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# Responding to the global financial crisis: Vietnamese exchange rate policy, 2008–2009<sup>☆</sup>

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## ABSTRACT

The paper presents an analysis of exchange rate policy in Vietnam during 2008–2009. In early 2008, the country faced a sudden reversal of capital flows as signs of developing domestic vulnerabilities became evident. The downward pressure on the dong then intensified with the onset of the global financial crisis in the fall. In these environments, the Vietnamese authorities responded with various exchange rate policy measures. The paper documents a shift in Vietnam's de facto exchange rate regime, from a basket peg to a simple US dollar peg, when the domestic vulnerabilities became compounded by the evolving global crisis. The authorities utilized additional measures to relieve pressure on the parallel exchange rate. An event study methodology finds little evidence of systematic effectiveness for these policy actions; any effectiveness was short-lived. A close examination of individual actions suggests that the impact of foreign exchange market intervention appeared more consistent than any other type of measure and most effective when combined with other measures.

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## 1. Introduction

The paper presents an analysis of exchange rate policy in Vietnam during 2008–2009, when the country faced a series of domestic and global shocks. Although Vietnam had earlier experienced appreciation pressure amid buoyant capital inflows, in early 2008, the country faced a sudden reversal as signs of developing domestic vulnerabilities became evident. The downward pressure on the exchange rate then intensified with the onset of the global financial crisis in the fall. In these environments, the Vietnamese authorities responded with various exchange rate policy measures to relieve downward pressure on the dong. A novel feature of our analysis is the application of a Kalman filter to the celebrated Frankel–Wei regression, in order to identify the timing of a shift in the de facto exchange rate regime. An event study (or news analysis) methodology is then used to assess the effectiveness of various exchange rate measures in stabilizing the parallel exchange rate relative to the official rate and reducing the parallel market premium.

The paper contributes to the literature on the use of exchange rate policy as a crisis management tool. Although various exchange rate policy measures have been used in the past to respond to a currency crisis, there is a general lack of consensus in the literature on their effectiveness. For example, should a country under a managed float increase or reduce exchange rate flexibility when faced with downward pressure on the currency? Does raising interest rates help arrest a depreciating

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currency when there is a speculative attack? An especially large literature has emerged on the relationship between interest rates and exchange rates (e.g., Caporale, Cipollini, & Demetriades, 2005; Evans & Lyons, 2005; Fatum & Scholnick, 2008; Kim, 2003, 2005). The case of Vietnam is unique in this context as it is a semi-financially open economy. Though it controls capital flows tightly, it condones the existence of a parallel foreign exchange market (see Phylaktis, 1996 for a survey of conceptual issues related to a parallel foreign exchange market). The very use of monetary policy instruments by the Vietnamese authorities to address pressure in the foreign exchange market is an indication of their recognition that they do not have full control over a substantial part of foreign exchange transactions. The experience of Vietnam should therefore yield important implications for other developing countries that are at a similar stage of capital account openness.

There are three major findings. First, the paper verifies that the country's de facto regime switched from a managed float (in the form of a basket peg) to a simple dollar peg. The application of a Kalman filter algorithm to the conventional Frankel–Wei methodology further indicates that the shift took place in June 2008 when the State Bank of Vietnam carried out a number of exchange rate policy actions to stabilize the parallel exchange rate. Second, the paper utilizes an event study (or news analysis) methodology to find little evidence of systematic effectiveness for the exchange rate policy measures in stabilizing the parallel exchange rate and reducing the parallel market premium. Any impact, moreover, was short-lived because statistical significance (the number of successful events) generally declined as the length of an event window was increased. Third, a close examination of individual events suggests that the impact of intervention appeared more consistent than any other type of measure taken alone and most effective when combined with other measures.

The remainder of this paper is organized as follows. Section 2 reviews the major exchange rate policy related actions taken by the Vietnamese authorities during 2008–2009, against the movements of the official and parallel exchange rates of the Vietnamese dong against the US dollar. Section 3 examines how the authorities may have shifted the country's de facto regime in response to the evolving crisis. Section 4 assesses the impact of exchange rate policy actions, including a devaluation of the official exchange rate, a widening of the trading band, an announcement to sell foreign exchange, and an interest rate hike, in stabilizing the parallel market exchange rate relative to the official rate and reducing the parallel market premium. Section 5 presents a summary and a conclusion. Finally, Appendix explains the sources of the data and provides summary statistics on the variables used in the empirical study.

## 2. Exchange Rate Policy during 2008–2009<sup>1</sup>

### 2.1. Official and parallel exchange rates in Vietnam

The Vietnamese authorities used various exchange rate policy measures, including interest rate actions, in response to exchange rate developments during 2008–2009 (see Table 1 for a summary). In reviewing the exchange rate developments during this period, however, one must first understand that Vietnam's foreign exchange market consists of official and parallel markets. The official market covers the official rate announced by the State Bank of Vietnam (SBV) and the trading rate determined among commercial banks licensed to do foreign exchange business. Since 25 February 1999, the SBV has followed the practice of announcing on each working day an official US dollar exchange rate of the Vietnamese dong (VND), along with a trading band, on the basis of the average actual exchange rates of preceding days in the inter-bank market. The trading rate at commercial banks is determined freely among the licensed banks, subject to the requirement that buying and selling rates remain within the ceilings and floors established around the official rate (Fig. 1). In contrast, exchange rates in the parallel market are determined by demand and supply conditions, and are for the most part not subject to control by the SBV.<sup>2</sup>

The parallel market is illegal but has emerged in response to the tight control of foreign exchange transactions in the official market. First, according to the 2006 Ordinance on Foreign Exchange, market participants in the official market are limited to commercial banks, credit institutions, and import–export companies. Although import–export companies have access to foreign exchange from commercial banks upon submission of required documents, foreign exchange may not be always available and the required procedures are cumbersome. Second, the authorities impose tight controls on purchases of foreign exchange by individuals, even for current account transactions. The parallel market typically offers more attractive terms for buying foreign exchange, so that individuals and import–export companies that have legally acquired foreign exchange prefer to go to the parallel market, thus ensuring its viability as an alternative source of foreign exchange funding.

### 2.2. Responding to domestic disturbances, early to late 2008

Though the Vietnamese dong experienced appreciation pressure through 2007 amid buoyant direct and equity investment inflows, the situation changed when it had become apparent that Vietnam faced several economic disturbances.

<sup>1</sup> For information on the legal and institutional details of Vietnam's foreign exchange market, we rely on the official Vietnamese-language material obtained from the State Bank of Vietnam (at [www.sbv.gov.vn](http://www.sbv.gov.vn)); for the timing of various policy announcements or actions we have relied on both the SBV website and the information reported in Vietnam's leading Vietnamese-language economic daily *VnEconomy* ([www.vneconomy.vn](http://www.vneconomy.vn)).

