

NBER WORKING PAPERS SERIES

MOSCOW BLACK MARKETS AND OFFICIAL MARKETS FOR FOREIGN EXCHANGE:
HOW MUCH FLEXIBILITY IN FLEXIBLE RATES?

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Working Paper No. 4040

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
March 1992

This paper is part of NBER's research program in International Finance and Macroeconomics. Any opinions expressed are those of the author and not those of the National Bureau of Economic Research.

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ABSTRACT

Flexible exchange-rate systems often are not recommended for countries undergoing economic transition. In late 1989, the former Soviet Union instituted exchange-rate flexibility on the limited share of enterprise international transactions channelled through the auction and, later, interbank markets for foreign-currency trade. This paper details the regulatory evolution of this system and analyses the impact of announced and implemented policy initiatives on two sets of flexible exchange rates observed in Moscow: i) the exchange-rates instituted through foreign-currency auctions and interbank markets; and ii) black-market exchange rates on dollar-ruble trade. We ask whether the flexible-rate system, as implemented, was associated with the negative or positive features of flexible exchange-rate systems.

Initially the auction and interbank currency structure was used as a mechanism for a steady real depreciation of the ruble. Thereafter, the ruble was pegged in real terms at a level initially equal to the black-market exchange rate. This peg persisted until the end of 1991, when government central-bank foreign-exchange reserves were depleted and the crawling peg appears to have been abandoned. Throughout the sample, patterns in black-market exchange rates contrasted sharply with those of the auction rates. Black-market rates exhibited greater real variability and exhibited sharp speculative swings.

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I. Introduction¹

On the road to a market economy, an essential step is the establishment of appropriate relative prices on all commodities, including both goods and financial assets. This step, achieved through early introduction of currency convertibility, is hoped to enable enterprises and individuals to trade at undistorted exchange rates and prices, thereby speeding the transition process. Nonetheless, access to foreign currency remains restricted in most of Eastern Europe and the former Soviet Union, with the severity of these restrictions greatly varying across countries. In most countries, black-markets thrive alongside the restricted official-markets for foreign exchange.

This paper analyzes the extent of price-flexibility and market-based activities observed in two Moscow-based markets for foreign exchange. The first market is an official legal market implemented through auction and interbank activities in foreign currency. The second market is the active black market on Moscow's streets. The price-based activities in these markets are compared and discussed in terms of the advantages and disadvantages of adopting flexible-rate systems. Econometric analysis is used to trace the effects on exchange rates of prices and currency-related initiatives within the former Soviet Union during the period between November 1989 and December 1991. Both announced and implemented policy initiatives are permitted to affect exchange rates. Time-tables of relevant events in these markets during this period are provided.

In late 1989, Gorbachev's government had chosen a type of flexible-exchange rate system as an initial step toward establishing currency convertibility. This "embracing" of markets in the sphere of foreign exchange began in November 1989 with the introduction

¹A much earlier version of this paper, "USSR Foreign Currency Markets: How Much Flexibility in Flexible Exchange Rates?", was prepared for the Jerome Levy Economics Institute conference on "Moving to a Market Economy: Policies for Economic Reform in Eastern Europe and the Soviet Union," October 25-26, 1991 at Bard College, Annandale-on-Hudson, New York. The author is grateful for many useful discussions with Dr. Il'dar Karimov (Central Economics and Mathematical Institute, Moscow, and The International Institute for Applied Systems Analysis, Vienna) and for his help in the compilation of the time-series of exchange rates and currency-market events. The author also acknowledges the research support of the C.V. Starr Center for Applied Economics at New York University.

of currency auctions. By April 1991, these auctions were replaced or supplemented by interbank transactions in foreign exchange. Presumably, the objective of these markets was to introduce exchange-rate flexibility and permit "market-based" activities to determine equilibrium exchange rates, even transitory ones. From the analysis provided in this paper, it is apparent that this flexibility, and the responsiveness of exchange rates to relevant stimuli, was not a central feature of these "markets". Limited transactions were channelled through the auction and interbank hard-currency markets. While the auction exchange rates were adjusted systematically for inflation, they generally did not exhibit the significant speculative swings that were observed in black-markets and could have been triggered by the major events that occurred.

Flexible exchange-rate systems generally are not recommended for countries with the level of financial-market development observed in Russia, the Baltics, Bulgaria, or Poland, for example. The appropriateness of adopting various exchange-rate systems, with their associated exchange-rate flexibility, has long been a subject of debate. For the advanced industrialized countries, this debate accompanied the Smithsonian Accord in 1971, the Plaza accord in 1985, the Louvre Accord in 1987, and the choice of an optimum system within the European Monetary Union. The earliest comparisons of fixed and flexible exchange-rate systems emphasized that these regimes have distinct implications for the effectiveness of important tools of macroeconomic policy, specifically monetary and fiscal policy. Later, the dangers of variable exchange rates were argued by proponents of fixed rates. In this context, it was argued that currency speculation could have destabilizing effects on the market place. Moreover, variability could depress growth and investment,² despite the potential for sophisticated financial

²On the appropriateness of introducing auction or interbank markets, see Quirk et al. (1987). For a survey of the literature on the effect of exchange-rate variability on international flows of goods, see Edison and Melvin (1990). More recent work of this type considers the impact on international movements of capital, as in Goldberg (1991).

instruments to be used to hedge against this variability. In countries with less-developed financial markets, these negative effects of variability may be accentuated.

For high-inflation countries, fixed exchange rates often are recommended for their role as introducing a nominal anchor for the domestic currency. A commitment to a fixed rate ties the hands of the monetary authorities who must limit money creation for fiscal-deficit financing.³ However, if this commitment is not credible, the fixed rate regime is undermined by currency speculation and can collapse under the weight of speculative attacks. For the reforming economies of the former Soviet Union and Eastern Europe, the requisite fiscal austerity may not be on the immediate horizon.

Flexible exchange rates do not imply analogous restrictions on domestic-credit creation. One limited form of flexibility in the form of real exchange-rate targets permit the exchange rate to move only to offset domestic and international inflation differentials, i.e. to maintain generalized purchasing-power-parity. Although a more sustainable system, the crawling peg imparts less monetary discipline. Appropriately chosen real parities can be adjusted only in response to real and permanent shocks to the system.⁴

Flexible exchange rates have the advantage of minimizing exchange-rate-induced price distortions (relative to those generated by the choice of an incorrect fixed exchange-rate vis-a-vis trading partners). Moreover, since the need for central-bank intervention in foreign-exchange markets is eliminated, flexible-rate systems could be attractive to countries with limited international reserves or access to foreign-currency credit or financing facilities.

This debate is not relevant for black markets, which, by their very nature, fully reflect market forces and exhibit associated price flexibility. In Moscow, the flexible-

³For example, see the discussion applied to the European Monetary System in Giavazzi and Pagano (1988).

⁴An extensive discussion of the nominal anchor and real anchor roles of alternative exchange-rate regimes are provided in Williamson (1991).

price black markets have been the primary grounds for foreign-currency transactions between individuals. As "free" markets, it is reasonable to expect that resulting black-market exchange rates would exhibit the types of responsiveness to economic signals and announcements predicted by Western economic theories.⁵ Of course, there is no shortage of rhetoric to the contrary, counter-arguing that market-based intuitions must slowly develop in the East, so that movements of exchange-rates in black markets might be largely insignificant. While it is the view of the author that it is unlikely that black-markets for foreign exchange are valid targets for such criticisms, the data will resolve this empirically.

