**Exchange rate arrangements: Evidence from**

**Central Asian countries**

**Bekzod Islamovich Shamshiev**

**Banking and Finance Academy, Uzbekistan**

***Email:*** **sbekzod@yahoo.com**

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***Email:* sbekzod@yahoo.com**

***Abstract:*** *The five post-Soviet nations in Central Asia have followed their own monetary policies since introducing their own currencies in the early 1990s. This paper empirically studies exchange rate arrangements in Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan. It tests whether these exchange rates follow a basket of the world’s major currencies and, if so, which currencies especially influence the rates. Using a well-known Frankel and Wei methodology, the paper analyzes the influence of major currencies by estimating time-varying coefficients. The US dollar played an important role in exchange rates in the region over the period 1995-2014, although its influence has slightly declined.*

***Key words:*** *exchange rate arrangements, monetary policy, exchange rate flexibility, time-varying coefficients*

**1. Introduction**

After the collapse of the Soviet Union in 1991, most of the former Soviet republics introduced their own currencies in an attempt to get rid of the influence of the Russian ruble. In Central Asia, Kyrgyzstan was the first country to adopt its own currency, in May 1993. It was followed by Kazakhstan and Turkmenistan in November 1993; Uzbekistan in July 1994; and Tajikistan in May 1995.

This paper analyzes how the US dollar and the ruble have influenced exchange rates in Kyrgyzstan, Kazakhstan, Tajikistan and Uzbekistan.[[1]](#footnote-1)

Related studies of the Commonwealth of Independent States (CIS) include Pastor and Damjanovic (2001), on the effect of the Russian financial crisis on Central Asian countries and their responses in 1998-1999. A sharp devaluation of the ruble against the dollar led to a sharp decrease in exports of Central Asian countries to their major trading partner, Russia. To mitigate the consequences of the Russian financial crisis, and to keep their own economies competitive, some countries devalued their nominal exchange rates -- in particular, Kyrgyzstan, Kazakhstan and Tajikistan (Pastor and Damjanovic, 2001).Most CIS countries manage their exchange rates, due to dollarization (Keller and Richardson, 2003). Dollarization increases their financial vulnerability as well as their fear of floating currencies, and it is not easily reversed.

Although national currencies in Central Asia are largely dollarized, the economic growth of Russia during the 2000s[[2]](#footnote-2) and the growing trade within the CIS might cause the ruble to become more influential in Central Asia as a nominal anchor. To verify such a trend, one must examine how the ruble and the dollar have affected each currency in Central Asia. To the best of my knowledge, there are no other empirical studies of the degree of influence exerted by the ruble and the dollar over the region’s currencies.

This paper measures the degree of influence of the two major currencies by applying a model of Ordinary Least Squares (OLS) developed by Frankel and Wei (1994, 2007) to examine exchange rate policies in East Asia. Moreover, following Cavoli and Rajan (2007) and Ogawa and Yang (2008), this paper shows how the degree of influence has changed, by using OLS coefficient estimates that are time-varying and recursive.

Since Central Asian countries remained in the ruble zone until mid-1995, this paper uses monthly exchange rates for the period from June 1995 through December 2014.

The paper shows that the dollar is much more influential than the ruble over all local currencies in Central Asia. But recently the ruble became slightly more influential than before in Kazakhstan, Kyrgyzstan and Uzbekistan, just before Western sanctions against Russia for its Ukrainian policy took their full effect. This trend could relate to concurrent economic growth in Russia and to the growing role of that economy in the CIS.

The rest of this paper is organized as follows. The next section briefly reviews exchange rate arrangements in Central Asia. Section 3 measures and discusses the influence of the dollar and ruble. Section 4 concludes.

**2. Exchange rate arrangements in Central Asian countries**

After introducing their currencies, Central Asian countries (except Kyrgyzstan) maintained fixed exchange rates against the dollar.[[3]](#footnote-3) But subsequent favorable economic conditions, such as the end of the ruble crisis and the rise in resource prices, enabled them to adopt flexible exchange rates around 2000. Figures 1-3 illustrate the exchange rate movements of four national currencies in Central Asia in terms of the dollar, the ruble and the Swiss franc.

