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**OFFICIAL POLICY AND THE IMPACT ON FINANCIAL
INNOVATIONS IN THE CARIBBEAN**

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**FINANCIAL INNOVATION AND THE IMPACT OF MONETARY POLICY IN THE
CARIBBEAN**

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ABSTRACT

The paper considers, in general terms, the transmission mechanisms of monetary policy in open economies, discussing how financial innovations, in the sense of widespread changes in the arrangements and instruments available to economic agents, could affect the effectiveness of the transmission channels. It goes on to look at descriptions of monetary policy in the Caribbean and at some of the innovations documented in Caribbean markets to assess how these may be expected to impact on monetary policy.

INTRODUCTION

In the last ten years, a number of new institutions, instruments and arrangements have been introduced into Caribbean financial markets. In several respects, not surprisingly given our "openness", these are similar to innovations introduced into G10 markets in the previous decade (see Bank for International Settlements, 1986). The innovations imply that the parameters faced by monetary authorities and the environments in which they operate have changed significantly (in ways additional to the changes brought about by the removal of price, quantity and exchange controls). Effective policy will require that central banks explicitly factor these changes into their operating rules. The degree and type of innovations are really quite different among the countries, although, in at least two, Jamaica and Trinidad and Tobago, the innovations have chiefly acted to widen credit and investment facilities.

This paper is a very preliminary look at the implications for monetary policy of these innovations. Preliminary because, while it is clear that the innovations are often a reaction to policy initiatives, I have not yet been able to get the data required to examine the pattern of reaction. Further, the authorities, appear to themselves react, with some lag, to tighten conditions or close loopholes, eliciting, it would appear, another innovatory response from the private sector. If the authorities are not to play a game of catch-up with private agents, so that the Lucas critique is always operative, it would seem necessary to obtain a

good understanding of the reaction function.

I begin by trying to distinguish, in a rather summary fashion, the channels through which monetary policy is said to affect the economy. That is, the channels are taken from various models of monetary policy in an open economy. This rather eclectic approach is probably inferior to considering a particular model of monetary policy transmission and identifying the points where, and how, innovation is likely to change the transmission mechanism assumed. However, in the absence of a preferred model of monetary policy transmission and given that I believe that there will not at this time be a preferred model common to all the Caribbean countries, I am essentially trying to cover all bases, albeit relatively superficially. This approach has the disadvantage of nearly ignoring (it is in fact impossible to do so entirely) the interactions between the channels identified, although a model could do so only in a highly stylized fashion. If my understanding that there is a kind of innovation game being conducted between central banks and private agents is a reasonable description of reality, this approach has the particular disadvantage of ignoring the endogeneity of actions by both players.

TRANSMISSION MECHANISM OF MONETARY POLICY: CHANNELS

I distinguish five channels through which monetary policy affects the macroeconomy: the money supply, interest rates, the exchange rate, credit and expectations. As you know, and will soon be discussed, these channels are not only *not* mutually exclusive, but may be very closely interrelated.

Money supply:

Monetary policy is usually aimed at influencing certain monetary aggregates, and hence the level of interest rates, in order to influence aggregate demand. Those monetary aggregates, M1 through M3, say, are used as an indicator of the need for monetary policy adjustment. To tighten aggregate demand the central bank can engage in open market sales of securities, reducing banks' reserves (the monetary base) and hence the volume of loanable funds (deposits) they are able, or wish, to hold. Or it can directly intervene to change required reserves. The success of these actions will depend on the response of banks and

on the response by holders of deposits and, in part as a result, how accurate an indicator bank liabilities are of the liquidity in the economy. (The importance one attaches to the volume of liquidity, transactions balances, on expenditure, as opposed to the effect of that liquidity on interest rates and interest rates' effect on expenditure in part depends on whether a monetary-type or Keynesian-type model is adopted).

Innovation in the financial sector changes the appropriateness of the indicator of liquidity. For example, the narrow money supply traditionally discussed includes only currency and non-interest-bearing demand deposits, but in the Caribbean, where savings deposits have always tended to be used for transactions purposes, it would be appropriate to include the latter. As banks broaden their range of accounts and as new, or revamped old, institutions offer accounts which can be used for transactions purposes, the appropriate money supply indicator becomes difficult to define. Innovations are not confined to exotic instruments, but, more importantly for the majority of the consumers, have taken the form of new means of making payments.

