WP/04

The International Investment Position of Jamaica: An Estimation Approach

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Abstract

This paper seeks to introduce the international investment position, IIP and identifies methodologies that can be employed in estimating it for Jamaica. In doing this, the paper outlines two main methodologies, the adjusted cumulative current account method, ACUMCA, and the adjusted cumulative flows method, ACUMFL. The analysis reveals that Jamaica has maintained a negative net international investment position, for the period 1970 to 2003. This negative net IIP outlines that Jamaica's foreign assets[1] are less that their foreign liabilities. The major component of the foreign liabilities that contributes to this negative position is the country's external debt stock.

Keywords: Foreign assets, external debt, foreign direct investment, equity flows

JEL Classification: **F21, F32**

* The view expressed does not necessarily reflect those of the Bank of Jamaica.

[1] Note that throughout the paper assets and liabilities refer to financial assets and liabilities.

1.0 Introduction

The liberalization of most financial markets has created an increased concern in the movement of capital between countries. With this new development, countries are seeking to protect themselves from external shocks that are caused by rapid capital flight, as was the case in the Asian crisis. Information that can be used to assess the vulnerability of a country to these shocks is present in its stock of external assets and liabilities. A statistical presentation of the external assets and liabilities of a country for a particular period is known as the International Investment Position (IIP).

Macro-economists, investors and researchers use the IIP as a statistical tool for advice on policy making and decisions on macroeconomic stability. The knowledge of the financial obligation of institutions within an economy can provide vital information on the demand for foreign exchange for external debt payments. Therefore, the central bank can formulate policies to maintain stability in the foreign exchange market when the demand increases. This stock of external liabilities can cause a negative effect on the banking system when there is exchange rate devaluation.

Lane (2000) supported the above argument in his paper where he stated that the level and composition of gross international investment positions matters for macroeconomic adjustment to shocks. He further noted that the size of the gross international investment positions can be interpreted as a volume-based measure of financial openness and the level of integration into the international capital markets, just as exports/gross domestic product, GDP and import/GDP ratios do for openness to trade in goods and services.

In light of the above, the main objective of the paper is to construct reasonable estimates of the stock of foreign assets and liabilities and their subcomponents for Jamaica using the balance of payments, BOP, data for the period 1970-2003. The analysis also highlights two measures used to estimate the stock of foreign direct investment assets and liabilities. Finally, inferences are drawn from the estimates of the stock of external assets and liabilities of Jamaica.

The methodological framework followed in this paper imitates the measures of external assets and liabilities outlined in Lane, Milesi-Ferretti (2000). Firstly, the balance of payments accounting system is presented to show the link between the BOP and the international investment position. This linkage permits the construction of equations of the components of the

BOP and the formulation of other system of equations to estimate the stocks of external assets and liabilities of Jamaica. To accomplish this objective, the components of the financial account are grouped into five main components: foreign direct investments, portfolio investments, debt, other investment and foreign exchange reserves. The individual components are then estimated and accumulated to get the net foreign asset position.

Sinn (1990) and Rider (1994) were the first to construct detail measures of foreign assets and liabilities for 145 countries, using data from the International Monetary Fund, the United Nations and national sources[2]. Sinn's work is the most comprehensive project undertaken to date, but it covers only a limited period, 1970-1987. Rider (1994), on the other hand, performed similar measures for the stock of foreign assets and liabilities of industrial countries, for the period 1984-1993[3].

Hudson and Stennett (2003) were the first to construct estimates of Jamaica's IIP. Their work assessed the sustainability of the Jamaican current account using an inter-temporal model of current account determination. In addition, they applied traditional methods of evaluating the path of a country's net external liabilities, which provided estimates of private, and public sector IIP of Jamaica[4]. A five year forecasts of Jamaica's IIP were also presented in their analysis.

The Bank of Jamaica seeks to compile the IIP statistics by 2005, however this paper seeks to provide an estimation of the IIP using methods presented in the literature. The IIP and BOP are exceptional statistical tools that are used widely to explain macroeconomic conditions within an economy. Given this importance, researchers have dedicated much time in formulating estimation models that use the BOP data to estimate the IIP statistics. A similar approach is taken in this paper.

The rest of the paper is structured as follows. Section 2 presents the balance of payments accounting framework used to estimate the foreign assets and liabilities, section 3 outlines the data sources, section 4 highlights the results obtained and section 5 concludes.

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[2] Lane, Phillip, and Gian Milesi-Ferretti (2000), *'The External Wealth of Nations: Measures of Foreign Assets and Liabilities For Industrial and Developing Countries'* CEPR Discussion Paper

[3] Ibid

[4] Hudson, Suzette and Robert Stennett (2003), *"Current Account Sustainability in Jamaica"*, working paper, Bank of Jamaica

2.0 Balance of Payments Accounting Framework

The net external position of a country is the summation of its net debt position, net equity position, net foreign direct investment position, net other investments and its foreign exchange reserves. That is,

$$NFA_t = DEBTA_t + EQA_t + FDIA_t + OA_t + FX \quad - DEBTL_t - EQL_t - FDIL_t - OL_t \quad (1)$$

where DEBTA (L), EQA (L), OA (L) and FDIA (L) represent the stocks of debt, portfolio equity, other investment and foreign direct investment assets (liabilities) while FX are the foreign exchange reserve. This section outlines the estimation techniques used to calculate the stock of external assets and liabilities. Two methodologies are employed, the adjusted cumulative current account, ACUMCA and the adjusted cumulative flows, ACUMFL, methods outlined in Lane, Milesi-Ferretti (2000).

The ACUMCA method involves the accumulation of the current account balance, adjusting the capital account for capital transfers, debt forgiveness or reduction and other government transfers. Exceptional financing that affects the current account should also be included. For example, arrears on principal, interest payments on external liabilities and special loans contracted for balance of payments purposes will impact the capital account balance. Valuation adjustments are also incorporated for financial assets recorded in the financial account of the BOP. When financial assets are not held in the currency used for the BOP compilation, then price and exchange rate changes will impact on the value of the external assets and liabilities. Therefore, the ACUMCA method must capture the relative capital gains or losses on theses financial assets and liabilities.

Correctly accounting for valuation changes of external financial assets is the one of the most difficult task encountered in BOP and IIP compilation. This issue is even more complex for FDI and equity assets and liabilities. Fortunately, there is no significant concern in financial asset and liability valuation for Jamaica as most financial instruments are denominated in US dollars. The BOP data is also recorded in US dollars.

Within the financial account of the BOP, there is a component that measures unrecorded transactions of the current account, financial account or both. This item is termed net errors and

omission. Net errors and omission normally reflects unrecorded capital flows or unrecorded current account flows. However, capital flows among countries is prevalent in the modern financial markets where money can be transferred or transformed into several medium of exchange, thus making it difficult to capture all capital flows. Therefore, net errors and omission will be treated as unrecorded capital flows.