The Kazakhstan tenge and the Kyrgyzstan som have been relatively stable against the dollar and the ruble over the sample period from 1995 through 2014, although the Russian crisis in 1998 caused these two Central Asian currencies to depreciate against the dollar and appreciate against the ruble.[[4]](#footnote-4) On the other hand, the Tajikistan somoni and the Uzbekistan som have been depreciating against the dollar and the ruble, although the 1998 crisis caused the two local currencies to appreciate against the ruble. Moreover, trends show structural breaks in the movements of all national currencies, except those of the Uzbekistan som, against all major currencies during the 2008-9 world financial crisis.[[5]](#footnote-5) The som had a structural break against only the ruble during that period.



Figure 1: Logs of exchange rates against the US dollar.



Figure 2: Logs of exchange rates against the Russian ruble.



Figure 3: Logs of exchange rates against the Swiss franc.

The depreciation of the somoni against the dollar and the ruble might have been caused by political instability, enormous budget deficits, weak monetary policy, and a fall in real GDP of about 20% to 30% during the mid-1990s (Tashrifov, 2005). The considerable depreciation of the Uzbekistan som during the late 1990s might be explained by unification of exchange rates and the decline of the world prices of cotton and gold, two main sources of foreign exchange reserves.[[6]](#footnote-6)

The first critical shock during the sample period was the 1998 ruble crisis, since Russia had been one of the most important trading partners for Central Asia. In August 1998, Russia declared a 90-day moratorium on foreign debt and defaulted on its domestic bond obligations. Moreover, the Russian central bank could not provide a stable exchange rate, and the ruble depreciated by more than two thirds within a month, falling from 6.2 rubles against the US dollar to 20 rubles.[[7]](#footnote-7)The second shock was the 2008-9 crisis. Advanced economies suffered deep recession, while emerging and developing economies slowed due to declines in exports and in external financing.

Exchange rate movements in Central Asian currencies in terms of volatility and correlation are analyzed by dividing the time interval into three periods, demarcated by the two crises. The first period is from June 1995 through December 1997; the second, from January 2000 through June 2008; the third, from June 2009 through December 2014.

Tables 1-3 present summary statistics of monthly changes in the nominal exchange rates against the Swiss franc during each of the three sample periods. Among the four countries, the somoni had the highest volatility with a standard deviation of 0.1967 during the first period. The Uzbekistan som had the highest volatility, with a standard deviation of 0.0693, between the two crises, while the somoni was the most volatile currency in the last period, with a standard deviation of 0.0321. During all three periods, the Kazakhstan tenge was usually less volatile than other Central Asian currencies, implying that it was managed to some extent. The volatility of the tenge, the Kyrgyzstan som, and of the somoni decreased after the Russian crisis and changed little during the third period. But the volatility of the Uzbekistan som increased from the first period to the second; during the third period, it declined to its lowest level for all three periods.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 　 | Kazakhstan | Kyrgyzstan | Tajikistan | Uzbekistan | USA | Russia |
| Mean | -0.0005 | 0.0096 | 0.0795 | 0.0254 | -0.0076 | 0.0026 |
| Median | 0.0007 | 0.0061 | 0.0195 | 0.0215 | -0.0128 | 0.0004 |
| Maximum | 0.0703 | 0.1505 | 0.9244 | 0.1331 | 0.0378 | 0.0536 |
| Minimum | -0.1281 | -0.0606 | -0.0814 | -0.0366 | -0.0481 | -0.0353 |
| Std. Dev. | 0.0362 | 0.0444 | 0.1967 | 0.0432 | 0.0233 | 0.0236 |
| Observations | 29 | 29 | 29 | 29 | 29 | 29 |

Note: The base currency on which the statistics are based is the Swiss franc.