In this paper, the exchange-rate flexibility observed in official markets is compared and contrasted with that observed in black markets. On balance, prices in official markets for foreign-currency trade did not demonstrate the type of speculative flexibility observed in black markets. In theory, this could minimize costly misallocations of resources attributed to speculative swings in exchange rates. However, this limited flexibility in exchange rates may have been achieved by officially rationed access of enterprises to foreign exchange. This creates the potential for an entirely new set of costs associated with inefficient allocation of resources under a "flexible" exchange-rate system. The remainder of the paper is divided into four sections. Section II provides a summary of the major policy initiatives (announced or enacted) influencing foreign-exchange market activities in Moscow between 1989 and 1991. Section III presents alternative ruble exchange-rate series and provides an econometric analysis of the effects of prices and policy initiatives. The results are interpreted within an in-depth discussion of market events. Section IV concludes with a broader discussion of the

⁵This view is corroborated by the Shiller, Boycko and Korobov (1991) interviews of individuals in Moscow and New York. The attitudes of Moscovites concerning markets were not fundamentally different than those of their New York counterparts.

implications of these results for exchange-rate policy formation in the reforming economies of Eastern Europe and the former Soviet Union.

II. Moscow Markets for Foreign Exchange: 1989-1991⁶

Currency auctions were introduced into the former Soviet Union in November 1989. This marked the start of a period of exchange-rates movements that in principle would be driven by market forces. Previously, all foreign-currency transactions were conducted according to a complex system of fixed "differentiated-exchange-coefficients", in which thousands of fixed exchange rates were distinguished by region and by goods traded. The new, more-unified system was presented as an attempt to use the forces of supply and demand in the currency markets to find a credible equilibrium exchange-rate. The auctions for hard currency were not, however, open to all agents engaging in foreign-exchange transactions. Buyers and sellers of foreign exchange were chosen using less than transparent criteria and licenses for currency purchases at auctions (and later interbank markets) were not openly distributed.

The foreign exchange sold on these auctions was supposed to be voluntarily supplied by Soviet exporting-enterprises. Although these exporters can earn a considerable amount of hard-currency, the government enforcement of strict foreign-exchange surrender-requirements implies that a much smaller portion of these foreign-currency earnings are available for discretionary allocations. In 1989, the surrender requirements of the central government were upward of 90 percent of foreign-exchange earnings, leaving the exporters with less than 10 percent of their earnings to allocate across alternative "voluntary" uses. By 1990, the scale of surrender requirements was highly industry-specific. All firms (excluding joint ventures) were required to sell to the Central Bank for Foreign Economic Affairs (Vnesheconombank) 40 percent of their

⁶This currency history is compiled from columns in the Soviet business journal, *Commerzant*, and from other miscellaneous news sources.

export revenues. Of the remaining hard currency, another share was seized by local authorities and an "union-republic fund". For the surrendered foreign-exchange earnings, the firm was compensated at the official exchange rate by both central and local authorities.

As of early 1990, the unappropriated share of enterprise foreign-exchange earnings ranged between 12 percent for gas, electricity and non-oil mineral products, and 42 percent for enterprises specializing in agricultural exports and machinery. In theory, managers of exporting enterprises can choose between selling their unappropriated hard currency in "free" internal markets, such as currency auctions or interbank markets, or retaining the hard currency for discretionary foreign-currency expenditures. In practice, foreign-currency auctions in the Soviet Union have been characterized by a distinct shortage of exporters willing to voluntarily sell foreign exchange.⁷ For auctions to continue to function, either exchange rates would have to reflect these shortages, or the demand-side of foreign-exchange markets would be rationed, or the government would need to use its foreign-exchange reserves (or surrender receipts) for intervention purposes.

Immediately following the break-up of the Soviet Union in late 1991, the changes in auction and interbank regulations were largely cosmetic. However, pervasive and sharp shortages of foreign exchange in early December led the government to drastically curtail sales of foreign exchange. In addition, the Vnesheconombank blocked access by both private and business residents to accounts containing foreign exchange.

Auction and interbank exchange rates, if market determined, should respond to regulatory and economic shocks. Table 1 presents a summary of the regulatory changes (announced or enacted) affecting the auction and interbank markets in Moscow from the time of their inception through the end of 1991.

⁷See Goldberg and Karimov (1991) for extensive discussion of this issue and for formalization of the hard-currency-allocation decisions of exporting enterprises.

Table 1 Regulatory Changes in the Auction and Interbank Markets

July 22 1990	Central government decree legalizing internal retail trade in foreign currencies.
August 1990	500 Day Plan declared and widely popularized in mass media. Contrary to the July 22 decree, this plan would impose a ban on the legal internal trade in hard currency.
October 19 1990	Demise of 500 day-plan apparent: President Gorbachev announced the "Principal Directions for Stabilization of the National Economy and for Transition to Market" program.
mid October 1990	Joint ventures and private firms (the so-called alternative economy) permitted to participate in currency auctions.
October 1990	Gorbachev announced that in 1991 the structure of "differentiated-exchange-coefficients" operational in the USSR would be replaced by a more unified controlled-exchange-rate regime.
December 3, 1990	Decree by the Russian Cabinet of Ministers wherein non-residents (foreign firms) allowed to transact in rubles within the Russian territory. These firms also were permitted to open ruble accounts in Russian banks.
April 9, 1991	First day of operation of the Moscow Currency Exchange (MCE) and announced termination of foreign-exchange auctions in Moscow, Riga and Vilnius.
June 10, 1991 ^{apprx}	Gosbank and Ministry of Finance issue two mutually contradictory instructions. Gosbank restricted the access to foreign currency of some importers of highly-profitable goods, including computers, consumer electronics, and cars. The Ministry of Finance introduced a new tax, wherein sellers of currency would have to pay the Ministry 35 percent of their total ruble revenues from currency sales.
July 16, 1991	Gosbank attempted to broaden the operations of the MCE by opening access to everyone (theoretically).
July 22, 1991	Gosbank introduced a complex set of regulations on transaction volumes. The bank-participants of the exchange were subject to quotas on their purchases of hard currency.
August 1, 1991	Gosbank allowed members of the MCE to engage in bilateral operations outside of the MCE.
September 3 1991	Gosbank doubled imposed quotas on the MCE (see July 22 1991 entry)
Dec. 4, 1991	Vnesheconombank blocked all foreign-currency accounts of USSR residents (both private and business).
Dec. 15, 1991	Decree on Foreign Trade Liberalization by Yeltsin. This loosened restrictions on foreign-currency transactions. Dissolution of Soviet Union announced.

In order to assess the expected impact on auction/interbank exchange rates of each of the regulatory changes presented in Table 1, and of the political or policy events presented in Table 2, an analytical model of enterprise behavior must be posited. For these purposes, the decision rules of exporters and importers are provided in their simplest form. Exporters supply hard currency and importers operate on the demand side of these markets. Denote the auction exchange rate by $S(t)$, defined as the amount of rubles per dollar; the price of enterprise products by $P(t)$; and denote the quantity of

foreign supplied as $F^s(t)$ and quantity demanded as $F^d(t)$. Let the subscript "e" denote the expectations computed in period t based on all currently available information.

The exporter's supply of hard-currency to official-foreign exchange markets is given by:

$$F^s(t) = \alpha + \alpha_0 S^a(t) - \alpha_1 S^e(t+1) + \alpha_2 P(t) - \alpha_3 P^e(t+1) \quad (1)$$

The foreign exchange supplied to auction and interbank markets is assumed to increase as the auction market exchange-rate increases, decrease with the expectation of future higher prices on currency sales (reflecting the intertemporal shift of currency sales), increase as domestic-currency production costs rise (and additional hard-currency sales are need in order to cover these expenditures), and declines in anticipation of future cost increases reflecting the delay of foreign-exchange sale dates. α reflects other exogenous forces that increase hard-currency supplied to auctions.

