ECONOMIC CONVERGENCE IN THE CARIBBEAN

Paper Presented by
DeLisle Worrell, Deputy Governor, Central Bank of Barbados
to the
13th International Symposium on Forecasting
Pittsburgh, Pennsylvania
June 9 - 12, 1993

1. Introduction

The notion of economic union among Caribbean countries has always had champions but because of patterns of established trading links no lasting association was formed prior to the establishment of Caricom in 1973. Although it has provided for economic consultation among members and some harmonization (for example, of fiscal incentives for industry) Caricom has not been effective in improving regional economic performance. A major reason is the very disparate economic policies and performances of member countries in the 1970s and 1980s. Bahamas and Belize in the Western Caribbean and most member countries in the East Caribbean employed cautious fiscal policies and modest external borrowings and experienced steady growth, low inflation and sustainable balance of payments performance. In contrast, Guyana, Jamaica and Trinidad and Tobago ran up large fiscal deficits, encountered debt servicing difficulties and experienced economic contraction, bouts of high inflation and chronic foreign exchange shortages.

Economic divergences stifled the growth of the Caribbean Economic Community. Measures taken to ration foreign exchange or to make traded goods more expensive inhibited transactions among members. Fears that poor performers might depress growing economies meant no progress towards freedom of movement of capital and labour among members.

This paper seeks to find out whether policies might have been designed to achieve convergence of economic performance and whether such policies would have depressed growth rates of member countries. Unfortunately, the results so far do not allow us to make a judgement for reasons which will be explained in Sections 4 and 5.

2. Convergence

The criterion of convergence employed in this paper is the achievement of reasonable growth rates with a sustainable balance of payments over the medium term. Balance of payments crises precipitated policies by some member states which prevented closer integration of the region. If those balance of payments crises could have been avoided without contraction in real output, the process of economic integration might have gone ahead. A stronger union might have hastened convergence of other aspects of economic performance such as the growth of employment, inflation and interest rates.

The trend in external payments must be sustainable without resort to exceptional financing, foreign exchange rationing, import rationing, temporary income restraint and other policies of limited effectiveness. Caricom members invariably resorted to foreign financing when excess demand for imports depleted stocks of foreign exchange but this merely postponed the manifestation of the external imbalance. Various kinds of rationing - exchange controls, import licences and credit limits - were imposed time to time with widely differing intensity and results. A common feature wa fact that where they were effective they were strictly temporary. Where cor remained in force for a long period the surplus income which would have have used to purchase imports or service credit was used to circumvent controls thr illegal imports, informal credit arrangements and similar devices.

Foreign exchange receipts were occasionally augmented by export windfalls o time capital inflows for specific projects such as electricity generation. These must be discounted to arrive at a measure of the sustainable balance of payr deficit or surplus. Ironically such good fortune may worsen external payments time because it raises domestic spending to levels which cannot be financ subsequent years when income earners refuse to condone a reversion to normal of spending.

The balance of external payments is a good indicator of convergence only in "r economic circumstances", that is, when there are no external shocks a emergency policies enforced domestically. Whenever external balance is acl other criteria must be used to determine whether the balance results circumstances which will not persist. The most important of these criteria are tl of the fiscal deficit and the extent of foreign borrowing and projected debt s requirements. High or rapidly increasing servicing on external debt is a sign tl

balance of payments is not sustainable whatever the outcome in the current period. Large fiscal deficits drain foreign exchange reserves away when they exhaust government receipts from taxes and borrowing and government expenditure is financed by central bank credit. The criterion for external balance should include strictures on money creation.

Other criteria found in the literature on convergence are not of much importance for very open economies like those of Caricom. For example, the rate of monetary growth does not yield additional information since there is little scope for monetary policy in open economies. Different rates of monetary growth reflect different sizes of money financed deficits. Persistent money creation leads to a balance of payments deficit. Fiscal deficits and balance of payments indicators will therefore serve to capture the effects of monetary divergences.

Similarly, interest rate divergences around the Caribbean provoke net capital flows, not so much between members as from international financial markets. If interest rates diverge some countries will feature rates which are out of line with international markets and those countries will either gain or lose foreign exchange through capital flows.

3. Caribbean Economic Structure

The simplest practical models of the open economy employ two producing sectors, for tradables and non-tradables. The mechanisms by which output reacts to policies and shocks vary greatly between the two sectors. In turn, the interaction of the tradable and non-tradable sectors influences the balance of payments and relative prices. Such models may therefore be used to explore the relationship between policies, balance of payments outcomes and economic growth.