Of course, in macro models the rate of interest of which we speak as the opportunity cost of holding money (currency and demand deposits) is the rate of interest on securities, increases in which are seen as increasing the spectrum of interest rates in the economy to reduce expenditure. If the demand for money or its velocity is relatively stable and predictable, monetary authorities can expect that meeting the money supply (however defined) target will produce a predictable response on expenditure. Innovation may mean that a wide range of deposits, paying market rates of interest, which can be used for both transactions and savings purposes becomes available. As additional institutions enter the market offering services not dissimilar from banks, even traditionally-reluctant banks may need to become more competitive in the deposit market; money balances may then take on characteristics of both a wealth and transactions variable. In other words, the money demand (depending on the variable on the left hand side variable) function may shift. There has been evidence of such shifts in a wide variety of countries in recent years. Arrau and De Gregorio (1993) and Arrau et al (1995) argue that omission of a proxy for innovation in estimates of demand-for-money functions in several developing countries results in failure to find a cointegrating vector and implausible parameter values. There

is no similar evidence for the Caribbean, as far as I am aware. Craigwell (1991) estimated narrow money demand for Jamaica using data for the period 1953-86 and found a set of cointegrating variables and a specification that was robust to a panoply of specification tests, although no innovation variable was included. On the other hand, innovation had probably not become sufficiently established in the period tested to alter the demand for money.

The effect of the change in reserves on the banks' ability to lend (and eventually on the scale of overall demand) and on the rate of interest at which they lend will depend on whether they are able to substitute other liabilities for deposits, and on the extent to which lending is confined to bank on-balance-sheet lending. To the extent that banks have access to a wholesale market for funds, or are willing to arrange loans for fees, provide guarantees for third-party loans or access foreign funds, their balance sheet deposits will prove a poor guide to the volume of activity they are able to fund. Furthermore, with innovation in traditionally commercial-bank-dependent markets, bank credit quantities may be a poor indicator of the ability (willingness) of resident agents to access funding. Pricing considerations become more important.

Interest rates:

The level of interest rates is the major channel by which monetary policy is usually taken to operate and interest rate levels are generally indicative of the degree of tightness of monetary policy. The increase in the Treasury Bill or other security rate through which the monetary authority induces banks to purchase securities sets a benchmark for other rates. Increases in interest rates will increase the cost of both investment and current expenditure for firms and will similarly encourage consumers to reduce consumption expenditure. Reductions in consumer expenditure may also reduce the demand firms face and hence their own planned expenditure. Interest rates also operate indirectly via their wealth effects. Increases in interest rates reduce the net worth of the assets which firms may use as collateral, reducing the access of bank-dependent small borrowers to bank loans (the distinct credit view is treated below). Similarly, increases in rates of interest reduce the value of private assets such as houses and property (higher rates of interest increase

mortgage costs, reducing mortgage loans and hence the demand for housing and the price of houses). If private expenditure is a positive function of wealth, the decline in asset value will be another means by which monetary policy is able to affect expenditure. As the opportunities for individual investment expand, which is a feature of innovation, these wealth effects may become more important, adding a further link between monetary policy and expenditure. To the extent that individuals begin to invest in bonds, for example, interest rate increases will impact on another element of private wealth. There may be long lags between a change in monetary policy and the effect on wealth and hence expenditure, however.

The overall efficacy of monetary policy will depend on the sensitivity of expenditures to interest rate levels and on the extent to which the capital account is open and capital is mobile. Of course, with a fixed exchange rate, perfect asset substitutability and perfect capital mobility, monetary policy can have no effect on the rate of interest or the money stock itself. An incipient increase in interest rates brought about by a decrease in the money supply will induce the substitution of domestic for foreign securities and an incipient appreciation of the exchange rate which the monetary authorities must forestall by buying foreign reserves. The resulting increase in base money increases the money supply to maintain the domestic interest rate at international levels. But even perfect asset substitutability between domestic and foreign assets does not imply perfect capital mobility. Transactions costs, informational differences and capital controls all act to restrict capital mobility and maintain differential yields between assets in different countries. Dornbusch and Giovannini (1990) cite studies which suggest that even capital controls by members of the European Union with internationally-traded currencies act to segment their markets. Financial innovation can bring about a considerable change in this scenario, however.