Table 2 **Other Policy Changes and Major Political Events Potentially Impacting Official Currency Markets**

May 24, 1990	Ryshkov's government announced a new program of transition to a market economy according to which retail consumer prices would increase significantly.
November 26, 1990	Finance Minister Valentin Pavlov launched the idea of monetary confiscations during a speech in the Supreme Soviet.
January 22, 1991	Monetary confiscations by central government of a portion of 50 and 100 ruble notes in circulation.
April 1991	Long-awaited price reform took place. This price reform increased retail prices by sixty percent.
June 12, 1991	Yeltsin elected President of Russia.
August 19-21, 1991	Attempted coup d'etat to overthrow Gorbachev. Yeltsin gains political momentum.
October 28, 1991	Yeltsin, in speech to Supreme Soviet, announces possibility of new Russian ruble, and launches idea of pending price liberalization for January 1992.
Early Dec. 1991	The Ukraine expands currency "coupon" system.
Dec. 12, 1991	Georgia announces that it will introduce a new currency (called the Marchuli) on or about January 1, 1991.

The importer's demand for hard-currency in official-foreign exchange markets is given by:

$$F^d(t) = \beta - \beta_0 S^a(t) + \beta_1 S^c(t+1) - \beta_2 P(t) + \beta_3 P^c(t+1) \quad (2)$$

The foreign exchange demanded at auction and interbank markets is assumed to decline as foreign exchange becomes more expensive, increase with the expectation of future higher prices on currency purchases (reflecting the intertemporal shift of currency demand), increase as domestic prices rise (reflecting both the relative decline in the prices of imported goods and effects of increased domestic costs so that less domestic currency is available for purchases of foreign exchange), and increase in anticipation of future price increases. β reflects other exogenous forces that increase currency demands.

Given this simple model,⁸ and the presumption -- perhaps not supported by the data-- that exchange rates are permitted to adjust to equate foreign-exchange supply and demand, the exchange rates in auction and interbank markets, $S^a(t)$, is given by:

$$S^a(t) = \frac{\alpha + \beta}{\alpha_0 + \beta_0} + \frac{\alpha_1 + \beta_1}{\alpha_0 + \beta_0} S^a_c(t+1) + \frac{\beta_2 - \alpha_2}{\alpha_0 + \beta_0} P(t) + \frac{\alpha_3 + \beta_3}{\alpha_0 + \beta_0} P^c(t+1) \quad (3)$$

Expected depreciations of the auction exchange rate and expected increases in goods prices pull up the current price of foreign currency. Current price-inflation depreciates the auction rate as long as the corresponding increase in demand exceeds the increase in supply for foreign exchange.

For participants in black markets for foreign exchange, a similar model of activity on demand and supply sides of the market can be posited.⁹ The main difference in structure is that tourist exchange-rate ($S^o(t)$) devaluations will be associated with a

⁸This can be modified to introduce disequilibrium in the foreign-exchange market. Specifically, in official markets, demand may be rationed or government central-banking authorities may otherwise intervene. For either specification, the exposition treats the parameters of hard-currency demand and supply functions as positive. These parameters are unconstrained in the empirical analysis.

⁹See Pinto (1991) for a recent theoretical exposition of the determinants of black-market exchange rates.

reduced supply of foreign exchange to the black market and a depreciation of the black market rate. The reduced-form equation for the black-market exchange rate, $S^b(t)$, is:

$$S^b(t) = c + c_1 S^b(t+1) + c_2 P(t) + c_3 P^e(t+1) + c_4 S^o(t) \quad (4)$$

Table 3 Events and Regulatory Announcements Affecting Black Markets

May 24, 1990	Ryshkov's government announced a new program of transition to a market economy according to which retail consumer prices would increase significantly.
July 22 1990	Central government decree legalizing internal retail-trade in foreign currencies.
Early August 1990	Central government imposed significant additional restrictions at the border for the Soviets going to Hungary, Poland, and Czechoslovakia.
August 1990	500 Day Plan declared and widely popularized in mass media. Contrary to the July 22 decree, this plan would impose a ban on the legal internal trade in hard currency.
October 19 1990	Demise of 500 day plan apparent: President Gorbachev announced the "Principal Directions for Stabilization of the National Economy and for Transition to Market" program.
mid October 1990	Joint ventures and private firms (the so-called alternative economy) permitted to participate in currency auctions.
October 1990	Gorbachev announced that in 1991 the structure of "differentiated-exchange-coefficients" operational in the USSR would be replaced by a more unified controlled-exchange-rate regime.
November 26,1990	Finance Minister Valentin Pavlov launched the idea of monetary confiscations during a speech in the Supreme Soviet.
January 22, 1991	Monetary confiscations by central government of a portion of 50 and 100 ruble notes in circulation.
April 1, 1991	Anticipated price reform. Retail prices rise by sixty percent. Devaluation of the tourist exchange rate.
July 23, 1991	Devaluation of the tourist exchange rate.
August 19- 21,1991	Attempted coup d'etat to overthrow Gorbachev. Yeltsin gains political momentum.
October 28, 1991	Yeltsin announces possibility of new Russian ruble, and launches idea of price liberalization for January 1992.
November 4, 1991	Devaluation of the tourist exchange rate.
Early Dec. 1991	The Ukraine expands currency "coupon" system.
Dec. 4, 1991	Vnesheconombank blocked all foreign-currency accounts of USSR residents (both private and business).
Dec. 12, 1991	Georgia announces that it will introduce a new currency (called the Marchuli) on or about January 1, 1991.
Dec. 15, 1991	Decree on Foreign Trade Liberalization by Yeltsin. This loosened restrictions on foreign-currency transactions. Dissolution of Soviet Union announced.

The summary of events and regulatory changes that may have influenced black-market exchange rates are provided in Table 3. Using these simplified representations of supply and demand in currency markets,¹⁰ the empirical analysis considers the likely effects of the forementioned regulatory and policy initiatives.

III. Empirical Analysis of Ruble-Dollar Exchange Rates

Below, estimates are provided of the responsiveness of the exchange rates to market-based forces. Ex-ante, it is assumed that some policy initiatives and regulatory changes primarily impact only one of the respective markets. Since many of the policy initiatives are introduced via dummy variables, this distinction takes the form of a selection from the complete set of dummies for estimation in each market. Ordinary-least-squares and time-series techniques are applied to estimate the effects of prices and policy changes on exchange rates. The statistical properties of the alternative series are provided and discussed.

III A. The Data

Nominal auction/interbank and black-market exchange rates for Moscow markets are presented in Figure 1. Nominal exchange-rate in auction markets¹¹, S^a_t , are defined as the amount of domestic currency (rubles) per unit of foreign exchange (dollars). The sample period for this official flexible-exchange rate market spans from November 3, 1989 to December 1991, and contains the nineteen foreign-currency auctions held in Moscow and run by the Vnesheconombank, and thirty-four interbank-market observations from the MCE. The observations span November 3, 1989 to December 24, 1991. Black-market exchange rates on the Moscow market, denoted by S^b_t , are from bi-weekly interviews with currency-dealers reported in the Moscow publication

¹⁰Goldberg and Karimov (1992) formally model the adjustment process in black-markets for foreign exchange in economies in the transition process.

¹¹In the discussion of this section, no distinction is drawn between exchange-rate flexibility achieved through auction or interbank markets for foreign exchange.

Commersant. These middle and end-of-month observations are assumed to correspond approximately to the fifteen and the thirtieth days of the respective months.¹² The sample period begins on May 30, 1990 and ends on December 30, 1991.

Interpretation of exchange-rate activity requires construction of real exchange-rate indices. This requires deflation of the nominal rates by appropriate price series and ones available at high enough frequency. Two price series are applied for this purpose. For constructing the real auction and interbank exchange rates, a wholesale-price index is used as the deflator. For constructing the real black-market exchange rates, a retail-price index is used as the deflator. Both price series are normalized to 1990:1=100.¹³ These price indices are presented in Figure 2.

Wholesale prices were basically constant between November 1989 and December 1990. In January 1991, a wholesale-price reform increased wholesale-price levels by more than 50 percent. Prices continued to increase another 50 percent through the first quarter of 1991. Between April 1991 and December 1991, the WPI gradually increased from a level of 215.2 to 355.1 (base January 1990=100).