Table 1: Statistics of monthly changes in nominal exchange rates (1/1995 – 12/1997).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Kazakhstan | Kyrgyzstan | Tajikistan | Uzbekistan | USA | Russia |
| Mean | 0.0026 | 0.0020 | 0.0126 | 0.0260 | 0.0041 | 0.0030 |
| Median | -0.0007 | 0.0010 | 0.0093 | 0.0137 | 0.0007 | -0.0016 |
| Maximum | 0.0774 | 0.0899 | 0.1052 | 0.4465 | 0.0750 | 0.0559 |
| Minimum | -0.0504 | -0.0759 | -0.0381 | -0.0502 | -0.0396 | -0.0350 |
| Std. Dev. | 0.0242 | 0.0323 | 0.0281 | 0.0693 | 0.0241 | 0.0227 |
| Observations | 102 | 102 | 102 | 102 | 102 | 102 |

Note: The base currency on which the statistics are based is the Swiss franc.

Table 2: Statistics of monthly changes in nominal exchange rates (1/2000 – 6/2008).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Kazakhstan | Kyrgyzstan | Tajikistan | Uzbekistan | USA  | Russia |
| Mean | 0.0048 | 0.0060 | 0.0043 | 0.0089 | 0.0019 | 0.0104 |
| Median | 0.0009 | 0.0102 | 0.0084 | 0.0115 | 0.0013 | 0.0062 |
| Maximum | 0.1222 | 0.0686 | 0.0700 | 0.0640 | 0.0672 | 0.1848 |
| Minimum | -0.1025 | -0.1262 | -0.0891 | -0.1164 | -0.1103 | -0.0434 |
| Std. Dev. | 0.0309 | 0.0304 | 0.0299 | 0.0280 | 0.0259 | 0.0357 |
| Observations | 67 | 67 | 67 | 67 | 67 | 67 |

Note: The base currency on which the statistics are based is the Swiss franc.

Table 3: Statistics of monthly changes in nominal exchange rates (6/2009 – 12/2014)

Tables 4-6 present the correlation matrix of monthly changes in the nominal exchange rates against the Swiss franc for each of the three periods. All currencies correlated positively with each other during all periods. The tenge shows a high correlation with the dollar and the ruble in the first two periods and with the dollar in the third period, while it has a lower correlation with the ruble in this period. For the Kyrgyzstan som and the somoni, correlations with the dollar and the ruble increased from the first to the second period. Their correlations with the dollar further increased during the third period, while their correlations with the ruble decreased during this period. In contrast, for the Uzbekistan som, correlation with the dollar and the ruble declined after the Russian crisis. After the 2008-9 crisis, its correlation with the dollar increased, while its correlation with the ruble declined further. Moreover, correlations among the tenge, the Kyrgyzstan som, and the somoni increased from period to period. For the Uzbekistan som, the correlations with the Kazakhstan tenge, the Kyrgyzstan som, and the Tajikistan somoni also increased from the first to the third period but declined in the second period.

To sum up, the volatilities of all national currencies decreased from the first period to the last, although the volatility of the Uzbekistan som increased in the second period. Correlations among Central Asian currencies increased considerably from the first period to the last. Correlations of these currencies with the dollar also increased, while their correlations with the ruble, except that of the somoni, decreased from the first period to the last.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 　 | Kazakhstan  | Kyrgyzstan | Tajikistan | Uzbekistan | USA  | Russia |
| Kazakhstan | 1.000 |  |  |  |  |  |
| Kyrgyzstan | 0.335 | 1.000 |  |  |  |  |
| Tajikistan | 0.423 | 0.177 | 1.000 |  |  |  |
| Uzbekistan | 0.240 | 0.577 | 0.312 | 1.000 |  |  |
| USA  | 0.727 | 0.316 | 0.283 | 0.343 | 1.000 |  |
| Russia  | 0.721 | 0.361 | 0.233 | 0.329 | 0.960 | 1.000 |

Note: The base currency on which the statistics are based is the Swiss franc.

