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Determinants of Foreign Direct Investment and Its Impact on Economic Growth*

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Conventional empirical studies treat determinants and consequences of FDI independently. Ignoring the simultaneity between determinants and consequences of FDI, however, is very likely to lead to unreliable results. Using a simultaneous equation model, this study explicitly takes the simultaneity problem into consideration. It is shown that domestic market size and trade balance are two key determinants of FDI, though economic growth and labor cost are also important. While there are geographical differences in the impact of FDI on economic growth, in general neither modernization arguments nor dependency assertions are supported by the empirical findings.

I. Introduction

Since the early 1980s, the changing international economic and political environment has led to a renewed interest in the relative merits of foreign direct investment (FDI) as means whereby less developed countries (LDCs) can achieve a reasonable rate of economic growth. On the one hand, many LDCs face increasingly formidable difficulties – rising inflation, snowballing foreign debt as well as falling growth rate – and thus claim that more resources from the North is needed to resume the impetus of economic growth and to eradicate poverty in the South. On the other hand, beset by their own economic problems such as recession and unemployment, the so-called "aid fatigue" syndrome

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has been growing steadily in the donor countries. This leads directly to questioning about the effectiveness of official development assistance (or, aid) and the amount required to meet the development needs in LDCs. In the recent North-South dialogues, the North, in particular the United States, rejected the claim of LDCs and took the position that massive increase in aid were neither practical nor the best means of ensuring sustained economic growth in the South. Instead, they emphasize the importance of a free market system and private capital flows. Against this background as well as the fact of rapidly declining commercial bank lending, more and more development economists and officials of international agencies believe that FDI will be a more reliable financial source for LDCs in the future (IMF, 1985; Balasubramanyam, 1986).

While the potential importance of FDI in LDCs' development process is getting appreciated, two fundamental issues concerning FDI remain unresolved. In the first place, what are the determinants of FDI? Specifically, from a LDC's point of view, are there factors under the control of the host country that can be manipulated to attract FDI? Or, as some researchers claim that, by and large, LDCs play a relatively passive role in determining the direction and volume of FDI (Riedel, 1987). This is the question about the demand side determinants (or host country factors) of FDI, which are widely discussed in the literature.[1] Secondly, does FDI really contribute to attaining the object of economic growth in the host country as argued by the proponents of the modernization approach? Or, as the dependency theorists assert that FDI, although may spur short-term economic growth, will generate and accelerate internal distortions and contradictions and ultimately depress or even retard the host country's economic growth. This is the question concerning the consequences of FDI. It has stimulated a vast amount of research and generated much debate between modernization and dependency theorists since the early 1970s.

Given the practical importance of these two issues in terms of policy making, empirical works about the "determinants" of FDI and its "consequences" have proliferated in recent years. A salient feature of these empirical works is that most of them specify and estimate a single equation model.[2] In other words, these studies implicitly treat the deter-

[1] There are also supply side determinants or firm specific factors of FDI (Ragazzi, 1973; Dunning, 1973, 1980; Agarwal, 1980). Since the supply side factors are beyond the control of LDCs, they are not investigated in this study.

[2] Some authors use a simultaneous equation model to study the impact of FDI on economic growth, but they focus on the interdepenedence between economic growth and

minants and the consequences of FDI as two utterly independent issues. This approach, while useful as a first approximation in understanding the two issues, is deficient in the sense that variables considered exogenous in the analysis may be in fact endogenous. Higher growth rate may attract more FDI, which fosters higher growth rate, and so on. Failure to capture the interdependence of the determinants and the consequences of FDI ordinary least squares (OLS) estimates of a single regression equation are very likely to be biased and inconsistent. Interestingly, as the empirical works are surveyed and compared, we find that almost all the studies concerning the determinants of FDI take the host country's rate of economic growth to be a crucial factor attracting FDI. At the same time, and by definition, all the studies about the consequences of FDI include flow and/or stock of FDI among the explanatory variables for economic growth. It is therefore evident that, not only can the inflow of FDI affect the host country's economic growth, but economic growth can in turn affect the direction and volume of FDI. This finding suggests that the simultaneity between the determinants and the consequences of FDI should not be dismissed casually. Because of his deficiency, the empirical results obtained in a single equation model becomes questionable.

The primary purpose of this paper is to explicitly take the simultaneity problem into consideration by specifying and estimating a simultaneous equation model in which inflow of FDI and rate of economic growth are jointly determined. This way it is hoped that more reliable conclusions of the determinants of FDI and its impact on economic growth can be obtained. Besides, as all the single equation studies have covered time periods only up to the 1970s, this paper will incorporate the data of the 1980s into the analysis to see whether the results have changed over time. Finally, the paper will for the first time test the cheap labor cost hypothesis using cross-country data, which is theoretically more appropriate than using time series data of a specific country (Tsai, 1991).