Reported retail prices in the former Soviet Union rose steadily but not steeply during 1990, registering a total rise of 15 percent over the year. Although retail prices rose another 10 percent during the first quarter of 1991, the most significant adjustment in prices, of about 50 percent, occurred in April 1991. Prices rose another 50 percent between April and December 1991, with the rate of inflation sharply accelerated in the last quarter of 1991.

¹²*Commersant* provides both buy and sell rates between the black ruble and the dollar. The midpoint of these rates are used in the empirical analysis. The determinants of spreads in black markets have been discussed in other contexts, including in Cohen et al. (1979) and Dornbusch and Pechman (1985).

¹³Based on releases from the Soviet State statistical offices, *PlanEcon* provided these monthly indices for the period between January 1990 and September 1991 (*PlanEcon* VII numbers 43-44). For the earlier dates of the auction-rate sample, backwards interpolation is used to fill in the missing November 1989 observation. A .5 monthly price increase is assumed, as is consistent with the reported monthly price-level increases in the first quarter of 1990. For the price levels reported for the last quarter of 1991, data are drawn directly from releases by the State Statistical Offices. To fill in the bi-weekly observations and to construct date-specific values of the indices, linear-interpolation techniques are applied.

Figure 1: Nominal Exchange Rates (SUR/\$).

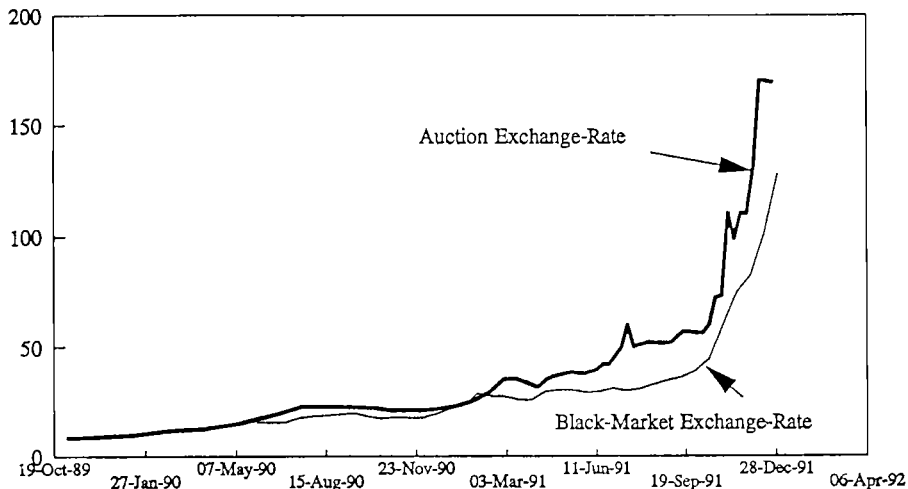
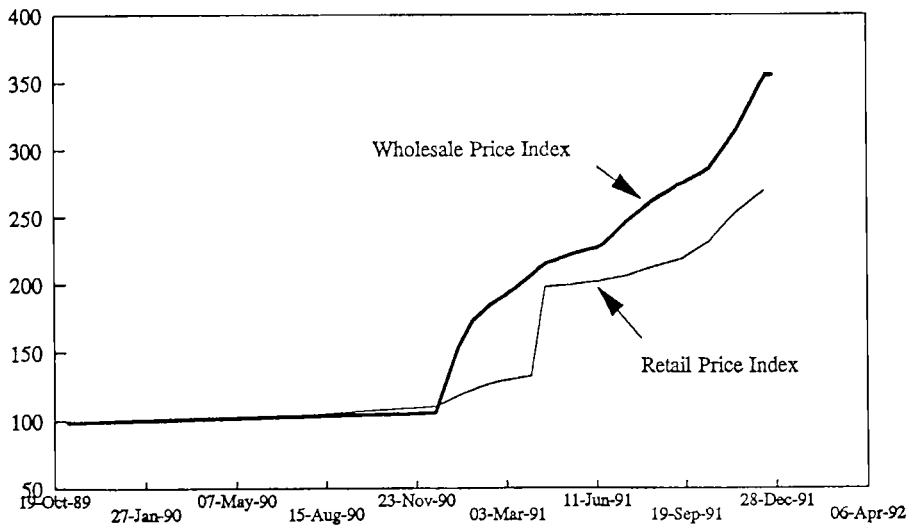


Figure 2: Wholesale and Retail Price Indices (January 1990=100)



The real auction/interbank and black-market exchange-rate indices are presented in Figures 3 and 4. Observe that the real auction rate depreciated steadily from the time that auctions were introduced (November 1989) through July 1990. From that latter point, which was precisely the time when the nominal auction-exchange-rate was equal to the nominal rate observed in Moscow black markets, the real exchange rate in auctions remained nearly constant until the end of October 1991.¹⁴ The only major deviation from this pattern is the real depreciation spike at the time of the July 16, 1991 brief experiment with open access to foreign exchange. Thereafter, in the last quarter of 1991, the ruble depreciated more than 100 percent in real terms.

This visual pattern suggests that the auction and interbank markets in Moscow were used for a clear and specific purpose. *For the early months of the auctions, this "flexible" exchange rate system was used to gradually and steadily lower the real value of the ruble against the dollar. Thereafter, auctions and interbank exchange markets were used as a mechanism to keep the ruble pegged in real terms against the dollar. In the last quarter of 1991, the ruble sharply declined in real terms.* During the "crawling peg" period, there is evidence that the demand-side of these currency markets was rationed. The extent of the rationing is glimpsed from the July 16, 1991 experiment with freer access to foreign exchange. In the end of 1991, the real ruble decline can perhaps be attributed to reduced availability of central-bank foreign-exchange reserves and a new willingness to depreciate the ruble in order to attract participants to the supply-side of foreign-exchange markets. This decline in the ruble cannot be considered purely "demand-induced" since the volume of dollars sold in the MCE during this period was comparable to volumes transacted in previous periods.¹⁵ This interpretation, implying a

¹⁴In other words, the amount of real goods needed to purchase dollars was constant over this interval. Alternatively, during this period there was a constant amount of domestic goods that exporters could purchase after they converted into rubles the dollars earned by exporting.

¹⁵Data on volumes of foreign exchange sold in these auctions are available from the author on request. Transaction volumes are not available at every observation. During 1990, transaction volumes were in the

Figure 3: Real Auction/Interbank Exchange Rate
(SUR/\$)/WPI

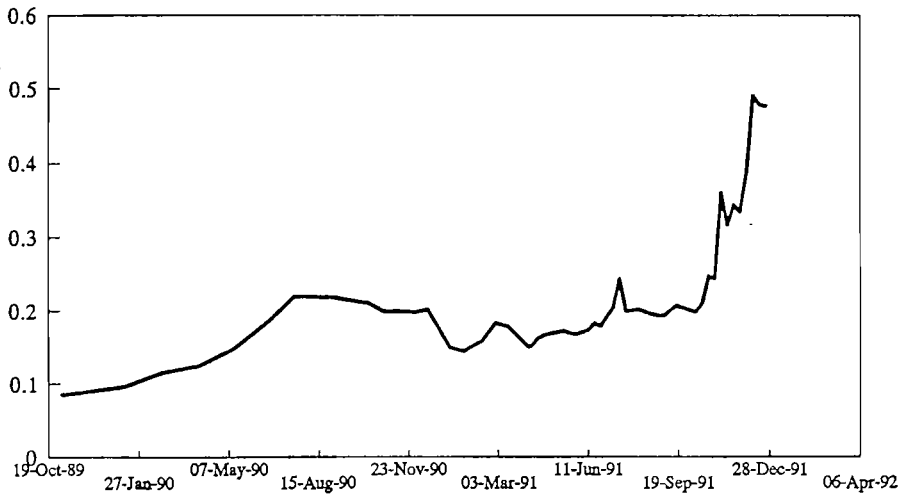
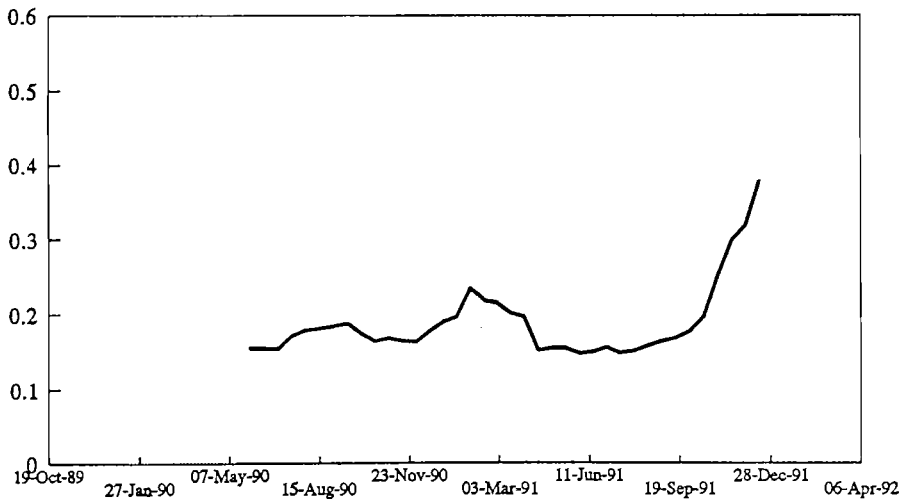