<sup>2</sup> According to Circular 33/NH-TT, dated 15th March 1989 (superceded by Article 22 of the Ordinance on Foreign Exchange, 2006), foreign exchange transactions can only be carried out through authorized commercial banks and other organizations, and any transactions in the parallel market are illegal. However, the SBV seems to condone its existence and generally refrains from taking legal action against market participants. It is only during periods of significant market volatility that it occasionally cooperates with police to arrest and fine those involved in parallel market transactions.

**Table 1**  
Exchange rate policy related measures, 2008–2009.<sup>a</sup>

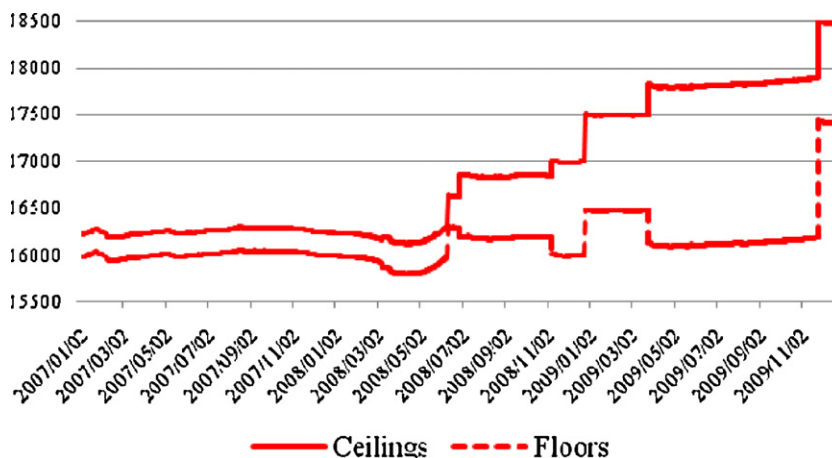
Policy measure	Announcement date	Effective date
Change in the official exchange rate (dong per US dollar)		
1 Devalued by 2 percent (from 16,134 to 16,461)	11 June 2008	11 June 2008
2 Devalued by 2.9 percent (from 16,494 to 16,989)	25 December 2008	25 December 2008
3 Devalued by 5.16 percent (from 17,034 to 17,961)	25 November 2009**	26 November 2009
Change in the width of the trading band (on either side of the official rate)		
1 Widened to 1 percent	7 March 2008	10 March 2008
2 Widened to 2 percent	26 June 2008*	27 June 2008
3 Widened to 3 percent	6 November 2008	7 November 2008
4 Widened to 5 percent	24 March 2009	25 March 2009
5 Narrowed to 3 percent	25 November 2009**	26 November 2009
Market intervention (an estimated amount of net intervention during the month of announcement in parentheses) <sup>b</sup>		
1 Announcement of willingness to sell foreign exchange (an estimated US\$ 1.698 billion sold during the month)	27 May 2008	n.a.
2 Announcement of willingness to sell foreign exchange (an estimated US\$ 1.336 billion sold during the month)	26 June 2008*	n.a.
3 Announcement of willingness to sell foreign exchange (an estimated US\$ 153 million sold during the month)	16 May 2009	n.a.
4 Announcement of willingness to sell foreign exchange (an estimated US\$ 1.18 billion sold during the month)	10 July 2009	n.a.
5 Announcement of willingness to sell foreign exchange (an estimated US\$ 925.6 million sold during the month)	25 November 2009**	n.a.
Change in the base interest rate		
1 Raised to 8.75 percent (from 8.25 percent)	30 January 2008	1 February 2008
2 Raised to 12 percent	30 May 2008	2 June 2008
3 Raised to 14 percent	10 June 2008	11 June 2008
4 Raised to 8 percent (following a series of cuts, from October 2008 to January 2009, to 7 percent)	25 November 2009**	26 November 2009

Sources: The State Bank of Vietnam; International Monetary Fund, *International Financial Statistics*.

<sup>a</sup> \* and \*\* indicate that the respective actions were taken simultaneously.

<sup>b</sup> The amount of net intervention is calculated as a change in the balance of foreign exchange, adjusted for estimated interest income on the average balance. The US Treasury bill rate is used as the interest rate.

First, the rate of inflation picked up in 2008 and reached more than 28 percent (year on year) in August, the highest in 17 years. Second, equity and real estate prices began to fall from the beginning of the year (the declines would amount to nearly 70 percent and 50 percent, respectively, from January to December). Third, market interest rates began to rise substantially in 2008 (e.g., from 7.5 percent in January to 19 percent in July for 3-month deposits). Finally, the trade balance began to deteriorate and recorded a large deficit of US\$ 14.21 billion during the first six months of 2008. As market participants saw lurking problems for the prospects of the Vietnamese economy, the dong began to depreciate from late May 2008, reaching a



**Fig. 1.** Official ceilings and floors in the inter-bank market, January 2007 to December 2009 (Dong per US dollar). The State Bank of Vietnam; authors' calculation.

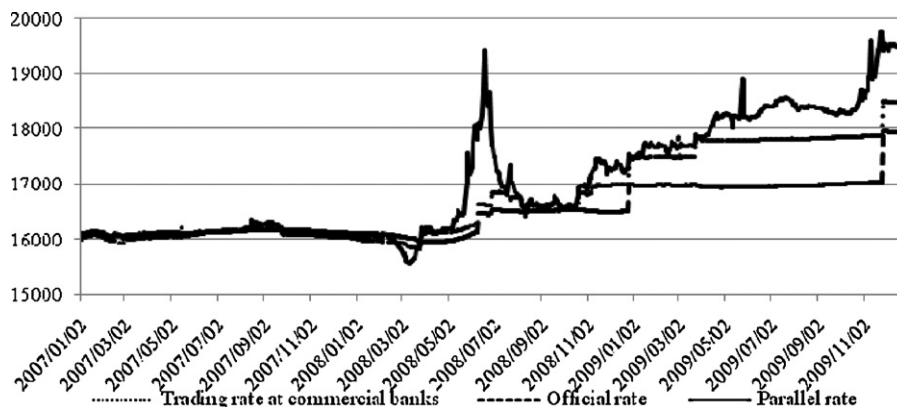


Fig. 2. The Vietnamese Dong exchange rates in official and parallel markets, January 2007 to December 2009 (Dong per US Dollar). [www.sbv.gov.vn](http://www.sbv.gov.vn); [www.vietcombank.com.vn](http://www.vietcombank.com.vn).