The rest of the paper is organized as follows. Section II presents a two-equation model. Section III briefly discusses the data used and reports the empirical results. Section IV gives summary and conclusions.

rate of savings, which is not the major concern of this paper. See, for example, Over (1975), Gupta and Islam (1983), and Rana and Dowling (1988).

II. The Model

The preceding discussion points out the potential simultaneous equation problem in a single equation model. To overcome this problem, let us consider the following two-equation model:

$$(1) \quad PCFDI = a_{11} + a_{12}PCGDPGR + a_{13}PCGDP + a_{14}PCTB + a_{15}NW + \varepsilon_1$$

$$(2) \quad PCGDPGR = a_{21} + a_{22}(PCFDI/PCGDP) + a_{23}GDSGDP = a_{24}EMPLGR + a_{25}FDISGDP + a_{26}EXGR + a_{27}(PCFDI/PCGDP)\times D(i) + a_{28}(PCFDI/PCGDP) \times D(i+1) (\text{or } a'_{27}FDISGDP\times D(i) + a'_{28}FDISGDP \times D(i+1)) + \varepsilon_2, \; i = 1, 3,$$

where

PCFDI = per capita FDI,
PCGDP = per capita gross domestic product,
PCGDPGR = annual growth rate of PCGDP,
PCTB = per capita trade account balance,
NW = nominal hourly rate of pay in manufacturing sector,
GDSGDP = gross domestic savings as proportion of GDP,
FDISGDP = stock of FDI as proportion of GDP,
EMPLGR = rate of growth of employment,
EXGR = rate of growth of real exports,
D(1) = high income LDCs, PCGDP exceeds US$1300 in 1975-1978 (US$1500 in 1983-1986), dummy variable,
D(2) = median income LDCs, PCGDP lies between US$600 and 1300 in 1975-1978 (US$700 and 1500 in 1983-1986), dummy variable.
D(3) = African LDCs, dummy variable,
D(4) = Asian LDCs, dummy variable,
ε_1, ε_2 = stochastic disturbance terms.

Superficially, the model just puts together two single equations which are rather familiar in the literature of FDI. The economic implications are quite different from those of the single equation models, however. In the simultaneous equation model, both PCGDPGR and PCFDI are endogenous variables. PCGDPGR can affect PCFDI via

equation (1), but PCFDI can in turn affect PCGDPGR via equation (2). The interdependence of PCFDI and PCGDPGR does not exist in a single equation model where either PCFDI or PCGDPGR is treated as exogenous. As noted above, neglecting the interdependence may result in biased and inconsistent estimates. Accordingly, the model consisting of (1) and (2) is more appropriate in capturing the underlying relationship among variables from the point of view of both economic theory and statistical investigation.

Now let us examine the model more closely.

A. The Determinants Equation

Equation (1) includes most of the frequently mentinoed, quantifiable demand side determinants of FDI.[3] The variables PCGDP and PCGDPGR stand respectively for the market size hypothesis and the growth hypothesis.[4] The market size hypothesis stresses the necessity of large market size for efficient utilization of resources and exploitation of economies of scale. As the market size grows to some critical value, the hypothesis asserts that FDI will start and increase thereafter with the expansion of the market size (Scaperlanda and Mauer, 1969; Torrisi, 1985). Moreover, PCGDP can be used to capture the influence of proven economic performance. The higher value of PCGDP implies, in addition to greater domestic market, better infrastructure and hence provides greater incentive for FDI. The growth hypothesis postulates a positive relationship between PCFDI and PCGDPGR.[5] The argument goes like this: a rapidly growing econmy provides relatively better opportunities for making profits than the ones growing slowly or not growing at all (Lim, 1983). Thus an impressive rate of economic growth will be taken as a favorable signal by international investors in making investment decisions.

3 Admittedly, there are noneconomic, qualitative factors such as political stability and incentive policies that are of vital importance in determining FDI. The difficulties and controversies in defining and quantifying these variables prevent the paper from including them in the analysis. Root and Ahmed (1979) use discriminant analysis to avoid problems in regression analysis, yet they still have to face the problem of assigning categorical index to each qualitative variable.

4 The per capita values of FDI, GDP and trade balance are used to eliminate possible biases caused by difference in population size in a cross-country study, which could be crucial to the empirical results as noted by Root and Ahmed (1979).

5 This is the way the growth hypothesis traditionally formulated. Criticisms of the formulation do exist (Scaperlanda and Mauer, 1969; Goldberg, 1972). Since the formulation is so popular in the literature that it is followed in this paper.

