An Analysis of the Jamaican Foreign Exchange Auction

by

Karl M. Bennett
Department of Economics
University of Waterloo

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1. INTRODUCTION

In November of 1983, the Government of Jamaica decided to abandon the fixed exchange rate standard and introduced an auction system for the determination of the exchange rate. The primary reason for the introduction of the auction was to curb the growth of black market trading in foreign exchange. It was expected that this system would stem the leakage of foreign exchange to the black market by generating exchange rates which would be directly competitive with the black market rate.[1]

The growth in the level of black market transactions over the previous decade had, undoubtedly, compounded the economic problems faced by the country, which were, in large part, due to a severe scarcity of foreign exchange. Curbing the leakage of foreign exchange would, however, not resolve the problem of scarcity. This problem could only be resolved through a structural adjustment of the economy, which would result in an expansion and diversification of its exports and a more effective exploitation of opportunities for replacing imports with domestic products. The auction could make a positive contribution to such developments by helping to ease the process of exchange rate adjustment in the face of changing external and internal conditions. This would work to reduce the tendency towards overvaluation of the currency inherent in most fixed exchange rate standards operated by developing countries.

Since the auction was introduced, the currency has depreciated in value by more than 100 percent.[2] The rapid rate of depreciation of the

currency resulted in the government employing its instruments of macro economic policy to try to stabilize the exchange rate. Specifically, emphasis was placed on curbing aggregate demand. Consequently, the auction has not, as might have been expected, allowed the government greater freedom to pursue its developmental objectives by relieving it of responsibility for exchange rate management.

In this paper an analytical framework will be developed which will be used to demonstrate why the auction system would inevitably lead to a rapid depreciation of the currency. It will also be argued that the combination of the unique structural characteristics of the Jamaican economy and other exogeneous developments, such as, the collapse of the bauxite industry, meant that the auction could not contribute to the necessary structural adjustments in the economy.

2. OPERATING FEATURES OF THE EXCHANGE AUCTION[3]

Each bank was initially required to supply to the auction, at each daily session, the equivalent of 25 percent of its foreign exchange purchases of the previous day. Bidding by the banks was to be conducted within a prescribed band set fortnightly by the Bank of Jamaica. The mid point of the band was to be adjusted fortnightly on the basis of the weighted average of the average rates for spot transactions during the previous fortnight.[4]

Foreign exchange was to be allocated as follows. If the bank that bid the highest price, offered to buy an amount equal to or more than the quantity of foreign exchange available, that entire day's allotment would go to the bank in question. If two or more banks bid the same

high price, then the allocation would be in proportion to the amount each bank had contributed to the auction. This procedure would be continued until all foreign exchange was exhausted. In case the total amount for which the banks tendered bids was less than the amount available, the Bank of Jamaica would purchase the remaining exchange at the lowest bid tendered on that day's auction. No trading would occur if all banks had identical bids on any given day. The Bank of Jamaica, also, reserved the right to tender bids for purchase at any of the daily auctions.

The price at which the successful banks would make settlement would be the banks' bid price. The price paid to the banks supplying the exchange was to be the weighted average price of the successful bids. The commercial banks' buying rate on the subsequent trading day would be set at the lowest bid price which cleared the market.

The system was amended in March 1984.[5] At that time the commercial banks were required to purchase foreign currency as agents of the Bank of Jamaica and surrender the entire proceeds of their purchases to that institution.[6] Auctions were to be held twice weekly and they were now open to participants from the public and private sectors. Each bid had to be accompanied by a local currency deposit to cover the value of the bid. The actual amount which a successful bidder would pay for foreign exchange would be the lowest price within the band at which foreign exchange was sold. This meant, that unlike the initial system, all successful bidders at the auction would pay the same price for foreign exchange. In November 1984, there was a further adjustment in the system. The Bank of Jamaica discontinued the practice of setting bands within

which participants had to bid. Individuals were free to bid at any price they chose. In addition, successful bidders would have to pay the price at which they had bid and not the clearing rate.

3. A MODEL OF THE EXCHANGE AUCTION

Given the operating rules of the auction, any participant bidding for foreign exchange would have previously incurred a debt in foreign currency. The value of bids would be determined by the size of contractual payments for commodity imports, income payments to foreigners and debt service obligations. Since the exchange rate directly determines the domestic cost of any foreign payment, a decision on the part of individuals to incur a given level of foreign payment obligations would be based on expectations of what the exchange rate would be at the time payment had to be made. If at the time of payment, the individual's bid is not satisfied at his expected rate, he would have to decide whether to re-enter a subsequent auction with the same bid, or raise the bid to increase his chances of success.

