Boston University

Center for Latin American Development Studies

MONETARY ASPECTS OF THE BLACK-MARKET EXCHANGE RATE DETERMINATION

by
Mario I. Blejer

Discussion Paper Series
Number 27 July 1977

MONETARY ASPECTS OF THE BLACK-MARKET EXCHANGE RATE DETERMINATION

by

Mario I. Blejer

Discussion Paper Series

Number 27   July 1977

MONETARY ASPECTS OF THE BLACK-MARKET EXCHANGE RATE DETERMINATION

by Mario I. Blejer

I Introduction

The importance of monetary variables in the determination of the exchange rate in a regime of floating rates has recently been the object of careful theoretical and empirical study.[1/] Many of these studies, however, have been carried out under the stated or the implicit assumption that restrictions to the international movement of capital are not present and, therefore, that market forces are the overwhelming determinants of the exchange rate.

The purpose of this paper is to present an extension to the monetary approach to the exchange rate that enables us to analyze the experience of countries where the presence of exchange restrictions leads to the development of a black market for foreign money. We postulate that in those cases the exchange rate in the black market is freely determined by market forces and responds to disequilibria in the domestic money market while the official exchange rate is exogenously and administratively determined by the government responding to a reaction function that may be derived from a condition of utility maximization.

Black-market behavior and equilibrium determination with price controls have been analyzed, among others, by Boulding (1937), Bronfenbrenner (1947) and Michaely (1954). The specific behavior of the black market for foreign exchange was considered by Einzig (1937) and more recently by Sheikh (1976) and Culbertson (1975) who also presents an empirical test of his model. Those models, however, do not consider the importance of monetary factors in the determination of the equilibrium exchange rate in the black market (and of its rate of depreciation).2/

Since the exchange rate is nothing but the relative price of two monies, it is reasonable to discuss its determination in terms of supply and demand for those monies. In this paper, we present a model in which the behavior of monetary variables are the main factors underlying the behavior of the black-market exchange rate.

After presenting the formal model in Part II, the results of an empirical analysis of the experience of several Latin American countries are reported in Part III. In that section, the behavior of the black-market exchange rate is explained on the basis of the theoretical considerations of Part II. Part IV consists of a brief summary.

II The Model

Several assumptions are used throughout the paper, particularly regarding the institutional framework and the functioning of the black market. We consider the black market as an outlet for capital transactions that are barred from the official market. In other words, foreign exchange is bought and sold in the black market because the public desires to alter the composition of its portfolio of financial assets and not for the purpose of carrying out international sales and purchases of commodities. That is so because most of the current-account operations are really chanelled through the official market. We also assume in this context that there are no tight controls on the foreign-trade sector (tariffs or quotas), so we do not have to consider the effects of smuggling.[3/]

We assume a small country (in the sense that the international price of its traded goods is exogenously determined) and we allow for the existence of non traded goods (defined as those whose price responds, at least in the short run, to domestic monetary disequilibria). We also assume full employment and that monetary disequilibrium does not affect the rate of growth of real income.

II.a The Money Market and the Excess Supply of Money in an Open Economy

The basic relationships of the monetary sector are the following:

$$(1) \quad M_s = a(R + D)$$

$$(2) \quad M_d = P.m_d$$

$$(3) \quad m_d = f(y, i)$$

where M_s is the nominal supply of money, a is the money multiplier, R the foreign-exchange reserves of the Central Bank, D the domestic-credit component of the monetary base, M_d is the demand for nominal cash balances, P stands for a price index that includes traded and non-traded goods and m_d is the real demand for money, which is a function of real permanent income (y) and of the alternative cost of holding money (i).

The condition for stock equilibrium in the money market is that the nominal quantity of money equalizes, ex-post, the demand for nominal cash balances. That condition will be maintained if the market clears in each period, which requires the following flow equilibrium:

$$(4)\quad M_s^* = M_d^*$$

where the symbol (*) indicates the percentage rate of change of the variable. Deriving logarithmically equations (1) and (2) and replacing into (4) we obtain:

$$(5)\quad a^* + (1 - \gamma)R^* + \gamma D^* = \Pi + m_d^*$$

where γ is a factor of proportionality equal to $\frac{D}{D + R}$ and Π is the domestic rate of inflation.

