



THE XXIX ANNUAL CONFERENCE OF
MONETARY STUDIES

Caribbean Centre for Monetary Studies

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Central Bank of Barbados

*FOREIGN DIRECT INVESTMENT
AND
THE BARBADIAN ECONOMY*

by

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October 27 - 31, 1997

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*The authors wish to thank Dr. Delisle Worrell, Deputy Governor, Dr. Roland Craigwell, Chief Economist, Mr. Peter Whitehall, Deputy Director, Economics and Harold Codrington, Adviser to the Governor. Miss Sheryl Peter, Statistical Officer has provided invaluable assistance in the editing of this document. Any remaining errors are the sole responsibility of the authors.

Paper prepared for the XXIX Annual Conference of Monetary Studies
to be held at Hilton International, Barbados, October 27-31, 1997.

October 1997

Foreign Direct Investment and the Barbadian Economy

by

Anton Belgrave and Warrick Ward

Abstract

FDI and its impact on the Barbadian Economy.

This paper seeks to determine the impact of foreign direct investment (FDI) on the manufacturing sector in Barbados, over the decade 1985 to 1995. Analysis of this impact is carried out within Bhagwati's hypothesis that the impact of FDI is conditional on the type of trade strategy pursued by the host country. Section A presents a brief generalized history of FDI, while Section B examines Bhagwati's hypothesis in more detail. Section C looks at the modern history of FDI in various sectors of the Barbadian economy and compares the period 1977-1984 with the period 1990 to 1994. The final section presents a micro-econometric analysis of the impact of FDI on the manufacturing sector using a probit model as the tool of analysis.

Introduction

The nature and type of foreign direct investment(FDI) is a very important aspect of any economy. This paper seeks to ascertain its impact on the manufacturing sector of Barbados for the period 1985 to 1995. Although many hypotheses have been forwarded to explain the impact of FDI on developing economies, Bhagwati's hypothesis is one of the most influential. Bhagwati (1978) argues that the effect of FDI is conditional upon the trade strategy pursued by the host country, in this case, Barbados.

A historical overview of FDI flows precedes a more detailed examination of Bhagwati's hypothesis and its applicability to the Barbadian situation. A brief examination of capital flows for the period 1977 to 1984 and 1990 to 1994, is then provided. The final section presents a micro-econometric analysis of its impact on the manufacturing sector by utilizing a probit model.

Section A

A General History of Foreign Direct Investment(FDI) Flows.

Private foreign capital has long been acknowledged by historians as playing a major role in the development of the New World. However, this role was driven mainly by the performance of portfolio investment. Dunning (1970) reports that in 1914, 90% of all investment took the form of portfolio flows.

Not only were the flows of FDI relatively minor, but there were also highly concentrated both by area and by sector. The majority of the FDI flows originated in the UK and was directed to the US and Canada (Table 1). The primary extractive sectors as well as railroad systems were the major sectoral recipients of these FDI flows.

In subsequent decades the volume of FDI continued to increase and by the 1920s had reached one quarter of total private foreign investment. The Depression and the ensuing World War which followed resulted in the destruction of the world monetary system and with it a dramatic reduction in the level of both portfolio as well as direct investment. However, whereas there was a collapse in the portfolio investment, FDI proved to be more resilient and recovered slightly during the late 1930s.

Table 1

The Stock Of FDI in 1914

By Country of Origin		By Sector		By Recipient	
UK	45.5	Primary	50	US & Canada	45.8
US	16.5	Manufac.	15	West. Europe	7.7
Germany	10.5	Trade	10	Other Indust.	9.9
France	12.2	Railroads	20	L.D.C's	26.6
Other	13.3	Finance	10		

Source: Dunning and Stopford (1983).

In the immediate postwar period and the late 1950s there was virtually no borrowing by developing countries in the world capital market. The majority of financing to developing countries took the

form of direct investment, along with loans from the International Bank for Reconstruction and Development (IBRD) and the U.S. Export-Import Bank. Although there were differences from country to country, the late 1960s marked the turning point from the cleaning up of debt, to renewed commercial borrowing for most countries.

However, after 1973 there was an explosion of commercial debt financing, but this phenomenon ceased abruptly with the onset of the Mexican default in 1982. The resurgence of interest in FDI among policy makers can be attributed to the changing composition of capital flows. Amirahmadi and Wu (1994) argued that four factors have served to underpin the new consensus on FDI flows.