It might then be concluded that there will be a discrete time interval over which there will be a predetermined demand for foreign exchange which will be independent of the level of the exchange rate. To the extent that the actual amount paid for foreign exchange exceeded the expected amount, this might have an influence on the size of the foreign payment obligations an individual would be willing to accept in some future period. This, in turn, would be determined by the extent to which the additional costs were actually borne by the individual.

The amount of foreign exchange available for auction would be deter-
mined by exports of goods and services, excluding bauxite and alumina,
foreign exchange brought in by the bauxite/alumina companies to cover
local operating costs, the bauxite levy, direct foreign investment and
foreign borrowing. The size of these inflows in any period would clear-
ly be determined by decisions taken in an earlier period. Given the ex-
istence of a black market, a distinction must be drawn between the po-
tential supply and the actual supply of foreign exchange. The potential
supply would be based on the factors listed above and could be taken to
be predetermined over a discrete time interval. The actual amount would
differ from the potential amount depending on the size of the black mar-
ket premium and associated leakage of funds from the official market.
The size of this premium would be determined by the amount by which the
demand for foreign exchange exceeded potential supply over a discrete
period and whether the auction generated prices which truly reflected
the scarcity value of foreign exchange.

Our model is then based on the assumption that there will be a pre-
determined demand for foreign exchange, which will extend over several
auctions. It will be assumed that at each auction there will be an au-
tonomous demand for foreign exchange, which will be a fixed portion of
that periods predetermined demand. At any auction the amount of foreign
exchange for which bids would be made would consist of an autonomous
component, as well as, any unsatisfied demands from previous auctions.
The amount of foreign exchange available at any auction would be fixed
portion of the predetermined potential supply.

The relationships might be expressed as follows:

$$Q_{dT} = \sum_{i=1}^{N} Q_{di} \qquad (1)$$

$$Q_{di} = Q_{da} + B \qquad (2)$$

$$Q_{ST} = \sum_{i=1}^{N} Q_{Si} \qquad (3)$$

$$Q_{Si} = \tau Q_{Sp} \qquad (4)$$

$$Q_{Sp} \geq Q_{ST} \qquad (5)$$

where Q_{dT} = Predetermined cumulative demand for foreign exchange over N auctions in period T.

Q_{di} = The amount bid at each auction in period T.

Q_{da} = The autonomous demand assumed to be a fixed portion of total demand for period T.

B = The unsatisfied demand for foreign exchange from previous auctions.

Q_{ST} = The cumulative supply of foreign exchange over N auctions in period T.

Q_{Si} = The amount of foreign exchange offered at each auction.

Q_{Sp} = The predetermined potential supply of foreign exchange.

If $Q_{dT} > Q_{ST}$ the following generalizations might now be drawn. At each auction the unsatisfied demand, B, will grow relative to total demand, Q_{di}. As the level of unsatisfied demand rises, the auction will work to accelerate the rate of currency devaluation for the following reasons. First of all, participants in an auction will view the clearing rate established at a previous auction as the effective floor price for the current auction. Secondly, they would also likely conclude that a failure to secure the required foreign exchange at the earliest possible

auction would likely expose them to even higher prices for foreign exchange. Consequently, bidding at higher prices might be accepted as a loss minimization strategy.

Let us now turn to a consideration of whether our assumptions concerning the demand and supply relationships and the bidding process were in fact reflected in the actual performance of the auction. Data was collected for 62 auctions, starting with the auction of July 3, 1984 and ending with the auction of February 28, 1985.

The first issue to which attention was directed was whether there was any evidence to support the proposition that there would be a predetermined demand for foreign exchange extending over several auctions. If there was evidence that over several auctions the autonomous or net bid remained relatively unchanged, this would lend support to the presumption of a predetermined demand. It was then necessary to establish rules which would make it possible to determine what portion of the total amount bid at any auction represented unsatisfied bids from previous auctions. At any auction some bids would not be satisfied, either because of an insufficiency of funds or because the bid was disqualified. Disqualification could be related to the fact that a bid was not supported by the necessary documentation. At virtually every auction some bids were unsatisfied. However, in the immediately following auction the total amount bid did not always increase. At other times, the interauction changes seemed at variance with the reported level of unsatisfied bids. As a result, the following rules were adopted in an effort to identify the portion of the total amount bid at any auction which represented arrears, or unsatisfied bids, from previous auctions.

