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The Premium in Black Dollar Markets*

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Abstract

This paper examines the effects of various economic factors on the black market exchange rate premium in developing countries using monthly data from 1985 to 1989. The model analyzes the interaction of stock and flow conditions in determining both the premium on the black dollar and the stock of black money. Some of the factors this paper hypothesizes to determine the black market premium is the official real exchange rate, the official depreciation-adjusted interest rate differential, the level of exports, and a seasonal factor associated with tourism.

The empirical results tend to agree with the findings of Dornbusch et. al. (QJE, February 1983). These results are important because they provide a starting point for governments to control the level of black market activity.

1. Introduction

This paper develops a model with which to explain the effects of various economic factors on the black market exchange rate premium. This study is targeted at

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the behavior of the black market foreign exchange in developing countries using monthly data from 1985 to 1989. The vast majority of black markets in foreign exchange are in the developing countries. The empirical investigation is based on a model developed by Dornbusch, Dantas, Pechman, Rocha, and Simoes (1983). The central and most interesting feature of the model is the interaction of stock and flow conditions in determining both the premium on the black dollar and the stock of black money. It is proposed that the black market premium is determined by the official real exchange rate, the official depreciation-adjusted interest rate differential, the level of exports, and a seasonal factor associated with tourism. These factors are interesting to examine because they may provide a foothold for governments of developing countries in trying to restrict activities in the black market. Black money affects public revenues, degenerates the investable surplus, delimits the national productivity, drains the balance of payments, and distorts equity and equality concepts of economic distribution.

The black market exchange rates in the following seventeen developing countries are studied: Bangladesh, Brazil, Fiji, Gambia, Ghana, Guyana, Hungary, Ireland, Jamaica, Kenya, Nepal, Nigeria, Philippines, Somalia, South Africa, Uganda and (the former) Yugoslavia.

Despite the increasing trend toward globalizing the world economy, many developing countries are still living in a chaotic constellation of limitations and controls over foreign currency holdings and transactions and a wide array of black market of currencies. Many developing countries' currencies have so called "legislation for monetary protection", usually limiting the amount of foreign exchange an individual is allowed to hold. Such currency regulations lead to unofficial, parallel, or illegal transactions in foreign currencies.

A parallel, or a black market is an illegal structure that is created in response to government intervention which produces excess supply or demand for a product. When the price of foreign currency is set below the market clearing rate, an excess demand is usually generated for acquiring foreign currency. The government has the choice of either devaluating the currency, or maintaining strict controls over exchange, such as setting quotas on the purchase of foreign exchange. Such currency controls are designed by governments in order to limit the use of foreign exchange in transactions.

The United States' Dollar used to be the only preferred currency on the black market. When the dollar was removed from the gold standard in August 1971, it lost its dominance and other currencies became popular as vehicle currencies in

foreign currency black markets throughout the world. The increased demand for such monies as the German Mark and the Swiss Franc reduces the premia for the U.S. Dollar. Nonetheless, the U.S. dollar is still the primary currency traded in most of the globe's black markets, serving as a "pass-through" vehicle to precious metals such as gold, energy uses such as oil, and other monetary units such as the Japanese Yen, the German Mark, and the Swiss Franc.

Only seventeen countries have currencies that are free from internal black market exchange.[1] Most other currencies have legislation that limits the foreign exchange available which only serves to generate illegal transactions. Controls over monetary exchange only increase the risk and encourage evasion. The restrictions promote the diversion of scarce money from the official channels to be distributed later in the illegal channels. As long as the risk is tolerable, there are high incentives to sell on the black market to reap the profits. The commodity is purchased at a lower price, but is then sold illegally at a higher price on the market because of the demand generated from shortages. The more inefficient a country's reserves or financial capacities, the greater the likelihood of a vigorously organized black market. The stringent regulations or punishments only serve to increase the premium between the black and the official foreign exchange rates. If a large proportion of foreign exchange transactions are conducted in this manner, the devaluation of official rates can affect consumer prices as well as the entire economy.

Legislative controls and rationing that attempt to fight black markets often contribute instead to higher activities in the black market for foreign exchange. The enforcement of governmental policies, price ceilings, and restrictions on foreign currency help increase scarcity which in turn encourages accumulation for later illegal transactions. Attempts by governments are usually ineffective unless they are also accompanied by increases in productivity, price stability, and availability of goods. Without careful monitoring of these actions, transactions in the black market are going to persist despite government interventions.

The designing of monetary policy in each country depends on the official economy. This economy involves open transactions financed through identifiable sources and generates income within the parameters of government rules and regulations. In addition to the official economy, many countries, particularly developing ones, have developed a parallel economy.

This parallel economy, or black market, emerges through the manipulation of the economic forces of supply and demand for both currency and commodities. A

black market also emerges when trade and industry create an artificial situation of scarcity or glut, and in the process amass high returns on their investments by profiteering. As a result of profiteering activity, the black market generates unreported income and wealth which escape detection by official statistics (Culbertson, 1975; Ray, 1981; Nowak, 1985; Manasian et al., 1987; Roemer and Jones, 1991; and Argy, 1994).

Gupta (1981) attributes much of the strength of the black market to the resale of officially allocated foreign exchange holdings and to the incentive to underinvoice and smuggle exports. He argues that an increase in the black market rate, given the official exchange rate, creates an incentive for residents abroad to channel their remittances through the black market. This raises their private receipts in terms of home currency and deprives the central bank of this foreign exchange. Economists studying black market activity in developing countries advocate that it is best to keep the black market premium rate as low as possible (Gupta, 1981). By influencing the determinants of the black market exchange rate, developing counties can keep the black market premium rate low and increase their official foreign exchange currency holdings.

The paper is organized as follows. Section 2 presents the model for the premium on the black dollar. Section 3 introduces the data. Section 4 details the empirical results. Section 5 summarizes.

2. The Model

The model is based on that of Dornbusch et. al. (1983). The black market is treated in a partial-equilibrium, stock and flow framework. The interest rate on the home currency, the U.S. interest rate, the official exchange rate, and the domestic currency value of non-dollar assets are taken as given. The stock demand for black dollars arises as the result of portfolio diversification and the flow market arises as the result of international trade, both reported and unreported.

2.1. The Stock Demand for Black Dollars

The stock demand for black dollars is posited to be positively related to wealth and the official depreciation-adjusted interest rate. Equilibrium in the stock market for dollars must meet the condition that supply equal demand. Using the notation of Dornbusch et. al., this relation may be expressed as follows:

$$EB = \theta\ (i* + d - i)(A + EB)\ \ \theta\prime > 0(1) \tag{1}$$

Thus, EB represents the supply of black dollars and q is a positive function of θ (i* + d - i)(A + EB) where E represents the black market exchange rate, B the stock of black dollars, i* the interest rate on U.S. dollars, d the rate of depreciation of the home currency in the black market, i the interest rate on the home currency, A represents the value of non-dollar assets. As stated above, demand is posited to be positively related to wealth and to the depreciation adjusted interest rate, or yield.

The stock market equilibrium condition can be written alternatively in terms of the black market premium, actually 1 plus the premium, and the ratio of black dollars to wealth. The premium is defined as $X = E/\bar{E}$, where $\bar{E}$ represents the official exchange rate and the dollar value of domestic assets is taken as exogenous. Dividing equation (1) by wealth:

$$XB/(XB + \bar{A}) = \theta\,(i* + d - i) \tag{2}$$

The rate of depreciation of the black dollar, $\bar{d}$, is taken as given. The rate of change of the premium is denoted by $\mathbb{X}/X$ and is equal to the difference between the rate of depreciation the official and black exchange rate, or formally:

$$\mathbb{X}/X \equiv d - \bar{d} \tag{3}$$

Substituting equation (3) into the stock market equilibrium condition, equation (2), and inverting equation in such a way that $\mathbb{X}/X$ will be on the left-hand side of the equation, one can express the relationship between the stock of black dollars, the premium, and the rate of change of the premium as follows:

$$\mathbb{X}/X = G(XB/\bar{A}) - (i* + d - i), \quad G' > 0 \tag{4}$$

where $(XB/\bar{A})$ denotes the relative supply of black dollars. From equation (4), the dynamic relationship between the above variables is given. Equilibrium in the stock market for black dollars requires that an increase in the relative supply of black dollars occur along with an increase in the relative yield via either an increase in the premium or an increase in the official depreciation-adjusted interest rate differential, (i* + d - i). On the other hand, an increase in the official depreciation-adjusted interest rate differential will cause an excess demand for

black dollars that must be offset either by a decrease in demand due to a lowering premium or through an increase in supply due to a higher premium.