bottom of 16,522 per US dollar on 8 July in the inter-bank market and 19,400 per US dollar on 19 June 2008 in the parallel market.<sup>3</sup> Some observers believed that the dong faced a speculative attack.<sup>4</sup>

In response, on 19 June 2008, the SBV Governor stated that Vietnam had sufficient foreign exchange reserves of US\$ 20.7 billion (equivalent to 15–16 weeks of imports), which he said would be augmented to more than US\$ 22 billion. At the same time, between 30 May and 26 June, the central bank introduced a package of measures to address the turbulence in the currency market, including: (i) readiness to sell US dollars directly to commercial banks; (ii) devaluation of the official exchange rate from 16,139 to 16,461 dong per US dollar on 11 June 2008; (iii) widening of the trading band from  $\pm 1$  to  $\pm 2$  percent on 26 June 2008; (iv) stricter controls on parallel market transactions to prevent speculation; (v) an immediate increase in the base interest rate from 8.75 to 12 percent on 30 May and further to 14 percent in another 10 days; and (vi) an increase in the interest rate on “compulsory” T-bills from 7.8 to 13 percent.<sup>5</sup> In late July 2008, the dong stabilized around 16,800 dong per US dollar in both the official and parallel markets.

### 2.3. Responding to the global financial crisis, late 2008 through 2009

Following the Lehman failure, the central bank intensified its efforts to further stabilize the foreign exchange market. On 6 November 2008, the SBV widened the trading band to  $\pm 3$  percent. On 25 December 2008, the central bank devalued the official rate, from 16,494 to 16,989 dong per US dollar. Exchange rate stability appeared to be achieved, allowing the SBV to switch from monetary tightening (designed to stabilize the exchange rate) to monetary easing in order to help facilitate economic recovery from the impact of the global crisis. Following the first few months of relative stability in 2009, however, the dong faced renewed pressure and began to depreciate sharply in late June. The parallel rate continued to depreciate and, in November 2009, reached a low of 19,800 dong per US dollar (see Fig. 2).

The sharp depreciation of the parallel exchange rate reflected several interrelated factors. First, there was a large deficit in the trade balance, which amounted to US\$ 10.5 billion during the first 10 months of the year. Second, Vietnam experienced a withdrawal of foreign investments and a decline in current transfers from overseas Vietnamese (*Viet Kieu*). Third, the balance of foreign exchange reserves declined gradually to a bottom of US\$ 17.9 billion in November 2009 (from the peak of US\$ 26.4 billion in March 2008). Fourth, in the last quarter of 2009, Vietnamese firms arbitrated, either legally or illegally, on the large difference that had emerged between domestic and foreign gold prices,<sup>6</sup> which led to an unexpected demand for US dollars. These developments created the expectation that the SBV would devalue the dong over the short term.

In response, on 25 November 2009, the SBV devalued the official exchange rate by 5.16 percent, from 17,034 to 17,961 dong per US dollar, and narrowed the trading band from  $\pm 5$  to  $\pm 3$  percent. In a reversal of the monetary easing it had followed for several months, moreover, the central bank raised the base interest rate from 7 to 8 percent and implemented a package of policy measures, including: (i) imposition of surrender requirements for seven state-owned corporations<sup>7</sup>; (ii) requirement that the eight largest commercial banks sell foreign exchange (especially US dollars) to importers of essential goods used as inputs in domestic production,

<sup>3</sup> Morgan Stanley, for example, stated on 7 July 2008: “Vietnam will fail to halt declines in their currency by using intervention because their economy is slowing and trade deficits widening”, <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aHON80056km4&refer=india>.

<sup>4</sup> See, for example, Chan and Packard, Moody’s Economy.com 13 June 2008, [http://www.viet-studies.info/kinhte/VN\\_currency\\_crisis\\_TuPackard.pdf](http://www.viet-studies.info/kinhte/VN_currency_crisis_TuPackard.pdf).

<sup>5</sup> These are government bills that 41 commercial banks are required to purchase at a coupon rate below the prevailing market rate.

<sup>6</sup> The arbitrage involved purchasing gold in foreign markets and selling it in the domestic market at a higher price.

<sup>7</sup> The seven state-owned corporations were: PetroVietnam, Vietnam National Coal-Mineral Industries Group, Vietnam National Chemical Group, Southern Airport Corporation, Vietnam Northern Food Corporation, Vietnam Southern Food Corporation, and Vietnam Machinery Erection Corporation. They were required to sell immediately 30 percent of the foreign currency term deposits they held (as of 31 December 2009), and the remaining 70 percent within the first two months of 2010.

and to certain individuals who had a legitimate need; (iii) stricter control of foreign exchange transactions in the parallel market; and (iv) fixing the official exchange rate at 17,941 dong per US dollar, from 12 December (the rate would be kept until 10 February 2010). Following the implementation of these measures, the parallel exchange rate appreciated somewhat through the end of 2009.

### 3. Identifying a shift in Vietnam's de facto exchange rate regime, 1 January 2007 to 31 December 2009

Was there a change in Vietnam's de facto exchange rate regime during the crisis? Although we can easily identify how the authorities changed the official exchange rate or the width of the trading band just from official policy announcements or by looking at the data, we need a rigorous statistical procedure to verify if there was any change in the way the authorities managed the exchange rate from day to day. One way to do this is to follow Frankel and Wei (1994, 2008), and to regress the daily exchange rate of the Vietnamese dong (VND) over those of major currencies that are considered important, all expressed in terms of a numeraire currency:

$$\Delta \log H_t = \alpha + \sum w(j) [\Delta \log X(j)_t] + u_t \quad (1)$$

where  $H_t$  is the exchange rate of the dong in terms of the numeraire at time  $t$ ;  $X(j)_t$  is the exchange rate of currency  $j$  in terms of the numeraire at time  $t$ ;  $w(j)$  is the implicit weight of currency  $j$  in the determination of the dong exchange rate;  $u_t$  is a disturbance term; and  $\Delta$  is a difference operator.

The currencies to be included in Eq. (1) are those of Vietnam's major partners in trade, finance, and investment based on the 2008 data, and include the US dollar (USD), the euro (EUR), the British pound (GBP), the Japanese yen (JPY), the Australian dollar (AUD), the Korean won (KRW), the Singapore dollar (SGD), the Thai baht (THB), and the Malaysian ringgit (MLR). The SDR and the Swiss franc (CHF) are alternatively used as the numeraire currency.<sup>8</sup> The Chinese yuan (CNY) is also an important currency, but it was pegged to the US dollar during most of the sample period; we include the yuan in one specification but exclude it in another as a robustness check (see Appendix for the summary statistics).