1. If the increase in the value of bids at an auction was equal to or greater than the value of unsatisfied bids from the previous auction, it was assumed that the total value of arrears from the previous auction was reflected in the bid.

2. If the increase in the value of bids is less than the value of accumulated arrears from the preceding auction it was assumed that only 50 percent of the value of accumulated arrears was reflected in the total amount bid.

3. If the total value of bids at an auction is less than that of the preceding auction and the decline is equal to or greater than the value of arrears, it was assumed that unsatisfied bidders from previous auctions did not participate in that auction.

4. If there was a decline in the value of the total amount bid over two or more auctions while there were outstanding arrears, it was assumed that 50 percent of the value of these arrears were included in the amount bid at the latest auction. This rule was applied, subject to the constraint, that the amount of the bid assumed to reflect arrears could not exceed that of a previous auction.

5. If there was a cyclical variation in the value of total bids over several auctions it was assumed that these variations represented in exact value changes in the value of arrears included in the total bid.

6. It was assumed that bids rejected at any auction would be resubmitted after a lapse of one auction.

In Table 1 is set out the total amounts bid and estimates of arrears and net bids based on the rules outlined above for the 62 auctions. The super scripts over the values shown for arrears indicated which of the

Table 1
Total Demand and Estimated Net Demand for Foreign Exchange

$US Million

Auction Date		Total Bid	Arrears	Net Bid	Auction Date		Total Bid	Arrears	Net Bid
July	3	3.4	0.0	3.4	November	1	14.2	8.9[2]	5.3
	5	3.1	0.0[3]	3.1		6	16.5	10.5[2]	6.0
	10	4.0	0.4[1]	3.6		8	15.7	10.5[4]	5.2
	12	3.3	0.0[6]	3.3		13	18.8	13.6[2]	5.2
	17	3.8	0.5[6]	3.3		15	20.1	15.5[2]	4.6
	19	3.0	0.0[3]	3.0		20	19.0	15.5[4]	3.5
	24	5.0	1.0[1]	4.0		22	18.7	15.5[4]	3.2
	26	4.5	0.7[2]	3.8		27	20.1	16.9[2]	3.2
	31	3.9	0.7[2]	3.2		29	4.8	0.0[*]	4.8
August	2	4.8	1.0[1]	3.8	December	4	6.7	1.8[1]	4.9
	9	7.6	2.0[1]	5.6		6	5.1	1.3[4]	3.8
	14	6.7	1.6[4]	5.1		13	9.0	3.5[1]	5.5
	16	5.7	1.6[4]	4.1		18	11.0	6.3[1]	4.7
	21	7.5	2.9[2]	4.6		20	6.1	0.7[3]	5.4
	23	6.5	1.5[4]	5.0	January	3	10.6	6.3[2]	4.3
	28	7.0	3.5[2]	3.5		8	10.5	5.9[2]	4.6
	30	5.4	2.9[4]	2.5		10	7.7	6.1[4]	1.6
September	4	4.0	1.9[4]	2.1		17	7.8	6.1[2]	1.7
	6	5.7	1.5[2]	4.2		22	7.5	6.1[4]	1.4
	11	8.3	4.0[1]	4.3		24	9.0	5.7[2]	3.3
	13	7.4	2.9[4]	4.5		29	8.6	5.7[4]	2.9
	18	10.8	6.3[1]	4.5		31	6.8	3.9[5]	2.9
	20	9.3	5.8[4]	3.5	February	5	9.2	6.3[5]	2.9
	25	5.0	0.0[*]	5.0		7	7.3	4.4[5]	2.9
	27	3.9	1.1[4]	2.8		12	9.3	6.4[5]	2.9
October	2	4.5	2.1[2]	2.4		14	6.9	4.0[5]	2.9
	4	4.5	1.2[2]	3.3		19	9.5	6.6[5]	2.9
	9	5.6	1.8[2]	3.8		26	8.7	3.0[4]	5.7
	11	6.7	2.1[2]	4.6		28	6.4	2.7[4]	3.7
	18	7.8	3.8[2]	4.0					
	23	9.3	4.1[2]	5.2					
	25	11.0	5.8[2]	5.2					
	30	12.4	7.4[2]	5.0					