These were, the globalization of production by multinationals, the domestic urgency for new economic growth following the general slowdown in the 1970s, the reduction of government's availability to excess surpluses following falling oil prices in the 1970s, and the "new pragmatism" of many countries in their approach to FDI. This "new pragmatism" represents the convergence of three independent currents:

1. the decline of the "dependienca" school and the gradual recognition that foreign investors can contribute to the development of developing countries by enhancing the latter's foreign exchange earnings and becoming a vehicle for technology transfer.
2. Increased efforts to curb the growth of the state which culminated in the privatization and deregulation of state assets.
3. The demonstration effect of successful strategies followed by the Asian newly industrialized countries (NIC).

Though these trends have been advanced as the general causes for the upsurge in FDI, their ability to explain the Barbadian situation is limited. Throughout its history, Barbados, like Trinidad and Tobago, has always embraced foreign investment. The “dependencia” school has never had any significant effect on policy, and there was never any large scale nationalization of private assets.

Section B

The Impact of FDI on Economies.

Bhagwati (1978) has hypothesized that both the volume and efficacy (social returns) of incoming FDI will vary according to whether a country is following an export promoting strategy (EP) or import substituting industrialisation strategy (ISI). Bhagwati defines the EP strategy as one which equates the average effective exchange rate on exports to the average exchange rate on imports. An ISI strategy is one in which the effective exchange rate on imports exceeds the effective exchange rate on exports and is biased in favor of import substituting activities. Since our concern is with a single economy, Barbados, we merely note that the support for the volume effect has been found by Balasubramanyan and Salisu (1991).

Bhagwati argues that an ISI strategy results in a heavy reliance on tariffs and quotas on trade. This promotes distortion in product and factor markets and encourages the adoption of techniques at variance with the factor endowments of the economy. In addition to resource misallocation, an ISI trade strategy also fosters X-inefficiency (Bhagwati(1978), Kreuger(1975), Greenway and

Nam(1988)), as well as rent seeking and “directly unproductive profit seeking activities” (Bhagwati(1994)).

Balasubramanyan et al (1996) recognise the overlap between export orientation theories and the new growth theory. The concern of new growth theory is with endogenising the growth rate of GDP, which in turn requires the rate of investment to be endogenised since factor accumulation ultimately accounts for growth. The social rate of return must exceed the private rate of return. Thus, the discrepancy between the private and social rates of return occurs because individual acts of private investment add to the stock of knowledge and hence the productivity the capital stock. In addition, there are various sorts of knowledge spill-over effects and externalities which contribute to growth in aggregate (Romer(1986,1987)). Thus externalities, human capital and learning by doing form the main springs of endogenous growth theory.

Balasubramanyan (1996) argues that “many of the growth promoting factors identified by new growth theory can be initiated and nurtured through FDI. FDI has long been a major source of technology and know-how to developing countries. Indeed, it is the ability of FDI to transfer not only productive know-how, but also managerial skills that distinguish it from all other forms of investment, including portfolio capital and aid.”

Externalities have been recognised as the major benefit accruing to host countries. FDI provides an essential bridge between developed and developing countries. Knowledge and technology could spill over from foreign to indigenous firms through the training of labour and domestic management

and through links between foreign firms and local suppliers.

Most authors emphasize that FDI is most beneficial when it flows into the the tradeables sector, especially the manufacturing sector. Most of the foreign investment in Barbadian economy has, since the 1980s, been in the form of loan capital to facilitate expansion by the utilities (Appendix 3).

Bhagwati's hypothesis contains an important corollary. If an economy is oriented towards an ISI strategy then, FDI in this sector is driven by domestic policy considerations rather than fundamental economic forces. Changes in for example, tariff rates, would have a significant impact on the manufacturing sector.

Balasubramanyan et al (1996) attempt to test Bhagwati's second hypothesis, (specifically the authors test whether the partial derivative of the rate of growth with respect to FDI is higher in countries following an EP strategy than in countries following an IS strategy). However, the attempt made to quantify trade strategies is flawed. In the absence of tariff, quota and export subsidies data the authors used the import to GDP ratio as a proxy for the complexion of trade policy. However, microstates by their very nature, will have high import to GDP ratios resulting in a bias towards the classification of these states as EP. This bias can be demonstrated in the case of Barbados. The average import to GDP ratio for Barbados over 1985 to 1995 is 45.7%. However, the Maxwell Stamp data (Appendix 2) which contains effective rates of protection within the manufacturing industry, suggest that the strategy followed by Barbados should be classified as an import substituting approach.