An increasing range of options available to the depositor may also increase the interest elasticity of money demand. This may reduce the effectiveness of monetary policy since increased elasticity implies a smaller increase in interest rates, and hence fall in expenditure, for a given change in the money supply. On the other hand, the increased elasticity would express itself in depositors' willingness to remove funds from banks when alternatives are available, forcing banks to reduce their loans, or raise their interest rates.

Innovation has created a number of devices to allow corporations to hedge risks - derivatives being the oft-infamous example. Interest rate swaps allow firms to access a wider variety of markets without increasing interest rate risk. Options such as interest-rate caps, collars and floors act like insurance. For example, an interest-rate cap (or ceiling) allows a borrower at a floating rate of interest to insure against a rise in the rate over a specified level. This can be seen as follows: an option is a financial contract with a fixed expiration date that offers a positive payoff or nothing at maturity. At expiration, a call option gives the purchaser the right, but not the obligation, to buy a fixed number of units of the underlying asset if that asset's price exceeds a level specified in the option contract. A call with an strike level (exercise price) of 8% (on an annual basis) on some notional amount of principal is a cap on the floating-rate loan payment which coincides with the expiration of the option. A cap can then be viewed as a series of interest-rate call options, designed to hedge a series of interest payments. If the interest rate at the exercise date exceeds 8%, the call pays off the difference between the actual rate and the strike level times the notional principal times the fraction of the year since the purchase of the option. (The above description quotes, almost verbatim, from Abken, 1993). The availability of such insurance may, it has been argued, reduce firms' reactions to interest rate changes. Note that the insurance can be costly: if interest rates remain at below the strike level, the premium paid by the buyer for this insurance is a sunk cost. And on the other side of the contract, while the seller of the cap provides insurance for the premium, large losses can be made if a large movement in rates takes place, unless the portfolio of the seller has other offsetting assets - hence the infamy of derivatives. Correct pricing of the option is also crucial to the control of risk.

Exchange rate:

With a free capital account, an increase in real interest rates relative to foreign interest rates (it is assumed that risk aversion on the part of investors will maintain a wedge between domestic and foreign rates - domestic and local assets are not perfect substitutes, especially since denominated in different currencies), following a tightening of monetary policy, will lead to an appreciation of the exchange rate, lowering the domestic

cost of imports, and lowering domestic prices if the decreased price of imports are passed on. At the same time, exporters become less competitive and this affects the current account and overall income. (Unsterilized central bank intervention will also affect the exchange rate but this is not a policy tool the Caribbean has been able to employ)

Increased capital mobility makes the exchange rate channel more important. A major feature of official innovations has been the opening of the capital account, removal of exchange controls, and the relaxation of the fixed exchange rate. Essentially, the transactions costs of moving capital may be decreased at the same time as the degree of asset substitutability is increased. Innovations such as currency interest swaps, forward agreements on currencies and, perhaps more importantly, a more active secondary market in all instruments, may greatly increase actual capital mobility. In turn, the increased volumes from such flows encourages the development of new opportunities. Mobile capital constrains the change in interest rates which the authorities can achieve.

Credit channel:

In the more recent and hotly-disputed credit view of monetary policy, financial assets are imperfect substitutes to the firm (the Modigliani-Miller theorem on the irrelevance of capital structure does not hold because information is imperfect) so that the cost of external funds (from traded equity and debt) is greater than the cost of internal funds. This gives banks, who specialize in monitoring (see Diamond, 1984) and information gathering, a special advantage in providing loans to firms who would otherwise have difficulty in obtaining external funding. A decline in the monetary base affects not only bank liabilities (the money supply) but reduces bank loan assets and hence the financing available to (usually taken to be small) firms who cannot obtain alternative financing, the reduction in bank loan supply raising the bank loan rate relative to other loan rates from other sources of credit. The existence of this credit channel has been disputed and subjected to empirical tests using US data. Ramey, 1993, found that M2 leads both bank loans and output following a change in monetary policy, a result which Bernanke pointed out could reflect the fact that banks are able to reduce security holdings more rapidly than loans because of the transactions cost of calling in or selling loans. The credit channel depends on the