2.2. The Flow Market for Black Dollars

The demand in the flow market is the product of both import smugglers and tourism out of the country and supply is the product of export smugglers and tourism into the country. Following Phylaktis (1992), it is assumed that the flow demand for black dollars is positively related to wealth. The current account of the black market is posited to be a function of the premium, the official real exchange rate, and exports:

$$\beta = f\left(X, \bar{e}, exports, [A + EB]\right) \tag{5}$$

$f_x > 0$, $f_{\bar{e}} > 0$, $f_{exports} > 0$, and $f_{[A+EB]} > 0$ and $\bar{e}$ represents the official real exchange rate. Substituting $\bar{A} \equiv A/\bar{E}$ into equation (5), the dynamic relationship between β, B, exports, and X is obtained for a given value of $\bar{e}$ and $\bar{A}$ as follows:

$$\beta = f(X, \bar{e}, exports, [\bar{A} + EB]) \tag{6}$$

An increase in the black market premium is expected to reduce under-invoicing and tourism abroad by domestic tourists. Due to the accompanying fall in the relative value of home currency assets, there will also be a decrease in wealth. At the same time, there is an increase in the supply of black dollars to export smugglers, or over-invoicers. Taken together, the two effects result in a current account surplus. Equilibrium is regained through an increase in the stock of black dollars, B, which increases wealth and thus the demand for black dollars in the flow market. A depreciation of the official real exchange rate is expected to increase net inflows, as it makes domestic goods more competitive, and thus increases exports and reduces the supply of black dollars to smugglers and tourists.

These relationships are demonstrated graphically in Figures A, B, and C. In Figure A, a balanced current account is represented by the upward sloping $\beta = 0$ schedule, while the $\mathbb{X} = 0$ schedule represents the points at which the premium is constant. As can be seen from equation (4), the $\mathbb{X} = 0$ schedule is a rectangular parabola. The $\mathbb{X} = 0$ schedule is drawn for a given ($i^* + d - I$) and $\bar{e}$. Points to the right of $\beta = 0$ represent a premium that is so high as to cause a surplus in the stock of dollars. Points to the left, on the other hand, represent shortage conditions as the result of a low premium. Point A represents the point of market

equilibrium as indicated by the arrows on the unique trajectory Q. As the stock of black dollars rises over time, the rate of depreciation of the black dollar decreases relative to that of the official rate.

(Insert Figure A)

Figure B shows the effects of a shock to the stock market via a change in the interest rate differential. A reduction in the differential, by making domestic assets more attractive, results in a demand-side shift out of the black market as people shift their money to the official market.

(Insert Figure B)

Figure C pictures the reaction to the flow market to changes in the real official exchange rate. A real depreciation in the domestic currency leads to increased flow into the black market as the black market rate becomes relatively more attractive. The increased flow into the black market causes a shift to the left in the current account balance, $\beta = 0$.

(Insert Figure C)

3. Data

The developing countries examined in this paper are: Bangladesh, Brazil, Fiji, Gambia, Ghana, Guyana, Hungary, Ireland, Jamaica, Kenya, Nepal, Nigeria, Philippines, Somalia, South Africa, Uganda and Yugoslavia. The monthly data starts January, 1985 and ends December, 1989. The data is from the World Currency Yearbook of various years (Cowitt, 1992). The premium, vis-a-vis the Official Rate of a currency are based on the unofficial and/or illegal prices paid for the U.S. Dollar in the trading centers of the above mentioned countries.

The CPI is based on data of the CPI for both the United States and the developing countries. The CPI is the monthly price level of the various countries measured in terms of U.S. dollars.[2] The consumer price indexes are found in the Prices section of the International Financial Statistics (1985-1992). They are compiled from reported versions of national indexes. Most countries listed in the International Financial Statistics (IFS) compile their consumer price indexes according to the Laspeyres formula which utilizes weights and selections of items based on consumption patterns.

The interest rates used are the Deposit Interest Rates and they are found in the interest rate section of the IFS. They include rates offered to resident consumers for demand, savings and time deposits. The IFS also publishes the exports data

measured in millions of U.S. dollars. The official exchange rates measured by the IFS are expressed in U.S. dollars per national currency unit. This model uses the **ae** series official exchange rates, which denote end of the period exchange rates.

Figure 0.1 presents the black market premia for the U.S. Dollar based on the official rate at the end of December 1988. The premia range from 2 percent in Ireland to 430 percent for Guyana in that period. Figure 0.2 presents some summary statistics for each of the black, official and premium dollar exchange rates. It is clear from the figure that different countries have very different patterns of black and official dollar exchange rates. These patterns are visualized in Figures 1 - 17 where the black, official and the premium exchange rate for each country are presented as a function of time. The left y-axis measures the black and the official exchange rates with respect to the U.S. dollar. The premium as a function of time is measured on the right y-axis. It is of particular interest to ascertain whether the model presented above is capable of explaining the premium as a function of the variables introduced above.

The cross-sectional data is pooled and estimated by OLS. Dummy variables are constructed to represent the seventeen developing countries used in this paper. Dummy variables are also constructed to represent a seasonal factor and time dimension. The seasonal factor is estimated in two ways. First, an eleven month dummy variable is constructed to capture monthly tourist movements either into or out of the country in question. Second, a bi-monthly dummy variable is constructed to capture the effects of tourist movements by season, either high or low tourist travel season. The time dimension dummy variables are constructed to capture the fluctuation in the premium for the years of 1985, 1986, 1987, and 1988.

4. Empirical Results

As can be seen in Figure 0.3, the empirical results are very supportive of the model. The first set of results, called Model 1, is obtained by testing the premium against the dollar value of the domestic assets, the real exchange rate, the interest rate differential, exports, Rho, and the country dummy variables. In this set of results, every variable tested is found to be significant at the 5% level and of the expected sign. The R-squared and adjusted R-squared are over 0.99. The country dummy variables show that in each of the seventeen countries, the premium is declining.

The second set of results, called Model 2, shown in Figure 0.3 is obtained by testing the premium against the dollar value of the domestic assets, the real exchange rate, the interest rate differential, exports, Rho, the country dummy variables, and the time dummy variables. Each of the results, with the exception of the time dummy variables, is significant at the 10% level. The coefficients of country dummy variables are, again, all negative demonstrating a declining premium.

The third set of results, called Model 3, shown in Figure 0.3 is obtained by testing the premium against the same variables in the first with the addition of the time dummy variable and the eleven month seasonal dummy variable. It is found that the dollar value of domestic assets, the real exchange rate, the interest rate differential, and Rho are found to be significant at the 10% level. Each of the country variables is significant at 5% and negative. Unexpectedly, the time and seasonal variables are not found to be significant. Nonetheless, the R-squared and adjusted R-squared values are above 0.99.

The fourth set of results is obtained from the same variables as the second with the addition of the bi-monthly seasonal factor in the place of the eleven month factor. The country variables are each significant at 5% and negative. The dollar value of domestic assets, the real exchange rate, the interest rate differential, and Rho are all significant at the 10% level.

In Figure 0.4 two additional sets of results are presented. First, the results of the premium tested against the dollar value of domestic assets, the real exchange rate, the interest rate differential, and Rho are included. Second, the results of the premium tested against the above variables and the time dummy variables are included. The results summarized in Figure 0.4 all have R-squared and adjusted R-squared values of over 0.99, even though the significance of the coefficients is not as supportive as in the cases of the results presented in Figure 0.3.

In Figures 0.5 to 0.8 the model is tested with adjustments for the different sizes of the economies examined and the results are summarized. In this paper the developing countries examined have economies of vastly differing sizes. Thus, in order to adjust for the variations in the size of the economies examined, the assets, $\bar{A}$, and exports variables are divided by the gross domestic product (GDP) of the country in question in Figures 0.5 and 0.6 and the population of the country in question in Figures 0.7 and 0.8. The results obtained from these adjustments are similar to those in Figure 0.3.

In Figures 0.5 and 0.6, the results found for the GDP-adjusted dollar value of

domestic assets, interest rate differential, Rho, and the country dummy variables are supportive of the model. However, the results presented in Figures 0.5 and 0.6 demonstrate that the real exchange rate and GDP-adjusted exports are not significant. The results presented in Figures 0.7 and 0.8 demonstrate that the population-adjusted assets, real exchange rate, and population-adjusted exports are not significant but that the interest rate differential, Rho, the country dummy variables, the month of January in Model 5 and January/February in Model 6 are significant at the 10% level.

5. Conclusion

This paper develops a model with which to explain the effects of various economic factors on the black market exchange rate premium. It uses monthly data beginning in 1985 and ending in 1989. The empirical results are very supportive of the model and agree with the findings of Dornbusch et. al. (1983). R-squared and adjusted R-squared values are all above 0.99. It is found that the interest rate differential and assets positively influence the premium as is expected. The official real exchange rate is found to negatively influence the premium.

Unexpectedly, neither the seasonal factors nor the time dummy variables are found to significantly affect the premium. It is very interesting that the coefficient values of the country dummy variables are all negative. This suggests that the premium in all of these countries is decreasing.

These results are important because they provide a starting point for governments to control the level of black market activity. Developing countries appear to be the most disastrously affected by black market activity. This may be due to a strong distrust in the ability of the free market to regulate supply and demand in these countries. In addition, third world governments heavily embed foreign sector regulations into their planned programs.

However, the most important reason for the harmful impact of high black market activity on developing nations is the flight of much needed capital abroad. Developing countries can stem the tide of foreign currency out of the country through appropriate economic policy. A proper policy, in light of the findings of this paper, would tend to reduce the incentives of the population to resort to black market activities, and thus to contribute more to the official economy. By implementing policies which monitor and/or affect the variables examined in this study, governments in developing countries can control the level of black market

activity and lessen its negative impact on the development of their economies.