Figure 4: Real Black-Market Exchange Rate
(SUR/\$)/RPI



type of balance-of-payments crisis, is especially likely if we recall that in December 1991 the central bank declared severe foreign-exchange shortages and eventually froze (or seized) foreign-currency accounts of exporters.

Patterns in the price-adjusted black-market exchange-rate also are extremely revealing. More volatile period-to-period than the auction/interbank rates, between May 1990 and August 1991 the real exchange rate in black markets was relatively stable with the exception of two important intervals. The first of these was in September 1990 and the second interval was around January 1991. Both of these periods are similarly characterized by a sharp decline in the value of the ruble and then a recovery in value to the initial real level. Both of these periods involved actual or anticipated price reforms. Another sharp decline in the real value of the ruble took place at the end of 1991. Some of this variability is attributable to rational speculative demands for dollars in anticipation of price reforms. However, as in previous episodes, the black-market exchange rate overshot longer-run levels.¹⁶

The statistical properties of the nominal and real ruble-dollar rates are provided in Table 4. For both auction/interbank markets and black markets, the table shows the minimum, maximum, mean values, and normalized standard deviations of the respective series. In both real and nominal terms, the auction exchange-rate series exhibited the greatest absolute movements during the 1989 to 1991 period. The gap between the minimum and maximum levels of the ruble against the dollar represented a 2000 percent adjustment of the nominal price of foreign currency. In real terms, this gap represented an almost 500 percent increase in the price of foreign currency. Black-market exchange rates (rubles per dollar) exhibited a 550 percent nominal depreciation or a 133 percent real depreciation from minimum to maximum levels.

neighborhood of \$15 million per month. During 1991, transaction volumes generally ranged between \$20 -25 million per month.

¹⁶The dynamics of adjustment of black-market exchange rates and prices to anticipated official reforms are provided in Goldberg and Karimov (1992).

Table 4 Properties of Ruble-Dollar Exchange-Rate Data, 1989-1991

	full sample on auction data: November 1989- December 1991			
	full sample on black-market data: May 1990 - December 1991			
	minimum	maximum	mean	normalized standard.dev
nominal S^a_t	8.39	170.1	51.86	0.752
real S^a_t	0.085	0.490	0.214	0.407
nominal S^b_t	15.45	100.5	30.75	0.607
real S^b_t	0.144	0.373	0.184	0.266
	partial sample on auction data: 7/19/90- 10/15/91[excluding 7/16/91]			
	partial sample on black-market data: 7/15/90 - 10/15/91			
	minimum	maximum	mean	normalized standard.dev
nominal S^a_t	20.94	60.10	39.74	0.328
	[20.94]	[60.10]	[39.20]	[0.326]
real S^a_t	0.145	0.243	0.188	0.118
	[0.145]	[0.220]	[0.187]	[0.110]
nominal S^b_t	17.25	44.50	25.97	0.279
real S^b_t	0.144	0.230	0.172	0.129

During a stabilization program, the comparative performance of alternative exchange-rate regimes can, in part, be assessed in terms of their roles as nominal or real anchors. In nominal terms, the auction exchange rate was less of an anchor than the black-market rate. This is observed during the full sample and during subperiods of the sample. In real terms, however, the black-market exchange rate was more than 16 percent more variable during the "crawling peg" period of the auction and interbank markets (mid-July 1990 to mid-October 1991). During this interval, the auction/interbank system performed a "real anchor" function. This function was abandoned in the last quarter of 1991.

IIIB. Estimation

To measure the response of the alternative exchange-rate series to price changes and policy initiatives, the exchange rates are regressed against the price series and a range of dummy variables. As described in Table 5, the dummies proxy the announced and implemented events that would impact either demand or supply, and therefore exchange rates, in foreign-exchange markets. Dummy variables for changes in Tourist exchange-rates also are used in black-market exchange-rate regressions.¹⁷

The estimation equations on auction markets, using exchange rates and prices in logarithmic form, are:

$$S_t^a = \alpha_0 + \alpha_1 P_t^{*pi} + \alpha_2 Dummy_t + \varepsilon_{at} \quad (5)$$

where the residuals are denoted by ε_{at} and adjusted to have standard properties. For the auction and interbank markets, *Dummy* contains subsets of the following events dummies: [PReforma, PReform, D72290, Plan500a, MReforma, MReform, June1191, July1691, Bilateralop, Quotaⁱ, Coup, Preform2a, Dec1991]. Visual inspection of the auction exchange-rates data suggested three regimes of activity (November 1989 to July 1990; July 1990 to end of October 1991; end of October 1991 to end of December 1991). These are confirmed in empirical tests.

The regressions reported in Table 6 show the response elasticities of auction exchange-rates for the different regimes in the auction markets. Since the exchange rates and prices are in logarithmic form, the coefficient estimates are interpreted as response elasticities.

¹⁷The auction/interbank exchange rates and the black-market exchange rates are examined in separate regressions. Neither the data frequency or the intervals covered by these two series are matched. The regressions do not seasonally adjust the data.

Table 5: Dummy Variables for Announced and Anticipated Events

<u>Variable</u>	<u>Description of Event and Interval</u>
<u>PReforma</u>	Reform program announced late May 1990 would be accompanied by price rises. Rises enacted April 2 1991. Preforma= 1 late May 1990 to end of sample; = 0 otherwise.
<u>PReform</u>	Period of following implemented price reform. Preform= 1 from April 2 1991 to end of sample; = 0 otherwise.
<u>Decr72290</u>	Legalized internal trade in foreign currencies. Decr72290= 1 from July 22, 1990 to end of sample; = 0 otherwise.
<u>Border</u>	Tightened border restrictions beginning early August 1990. Border=1 from August 1990 to end of sample; = 0 otherwise.
<u>Plan500a</u>	Announced in mid-August 1990. Proposed ban on legal internal foreign-exchange trade. Future of program extremely bleak in mid-October 1990. Plan500a= 1 from mid-August 1990 to mid-October 1990; = 0 otherwise.
<u>MReforma</u>	Announced pending monetary reform. Mreforma= 1 from November 26, 1990 to end of sample; = 0 otherwise.
<u>Mreform</u>	Implemented monetary reform. Mreform= 1 from January 21, 1991 to end of sample; = 0 otherwise.
<u>June1191</u>	Regulatory changes from Gosbank and Ministry of Finance. June1191=1 on June 11, 1991; = 0 otherwise.
<u>July1691</u>	Regulatory change in MCE operations. July1691 =1 on July 16, 1991; = 0 otherwise.
<u>Bilateralop</u>	MCE members could engage in own bilateral clearing-house operations. Bilateralop = 1 from August 1, 1991 to end of sample; = 0 otherwise.
<u>Coup</u>	Attempted coup. Coup=1 August 19 to August 21, 1991; = 0 otherwise.
<u>Quotaⁱ</u>	Gosbank quota regulations on currency sales. Quota1=1 from July 22, 1991 to end of sample; = 0 otherwise. Quota2=1 from Sept. 3, 1991 to end of sample; =0 otherwise.
<u>Preform2a</u>	Yeltsin announces possibility of new Russian ruble and pending price reform Jan. 1992. Preform2a=1 from October 28, 1991 to end of sample; = 0 otherwise.
<u>Dec1991</u>	December 4 Vnesheconombank blocked all foreign-currency accounts of USSR residents. Ukraine announces own currency system. December 12, Georgia announces that it will introduce new currency. December 15 Disintegration of Soviet Union. Yeltsin decree of Foreign Trade Liberalization. Dec1991 = 1 from December 1, 1991 to end of sample; = 0 otherwise.