In view of the number of exchange rate policy measures taken during 2008–2009, it is reasonable to consider the possibility of a structural break (or structural breaks) in the relationship between the dong and the other currencies. Thus, we employ the Kalman filter method to allow time-varying coefficients. The Kalman filter is an efficient recursive filter that estimates the state of a linear dynamic system from a series of noisy measurements; it provides the optimal estimator of a state vector at time  $t$ , based on information available at the time (Harvey, 1989). The space state model for estimating the implicit currency weights is given by:

$$\begin{aligned} \Delta \log VND_t = & \alpha + \beta_{1,t} \Delta \log USD_t + \beta_{2,t} \Delta \log EUR_t + \beta_{3,t} \Delta \log GBP_t + \beta_{4,t} \Delta \log JPY_t + \beta_{5,t} \Delta \log AUD_t + \beta_{6,t} \Delta \log KRW_t \\ & + \beta_{7,t} \Delta \log SGD_t + \beta_{8,t} \Delta \log CNY_t + \beta_{9,t} \Delta \log THB_t + \beta_{10,t} \Delta \log MLR_t + u_t \end{aligned} \quad (2)$$

$$\beta_{i,t} = \beta_{i,t-1} + v_{i,t} \quad \text{for } i = 1, 10 \quad (3)$$

where  $\alpha$  is a fixed coefficient;  $\beta_{j,t}$  is a vector of time-varying coefficients of currency  $j$  at time  $t$ ;  $u_t$  is a scalar disturbance term; and  $v_t$  is a vector of disturbance terms. Eq. (2) is a measurement (or signal) equation, while Eq. (3) represents a transition (or state) equation. We assume in Eq. (3) that, as these coefficients represent policy action with respect to the official exchange rate, they follow a simple random walk. The combination of these two equations gives a recursive system for estimating the implicit weights of the US dollar and other currencies.

Specifically, we estimate the following signal and state equations (expressed without the time subscript), in terms of SDR and CHF, for the period January 2007 to December 2009:

$$\begin{aligned} d \log VND = & c(1) + sv1 \times d \log USD + sv2 \times d \log EUR + sv3 \times d \log GBP + sv4 \times d \log JPY + sv5 \times d \log AUD + sv6 \\ & \times d \log KRW + sv7 \times d \log SGD + sv8 \times d \log CNY + sv9 \times d \log THB + sv10 \times d \log MLR + sv11 \end{aligned} \quad (4)$$

$$sv1 = sv1(-1) + v1 \quad (5-1)$$

$$sv2 = sv2(-1) + v2 \quad (5-2)$$

$$sv3 = sv3(-1) + v3 \quad (5-3)$$

$$sv4 = sv4(-1) + v4 \quad (5-4)$$

$$sv5 = sv5(-1) + v5 \quad (5-5)$$

$$sv6 = sv6(-1) + v6 \quad (5-6)$$

<sup>8</sup> As additional robustness checks, we have used the New Zealand dollar and the British pound as the numeraire to confirm that the qualitative results remain unchanged.

**Table 2**  
Correlograms of  $\log(\text{SDR/VND})$  and  $\log(\text{CHF/VND})$ .

	Log(SDR/VND)				Log(CHF/VND)			
	AC	PAC	Q-Stat	Prob	AC	PAC	Q-Stat	Prob
1	0.986	0.986	671.41	0.000	0.991	0.991	715.60	0.000
2	0.974	0.040	1327.1	0.000	0.982	0.021	1419.6	0.000
3	0.962	0.016	1968.1	0.000	0.973	0.008	2112.3	0.000
4	0.951	0.010	2594.9	0.000	0.964	-0.047	2792.8	0.000
5	0.938	-0.056	3205.9	0.000	0.956	0.035	3462.2	0.000
6	0.925	-0.023	3800.8	0.000	0.948	0.029	4121.4	0.000
7	0.912	-0.021	4379.5	0.000	0.938	-0.077	4768.6	0.000
8	0.900	0.051	4944.2	0.000	0.929	-0.029	5403.3	0.000
9	0.887	-0.062	5493.0	0.000	0.919	0.016	6026.3	0.000
10	0.873	-0.006	6026.1	0.000	0.909	-0.071	6635.8	0.000
11	0.860	-0.000	6544.0	0.000	0.900	0.074	7234.1	0.000
12	0.846	-0.043	7046.0	0.000	0.890	-0.035	7820.6	0.000
13	0.832	-0.006	7532.3	0.000	0.880	-0.040	8394.4	0.000
14	0.818	0.001	8003.3	0.000	0.869	-0.021	8955.5	0.000
15	0.804	-0.028	8458.6	0.000	0.859	0.012	9504.3	0.000
16	0.789	-0.044	8897.6	0.000	0.850	0.036	10042.	0.000
17	0.773	-0.032	9319.8	0.000	0.840	-0.012	10568.	0.000
18	0.757	-0.006	9725.7	0.000	0.830	-0.033	11082.	0.000
19	0.742	-0.001	10116.	0.000	0.819	-0.049	11583.	0.000
20	0.726	-0.026	10490.	0.000	0.808	0.005	12072.	0.000
21	0.710	0.005	10849.	0.000	0.798	0.021	12550.	0.000
22	0.695	0.005	11193.	0.000	0.789	0.066	13017.	0.000
23	0.686	0.204	11528.	0.000	0.780	-0.014	13475.	0.000
24	0.677	0.038	11855.	0.000	0.771	-0.013	13922.	0.000
25	0.668	0.027	12174.	0.000	0.764	0.120	14361.	0.000
26	0.660	0.021	12485.	0.000	0.757	0.047	14794.	0.000
27	0.651	-0.020	12790.	0.000	0.750	-0.036	15220.	0.000
28	0.642	-0.041	13086.	0.000	0.744	0.019	15639.	0.000
29	0.633	-0.017	13375.	0.000	0.738	0.004	16052.	0.000
30	0.625	0.045	13657.	0.000	0.732	0.008	16458.	0.000

$$sv7 = sv7(-1) + v7 \quad (5-7)$$

$$sv8 = sv8(-1) + v8 \quad (5-8)$$

$$sv9 = sv9(-1) + v9 \quad (5-9)$$

$$sv10 = sv10(-1) + v10 \quad (5-10)$$

$$sv11 = c(2) \times sv11(-1) + v11 \quad (5-11)$$

where  $c(1)$  is a constant;  $c(2)$  is an autoregressive (AR) coefficient of order 1;  $sv1, \dots, sv10$  are state vectors;  $sv11$  is a vector of residuals; and the notation  $(-1)$  denotes that the variable in question is lagged one period. Eq. (4) and Eqs. (5-1)–(5-11), respectively, represent the signal and state equations. We estimate these equations by the maximum likelihood method by making the time-invariance and other standard assumptions for the system matrices (see Harvey, 1989 for details).