The relation between trade balance (PCTB) and FDI is rather complex and there are diverse predictions about this relationship.[6] However, I would approach this relationship from another aspect. There is a growing realization that little of the incentives offered by LDCs appear to have been effective in attracting FDI. Among the explanations of the inefficacy, the one posed by the political scientist Earl H. Fry is of particular interest. Having conducted a variety of field surveys and visited relevant officials in numbers of LDCs, Fry (1983) concludes that administrative procedures concerning investment is of utmost importance in determining FDI in LDCs. He observes that generous and numerous incentive policies themselves are immaterial and, as a matter of fact, irrevalent to a country's attitude toward FDI. As long as a country regards FDI as unfavorable politically or economically, it can create so much red tape during the investment process as to deter virtually all FDI despite of the generousness of the incentives. Conversely, whenever a country is eager to woo FDI, it can always give expediential considerations, streamline the administrative procedures and beome more flexible in the enforcement of regulations.[7] Following Fry's view, along with the argument of the two-gap model that foreign exchange is one of the key constraints on economic growth in LDCs, it is not difficult to understand the relation between trade balance and FDI. When a country faces growing trade deficits, it is expected to adopt more favorable policies to facilitate inflow of FDI.

The variable NW is included to reflect the cheap labor cost hypothesis. The importance of cheap labor cost in attracting FDI into LDCs is agreed upon by dependency as well as modernization proponents, though with very different implications. While the theoretical aspect of the hypothesis is well articulated, to the knowledge of the author there are no cross-country studies for lack of proper labor cost information.[8]

6 It is argued, on the one hand, that mounting trade deficits are likely to stimulate FDI for a desire for export diversification and a shift toward import substitution strategies; on the other hand, trade surpluses may be indicative of a dynamic, healthy economy and thus encourage more FDI (Torrisi, 1985).

7 Torrisi (1985) finds that, during 1958-1985, Colombia did have more favorable treatment of FDI and become more flexible in the enforcement of the restrictive Andean Foreign Investment Code whenever there were negative trade performance. Tsai (1991) also points out that the amount of approved FDI in Taiwan soared in the years right after Taiwan's being expelled from the United Nations in 1972 and the death of President Chiang Kai Shek in 1975. Both give evidence of administering FDI for economic or political purpose.

8 Riedel (1975) makes use of the data of FDI coming into Taiwan from U.S.A., Japan and Hong Kong to test the cheap labor cost hypothesis. However, as argued in Tsai

B. The Growth Equation

The growth equation is derived from a neoclassical aggregate production function comprising exports.[9] There are reasons to include the export variable in the growth equation. It is well documented that trade, especially exports, may increase competition, permit the realization of comparative advantage, enable countries to purchase goods from abroad, and provide opportunities to gain access to new technology as well as new managerial knowledge (Voivodas, 1973; Tyler, 1981; Ram, 1985; Rana and Dowling, 1988; Otani and Villanueva, 1989). There may be also "virtuous policy circle" linking exports and government policies, which is put forward recently by Krueger. Based on the experiences of the East Asian superexporters, Krueger argues that "a successful export oriented set of trade policies forces adoption of other efficient and growth-enhancing liberalization policies. Those polices permit further gains to be realized from the trade strategy, and simultaneously induce further growth." (Krueger, 1990). Thus, the view that exports play a preponderant role in determining growth in LDCs seems to have strong support.

The impact of FDI on economic growth is one of the most controversial topics in development economics. According to the modernization hypothesis, FDI promotes economic growth by providing external capital, and, through growth, spreads its benefits throughout the economy. It is the presence, rather than the origin of investment that is considered to be important. Moreover, FDI usually brings with it advanced technology, and better management and organization. FDI is, in fact, the other "engine" of growth in LDCs. Contrary to the modernization hypothesis, the dependency hypothesis, while admitting a possible short-term positive impact of the flow of FDI on economic growth, insists that there is a deleterious long-term impact of FDI on economic growth as reflected in the negative correlation between the stock of FDI and growth rate. In the short run, any increase in FDI enables higher investment and consumption and thus creates directly and immediately economic growth. However, as FDI accumulates and foreign projects take hold, there will be adverse effects on the rest of the economy that reduce economic growth. This is due to the intervening mechanisms of dependency, in particular, "decapitalization" and

(1991), using a specific country's time series data instead of cross-country data in the regression analysis is not consistent with the cheap labor cost hypothesis. The problem also exists in the empirical works surveyed in Agarwal (1980).

[9] The derivation is a routine exercise (see, e.g. Gupta and Islam, 1983; Ram, 1985) and is available from the author.