Table 6 Determinants of Moscow Auction-Exchange-Rates

Dependent variable: logarithm of the auction/interbank exchange rate (SUR/S)

	11/89-12/91	7/90-12/91	7/90-11/91	7/90-10/15/91
	<u>Reg 1</u>	<u>Reg 2</u>	<u>Reg 3</u>	<u>Reg 4</u>
constant	-2.75* (-2.75)	-2.333** (-2.52)	-2.140** (-2.31)	-0.525 (-1.06)
wpi	1.139* (5.30)	1.162* (5.87)	1.121* (5.65)	0.779* (7.57)
preforma	0.519* (6.67)			
preform2a	0.415* (6.53)	0.421* (7.64)	0.423* (7.58)	
mreforma	-0.136*** (-1.67)	-0.146** (-2.06)	-0.141*** (-1.96)	-0.140** (0.028)
mreform	-0.150 (-1.03)	-0.164 (-1.22)	-0.140 (-1.04)	0.095*** (1.76)
quota1	0.151** (2.29)	0.143** (2.46)	0.154** (2.62)	0.196* (3.74)
july1691	0.326* (2.95)	0.342* (3.33)	0.340* (3.40)	0.257* (5.31)
Dec1991	0.348* (4.59)	0.346* (5.23)		AR(1) 0.965* (4.96)
AR(1)	0.082 (0.49)	-0.030 (-0.19)	0.015 (0.90)	AR(2)-0.779* (-3.70)
				AR(3) 0.306** (2.06)

* implies significance at 1 percent level. ** implies significance at 5 percent level. *** implies significance at 10 percent level. In parentheses below the coefficient estimates are their *t*-statistics.

Adj. R-squared	0.977	0.974	0.961	0.973
Durbin-Watson	2.21	2.17	2.15	1.92
#observations	54	49	45	38

Wholesale prices and announced and enacted reforms significantly influenced auction exchange rates. Moreover, the directions of these effects generally were consistent with theories of exchange-rate determination. The ruble depreciated as domestic-price levels rose. For most subintervals, the coefficient on the wholesale-price-index implies that the corresponding ruble depreciations were slightly in excess of those that would be predicted by (generalized) purchasing-power-parity arguments.

The announcement of pending monetary reform (November 26, 1990) was associated with an appreciation of the ruble. In a market economy, this significant correlation would suggest that agents expected price inflation to decline in the future and thereby increased their assessment of the future strength of the domestic currency. The announcements of pending price reforms, both in May 1990 and in October 1991, led to significant ruble depreciations in auction markets. These effects are consistent with market-based practices. However, neither the announced 500-Day-Plan or the attempted Coup in August 1991 significantly impacted auction- or interbank-market exchange rates.

Regulatory changes in auction and interbank markets had mixed effects on exchange rates. Quota restrictions, although intended to regulate demand, were associated with ruble depreciations rather than appreciations. While regulatory changes in the form of reduced restrictions on demand (July 16, 1991) led to significant ruble depreciations, other regulatory changes did not have any significant impact (Decree of 7/22/90, adjustment of quota restrictions, and June 11, 1991 regulatory changes).

For the black-market exchange rates, the estimation equation is:

$$S_t^b = \beta_0 + \beta_1 P_t^{rpi} + \beta_2 Dummy_t + \beta_3 S_t^O + \varepsilon_{bt} \quad (6)$$

where S^O is a vector of changes in the tourist exchange-rates, and the residuals are adjusted to have standard properties. The relevant dummy variables are drawn from the

set of: PReforma, PReform2a, D72290, Border, Plan500a, MReforma, MReform, Dec1991.¹⁸ A seasonal-adjustment term [MA(24)] also is included in some regressions.

The first and perhaps most-striking result from this set of regressions is that black-market rates exhibit much greater absolute responsiveness to changes in the (retail) price index than did auction exchange rates. For given changes in retail prices, the decline in the value of the ruble in black markets is almost twice that indicated by (generalized) purchasing-power-parity.

As in auction/interbank markets, in black markets announcements of pending price reforms led to significant declines in the value of the ruble. Announcements of monetary reform and of the 500 Day Plan may have slightly appreciated the black-market ruble. The tourist exchange-rate devaluation (*Tourist3*) in November 1991 was associated with a significant ruble depreciation. Neither changes in border controls, other decrees, or the attempted coup in August 1991 significantly impacted black-market exchange rates.

¹⁸ For a longer sample period, it also might be desirable to introduce a seasonal dummy in the black-market data to correspond to the months of July and August. During these summer month, traditionally demand for dollars at the internal black-market increases while theoretically, the supply of rubles decreases significantly because foreigners and currency dealers leave Moscow and other large industrial cities for their vacations.

Table 7 **Determinants of Moscow Black-Market Exchange-Rates**

Dependent variable: logarithm of the black-market exchange rate (SUR/\$)
estimation interval 5/30/90 - 12/15/91

	<u>Reg I</u>	<u>Reg 2</u>	<u>Reg 3</u>	<u>Reg 4</u>
constant	-9.150* (-13.1)	-8.706* (-11.53)	-8.280* (-5.58)	-8.548* (-5.55)
retail price	2.394* (17.9)	2.303* (16.00)	2.208* (7.80)	2.265* (7.73)
preforma	0.917* (12.2)	0.887* (10.95)	0.861* (5.41)	0.854* (5.12)
preform2a	0.229* (7.43)	0.239* (7.46)	0.256* (4.06)	0.231 (3.51)
mreforma	-0.150* (-5.59)	-0.106* (-3.70)	-0.032 (-0.58)	-0.039 (-0.69)
Tourist3	0.173* (5.36)	0.180* (5.33)	0.229* (3.48)	0.186* (2.79)
Plan500a		-0.044*** (-1.74)	0.012 (0.24)	0.018 (0.35)
AR(1)	0.406* (5.18)	0.443* (4.87)	0.620* (2.92)	0.566** (2.61)
MA(24)	-0.928* (-10.09)	-0.920* (-9.50)	AR(2) -0.338 (-1.63)	
Adj. R-squared	0.997	0.996	0.985	0.985
Durbin-Watson	1.80	1.80	2.01	1.63
#observations	37	37	36	37

* implies significance at 1 percent level. ** implies significance at 5 percent level. *** implies significance at 10 percent level. In parentheses below the coefficient estimates are their *t*-statistics.

III C. Interpretation of Empirical Results

In this section, each of the regulatory and policy initiatives are discussed. The *a priori* expected effects of the initiatives are contrasted with their observed impacts. For our sample period, the first significant initiative occurred on May 24, 1990, when a new program of transition to a market economy was announced. Since this plan provided for substantial future increases in retail consumer prices, the anticipated inflation would, in theory, immediately depreciate the ruble in auction and black markets for hard-currency. Empirically, the sign of the expected impact is confirmed and significant in both auction/interbank and black markets.