As is being increasingly recognized,[4/] in a small open economy under fixed exchange rates the nominal supply of money is, in fact, beyond the control of the monetary authority. All that it can do is to determine the ex-ante quantity of money by changing the domestic-credit component of the base or manipulate variables under its control to affect the money multiplier. These actions, in conjunction with the flow demand for real balances (generated by adjustments in the desired stock), create an ex-ante excess flow supply of money to which the public reacts by changing the level of the reserves component of the base through the balance of payments and, at least in the short run, by affecting the rate of domestic inflation. Is the public, therefore, which determines the ex-post nominal quantity of money in an open economy.

From the above discussion, it appears that the operative measure of money-market disequilibrium should be an ex-ante measure which excludes the endogenous reaction of the foreign component of the monetary base. Therefore, in what follows, we measure flow monetary disequilibrium as the difference between the expansion of the domestic-credit component of the base (and variations in the money multiplier) and the changes in the demand for real cash balances.

II.b The Domestic Rate of Inflation

The rate of domestic inflation is here measured as a weighted average of the rate of change of the prices of traded and non-traded goods:

$$(6) \quad \Pi = \beta P^*_T + (1 - \beta) P^*_{NT}$$

where P_T is the price of traded goods and P_{NT} the price of non-traded goods. β stands for the share of traded goods in total expenditure. Since we assume that this is a small economy, the price of traded goods is exogenously given and its rate of change (in domestic currency) is determined by the world rate of inflation (Π_w) and by variations in the official exchange rate (ρ_o^*):

$$(7) \quad P_T^* = \Pi_w + \rho_o^*$$

On the other hand, and since an excess supply of money implies an excess demand for goods (both traded and non-traded goods), by assuming that the excess demand for non-traded goods varies monotonically with excess demand throughout the economy, we can postulate the following equation for the rate of change of the prices of non-traded goods:

$$(8) \quad P_{NT}^* = P_T^* + \lambda(\gamma D^* + a^* - M_d^*)$$

where λ is the elasticity of the relative prices to monetary unbalance. 5/

Substituting (7) into (8) and then (8) into (6) we obtain after some manipulations an expression for the rate of domestic inflation as a function of world inflation, of changes in the official exchange rate, and of the rate of *ex-ante* disequilibrium in the money market:

$$(9) \quad \Pi = \theta(\Pi_w + \rho_o^*) + (1 - \theta)[\gamma D^* + a^* - m_d^*]$$

where $\theta = \dfrac{1}{1 + \lambda(1 - \beta)}$. [6]

II.c The Black-Market Exchange Rate

The black-market exchange rate is determined by the interaction between the supply of and the demand for foreign money in that market. The main sources of foreign-exchange supply to the black market are receipts from the over-invoicing of imports and under-invoicing of exports as well as receipts from turism. The main incentive for engaging in over and under-invoicing is provided by the differential between the official and the black-market rates. The greater the differential, the larger the profit possibilities, and the higher the incentive for defeating the system. This leads to a diversion of transactions from one market to the other which even a comprehensive control network may not be able to stop. Discrepancies between the official and the black-market rates also increase the supply of foreign exchange to the black market by turists since this differential tends to spur the flow of visitors to the country.

Therefore, we can postulate the following supply function of foreign exchange to the black market:

$$\text{(10)} \quad \log S_B^{fe} = c_1 + a \log \left(\frac{\rho_B}{\rho_o}\right)$$

where S_B^{fe} is the supply of foreign exchange to the black market and ρ_B is the black-market exchange rate.

On the other hand, as is the case for the demand for domestic currency, the demand for foreign currency at a given level of income is positively related to the return derived from holding this asset and negatively related to the return derived from holding alternative assets.

The return from holding foreign currency as an asset is a function of the expected rate of depreciation in the black market. Indeed, when at any particular moment of time people compare the past behavior of the exchange rate with the behavior of the ratio between the domestic and foreign level of prices and conclude that domestic prices have been rising faster than foreign prices and that this has not led to a corresponding increase in the black-market exchange rate, they will expect as large a depreciation of the black-market rate as is the observed inflation rate differential.[7/] In addition, since expectations are formed for the future, people are likely to anticipate that any expected excess of domestic over foreign inflation will also be transmitted to the exchange rate.

From these considerations we can postulate the following expression for the expected depreciation of the black-market exchange rate:

$$(11) \quad (\rho_B^*) = (\log P - \log P_W - \log \rho_B) + (\Pi^e - \Pi_W^e)$$

where P and P_W are, respectively, the domestic and the world price level and Π and Π_W^e are their expected rate of change.