"disarticulation" (lack of linkages) (Stoneman, 1975; Bornschier, 1980; O'hearn, 1990).[10]

Some economists have suggested that political, social and cultural factors play crucial roles in determining the growth performance of a country. Others have argued that the impact of FDI on economic growth might vary across countries because of different stages of development. Each of these arguments has been examined from time to time since Papanek (1973) as long as the sample size is large enough to allow disaggregated studies for different geographical groups and groups with different stages of development (Stomeman, 1975; Bornschier et al., 1978; Jackman, 1982; Gupta and Islam, 1983). As an attempt to discriminate the impact of FDI on economic growth among various groups of countries, this paper uses dummy variables D(1), D(2), D(3) and D(4) to capture the difference in regions or stages of development.

From the discussions so far, the expected signs for the coefficients of PCGDPGR and PCGDP are positive, whereas those of PCTB and NW are negative. In the growth equation, the coefficients of PCFDI/PCGDP and FDISGDP denote respectively the short-term and long-term impact of FDI on economic growth. According to modernization hypothesis, both should be positive. But dependency hypothesis would expect the coefficient of FDISGDP to be negative and that of PCFDI/PCGDP to be uncertain. Finally, the variables GDSGDP and EMPLGR are so standard in a production function that it is unnecessary to repeat the rationale of including them. As usual, the coefficient of GDSGDP is expected to be positive. The meaning of the coefficient of EMPLGR needs some explanations. It is the elasticity of GDP with respect to employment minus one. Although the elasticity itself should be positive, there is no information about how large it is. The sign for the coefficient of EMPLGR is, therefore, uncertain. As far as the parameters a_{27}, a_{28}, a'_{27} and a'_{28} are concerned, they denote the difference in the impact of FDI on economic growth among different regional groups and groups with different stages of development. Again, their signs can not be specified a priori.

III. The Empirical Results

Most of the data used in the analysis are from the publications of

10 Stoneman (1975) coins the terms "balance of payments effect" and "structure effect" to distinguish the short-term and long-term impacts of FDI on growth.

International Monetary Fund (IMF) and World Bank; the details of data sources are provided in Appendix A. Two time periods are covered, 1975-1978 and 1983-1986, which stand for the seventies and the eighties respectively.[11] The sample size for each period is determined exclusively by the availability of the data. There are 62 countries in the seventies and 51 in the eighties (Appendix B). To eliminate short-term fluctuations, all the data are calculated as the arithmetic average of each period.

The model specified in the previous section is a nonlinear simultaneous equation model. A nonlinear two-stage least squares (SYSNLIN 2SLS) procedure of the Statistical Analysis System (SAS) is employed to estimate the parameters. The estimation results with the variable NW dropped from the model are presented in Tables 1 and 2.[12] Since the R^2 defined for the 2SLS does not have the usual interpretation of R^2 as the proportion of variance explained by the regression, I will concern myself with the coefficients estimates only.[13]

Comparing Table 1 and Table 2 reveals a number of interesting observations:

(i) The results of the determinants equation are quite satisfactory. For the eighties (Table 2), all the coefficients are correctly signed and statistically different from zero. The fact that the coefficient of PCGDPGR is statistically significant confirms the existence of simultaneity problem. Comparing across equations (1), (1a), (1b), (1c) and (1d) of Table 2, we find that the coefficients of PCGDP and PCTB stay the same and that of PCGDPGR is rather stable. Consequently, the results for the eighties are quite robust. Both the market size and the growth hypotheses are supported by the present study. The significant negative correlation between PCFDI and PCTB indicates that a deterioration of the trade balance does, as expected, lead a country to adopting more liberal policies toward FDI.

For the seventies, the results are not very different from those of

[11] The years before 1975 and 1979-1982 are excluded for being affected by oil crises which are essentially exogenous shocks to the world economy.

[12] NW is dropped because of too many missing values on this variable. If NW is included, the sample size reduces to 34 for the seventies and 27 for the eighties. While it is tempting to pool the data of the seventies and the eighties, the procedure is rejected by Chow test, showing that pooling the data of the two periods might be illegitimate (See p. 167 of Gupta and Islam, 1983, for the application of Chow test in this context). However, NW is such an important determinant of FDI that the results with NW are reported in Appendix C.

[13] For properties of R^2 defined for 2SLS, see Intriligator (1978), p. 392.