The fifth edition of the Balance of Payments manual, BPM5, published by the International Monetary Fund, IMF, states that the current account, CA, balance for a country is equal to the net changes of the financial and capital accounts balances. That is,

$$CA = -(KA + FA) \tag{2}$$

where KA and FA represents the capital and financial account balances respectively . The financial account can be defined further as the sum of the net changes in portfolio investment, foreign direct investment, other investment, debt capital and foreign exchange stock.

$$FA = -(\Delta EQ + \Delta FDI + \Delta OI + \Delta DEBTL - \Delta DEBTA + \Delta FX) \tag{3}$$

Therefore, substituting equation 3 into equation 2 results in the following fundamental BOP relation.

$$CA = \Delta EQ + \Delta FDI + \Delta OI + \Delta DEBTA - \Delta DEBTL - \Delta KA + \Delta FX \tag{4}$$

where,

$$\Delta FDI = -(\Delta FDIA + \Delta FDIL)$$
$$\Delta EQ = -(\Delta EQA + \Delta EQL)$$
$$\Delta DEBTL = \Delta PDL + \Delta IMF + \Delta EF$$
$$\Delta DEBTA = -(\Delta PDA + EO)$$
$$\Delta OI = -(\Delta OA + \Delta OL)$$

EO represents errors and omissions, while PDA (L) represents portfolio debt assets and liabilities respectively. Therefore, the current account can be defined as the sum of the net changes in portfolio investment, foreign direct investment, other investment, debt capital and foreign exchange stock and capital transfers.

If the current account balance is summed over s periods, where s periods occurred before the t period, then,

$$\sum_{s}^{t} CA_i = DEBTA_s(t) - DEBTL_s(t) + EQ_s(t) + FDI_s(t) + OI_s(t) + FX_s(t) - KA_s(t) \quad (5)$$

Equation 5 and 1 are used to get an approximate estimate of the net foreign assets of a country at time t.

$$\begin{aligned} NFA(t) &\approx NFA(s-1) + \sum_{s}^{t} CA_i + KA_s(t) \\ &= NFA(s-1) + DEBTA_s(t) - DEBTL_s(t) + EQA_s(t) - EQL_s(t) + FDIA_s(t) - FDIL_s(t) \\ &+ OA_s(t) - OL_s(t) + FX_s(t) \end{aligned} \quad (6)$$

Equation 6 outlines the two methods employed in the paper. The left hand side of the equation states that the change the NFA is equal to the adjusted accumulative current account. On the other hand, the right hand side shows that the change in the NFA is equal to the summation of the individual components of the financial account.

The second method utilized in this paper is the adjusted cumulative flows method, ACUMFL, which is used for developing countries. This method involves the summation of the individual stock estimates of the net foreign asset position outlined in equation 6. That is, the summation of the net debt, net equity, net foreign direct investment, net other investment and the net international reserves position for the country gives the net foreign assets as seen in equation 5.

In this analysis, the initial value of the net foreign asset for 1970 is obtained by equating the initial NFA to the summation of the individual stock estimates. The debt stock and the foreign exchange reserves are readily available for Jamaica. Initial stock of FDI liabilities and assets are not easily obtained and will be estimated using an accumulation of capital flows method below. For portfolio assets and liabilities, the basic procedure of cumulating flows is employed, assuming an initial stock value of zero.

2.1 Foreign Direct Investment

The stock of FDI assets, FDIA, and FDI liabilities, FDIL, of Jamaica is estimated using two techniques. Firstly, the FDI inflows are accumulated to provide an average estimate of the stocks of FDIL. A similar process is followed for the FDI assets. The other method uses a book value estimation methodology outlined in Lane, Milesi-Ferretti (2000) paper where the estimates of FDIA and FDIL are based on accumulative flows which also includes reinvested earnings.

Lane, Milesi-Ferretti (2000) use a book value estimation method to get the FDIL, which is based on the assumption that the relative price of capital goods across countries follows relative consumer price index, CPI. This implies that the change in the domestic price of capital goods is the sum of the change in the relative price of capital between Jamaica and the US, since this is the currency of denomination of the flows, plus the increase in the US price of capital. That is,

$$FDIL_t = FDIL_{t-1}\left[\frac{reerus_t}{reerus_{t-1}}\right] + \Delta FDIL_t \tag{7}$$

where reerus is Jamaica's real effective exchange rate vis-à-vis the US dollar and an increase measures an appreciation. Depreciation of existing capital stock is assumed zero. However, in an inflationary environment, we assumed real capital depreciation is offset by reinvested profits, therefore eliminating the need for an inflation-adjustment term. In the absence of initial stock data, cumulative flows are used dating back to 1960.

Estimates of the stock of FDI abroad are based on the assumption that the investment pattern of a country reflects its trade patterns. The technique requires an additional adjustment designed to account for the impact of changes in the exchange rates of the countries where the investment takes place vis-à-vis the US dollar.

$$FDIA_t = FDIA_{t-1}\left[\frac{reerpc_t}{reerpc_{t-1}}\right] + \Delta FDIA_t \tag{8}$$

$$reerpc = \frac{cpi^{pc} e_{\$}^{p}}{cpi^{us}}$$

where pc stands for partner countries, us for United States, cpi^x is the consumer price index of country x and e^{pc} is the dollar/partner countries' nominal exchange rate. The term within the brackets is equal to one plus the change in the purchasing power of the basket of the partner country currencies vis-à-vis the US dollar between the end of year t and t-1.

2.2 Portfolio Investment

Portfolio investments as outline in the fifth edition of the Balance of Payments Manual are debt and equity securities that are traded in organized financial markets. Debt securities include bonds, debentures, notes, money market or negotiable debt instruments, and financial derivatives or secondary instruments such as options that are used for hedging against risks, investments and trading purposes. Equity securities covers all instruments and records acknowledging, after the claims of all creditors have been met, claims to the residual values of incorporated enterprises. Shares, stocks, participation, or similar documents usually denote ownership of equity instruments.

Portfolio investments in Jamaica were not significant until 1997. That is, the balance of payments data for Jamaica did not report portfolio investment before 1997. As a result, the accumulated flows simple average method can be employed to estimate the portfolio investments abroad and those made by foreign investors. These types of investments have become popular within the financial market in recent times.

2.3 External Debt Assets and Liabilities

For most developing countries, the stock of external debt is widely available. Countries like Jamaica produce standard reports on the composition of its external debt stock. This information is important as international investors use it as an indicator of the country's indebtedness. Debt assets, DEBTA, are of equal importance as it provides an indication of a country's investment abroad. This stock of debt assets is not readily available as the debt liabilities, DEBTL, and is minimal for developing countries. The value of DEBTA is assumed zero for Jamaica for the period of review.