Table 4: Correlation matrix of monthly changes in nominal exchange rates (6/1995 – 12/1997)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 　 | Kazakhstan | Kyrgyzstan | Tajikistan | Uzbekistan | USA | Russia |
| Kazakhstan | 1.000 |  |  |  |  |  |
| Kyrgyzstan | 0.412 | 1.000 |  |  |  |  |
| Tajikistan | 0.613 | 0.220 | 1.000 |  |  |  |
| Uzbekistan | 0.182 | 0.334 | 0.245 | 1.000 |  |  |
| USA  | 0.887 | 0.507 | 0.621 | 0.192 | 1.000 |  |
| Russia  | 0.750 | 0.612 | 0.577 | 0.213 | 0.789 | 1.000 |

Note: The base currency on which the statistics are based is the Swiss franc.

Table 5: Correlation matrix of monthly changes in nominal exchange rates (1/2000 – 6/2008).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 　 | Kazakhstan | Kyrgyzstan | Tajikistan | Uzbekistan | USA  | Russia |
| Kazakhstan | 1.000 |  |  |  |  |  |
| Kyrgyzstan | 0.631 | 1.000 |  |  |  |  |
| Tajikistan | 0.553 | 0.776 | 1.000 |  |  |  |
| Uzbekistan | 0.675 | 0.845 | 0.847 | 1.000 |  |  |
| USA  | 0.869 | 0.680 | 0.656 | 0.786 | 1.000 |  |
| Russia  | 0.152 | 0.213 | 0.260 | 0.099 | 0.073 | 1.000 |

Note: The base currency on which the statistics are based is the Swiss franc.

Table 6: Correlation matrix of monthly changes in nominal exchange rates (6/2009 – 12/2014).

**3. Measuring the degree of influence**

**3. 1 Model specification**

The theory of optimum currency areas suggests a plausible solution to balance of payment crises -- a system of national currencies with flexible exchange rates.[[8]](#footnote-8) Neighboring countries can stabilize their exchange rates by choosing a major currency as a nominal anchor. In Central Asia, the anchor might be the dollar, the euro, the yen or the ruble.[[9]](#footnote-9)

In analyzing the role of major currencies in determining exchange rates, most empirical analyses use the Frankel and Wei (1994) methodology. Frankel and Wei examine exchange rate policies of nine East Asian countries by estimating the weight of the yen or the degree of pegging to the yen over the sample period from 1979 to 1992. They hypothesize that central banks in the region were trying harder than before to stabilize exchange rates vis-à-vis the yen. As a test, the authors use OLS to determine implicit weights of major currencies in the currency basket. They regress national currencies on major currencies expressed in terms of the numeraire, the Swiss franc. OLS coefficients imply the weights of basket currencies. Of course, their signs are predicted to be positive.

Several papers similarly analyze exchange rate policies, including Bayoumi and Eichengreen (1998), Calvo and Reinhart (2002), and Reinhart and Rogoff (2004). But when they assume that local currencies follow a basket of the world’s major currencies, most authors use the Frankel and Wei (1994) approach, including McKinnon (2001), Baig (2001), and Ogawa and Yang (2008).

Cavoli and Rajan (2007) characterize Singapore’s exchange rate policy through Frankel-Wei regressions. Instead of referring to the “weights” of major currencies, they use the term “degree of influence” since “weights” could not be appropriate in interpreting currency coefficients when regressed exchange rates are correlated with each other. Given that exchange rates are typically correlated, as shown in Tables 4-6, this paper uses the term “degree of influence.”

Central Asian countries stayed within the ruble zone immediately after the dissolution of the Union of Soviet Socialist Republics and have reduced the ruble’s influence only since the middle of the 1990s. To discuss recent foreign exchange rates in Central Asia, this paper examines how monthly changes in each national currency respond to those in major currencies, over the period from June 1995 through December 2013. Monthly data are from the websites of the central banks. Following Frankel and Wei (1994), the analysis uses this regression model:

****=  +

 ,

where the dependent variable, , is the log difference of the nominal exchange rate of each national currency in Central Asia in terms of the Swiss franc. The independent variables,,, and, are the respective log differences of the dollar, the ruble, the euro, and the yen, in terms of the Swiss franc. A large coefficient corresponding to a major currency implies that it influences the local currency significantly.