The correlograms of the bilateral exchange rates between the dong and each of the two numeraire currencies (abbreviated as VND/SDR and VND/CHF) show that the orders of the AR and moving average (MA) models are 1 and 0, respectively (Table 2). The MA coefficient therefore will not be estimated. The AR coefficient is parameterized in terms of  $c(2)$ , but it was found to be insignificant at all conventional significance levels. This means that the Kalman filter is suitable for estimating the weight of the US dollar and other currencies in the determination of the dong.

Table 3 provides the final values of the state vectors  $sv1, sv2, \dots, sv10$  or  $\beta_{i,t}(i = 1, 10)$  according to the notations of Eqs. (2) and (3) ( $sv11$ , a vector of residuals, is not reported in the table). These estimates indicate that, with the SDR used as the numeraire, the final value of the weight of the US dollar, at 0.992, is significant at the one percent level of significance when the Chinese yuan is included (the results do not change materially even if the yuan is excluded). In contrast, the final values of the weights of the other currencies are small and for the most part statistically not significant; neither is the constant  $c(1)$ . These results suggest that the Vietnamese authorities made a shift in the country's de facto exchange rate regime from a managed float (in the form of a basket peg) to a simple dollar peg during the course of 2007–2009.

But when was the shift made? Fig. 3 depicts the evolution of the weight of the US dollar when the SDR or the Swiss franc is alternatively used as the numeraire.<sup>9</sup> Over the period January 2007 to December 2009, the US dollar's weight rose gradually;

<sup>9</sup> These results do not change with the choice of the New Zealand dollar or the British pound as the numeraire currency.

**Table 3**  
Final state estimates.

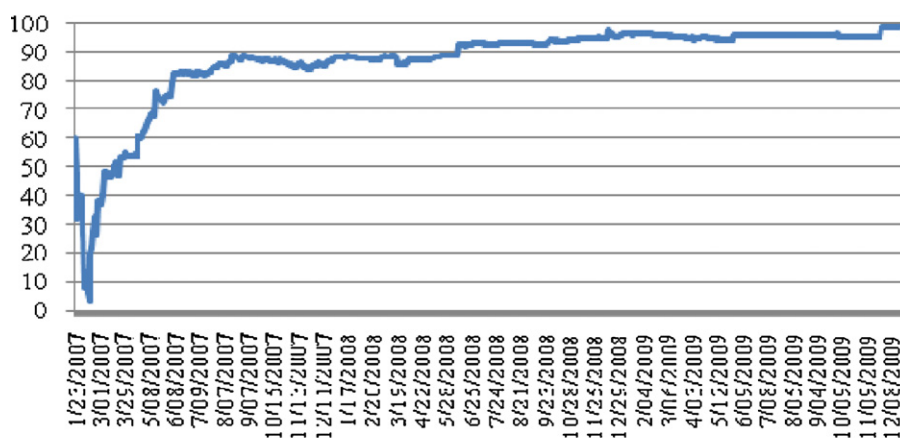
	Numeraire: SDR (with CNY)			Numeraire: SDR (without CNY)		
	Coefficients	Root MSE	P-value	Coefficients	Root MSE	P-value
USD	0.992 <sup>***</sup>	0.146706	0.0000	1.096 <sup>***</sup>	0.058	0.0000
EUR	0.019	0.056643	0.7389	0.02	0.04	0.6171
GBP	0.036	0.026241	0.1665	0.04 <sup>**</sup>	0.018	0.025
JPY	-0.037	0.023776	0.1112	-0.033	0.016	0.0432
AUD	-0.006	0.019294	0.7417	-0.0006	0.013	0.6262
KRW	-0.032	0.013989	0.0204	-0.028	0.009	0.0026
SGD	0.115	0.072073	0.1099	0.108 <sup>**</sup>	0.050	0.0304
CNY	0.123	0.135102	0.3612	-	-	-
THB	0.037	0.050791	0.4605	0.039	0.035	0.2856
MLR	-0.137	0.056137	0.0146	-0.12	0.002	0.9866

<sup>\*\*</sup> Coefficient is significant at 5 percent.

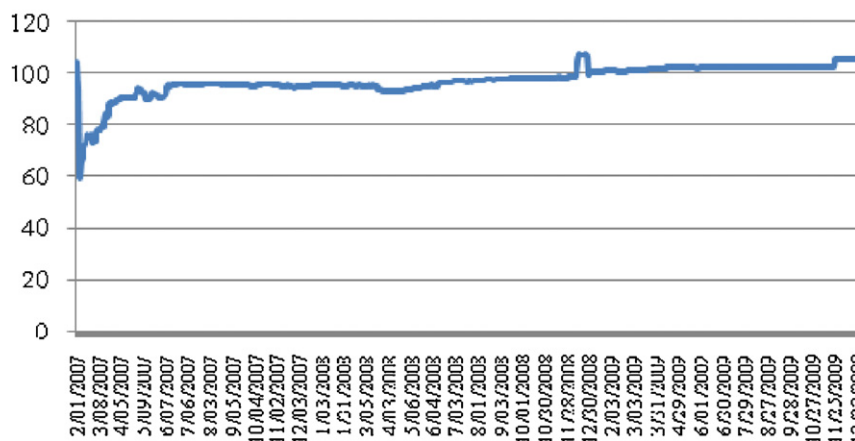
<sup>\*\*\*</sup> Coefficient is significant at 1 percent.

### January 2007-December 2009 (In percent)

#### a SDR as the numeraire currency



#### b Swiss franc as the numeraire currency



**Fig. 3.** The evolving weight of the US dollar, January 2007 to December 2009 (in percent) (a) SDR as the numeraire currency (b) Swiss franc as the numeraire currency.