Next, on July 22 1990 the Central government issued a decree legalizing internal retail trade in foreign currencies. This (theoretically) caused further substitution of the ruble by the dollar in internal-transactions-turnover. The expected impact is an increased demand for dollars at currency auctions and in black markets. While theoretically this would imply nominal and real ruble depreciations, in practice, neither exchange-rate series significantly responded to this decree.

Early in August 1990, the Central government imposed additional restrictions at the border for the Soviets going to Hungary, Poland, and Czechoslovakia. The number of tourists from the East dropped sharply. In theory, the effect of border controls would be greatest in unofficial markets: if this led to an increased price of imported goods, the effect on the ruble-dollar rate would depend on the demand elasticity for imported goods. In practice, these border changes did not have significant effects on Moscow black-market exchange rates.

Later in August 1990, the 500 Day Plan was declared and widely popularized in mass media. In direct contrast to the July 22 decree, this plan would impose a ban on the legal internal trade in hard currency. In theory, such an announcement would reduce demand for dollars on black market and increase the supply of dollars to auctions. This would appreciate the ruble in both official and unofficial markets. The plan also provided

for a time-table of reform initiatives. The future of this plan was revealed as extremely bleak as of October 19, 1990 when President Gorbachev announced his program entitled "Principal Directions for Stabilization of the National Economy and for Transition to Market". The *Plan500a* dummy was insignificant in both auction and black markets (or, if significant the coefficient was extremely small). This could suggest that markets never believed in the likelihood that the program would be implemented.

The next significant official reform in foreign-exchange markets occurred in mid-October 1990 when joint ventures and private firms (the so-called alternative economy) were allowed to participate in currency auctions.¹⁹ Since more firms had the "right" to bid for dollars, this policy change reportedly facilitated Soviet imports of profitable consumer goods. In the Russian press this has been linked to the real retail-trade boom in Moscow and other large industrial cities observed in early 1991. In principle, legal private trade in these consumer goods would replace some of the trade on black markets. In theory, this would reduce the demand for dollars on black markets and increase the demand at auctions.

Also in October 1990, Gorbachev announced that in 1991 the structure of "differentiated-exchange-coefficients" operational in the USSR would be replaced by a more unified controlled-exchange-rate regime. In the aggregate economy, a new commercial exchange rate would replace the complex system of foreign-currency coefficients. Moreover, while some transactions were to be conducted at the old official rate (for example, repayment of official foreign-currency debts), others would be conducted at a "personal exchange rate" (tourism, for instance), and still others conducted

¹⁹Another possible effect on currency markets occurred in September 1990, when the Moscow realty market (and those in other large cities) began to function, no longer stymied by complex bureaucratic procedures. Apartments, private cars, summer houses, furniture and household goods began to be transacted in hard currency, thereby increasing internal hard currency demand.

at the flexible "market rate".²⁰ Since this was the point of a structural break in the auction-rate series, the impact of these initiatives are not estimated.

On November 26, 1990, when Finance Minister Pavlov launched the idea of monetary confiscations during a speech in the Supreme Soviet. At the time, he proposed partial confiscation only of enterprise cash-holdings, but not of those of households. Nonetheless, rumors about pending monetary reform began to circulate. In theory, substitution out of rubles should have led to ruble depreciation in both auction and black currency-markets. Empirically, we observe that the announcement of the pending monetary reforms was associated with appreciated rather than depreciated rubles in both auction and black markets.

The monetary reform took place on January 22, 1991, when the central government confiscated a portion of the 50 and 100 ruble notes in circulation. Curiously, differences in opinion existed on the perceived impact of this confiscation on the domestic-currency value. It could be argued that it irreparably undermined any remaining confidence in the value of the ruble, especially since the government did not simultaneously introduce a credible budgetary reform program. By this interpretation, the value of the ruble should have plunged further following the confiscation. Alternatively, some believed that the occurrence of this type of monetary reform and its clumsy and abysmal failure, made it unlikely that another similar reform would recur. By this interpretation, the relative strength of the ruble would have risen in the aftermath of monetary "reform". Empirically, statistically-significant changes in the value of the ruble did not occur at the time of monetary reform.^{21,22}

²⁰Following the implementation of this policy change (and as of June 1991), four types of (legal) arrangements for trade in foreign currencies existed in the USSR. These include currency auctions, bilateral operations between enterprises, interbank transactions, and foreign currency exchange through the Gosbank (the Central Bank of the USSR).

²¹Another possible policy initiative influencing currency markets occurred in November 1990 when the Ukraine, the second largest republic, introduced coupons that served as a parallel currency. In order to conduct most transactions, equally denominated payments in rubles and coupons were required. However, only 70 percent of salary or pension were covered by equal amounts of coupons. The residual

Among the institutional changes affecting the foreign-exchange markets was a decree issued on December 3, 1990 by the Russian Cabinet of Ministers. Accordingly, non-residents (foreign firms) were allowed to transact in rubles within the Russian territory. These firms were also allowed to open ruble accounts in Russian banks. Previously, these activities were strictly prohibited. The expected magnitude of this effect on actual operations is not obvious. The magnitude of the effect of this policy change would be inversely related to the prior success of non-residents in circumventing the previous restrictions on currency usage. This decree did not appear to have any statistically significant effect in auction-market exchange rates.

Important changes in the official foreign-exchange markets occurred in April 1991. On the first of the month, the Vnesheconombank introduced the new "tourist" exchange rate at 27.6 SUR/US\$, which was very close to the black-market rate. The supply of dollars from tourists to the black market was reported to have declined as tourists diverted their conversions of dollars into rubles from the black to the official markets.²³ Nonetheless, in the Moscow black markets for dollars did not collapse completely. The restrictions that remained on household currency-transactions still yielded a premium to black-market sellers of currency since the demand for dollars in the black market remained. The effects of this tourist-rate devaluation on auction markets were not expected to be large. These participants, in theory, had no direct involvements in black markets. Empirically it is not possible to determine whether this policy had significant effects, since it occurred on the heels of the long-awaited price reform.

30 percent of ruble salary could be used to purchase coupons. This reduced demand for rubles in the Ukraine.

²²Prior to the November 30, 1990 Vnesheconombank auction, the maximum foreign-currency purchase at the Moscow auction was \$830,000. As of this auction, the maximum was reduced to \$500,000.

²³In Vienna markets this led to a temporary suspension of ruble operations.

The price reform that occurred on the second of April 1991 increased retail prices by sixty percent.²⁴ Since a price reform had been expected since May 1990, the impact effect would depend upon whether the markets had over-predicted or under-predicted the magnitude of price increases. Therefore, on impact, the reform either could have appreciated or depreciated the ruble against the dollar. This impact effect is not easily measurable, since it accounts for an important part of the overall movements of the retail-price series.

Soon afterward, the primary mechanism for achieving flexibility of exchange rates was changed from an auction market to an interbank market. April 9, 1991 was the first day of operation of the Moscow Currency Exchange (MCE) and the date of the announced termination of foreign-exchange auctions in Moscow, Riga and Vilnius.²⁵ Currency sales now were under the supervision of the Gosbank instead of the Vnesheconombank. This left only two legal "market places" for transacting in foreign exchange, the Moscow Currency Exchange and the Tallinn Currency Auction. The shift from auctions to interbank markets in Moscow meant that direct access to the foreign-exchange markets by enterprises was no longer permitted. Only the enterprise representatives, i.e. banks operating as members of the exchange, were permitted to participate in the MCE. As of June 1991, ten commercial banks controlled 90 percent of this market. While 45 licenses had been "made available", only twelve licenses were in use, one of these belonging to the central bank. Visual inspection of the data did not reveal any significant shifts in patterns of real official-exchange-rates or in transaction volumes.²⁶

²⁴The State Price Committee set maximum limits for price increases on meat, milk and milk products, eggs, bread, salt, linen and some basic types of clothing.