Section C

The Impact of Foreign Investment on the Barbadian Economy.

Due to data unavailability it was only possible to provide a sectoral analysis from 1977 (Appendix 3). One dominant trait throughout the period is the concentration of foreign inflows. During the period 1977-1984, approximately 44% of all inflows was pumped into public utility companies while insurance companies and oil companies accounted for approximately 27% and 18% of total flows, respectively. The next period for which comparable information is available, is 1990-1994. The percentage of flows to the public utilities was greater during this period than the 1977-1984 period. Oil companies received the second highest level of flows during the 1990 to 1994 period, while manufacturing and tourism received relatively significant proportions. Capital investment in all other sectors was, in essence, marginal.

Sectoral Analysis

Public Utilities

Investment in public utility companies has been dominated by foreign capital over the years, especially in the area of telecommunications and electricity. According to Codrington et al (1984), during the 1950's, the electricity company, which was at that time a subsidiary of a British company, received its funding from sources in the UK. The telecommunications company was however, funded and managed by a local holding company. It was not, however, until the late 1960's, when

the telecommunications company was acquired by the Canadian firm, that there was a sustained inflow to this sector. During the 1970's, there was on average, \$5.6 million flowing into the sector annually. These funds were invested in upgrading the telephone network, and expanding services to rural areas.

During the 1980's foreign capital flows to the utilities accelerated. Between 1979 and 1984, these inflows were on average, \$38.7 million per year ,approximately 71% of total foreign inflows. The electricity invested these funds into fuel efficient plant and additional rural electrification, while the telephone Company, upgraded its network capacity

The dominance of the public utilities in attracting capital investment continued into the next decade. Between 1990 and 1994, total foreign inflows were approximately \$140.7 million (44.6%),or about \$28 million per year.

Manufacturing

Private foreign inflows in this sector began in earnest during the 1960's as policy makers followed the Lewis model, in an effort to move away from mono-crop dependence. During the mid 1960's, inflows averaged just under \$1 million annually, all of which was direct investment. The areas of concentration were in clothing, food processing and miscellaneous products. At a time where the world economy was in a healthy state there was evidence of an increased drive towards offshore production. This led to an average increase of about \$0.3 million during the five year period between

1969 and 1973. During the 1970's, the sector, which benefitted from concessions on inputs, equipment and factory space, witnessed an acceleration in foreign inflows. These inflows averaged about \$10 million per year. The sector also enjoyed a ten year tax holiday incentive, which had been increased from seven years, and tax benefits which had only applied to profits, were widened to include depreciation allowances. The manufacturing areas which had received the majority of the investment during this period, were the textiles, chemicals and food and beverages sub-sectors. The foreign investment took the form of branch investments and to a lesser extent long term loans from market sources. Foreign ownership was concentrated in the electronic components, chemicals and furniture sub-sectors. European involvement was most visible in the production of chemicals, whereas North America interests were centered around electrical and electronic component production. There was also some Caribbean presence, but this was mainly in the area of food and beverage, furniture and other miscellaneous production.

During the 1990-1994 period, though experiencing a decline in its contribution to Gross Domestic Product, the manufacturing sector continued to receive flows which were on average higher than during the previous phase. Average inflows were approximately \$8.5 million greater than over the 1977-1984 period, and accounted for roughly 19% of total capital flows during the period. FDI flows were concentrated within the food and beverage and chemicals sectors, accounting for 13.2%, and 4.7% of total FDI. Interestingly, one of the sectors which was previously a major recipient of foreign capital inflows, textiles and clothing, received negligible flows during the period. This should be taken in light of the clothing industry's remarkable decline. Currently its contribution to GDP is negligible. There were smaller receipts to the wooden furniture, the non-metallic minerals

sub-sector (includes electronic component production) and to a lesser extent basic metal products.