The distinguishing feature of the tradable sector is that firms must sell at a ruling international price over which they have no control. Output is driven by conditions of supply and will vary with determinants of factor costs; demand elasticities are infinite.

Factors are assumed to be mobile between tradable and non-tradable sectors so the returns are the same in both. Capital is assumed to be internationally mobile as well. As was discussed earlier, capital controls are not very effective except as a temporary expedient. The return to capital is therefore determined on the international market.

The output of tradables depends principally on domestic wages since other prices are given by the international market. This reality is reflected in the extensive debate in the Caribbean and among Washington institutions with respect to wage competitiveness in Caribbean countries. Wage reduction is the most obvious policy available for stimulating output of tradables.

Unfortunately, it is virtually impossible to reduce wages in small open economies without reducing real income. These economies are too small to supply a full basket of essential wage goods at internationally competitive prices. The import content of the average consumption basket is estimated at more than 75% in Barbados and Jamaica. It could be almost 100% in Antigua and the Bahamas. Import substitution policies have made little difference to import ratios. The relationship between wages and international prices therefore tends to be very close. To achieve lasting improvement in international competitiveness the small open economy must take measures to shift the supply curve downwards by increasing factor productivity, in particular, labour productivity, since labour is the relatively immobile factor of production.

The model to be employed in this paper does not offer any insight on this issue since there is no provision for investment and the production function is not specified. The growth in output of tradables is therefore largely determined exogenously though there is a possibility that the inflation rate may affect output of tradables depending on the strength of wage earners' money illusion and workers' ability to resist the erosi real wages.

In the non-tradable sector, in contrast to the tradable, output and prices are domestically determined. The supply equation is no different from that for t goods but both price and output will adjust in accordance with demand which de on income and the relative prices of tradables and non-tradables. De management policies have a direct impact on the non-tradable sector which mirrored in the tradable sector.

Two factors limit the extent to which demand management policies may be emp to increase output. They are the effects on money income and therefore on in and the effects on relative prices. Policies to increase demand - represented present model by an increase in credit advanced by the central bank - will pu both the price and output of non-tradables. On both counts there is an incre imports. The income effect predominates because import ratios are extremel for small open economies and because tradable and non-tradable goods definition not good substitutes. There is in any case no effect on the out tradables. If at the higher level of domestic income there is greater dema domestically produced tradable goods at ruling international prices the required a is diverted from exports.

The increase in imports and the decline in exports causes a loss of foreign exchange reserves in the first instance. If the reserve loss is matched by an equivalent contraction in the money supply - if the central bank reduces its net discounts in an amount sufficient to compensate for the original monetary shock - demand contracts and the loss of reserves is the only consequence. Temporary monetary expansion by a government whose central bank has ample foreign exchange reserves is not problematical and this circumstance is not explored in the empirical work.

When monetary expansion persists to the point where foreign exchange reserves are depleted, the nominal exchange rate depreciates. That depresses the supply of non-tradables, eroding part of the increase in income. In addition, the increase in the price of tradables causes real wages to fall, at least for some time. Prices adjust with a lag and they may not fully catch up when they do adjust. The effect of the change in the relative price of tradables on domestic demand will be relatively small because of limited substitution.

Fiscal expansion that is financed by newly created money has the potential to cause divergence of economic performance through unsustainable external balances and exchange rate depreciation. The model is to be simulated for different magnitudes of base money to explore the effects on growth and the balance of payments. The aim is to trace alternative paths of fiscal stimulus or restraint that might have avoided balance of payments disequilibrium. If it were possible to attain reasonable growth rates with policy that kept the balance of external payments in equilibrium that policy would have sufficed to keep economies on converging paths.

This paper does not explore the possibility that demand expansion and a depreciating exchange rate might achieve a faster growth trajectory than policies to ensure balance of payments equilibria at a constant exchange rate. To do so realistically would require better representation of exchange rate dynamics and equations to model capital flight and investment under uncertainty. These might form the basis of subsequent analysis but theory and casual empiricism suggest such a trajectory will be inferior to the one which achieves a stable balance of payments.

The model does not address policies for protecting import substitution though it is relatively simple to add a second tradable sector that sells at the international price plus a degree of protection. Lowering levels of protection reduces output of tradables and increases imports but the effects are not great because of the limited extent of import substitution that is possible in economies as small and resource poor as the Caribbean. (In Trinidad and Tobago, which boosted the highest levels of protection yet seen in the Caribbean during the 1970s, import substitution production did not amount to 5% of total output.)