[*]Accumulated arrears removed from the Auction.

rules were applied to determine the value of unsatisfied bids from previous auctions. In most cases, because of the frequency of rejection, the rule indicated was applied in conjunction with rule 6. During the period covered there were two occasions when accumulated arrears were removed from the auction. The first was after the auction of September 20 and the second after the auction of November 27. There were seven periods, encompassing four or more consecutive auctions, where the procedure adopted yielded estimates of net bids, which were very close in value. These periods are identified in Table 2 and include 48 of the 62 auctions held in the period under study. In each of these periods, the absolute differential in the amounts bid over consecutive auctions, with one exception, never exceeded $1 million. In most instances the auction to auction variation was less than half a million dollars. It can also be seen from the table that in all the periods the standard deviation of the estimated net bids was, at a maximum, 12 percent of the mean value for the particular period. This lends fairly strong support to the proposition that there would be an autonomous demand for foreign exchange which would be a constant portion of a predetermined demand for foreign exchange.

Evidence from the auctions, also support the proposition that there was a predetermined supply of foreign exchange extending over several auctions. In Table 3, is reported the amounts of funds provided at each auction, as well as, the changes in amounts from the immediately preceding auction. There were five consecutive auctions in September and eleven consecutive auctions from October 23 to November 27, when the amount supplied remained unchanged at $2 million. Apart from those

Table 2
Periods with Constant Values of Net Bids

US$ Millions

Period	Range of Bids Min.	Max.	No. Auctions	Max. Inter Auction Differential	Mean	σ	σ/Mean %
July 3 – August 2	3.0	4.0	10	1.0	3.45	.32	9.2
August 9 – August 23	4.1	5.6	5	1.0	4.88	.50	10.2
September 6 – September 20	3.5	4.5	5	1.0	4.20	.37	8.8
October 4 – October 18	3.3	4.6	4	0.8	3.92	.47	12.0
October 23 – November 15	4.6	6.0	8	0.8	5.21	.36	6.9
November 29 – January 8	3.8	5.5	8	1.1	4.75	.52	10.9
January 24 – February 19	2.9	3.3	8	0.4	2.95	.13	4.4

Table 3

Amount of Foreign Exchange Supplied Per Auction

US$ Millions

Auction Date		Total Supply	Δ Previous Auction	Auction Date		Total Supply	Δ Previous Auction
July	3	3.0		November	1	2.0	0.0
	5	3.5	0.5		6	2.0	0.0
	10	3.5	0.0		8	2.0	0.0
	12	3.5	0.0		13	2.0	0.0
	17	3.2	−0.3		15	2.0	0.0
	19	2.5	−0.7		20	2.0	0.0
	24	3.5	1.0		22	2.0	0.0
	26	3.7	0.2		27	2.0	0.0
	31	4.0	0.3		29	3.0	1.0
August	2	3.0	−1.0	December	4	3.0	0.0
	9	4.5	1.5		6	4.0	1.0
	14	4.0	−0.5		13	2.0	−2.0
	16	2.5	−1.5		18	2.0	0.0
	21	6.4	3.9		20	2.5	0.5
	23	4.5	−1.9	January	3	4.7	2.2
	28	3.0	−1.5		8	3.0	−1.7
	30	4.2	1.2		10	2.5	−0.5
September	4	5.0	0.8		17	2.0	−0.5
	6	2.0	−3.0		22	2.5	0.5
	11	3.0	1.0		24	3.0	0.5
	13	2.0	−1.0		29	3.0	0.0
	18	2.0	0.0		31	2.2	−0.8
	20	2.0	0.0	February	5	3.5	1.3
	25	2.0	0.0		7	3.5	0.0
	27	2.0	0.0		12	4.0	0.5
October	2	3.8	1.8		14	2.5	−1.5
	4	2.0	−1.8		19	7.0	4.5
	9	3.0	1.0		26	7.0	0.0
	11	2.0	−1.0		28	3.0	−4.0
	18	3.0	1.0				
	23	2.0	−1.0				
	25	2.0	0.0				
	30	2.0	0.0				

periods where the absolute amount of foreign exchange supplied remained unchanged over several auctions, there were three discrete extended periods when the interauction changes in funds supplied netted out to zero. In Table 4, we have identified six discrete periods, encompassing 55 auctions, where it would seem that there was a predetermined amount of foreign exchange available.