Tourism

Codrington et al (1984) and Watson (1974) note that during 1955 and 1976, the hotel sector, especially luxury accommodations were foreign owned. During this period there were consistent inflows, primarily from the UK and North American interests to be used for facility upgrades and construction. In the 1970's, the rapid expansion in international travel resulted in an increase in both luxury and low end accommodation. The recessionary conditions of the early 1980s resulted in this sector suffering from excess capacity. Codrington et al notes that there was on average only \$1.4 million in foreign inflows most of which constituted long term loans. The period 1990-1994 witnessed an improvement in the outlook for the tourism sector. Investment in the hotel sector was more than previously averaging \$8.3 million per year. The hotel sector received slightly more investment than the previous period, averaging approximately \$8.3 million per year. Investment during this period was however concentrated among West Coast luxury hotels which were frequented by mainly Europeans.

Section D

FDI: A Micro-analysis

Most of the previous work on FDI has either been descriptive in nature or has tried to determine the causes of FDI flows. This study differs from all other studies done on the foreign capital in

Caribbean in two ways. Rather than examine the causes of foreign investment flows, the study examines the actual impact this flow has had on the manufacturing sector in Barbados. Secondly, while Codrington's (1984) study outlines the impact of foreign capital in the Barbadian economy, this is done largely at a sectoral level. In contrast, the current study utilises individual firm data which has become available since Codrington's (1984) paper was published.

To analyze the impact of foreign investment on the manufacturing sector we looked at the influence of foreign equity on the survival rates of manufacturing firms. A binary choice probit model was utilized, in which the outcomes were defined as $I=1$ if the firm "survived" over the interval 1985 to 1995, and zero otherwise. Survival is defined with reference to the firms' names and product lines. If the firm appears in both the Barbados Industrial and Development Corporation's (BIDC) Manufacturing Directories of 1985 and 1995 it was deemed as having survived. In cases where the firm did not reappear in the 1995 BIDC directory, the 1995 Barbados Telephone Directory was used to verify the "non survival" of the firm. Similarly, if there was a modification in the enterprise's name, the product line was used to determine whether the changes were mainly cosmetic. If there was a change in both name and product line, the firm was deemed as not having survived. The combined survey resulted in a total of 254 firms.

Sectoral failure rates were analyzed in order to give a broad picture of the data. Firms were classified by sector as producers of electronics (EE), alcoholic beverages (AB), furniture (FU), chemicals (CH), food and beverages (FB), clothing (CL), construction material (CM), agricultural products (AG), general manufacturing (GM), tourism services (TS), data processing (DP), racing

services (RS), and printing and publishing (PP). However, only the larger sectors were placed in the regression model and analyzed.

Our general specification is

$$I_t = f(\Phi, V) \quad I_\Phi \leq 0 \quad (1)$$

where I_t measures the survival rates of firms, Φ denotes the percentage of foreign equity and V represents a vector of other control variables. The expected marginal effect of foreign equity is the result of our assertion that ISI is the appropriate categorization in Barbados's economic strategy. FDI in this environment should have either a negative impact or no impact on the survival rates of firms. Although the literature on "financial stress" suggests that variables such as the debt/asset ratio, profitability, the ratio of working capital to fixed capital, and the interest burden should serve as explanatory variables [Franks(1997)], this class of data was not available for the BIDC data set. Given the data available, an approach similar to Whitehall(1986) in his analysis of the Barbadian manufacturing sector was utilised

Whitehall (1986) has described the manufacturing sector in Barbados as being a pastiche of large foreign export oriented firms and smaller indigenous firms. Using these stylised facts, the variables chosen as explanatory variables are firm size, export orientation and firm concentration. We were unable to acquire data on export orientation or firm concentration from the BIDC data, but the 1985 Directory listed the percentage of foreign equity and the number of employees for each firm surveyed. This variable was used as a proxy for firm size. An employer three firm concentration ratio was also used as a proxy for firm concentration within each of our defined sectors. The general

model thus becomes,

$$I_t = f(\Phi, EMP, CONC3) \quad I_\Phi \leq 0, I_{EMP} > 0, I_{CONC3} > 0 \quad (2)$$

where the expected marginal effects are size and concentration are positive.

Table 3 catalogues the effects of firm size and industry sector on the survival patterns and an analysis of the above table reveals the following trends;

1. Firms within the electronics and clothing sectors were unusually prone to failure when compared with the other industries.
2. An increase in firm size appears to be positively correlated with survival, with the exception of the clothing and electronics industries.
3. Average foreign equity was higher in the expired firms in only two sectors, electronics and clothing. In all other sectors foreign equity was higher in surviving rather than non-surviving firms.