Table 1

DETERMINANTS OF FDI AND ITS IMPACT ON ECONOMIC GROWTH
(1975-1978, N = 62[a])

Explanatory Variables	(1)	(2)	(1a)	(2a)	(1b)	(2b)	(1c)	(2c)	(1d)	(2d)
Constant	-8.39	2.10	-4.52	2.50	-13.20	2.21	-7.51	2.75	-14.14	1.99
	(-0.56)	(1.69)*	(-0.30)	(1.68)*	(-0.97)	(1.67)*	(-0.53)	(1.92)*	(-1.05)	(1.60)
PCGDPGR	-0.64		-1.77		0.76		-0.90		-1.03	
	(-0.20)		(-0.55)		(0.28)		(-0.31)		(0.39)	
PCGDP	0.02		0.02		0.02		0.02		0.02	
	(3.86)**		(3.77)**		(3.92)**		(3.84)**		(3.92)**	
PCTB	-0.04		-0.04		-0.04		-0.04		-0.04	
	(-5.51)**		(-5.41)**		(-5.56)**		(-5.49)**		(5.55)**	
FDIGDP[b]		-0.23		-1.49		-0.66		-0.62		-0.52
		(-0.28)		(-0.69)		(-0.50)		(-0.86)		(-0.59)
GDSGDP		-0.01		-0.01		-0.01		-0.01		-0.001
		(-0.14)		(-0.24)		(-0.28)		(-0.31)		(0.03)
EMPLGR		0.05		0.08		0.23		0.12		0.16
		(0.50)		(0.51)		(1.58)		(1.17)		(1.54)
FDISGDP		-0.005		-0.003		0.006		-0.09		0.006
		(-0.29)		(-0.16)		(0.32)		(-0.84)		(0.34)

Table 1 (Continued)

Explanatory Variables	(1)	(2)	(1a)	(2a)	(1b)	(2b)	(1c)	(2c)	(1d)	(2d)
EXGR		0.16		0.17		0.14		0.16		0.15
		(2.96)**		(2.94)**		(2.39)**		(2.66)**		(2.65)**
FDIGDP1[c)]				0.97						
				(0.57)						
FDIGDP2				1.06						
				(0.68)						
FDIGDP3						−1.58				
						(−1.28)				
FDIGDP4						0.52				
						(0.43)				
FDISGDP1								0.09		
								(0.88)		
FDISGDP2								0.06		
								(0.56)		
FDISGDP3										−0.08
										(−1.70)*
FDISGDP4										0.05
										(0.50)
R^2	0.39	0.18	0.36	0.15	0.40	0.20	0.38	0.15	0.40	0.22

Notes: a) N stands for sample size. b) FDIGDP stands for PCFDI/PCGDP.
c) FDIGDP1, FDIGDP2, FDIGDP3 and FDIGDP4 are equal to (PCFDI/PCGDP) times D1, D2, D3 and D4; similarly for FDISGDP1-FDISGDP4.
d) The numbers in parentheses are asymptotic t-statistics; * and ** indicate significantly different from zero at 10% and 1% levels, respectively.

Table 2

DETERMINANTS OF FDI AND ITS IMPACT ON ECONOMIC GROWTH
(1983-1986, N = 51)

Explanatory Variables	(1)	(2)	(1a)	(2a)	(1b)	(2b)	(1c)	(2c)	(1d)	(2d)
Constant	−17.18	−1.53	−16.03	−1.93	−17.01	−1.27	−17.84	−3.26	−16.38	−2.02
	(−1.53)	(−0.95)*	(−1.50)	(−1.32)	(−1.54)	(−0.82)	(−1.57)	(−1.78)*	(−1.54)	(−1.24)
PCGDPGR	6.04		5.44		5.95		6.38		5.62	
	(2.36)*		(2.26)*		(2.42)*		(2.63)**		(2.49)*	
PCGDP	0.01		0.01		0.01		0.01		0.01	
	(2.37)**		(2.44)*		(−2.39)*		(2.34)*		(2.43)*	
PCTB	−0.05		−0.05		−0.05		−0.05		−0.05	
	(−3.19)**		(−3.40)**		(−3.22)**		(−3.08)**		(−3.34)**	
FDIGDP		1.16		4.17		1.06		0.80		1.40
		(0.79)		(1.40)		(0.32)		(0.63)		(0.88)
GDSGDP		0.15		0.16		0.11		0.21		0.15
		(1.76)*		(2.13)*		(1.33)		(2.36)*		(1.79)
EMPLGR		−0.11		−0.13		−0.11		−0.15		−0.10
		(−0.59)		(−0.78)		(−0.68)		(−0.83)		(−0.53)
FDISGDP		−0.02		−0.02		−0.04		0.27		−0.03
		(−0.58)		(−0.49)		(−0.71)		(1.68)*		(−0.83)

Table 2 (Continued)

Explanatory Variables	(1)	(2)	(1a)	(2a)	(1b)	(2b)	(1c)	(2c)	(1d)	(2d)
EXGR		−0.004 (−0.28)**		−0.008 (−0.67)		−0.02 (−1.18)		−0.002 (−0.18)		−0.001 (−0.61)
FDIGDP1				−3.49 (−1.29)						
FDIGDP2				−2.92 (−1.05)						
FDIGDP3						4.50 (1.74)*				
FDIGDP4						0.55 (2.20)				
FDISGDP1								−0.29 (−1.91)*		
FDISGDP2								−0.23 (−1.54)		
FDISGDP3										0.15 (1.57)
FDISGDP4										−0.01 (−0.31)
R^2	0.13	0.20	0.22	0.41	0.15	0.38	0.08	0.26	0.19	0.25