Fear of a floating currency can be captured by the currency’s flexibility against the dollar, measured as the deviation from unity of the dollar coefficient (Ogawa and Yang, 2008). As discussed in Baig (2001) and Cavoli and Rajan (2007), a large value of the coefficient of a major currency need not connote pegging to the currency, since it might reflect not exchange rate policy but market-driven correlations between the two currencies.[[10]](#footnote-10)

To analyze the influence of major currencies on local ones, this paper estimates the Frankel and Wei (1994) equation through two methods: The standard time-invariant OLS; and the time-varying recursive OLS, following Cavoli and Rajan (2007) and Ogawa and Yang (2008). The first method is applied in a preliminary examination of the whole sample period. The latter method, an extension of the former, estimates repeatedly, using subsets of the data that increase by one observation at each iteration. This allows us to trace the evolution of the coefficients. Large variations in an estimated coefficient indicate a structural break.

Time-varying coefficients are a staple of the recent literature on exchange rates. In analyzing the influence of the dollar and the yen on Singapore’s currency, Cavoli and Rajan (2007) used recursive OLS estimates. Beckmann et al. (2010) used time-varying coefficients to examine the relationship between the exchange rate for the Deutsche mark and the dollar and macroeconomic fundamentals, shown in monthly data from 1975 to 2007. With time-varying coefficients, Kim et al. (2009) investigated the purchasing power parity of Southeast Asian currencies. These papers use time-varying coefficients mainly to track changes in relationships.

Beckmann et al. (2010) use time-varying coefficients because of the Lucas critique: Coefficients change when people anticipate a change in policy. Fixed coefficients cannot capture the effects of anticipated and unanticipated shocks.

**3.2. Diagnostic tests**

One must determine whether the time series used are stationary – that is, whether their nature remains the same over time. If they are not stationary, the regression might be spurious and the coefficients invalid. Augmented Dickey-Fuller (ADF) unit root tests find that all variables are stationary in their first differences (Table 7).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variables |   | Test Statistic |   | Critical Value (at 5% Level) |
| The Kazakh tenge, LnKZT |  | -13.0117 |  | -2.8738 |
| The Kyrgyz som, LnKGS |  | -14.3847 |  | -2.8738 |
| The Tajik somoni, LnTAD |  | -10.3947 |  | -2.8738 |
| The Uzbek som, LnUZS |  | -14.7175 |  | -2.8738 |
| The US dollar, LnUSD |  | -12.4766 |  | -2.8738 |
| The Russian ruble, LnRUB |  | -6.0638 |  | -2.8739 |
| The Japanese yen, LnJPY |  | -11.6512 |  | -2.8738 |
| The euro, LnEUR |   | -13.1483 |   | -2.8738 |

Table 7: ADF statistics for unit root testing of first differences.

We also examine whether a long-run equilibrium relationship exists among variables (which may be nonstationary) in the Frankel and Wei regression model for each currency. Table 8 presents Johansen’s cointegration test results for Central Asian currencies. In each national currency, the eigenvalue trace statistic rejects the null hypothesis of no cointegration between the respective national currency and major currencies at the 5% level of significance. (The variables are in first differences.) This suggests a long-run relationship between Central Asian currencies and major currencies.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cointeg. Vectors |  | The Kazakh Tenge |  | The Kyrgyz Sum |  | The Tajik Somoni |  | The Uzbek Som |
|  | Eigenval. | Trace Statistic |  | Eigenval. | Trace Statistic |  | Eigenval. | Trace Statistic |  | Eigenval. | Trace Statistic |
|   |   |   |   |   |   |   |   |   |   |   |   |   |
| None \* |  | 0.2706 | 205.385 |  | 0.2609 | 201.595 |  | 0.2541 | 219.379 |  | 0.2287 | 192.014 |
| At most 1 \* |  | 0.2139 | 133.433 |  | 0.1973 | 132.675 |  | 0.2241 | 152.546 |  | 0.2096 | 132.793 |
| At most 2 \* |  | 0.1374 | 78.553 |  | 0.1564 | 82.558 |  | 0.1812 | 94.691 |  | 0.1355 | 79.152 |
| At most 3 \* |  | 0.1048 | 44.860 |  | 0.1243 | 43.786 |  | 0.1245 | 49.099 |  | 0.1165 | 45.953 |
| At most 4 \* |   | 0.0825 | 19.628 |   | 0.0576 | 13.532 |   | 0.0791 | 18.789 |   | 0.0747 | 17.712 |
|  \* denotes rejection of the hypothesis at the 5% level. |  |  |  |  |  |  |  |

Table 8: Johansen’s cointegration test for the regression model of Central Asian currencies.