The model consists of equations for the supply of tradables, the demand and supply of non-tradables, import demand, wage formation and exchange rate determination

(See Table 1-3). The demand for imports and for non-tradables are reduced forms which include the impact of an excess supply of money along with real income and interest rates (See Khan, Monteil and Haque, 1991). The main policy variable is the net domestic assets of the central bank, a measure of central bank credit to government and financial institutions. We also simulate different levels of capital inflow and changes in interest rates, the latter as a measure of external shock.

4. *Empirical Results*

Estimates of the model for Barbados are given in Table 1. In the equation for the ouput of tradables only the interest rate variable is significant. This suggests a need for disaggregation of tradables. While some exports are undifferentiated and sold at world prices, others are sold under special quota arrangements and yet others may be sufficiently differentiated that they face downward sloping supply. Parallel work is underway to estimate a disaggregated structure of exports for Barbados.

In the equation for non-tradables, the money supply has only a lagged effect. Expansion in central bank credit has no contemporaneous effect. Not surprisingly the relative price variable is not significant and the interest rate is also not important.

The price of non-tradables is very sensitive to changes in the price of tradables and in wage rates but supply seems inelastic with respect to price.

Lagged price effects and interest rates have a strong effect on imports. Relati prices are also significant when judged by less stringent criteria. Neither money n output has much of an influence. Monetary expansion will therefore not ha powerful balance of payments effects. This counter-intuitive result is probably reflection of the time period of the estimation when there was no sustained increa in the money supply arising from credit creation by the central bank.

The lagged price effects on wages are quite strong. No exchange rate equation co be estimated for Barbados because the exchange rate remained fixed and unchang during the entire estimation period.

The first simulation was an increase in central bank credit by the equivalent of 1(of GDP for 1974 and 1975 only. These were the years of economic slump and wanted to test whether a one-shot monetary expansion for counter-cyclical purpo was tolerable without leading to an unsustainable balance of payments performanc

Output increases very little, by 0.6% and 0.7% in the two years. There is little eff on inflation. There is a small loss of foreign exchange reserves compared to the b forecast of about $20 million each year. These results show that the effects on balance of payments are not devastating but the gains seem hardly worth the eff

A greater danger of balance of payments instability emerges if the central bank's credit expansion is sustained over time. A boost in the net domestic assets of the central bank by 5% of GDP each year between 1974 and 1988 accelerates GDP growth but very modestly. There is a gain of 0.3% in the first year rising to a maximum of 1.3% by 1988. The rise in inflation is not significant compared to the base forecast. Balance of payments losses mount each year reaching a maximum of $53 million by 1988. Were we to have imposed the restriction that foreign exchange reserves could not be negative the exchange rate would have been devalued. Because we have no past behaviour on which to guage the determinants of a flexible exchange rate the nature of the adjustment that would have ensued remains a matter for speculation.

Increased capital inflows do not have powerful growth effects though they obviously improve the balance of payments outcome. A 50% increase in capital flows each year for 1974 and 1975 boosts the growth rate by 0.3% and 0.4% and increases reserves by $20 million and $32 million.

An interest rate shock depresses output very sharply. If interest rates rise by 4 points in 1974 and 1975 the growth rate declines by 5 points and 7 points in those areas with residual effects of lower growth tapering off in the following years. Inflation accelerates by 2.5 points and 3 points in 1974 and 1975 again with residual effects in the following years. Foreign exchange reserve losses are quite severe at $54 million and $75 million in 1974 and 1975, becoming smaller thereafter.

The Barbados results do not suggest monetary policies that might have improved on the growth performance without harming the balance of payments. In any case, the combination of growth and balance of payments outcomes actually observed in Barbados during this period allowed for convergence with other Caribbean countries. Since the model does not incorporate mechanisms for productivity increases it cannot define a trajectory that would have improved on the prospect.

The estimations for Jamaica are shown in Table 2. The interest rate has a strong depressing effect on the output of tradables in Jamaica but wages are associated with an increase in output (incomes per capita are used as a proxy for the wage rate). This suggests that productivity growth in the tradable sector of Jamaica was quite rapid. There is an inverse relationship between the price of tradables and their output. This can only be a quirk of the aggregation process and it will need to be further explored in a disaggregated model.

Increases in tradable output and rising money supply stimulate increases in the output of non-tradables, the latter with a one-year lag. Money creation does not have significant contemporaneous effects. Rising interest costs depress the output of non-tradables. Relative prices have no significant effect, nor does lagged inflation.