In the absence of the stock of external debt assets and liabilities, Lane, Milesi-Ferretti (2000) proposed the use of cumulative flows, using initial stocks obtained by Sinn (1990). Alternately we could employ a residual approach by taking the cumulative current account balance as the appropriate NFA measure, and then calculate the DEBTA as

$$DEBTA = NFA + FDI - EQ + DWB - FX. \quad (9)$$

The paper follows the former, and utilizes the data stock available from the sources mentioned.

2.4 Foreign Exchange Reserves

The stock of foreign exchange reserves, FX, is the most easily accessible data series for our analysis. Most central banks produce this stock on a regular basis. Bank of Jamaica publishes FX data on a monthly and yearly basis.

2.5 Other investments

This component accounts for the stocks of foreign assets and liabilities of financial institutions. The financial institutions comprise of the commercial banks, merchant banks, finance houses, trust companies, and building societies. These institutions are considered to be the core components of the financial sector in Jamaica, and represent majority of the financial market. Therefore, the stock of foreign assets and liabilities provide a reasonable approximation of the financial market.

3.0 Data

The data were sourced from the International Monetary Fund's Balance of Payments (BOPS) and International Financial Statistics (IFS), the World Bank's World Debt Tables and Global Development Finance, the United Nations Conference on Trade and Development, UNCTAD, OECD statistics, Bank of Jamaica and the Ministry of Finance. Stock data for the components of the net foreign assets position are only available for the debt liabilities and the foreign exchange reserves. As a result, the other components will be estimated using cumulative flows data for the balance of payments statistics.

Jamaica's stock of external debt is published on the Ministry of Finance website, with annual data for the years 1980-2003. This information is not sufficient for the period under review. As a result, the gross debt stock reported in the World Debt Tables of the World Bank is substituted for the missing years. Minute differences were seen in the data received from the two sources, but the information received from the Ministry of Finance was considered more creditable and accurate. Debt assets are not a common feature of Jamaica's foreign assets and as such, it is assumed insignificant for the IIP estimation.

Stocks of FDI assets and liabilities are also not available. As mentioned in section 2, the only reasonable measure of FDI stocks is obtained by cumulating the FDI inflows and outflows. These flow data are sourced from the financial account of the balance of payments data series at the Bank of Jamaica for the period 1960-2003. Since there are no FDI stocks, the flows are accumulated from 1960-1969 to obtain a crude estimate of the initial stock for 1970. This estimation technique is not unique to our calculation as UNCTAD uses it to measure their FDI stocks of Jamaica.

Portfolio investment assets and liabilities will also be estimated. The estimation technique is similar to that used for the FDI stocks. That is, EQA and EQL are obtained by accumulating the inflows and outflows recorded in the BOP data series for the period 1997-2003. Prior to 1997, the portfolio investment flows were not significant and as such were not recorded in the BOP data. Therefore, the initial stocks of EQA and EQL for 1997 are assumed zero. The cumulative flows method was then employed for the proceeding years to get the annual stock data, as outlined in table 3.

The stock of foreign exchange reserves of Jamaica is sourced from the IFS data series obtained from the IMF. The FX stock use in our calculation excludes the net foreign assets of commercial banks, external assets of the central government and the Bank of Jamaica net reserves. S.D.R.s are included, as they are considered external assets of the country. The foreign assets and liabilities of the commercial banks and other financial institutions are included in the other investment component of the IIP.

As outlined above, the paper considers two main measures: the adjusted cumulative current account method, ACUMCA and the adjusted cumulative flows method, ACUMFL. The

ACUMCA method incorporates the impact of capital transfers, valuation changes, capital gains and losses on equity and FDI and debt reduction and forgiveness. ACUMFL on the other hand, accumulates the stock of the components of the net foreign asset positions outlined in equation 1. These stocks were derived mostly from estimation techniques discussed in section 2 through crude measures.

The ACUMCA method reflects the format outlined in the BPM5 in calculating the IIP. The manual states that the IIP is equal to the initial stock position plus changes in the position caused by transactions, price and exchange rate changes, and other adjustments. The ACUMCA assumes an initial stock position of zero in 1960, to which transactions are incorporated using BOP data. The impact of price change in the model is minimal as the BOP data is compiled in US dollars.
It is also assume that the inflation rate of the US economy is at least equal to the rate of depreciation of the capital stocks also denominated in US dollars. Exchange rate changes did not affect the estimation as all data are denominated in US dollars. The further adjustments made to the stock position were changes that are non-BOP transactions.

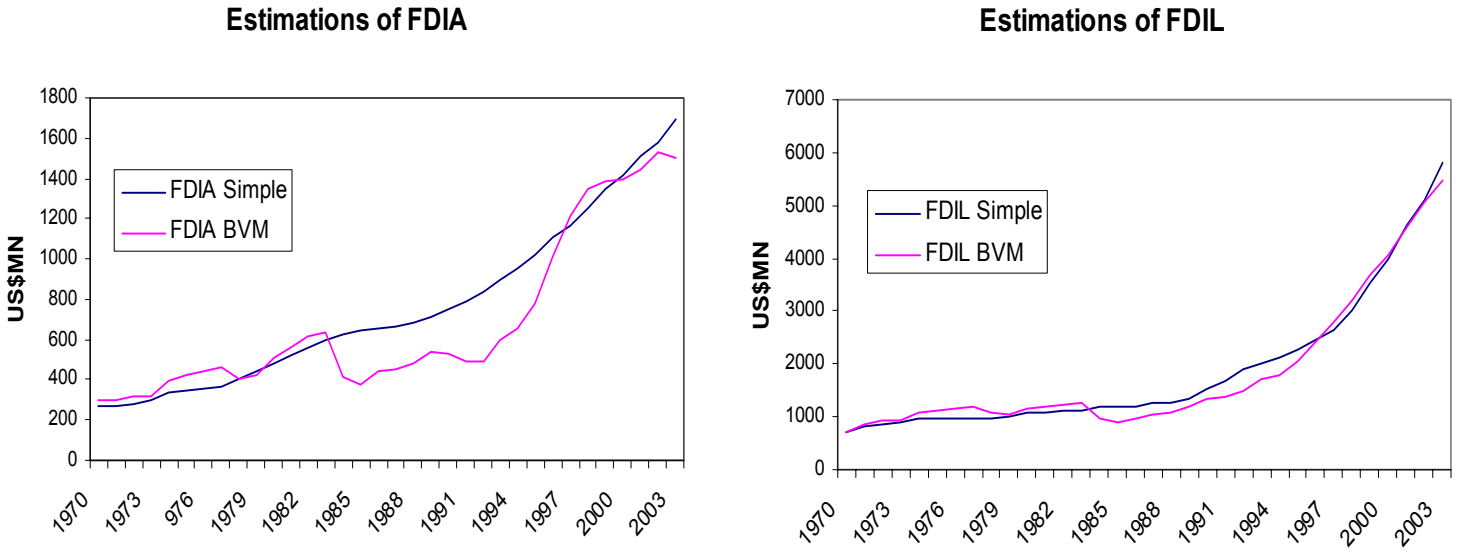
The second method considered involves the accumulation of the individual stock components of equation 6. That is, ACUMFL is computed by summing the net debt, net FDI, net portfolio investment, net other investment and foreign exchange reserves positions. Only the external debt liabilities and the net foreign exchange reserve positions are available in stock data. The other components were estimated using the techniques presented above. This methodology is represented in equation 6. The initial net foreign asset position is not available and an estimate was obtained by cumulating the flows of the individual components to 1970.