It can thus be concluded that the electronics and clothing sectors were anomalies, when compared to the remaining sectors. This is especially true with respect to the electronics sector. Employment in this sector was 2,983 in 1985, of which the two largest firms accounted for 1,760 of these employees. Neither of these large firms, (which were 100% foreign owned) survived the decade. The clothing sector, however, was more heterogeneous, with total employment in this sector being 2,902, and the two largest firms employing 855 workers. Like the electronics sector, the two largest firms in this industry were also 100% foreign owned and they too also failed.

Table 3**Survival and Failure Rates By Industry.**

	All	EE	FU	CH	FB	CL	CM
Average Size of Surviving Firm (number of employees)	43.9	96.8	19.85	25.21	60.73	45.2	48.8
No. of Surviving Firms	145	5	20	14	26	19	16
Average Foreign Equity (As % of total equity)	18.6	70	12.2	49	9.4	5.3	49
Average Size of Deceased-Firm (number of employees)	55.36	208.5	18.2	16.5	26.85	85.1	36.9
No. of Deceased Firms	110	12	13	6	14	24	8
Average Foreign Equity (As % of total equity)	21.91	78.75	0	44.5	0	18.1	44.5

Source: BIDC Data

Methodology and Results

In order to analyze the data presented a probit model was used. The probit model is a non-linear (in the parameters) statistical model that addresses the objective of relating the choice probability P_i to explanatory factors such that the probability remains in the zero to one interval. To develop the probit model for a discrete choice variable we will assume the existence of an index, I_i , for which

we observe a two outcomes; $I_i = 0, 1$.

Using vector notation, let

$$I_i = x_i' \beta \quad (3)$$

where x_i' represents a vector of independent variables.

One transformation which meets the criteria of a strictly increasing relationship between P_i , the probability, and I_i , is the cumulative distribution function of the standard normal random variable $N(0,1)$.

Thus

$$P_i = F(I_i) = P[z \leq I_i] = \int_{-\infty}^{I_i} (2\pi)^{-1/2} e^{-z^2/2} dz \quad (4)$$

where z is a standard normal random variable.

Unlike the usual linear statistical models considered, including the linear probability model, the parameter values of β_k , are not directly interpretable as marginal effects. Instead the marginal effects of a change in the independent variable x is given by

$$\frac{\partial P_i}{\partial x_{ik}} = \frac{\partial F(x_i' \beta)}{\partial x_{ik}} = f(x_i' \beta) \frac{\partial (x_i' \beta)}{\partial x_{ik}} = f(x_i' \beta) \beta_k \quad (5)$$

where $f(x_i' \beta)$ is the standard normal probability density function evaluated at the point $I_i = x_i' \beta$.

Maximum likelihood estimation (MLE) is used for this problem due to the discrete nature of the outcome variable and the non linear (in the parameters) functional relationship between the choice probability P_i , and the explanatory variable x_k .

Since the observed choices, y_i , are a realization of a binomial process, the probability density function is given by;

$$g(y_i) = P_i^{y_i} (1 - P_i)^{1 - y_i} \quad (6)$$

Thus, the joint probability density function of the sample of T independent observations is the product of T probability density functions $g(y_i)$ is;

$$g(y_1, y_2, \dots, y_T) = \prod P_i^{y_i} (1 - P_i)^{1 - y_i} \quad (7)$$

$$L = \prod F(x_i, \beta)^{y_i} [1 - F(x_i, \beta)]^{1 - y_i} \quad (8)$$

The idea of MLE is to chose as estimates of B, the values of b that maximize the probability of obtaining the sample that is actually observed. The resulting maximum likelihood estimates of the probit model are obtained by considering the joint probability density function of L to be a function of the unknown parameters B, assuming that the sample outcome y_i and x_i are known. The properties of maximum likelihood estimation cannot be determined unless T is large. When T is large, the maximum likelihood estimate for the probit model has a sampling distribution that is

approximately normal with mean β and a covariance matrix;

$$\text{cov}(\hat{\beta}) = (XDX)^{-1} \quad (9)$$

where X is the usual $(T \times K)$ design matrix of observations on K explanatory variables for T individuals $D = \text{diagonal}(d_1, d_2, \dots, d_T)$ is a diagonal matrix with elements

$$d_1 = \frac{[f(x_i\beta)]^2}{F(x_i\beta)[1-F(x_i\beta)]} \quad (10)$$

where $f(x_i\beta)$ and $F(x_i\beta)$ are probability density functions and cumulative distribution function of the standard normal distribution evaluated at $x_i\beta$. For large samples the probit model can be reported in the usual way with approximate standard errors and valid t statistics. The results from estimating the probit model are presented in Table 4.