The Breusch-Godfrey Lagrange Multiplier (LM) test finds serial correlation in error terms only for the tenge and the somoni. In both cases, a first-order autoregressive process eliminates the problem.

Test results also indicate that all residuals are homoskedastic except those for the somoni in the full regression.

**3.3 Results**

Table 9 gives results of the standard time-invariant OLS model for each Central Asian country over the period from June 1995 through December 2014. The coefficient for each major currency represents the degree of influence of that currency. Influence of the dollar is statistically significant for the tenge, the Kyrgyzstan som, and the Uzbekistan som, with the largest coefficient of 0.81 for the tenge. The dollar’s influence is statistically insignificant for the somoni. The ruble’s influence is statistically significant only for the Kyrgyzstan som with its value of 0.19, but its practical significance in the sample is much smaller than that of the dollar with its value of 0.51. In practical terms, the euro is influential in the sample for the somoni and the Uzbekistan som with relatively large coefficients (0.35 and 0.28 respectively), but it is insignificant for the tenge and the Kyrgyzstan som. Again in practical terms, the yen affects the somoni and the Uzbekistan som in the sample to some extent (0.34 and 0.10 respectively) but not the tenge or the Kyrgyzstan som.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent variable | The Kazakh Tenge | The Kyrgyz Som | The Tajik Somoni | The Uzbek Som |
| Constant | 0.00  |  | 0.00 |  | 0.01  |  | 0.01 |  | 0.02  |  | 0.02 |  | 0.02  |  | 0.02 |  |
|  | (2.16) | \*\* | (2.18) | \*\* | (2.40) | \*\* | (2.42) | \*\* | (2.39) | \*\* | (2.39) | \*\* | (5.25) | \*\* | (5.34) | \*\* |
| US Dollar | 0.81  |  | 0.82 |  | 0.51  |  | 0.51 |  | 0.56 |  | 0.79 |  | 0.57  |  | 0.64 |  |
|  | (8.11) | \*\* | (9.98) | \*\* | (4.16) | \*\* | (5.10) | \*\* | (2.12) |  | (3.54) | \*\* | (3.11) | \*\* | (4.24) | \*\* |
| Russian Ruble | 0.04  |  | 0.03 |  | 0.19  |  | 0.19 |  | 0.09 |  | 0.08 |  | 0.05  |  | 0.04 |  |
|  | (1.07) |  | (1.04) |  | (4.75) | \*\* | (4.84) | \*\* | (1.02) |  | (0.83) |  | (0.83) |  | (0.71) |  |
| Euro | 0.03  |  | 0.03 |  | -0.03  |  | -0.03 |  | 0.35 |  | 0.29 |  | 0.28  |  | 0.26 |  |
|  | (0.19) |  | (0.17) |  | (-0.13) |  | (-0.14) |  | (0.82) |  | (0.68) |  | (0.95) |  | (0.88) |  |
| Japanese Yen | 0.02  |  | - |  | 0.01  |  | - |  | 0.34  |  | - |  | 0.10  |  | - |  |
|  | (0.24) |  |  |  | (0.09) |  |  |  | (1.58) | \*\* |  |  | (0.68) |  |  |  |
| AR(1) | 0.20 |  | 0.20 |  | - |  | - |  | 0.37 |  | 0.38 |  |  |  |  |  |
|  | (3.15) |  | (3.17) |  | - |  | - |  | (6.01) |  | (6.22) |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| R-squared | 0.40 |  | 0.39 |  | 0.27 |  | 0.27 |  | 0.11 |  | 0.09 |  | 0.12 |  | 0.12 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Wald test (F-stat) | 0.50 |  | 0.40 |  | 2.68 |  | 3.10 |  | 2.07 |  | 0.62 |  | 0.00 |  | 0.04 |  |
| Probability | (0.48) |  | (0.53) |  | (0.10) |  | (0.08) |  | (0.15) |  | (0.43) |  | (0.98) |  | (0.84) |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Observations | 233 |  | 233 |  | 233 |  | 233 |  | 233 |  | 233 |  | 233 |  | 233 | 　 |