## January 2007–December 2009 (In daily percentage changes)

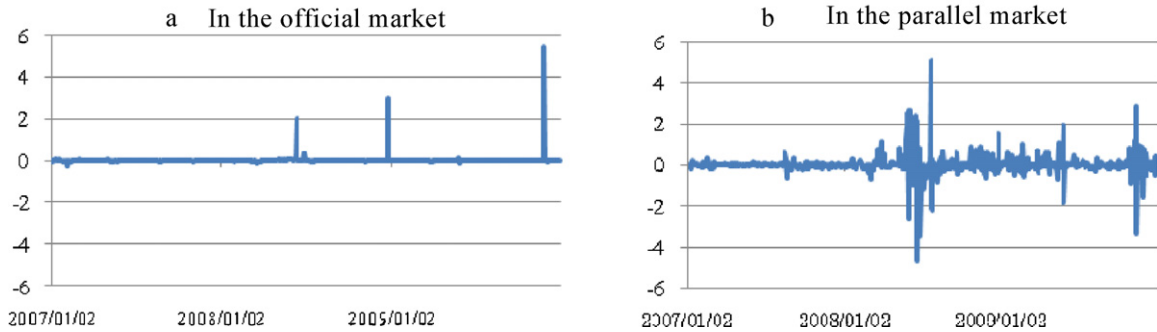


Fig. 4. Exchange rate volatility in the official and parallel markets, January 2007 to December 2009 (in daily percentage changes). The State Bank of Vietnam; authors' calculations.

it rose from less than 70 percent before July 2007 (when the subprime crisis occurred) to over 99 percent (or even beyond if the Swiss franc is used) at the end of the period. The gradual rise in the weight of the US dollar in the first half of 2008 coincided with the devaluation of the official exchange rate and the widening of the band (see Table 1). The hardening of the de facto US dollar peg from June 2008, moreover, coincided with the number of exchange rate policy actions taken to stabilize the parallel exchange rate. Against the background of visible exchange rate policy actions, there was thus a quiet shift in the way the exchange rate was managed from day to day.

How was the evolving weight of the US dollar reflected in market volatility?<sup>10</sup> Daily data show that volatility, measured as daily percentage changes, was extremely low throughout the period in the official market; the exchange rate changed substantially only three times (11 June 2008, 25 December 2008, and 26 November 2009) when the official rate was devalued (Fig. 4). In some sense, this is not surprising. After all, the authorities had tight control over official foreign exchange transactions. A more interesting result concerns the parallel market, where we observe different phases of exchange rate volatility over the period. Initially, volatility was low. Then, from May to July 2008, volatility fluctuated between 2 and 5 percent on either side. From then on, volatility remained for the most part below 2 percent on either side. This reduction in volatility (despite the widening of the trading band) corresponded to the identified shift to a more conventional US dollar peg as the crisis intensified.

#### 4. Assessing the effectiveness of exchange rate policy actions

How effective were the series of exchange rate policy actions in stabilizing the parallel exchange rate in a desired direction and thereby reducing the parallel market premium? To address this question, we employ below an event study methodology. While it is straightforward to identify the timing of most policy measures (including devaluation, widening of the band, and interest rate hikes), the same does not hold for foreign exchange market intervention. In Vietnam, the authorities do not disclose when and how much they intervene in the market. We have verified, however, that each announcement by the SBV of its willingness to sell foreign exchange was followed by a decline in the balance of foreign exchange reserves (adjusted for an estimated interest income on the average balance) for that month.

All in all, the SBV devalued the official rate three times, changed the trading band five times, announced their intention to sell foreign exchange five times,<sup>11</sup> and raised the base interest rate four times,<sup>12</sup> during 2008–2009. While there were thus 17 policy actions, only 13 of them were independent as multiple actions were taken on two occasions (26 June 2008 and 25 November 2009). Note that the authorities took all of these measures when the parallel market rate was above the official rate (i.e., there was a positive parallel market premium), so that their intention was clearly to relieve downward pressure on the parallel rate. They were meant to achieve this objective by increasing the supply of foreign exchange, especially to the parallel market. For example, an interest rate hike would induce residents to sell foreign exchange and to deposit the dong at commercial banks that offer higher returns; widening of the trading band, like official devaluation, would narrow the gap between the official and parallel rates and diminish the expectations of official rate depreciation, thereby inducing resident speculators to sell the foreign exchange they may have in order to realize any capital gains. On 25 November 2009 the SBV

<sup>10</sup> In a country like Vietnam where foreign exchange transactions are tightly controlled, it is difficult to make a clear conceptual distinction between market volatility and exchange rate flexibility. Thus, daily percentage changes in the exchange rate can be interpreted alternatively as a measure of volatility or as a measure of flexibility.

<sup>11</sup> On 12 September 2008 the SBV announced that it would buy foreign exchange, but this was not an exchange rate policy action as defined in the paper. Instead, this was designed as a measure to build market confidence in the SBV's ability to defend the dong when necessary.

<sup>12</sup> From 20 October 2008 to 23 January 2009, the SBV took six incremental measures to cut the base interest rate from 14 percent to 7 percent. These actions took place against the background of overall foreign exchange market stability in order to help facilitate economic recovery from the impact of the global crisis. We regard them strictly as monetary policy actions with no exchange rate policy objective.

narrowed, rather than widened, the band, but this action was part of a larger package that included a devaluation of the official exchange rate.

We define below an “event” as a period of days around the announcement of a policy measure. In particular, an event consists of (i) pre-event days, (ii) the event day; and (iii) post-event days. When there was a lapse of time between the announcement date and the effective date, we assume that the first date was more relevant because the impact of an anticipated event should have already been reflected in the parallel exchange rate, if the market was efficient at all. Thus, we use the first date as the event day, though we use the second date as a robustness check. We set the length of an event alternatively as 2, 5, or 10 working days around the event day.

We characterize an exchange rate policy action as a “success” when it is identified to influence the exchange rate in an intended manner (Fatum & Hutchison, 2003, 2006). There are two criteria of success: (i) whether the change during post-event days is in the same direction as the policy measure—the “direction” criterion; and (ii) whether the news is associated with a smoothing of the exchange rate movement—the “smoothing” criterion. According to these criteria, news analysis would consider the following cases to be a success, given the fact that all the identified independent actions were designed to relieve downward pressure on the parallel exchange rate relative to the official rate:

- Direction criterion: if devaluation, widening of the band, an announcement of readiness to sell foreign exchange, a base interest rate hike, or a combination of some or all of these leads to an appreciation of the dong in the parallel market ( $\Delta s_{i+} < 0$ ) and a fall in the parallel market premium ( $\Delta PRE_{i+} < 0$ ) in the post-event window; and
- Smoothing criterion: if devaluation, widening of the band, an announcement of readiness to sell foreign exchange, a base interest rate hike, or a combination of some or all of these leads to smaller exchange rate volatility ( $\Delta s_{i+} < \Delta s_{i-}$ ) in the parallel market and greater stability in the parallel market premium ( $\Delta PRE_{i+} < \Delta PRE_{i-}$ ) in the post-event window compared to the pre-event window.

where  $\Delta s_{i+}$ ,  $\Delta s_{i-}$  are changes in the exchange rate during the post-event and pre-event windows, respectively; PRE is a parallel market premium, defined as a percentage differential between the average parallel rate and the official rate; and  $\Delta PRE_{i+}$ ,  $\Delta PRE_{i-}$  are changes in the parallel market premium during the post-event and pre-event windows, respectively.