Notes

1. The countries are Bahrain, Djibouti, Hong Kong, Kuwait, Lebanon, Malaysia, Netherlands, Oman, Panama, Qatar, Saudi Arabia, Seychelles, Singapore, United Arab Emirates, United Kingdom, and the United States (World Currency Yearbook 1989).

2. Summers and Heston (1988) provide yearly, but not monthly, purchasing power parity price levels estimates.

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Figure 0.1: Black Market Premiums for the U.S. Dollar (Based on Official Rate at the End of December 1988)

Bangladesh	318%
Brazil	57%
Fiji	13%
Gambia	36%
Ghana	36%
Guyana	430%
Hungary	56%
Ireland	2%
Jamaica	22%
Kenya	13%
Nepal	61%
Nigeria	87%
Philippines	3%
Somalia	48%
South Africa	5%
Uganda	261%
Yugoslavia	17%

Figure 0.2: Statistics for Black, Official and Premium Dollar Exchange Rates

	Mean	Std Error	Minimum	Maximum	Median
Bangaladesh					
BEX	91.56	22.15	37.3	128	96.88
OFFEX	30.74	1.59	26	32.27	31
PB	60.99	20.8	10.3	96	65.69
Brazil					
BEX	400.49	806.35	4	3300	37.05
OFFEX	55851.75	68735.98	88.04	278940	22391.73
PB	-61629.29	70132.99	-278936	2591.67	-42201.7
Fiji					
BEX	0.77	0.12	0.57	0.96	0.8
OFFEX	1.29	0.17	1.07	1.53	1.29
PB	-0.5	0.28	-0.94	-0.13	-0.38
Gambia					
BEX	0.16	0.05	0.1	0.28	0.13
OFFEX	6.44	1.43	3.37	8.32	6.99
PB	-6.11	1.45	-7.68	-3.09	-6.77
Ghana					
BEX	209.56	59.04	120	339	215
OFFEX	155.28	80.63	50	303.03	149.93
PB	68.87	24.32	17.73	129.99	67.89
Guyana					
BEX	44.91	10.57	19	58	50
OFFEX	11.15	9.63	4.15	33	10
PB	36.18	9.11	14.7	47.7	40
Hungary					
BEX	64.7	7.69	51.2	87	62.4
OFFEX	50.48	5.17	43.58	62.9	48.24
PB	15.28	4.48	6.72	29.46	14.29
Ireland					
BEX	1.37	0.18	0.91	1.6	1.42
OFFEX	0.74	0.11	0.6	1.07	0.7
PB	0.62	0.3	-0.16	1	0.72
Jamaica					
BEX	6.49	0.3	5.55	7.4	6.48
OFFEX	5.55	0.24	5.04	6.48	5.48
PB	0.99	0.31	0.31	1.92	0.99
Kenya					
BEX	19.09	2.78	14.85	24.5	18.9
OFFEX	17.51	1.8	16	21.86	16.6
PB	2.03	2.01	-1.19	6.48	2.4
Nepal					
BEX	27.26	7.19	19.9	46	24.75
OFFEX	22.46	3.09	17.3	28.6	21.85
PB	5.44	5.22	-1.5	18.7	4
Nigeria					
BEX	0.2	0.07	0.07	0.32	0.19
OFFEX	3.75	2.37	0.83	7.65	4.04
PB	-3.14	2.2	-7.49	-0.55	-3.76
Philippines					
BEX	21.41	1.7	16.9	24	22
OFFEX	20.52	1.13	18.36	22.44	20.59
PB	1.07	0.99	-1.57	3.54	0.99
Somalia					
BEX	230.65	197.11	40	800	153.5
OFFEX	179.99	191.49	36	929.5	100
PB	102.36	97.32	4	426	70
South Africa					
BEX	0.41	0.05	0.29	0.52	0.41
OFFEX	2.3	0.27	1.9	2.79	2.26
PB	-1.85	0.29	-2.45	-1.41	-1.8
Uganda					
BEX	221.08	224.71	5.9	625	121.25
OFFEX	81.22	94.06	5.5	370	60
PB	161.95	165.12	0.35	460	95.5
Yugoslavia					
BEX	2359.31	3778.8	238	18000	705
OFFEX	0.74	1.96	0.02	11.82	0.07
PB	2359.1	3778.45	237.98	17998.26	704.94

Figure 0.3: Regression Results

	Constant	A	e	(i* + d + i)	Exports	Rho	Bangladesh	Brazil	Fiji	Gambia	Ghana	Guyan
Model 1												
Coefficient	7681.293	0.000	-809.407	0.344	-0.126	0.333	-7735.934	-7340.035	-7235.770	-7604.116	-7674.863	-7612.21
T-Statistic	17.699	2.924	-1.980	4.337	-2.006	9.333	-17.939	-16.642	-14.007	-17.213	-17.679	-17.288
Model 2												
Coefficient	7757.125	0.000	-780.4917	0.336171	-0.135746	0.325456	-7826.089	-7403.191	-7341.212	-7696.393	-7764.053	-7704.46
T-Statistic	17.54434	2.906188	-1.774593	4.095847	-2.070552	9.049065	-17.9443	-16.70685	-13.66091	-17.13593	-17.66865	-17.2215
Model 3												
Coefficient	7731.867	0.000	-790.186	0.338	-0.108	0.326	-7808.155	-7445.739	-7318.297	-7677.422	-7747.615	-7686.32
T-Statistic	17.267	2.803	-1.781	4.093	-1.587	8.980	-17.755	-16.633	-13.512	-16.955	-17.487	-17.043
Model 4												
Coefficient	7743.748	0.000	-806.317	0.337	-0.110	0.324	-7828.606	-7461.650	-7329.110	-7695.661	-7767.289	-7704.89
T-Statistic	17.391	2.850	-1.824	4.100	-1.626	8.970	-17.879	-16.753	-13.579	-17.066	-17.608	-17.156

	Hungary	Ireland	Jamaica	Kenya	Nepal	Nigeria	Philippines	Somalia	S. Africa	Uganda	1985
Model 1											
Coefficient	-7847.297	-7545.914	-7592.658	-7657.151	-7666.936	-7649.476	-7732.438	-7663.612	-7666.220	-7714.569	-
T-Statistic	-18.060	-17.387	-17.184	-17.573	-17.579	-17.650	-18.046	-17.506	-17.800	-16.720	-
Model 2											
Coefficient	-7935.994	-7625.859	-7684.923	-7747.288	-7757.472	-7741.877	-7826.922	-7755.591	-7743.192	-7797.243	11.75963
T-Statistic	-18.07208	-17.42688	-17.10568	-17.54464	-17.54786	-17.61909	-18.05642	-17.83423	-17.51767	-16.70618	0.331696
Model 3											
Coefficient	-7906.185	-7640.133	-7667.108	-7730.624	-7739.018	-7733.882	-7817.345	-7726.914	-7767.278	-7782.978	16.172
T-Statistic	-17.830	-17.315	-16.929	-17.364	-17.363	-17.461	-17.887	-17.340	-17.716	-16.543	0.426
Model 4											
Coefficient	-7921.149	-7657.586	-7685.155	-7749.850	-7758.400	-7752.130	-7836.903	-7746.970	-7785.165	-7802.058	14.824
T-Statistic	-17.952	-17.436	-17.039	-17.482	-17.481	-17.578	-18.012	-17.462	-17.839	-16.669	0.393

	1986	1987	1988	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Model 1											
Coefficient	-	-	-	-	-	-	-	-	-	-	-
T-Statistic	-	-	-	-	-	-	-	-	-	-	-
Model 2											
Coefficient	-2.58002	44.22624	8.186367	-	-	-	-	-	-	-	-
T-Statistic	-0.074219	1.339731	0.252267	-	-	-	-	-	-	-	-
Model 3											
Coefficient	-1.365	43.351	6.288	49.713	25.674	4.537	-8.445	-30.664	-5.863	-7.530	59.395
T-Statistic	-0.037	1.250	0.185	1.064	0.584	0.106	-0.195	-0.708	-0.137	-0.167	1.309
Model 4											
Coefficient	-1.564	43.132	5.821	-	-	-	-	-	-	-	-
T-Statistic	-0.043	1.247	0.172	-	-	-	-	-	-	-	-

	Sept	Oct	Nov	J/F	M/A	M/J	J/A	S/O	Obs	RS	ARS
Model 1											
Coefficient	-	-	-	-	-	-	-	-	707	0.994	0.993
T-Statistic	-	-	-	-	-	-	-	-			
Model 2											
Coefficient	-	-	-	-	-	-	-	-	707	0.993678	0.993446
T-Statistic	-	-	-	-	-	-	-	-			
Model 3											
Coefficient	2.440	18.656	-17.318	-	-	-	-	-	707	0.994	0.993
T-Statistic	0.054	0.412	-0.382	-	-	-	-	-			
Model 4											
Coefficient	-	-	-	44.367	6.379	-9.884	34.288	18.807	707	0.994	0.993
T-Statistic	-	-	-	1.354	0.206	-0.319	1.063	0.587			

Note: A represents the dollar value of domestic assets.
e represents the official real exchange rate.
(i* + d + i) represents the official depreciation-adjusted interest rate differential.
Rho represents the first order difference in the black market premium.
Jan represents January, Feb represents February and so forth through November.
J/F represents January and February.
M/A represents March and April.
M/J represents May/June.
J/A represents July and August.
S/O represents September and October.
RS represents R-squared.
ARS represents Adjusted R-squared.