4.0 Results

Figure 1 shows the correlation between the FDIA and the FDIL estimates obtained under the cumulative flows method and the book value method. The graph of the estimates of FDIL follows each other more closely that the graph of the estimates of FDIA. Despite the small variation seen in the FDIA graph, the trend observed in both graphs are consistent and show that foreign direct investment stocks have increased consistently over the period 1970 to 2003. However, the stock of FDIL is at least twice the size of the stock of the FDIA. This means that Jamaica is receiving more FDI flows from abroad than it is investing overseas.

Detailed analysis was done on the foreign direct investment stocks since this category accounts for a significant portion of the international investment position. This component reflects the major investments or project undertaken by private investors in Jamaica. Major FDI flows are received from the bauxite or the alumina and tourism industry, the finance and telecommunication sector and the manufacturing and energy sector. The estimates of the stock of FDI liabilities have adequately covered the manufacturing, energy, finance, telecommunication and tourism sectors since these recent fleet of investments would have been captured in the BOP data.

Figure 1: Estimates of FDIA and FDIL using Book Value Method and Cumulative Simple Method

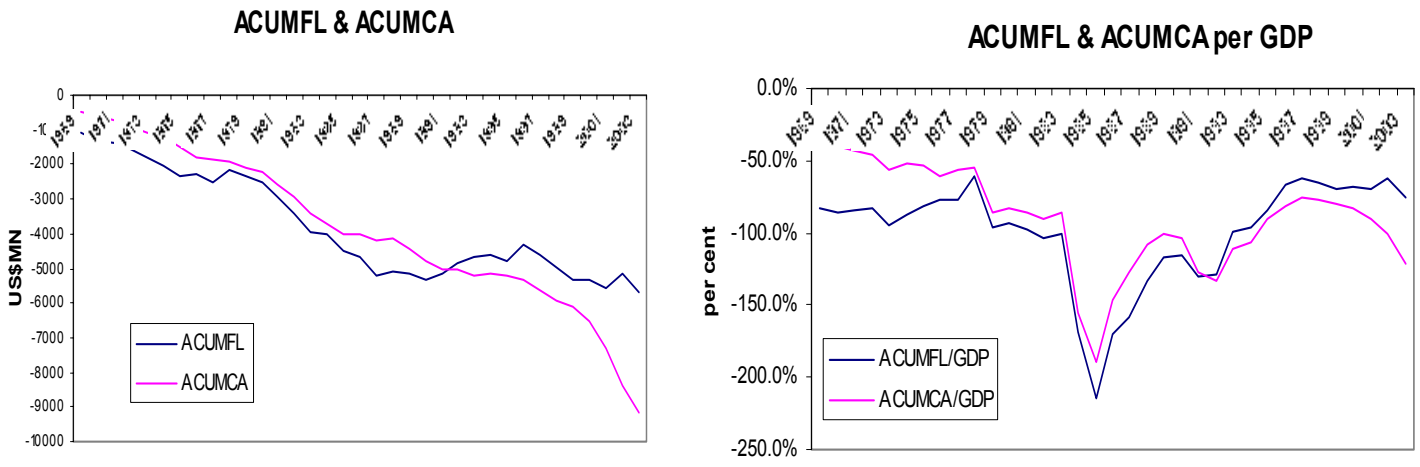


The results obtained for the estimates of ACUMCA and ACUMFL are depicted in figure 2. The graph shows that both methods are highly correlated and follows similar path of a negative net international investment position. In 1970, Jamaica had a negative net IIP of US$1.3 billion and US$603 million for the ACUMFL and ACUMCA methodologies respectively. The difference between the methodologies accounts for this wide gap in the estimates. The ACUMCA method has a low initial stock estimate using the adjusted cumulative current account method, as data on current account balance are not available before 1960. However, the estimates of IIP for 2003, using the ACUMCA and ACUMFL methods were US$9.1 billion and US$5.7 billion respectively.

Regardless of the significant differences seen in the estimates for IIP, figure 2 and the correlations from table 4 confirm that the dACUMCA and dACUMFL are highly related. That is, the first

difference of ACUMCA and ACUMFL expressed as a ratio of gross domestic product, GDP, shows a correlation of 43.9 per cent. This result is important as it highlights the fact that both methodologies used depict a consistent trend for the IIP stock over the review period. Another important result of the analysis is obtained from the correlation between the first difference of each estimates and the current account balance for the period 1970-2003. This result is critical in our analysis as it underpins the BOP theory. Recall that, the change in capital stocks over a time t is equal to the net capital flows for the period. Similarly, the change in the IIP over a

Figure 2: Estimates of ACUMCA and ACCMFL



period t is equal to the net flows seen in the adjusted current account. That is, the current account balance adjusted by the capital account, for a particular year is approximately equal to the net change seen in the IIP over the previous year. Recall equation 6,

$NFA(t)_i \approx NFA(s-1) + \sum_{s}^{t} CA_i + KA_s(t)$, this can be approximated to

$NFA(t) \approx NFA(t-1) + CA(t) + KA(t)$. Therefore, the change in the IIP is equal to the adjusted current account:

$$IIP_t - IIP_{t-1} \approx CA(t) + KA(t) \qquad (10)$$

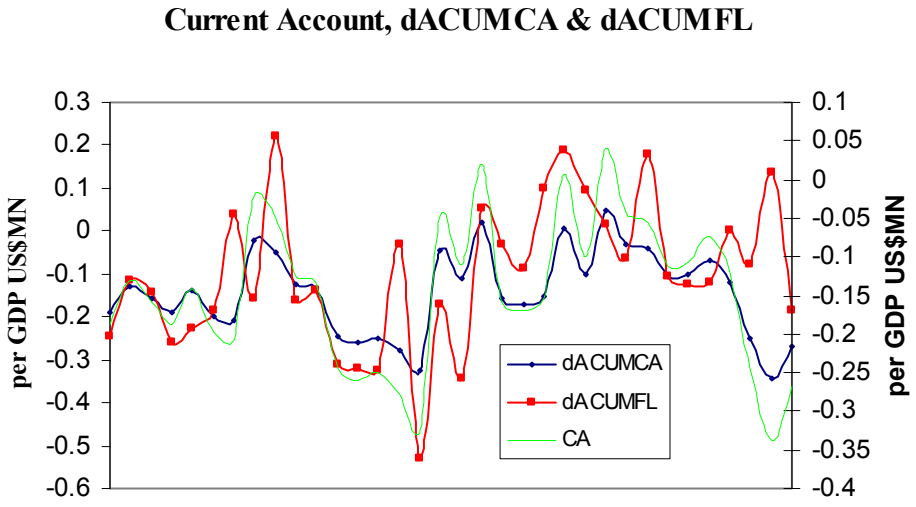
An estimation was conducted to verify the accuracy of the results obtained.