inability of some firms to obtain financing elsewhere, and on banks' inability to obtain alternative financing for bank loans when their deposit liabilities decline. It has been widely accepted that small firms cannot obtain nonbank financing because they do not have access to anonymous markets. To the extent that banks can obtain non-deposit funding, on the wholesale market, for example, without an increase in the cost of their funds relative to the Treasury Bill rate, the bank-dependent firms need not be squeezed out of the market. Kashyap and Stein (1995), assuming that small banks will have poorer access to non-deposit sources of funds, test this link and find that the lending volume of small banks is more sensitive to monetary policy than the lending volume of large banks, though results are not as clear-cut for security holdings.

Expectations:

The operation of the interest rate and exchange rate channels depends importantly on expectations. For example, to the extent that there are inflationary expectations, an increase in interest rates which reduces the asset value of a house may not dissuade house investment if it is seen as an inflation hedge. With inflationary expectations consumers may have an incentive to bring forward consumption despite an increase in interest rates. An opposing tendency would arise if high interest rates create expectations of unemployment and a continuing uncertain environment, either of which could be expected to increase saving and reduce expenditure. Furthermore, with mobile international capital and a flexible (or fixed) exchange rate, the reaction of capital flows depends on expectations of exchange rate changes. The Dornbusch (1976) assumption that financial markets adjust very rapidly while the real market is sluggish implies that expectations can produce rapid changes in the spot exchange rate, which overshoots its long-run value while the real economy adjusts. If agents' expectations of exchange rate movements are not well-organised, an unstable exchange rate can result. In general, Dornbusch-type models which take explicit account of dynamic behaviour and expectations (that are not necessarily either perfect foresight-type or rational, in the sense of being based on the correct model) seem far more applicable in markets where innovation is opening the capital market and eroding the dominance of conservative commercial banks. Furthermore, in the initial stages of

innovation, one can presume that the economy's agents go through a learning stage where they are both unsure of their best reactions and have difficulty in forming consistent expectations.

MONETARY POLICY AND INNOVATIONS IN THE CARIBBEAN

In the Caribbean monetary policy has generally taken the following forms: credit limits, selective credit controls, bank reserve requirements, changes in the monetary base, interest rate controls and exchange controls. Innovations on the part of the authorities themselves have increasingly limited resort to the more direct controls. In matching Caribbean outcomes following innovation to those suggested by theory (or empirical work in other countries) we will take as a basis the transmission mechanisms suggested in three discussions of monetary policy in the Caribbean: those by De Silva and Hilaire (1996), Peart(1994?) and Worrell (1996). These three examples are used because written accounts were available.

De Silva and Hilaire (*op. cit.*) highlight four features of the environment in which monetary policy has operated in **Trinidad and Tobago**: the stimulative effect of the domestic budget deficit, insulation of the domestic interest rates from international rates prior to April 1993 when capital controls were removed and a continuing absence of significant capital flows, the dominance of commercial banks as a source of credit, the income sensitivity and interest rate insensitivity of the demand for money and the influence of expectations on investment expenditure. Monetary policy is aimed at controlling inflation with nine indicators used to monitor the economy and determine policy responses: the rate of inflation, money supply, including one measure which takes account of non-bank deposits, the domestic fiscal balance, exchange rates, domestic and foreign interest rates, credit to the private sector, commercial banks' liquid assets, capital flows and market sentiment (the latter I interpret to be equivalent to what I have termed expectations). The authors note that the demand for transactions balances is shifting as financial institutions provide alternative forms of making payments. The Central Bank of Trinidad and Tobago used a mix of reserve requirements, the Central Bank discount rate (reinforced most recently by discouragement of borrowing at the discount window), selective credit controls, interest rate

controls, exchange controls and moral suasion to effect monetary policy, with most reliance placed on reserve requirements. Open market operations in Government's short- and medium-term securities are being introduced.