Equation 1 represents the probit regression on the entire sample of 255 firms. As expected, the size proxy, (L_EMP) , adequately captures the fact that larger firms tend to have higher survival rates than smaller firms. Larger firms are often well capitalised and capable of withstanding the vagaries of the economic cycle. The three firm concentration index (3FIRM) is positive, but insignificant at conventional levels. As hypothesized, the foreign equity variable (Φ) is negative but it is also insignificant at conventional levels.

Table 4

Estimation Results

Equation Number/Sector	Coefficient				Log likelihood	No. Of Observations
	Φ	L_EMP	FIRM3	C		
Eq. 1	-0.004 (-1.497)	0.132 (2.020)	0.278 (0.999)	-0.313 (-1.300)	-170.81	255
Eq. 2	-0.001 (-0.320)	0.165 (2.369)	0.515 (1.747)	-0.522 (-2.028)	-156.0	237
Eq.3 FURNITURE	0.004 (0.526)	0.128 (0.502)		-0.159 (0.231)	-24.16	36
Eq. 4 ELECTRONICS	-0.004 (-0.681)	-0.126 (-0.719)		0.630 (0.976)	-19.302	29
Eq. 5 CHEMICALS	-0.001 (-0.122)	0.629 (1.434)		-1.211 (-0.975)	-11.121	20
Eq. 6 CLOTHING	-0.011 (-1.356)	0.105 (0.476)		-0.365 (-0.480)	-25.049	21
Eq.7 FOOD	0.775 (0.000)	0.026 (0.144)		0.116 (0.204)	-22.483	14
Eq. 8 CONSTRUCTION	0.259 (0.000)	0.329 (1.009)		-0.937 (-0.844)	-11.84	24
Eq. 9 GENERAL	-0.003 (-0.627)	0.418 (2.635)		-0.931 (-2.219)	-33.58	27

t-statistics are in brackets.

The insignificance of the foreign proportions variable was not surprising in an environment with ISI despite the advantage which foreign firms were expected to possess in terms of capital access and

management. To further the analysis, the electronics sector was removed from the sample and the equation re-estimated (Eq. 2).

The electronics sector was considered to be unusual for three reasons;

1. This sector has been dominated by large foreign owned firms. Of the 12 firms which were 100% foreign owned, average employment was 237 persons. The five firms which were locally owned or joint ventures employed on average 28 persons.
2. Despite their expected size advantage, only three of the foreign owned firms in the electronics sector survived the decade.
3. Almost all of the output from the electronics sector is exported. Removing this sector would result in an increase in the import substituting nature of the remaining sample. Provided our hypothesis is true re-estimation should result in an increase in the significance level of the foreign proportion variable.

Equation 2 reveals that re-estimating the model results in a decline in the observed significance level of the foreign proportions variable (Φ), although the variable remains negative. This is contrary to our expectations. The size proxy (L_EMP) remains stubbornly positive and significant, while there is an increase in the significance level of the concentration proxy (3FIRM).

In equations 3 to 9 the sample is disaggregated by sector and the size and concentration proxies are estimated for each sector. In all cases the foreign proportion variable (Φ) is insignificant.

The results raise a number of issues, the major one questions why the influence of foreign capital was either so muted, or negative . Several explanations have been suggested but, it is believed that Bhagwati's hypothesis provides the most plausible explanation. Much of the foreign capital which was invested in the non-electronics sector was in response to the high tariff and non-tariff barriers which were used in an attempt to promote local industrial development. This occurred especially in clothing and food and beverage sector. The period 1985 to 1995 marked a decided trend towards a reduction in tariff and non tariff barriers. This phase was capped with the introduction of the Caricom's Common External Tariff in August,1991. Firms which would previously have invested in a separate plant in each Caribbean island, would logically have consolidated their plant structure to meet regional rather than local needs. This phase can be characterized by nations moving from import substituting industrialization to export promotion.