Given that foreign exchange which is acquired through the black market may be used to buy foreign assets, the nominal holding return of those assets, namely the foreign nominal interest rate, also has to be considered as part of the return from the purchase of foreign exchange. On the other hand, since the alternative to holding foreign assets is to hold domestic ones, the opportunity cost of buying foreign exchange will be given by the nominal return of domestic assets, i.e., the domestic nominal interest rate. Assuming that variations in domestic and foreign nominal interest rates are dominated by variations in the expected rate of inflation, the demand function for foreign exchange in the black market will be specified as following:[8,9]

$$(12) \quad \log D_B^{fe} = c_2 + b\left[(\rho_B^*)^e + \Pi_w^e \right] - d\, \Pi^e$$

and using (11) that is equal to:

$$(12') \quad \log D_B^{fe} = c_2 + b\left[(\log P - \log P_w - \log \rho_B) + (\Pi^e - \Pi_w^e) + \Pi_w^e \right] - d\, \Pi^e$$

If we assume that the own-return elasticity (b) is equal to the alternative-cost elasticity (d), we can rewrite (12') as:

$$(13) \quad \log D_B^{fe} = c + b\, (\log P - \log P_w - \log \rho_B)$$

Deriving equations (10) and (13) we obtain:

$$(14) \quad \left[S_B^{fe} \right]^* = a\, (\rho_B^* - \rho_o^*)$$

$$(15) \quad \left(D_B^{fe}\right)^* = b\,(\Pi - \Pi_W - \rho_B^*)$$

The flow-equilibrium condition on the foreign-exchange black market requires that:

$$(16) \quad \left(S_B^{fe}\right)^* = \left(D_B^{fe}\right)^*$$

which, using (14) and (15), can be solved for the rate of black-market exchange-rate depreciation:

$$(17) \quad \rho_B^* = \frac{1}{a + b} \left(a\,\rho_o^* + b(\Pi - \Pi_W)\right)$$

and replacing Π by its value in equation (9) we finally obtain:

$$(18) \quad \rho_B^* = \left(\frac{a + b\theta}{a + b}\right) \rho_o^* + \frac{b\,(1 - \theta)}{a + b} \left(\gamma D^* + a^* - \Pi_W - m_d^*\right)$$

which formulates the rate of depreciation of the black-market exchange rate as a weighted average of the rate of devaluation of the official exchange rate and of flow monetary disequilibrium.10/

II.d The Official Exchange Rate

Except in the presence of free floating, the official exchange rate is regarded by governments as a policy instrument and its fluctuations generally follow policy decisions. That seems to be particularly true in those cases in which the interaction of market forces in the official market is restricted by exchange controls. It is likely, therefore, that policy decisions regarding the exchange rate are taken following some sort of reaction function that is aimed at maximizing a government utility function. A plausible simple form for such reaction function is the following: 11/

$$(19) \qquad \rho_o^* = \alpha\,(\Pi - \Pi_W)$$

The parameter α takes values ranging from 0 to 1. When $\alpha = 1$, there will be a free floating exchange rate and the model approaches the one presented by Frenkel (1976) since the rate of devaluation will be fully determined by the differential between domestic and foreign inflation rates. The other extreme case ($\alpha = 0$) implies a fixed-exchange-rate system where monetary disequilibria and domestic inflation are not transmitted to the official exchange rate.

II.e Summary of the Model and Equilibrium Conditions

If the official exchange rate is endogenously determined by the reaction function defined by equation (19) we can rewrite equation (18) as follows (using (9)): 12/

$$(20) \qquad \rho_B^* = \frac{(\alpha a + b)(1 - \theta)}{(a + b)(1 - \theta\alpha)} \left[\gamma D^* + a^* \; m_d^* - \Pi_W \right]$$

In that form, the rate of depreciation of the black-market exchange rate may be expressed as a function of the relationship between domestic monetary disequilibrium and the world rate of inflation. The black-market exchange rate will depreciate faster the higher is the rate of domestic credit expansion relative to the increases in the demand for domestic real cash balances and it will depreciate slower the higher is the world rate of inflation.

Equilibrium will be maintained in this system when the monetary authority expands the money supply at the rate necessary to satisfy the growth of the real demand and to replace the depreciated value of the nominal stock. That is achieved when the ex-ante excess flow supply of money is equal to the world rate of inflation, i.e. when the exogenous components of the supply of money (domestic credit and the money multiplier) are expanded at a rate that exceeds the growth in the demand for real balances by the world rate of inflation. In that case the domestic rate of inflation will not depart from the world rate, the balance of payments will be in equilibrium and the official as well as the black-market exchange rates will be constant.