The periods identified as being associated with a predetermined supply of foreign exchange do not precisely coincide in terms of starting point and duration in all instances with those periods identified as having a predetermined demand. However, six of the seven periods identified as having a predetermined demand, fall within periods when the supply of foreign exchange was predetermined. In all of these periods the interauction changes in supply netted out to zero.

It was argued that if in any period the demand for foreign exchange, which would be predetermined, exceeded the supply, at each successive auction, the level of unsatisfied bids would rise relative to the total amount bid. This would contribute to an acceleration in the rate of devaluation of the currency. In the period when bidding was restricted to prescribed bands, this argument would be supported if there was evidence of a concentration of bids towards the band ceilings and frequent upward revisions in the bands.

The pattern of bidding is reported in Table 5. In the month of July, the amount of foreign exchange supplied was able to satisfy, on average, 88 percent of demand at the nine auctions held. Given the approximate balance between supply and demand, it was not surprising to find that in six of nine auctions held in that month, the clearing rate was at the floor of the prescribed band.

Table 4

Periods with Stable Supplies of Foreign Exchange

US$ Millions

Period	No. Auctions	Supply Range Min.	Supply Range Max.	Mean	Net Inter Auction Change	σ
July 3 – August 2	10	2.5	4.0	3.34	0.0	0.40
August 9 – September 11	10	2.5	6.4	3.91	0.0	1.24
September 13 – September 27	5	2.0	2.0	2.0	0.0	0.0
October 2 – October 23	6	2.0	3.8	2.63	0.0	0.69
October 25 – November 27	10	2.0	2.0	2.0	0.0	0.0
November 29 – January 31	14	2.0	4.7	2.81	0.2	0.75

Table 5

Pattern of Bidding and Percentage of Bids Satisfied

Percent

Auction Date	Above Band Mid-Point	At Band Ceiling	Above Previous Clearing Rate	% Total Satisfied	Auction Date	Above Band Mid-Point	At Band Ceiling	Above Previous Clearing Rate	% Total Satisfied
July 3	47.6	39.4	73.3	88.2	November 1	98.4	95.0	0.0[a]	14.1
5	30.3	30.3	70.5	100.0	6	98.7	98.5	0.0[a]	12.1
10	19.3	10.8	64.4	87.5	8[1]	83.3	80.7	83.3	12.7
12	22.2	22.2	82.9	100.0	13	100.0	100.0	0.0[a]	10.6
17	25.6	24.6	75.3	84.2	15	99.4	99.4	0.0[a]	10.0
19	32.7	30.4	88.9	83.3	20	75.3	74.2	75.8	10.5
24	49.6	36.2	90.8	70.0	22[1]	99.7	99.1	0.0[a]	10.7
26	55.8	47.4	63.4	82.2	27	100.0	100.0	0.0[a]	10.0
31	52.2	39.2	68.6	100.0	29	N/A	N/A	61.9	62.5
July Av.	37.3	31.2		88.4	November Av.*	94.4	93.4		11.3
August 2	48.7	31.7	84.7	62.5	December 4	N/A	N/A	34.8	44.8
9	89.6	31.6	74.6	59.2	6	N/A	N/A	55.5	78.4
14	96.7	54.7	84.4	59.7	13	N/A	N/A	90.3	22.2
16	100.0	97.2	99.3	43.9	18	N/A	N/A	69.6	18.2
21	95.8	89.2	0.0[a]	85.3	20	N/A	N/A	58.3	41.0
23	74.8	55.3	86.4	69.2	December Av.				40.9
28	99.0	85.6	94.9	42.9	January 3	N/A	N/A	19.8	44.3
30	97.7	93.9	0.0[a]	77.8	8	N/A	N/A	49.2	28.6
August Av.	87.8	67.4		62.6	10	N/A	N/A	46.0	32.5
September 4	88.6	82.5	0.0[a]	85.0	17	N/A	N/A	53.7	25.6
6	86.8	74.3	93.9	35.1	22	N/A	N/A	55.8	33.3
11	94.9	94.3	0.0[a]	36.1	24	N/A	N/A	53.5	33.3
13	97.2	96.7	0.0[a]	27.0	29	N/A	N/A	61.4	34.9
18[1]	50.9	47.2	51.5	18.5	31	N/A	N/A	73.3	32.4
20	95.4	95.0	0.0[a]	22.0	January Av.				33.1
25	88.3	88.3	88.3	40.0	February 5	N/A	N/A	85.5	38.0
27	96.2	89.5	0.0[a]	51.3	7	N/A	N/A	92.3	48.0
September Av.	87.3	83.5		39.4	12	N/A	N/A	92.6	43.0
October 2	91.6	76.1	0.0[a]	84.0	14	N/A	N/A	87.5	36.2
4	90.4	80.7	93.9	44.4	19	N/A	N/A	72.9	73.7
9	86.2	60.0	0.0[a]	53.6	26	N/A	N/A	34.7	80.5
11	85.4	62.6	0.0[a]	29.9	28	N/A	N/A	55.1	46.9
18[1]	52.0	39.0	52.0	38.5	February Av.				52.3
23	82.7	54.7	59.9	21.5					
25	94.6	88.3	0.0[a]	18.2					
30[1]	48.0	38.7	48.0	16.1					
October Av.	78.9	62.5		38.3					