Conclusion

This survey has in many ways, been constrained by the poverty of the available data. There was, for example an inability to obtain a similar disaggregation of employment by firm for 1995, as was the case for 1985. Additionally, although no data could be found on the percentage of product exported by each firm, or actual firm capitalisation. Enhanced data gathering is a must, if we are to establish a sound basis as to why firms survive, as well as the contribution of foreign firms to employment

growth. The lack of available micro-data presented us with a potential mis-specification problem, namely the possibility of excluded variables.

Although this paper provides support for Bhagwati's hypothesis, a number of issues need to be addressed in future versions of this paper. Our assertion that the trade strategy of Barbados should be classified as ISI would be considerably strengthened by the calculation of effective rates of exchange on imports and exports. The authors plan to incorporate these calculations in an updated version of the paper. The general applicability of our approach also needs to be addressed. One possible way to deal with this issue is to apply the same methodology in a number of different countries. If similar results are obtained this would serve to enhance the validity of our testing procedure.

Appendix 1

Distribution of Foreign Equity By Year.

Percentage of Foreign Equity(%)	Number of Firms in Year			
	1985	1989	1991	1995
1-10	0	3	7	10
11-20	2	4	5	6
21-30	4	5	4	4
31-40	8	6	11	4
41-50	12	18	14	11
51-60	3	4	3	1
61-70	0	2	1	0
71-80	1	2	2	0
81-90	0	1	0	0
91-99	1	0	0	0
100	41	38	34	50

Source: Barbados Industrial Development Corporation Directory of manufacturing Establishments.

Appendix 2

**Net Effective Rates Protection by Sector In
Barbados(1989) and Trinidad(1991).**

Sector	Percentage Rate of Net Protection	
	Imports	Exports
BARBADOS		
Food & drink	282	0
Furniture	146	5
Garments	408	6
Metal & Glass Products	187	27
Paper & Printing	179	11
Other manufactures	125	9
Average	221	10
TRINIDAD		
Food Processing	134	-18
Tobacco	69	-15
Beverages	91	-31
Clothing	250	-21
Footware	174	-15
Cosmetics	103	-17
Other Manufactures	255	-28
Average	154	-21

Source: Milner (1994) and Maxwell-Stamp (1992).

Appendix 3

Total Private Foreign Investment									
<u>Sector</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Public Utilities	2.05	1.92	1.81	9.99	61.27	26.14	53.59	26.71	n.a
Distribution (Non-oil)	0.05	0.88	2.81	1.29	0.43	0.82	0.42	(0.06)	n.a
Oil Companies	1.14	(0.03)	4.91	35.67	31.61	2.98	(0.05)	0.00	n.a
Manufacturing:	5.60	0.46	5.81	0.74	2.16	3.06	2.11	2.73	n.a
Food and Beverages	0.51	0.35	0.27	0.72	(0.08)	0.30	(1.08)	0.52	n.a
Textiles	0.29	0.00	4.49	0.00	1.31	1.17	1.61	2.19	n.a
Chemicals	4.57	0.17	1.10	0.02	0.90	1.57	1.58	0.02	n.a
Wood Furniture	0.18	(0.06)	(0.05)	0.00	0.03	0.00	0.00	0.00	n.a
Non-Metallic Products	0.04	0.00	0.00	0.00	0.00	(0.01)	0.00	0.00	n.a
Basic Metal Products	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n.a
Miscellaneous Products	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	n.a
Hotels	0.49	0.77	0.59	1.79	3.43	1.53	0.00	2.16	n.a
Real Estate	0.08	0.10	0.08	0.00	0.00	(0.02)	0.00	0.00	n.a
Sugar	n.a	n.a	n.a	n.a	n.a	n.a	1.50	n.a	n.a
Insurance	6.25	7.98	8.41	(2.72)	8.95	25.53	26.46	33.26	n.a
Total	15.66	12.08	24.42	46.76	107.85	60.04	84.04	64.81	n.a

Source: 1977- 1984: Codrington, et al (1984)

: 1990 - 1994: Balance of Payments Survey Forms (8)