Wage and interest costs drive up the prices of non-tradables. Neither the output of non-tradables nor the price of tradables have a significant impact.

Increases in output generate additional demand for imports. Lagged monetary expansion seems to depress imports a phenomenon which is not easily explained. Monetary expansion in the current period does not have a significant impact nor do relative prices, inflation nor interest rates, though the coefficients all have the expected signs.

Wages in Jamaica are strongly affected by the lagged rate of inflation and exchange rates change in relation to the loss of foreign exchange reserves.

The Jamaica model does not fit the observed data very well. The prediction of real output is tolerable only from 1977 onwards and the price trends do not fit at all well. The prediction for exports is reasonable up to 1975; that for imports from 1978 onwards. The prediction for foreign exchange reserves goes badly off track in the 1980s. Relative prices come close to observed values only for the period 1974-1984. The exchange rate prediction never comes sufficiently close.

Notwithstanding these weaknesses the model was used to simulate policy changes and shocks pending modification to produce a more acceptable fit. A cut in the Bank of Jamaica's net domestic assets in 1974 and 1975 equivalent to 5% of GDP (to correct balance of payments disequilibria in those years) raises output a trifle in 197 but output falls below the base forecast by 3/4 of 1% in 1975 and remains that mu below for the remainder of the period. If anything the monetary contraction seems raise prices but the effect is miniscule. This policy measure improves forei exchange reserve balances in 1974 and 1975 but they worsen relative to the ba forecast in subsequent years.

A 4 point increase in interest rates in 1974 and 1975 would have boosted outp significantly and depressed prices - a counter-intuitive result. Foreign exchan reserves would have improved in 1974 and 1975 and then deteriorated.

If the policy of contracting the Bank of Jamaica's net domestic assets had be sustained over the period 1974 to 1987 output would have contracted significar relative to the base forecast. Contraction would have increased yearly to reach alm 5 points by 1987. Inflation would have accelerated but not by much - a maximum 2 points only in 1987. The foreign exchange position would have improved in 1980s. On this evidence, policies to stabilise Jamaica's balance of payments wo have been very costly in terms of lost output.

The estimates for the Trinidad and Tobago model are shown in Table 3. The m export from Trinidad and Tobago is oil, which accounts for over 80% of the total. production depends on the rate of discovery of new fields and productivity of exis

wells. There is no significant relationship to the price of tradables, wages and interest rates in the current period. Investment for exploration is undoubtedly influenced by past price trends but no attempt is made to estimate that relationship in the present economic model.

Monetary expansion generates significant extra demand for non-tradables in current and in subsequent time periods. Relative prices also influence the demand for non-tradables. Price increases are associated with rising output of non-tradables but it is doubtful that they could be the cause of the rise in output. Surprisingly, overall output has no significant effect on the demand for non-tradables.

Wages and the price of tradables have a strong effect on the price of non-tradables but the price of non-tradables and their output are inversely related.

Relative prices are a significant determinant of imports; though output, prices, interest rates and the lagged monetary variable have the expected signs their coefficients are not statistically significant. Money creation by the Central Bank of Trinidad and Tobago has no significant effect and the estimated coefficient does not carry the expected sign.

Lagged price effects on wages are quite strong. In estimating the exchange rate a filter was applied to exclude small changes in exchange rates in the previous time period. Also, foreign exchange reserve losses were deemed to affect the exchange rate only if the loss depleted the starting stocks of foreign exchange by more than an arbitrarially determined minimum accepted level. Both these variables appear to have significant effects.

The Trinidad and Tobago model fits the observed series reasonably well. There are few deviations on key variables in excess of 10%.

Simulations increasing the credit advanced by the Central Bank of Trinidad and Tobago by the equivalent of 5% of GDP and 10% of GDP did not have significant effects on growth, inflation or the balance of payments.

5. Further Work

It would be premature to draw any conclusion from the relatively unsatisfactory results obtained so far. The first task must be to improve the models' tracking ability. The disaggregation of the output of tradables seems an obvious place to start. Some equation specifications may need revision particularly where results are counter-intuitive. It may be that country pecularities require further tailoring to each country's circumstances. So far the modifications made have been principally the insertion of dummy variables when there appeared to be structural shifts.

Once we have a better basis for simulating the effects of increasing the net domestic assets of the central bank it will be useful to insert a model of fiscal behaviour with more detail on the effects of government expenditure and tax policies, as well as the financing of the government deficit.