Notes: See Table 1.

the eighties. The coefficients of PCGDP and PCTB are correctly signed, statistically significant different from zero and remain the same in equations (1), (1a), (1b), (1c) and (1d) in Table 1. Like the eighties, market size and trade balance are important determinants of FDI in the seventies. While the coefficient of PCGDPGR is not always positive, none of the estimates is statistically different from zero at 10% level. Thus the results of the seventies fail to support the market growth hypothesis. It also suggests that, for the seventies, simultaneity might not be a serious problem.

(ii) There are striking differences between the factors affecting economic growth in the seventies and those of the eighties. While rate of export growth is the preponderant factor for economic growth in the seventies, it is domestic savings that are responsible for economic growth in the eighties.[14] The importance of the export variable in the seventies reaffirms the findings of most other researchers (Ram, 1985). For the eighties, however, there is no existing empirical study which is directly comparable to what we obtained. Otani and Villanueva (1989) find that both domestic savings and export growth are significant determinants of economic growth for a sample of 55 LDCs. Since their study covers the period 1970-1985, including both periods of this study, the results here are not inconsistent with theirs.

As for the coefficients of FDIGDP and FDISGDP, the signs are generally congruous with the expectation of dependency theory. However, they are not significant for the whole sample in each period (Tables 1 and 2, equation (2)). Therefore, neither the flow nor the stock of FDI exercises significant influence on economic growth in both periods of time. In other words, neither the modernization nor the dependency hypothesis receives support from the empirical results. This finding is similar to that of Voivodas (1973) and Riedel (1987), but at variance with what obtained by authors such as Stoneman (1975), Bornschier et al. (1978), Bornschier (1980, 1981) and Jackman (1982).

(iii) As revealed in equations (2a) and (2c) of Table 1, different stages of development seem not to affect the long-term and short-term impacts of FDI on economic growth in the seventies. In the eighties,

[14] It is worth noting that the insignificance of the coefficient of EMPLGR means that the elasticity of GDP with respect to employment is not significantly different from one. But this does not imply that the elasticity of PCGDP with respect to employment is significantly different from zero. Therefore, no inference about the influence of employment on economic growth (in terms of per capita GDP) can be drawn directly from the statistical results.

however, both short-term and long-term contributions of FDI on economic growth tend to be lower in the more developed, richer LDCs as compared to the least developed ones (equations (2a) and (2c) of Table 2). The tendency is particularly strong in the long run context. In fact, for the group of the least developed countries in the eighties, FDI has positive long-term impact on economic growth which is statistically different from zero (Table 2, 2(c)), a result predicted by modernization theorists.

(iv) There are some differences among geogrpahical regions in LDCs with respect to the impact of FDI on economic growth. From equations (2b) and (2d) of Table 1, we find that in the seventies the impact of FDI on economic growth is basically the same in Asia and Latin America, no matter in the short run or in the long run. Nevertheless, compared to Latin America, FDI does have unfavorable impact on economic growth in Africa, especially in the long run. While the difference between Asia and Latin America once again is insignificant in the eighties, the difference between Africa and Latin America persists, but in exactly opposite direction to that of the seventies ((2b) and (2d) of Table 2). In the eighties, FDI contributes more to economic growth in Africa than in Latin America, especially in the short run. It can be concluded that only in Africa the impact of FDI on economic growth is different from other regions. But the difference changes over time. During the seventies the empirical results tend to support the arguments of dependency theory, however, they favor the modernization hypothesis in the eighties.

It is alluded to in the preceding section that the cheap labor cost hypothesis is so theoretically compelling and well accepted in the literature that one can hardly afford discarding it. A model including the variable NW is thus estimated. The results are listed in Tables C1 and C2 of Appendix C. The most devastating consequence to include NW is the large amount of missing value on the variable, resulting in decrease in almost half of the sample size in each period. As shown in Tables C1 and C2, the decrease in sample size does affect the estimation results. However, the results are not as perverse as one might expecct. In both periods, the coefficients of the determinants equation are all correctly signed. Barring the coefficient of PCGDPGR, all other coefficient of the eighties are statistically significant. But the coefficient of PCTB is the only one significantly different from zero for the seventies. While we have to be very cautious in interpreting the results, the information in Tables C1 and C2 does lend credence to the cheap labor cost hypothesis. The coefficient of NW is negative in both periods and is significantly different from zero in the eighties. Thus in-

crease in nominal wage rate tends to discourage inflow of FDI. To the knowledge of the author, this is the only statistical test of the cheap labor cost hyothesis using cross-country data, which is more consistent with the hypothesis as pointed out in note 8.