[a] Previous clearing rate at band ceiling.

* Excludes auction of November 29.

[1] Upward revision in the band.

In August, the funds provided were able to satisfy only 63 percent of demand. In six of eight auctions held during that month, in excess of 50 percent of the value of total bids was at the prescribed price ceiling. The tendency towards a concentration of bids towards the band ceiling became even more pronounced, as the shortage of foreign exchange became more severe. In September and October, only 39 percent and 38 percent, respectively, of bids were satisfied and this declined to 11 percent in November. From mid September to the end of November, a period during which 20 auctions were held, there were five upward revisions in the prescribed bands. In each instance, there was a massive concentration of bids at the band ceiling in two or three auctions after the revision.

In the case of the 21 auctions, for which we have data, after the setting of bands was discontinued, the continued excess demand for foreign exchange was reflected in a concentration of bids at rates in excess of the clearing rate of the previous auction. There were only five occasions when less than 50 percent of bids were at rates higher than the clearing rate of the previous auction.

The next matter for which empirical verification was sought concerned whether variations in the clearing rate could be linked directly to the percentage of bids satisfied at a previous auction. Over the 62 auctions in our sample, there were 32 occasions when the clearing rate depreciated and 9 occasions when it appreciated. An effort was made to determine the strength of the relationship between changes in the clearing rate and the percentage of bids satisfied by estimating the following equation.

$$\log Y = \alpha - \beta \log X_{t-1}$$

where Y is the clearing rate and X_{t-1} represents the percentage of satisfied bids lagged one auction. Employing OLS the initial regression covering the entire sample period did not yield meaningful results. Since the auction rules were adjusted at the end of November, it was decided to re-estimate the equation for two discrete periods. The first, encompassed 41 auctions starting with that of July 3 and ending with that of November 27. The results are reported below

$$\log Y = 1.701 - 0.071 \log X_{t-1} \qquad R^2 = .58$$
$$(47.369)\ (-7.40) \qquad\qquad \text{D.W.} = 2.183$$

Since this was a period when bidding was constrained within prescribed bands, the equation was re-estimated employing a technique appropriate where there are limitations on variations in the value of the dependent variable. The results, based on a maximum likelihood technique, are reported below.

$$\log Y = 1.780 - 0.093 \log X_{t-1}$$
$$(52.55)\ (-11.78)$$

It is clear that for this period changes in the percentage of bids satisfied was an important determinant of changes in the clearing rate.

Efforts to estimate the equation for the period from November 29 to February 28 did not yield meaningful results. It would appear that expectations of continued foreign exchange shortages was the principal determinant of changes in the rate. There were variations in the percentage of bids satisfied, however, the clearing rate depreciated steadily. The rate of change was clearly independent of these variations.

4.   THE IMPACT OF THE AUCTION ON RESOURCE ALLOCATION

In view of the fact that the auction was introduced at a time of foreign exchange shortage our analysis in the previous section suggests that there would be an immediate rapid devaluation of the currency. In principle, this early devaluation should have provided an incentive for producers to direct more resources towards exports and the production of goods for the home market, which economized on the use of imported inputs. The steady devaluation of the currency indicates that the auction has not made a significant contribution towards dealing with the basic factors behind the scarcity of foreign exchange.