Reference

Khan, Mohsin; Peter Monteil & Nadeem Haque, 1991, Macroeconomic Models for Adjustment in Developing Countries, Washington, D.C: IMF.

Table 1

Barbados Model

```
QT=118.9917-12.96823*PT-.6268153*W-6.562224*R+.7257414*QT(-1)+2.96064*TIME
QN=346.4814+.440072*QT+7.980163D-02*MB+172.0991*P(-1)-18.71484*RP-1.989069*R
06745*MO(-1)
PN=5.590068D-02-1.681646D-04*QN+.3780497*PT+.7387289*W+3.691842D-03*R
MR=175.2163+.2599843*Q+.4229576*MB+247.1717*P(-1)-328.1673*RP+26.06996*R+.25
5*MO(-1)
W=-5.152257D-02+.9155508*P(-1)+1.052891D-02*TIME+5.219817D-02*D6073
mo=.07*mb+mo(-1)
pt=er*pf/2
q=qt+qn
rp=pt/pn
p=(pt*qt+pn*qn)/q
dr=-pt*(xr-mr)-k
xr=beta*qt
mb=(dnda-dr)/p
```

Variable Names

qt	-	output of tradables
pt	-	price of tradables
w	-	wage rate
r	-	interest rate
qn	-	output of non-tradables
mb	-	base money
p	-	price index
rp	-	relative price
mo	-	the money stock
pn	-	price of non-tradables
mr	-	real imports
q	-	total output
d6073	-	dummy variable with value 1 between 1960 and 1973
ER	-	the exchange rate
pf	-	a world price index

dr - change in foreign exchange reserves

xr - real exports

k - net capital flows

beta - a constant

dnda - change in net domestic assets of the monetary authority

Table 2

Jamaica Model

```
QT=181.4341-101.7881*PT+233.9787*YPC-14.15964*R+.8357763*QT(-1)-.7868866*D7483PT

QN=567.9878+.5343671*QT-.1037554*MB+76.41349*P(-1)-114.6869*RP-16.39674*R+.373961
3*MO(-1)
PN=6.751911D-02-2.014697D-04*QN-4.831711D-02*PT+.9118111*YPC+2.823004D-02*R
DMR=24.29033+1.976667*DQ+.2141217*DMB-289.9698*DP(-1)-468.0442*DRP+53.85302*DINT
-.74685*DMO(-1)
mr=mr(-1)+dmr
YPC=-5.213469D-02+.9281679*P(-1)+1.493359D-02*TIME
DER=5.146223D-02+8.466154D-02*ERSIG(-1)+1.103624D-03*DFXRPROB
er=der+er(-1)
mo=.4*mb+mo(-1)
pt=pf*er
q=qt+qn
rp=pt/pn
p=(pt*qt+pn*qn)/q
dr=-pt*(xr-mr)
xr=beta*qt
mb=(dnda+dr)/p
```

Variable Names

See Table 1

Table 3

Trinidad & Tobago Model

```
QT=117.5152+8.108282*PT-.2141183*W-4.383554*R+.8928155*QT(-1)
QN=895.3244-.8284869*QT+.2351166*MBR+630.2978*P(-1)+500.9138*RP-33.0022*R+.59368
05*MOP(-1)-4039.97*D8288+5.285984*D82QT
MR=2832.924+.7760606*Q-.3346273*MBR-1022.705*P(-1)+3565.066*RP-409.5552*R+2.0724
03*MOP(-1)+2319.141*D8488
W=.1940208+105.1804*P(-1)+28.9218*D8288
D(ER)=5.760693D-02-.4399289*DERSIG(-1)+4.8947620-04*DRPROB
MOP=944.3579+.4018226*MBR+756.7416*D8288
dumder=d(er)>.2*er
dersig=dumder*d(er)
dumfxr=dr>(fxr(-1)-fxrmin)
drprob=dr*dumfxr
pt=pf*er/2.4
q=qt+qn
rp=pt/pn
p=(pt*qt+pn*qn)/q
xr=beta*qt
CAP=11437.47-2.686098*Q+110.3451*RP+.7414711*MBR-2482.124*P(-1)
capq=cap/q
```

Variable Names

See Table 1

Additional Variable Names

d8288 - dummy variable with value 1 between 1982 and 1988

d82qt - d828*qt

d8488 - dummy variable with value 1 between 1984 and 1988

dersig - a significant change in exchange rate defined in the model

drpob - a large change in foreign exchange reserves defined in the model

cap - real current account balance