-07	4.2355	0.0000
ARCH (-1)	0.0456	0.0067	6.7650	0.0000
GARCH (-1)	0.9339	0.0100	93.7986	0.0000

Table (5-b). GARCH Estimation of the Australian Exchange Rate (selling case).

Conditional mean equation				
Independent variable	Coefficient	Std. Error	z-statistic	Probability
Constant	-0.0024	0.0002	-9.8747	0.0000
SELL_AUS	0.0034	0.0003	11.6232	0.0000
Conditional variance equation				
Independent variable	Coefficient	Std. Error	z-statistic	Probability
Constant	9.57E-07	2.13E-07	4.4867	0.0000
ARCH (-1)	0.0465	0.0063	7.3366	0.0000
GARCH (-1)	0.9329	0.0092	101.3453	0.0000

Table (6-a). GARCH Estimation of the Turkish Exchange Rate (purchasing case).

Conditional mean equation				
Independent variable	Coefficient	Std. Error	z-statistic	Probability
Constant	-0.0005	0.0002	-2.5721	0.0101
BUY_TUR	0.0091	0.0012	7.6578	0.0000
Conditional variance equation				
Independent variable	Coefficient	Std. Error	z-statistic	Probability
Constant	1.74E-06	3.37E-07	5.1569	0.0000
ARCH (-1)	0.1374	0.0123	11.1745	0.0000
GARCH (-1)	0.8513	0.0104	82.2029	0.0000

Table (6-b). GARCH Estimation of the Turkish Exchange Rate (selling case)

Conditional mean equation				
Independent variable	Coefficient	Std. Error	z-statistic	Probability
Constant	-0.0003	0.0002	-1.5776	0.1147
SELL_TUR	0.0038	0.0050	0.7662	0.4435
Conditional variance equation				
Independent variable	Coefficient	Std. Error	z-statistic	Probability
Constant	2.21E-06	3.81E-07	5.802232	0.0000
ARCH (-1)	0.1337	0.0124	10.7593	0.0000
GARCH (-1)	0.8468	0.0111	76.0837	0.0000

Regarding Turkey, the issue with its ability to affect the exchange rate is different. The empirical results show that Central Bank of Turkey, with its purchasing activities, was able to depreciate the Turkish lira. This result was consistent with what was found by Égert and Lang (2005) on the Turkish economy. The results regarding selling activities were similar to what has been found in the Australian case. However, the depreciation in the Turkish lira because of selling activities was statistically insignificant.

Now, it is the interest of this paper to know whether intervention brings uncertainty and volatility in foreign exchange markets. The ARCH term (ε^2_{t-1}) measures volatility from previous period measured as a lag of the squared residual from the mean equation. The GARCH term (h_{t-1}) measures the last period's forecast variance. The GARCH model successfully captures several characteristics of financial time series such as volatility.

The estimated results for the GARCH model for both Australia and Turkey reveal that the null hypotheses of no present of ARCH effect and of no present of GARCH effect were rejected at 1% significant level. These results reveal that official intervention leads to an increase in exchange rate volatility and uncertainty. The reason is that intervention gives the market participants more concern about the stability of the market. Intervention adds a degree of uncertainty concerning the persistence of the intervention policies (Doroodian and Caporale, 2001). These findings support the theoretical arguments concerning the risk of exchange rate intervention found in Schwartz (1996).

7. Conclusion

The paper analyzed the effectiveness of foreign exchange market interventions carried out by the Reserve Bank of Australia and the Central Bank of Turkey on the exchange markets of the Australian dollar and Turkish lira; respectively. The results show that purchasing and selling US dollars by the Reserve Bank of Australia are correspondent to appreciation and depreciation in the Australian dollar; respectively. This could be interpreted as the Reserve Bank of Australia's interventions is simply meant to reduce the levels of fluctuations of the Australian dollar. On the other hand, the results show that the central bank of Turkey was able, through its conducting its selling activities, to depreciate the Turkish lira. In addition, this study finds that intervention is associated with a significant increase in the uncertainty (conditional variance) of the both exchange rates.

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استخدام نموذج (GARGH) لقياس أثر تدخل المصارف المركزية في سوق النقد الأجنبي

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ملخص البحث. تبحث هذه الورقة في أثر التدخل الرسمي من قبل المصرف الاحتياطي الأسترالي ومصرف تركيا المركزي على سعري صرف العملة الاسترالية والتركية ، على التوالي. سلسلة البيانات المستخدمة في هذه الورقة تغطي تدخل المصرف الاسترالي بشكل يومي للفترة ٢ كانون الثاني ١٩٩٨م إلى ٢٢ كانون الأول ٢٠٠٦م. كما تغطي سلسلة البيانات أيضاً تدخل المصرف التركي للفترة ١ آذار ٢٠٠٢م إلى ٣٠ نيسان ٢٠٠٧م.

تستخدم هذه الورقة نموذج [GARCH (1, 1)] لتقدير اثر التدخل على معدل وتقلب الدولار الاسترالي والليرة التركية. النتائج التطبيقية وجدت أن التدخل الرسمي يرتبط بزيادة واضحة لحالة عدم التأكد في سعر الصرف. ويدعم هذا الاستنتاج رأى القائلين بأن التدخل في سعر الصرف يؤدي إلى اضطراب في أسواق الصرف الأجنبية.

الكلمات المفتاحية: نموذج (GARCH) ، المصارف المركزية ، أسواق الصرف الأجنبية ، أستراليا ، تركيا.