IV. Summary and Conclusions

The primary intent of this paper is to test some popular hypotheses of demand side determinants of FDI and to see how FDI affect economic growth in the host countries. The potential simultaneity problem between FDI and rate of economic growth is emphasized so that a simultaneous equation model is set up to perform empirical analysis. Although the simultaneity problem seems not serious in the seventies, it does show up in the eighties. Consequently, for the eighties at least, the results of the simultaneous equation model are more reliable than those obtained in a single equation analysis.

Generally speaking, the market size hypothesis receives stronger support than the growth hypothesis. This is consistent with the findings of most of other researchers. The results about the role of trade balance in affecting the inflow of FDI is quite robust. In both time periods, deteriorating trade balance tends to result in more favorable attitude toward FDI as claimed by Fry (1983) and Torrisi (1985). Though only with somewhat limited observations, the empirical results concerning the cheap labor cost hypothesis is encouraging and informative. Increase in nominal wage does discourage FDI as expected, particularly in the eighties. This is the first time that the cheap labor cost hypothesis is tested using cross-country data.

Factors affecting economic growth appear to change over time. Rate of export growth is the key factor for economic growth in the seventies, but it is domestic savings that are mainly responsible for economic growth in the eighties. As far as the impact of FDI on economic growth is concerned, neither the modernization nor the dependency hypothesis is supported by this study. While the impact of FDI on economic growth in Africa differs from that in Asia and Latin America, the difference is in exactly opposite directions in the seventies and the eighties. Compared to Latin American (and Asian) countries, the experience of African counties in the seventies confirms the assertion of the dependency theorists. By contrast, in the eighties the African experience is more in agreement with the prediction of the modernization proponents. To sum up, the findings of this paper suggest that the impact of FDI on economic growth might be overstated.

And, the debate between modernization and dependency theorists seems to be unnecesary, or it might be more ideological than practical.

Appendix A

The Sources of Data and the Definition of the Variables Used

The major sources of data in this study are: (1) International Financial Statistics, IMF, 1988; (2) World Tables, World Bank, 1987; (3) Taiwan Statistical Data Book, Council for Economic Planning and Development, Executive Yuan, ROC, 1988. All the data for Taiwan come from (3) unless otherwise noted. Variables expressed in monetary unit are in terms of U.S. dollars in 1980.

1. FDI: flow of direct foreign investment, adopted from *Balance of Payments Statistics Year Book,* IMF, 1988. Unit: million dollars.
2. PCFDI: per capita FDI, which equals to FDI divided by total population. Total population for each country comes from (1). Unit: dollar.
3. GDP: gross domestic product, from (1). Unit: million dollars.
4. PCGDP: per capita GDP, which equals to GDP divided by total population. Unit: dollar.
5. PCGDPGR: annual growth rate of PCGDP. Unit: %.
6. PCTB: per capita trade account balance, adopted from (1) and (2). Unit: dollar.
7. NW: nominal hourly rate of pay in manufacturing sector, calculated from *Year Book of Labor Statistics,* International Labor Organization, Geneva, 1981 and 1987 and Statistical Yearbook, United Nations, 1983/84. Data for Taiwan come from *Monthly Bulletin of Earnings and Productivity Statistics,* Taiwan Area, ROC, July 1989. Unit: dollar.
8. FDIGDP: PCFDI divided by PCGDP. Unit: %.
9. GDSGDP: average propensity to save, which is equal to gross domestic savings divided by GDP, data for gross domestic savings come from (1) and (2). Unit: %.
10. EMPLGR: rate of growth of employment, calculated from (2). Unit: %.

11. FDIS: stock of foreign direct investment, adopted from John Dunning and John Cantwell: *Statistics of International Investment and Production,* Institute for Research and Information on Multinationsls, New York University Press, 1987, and *Transnational Corporations in World Development,* United Nations, 1983. For countries not available from the above two sources, their FDIS are estimated by acumulating the flows reported in *Balance of Payments Year Books,* IMF, various issues. Unit: million dollars.
12. FDISGDP: FDIS as proportion of GDP. Unit: %.
13. EXGR: rate of growth of real exports, calculated from data of (1) and (2). Unit: %.