Note: Figures in parentheses are t-statistics. All currencies are based on the Swiss franc. The symbols \* and \*\* imply the significance the levels of 10% and 5% respectively. The Wald test for the coefficient restriction tests the null hypothesis that the sum of all coefficients on the right-hand side equals 1.

Table 9: Estimation results of time-invariant OLS.

To check whether each currency follows a major currency or the currency basket, we test the null hypothesis that the coefficients of major currencies sum to unity, following Cavoli and Rajan (2007). Table 9 shows the Wald test results. The null hypothesis of the unity sum is rejected only for the Kyrgyzstan som, at the 10% level of significance. Evidently, most currencies follow the basket.

The method of time-varying coefficients also yields policy implications. As Cavoli and Rajan (2007) point out, a high and stable coefficient for a major currency suggests that the central bank is intervening often. A high and unstable coefficient indicates that the foreign exchange market, not intervention in it, influences the link between the major currency and the local one.

I applied recursive OLS to the sample period from June 1995 through December 2014. Figures 4-7 illustrate the dynamic behavior of the coefficients for the dollar and the ruble. In the case of the tenge, the dollar’s influence declined until the 2008-9 crisis (Figure 4). Then it slightly increased and remained significant. The ruble was influential until its crisis in 1998, when its power over the tenge declined drastically. After that, influence intensified very slightly, mostly due to the Kazakh authorities relaxing the exchange rate against the dollar in 2001-2.[[11]](#footnote-11) Since then, the dollar has lost some influence over the tenge, while the ruble has gained influence slightly. But the dollar remains far more influential than the ruble.



Figure 4: Recursive dollar and ruble coefficient estimates in Kazakhstan.

The result for the Kyrgyzstan som is somewhat like that for the tenge (Figure 5). The dollar’s influence fluctuated over the period, slightly intensifying after the 2008-9 crisis. The ruble’s influence also intensified to some extent but was less significant than the dollar, which in turn was less significant for the som than for the tenge.



Figure 5: Recursive dollar and ruble coefficient estimates in Kyrgyzstan.

On the somoni, neither the dollar nor the ruble had a significant influence (Figure 6).



Figure 6: Recursive dollar and ruble coefficient estimates in Tajikistan.

As for the Uzbekistan som, the dollar’s influence declined until the late 1990s and then increased steadily. The ruble’s influence has been insignificant since the 1998 crisis but has been intensifying since 2003. Overall, the dollar has had more of an impact than the ruble has, but neither currency is very influential (Figure 7).

Perhaps the dollar’s influence on the Uzbekistan som weakened during the 2000s because the Central Bank of Uzbekistan committed at that time to making the som convertible for current account transactions in order to improve the balance of trade as well as to speed up industrialization. Policymakers accepted the Article VIII obligations of the Articles of Agreement of the International Monetary Fund (IMF) that relate to currency convertibility;[[12]](#footnote-12) unified the official and parallel market exchange rates; increased access to and sale of foreign exchange; and promoted investment in exporting and in import substitution. These measures liberalized foreign exchange markets (Bakhromov, 2011; Olimov and Sirajiddinov, 2008) and so may have reduced the dollar’s influence.



Figure 7: Recursive dollar and ruble coefficient estimates in Uzbekistan.

In sum, recursive OLS estimations suggest structural changes in the exchange rate movements of some currencies in Central Asia. The dollar’s influence is significant in Kazakhstan, Kyrgyzstan and Uzbekistan, although it has declined over time. The ruble’s influence is insignificant in Kazakhstan, Tajikistan and Uzbekistan but recently intensified in Kazakhstan, Kyrgyzstan and Uzbekistan.