Figure 0.4: Additional Regression Results

	Constant	A	e	(i* + d + i)	Exports	Rho	Bangladesh	Brazil	Fiji	Gambia	Ghana	Guyan
Model 1												
Coefficient	3.128	0.000	-40.961	0.005	-0.019	0.991	-	-	-	-	-	-
T-Statistic	0.207	1.411	-0.548	0.059	-0.795	198.656	-	-	-	-	-	-
Model 2												
Coefficient	-13.954	0.000	-42.780	-0.004	-0.019	0.991	-	-	-	-	-	-
T-Statistic	-0.414	1.446	-0.570	-0.046	-0.829	196.450	-	-	-	-	-	-
Model 3												
Coefficient	6.287	0.000	-39.256	0.005	-0.017	0.991	-	-	-	-	-	-
T-Statistic	0.161	1.368	-0.524	0.053	-0.727	198.049	-	-	-	-	-	-
Model 4												
Coefficient	-7.694	0.000	-41.142	0.003	-0.018	0.991	-	-	-	-	-	-
T-Statistic	-0.263	1.406	-0.550	0.034	-0.752	198.393	-	-	-	-	-	-

	Hungary	Ireland	Jamaica	Kenya	Nepal	Nigeria	Philippines	Somalia	S. Africa	Uganda	1985
Model 1											
Coefficient	-	-	-	-	-	-	-	-	-	-	-
T-Statistic	-	-	-	-	-	-	-	-	-	-	-
Model 2											
Coefficient	-	-	-	-	-	-	-	-	-	-	19.983
T-Statistic	-	-	-	-	-	-	-	-	-	-	0.504
Model 3											
Coefficient	-	-	-	-	-	-	-	-	-	-	-
T-Statistic	-	-	-	-	-	-	-	-	-	-	-
Model 4											
Coefficient	-	-	-	-	-	-	-	-	-	-	-
T-Statistic	-	-	-	-	-	-	-	-	-	-	-

	1986	1987	1988	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Model 1											
Coefficient	-	-	-	-	-	-	-	-	-	-	-
T-Statistic	-	-	-	-	-	-	-	-	-	-	-
Model 2											
Coefficient	23.253	13.102	20.815	-	-	-	-	-	-	-	-
T-Statistic	0.596	0.332	0.532	-	-	-	-	-	-	-	-
Model 3											
Coefficient	-	-	-	54.877	-5.562	-30.415	-26.495	-32.242	5.705	0.845	68.066
T-Statistic	-	-	-	1.020	-0.109	-0.601	-0.519	-0.632	0.113	0.016	1.265
Model 4											
Coefficient	-	-	-	-	-	-	-	-	-	-	-
T-Statistic	-	-	-	-	-	-	-	-	-	-	-

	Sept	Oct	Nov	J/F	M/A	M/J	J/A	S/O	Obs	RS	ARS
Model 1											
Coefficient	-	-	-	-	-	-	-	-	707	0.990	0.990
T-Statistic	-	-	-	-	-	-	-	-			
Model 2											
Coefficient	-	-	-	-	-	-	-	-	707	0.990	0.990
T-Statistic	-	-	-	-	-	-	-	-			
Model 3											
Coefficient	-42.859	11.523	-29.712	-	-	-	-	-	707	0.991	0.990
T-Statistic	-0.796	0.212	-0.547	-	-	-	-	-			
Model 4											
Coefficient	-	-	-	35.134	-14.445	1.178	48.530	-2.134	707	0.990	0.990
T-Statistic	-	-	-	0.939	-0.396	0.032	1.260	-0.055			

Note: A represents the dollar value of domestic assets.
e represents the official real exchange rate.
(i* + d + i) represents the official depreciation-adjusted interest rate differential.
Rho represents the first order difference in the black market premium.
Jan represents January, Feb represents February and so forth through November.
J/F reprecents January and February.
M/A represents March and April.
M/J represents May/June.
J/A represents July and August.
S/O represents September and October.
RS represents R-squared.
ARS represents Adjusted R-squared.

Figure 0.5: GDP-Adjusted Regression Results

	Constant	A	e	(i* + d + i)	Exports	Rho	anglad	Brazil	Fiji	Gambia	Ghana	Guyan
Model 1												
Coefficient	5.862	0.000	-13.370	0.020	0.000	0.997	-	-	-	-	-	-
T-Statistic	0.385	-0.171	-0.183	0.079	-0.013	216.677	-	-	-	-	-	-
Model 2												
Coefficient	2.356	-0.000	-13.846	0.026	0.000	0.997	-	-	-	-	-	-
T-Statistic	0.071	-0.167	-0.189	0.102	-0.012	214.540	-	-	-	-	-	-
Model 3												
Coefficient	7710.788	0.000	11.312	0.547	0.004	0.352	-7719.098	-7683.484	-7717.789	-7708.228	-7709.456	-7705.21
T-Statistic	18.395	0.056	0.046	2.626	0.715	9.975	-16.810	-17.570	-17.614	-18.346	-17.997	-18.346
Model 4												
Coefficient	7793.307	-0.000	69.309	0.541	0.003	0.345	-7776.315	-7748.140	-7831.557	-7795.274	-7780.083	-7791.93
T-Statistic	18.416	-0.072	0.274	2.564	0.639	9.689	-16.709	-17.614	-17.620	-18.406	-18.019	-18.405
Model 5												
Coefficient	7772.057	-0.000	67.664	0.570	0.004	0.346	-7770.991	-7746.069	-7819.159	-7783.380	-7771.114	-7780.70
T-Statistic	18.212	-0.040	0.266	2.682	0.747	9.663	-16.565	-17.510	-17.489	-18.256	-17.865	-18.257
Model 6												
Coefficient	7802.352	-0.000	62.881	0.562	0.004	0.343	-7814.868	-7781.648	-7853.786	-7820.284	-7811.477	-7817.78
T-Statistic	18.368	-0.007	0.248	2.647	0.720	9.613	-16.734	-17.658	-17.628	-18.418	-18.039	-18.420

	Hungary	Ireland	Jamaica	Kenya	Nepal	Nigeria	Philippi	S. Africa	Somalia	Uganda	1985
Model 1											
Coefficient	-	-	-	-	-	-	-	-	-	-	-
T-Statistic	-	-	-	-	-	-	-	-	-	-	-
Model 2											
Coefficient	-	-	-	-	-	-	-	-	-	-	4.344
T-Statistic	-	-	-	-	-	-	-	-	-	-	0.110
Model 3											
Coefficient	-7711.270	-7711.117	-7705.081	-7708.628	-7710.435	-7710.690	-7708.970	-7710.624	-7705.774	-7699.931	-
T-Statistic	-18.109	-18.352	-18.343	-18.352	-18.351	-18.301	-18.319	-18.223	-18.267	-17.190	-
Model 4											
Coefficient	-7791.625	-7795.155	-7792.825	-7792.342	-7793.784	-7802.716	-7799.858	-7807.111	-7776.720	-7778.288	-8.722
T-Statistic	-18.173	-18.414	-18.401	-18.413	-18.413	-18.354	-18.374	-18.268	-18.329	-17.249	-0.250
Model 5											
Coefficient	-7769.000	-7783.595	-7780.779	-7780.636	-7782.193	-7790.764	-7787.692	-7794.987	-7765.482	-7766.654	-3.506
T-Statistic	-17.995	-18.263	-18.252	-18.263	-18.262	-18.207	-18.225	-18.124	-18.178	-17.099	-0.095
Model 6											
Coefficient	-7801.636	-7820.663	-7817.660	-7817.781	-7819.339	-7827.233	-7824.159	-7831.103	-7803.668	-7812.749	-6.470
T-Statistic	-18.152	-18.426	-18.413	-18.426	-18.425	-18.366	-18.385	-18.280	-18.346	-17.288	-0.176

Figure 0.6: GDP-Adjusted Regression Results (cont'd)

	1986	1987	1988	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Model 1											
Coefficient	-	-	-	-	-	-	-	-	-	-	-
T-Statistic	-	-	-	-	-	-	-	-	-	-	-
Model 2											
Coefficient	7.117	-2.319	6.885	-	-	-	-	-	-	-	-
T-Statistic	0.186	-0.060	0.178	-	-	-	-	-	-	-	-
Model 3											
Coefficient	-	-	-	-	-	-	-	-	-	-	-
T-Statistic	-	-	-	-	-	-	-	-	-	-	-
Model 4											
Coefficient	-15.443	26.149	-6.601	-	-	-	-	-	-	-	-
T-Statistic	-0.457	0.803	-0.205	-	-	-	-	-	-	-	-
Model 5											
Coefficient	-15.943	25.332	-7.131	74.901	20.520	-3.344	-11.626	-16.430	-5.512	-6.781	65.909
T-Statistic	-0.451	0.746	-0.213	1.678	0.490	-0.080	-0.277	-0.391	-0.133	-0.155	1.512
Model 6											
Coefficient	-16.270	24.949	-8.096	-	-	-	-	-	-	-	-
T-Statistic	-0.461	0.735	-0.242	-	-	-	-	-	-	-	-