There are certain structural characteristics of the Jamaican economy which would tend to weaken the potential impact of currency devaluation on resource allocation. The leading traditional exports, such as alumina, and sugar, are priced internationally. In addition, with the exception of domestic food production, all other production activities involve a very high import content. As a result the cost raising effect of currency devaluation would undermine any potential advantage which might arise from a lower external value for the currency. In the case of the internationally priced commodities, the benefits of increased earnings in local currency would also be modified by the higher costs.[7] Furthermore, there were a number of exogeneous developments, which not only had a direct negative impact on the country's international payments, but, when combined with the aforementioned structural factors, further undermined any potential beneficial effects of the auction. The principal exogeneous developments were the sharp decline in the bauxite/ alumina industry and the IMF policy directives, which the government was

forced to pursue in order to secure balance of payments support from that agency.

The decline in the bauxite/alumina industry can be traced to the general state of depression in the international market for aluminium. This sector had been the principal contributor to the country's foreign exchange earnings and consequently, the reduction in earnings associated with its decline could not be easily offset in the short term. Given the way in which the auction was structured this loss of foreign exchange would not only contribute to additional shortages and downward pressure on the exchange rate, but would also likely generate expectations of an inevitable continued devaluation of the currency.

Apart from the impact of the sectors decline on the country's foreign exchange earnings, it also had an important impact on the government's fiscal position. This took place at a time when the government had come to an agreement with the IMF to pursue policies of monetary and fiscal restraint. Losing a major source of revenue, at a time when it was required to meet specific targets with respect to the fiscal deficit and borrowing from the banking system, meant that even more restraint had to be applied in order to reach the targets. Moreover, given the level of external debt of the central government and the foreign exchange requirements for the operation of the public utilities, the level of the exchange rate had an important direct impact on the governments fiscal position. Stabilization of the exchange rate then became a major government objective. In the absence of abandoning the auction, such stabilization could only be achieved through applying rigid controls on the growth of aggregate demand.

Introducing the auction at a time when the bauxite/alumina industry, the single most important contributor to the country's foreign exchange earnings, was in a severe state of depression and given the other factors cited above, could only serve to limit any potential for structural adjustment. Between 1977 and 1983, the bauxite/alumina industry contributed between 44 and 57 percent of the country's foreign exchange earnings from exports of goods and services. However, in 1983, foreign exchange inflows associated with the operation of that sector amounted to only 59 percent of that contributed in 1980.[8] Although there was some improvement in bauxite exports in 1984, they were still below that of 1980. Moreover, alumina exports in that year amounted to only 60 percent of the value of exports in 1980.[9] In addition, 1984 witnessed the withdrawal of Reynolds from operations in the country. This was followed by the decision of Alcoa in February of 1985, to discontinue operations. However, their operations were subsequently taken over by the government, with Alcoa conducting operations under a management contract.

Given the impact of all of these developments on the supply of foreign exchange, downward movements in the exchange rate was unavoidable. The government, given its fiscal problems, reacted by employing demand management to ease the pressure on the exchange rate. Starting in 1984, the government pursued an increasingly restrictive monetary policy in an effort to curb demand. This approach reflected the government's view that access to bank credit was at the basis of the exchange rate problem.[10] There have been dramatic increases in interest rates, as well as, in cash reserves and liquid asset requirements for the commercial banks.[11]

These measures were, however, dealing only with the symptoms rather than the fundamental causes of the problem. Increasing the cost and reducing access to credit, made it more difficult for investors to engage in the new export activities, which were essential if the country was ever to escape the foreign exchange constraint. Indeed, the cost of credit, combined with the cost raising effect of the devaluations on production, discouraged all types of productive activity.[12] The failure to develop new exports meant that there were constant shortages of foreign exchange and downward pressure on the exchange rate. This, in turn, encouraged the government to apply even more severe restrictions in an effort to stabilize the rate.

5. ALTERNATIVES TO THE EXCHANGE AUCTION

The Jamaican economy cannot reduce its heavy dependence on imported inputs in the short term. There are also, no signs, that there will be an early major recovery in the bauxite/alumina industry. Given the likelihood of a continued scarcity of foreign exchange over an indefinite period, the country requires an exchange rate system which embodies the following characteristics. It should be sufficiently flexible to help maintain an appropriate international value for the currency, which would be consistent with encouraging the development of exports. At the same time, it should also be structured to avoid the destabilizing effects of uncertainties surrounding the order of magnitude of change in the exchange rate from period to period.