²⁵Contrary to rumors, the Riga auctions were not terminated.

²⁶Also in May 1991, on the 25th, the Gosbank issued prohibition of currency-transfer operations. This was the process by which Soviet and foreign banks opened credit lines to each other. This had helped Soviet exporters avoid foreign-exchange surrender requirements. In theory, this could increase the supply of dollars made available to the interbank markets by reducing over-invoicing of imports and under-invoicing of exports.

Another set of regulatory changes occurred prior to the June 11, 1991 operations of the MCE. The Gosbank and the Ministry of Finance issued two mutually contradictory instructions. The Gosbank restricted the access to foreign currency of some importers of highly-profitable goods, including computers, consumer electronics, and cars. This had the effect of reducing the number of high-end bidders for foreign exchange and presumably would reduce the demand-induced pressures on the exchange rate reached in the interbank transactions. Some of these orders were executed at the June 11 MCE market.

At the same time, the Ministry of Finance introduced a new tax which in theory would reduce the supply of currency to the MCE and increase the upward pressure on the exchange rate. According to the Ministry of Finance regulation, sellers of currency would have to pay the Ministry 35 percent of their total ruble revenues from currency sales. Ultimately, this tax was reported to have been ignored by enterprises after the main proponent of the tax (and the supervisor of the Finance Ministry, Prime Minister Valentin Pavlov) was jailed.²⁷ The overall effect of June 11, 1991 on interbank-market exchange rates was statistically insignificant.

On July 16, 1991, the Gosbank announced its intention to broaden the operations of the MCE by freeing access to foreign exchange. Curiously, the result in the MCE was a very low volume of interbank trade, with this trade transacted at a significantly depreciated price. Reportedly, the expectation of the resulting high prices reduced demand for currency at the MCE. A tier of this demand, that arising from non-governmental structures, switched to the Tallinn auction where the rate soared and transaction volumes increased. With this "unacceptable" outcome of reduced MCE share

²⁷Another policy change, introduced on July 1, 1991, is not entered into the political time-series. At that time, a new, considerably high custom duty for "tourist" imports of consumer goods was introduced. This was initially effective, however it was repealed on August 6, 1991 by the State Custom Committee after protests in the mass media.

of foreign-currency trade, the regulation was cancelled, and the real exchange rate returned to its previous levels.

Regulation of the MCE evolved further on July 22, 1991 when the Gosbank introduced a complex set of regulations on transaction volumes. The bank-participants of the exchange were subject to quotas on their purchases of hard currency given by:

Bank's net sales of foreign currency at MCE 04/09/91 to 07/16/91	Quota for dollar purchases of banks	
	Bank Class A	Bank Class B
+1000 and over	no limits	no limits
from 0 to +1000	+1000	500
from 0 to -1000	800	300
from -1000 to -2000	500	100
from -2000 to -3000	300	0
-3000 and below	0	0

All amounts in thousands of dollars. Bank Class A : have more than 100 current currency accounts of their clients or have more than \$20 million accumulated. Banks Class B : all others.

Since the implementation of these quotas was associated with a significant depreciation of the ruble, it must have increased demand-side access to the interbank markets.

On July 23, 1991, the tourist exchange rate was devalued to 32 SUR/\$, a level slightly more devalued than the black-market rate. As was true for the previous devaluation in April 1991, in theory this devaluation was intended to keep a narrow spread between the tourist and black-market exchange rates, thereby minimizing tourist sales of dollars in the black market. This tourist-rate devaluation did not significantly impact black-market rates.

Although August 1991 was replete with many important events in the former Soviet Union, their effects on financial markets were less transparent than many of those thus far described. On August 1, 1991 the Gosbank allowed members of the MCE to engage in bilateral foreign-exchange operations outside of the MCE. Previously, the Gosbank had provided a little publicized function as a bilateral-clearing-house between

exporters and importers. The exporter and the importer would negotiate amongst themselves the terms of a sale of foreign exchange. The Gosbank then would perform the transfer of funds between the parties in exchange for a commission. Under the new decentralized bilateral operations, instead of using the MCE as a centralized clearing-house for foreign currency trade, it was used as a mechanism for determining the upper margin on the price of dollars. The decentralized transactions could not be conducted at rates higher than the latest received at the currency exchanges. As of mid-August, Gosbank gave the same operational rights to all banks with licenses for currency operations. These regulatory changes on bilateral operations did not significantly impact auction/interbank exchange rates. Likewise, foreign-exchange operations appeared unimpeded by the attempted coup that occurred between August 19th and 21st, 1991.

Throughout the Fall of 1991, inflation increased sharply in Moscow markets. The sharp decline in the real value of the ruble was spurred on by continued loss of control over the money supply, and a range of announcements of Republic intentions to print individual currencies and therefore abandon their use of rubles. This decline accelerated after October 28, 1991, when Yeltsin, in speech to Supreme Soviet, announced the possibility of new Russian ruble and launched the idea of a pending price liberalization to take place in January 1992. According to the data, this apparently marked the beginning of a new period in the official markets for foreign exchange, where the exchange rate appeared to fluctuate more freely.

Between early November and the end of December, 1991 a variety of actions influenced foreign-exchange-related activities. On November 4, the tourist exchange rate was devalued from 32 to 47 rubles per dollar. On November 5, 1991, in part to counter the panic buying on black markets, a coupon-rationing system on basic foodstuffs and the legalization of sales of goods at higher commercial prices was announced by Moscow Mayor Popov. By the end of December, as the Soviet Union disbanded into the Commonwealth of Independent States, the move to dump rubles could only have

intensified with the Ukrainian and Georgian announcements that the ruble would be replaced by republic currencies. In December 1991 alone, the cost of dollars rose 55 percent in both the MCE and the Moscow black-markets.

IV. Concluding Remarks

Throughout this paper, the recent -- albeit brief -- history of the flexible-price ruble in the former Soviet Union has been documented. As defined in the International Monetary Fund Articles of Agreement, the ruble certainly was not convertible during this period. And, the mechanism chosen for moving towards convertibility, flexible exchange-rates achieved via auction and interbank markets for foreign-currency trade, is not the most-preferred system for a country with underdeveloped financial markets. However, the establishment of a system of foreign-exchange trading was a positive first step. The implemented system had advantages, such as facilitating the development of a broader system for trading in foreign exchange and permitting some degree of market activity.

The auction and interbank system was used as a vehicle for gradually depreciating the real ruble and then for maintaining a form of a real exchange-rate peg against the dollar. It is likely that this peg was maintained by rationing the availability of foreign currency to importers and by central-bank sales of foreign-exchange reserves to support the pegged rate. The procedures for rationing foreign-currency sales to importers are not transparent. It is transparent, however, that such rationing has highly distortionary effects that potentially can undermine the positive objectives of targeting external convertibility. This form of non-price rationing strictly should be avoided.

Exchanges rates and prices send signals to producers about the desirability of alternative production and consumption decisions. Under purely flexible exchange rates, the noise created by short-term speculative swings can depress incentives to undertake long-term investment projects. This could slow down growth and economic

transformation. In this domain, the auction and interbank system in Moscow, as implemented until the last quarter of 1991, wisely filtered out some of the short-term noise that was observed in black markets. This is a feature of systems that opt toward current-account convertibility initially, without also initially targeting capital-account convertibility.

For temporary balance-of-payments disequilibrium, an ample supply of foreign-currency reserves is needed to dampen short-term speculative swings in the real ruble. International agencies, such as the IMF, have traditionally used resources for these purposes. Nonetheless, this argument for ample supplies of foreign-currency reserves is conditional: it applies only to the use of stabilization funds for maintaining appropriately chosen and reasonable real exchange-rate targets.

As a final point, the benefits of introducing of any flexible-price exchange-rate system can only be realized when economic agents are free to respond to market signals. It is essential that immediate regulatory changes should facilitate these responses. Experience with markets only can grow from that fertile starting point.

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