III. Empirical Results

A test of the model presented in Part II was conduced using annual data for Brazil (1952-1973), Chile (1955-1970) and Colombia (1953-1973). The behavior of the black-market exchange rate is analyzed by estimating an equation similar to equation (20). However, in order to account for the lagged effects of monetary disequilibria on the dependent variable, the following specification was used:

$$(21) \quad \rho^*_B = \sum_{i=o} h_i \left(\gamma D^* + a^* - m^*_d - \Pi_w \right)_{t-i}$$

Changes in the U.S. wholesale price index were used as a proxy for the world rate of inflation and the domestic credit component of the monetary base was defined as the claims of the Central Bank on the Government, on the publicly-owned financial institutions, and on the private banking system. To obtain m^*_d, a money-demand function of the following form was estimated:

$$(22) \; \log (M_i/P) = n_o + n_1 \log y^P + n_2 \Pi^e \qquad i = 1,2$$

where y^P is real permanent income (a proxy for wealth)[13/] and Π^e is the proxy used for the opportunity cost of holding money.[14/] M_1 is defined as currency plus demand deposits and M_2 as M_1 plus time and savings deposits. For each of these definitions m^*_d is calculated by taking first differences of the estimated values from (22).[15/] [16/]

The data sources were the I.M.F.'s International Financial Statistics and the relevant Central Bank bulletins of the various countries. Data on black-market exchange rates were obtained from Pick's Currency Yearbook.

The results of the estimations of equation (21) are presented in Tables 1, 2 and 3. They indicate that in the three countries studied, monetary disequilibria have a significant effect on the rate of depreciation of the black market exchange rate. In Chile and Brazil the adjustment of the

TABLE 1: BLACK - MARKET EXCHANGE RATE EQUATIONS - BRAZIL (1952-1973)

$$(21)\quad \rho^* = c + h_1\left(\gamma D^* + a^* - m_d^* - \Pi_w\right)_t + h_2\left(\gamma D^* + a^* - m_d^* - \Pi_w\right)_{t-1} + \mu$$

Money Definition Used	Constant	h_1	h_2	R^2	F	D.W.
M_1	8.015 (1.25)	0.846# (4.25)		0.475	18.12	1.65
M_2	8.824 (1.35)	0.822# (4.05)		0.451	16.44	1.58
M_1	4.500 (0.60)	0.655# (2.25)	0.301# (1.58)	0.496	9.37	1.63
M_2	5.199 (0.69)	0.616# (2.08)	0.326# (1.39)	0.476	8.64	1.56

Notes: # Significant at the 0.05 level.
t-values are in parentheses below the coefficients

TABLE 2: BLACK - MARKET EXCHANGE RATE EQUATIONS - CHILE (1955 - 1970)

$$(21) \quad \overset{*}{B} = c + h_1 \left[\gamma D^* + a^* - m_d^* - \Pi_w\right]_t + h_2\left[\gamma D^* + a^* \; m_d^* - \Pi_w\right]_{t-1} + \mu$$

Money Definition Used	Constant	h_1	h_2	R^2	F	D.W.
M_1	10.358 (0.99)	0.923# (2.76)		0.545	7.63	1.56
M_2	11.906 (1.08)	0.885# (2.43)		0.498	5.94	1.47
M_1	23.901# (2.16)	0.721# (3.37)	0.173# (2.13)	0.653	5.97	1.78
M_2	27.60# (2.34)	0.826# (3.05)	0.137# (2.31)	0.634	5.39	1.65

Notes: See Table 1

TABLE 3: BLACK - MARKET EXCHANGE RATE EQUATIONS - COLOMBIA (1953 - 1973)

$$(21) \quad \rho_B^* = c + h_1 \left(\gamma D^* + a^* - m_d^* - \Pi_w\right)_t + h_2 \left(\gamma D^* + a^* - m_d^* \quad \Pi_w\right)_{t-1} + \mu$$

Money Definition Used	Constant	h_1	h_2	R^2	F	D.W.
M_1	9.598# (1.91)	0.327 (1.31)		0.132	0.61	2.20
M_2	9.085# (1.79)	0.374 (1.31)		0.143	0.81	2.24
M_1	4.086 (0.75)	0.233 (0.92)	0.770# (1.96)	0.412	2.29	1.97
M_2	2.817 (0.51)	0.308 (1.04)	0.813# (2.15)	0.448	2.81	2.06