The non-parametric sign test of MacKinlay (1997) is employed to assess the effectiveness of exchange rate policy actions. This statistic examines whether the “direction” of the parallel exchange rate change following an exchange rate policy action (e.g. from depreciation during the pre-event window to appreciation during the post-event window), or the “smoothing” of the parallel exchange rate change following an exchange rate policy action (e.g. smaller depreciation) is random or systematic. A significant sign test indicates that the observed number of successes is not a random finding attributable to the equal probability of appreciation or depreciation. Table 4 summarizes the null and alternatives hypotheses of the non-

**Table 4**  
Null and alternative hypotheses of the non-parametric sign test.

“Direction” criterion	Ho: Change in the parallel exchange rate (or the parallel market premium) in post-event days = 0 Ha: Change in the parallel exchange rate (or the parallel market premium) in post-event days < 0
“Smoothing” criterion	Ho: Comparison of changes in the parallel exchange rate (or the parallel market premium) between post-event days and pre-event days = 0 Ha: Comparison of changes in the parallel exchange rate (or the parallel market premium) between post-event days and pre-event days < 0

**Table 5**  
Non-parametric sign test of the effectiveness of exchange rate policy measures.

Length of event window	Type of exchange rate	“Direction” criterion			“Smoothing” criterion		
		Number of events	Number of successes	P-value <sup>a</sup>	Number of events	Number of successes	P-value <sup>a</sup>
2 days	Buying rate at Hanoi	13	9	0.1334	13	8	0.2905
	Selling rate at Hanoi	13	8	0.2905	13	7	0.5000
	Average rate at Hanoi	13	7	0.5000	13	6	0.7095
	Parallel market premium	13	6	0.7095	13	7	0.5000
5 days	Buying rate at Hanoi	13	2	0.9983	13	2	0.9983
	Selling rate at Hanoi	13	4	0.9539	13	6	0.7095
	Average rate at Hanoi	13	3	0.9888	13	3	0.9888
	Parallel market premium	13	4	0.9539	13	5	0.8666
10 days	Buying rate at Hanoi	13	3	0.9888	13	5	0.8666
	Selling rate at Hanoi	13	4	0.9539	13	7	0.5000
	Average rate at Hanoi	13	3	0.9888	13	5	0.8666
	Parallel market premium	13	3	0.9888	13	8	0.2905

<sup>a</sup> Based on a binomial probability distribution with the probability of an individual success of 50 percent.

parametric sign test for the event study, where we have alternatively used the buying, selling, and average rates in the parallel market as well as the parallel market premium (see [Appendix](#) for the summary statistics).

Three observations emerge ([Table 5](#)).<sup>13</sup> First, there was little evidence of systematic effectiveness for the exchange rate policy actions in achieving the objective of stabilizing the parallel exchange rate or reducing the parallel market premium. For all event windows, the non-parametric sign test of [MacKinlay \(1997\)](#) rejects the hypothesis that the actions were effective at conventional significance levels (though this in part reflects the small sample size). Second, any effectiveness was short-lived in the sense that statistical significance (the number of successful events) declined as the event window was lengthened. This is consistent with the findings of [Kim \(2003, 2005\)](#). Finally, a closer examination of individual events (not reported in the table) indicates that the impact of an announcement by the SBV of readiness to sell foreign exchange appeared more consistent than any other type of measure and most effective when it was combined with other measures (as was the case on 26 June 2008 and 25 November 2009) though no statistical significance was implied. Awareness of the limited overall effectiveness of conventional exchange rate policy measures may explain why the Vietnamese authorities occasionally resort to administrative measures to control parallel market activity during periods of significant market volatility.<sup>14</sup>

## 5. Concluding remarks

The paper has reviewed how the Vietnamese authorities used exchange rate policy to respond to domestic and global shocks affecting the country during 2008–2009, and assessed the effectiveness of the policy actions in relieving downward pressure on the parallel exchange rate relative to the official rate. An application of a Kalman filter algorithm to the conventional Frankel–Wei regression identified a shift in Vietnam's de facto exchange rate regime, from managed float (in the form of a basket peg) to a simple US dollar peg, further identifying that the shift took place in June 2008 when the State Bank of Vietnam introduced a number of additional stabilization measures.

An event study methodology was then used to assess the effectiveness of devaluation, widening of the trading band, an announcement of readiness to sell foreign exchange, and a base interest rate hike, in helping to stabilize the parallel exchange rate. For the most part, there was little evidence of systematic effectiveness; any impact was short-lived in the sense that statistical significance (the number of successful events) declined as the event window was lengthened. A close examination of individual events suggested that the impact of an announcement of readiness to sell foreign exchange appeared more consistent than any other type of measure and most effective when combined with other policy measures.

An important aspect of the Vietnamese experience concerns the June 2008 package, in which the authorities implemented two seemingly contradictory measures: they shifted to a de facto US dollar peg, while widening the trading band. Taken in isolation, this combination seemed to work in calming the market, possibly because the authorities thereby succeeded in demonstrating a greater commitment to defending the dong while eliminating the possibility of a one-way bet. The result was smaller exchange rate volatility in the parallel market, despite the fact that the authorities allowed greater exchange rate flexibility in the inter-bank market. This experience of Vietnam seems to yield an important insight into how market participants respond to exchange rate policy actions, and provide a potential lesson for other developing countries that may face a similar speculative attack on their currency.

## Appendix. Data sources and summary statistics

### A.1. Data for Section 3

The daily exchange rate series (5-day week, excluding holidays) of the Special Drawing Right (SDR), for the period 1 January 2007 to 31 December 2009, were obtained from the website of the International Monetary Fund (IMF) at [www.imf.org](http://www.imf.org), against 11 national currencies: the Australian dollar (AUD), the British pound (GBP), the Chinese yuan (CYN), the euro (EUR), the Japanese yen (JPY), the Korean won (KRW), the Malaysian ringgit (MLR), the Singapore dollar (SGD), the Thai baht (THB), the US dollar (USD), and the Vietnamese dong (VND). Likewise, the daily New Zealand dollar (NZD) and Swiss franc (CHF) exchange rate data series were obtained from the Pacific Exchange Rate Services of the University of British Columbia's Sauder School of Business (<http://fx.sauder.ubc.ca/data.html>) for the same currencies.

The following tables ([Tables A1 and A2](#)) report the summary statistics of the (logarithmic differences of the) SDR exchange rates of the 11 national currencies as used in estimating Eq. (1) in the text.

### A.2. Data for Section 4

The daily data series for the period 1 January 2007 to 31 December 2009 were obtained from the database of the Bank for Foreign Trade of Vietnam (Vietcombank) for (i) the buying rate at Hanoi; (ii) the selling rate at Hanoi; (iii) the average rate; and the parallel market premium. The following table ([Table A3](#)) reports their basic statistics in terms of the US dollar.