**4. Conclusion**

Central Asian countries have been orienting their economies towards markets, with monetary autonomy, since the introduction of national currencies. This paper examined the influence of the world’s major currencies on exchange rate arrangements in Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan over the period from June 1995 through December 2014. Empirical evidence shows that the tenge, the somoni, and the Uzbekistan som might follow a basket of regressed currencies. The dollar’s influence is significant in all countries but has fallen over time. The ruble’s influence is insignificant in Kazakhstan, Tajikistan and Uzbekistan. It is statistically significant in Kyrgyzstan but in practical terms less significant than the dollar.

In addition, a long-run equilibrium relationship exists between national currencies in Central Asia and the world’s major currencies.

Research is needed to identify the sources of influence of the dollar and the ruble. Two sources are plausible: Discretionary exchange rate management by central banks; and market-driven factors associated with economic conditions.

*Bekzod Shamshiev is a professor at the Banking and Finance Academy in Tashkent, Uzbekistan. He received his master’s degree in international development from the International University of Japan in Niigata.*

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1. Due to a lack of data, the analysis does not include Turkmenistan. [↑](#footnote-ref-1)
2. Russian Economic Report (World Bank Russian Country Office, 2007). [↑](#footnote-ref-2)
3. See the Introduction to Symposium on “Monetary and Exchange Rate Policies in the CIS Countries: Between the EU and Russia,” Brussels (2005). [↑](#footnote-ref-3)
4. Kazakhstan maintained a managed floating exchange rate regime during the period 1995-1997. The appreciation of the Kazakhstan tenge against the ruble could also have related to a rapid rise in oil exports. In general, Kazakhstan’s monetary policy was acknowledged to be successful in keeping inflation low and in managing the exchange rate (Keller and Richardson, 2003). The situation in Kyrgyzstan, which was the first country in Central Asia to float its exchange rate, was almost the same as in Kazakhstan. Kyrgyzstan began managing its exchange rate due to the tight links between inflation, exchange rates, and external debt (Keller and Richardson, 2003; and Pastor and Damjanovic, 2001), which provided a relatively stable exchange rate against the dollar after the 1998 Russian crisis. [↑](#footnote-ref-4)
5. The level of external debt and an increase in government expenditure led the Kazakh economy to overheat until 2007. So the Kazakh economy was hit all the harder by the world financial crisis of 2008-9. In dealing with the expected depreciation of the tenge, the National Bank of Kazakhstan heavily intervened in foreign exchange market and spent more than $9 billion to stabilize the exchange rate from October 2008 to February 2009. In the case of the somoni, demand for the main export commodities of Tajikistan, such as aluminum and cotton, decreased in 2008-9. And international prices of these commodities decreased. These tendencies raised the trade deficit and the depreciation rate of somoni. [↑](#footnote-ref-5)
6. In 1997-2003, Uzbekistan maintained several exchange rates in order to promote import-substituting industries and to subsidize basic food imports in 1997-2003 (Rosenberg and Zeeuw, 2001). In October 2003, authorities unified the exchange rates. [↑](#footnote-ref-6)
7. See Pastor and Damjanovic (2001). [↑](#footnote-ref-7)
8. See Robert Mundell (1961). [↑](#footnote-ref-8)
9. Fahad Alturky et al. (2009) examine the extent to which the growth rates in CIS countries are linked to developments in Russia. The paper finds an increasing Russian influence on Central Asian economies through remittances and financial channels. [↑](#footnote-ref-9)
10. Cavoli and Rajan (2007) state that the standard deviation of the coefficient can inform us. For example, a small standard deviation implies that the monetary authority tries to maintain the correlation between its own currency and a major one, through market intervention. [↑](#footnote-ref-10)
11. See Gissy (2009). [↑](#footnote-ref-11)
12. This is according to the IMF’s press release issued on November 11, 2003. IMF members that accept Article VIII of the IMF’s Articles of Agreement should not impose restrictions on payments for current transactions and engage in discriminatory currency practices. [↑](#footnote-ref-12)