Quite a number of instruments have been introduced in the Trinidad and Tobago financial sector since 1985. They include commercial paper, bankers acceptances, zero coupon bonds, insurance contracts with an investment component, short-term investment pools operated by commercial banks, commercial bank organisation of project financing for government, repurchase agreements, swaps and securitized loans. In addition, there have been new institutions created but these seem to have been mainly Government-initiated in an effort to deepen the market - the Home Mortgage Bank and a Unit Trust are examples. Instruments such as commercial paper, bankers acceptances and the investment pools appear to have been largely a response to reserve requirements, sometimes initiated by potential investors, rather than the banks. The Central Bank of Trinidad and Tobago has begun to take account of these off-balance sheet items and bankers' acceptances are included in the Basle capital requirements ratios with a risk-weighting of 20% (see Sergeant, 1995).

The range of monetary policy instruments employed by the Bank of Jamaica included reserve requirements, interest rate controls, selective credit controls and central bank discount facilities. Until 1986 the reserve requirements consisted of cash and a secondary requirement of government securities. Treasury bills were instead sold by a Bank of Jamaica auction and the BOJ conducted open market operations through the issue of its own securities, Certificates of Deposit, from 1985; these were phased out in 1995. In 1990 the Bank ceased to set a minimum savings rate. In 1991, exchange controls were lifted. In 1994 formal open market operations in Government securities, conducted through primary dealers, using primarily reverse repurchase agreements to reduce liquidity.

Jamaica is the Caribbean country with the greatest range of financial innovations. The institutional include the creation of a number of merchant banks: a single merchant bank existed in 1985 but by 1996 there were 29. Approximately half of the merchant banks are subsidiaries or affiliates of commercial banks (of which there are 10). They are licensed deposit-taking institutions and are now subject to reserve requirements though at a lower rate than commercial banks. Another important innovation has been the growth

of commercial paper which began in 1992, issued both by established public companies without a bank guarantee and by smaller firms with a guarantee. There are four unit trusts, all of which have money market funds, and several mutual funds which will now have to be registered with the recently established (1993) Securities Commission. The number of building societies has also grown by about 20 since 1989 to take advantage of less onerous regulation of the building societies. The licensing of cambios has been encouraged by the Bank of Jamaica to provide improved information about foreign currency purchases. In 1992, investment banks (distinguished from merchant banks by their inability to take deposits) were opened in response to the spreads maintained by other institutions. As may already be evident, much of the institutional innovation has arisen as a means of circumventing the liquidity constraints the Bank of Jamaica has imposed. Commercial banks, for example, have formed subsidiaries to conduct operations free from reserve requirements and a number of financial conglomerates have emerged (several of these have manufacturing or tourism affiliates). In addition, high interest rates have probably sharpened interest rate elasticity, enabling entrants to erode the market share of long-established institutions. A number of new instruments have also been introduced, fostered both by the costs imposed by monetary policy and the need to hedge risk. The most remarkable is commercial paper but there have also been securitized loans, forward agreements, interest and currency swaps, warrants, increased bond activity, and exchange rate options. Foreign remittances have also grown in importance with both financial institutions and manufacturing companies competing abroad for them.

The Bank of Jamaica has recognized two ways in which commercial paper has changed the transmission mechanism of monetary policy (see Bank of Jamaica, 1995): commercial paper rates appears to respond more rapidly to changes in the government security rate determined in open market and commercial paper acts as a possible constraint on liquidity management. The latter is clearly true: if we refer to the earlier discussion of the transmission mechanism, commercial paper would appear to be reducing the efficacy of monetary policy in two dimensions - not only are companies able to bypass the banking system, and hence monetary policy attempts to control expenditure, to obtain credit but issues of commercial paper by financial institutions provides them with non-deposit loanable

funds. To the extent, however, that the rates on commercial paper are more responsive to security rates, the interest channel is reinforced. The Bank of Jamaica has also recognized the regulatory implications of financial institution issue of commercial paper - it entails a likely increase in the portfolio risk that does not appear to be recognized in capital requirement ratios. The proliferation of institutions also act to weaken the Bank of Jamaica's monetary policy initiatives.