	Sep	Oct	Nov	J/F	M/A	M/J	J/A	S/O	Obs	RS	ARS
Model 1											
Coefficient	-	-	-	-	-	-	-	-	701	0.990	0.990
T-Statistic	-	-	-	-	-	-	-	-			
Model 2											
Coefficient	-	-	-	-	-	-	-	-	701	0.990	0.990
T-Statistic	-	-	-	-	-	-	-	-			
Model 3											
Coefficient	-	-	-	-	-	-	-	-	701	0.993	0.993
T-Statistic	-	-	-	-	-	-	-	-			
Model 4											
Coefficient	-	-	-	-	-	-	-	-	701	0.993	0.993
T-Statistic	-	-	-	-	-	-	-	-			
Model 5											
Coefficient	2.993	19.756	-16.633	-	-	-	-	-	701	0.993	0.993
T-Statistic	0.069	0.450	-0.379	-	-	-	-	-			
Model 6											
Coefficient	-	-	-	52.279	0.532	-2.984	37.655	19.337	701	0.993	0.993
T-Statistic	-	-	-	1.682	0.018	-0.099	1.210	0.621			

Note: A represents the dollar value of GDP-adjusted domestic assets.
e represents the official real exchange rate.
(i* + d + i) represents the official depreciation-adjusted interest rate differential.
Rho represents the first order difference in the black market premium.
Jan represents January, Feb represents February and so forth through November.
J/F reprecents January and February.
M/A represents March and April.
M/J represents May/June.
J/A represents July and August.
S/O represents September and October.
RS represents R-squared.
ARS represents Adjusted R-squared.

Figure 0.7: Population-Adjusted Regression Results

	Constant	A	e	(i* + d + l)	Exports	Rho	Bangladesh	Brazil	Fiji	Gambia	Ghana	Guyan
Model 1												
Coefficient	-3.446	0.000	-100.131	0.011	-0.251	0.989	-	-	-	-	-	-
T-Statistic	-0.225	1.770	-1.143	0.131	-1.417	182.456	-	-	-	-	-	-
Model 2												
Coefficient	-17.080	0.000	-100.743	0.005	-0.248	0.989	-	-	-	-	-	-
T-Statistic	-0.503	1.760	-1.145	0.060	-1.396	181.385	-	-	-	-	-	-
Model 3												
Coefficient	7630.838	0.000	-233.437	0.371	-0.309	0.336	-7638.907	-7547.964	7655.212	7621.035	7635.591	7739.22
T-Statistic	17.618	2.372	-0.855	4.725	-0.876	9.386	-17.627	-17.489	-16.969	-17.529	-17.627	-18.116
Model 4												
Coefficient	7710.438	0.000	-192.329	0.373	-0.346	0.329	-7721.088	-7620.570	7759.766	7706.829	7717.605	7825.14
T-Statistic	17.607	2.342	-0.678	4.651	-0.940	9.118	-17.668	-17.538	-16.939	-17.557	-17.669	-18.161
Model 5												
Coefficient	7701.697	0.000	-181.813	0.373	-0.197	0.329	-7727.929	-7633.454	7768.702	7714.855	7725.089	7828.67
T-Statistic	17.397	2.174	-0.638	4.638	-0.525	9.050	-17.537	-17.424	-16.835	-17.432	-17.539	-18.023
Model 6												
Coefficient	7715.596	0.000	-189.086	0.373	-0.226	0.327	-7746.692	-7651.603	7783.828	7732.915	7743.732	7847.62
T-Statistic	17.520	2.204	-0.665	4.645	-0.604	9.046	-17.656	-17.541	-16.933	-17.547	-17.658	-18.149

	Hungary	Ireland	Jamaica	Kenya	Nepal	Nigeria	Philippines	S. Africa	Somalia	Uganda	1985
Model 1											
Coefficient	-	-	-	-	-	-	-	-	-	-	-
T-Statistic	-	-	-	-	-	-	-	-	-	-	-
Model 2											
Coefficient	-	-	-	-	-	-	-	-	-	-	16.380
T-Statistic	-	-	-	-	-	-	-	-	-	-	0.414
Model 3											
Coefficient	7913.227	7784.247	7649.718	7631.880	7634.378	7618.233	-7659.489	-7742.176	7628.972	7669.301	-
T-Statistic	-18.248	-17.724	-17.707	-17.595	-17.598	-17.458	-17.712	-17.983	-17.509	-16.682	-
Model 4											
Coefficient	7995.532	7856.925	7735.527	7715.325	7717.700	7707.624	-7749.619	-7834.412	7699.889	7750.340	2.093
T-Statistic	-18.305	-17.756	-17.741	-17.631	-17.636	-17.475	-17.743	-18.012	-17.549	-16.737	0.060
Model 5											
Coefficient	7974.903	7900.744	7744.160	7722.857	7724.784	7715.806	-7754.439	-7839.576	7709.582	7763.339	8.497
T-Statistic	-18.109	-17.706	-17.617	-17.503	-17.506	-17.353	-17.609	-17.885	-17.426	-16.630	0.228
Model 6											
Coefficient	7990.535	7911.564	7761.954	7741.315	7743.358	7733.345	-7772.784	-7856.956	7728.471	7779.725	6.575
T-Statistic	-18.236	-17.804	-17.733	-17.621	-17.624	-17.465	-17.727	-18.003	-17.546	-16.749	0.178

Figure 0.8: Poplulation-Adjusted Regression Results (cont'd)

	1986	1987	1988	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Model 1											
Coefficient	-	-	-	-	-	-	-	-	-	-	-
T-Statistic	-	-	-	-	-	-	-	-	-	-	-
Model 2											
Coefficient	17.029	8.982	18.636	-	-	-	-	-	-	-	-
T-Statistic	0.437	0.228	0.477	-	-	-	-	-	-	-	-
Model 3											
Coefficient	-	-	-	-	-	-	-	-	-	-	-
T-Statistic	-	-	-	-	-	-	-	-	-	-	-
Model 4											
Coefficient	-17.208	28.688	-2.661	-	-	-	-	-	-	-	-
T-Statistic	-0.506	0.872	-0.082	-	-	-	-	-	-	-	-
Model 5											
Coefficient	-14.649	29.755	-2.995	58.202	36.993	8.631	-0.309	-23.164	5.806	-0.326	70.540
T-Statistic	-0.410	0.863	-0.089	1.260	0.856	0.202	-0.007	-0.536	0.136	-0.007	1.561
Model 6											
Coefficient	-15.465	29.141	-3.612	-	-	-	-	-	-	-	-
T-Statistic	-0.433	0.847	-0.107	-	-	-	-	-	-	-	-

	Sep	Oct	Nov	J/F	M/A	M/J	J/A	S/O	Obs	RS	ARS
Model 1											
Coefficient	-	-	-	-	-	-	-	-	707	0.990	0.990
T-Statistic	-	-	-	-	-	-	-	-			
Model 2											
Coefficient	-	-	-	-	-	-	-	-	707	0.990	0.990
T-Statistic	-	-	-	-	-	-	-	-			
Model 3											
Coefficient	-	-	-	-	-	-	-	-	707	0.994	0.993
T-Statistic	-	-	-	-	-	-	-	-			
Model 4											
Coefficient	-	-	-	-	-	-	-	-	707	0.994	0.993
T-Statistic	-	-	-	-	-	-	-	-			
Model 5											
Coefficient	10.463	24.336	-11.954	-	-	-	-	-	707	0.994	0.993
T-Statistic	0.233	0.536	-0.263	-	-	-	-	-			
Model 6											
Coefficient	-	-	-	51.669	9.792	-2.857	40.751	23.085	707	0.994	0.993
T-Statistic	-	-	-	1.602	0.316	-0.092	1.264	0.718			

Note: A represents the dollar value of population-adjusted domestic assets.
e represents the official real exchange rate.
(i* + d + i) represents the official depreciation-adjusted interest rate differential.
Rho represents the first order difference in the black market premium.
Jan represents January, Feb represents February and so forth through November.
J/F reprecents January and February.
M/A represents March and April.
M/J represents May/June.
J/A represents July and August.
S/O represents September and October.
RS represents R-squared.
ARS represents Adjusted R-squared.