Notes: See Table 1

black-market rate to monetary imbalance appears to take longer than one period since both the current and the one-period lagged coefficients of the excess-flow supply of money are significant at the 0.05 level.[17/] When additional lags of the independent variable were included in the estimation their coefficients, in all cases, were not significantly different from zero and their introduction did not contribute to the explanatory power of the equations. According to the obtained values of the F statistic, the equations are statistically significant at the 0.05 level and they explain about one half --and in the case of Chile, two-thirds--of the variations of the black-market rate. In the case of Colombia, the current rate of money-market flow disequilibrium does not yield a significant coefficient and it appears that all the explained variation is accounted for by the one-year lag. With exception of Colombia, the results indicate that a better fit is obtained when M_1 rather than M_2 is used as the definition of money. The Durbin-Watson statistics indicate,in the majority of the cases, the absence of first-order serial correlation.

It is important to notice that the sum of the estimated coefficients of the current and lagged independent monetary variables is very similar in the three countries studied and in all cases is remarkably close to unity --which seems to indicate that almost all flow disequilibria created in the money market are transmitted to the black-market exchange rate after a period of two years has elapsed.

IV Summary

The central aim of this study is to develope a testable model in order to analyze the behavior of the exchange rate in a economy where exchange-controls are present and lead to the development of a black market for foreign exchange. The black-market rate is taken to be freely determined by market forces and to respond, as do the rate of domestic inflation and the money account of the balance of payments, to monetary disequilibria. On the other hand, the official exchange rate is considered to be a policy instrument that varies according to a reaction function on the part of the authorities.

The empirical results are presented in Part III, and deal with the cases of Brazil, Chile and Colombia. They lend support to the hypotheses derived from the theoretical model. In particular, the black-market exchange rate appears to be significantly affected by current and one-year-lagged excess supply of money. From the values of the estimated coefficients we can conclude that almost all ex-ante, money market flow disequilibria is transmitted to the black market rate within a two-years period.

FOOTNOTES

1/ See specially Frenkel (1976), Kouri (1975) and Mussa (1976).

2/ A test of the monetary hypothesis, using black-market data for Israel, is presented by Fishelson (1976).

3/ Alternatively, it is possible to assume that the penalties and/or the probability to be caught are high enough in order to discourage illegal trade activities. This assumption is needed because in the presence of smuggling, foreign exchange will be demanded in the black market not only for financial transactions but also in order to pay for goods and services that are imported without declaring them to the authorities.

4/ See, for example, Johnson (1972) and Mundell (1971).

5/ Changes in the domestic price of traded goods affect the price of non-traded goods through substitutions in production and consumption. For a complete model of domestic-price determination with traded and non-traded goods, see Blejer (1975).

6/ Notice that if all goods are traded ($\beta = 1$), θ equals unity and the domestic rate of inflation in a fixed-exchange-rate country is pegged to the world rate.

7/ If the black-market exchange rate is freely determined by market forces, it may be expected that the rate of depreciation will follow closely the trend of the differential between domestic and foreign inflation rates. It is possible, however, to observe short and medium-run discrepancies between actual black-market depreciations and inflation differentials. Such discrepancies may result from a variety of reasons, mainly imperfect information, government intervention and seasonality.

8/ This specification assumes no exchange-rate changes abroad.

9/ Although the black-market activities are in general illegal, not all governments enforce the prohibition. If black-market transactions are effectively penalized, a risk coefficient should be included. However, we will assume that no legal risk is involved in dealing in the unofficial market since the operation of this market is tolerated by the government (the same results obtain if we assume that the probability to be caught is negligible). That assumption appears to be realistic in the empirical context to which the model is applied.

10/ The coefficient of the official exchange rate variable will be higher, and the coefficient of the excess supply of money will be lower, the higher the elasticity of supply of foreign exchange in the black market and the lower the price elasticity of the demand for foreign exchange in that market.