$$ACUMFL_t = \beta_1 + \beta_2 ACA_t + \beta_3 ACUMFL_{t-1} \qquad (11)$$

where $\beta_{i,}$ represents the residual and the coefficients. Table 8 presents the results for the coefficients and the residual. The R-squared, F-statistics and the DW statistics suggest that the results were inadequate to our a prior expectations. The t-statistics of the coefficient on the adjusted current account variable was not significant, which means that equation 11 does not explain equation 10 sufficiently. Further investigations were done, but the results became more spurious. This resulted from the inadequacy of the data through missing data for the time series of each variable coupled with the biased created from the change in BOP methodology in 1994.

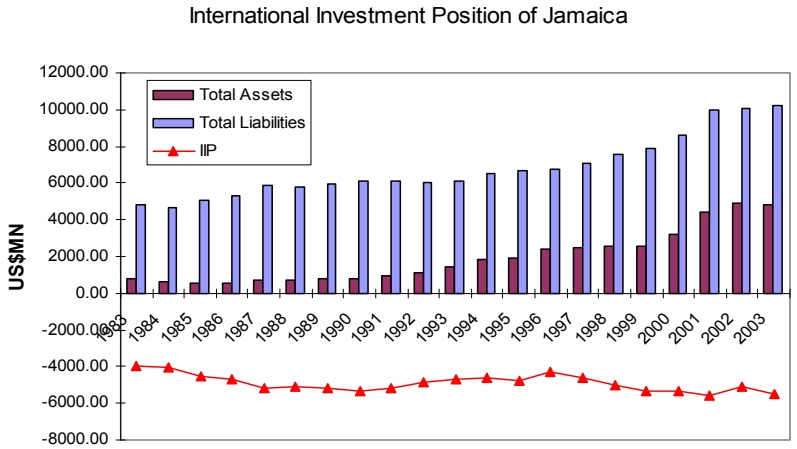
Figure 3 provides a graphical explanation of the equation above. The graph shows a relatively consistent trend over the period under consideration. Despite the variation from the current account graph, the correlation matrix shows a 99.9 per cent and 44.1 per cent relation for each of the estimates (dACUMCA and dACUMFL) and the current account balances. The relatively low correlation obtained for the ACUMFL means that the estimates are not accurately accounting for 55.9 per cent of the IIP over the period. It could also mean that the current account balances given for the period have not accurately reflected all data for the financial account.

Figure 3: Relation between dACUMCA, dACUMFL & the Current Account



The estimates of IIP obtained from the cumulative flows method shows that Jamaica maintained a relatively stable negative net IIP over the last 20 years. Despite an increase trend in total foreign liabilities, the net IIP remained stable since 1983. A compensatory increase in total foreign assets was also observed during this period as shown in figure 4.

Figure 4: The International Investment Position of Jamaica



5.0 Conclusion

In summary, the paper provides alternative estimates for the IIP. The methodologies used provided consistent results for the net asset position of Jamaica (as confirmed by a 91 per cent correlation). The analysis also provided detailed estimates for the foreign direct investment assets and liabilities of Jamaica. Table 7 outlines the principal results of the paper for the six-year period 1998-2003. The table shows that all components of the IIP increase for both the assets and liabilities categories. As a result, the net IIP deteriorated by 13.64 per cent during the period as the growth in assets was less than the growth in liabilities.

The increase in liabilities was cause by higher FDI investments from new telecommunication companies, bauxite industry owners, hotel industry investors and energy sector developments from overseas. This influx of FDI has contributed significantly to the external liabilities of Jamaica. FDI inflows for 2003 reached a high of US$721 MN coming from US$17 MN received 20 years earlier. The stock of FDI liabilities grew by 339.4 per cent over the same period, increasing to 52.2 per cent of total liabilities. As a result, the paper placed special emphasis on

estimating the stocks of FDI. The methods employed gave highly correlated estimates for the FDIA and FDIL.

Another stylized fact obtained was that the stock of external debt is negatively correlated with the net foreign asset position. This a priory expectation was obvious from the onset and was not surprising. Jamaica's IIP is severely biased with a high external debt stock. This composition of debt is the driving force behind the increase in liabilities and the predominantly negative net IIP. The external debt stock accounts for approximately 62 per cent of the total stock of external liabilities of Jamaica over the period 1970-2003. In 2003, the external debt stock represented 55.6 per cent of GDP. This is an indication of the dependence of the country on the global community for financial support. As a result, Jamaica is exposed to the dynamics of the macroeconomic variables of the world markets, in particular interest rates.

The analysis showed that there is positive correlation between the GDP per capita and the gross foreign asset position of Jamaica. This means that the higher the net foreign assets position the higher the GDP per capital. In addition, one can interpret this to mean that high gross foreign asset position support growth within the economy. Lane (2000) supported this conclusion as he explained that the size of the gross international investment position of a country serve as an indicator for growth.

The core result obtained from the paper involves the composition of the total foreign assets and total foreign liabilities. This stock data shows the level of indebtedness of the country, in particular the total obligation of Jamaica to other countries. This level of dependence has several implications for macroeconomic analysis. The analysis points to the fact that over the period 1970-2003, Jamaica's total external assets were insufficient to cover their total external liabilities. Table 7 provides some useful indicators of the vulnerability of the country to external shocks. Total liabilities represented approximately 139.7 per cent of GDP in 2003. In the same year, ACUMFL amounted to 75.3 per cent of GDP and projected to grow by 5.3 per cent per year. This result indicates that Jamaica is extremely indebted to external economies to maintain their growing debt stock. This level of dependence exposes the country to external shocks.

In conclusion, the stock of data computed can be used to address issues concerning Jamaica's macroeconomic development. Although the results obtained are preliminary, they serve as an

indication of the composition of the IIP of the country. The results can also be used as a benchmark for the international investment position that will be computed through surveys. The paper also encourages further work on the components of the IIP and the long-run relation between net foreign assets and other macroeconomic variables.

Appendix

1.0 Real Effective Exchange Rates[5]

Real effective exchange rates (REER) are the most frequently used indicators of fluctuations in the competitiveness of countries. This methodology provides a suitable means of analyzing the relative movements of macroeconomic indicators of costs and prices, between a country and its trading partners. In calculating effective exchange rates, it is important that an appropriate weighting system and definition of the exchange rate be employed. There are two alternative definitions of the exchange rate, the price of domestic currency in terms of a foreign currency and the price of the foreign currency in terms of the domestic currency. We will denote the price of one unit of the i^{th} trading partner's currency at time t, in terms of the domestic currency by R_{it}. The price of the domestic currency at time t in terms of the i^{th} trading partner currency will be represented by S_{it} ($S_{it} = 1/R_{it}$).