<sup>13</sup> These results do not change with the use of the effective date, instead of the announcement date, in defining an event.

<sup>14</sup> For example, in December 2009 (and again in March and April 2011), the press reported that the authorities had used police to curtail parallel market activity in Hanoi and Ho Chi Minh City.

**Table A1**  
Basic statistics for the SDR exchange rates of 11 national currencies.

Variable	Mean	Median	Maximum	Minimum	Std.Dev	Skewness	Kurtosis
<i>d log AUD</i>	0.000118	0.000489	0.073490	-0.099345	0.011998	-0.808779	15.71293
<i>d log GBP</i>	-0.000332	-0.000065	0.048626	-0.040142	0.006998	-0.017440	10.47464
<i>d log CNY</i>	0.000130	0.000015	0.027051	-0.024483	0.003710	0.548614	12.55331
<i>d log EUR</i>	0.000073	0.000243	0.024845	-0.027501	0.004524	-0.472478	8.51581
<i>d log JPY</i>	0.000319	0.000000	0.041205	-0.046171	0.008702	0.085210	6.71445
<i>d log KRW</i>	-0.000403	0.000000	0.121377	-0.069522	0.011993	1.935285	29.46833
<i>d log MLR</i>	-0.000027	0.000000	0.026602	-0.021876	0.004365	0.257327	7.42814
<i>d log SGD</i>	0.000063	0.000000	0.015614	-0.017328	0.003634	0.019882	5.42251
<i>d log THB</i>	0.000050	0.000000	0.032241	-0.024301	0.004720	0.463725	9.64126
<i>d log USD</i>	-0.000065	-0.000224	0.021999	-0.024746	0.003822	0.270155	9.59456
<i>d log VND</i>	-0.000223	-0.000203	0.023283	-0.053628	0.004873	-2.753000	34.04432

**Table A2**  
Correlation coefficients for the SDR exchange rates of 11 national currencies.

	<i>d log AUD</i>	<i>d log GBP</i>	<i>d log CNY</i>	<i>d log EUR</i>	<i>d log JPY</i>	<i>d log KRW</i>	<i>d log MLR</i>	<i>d log SGD</i>	<i>d log THB</i>	<i>d log USD</i>	<i>d log VND</i>
<i>d log AUD</i>	1.000	0.332	-0.077	0.190	-0.5373	0.172	0.386	0.498	-0.044	-0.098	-0.062
<i>d log GBP</i>	0.332	1.000	-0.326	0.233	-0.400	-0.005	-0.057	-0.055	-0.194	-0.342	-0.221
<i>d log CNY</i>	-0.077	-0.326	1.000	-0.719	0.197	0.235	0.494	0.449	0.702	0.950	0.775
<i>d log EUR</i>	0.190	0.233	-0.719	1.000	-0.354	-0.195	-0.268	-0.225	-0.591	-0.749	-0.593
<i>d log JPY</i>	-0.537	-0.400	0.197	-0.354	1.000	-0.060	-0.163	-0.140	0.120	0.180	0.088
<i>d log KRW</i>	0.172	-0.005	0.235	-0.195	-0.060	1.000	0.242	0.237	0.327	0.238	0.129
<i>d log MLR</i>	0.386	-0.057	0.494	-0.268	-0.163	0.242	1.000	0.740	0.404	0.485	0.358
<i>d log SGD</i>	0.498	-0.055	0.449	-0.225	-0.140	0.237	0.740	1.000	0.380	0.436	0.366
<i>d log THB</i>	-0.044	-0.194	0.702	-0.591	0.120	0.327	0.404	0.380	1.000	0.740	0.607
<i>d log USD</i>	-0.098	-0.342	0.950	-0.749	0.180	0.238	0.485	0.436	0.740	1.000	0.812
<i>d log VND</i>	-0.062	-0.221	0.775	-0.593	0.088	0.129	0.358	0.366	0.607	0.812	1.000

**Table A3**  
Summary statistics for alternative parallel exchange rates and the parallel market premium.

	Mean	Median	Maximum	Minimum	Std.Dev.	Skewness	Kurtosis
Buying rate	0.0259	0.00000	3.7837	-4.6875	0.5054	0.0436	32.863
Selling rate	0.0263	0.00000	6.4842	-4.6391	0.5784	1.2217	41.858
Average rate	0.0260	0.00000	5.0908	-4.6632	0.5173	0.2265	34.8669
Market premium	8.3716	0.00000	3700.0000	-899.9504	149.8474	19.7889	488.6097

## References

- Caporale, G. M., Cipollini, A., & Demetriades, P. O. (2005). Monetary policy and the exchange rate during the Asian crisis: Identification through heteroscedasticity. *Journal of International Money and Finance*, 24, 39–53.
- Evans Martin, D. D., & Lyons Richards, K. (2005). Do currency markets absorb news quickly? *Journal of International Money and Finance*, 24, 197–217.
- Fatum, R., & Hutchison, M. M. (2003). Is sterilized foreign exchange intervention effective after all? An event study approach. *Economic Journal*, 113, 390–411.
- Fatum, R., & Hutchison, M. M. (2006). Effectiveness of official daily exchange market intervention operations in Japan. *Journal of International National Money and Finance*, 25, 199–219.
- Fatum, R., & Scholnick, B. (2008). Monetary policy news and exchange rate responses: Do only surprises matter? *Journal of Banking and Finance*, 32, 1076–1086.
- Frankel, J., & Wei, S.-J. (1994). Yen bloc or Dollar bloc? Exchange rate policies of the East Asian economies. In T. Ito & A. O. Krueger (Eds.), *Macroeconomic linkages: Savings, exchange rates and capital flows*. Chicago: University of Chicago Press.
- Frankel, J., & Wei, S.-J. (2008). Estimation of de facto exchange rate regimes: Synthesis of the techniques for inferring flexibility and basket weights. *IMF Staff Papers*, 55, 384–416.
- Harvey, A. C. (1989). *Forecasting, structural time series models and the Kalman filter*. Cambridge, New York: Cambridge University Press.
- Kim, S. (2003). Monetary policy, foreign exchange intervention, and the exchange rate in a unifying framework. *Journal of International Economics*, 60, 335–386.
- Kim, S. (2005). Monetary policy, foreign exchange policy and delayed overshooting. *Journal of Money, Credit, and Banking*, 37, 775–782.
- Mackinlay, A. C. (1997). Event studies in economics and finance. *Journal of Economic Literature*, 35, 13–39.
- Phylaktis, K. (1996). Black market for foreign currency: A survey of theoretical and empirical issues. *Financial Markets, Institutions and Instruments*, 5, 210–233.