Appendix 3 Con't

Total Private Foreign Investment								
Sector	1986	1987	1988	1990	1991	1992	1993	1994
Public Utilities	n.a	n.a	n.a	44.90	32.30	26.40	47.60	(10.50)
Distribution	n.a	n.a	n.a	9.16	1.74	10.63	6.58	1.20
Oil Companies	n.a	n.a	n.a	28.70	22.38	35.51	9.36	0.00
Manufacturing:	n.a	n.a	n.a	15.87	14.41	23.80	2.11	0.80
Food and Beverages	n.a	n.a	n.a	10.40	8.13	12.30	10.21	0.80
Textiles	n.a	n.a	n.a	0.00	0.00	0.00	0.00	0.00
Chemicals	n.a	n.a	n.a	4.19	4.20	3.81	2.92	0.00
Wood Furniture	n.a	n.a	n.a	0.00	0.00	6.21	0.00	0.00
Non-Metallic Products	n.a	n.a	n.a	0.00	0.00	0.00	0.00	0.00
Basic Metal Products	n.a	n.a	n.a	0.66	1.37	1.48	0.00	0.00
Miscellaneous Products	n.a	n.a	n.a	0.61	0.71	0.00	1.00	0.00
Hotels	n.a	n.a	n.a	13.21	2.10	13.30	12.79	0.00
Real Estate	n.a	n.a	n.a	0.00	0.00	0.00	0.40	0.00
Sugar	n.a	n.a	n.a	(2.40)	(2.40)	(0.80)	0.00	0.00
Insurance	n.a	n.a	n.a	0.00	0.00	0.00	0.00	(7.10)
Total	n.a	n.a	n.a	49.81	48.61	108.84	43.30	64.81

Source: 1977- 1984: Codrington, et al (1984)
: 1990 - 1994: Balance of Payments Survey Forms (8)

References

- Amirahmadi**, Hooshang and **Wu**, Weiping, "Foreign Direct Investment in Developing Countries", *Journal of Developing Areas*, Vol. 28, Number 2, January 1994.
- Balasubramanyam**, V.N. and **Salisu**, M.A.(1991), "EP, IS and Direct Foreign Investment in LCD's", *International Trade and Global Development*, (eds. A. Kockkock and L.B.M. Mennes), London: Routledge.
- Balasubramanyam**, V.N., **Salisu**, M.A. and **Sapsford**, D., "Foreign Direct Investment and Growth in EP and IS Countries", *The Economic Journal*, Number 106, pp. 92-105, January, 1996.
- Bhagwati**, J. N., "Anatomy and Consequences of Exchange Control Regimes", *Studies in International Economic Relations*, Volume 1, No 10, (1978).
- Bhagwati**, J.N., "Free Trade : Old and New Challenges", *Economic Journal*, Volume 104, pp. 231-46, (1994).
- Codrington H.** , **Worrell**, D., **Khan**, Z. and **Nurse**, L., "Private Foreign Investment in Barbados (Interim report)", Cable, V. and Persaud, H.B (Editors), *Developing with Foreign Investment*, London: Croom Helm, 1987, pp. 122-142.
- Dunning**, J. and **Stopford**, J.(1983), *Multinationals: Company Performance and Global Trends*, (London), Macmillan.

Franks, Jeremy R., "Predicting Financial Stress in Farm Businesses: An Application of the Multinomial Logit Model", University of Manchester, School of Economic Studies, Discussion Paper Series, May 1997,

Greenaway, D. and Nam, C.H. "Industrialization and Macroeconomic Performance in Developing Countries Under Alternative Trade Strategies", *Kylos*, Volume 41, 1988, pp. 32-65.

Kreuger, A., "Foreign Trade Regimes and Economic Development: Turkey", National Bureau of Economic Research, New York, 1975.

Maxwell-Stamp (1992), Trinidad and Tobago Trade Policy Study, London: Maxwell Stamp PLC

Romer, P.M., "Increasing Returns and Long-Run Growth", *Journal of Political Economy*, Vol.94, pp.1002-37, 1986.

Romer, P.M., "Growth Based on Increasing Returns Due to Specialization", *American Economic Review* (Papers and Proceedings), Volume 77, pp. 56-62, 1987.

Watson, Beverley, "Supplementary Notes on Foreign Investment in the Commonwealth Caribbean", *Working Papers*, No.1, ISER, U.W.I., 1974.

Whitehall, Peter, "Profit Variation in the Manufacturing Sector of Barbados", *Social and Economic Studies*, Volume 35, No. 4, December 1986, pp. 67-91.