The most effective way of achieving this goal would seem to rest in the introduction of a crawling peg system. There are two variants of

the system which have been used. There is the so called "active" crawl, where the government announces in advance the rate at which the currency will be devalued over several months in the future. The alternative is what is known as the "decision variant" crawl, where the authorities adjust the rate on the basis of their own subjective judgement as to the timing and amount of the required change.[13] The latter variant would clearly be preferable in the Jamaican context, since it would leave the government with a greater degree of flexibility in its management of the economy. Moreover, there is substantial evidence to suggest that the system made a positive contribution to the success achieved by countries such as Brazil and Colombia in expanding and diversifying their exports.[14]

The establishment of this type of exchange rate regime would require a reintroduction of formal controls, such as import licenses, to guide the allocation of foreign exchange. The nominal allocational neutrality of the auction system is frequently cited to be one of its major assets. However, the auction system has replaced selective allocation with general demand management. It would seem to be most unlikely, that the costs of selective intervention could be greater than the costs associated with the application of extra ordinarily restrictive monetary policies during the course of 1984 and 1985. Moreover, the Jamaican auction does not function in the manner of a true auction. A true auction ensures that a scarce commodity will go to the participant who will put it to its most productive use. To that extent an auction is a highly efficient means of allocating a scarce resource. The Jamaican auction prevents individuals from bidding for foreign exchange prior to undertaking

a payment obligation in foreign currency. Consequently, most partici-
pants in the auctions are likely to consist of those who are able to
pass on unexpected costs associated with the purchase of foreign ex-
change. The ability to pass on such costs will be determined by the
competition which such individuals would face in marketing their prod-
ucts. Exporters, who have to face international competition, could not
assume that they could easily pass on any additional costs arising from
their having to pay higher than anticipated prices for foreign exchange.
On the other hand, distributors of imported consumer products would be
in a much stronger position to make such price adjustments. The Jamai-
can auction, as currently structured would seem to embody an anti export
bias and, in light of the country's economic problems, it is an ineffi-
cient system for allocating scarce foreign exchange.

NOTES

1. See Ministry of Finance and Planning, Ministry Paper No. 43, November 1983, paragraph 9.

2. At the initial auction the rate was J$3.15 = $1 US. By October 24th, 1985 the rate was J$6.40 = $1 US.

3. The operating features outlined in this section were derived from the Bank of Jamaica News Release January 16, 1984.

4. The initial band was J$3.00 - J$3.30 to $1 US.

5. Bank of Jamaica, News Release, March 16, 1984.

6. The Bank of Jamaica would subtract from the foreign exchange supplied by the commercial banks an amount of funds to help meet official debt service and other public sector external payments obligations. In addition, at each auction, a certain percentage of the pool of foreign exchange would be set aside to satisfy demands for educational, health and travel allowances. This would be allocated on a pro-rated basis among the banks.

7. The exception would be the bauxite/alumina industry. Since the firms in that sector have to bring in funds to cover local operating costs, the devaluations would actually lower their operating costs.

8. These estimates were based on information contained in the Foreign Exchange Budget. See Bank of Jamaica, Report and Statement of Accounts, Annual.

9. See Bank of Jamaica, Balance of Payments of Jamaica, 1981 and Report and Statement of Accounts, 1984.

10. This view was repeated in several Bank of Jamaica publications. See for example Report and Statement of Accounts 1984, p. 2, and An Overview of the Jamaican Economy in the First Quarter of 1985, p. 3.

11. The prime lending rate rose from 13% in January 1984 to 23% in April of 1985. Cash reserves requirements were increased from 5% in February of 1984 to 20% in July of 1985. Liquid asset requirements were increased from 36% in February of 1984 to 48% in April of 1985. See Bank of Jamaica, Statistical Digest, July 1985, Appendix II.

12. Real GDP was estimated to have expanded by 0.5 percent in 1984. The manufacturing sector registered a decline of 5.5 percent, the bauxite/alumina industry also declined by 2.7 percent. Non-tradi-

tional exports which would be the key element in measuring the extent to which progress was being made in the direction of structural adjustment declined by 13.4 percent in 1984. The only sector which showed strong growth was the domestic agricultural sector. Bank of Jamaica, <u>Report and Statement of Accounts</u> 1984, pp. 4 and 8.

13. R. McKinnon, "Monetary Control and the Crawling Peg," in J. Williamson (ed.) <u>Exchange Rate Rules</u>. The MacMillan Press Ltd., London, 1981.

14. See R. Lendt Jr., "The Brazilian Experience with the Crawling Peg," and M. Urrutia, "Experience with the Crawling Pet in Colombia," in Williamson, <u>op</u>. <u>cit</u>.

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