The geometric weighting system is used to compute the effective exchange rate (EER) indices:

$$EER1_t = 100\Pi(S_{it})^{w}_{i}$$

$$EER2_t = 100/\Pi(R_{it})^{w}_{i}$$

Both geometrically weighted indices EER1 and EER2 are identical. The difference arises from the definition of the exchange rate employed. As a result, of its symmetric nature, the geometric weighting system has become standard in calculating real effective exchange rates.

The construction of the above indices requires appropriate weights for each trading partner. Data from the balance of payments, in particular the data on trade in goods and services, are usually used to weight the different currencies. We can calculate both export and import indices, as well

[5] Excerpt from, Henry, Chandar (2001) *"Measuring Competitiveness in Jamaica"* working paper, Bank of Jamaica

as overall trade indices. An export-weighted index is calculated by weighting each currency by the share of exports to that country.

$$W_i^x = X_i / \sum X_i$$

where X_i = Export to country i

$\sum X_i$ = Total exports

W_i^x = Proportion of total exports to country i

Import indices are also calculated from weights generated by their share of imports to the local economy.

$$W_i^m = M_i / \sum M_i$$

where M_i = Import from country i

$\sum M_i$ = Total imports

W_i^m = Proportion of total imports from country i

The overall weight given to a particular country, W_i^t can be calculated from a simple average or a weighted average of the import and the export weights.

$$W_i^t = (W_i^x + W_i^m)/ 2$$

or

$$W_i = W_i^x V_x + W_i^m Vm$$

where

$$V_x = \sum X_i /(\sum X_i + \sum M_i)$$

and

$$V_m = \sum M_i /(\sum X_i + \sum M_i)$$

It is important to highlight that a country's exchange rate is usually expressed in terms of a major international currency such as the US dollar and bilateral rates for most currencies are not usually quoted. Thus, in most cases, bilateral rates have to be calculated. In this paper, all exchange rates obtained are linked to that United States dollar. Bilateral rates were obtained from the following relationships.

$$R_i = R_n / R_{ip}$$

$$S_i = R_{ip} / R_n$$

where

R_i = the amount of the local currency per unit of the i^{th} trading partner's currency

R_n = the amount of the local currency per US dollar

R_{ip} = the number of units of the i^{th} trading partner's currency per US dollar

S_i = the number of units of the i^{th} trading partner's currency per local currency.

It should be noted that for Jamaica, six trading partners contribute to approximately 80 per cent of its economic trade. The remaining 20 per cent of international trade is spread across many economies. Therefore, in calculating EERs, only trade weights relating to ten (10) major trading partners are used in calculating the above indices for Jamaica (Table 5).

Having established the nominal effective exchange rate the real effective exchange rate is calculated by adjusting the EER by choosing the appropriate deflators. The deflators generally used are indices of CPI, GDP deflators, wage index, wholesale and export price indices. In this exercise, the deflators chosen are wage indices, GDP deflators and the CPI. Export prices were excluded as given the contractual nature of the prices of major exports; the country is a price taker in this market. Wholesale prices, are also omitted because of data unavailability.

The wage index, GDP deflators and the CPI will be used in the calculation of the geometric indices. Imports, exports and total trade will weight the calculation of these indexes. The indices are defined thus:

Geometric Index $\qquad REER = 100\Pi(S_{it}/P_{it})^{wi}$

where:

S_{it} = an index of the price of the home currency in terms of the i^{th} trading partner's currency at time t

R_{it} = an index of the price of one unit the i^{th} trading partner's currency at time t in terms of the currency of the home country.

P_{it} = ratio of the price index of the i^{th} trading partner in period t to the price index of the home country in period t (with the same base year as that used to calculate S_{it})

w_i = normalized weight of the i^{th} trading partner's currency

2.0 Tables & Graphs

Table 1: Estimation of FDIL and FDIA using the Cumulative Flows Simple Method

Foreign Direct Investments				
Year	**Inflows**	**Outflows**	**FDIA Simple**	**FDIL Simple**
1960	64.90	37.30	37.3	64.90
1961	64.90	37.30	74.60	129.80
1962	64.90	37.30	111.90	194.70
1963	26.80	38.30	150.20	221.50
1964	24.00	39.80	190.00	245.50
1965	17.00	35.70	225.70	262.50
1966	42.80	30.60	256.30	305.30
1967	5.80	14.80	271.10	311.10
1968	120.72	-	271.10	431.82
1969	101.64	-	271.10	533.47
1970	161.41	-	271.10	694.88
1971	119.23	0.72	271.82	814.11
1972	32.05	4.43	276.25	846.16
1973	44.00	21.78	298.03	890.16
1974	64.35	41.03	339.06	954.51
1975	3.41	5.28	344.34	957.92
1976	8.25	8.80	353.14	966.17
1977	7.70	14.70	367.84	973.87
1978	11.90	38.60	406.44	985.77
1979	12.30	38.70	445.14	998.07
1980	64.90	37.30	482.44	1062.97
1981	26.80	38.30	520.74	1089.77
1982	24.00	39.80	560.54	1113.77
1983	17.00	35.70	596.24	1130.77
1984	42.80	30.60	626.84	1173.57
1985	5.80	14.80	641.64	1179.37
1986	10.40	15.00	656.64	1189.77
1987	64.60	11.10	667.74	1254.37
1988	1.90	13.90	681.64	1256.27
1989	90.30	33.20	714.84	1346.57
1990	174.90	37.00	751.84	1521.47
1991	171.20	38.00	789.84	1692.67
1992	190.40	48.00	837.84	1883.07
1993	139.20	61.30	899.14	2022.27
1994	86.50	52.70	951.84	2108.77
1995	147.40	66.30	1018.14	2256.17
1996	183.70	93.30	1111.44	2439.87
1997	203.30	56.60	1168.04	2643.17
1998	369.10	82.00	1250.04	3012.27
1999	523.70	94.90	1344.94	3535.97
2000	455.80	74.00	1418.94	3991.77
2001	613.90	89.00	1507.94	4605.67
2002	478.80	73.90	1581.84	5084.47
2003	720.70	116.30	1698.14	5805.17

$FDIL_t = Inflows_{t-1} + Inflows_t$ & $FDIA_t = Outflows_{t-1} + Outflows_t$

This methodology is used by UNCTAD to calculate the FDI stocks from the flows reported in the balance of payments data. This measure is considered a reasonable estimate for developing countries that had minimal FDI inflows and outflows before the 1960s era.