Barbados has traditionally employed monetary policy instruments very similar to those employed by the other two countries (selective credit controls, interest rate ceilings and floors, reserve requirements, moral suasion) but continues to maintain a fixed exchange rate, capital controls and a deposit rate floor. Monetary policy has been concerned in recent years with increasing private non-bank funding of government in order to avoid increases in the Central Bank's net domestic assets for this purpose. The interest rate channel is seen as relatively weak because banks are reluctant to pass on increased rates to their loyal customers; consumption is interest-inelastic. Despite exchange controls, capital flows are seen as relatively responsive to changes in domestic interest rates or declining bank liquidity. Most innovations, and they have been relatively few compared to the other countries, have been official creation of institutions, as well as some expansion of non-bank financial institutions into areas formerly confined to banks, encouraged by attempts to avoid credit controls. Some institutions have tried or are trying new instruments, such as convertible bonds, aimed at specific purposes.

All three countries appear to utilize the IMF's financial programming approach, whereby target or benchmark levels are set for net international reserves, net domestic assets of the central bank (the sum of these two being identically equal to the monetary base) and fiscal balances, supplemented by their own understanding of the economic relationships. In its most basic form, assuming fixed exchange rates, the transmission mechanism underlying the IMF's programming approach suggests that an increase in domestic credit increases monetary liabilities and nominal income, the latter stimulating imports and a loss of international reserves which offsets the initial increase in domestic credit. Under flexible exchange rates, the loss of reserves leads to a depreciation in the exchange rate and an increase in the price level. Monetary policy in this framework was principally seen as

limiting expansion of domestic credit through control of the monetary base via central bank credit and of the banking system's reserves. Increasingly, however, the Fund and the countries, are moving towards open market operations aimed both at control of monetary liabilities and influence of the interest rate level.

CONCLUSION

In the Caribbean, as the quantities agents use for transactions change, M1 can cease to be an adequate measure of transactions balances. For example, arrangements with credit unions to access their account for transactions purposes, deposits at non-bank institutions (a deposit does not have to be so-called to have features similar to demand deposits), the use of credit cards, all expand the means of making transactions without the use of demand deposits or currency. In those countries where a wide variety of instruments which allow for non-bank financing or for non-liability financing by banking institutions have appeared, or where institutions over whose reserves the central bank has reduced control have opened, the channels through which the monetary policy can affect aggregate demand are narrowed. That this is not a frivolous concern is suggested by the attached table which shows that commercial paper guarantees by commercial banks rose as high as 38% of domestic credit in Jamaica before declining to 17% in 1995. These numbers merit further investigation. Similar data is not yet available for Trinidad and Tobago where commercial paper and bankers acceptances are also important means of bypassing monetary policy influences.

A natural tendency may be to try and regulate these instruments and institutions out of existence, on the argument that, as reactions to regulation, they are not enhancing financial services. I believe this would be a mistake. Although frustrating for monetary policy, many seem capable of providing additional services for economic agents. For example, commercial paper may eventually allow small, risky firms (those whom we often complain are not provided for by banks) to find financing. Furthermore, extension of the available asset possibilities can provide useful competition for an oligopolistic banking sector. However, central banks will need (as they are aware) to consider the implications for prudential regulation and to take a forward-looking stance with regard to monetary policy.

JAMAICA

	CP Guarantees		BAs		op guar/CRP %
	Commercial banks		CRP	Commercial banks	
	J\$M		J\$M	J\$M	
December 31					
1986	487.9	2,938	17.1	16.61	
1987	768.1	3,913	21.5	19.63	
1988	724.6	4,896	160	14.80	
1989	1463.1	6,306	46.7	23.20	
1990	1832.4	7,342	275.2	24.96	
1991	3315.8	10,231	50.5	32.41	
1992	4764.5	12,518	61.6	38.06	
1993	6634.5	21,148	139.3	31.37	
1994	6324.3	26,282	72.2	24.06	
1995	6702.4	39,928	301.6	16.79	
June 1996	7216.6		206.3		

Note: CP = commercial paper; CRP = domestic credit to the private sector; BAs = bankers' acceptances
 Source: Bank of Jamaica

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