11/ A more general form for the reaction function is the following:

$$(10') \quad \left(\rho_o^*\right)_t = \alpha_j \left(\Pi - \Pi_w\right)_t + \sum_{i=1}^{n} \alpha_{j-i} \left(\Pi - \Pi_w\right)_{t-i}$$

where, in order to maintain the purchasing power parity, it is required that $\left(\alpha_j + \sum_{i=1}^{n} \alpha_{j-i}\right) = 1$

12/ Replacing ρ_o^* by its value in (19), the domestic rate of inflation can be rewritten as:

$$(9') \quad = \frac{\theta (1 - \alpha)}{1 - \theta\alpha} \Pi_w + \frac{1 - \theta}{1 - \theta\alpha} \left(\gamma D^* + a^* - m_d^*\right)$$

Notice that the higher the value of α, the higher the weight of the ex-ante excess supply of money relative to the weight of world inflation. With a free floating exchange rate ($\alpha = 1$) the domestic rate of inflation is isolated from the world rate and solely determined by domestic monetary disequilibrium.

13/ Permanent income is defined as follows:

$$y^P = \phi y_t + (1 - \phi) y_{t-1}^P$$

where y_t is current income at constant prices and y_t^P permanent income at costant prices. Several values of ϕ where tried and m_d^* was calculated on the basis of the values of ϕ that maximized R^2 ($\phi = 0.35$ for Chile; $\phi = 0.4$ for Brazil and Colombia). To calculate the initial value, a GNP-at-constant-prices series for the period 1945-1970 was used. The initial value was obtained by regressing the log of real GNP on a trend and using the fitted values.

14/ To estimate the expected rate of inflation, a traditional adaptive expectations hypothesis is used as follows:

$$\Pi_t^e = \delta\Pi_t + (1 - \delta) \Pi_{t-1}^e$$

where the rate of inflation is measured by the percentage change in the consumer price index (a yearly average of quarterly percentage changes), and δ is a given constant. To obtain the best fit several values of δ were tried. The results used in the subsequent regressions correspond to $\delta = 0.3$ for Chile and Colombia, and $\delta = 0.4$ for Brazil.

15/ Both the consumer price index and the wholesale price index were used as deflators. However, the values of m_d^* employed to calculate flow disequilibria in the money market correspond to the estimations that used the consumer price index, which gave, in general, better results.

16/ All the variables are calculated as first differences of natural logs. Therefore, γD^*, a^*, and Π_W are compatible expressions which can be used together with the estimated m_d^* to calculate the rate of ex-ante, excess flow supply of money that is used as the independent variable.

17/ In no case multi-collinearity in the independent variables is detected when both current and lagged values of monetary disequilibrium are included.

References

Blejer, M.I., (1975) "Money, Prices and the Balance of Payments. The Case of Mexico, (1950-1973), Unpublished Ph.D. Dissertation, University of Chicago.

Boulding, K.E., (1937) "A Note on the Theory of the Black Market," Canadian Journal of Economics and Political Science, 153-155.

Bronfenbrenner, M., (1947) "Price control under imperfect competition," American Economic Review, 107-120.

Culbertson, W.P. Jr, (1975) "Purchasing Power Parity and Black-Market Exchange Rates," Economic Inquiry, 287-296.

Einzig, P., (1937) The Theory of Forward Exchange, London, MacMillan.

Fishelson, G., (1976) "The Exchange Rate in a Controlled Foreign Exchange Market (Israel)", The Foerder Institute for Economic Research, Tel Aviv University. Working Paper N° 32-76

Frenkel, J.A. (1976) "A Monetary Approach to the Exchange Rate: Doctrinal Aspects and Empirical Evidence", Scandinavian Journal of Economics, June.

International Monetary Fund, International Financial Statistics, Washington D.C. Various Issues.

Johnson, H.G. (1972) "The Monetary Approach to the Balance of Payments" in his Further Essays in Monetary Theory, Allen and Unwin, London.

Kouri, P.J.K. (1975) "Exchange Rate Expectations, and the Short-Run and the Long-Run Effects of Fiscal and Monetary Policies under Flexible Exchange Rates", presented at the Conference on the Monetary Mechanism in Open Economies, Helsinski, Aug.

Miechaely, M., (1954) "A Geometrical Analisis of Black-Market Behavior", American Economic Review, 627-637.

Mundell, R.A. (1971) Monetary Theory, Goodyear Pub. Co. Inc. Pacific Palisades, California.

Mussa, M. (1976) "The Exchange Rate, the Balance of Payments and Monetary and Fiscal Policy under a Regime of Controlled Floating" Scandinavian Journal of Economics. June.

Pick, Franz, *Pick's Currency Yearbook*, New York, New York. Various Issues.

Sheikh, M.A. (1976) "Black Market for Foreign Exchange, Capital Flows and Sumuggling", *Journal of Development Economics*, 9-26.