Table 2: Estimation of FDIL and FDIA using the Book Value Method

Year	Inflows	Outflows	REER_JA	REER_US	CPI_JA	CPI_US	E_RATE_JA	E_RATE_US	FDIA BVM	FDIL BVM
1970	161.41	0.00	100.00	100.00	0.90	25.48	0.83	1.20	296.98	722.46
1971	119.23	0.72	98.90	100.09	0.94	26.57	0.83	1.20	294.44	842.37
1972	32.05	4.43	106.52	106.45	1.00	27.44	0.77	1.30	321.57	927.89
1973	44.00	21.78	97.09	102.79	1.17	29.15	0.90	1.11	314.86	940.02
1974	64.35	41.03	108.47	110.69	1.49	32.37	0.91	1.10	392.82	1076.61
1975	3.41	5.28	114.27	115.59	1.75	35.32	0.91	1.10	419.08	1127.63
1976	8.25	8.80	118.55	118.12	1.92	37.35	0.91	1.10	443.59	1160.56
1977	7.70	14.70	120.75	121.33	2.14	39.77	0.91	1.10	466.53	1199.86
1978	11.90	38.60	95.82	106.95	2.88	42.81	1.41	0.71	408.79	1069.57
1979	12.30	38.70	90.01	102.48	3.72	47.64	1.76	0.57	422.70	1037.13
1980	64.90	37.30	100.15	108.83	4.73	54.07	1.78	0.56	507.63	1166.31
1981	26.80	38.30	102.67	110.32	5.34	59.65	1.78	0.56	558.71	1209.04
1982	24.00	39.80	105.21	110.55	5.69	63.33	1.78	0.56	612.35	1235.62
1983	17.00	35.70	103.01	110.27	6.34	65.36	1.93	0.52	635.20	1249.51
1984	42.80	30.60	62.14	81.72	8.11	68.18	3.94	0.25	413.77	968.82
1985	5.80	14.80	53.48	74.78	10.19	70.61	5.56	0.18	370.90	892.26
1986	10.40	15.00	61.07	81.04	11.73	71.92	5.48	0.18	438.57	977.41
1987	64.60	11.10	61.88	82.28	12.51	74.61	5.49	0.18	455.52	1056.96
1988	1.90	13.90	63.44	84.22	13.54	77.61	5.49	0.18	480.86	1083.82
1989	90.30	33.20	67.04	86.35	15.48	81.35	5.74	0.17	541.34	1201.41
1990	174.90	37.00	61.56	82.51	18.89	85.74	7.18	0.14	534.09	1322.93
1991	171.20	38.00	52.44	75.43	28.53	89.37	12.12	0.08	492.99	1380.55
1992	190.40	48.00	47.10	71.28	50.58	92.08	22.96	0.04	490.80	1495.07
1993	139.20	61.30	51.64	75.03	61.75	94.80	24.95	0.04	599.35	1713.01
1994	86.50	52.70	51.57	74.70	83.40	97.27	33.09	0.03	651.31	1791.95
1995	147.40	66.30	56.20	78.93	100.00	100.00	35.14	0.03	776.10	2040.85
1996	183.70	93.30	66.50	86.24	126.41	102.93	37.12	0.03	1011.62	2413.55
1997	203.30	56.60	75.99	92.35	138.61	105.34	35.40	0.03	1212.51	2787.83
1998	369.10	82.00	79.19	94.30	150.58	106.97	36.55	0.03	1345.60	3215.73
1999	523.70	94.90	75.89	92.67	159.55	109.31	39.04	0.03	1384.47	3683.81
2000	455.80	74.00	72.32	90.29	172.58	113.00	42.70	0.02	1393.35	4044.90
2001	613.90	89.00	70.25	88.46	184.65	116.20	46.00	0.02	1442.47	4576.97
2002	478.80	73.90	70.99	88.53	197.72	118.04	48.42	0.02	1531.55	5059.56
2003	720.70	116.30	64.18	83.47	218.12	120.72	57.74	0.02	1500.80	5490.58

$$FDIA^{*}_{t} = FDIA^{*}_{t-1}\left[\frac{reerpc_{t}}{reerpc_{t-1}}\right] + \Delta FDIA^{*}_{t}$$

$$FDIL^{*}_{t} = FDIL^{*}_{t-1}\left[\frac{reerus_{t}}{reerus_{t-1}}\right] + \Delta FDIL^{*}_{t}$$

The above methodology is outlined in Lane, Milesi-Ferretti (2000) paper on measures of foreign assets and liabilities for industrial and developing countries.

Table 3: Estimation of Portfolio Investments Assets and Liabilities using the Cumulative Flows Simple Method

Portfolio Investment				
DATE	**Inflows**	**Outflows**	**EQA**	**EQL**
1970	-	-	-	-
1971	-	-	-	-
1972	-	-	-	-
1973	-	-	-	-
1974	-	-	-	-
1975	-	-	-	-
1976	-	-	-	-
1977	-	-	-	-
1978	-	-	-	-
1979	-	-	-	-
1980	-	-	-	-
1981	-	-	-	-
1982	-	-	-	-
1983	-	-	-	-
1984	-	-	-	-
1985	-	-	-	-
1986	-	-	-	-
1987	-	-	-	-
1988	-	-	-	-
1989	-	-	-	-
1990	-	-	-	-
1991	-	-	-	-
1992	-	-	-	-
1993	-	-	-	-
1994	-	-	-	-
1995	-	-	-	-
1996	-	-	-	-
1997	5.70	-	-	5.70
1998	10.90	3.90	3.90	16.60
1999	8.60	3.70	7.60	25.20
2000	5.90	70.00	77.60	31.10
2001	69.70	39.30	116.90	100.80
2002	155.80	351.30	468.20	256.60
2003	156.00	348.00	816.20	412.60

$EQL_t = Inflows_{t-1} + Inflows_t$ & $EQA_t = Outflows_{t-1} + Outflows_t$

Table 4: Correlation between variables*

Correl(CA,dACUMFL)	44.1%
Correl(CA,dACUMCA)	99.9%
Correl(ACUMFL,ACUMCA)	90.9%
Correl(dACUMFL,dACUMCA)	43.9%
Correl(dACUMFL, GDP)	37.7%
Correl(dACUMCA,GDP)	4.9%
Correl(EXTDEBT,GDP)	-60.1%

*Note that each of the variable listed in the table are expressed as a ratio of GDP for the period 1970-2003.