Figure 0.9: A, B, & C

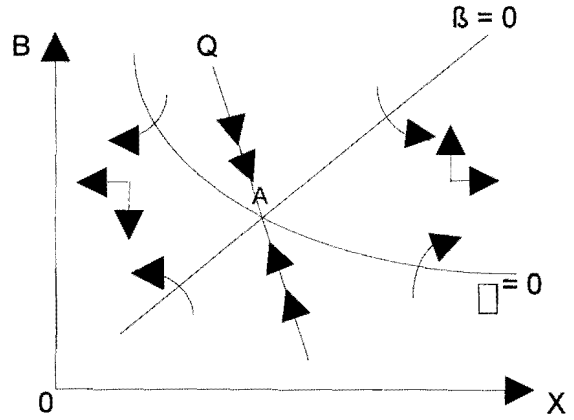


Figure A

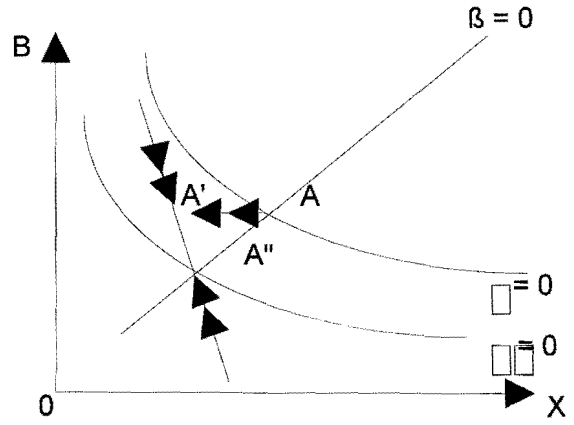


Figure B

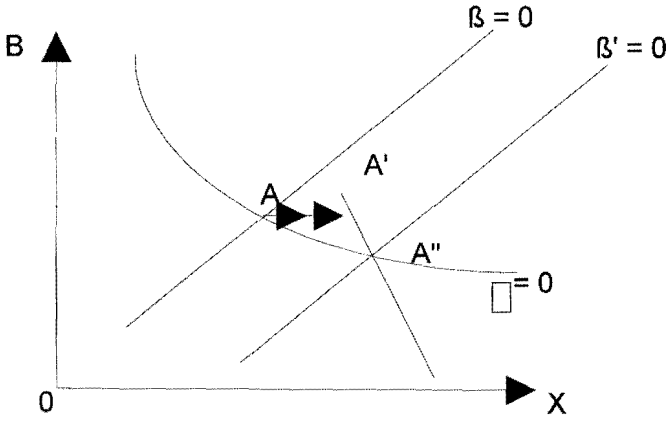


Figure C

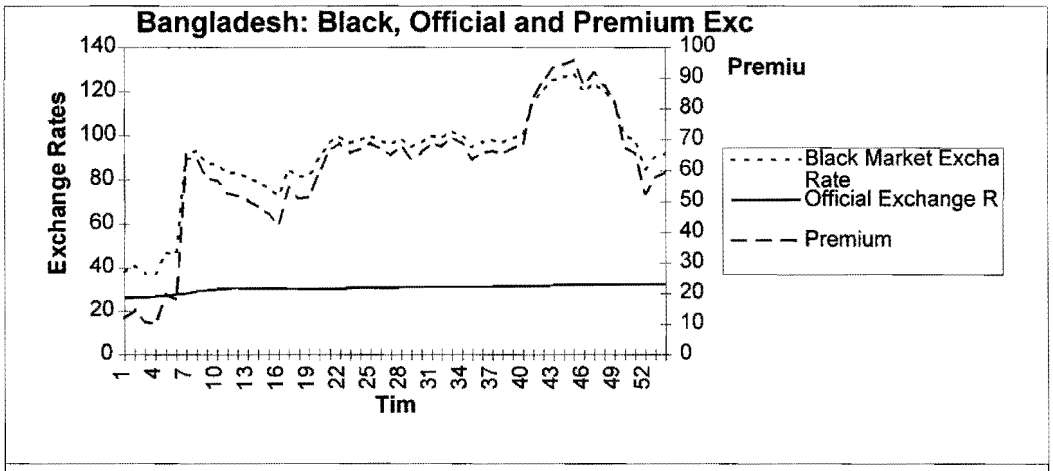


Figure 1

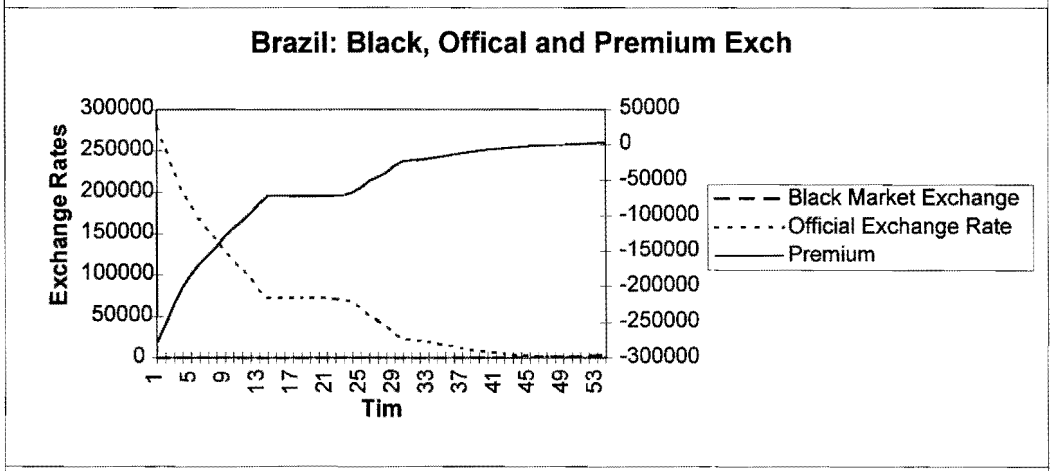


Figure 2

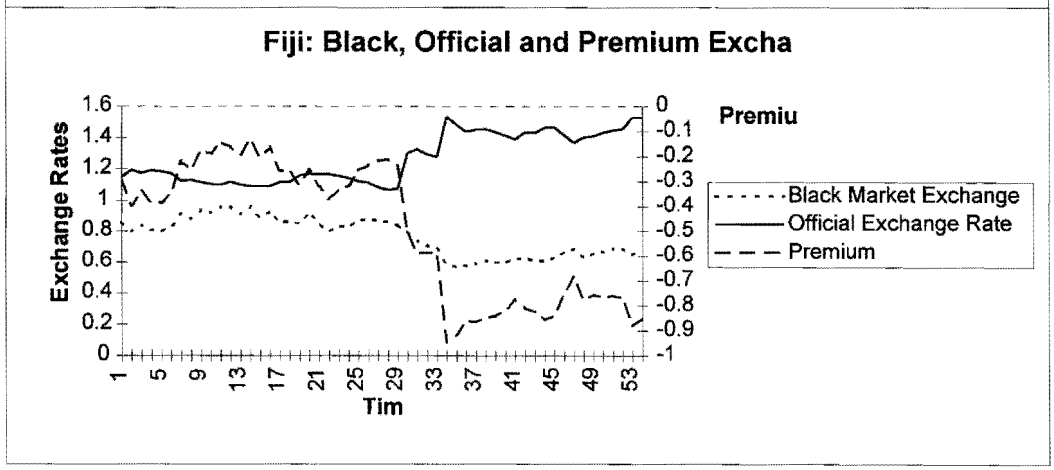


Figure 3

Figure 0.1:

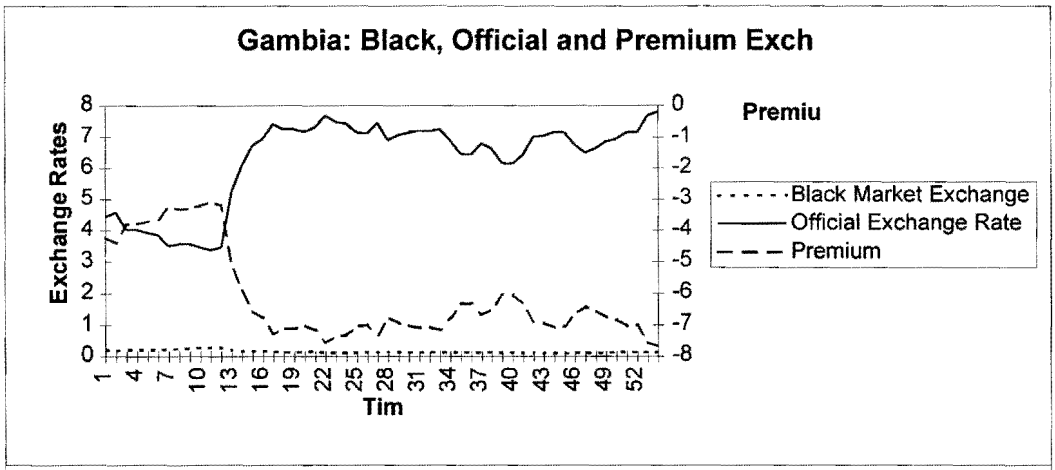


Figure 4

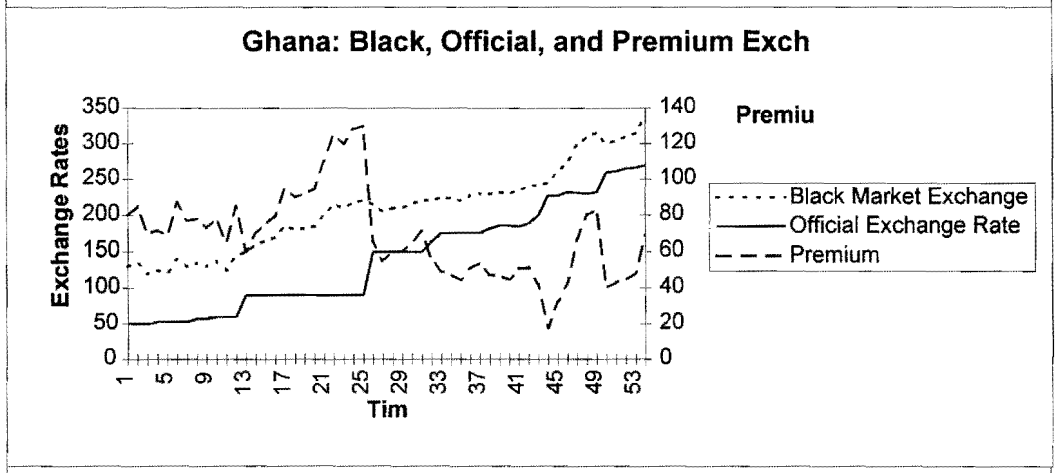


Figure 5

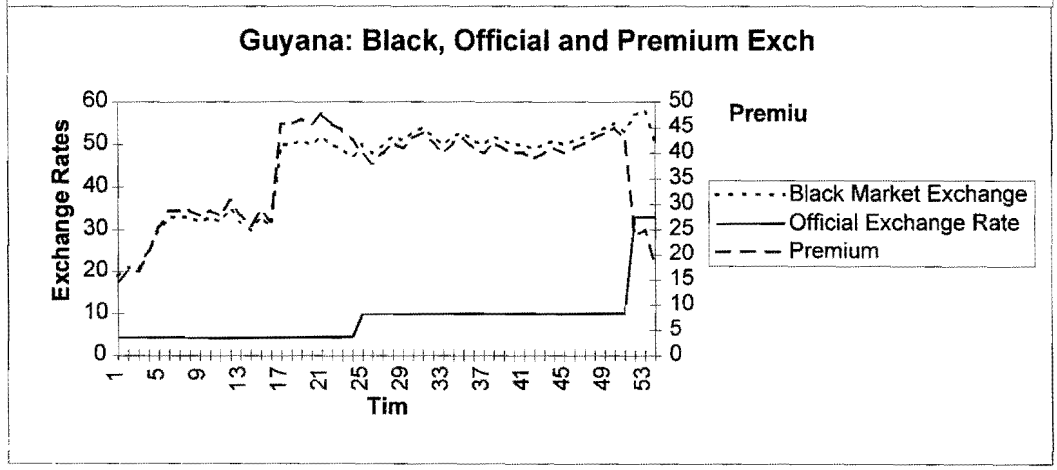


Figure 6

Figure 0.2:
2

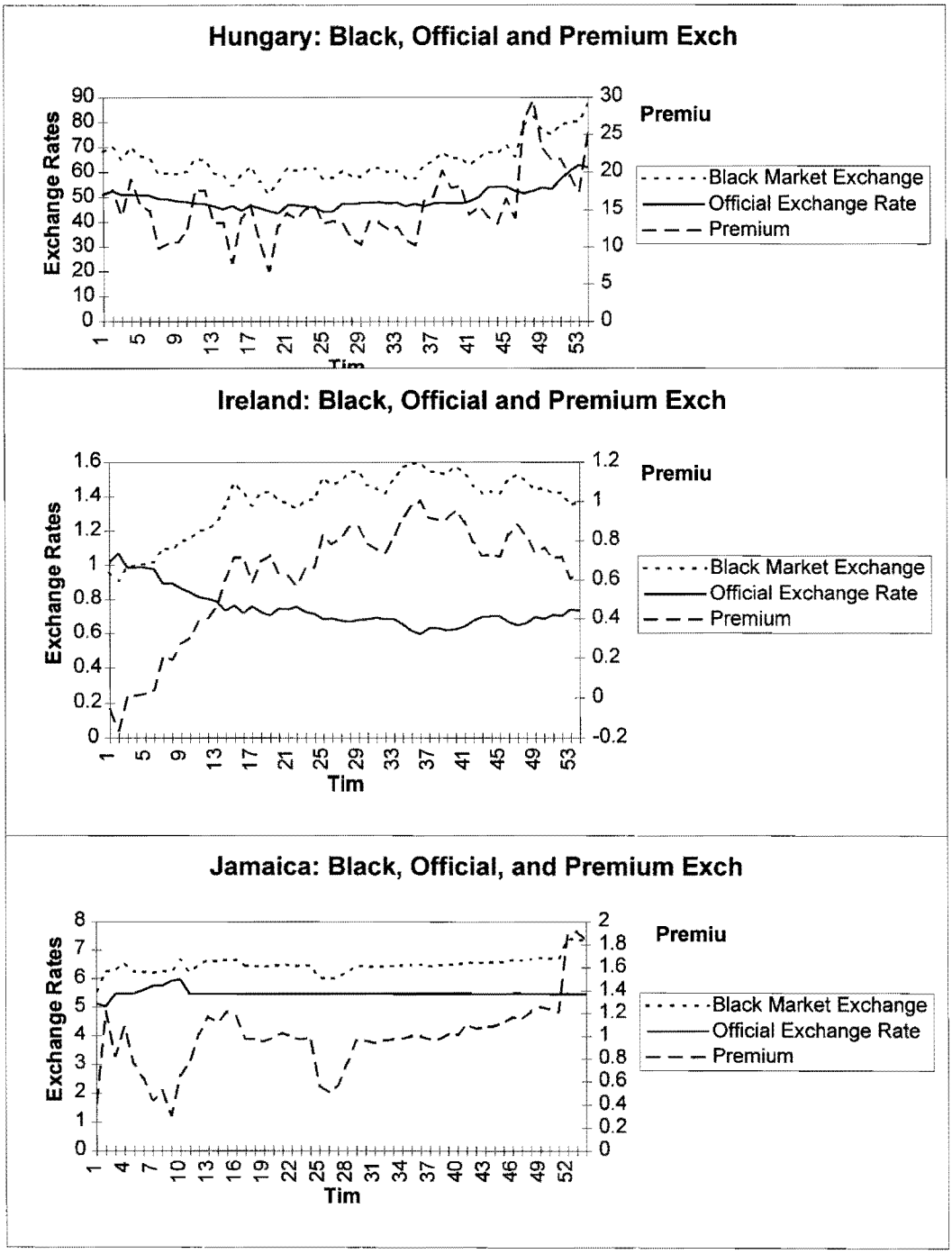


Figure 7

Figure 8

Figure 9

Figure 0.3:

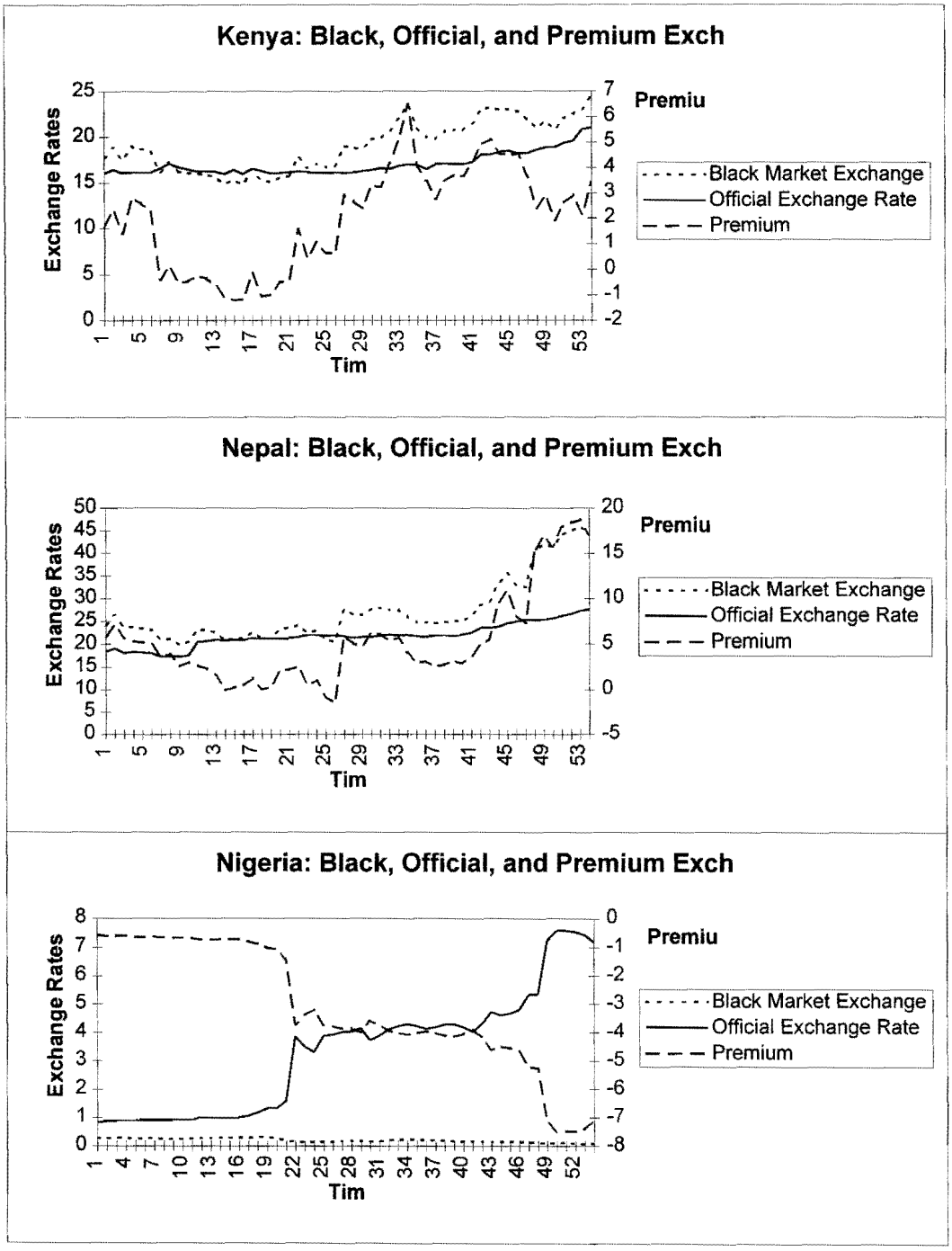


Figure 1

Figure 1

Figure 1

Figure 0.4:

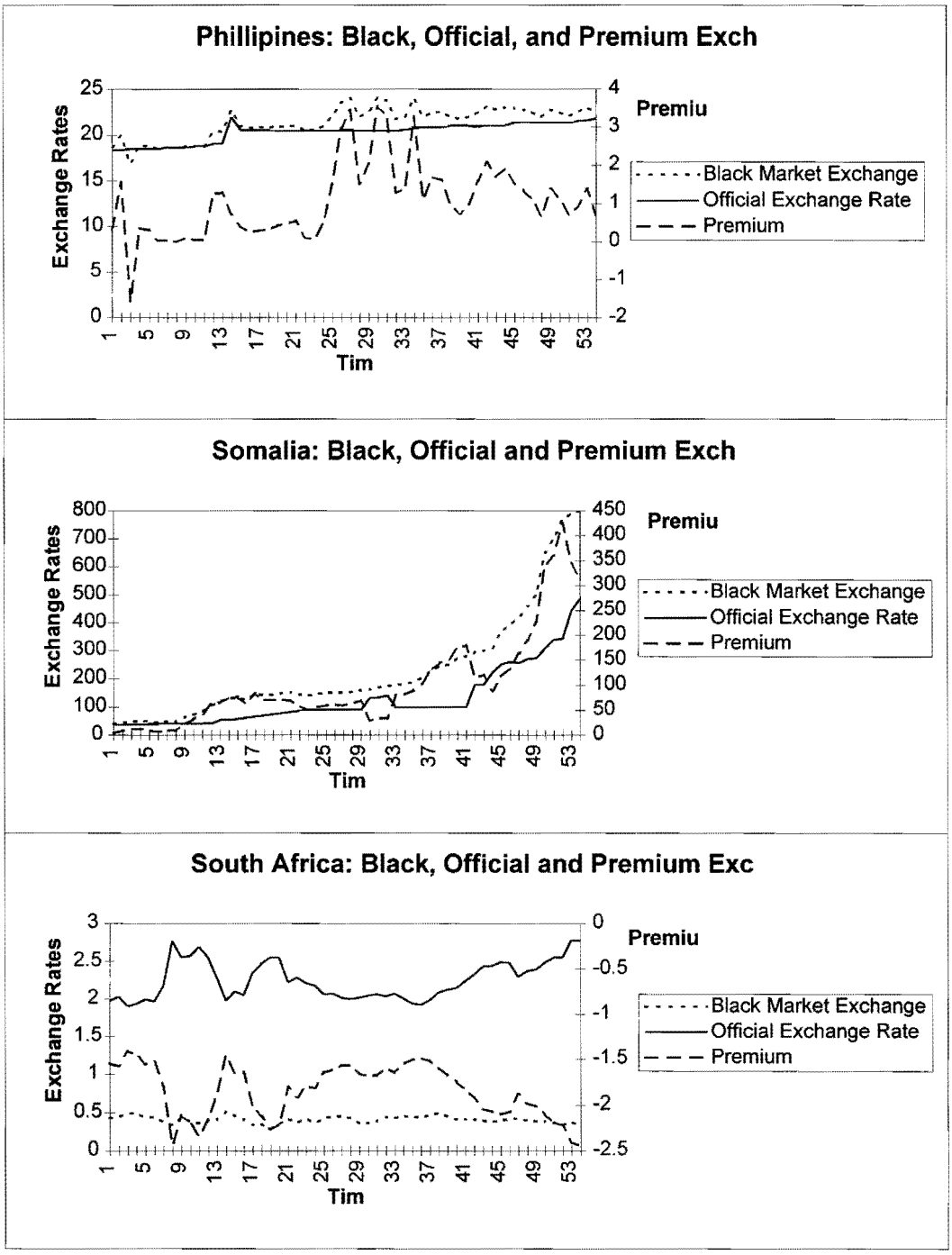
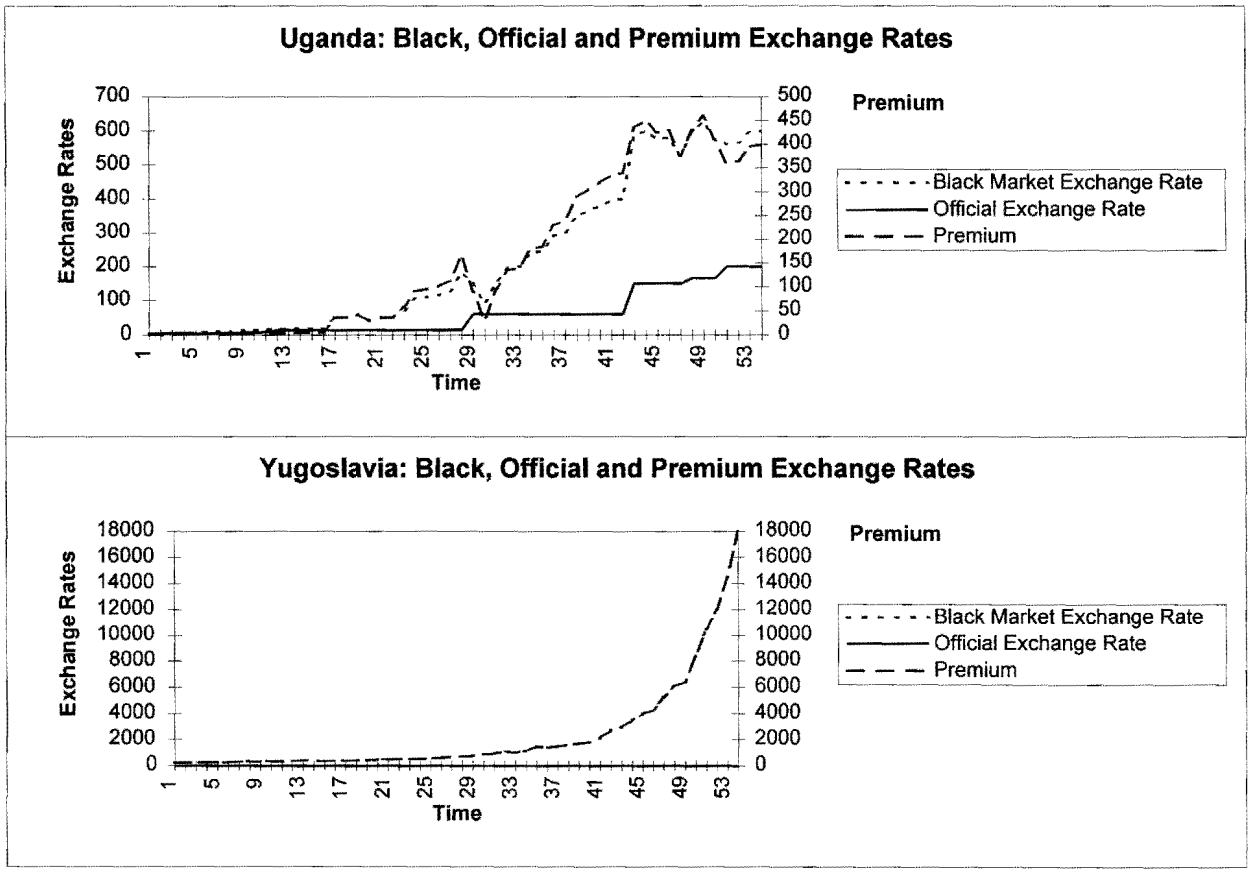


Figure 1

Figure 1

Figure 1

Figure 0.5:



Figur

Figur

Figure 0.6:

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