Table 5: Percentage Contribution to Trade in Goods and Services by Trading Partners

Trading Parthners	Contribution to total trade in Goods and Services (%)
USA	52.9
EURO	10.8
UK	8.5
CANADA	7.3
T&T	5.0
JAPAN	4.7
NORWAY	2.0
MEXICO	1.6
VENEZUELA	1.3
GHANA	1.1
BRAZIL	0.9
RUSSIA	0.7
BARBADOS	0.6
CHINA	0.5
TURKEY	0.5
SWEDEN	0.5
KOREA	0.4
SWITZERLAND	0.4
GUYANA	0.4

Table 6: Vulnerability Indicators (per cent)

YEAR	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
EXTDEBT/GDP	87.40	89.26	74.53	61.03	52.96	51.92	51.10	54.61	61.50	51.97	55.61
EXTDEBT/Total FL	67.06	66.40	63.82	59.04	55.22	52.85	49.50	49.79	49.50	43.31	40.86
FDIL/GDP	36.50	37.07	35.69	37.00	37.74	41.80	48.14	51.73	56.80	60.48	69.31
FDIL/Total FL	28.01	27.58	30.56	35.79	39.34	42.54	46.63	47.16	45.72	50.40	50.92
Total FL/GDP	130.32	134.44	116.77	103.37	95.92	98.25	103.24	109.69	124.23	120.00	136.12
ACUMFL/GDP	99.61	95.99	83.66	66.19	62.63	64.95	70.01	68.38	69.39	61.04	73.87
ACUMCA/GDP	111.32	106.39	91.66	82.54	77.38	78.56	81.82	84.77	91.65	101.64	125.85

Table 7: Net International Position of Jamaica

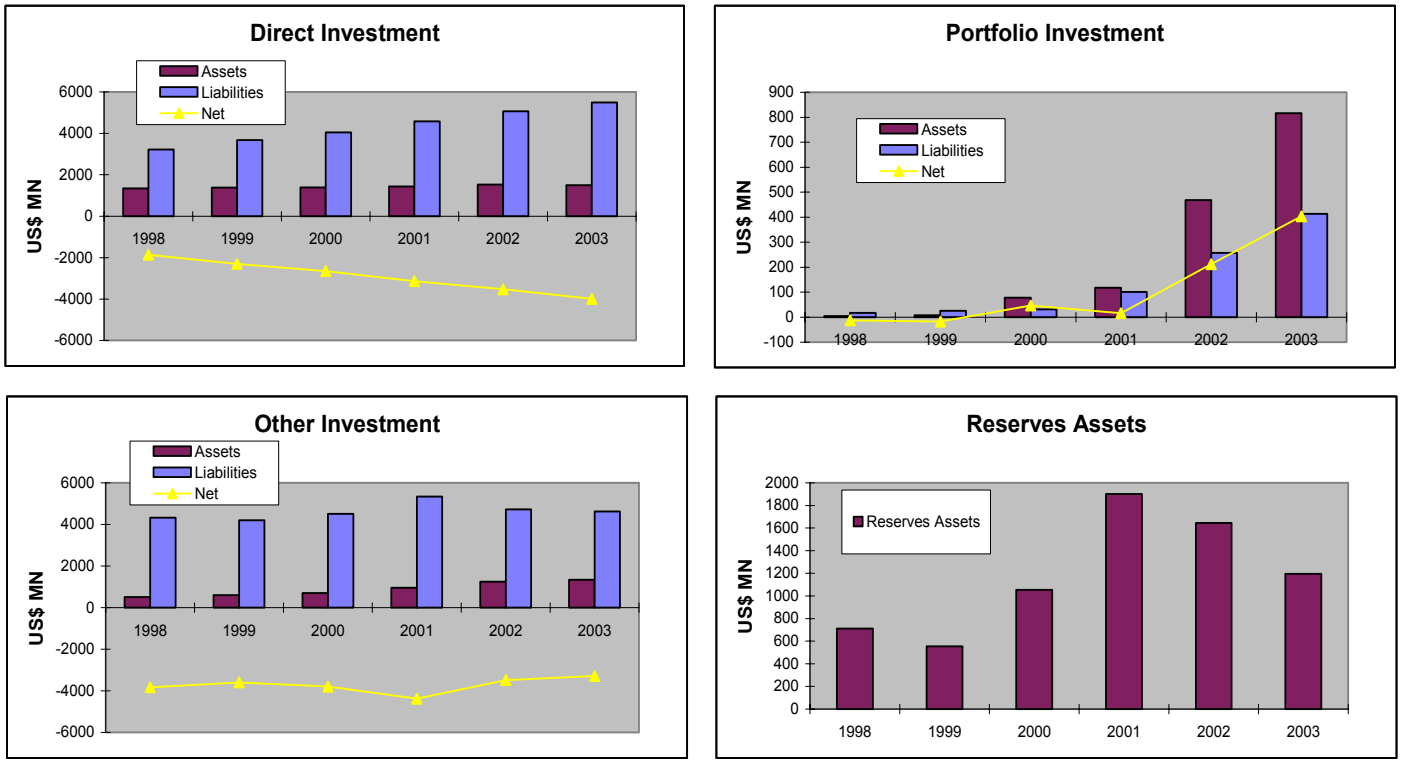
Net International Position of Jamaica US$Million						
	1998	**1999**	**2000**	**2001**	**2002**	**2003**
Assets	**2562.15**	**2542.76**	**3229.71**	**4419.57**	**4887.96**	**4848.36**
Direct Investments	1345.60	1384.47	1393.35	1442.47	1531.55	1500.80
Portfolio Investment	3.90	7.60	77.60	116.90	468.20	816.20
Financial Derivatives	0.00	0.00	0.00	0.00	0.00	0.00
Other Investments	503.20	596.17	705.07	959.66	1243.11	1336.50
Reserves Assets	709.45	554.52	1053.69	1900.54	1645.10	1194.86
Liabilities	**7558.93**	**7899.49**	**8576.33**	**10011.25**	**10038.82**	**10526.78**
Direct Investments	3215.73	3683.81	4044.90	4576.97	5059.56	5490.58
Portfolio Investment	16.60	25.20	31.10	100.80	256.60	412.60
Financial Derivatives	0.00	0.00	0.00	0.00	0.00	0.00
Other Investments	4326.60	4190.48	4500.33	5333.48	4722.67	4623.60
Net	**-4996.77**	**-5356.73**	**-5346.62**	**-5591.68**	**-5150.87**	**-5678.42**

Table 8: Regression of ΔACUMFL and the adjusted CA

Dependent Variable: ACUMFL
Method: Least Squares
Date: 09/23/04 Time: 15:02
Sample (adjusted): 1971 2003
Included observations: 33 after adjustments
ACUMFL=C(1)+C(2)*ACA+C(3)*ACUMFL(-1)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-281.44010	141.53650	-1.98846	0.05600
C(2)	0.24031	0.22984	1.04557	0.30410
C(3)	0.94622	0.03508	26.97450	0.00000
R-squared	0.962802	Mean dependent var		-3948.348
Adjusted R-squared	0.960322	S.D. dependent var		1382.988
S.E. of regression	275.4832	Akaike info criterion		14.16144
Sum squared resid	2276729	Schwarz criterion		14.29748
Log likelihood	-230.6637	Durbin-Watson stat		2.023631

Figure 5: Components of the IIP of Jamaica for the period 2003-1998



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