Appendix B

List of Sample Countries

A. The Seventies: Income Groups

Low Income (PCGDP<$600)	Median Income ($600<PCGDP<$1300)	High Income (PCGDP>$1300)
Malawi*	Liberia*	Malaysia
Mali*	Jordan	Ghana*
Sri Lanka	Bolivia	Jamaica
Haiti	Botswana	Panama
Pakistan	Zambia	Algeria
C. Africa Rep.	Morocco	Taiwan
Benin*	El Salvador*	Brazil
Nigeria	P.N. Guinea	Chile
Indonesia	Guatemala	Costa Rica
Sierra Leone	Peru*	Malta
Egypt*	Cote d'lovire*	Portugal
Niger	Colombia	Cyprus
Kenya	Dominican Rep.	Barbados
Madagascar*	Mauritius	Mexico
Togo*	Tunisia	South Africa
Thailand	Nicaragua*	Singapore
Philippines	Ecuador	Greece
Cameroon	Korea	Venezuela

Senegal	Turkey*	Tri & Tob.
Honduras		Gabon*
		Israel
		Libya*
		Kuwait*
20	20	23

Note: * These are countries not in the sample of the eighties.

B. The Seventies: Geographical Groups

Africa	Asia	Latin America**
Algeria	Indonesia	Barbados
Benin*	Korea	Bolivia
Botswana	Malaysia	Brazil
Cameroon	Pakistan	Chile
C. Africa Rep.	P.N. Guinea	Colombia
Cote d'lovire*	Philippines	Costa Rica
Gabon*	Singapore	Dominican Rep.
Ghana*	Sri Lanka	Ecuador
Kenya	Taiwan	El Salvador*
Liberia*	Thailand	Guatemala
Madagascar	Cyprus	Haiti
Malawi*	Turkey*	Honduras
Mali*	Israel	Jamaica
Mauritius	Jordan	Mexico
Morocco	Kuwait*	Nicaragua
Niger		Panama
Nigeria		Peru*
Senegal		Tri & Tob.
Sierra Leone		Venezuela
South Africa		Greece
Togo*		Malta
Tunisia		Portugal
Zambia		
Egypt*		
Libya*		
25	15	22

Notes: * These are countries not in the sample of the seventies.
** This group includes three non-Latin American countries, Greece, Malta and Portugal.

C. The Eighties: Income Groups

Low Income (PCGDP<$700)	Median Income ($700<PCGDP<$1500)	High Income (PCGDP>$1500)
C. Africa Rep.	Thailand	Fiji*
Nigeria	Bolivia	Costa Rica
Haiti	P.N. Guinea	Brazil
Sri Lanka	Zimbabwe*	Panama
Pakistan	Morocco	Korea
China*	Guatemala	Malaysia
Sierra Leone	Botswana	Algeria
Kenya	Jordan	Chile
Niger	Dominican Rep.	Portugal
Cameroon	Jamaica	Mexico
Indonesia	Colombia	South Africa
Senegal	Mauritius	Taiwan
Philippines	Ecuador	Uruguay*
Honduras	Tunisia	Barbados
Zambia		Venezuela
		Malta
		Cyprus
		Greece
		Argentina
		Tri. & Tob.
		Israel
		Singapore
15	14	22

Note: * These are countries not in the sample of the seventies.

D. The Eighties: Geographical Groups

Africa	Asia	Latin America**
Algeria	China*	Argentina*
Botswana	Fiji*	Barbados
Cameroon	Indonesia	Bolivia
C. Africa Rep.	Korea	Brazil
Kenya	Malaysia	Chile
Mauritius	Pakistan	Colombia
Morocco	Philippines	Costa Rica
Niger	Singapore	Dominican Rep.
Nigeria	Sri Lanka	Ecuador
Senegal	Taiwan	Guatemala
Sierra Leone	Thailand	Haiti
South Africa	Cyprus	Honduras
Tunisia	Israel	Jamaica
Zambia	Jordan	Mexico
Zimbabwe*	P.N. Guinea	Panama
		Tri. & Tob.
		Uruguay*
		Venezuela
		Greece
		Malta
		Portugal
15	15	21

Notes: * These are countries not in the sample of seventies.

** This group includes three non-Latin American countries, Greece, Malta and Portugal.

Appendix C

Determinants of FDI and Its Impact on Economic Growth, with NW included as an explanatory variable in the Determinants Equation.

Table C1

THE SEVENTIES (1975-1978), N = 34

Explanatory Variables	(1)	(2)	(1a)	(2a)	(1b)	(2b)	(1c)	(2c)	(1d)	(2d)
Constant	-0.13	2.04	-4.54	-1.41	-1.19	1.57	-1.13	2.85	1.01	1.53
	(-0.01)	(0.99)	(-0.23)	(-0.33)	(-0.07)	(0.52)	(-0.06)	(1.05)	(0.06)	(0.58)
PCGDPGR	0.98		1.84		1.19		1.18		0.76	
	(0.31)		(0.60)		(0.46)		(0.41)		(0.35)	
PCGDP	0.002		0.003		0.002		0.002		0.002	
	(0.22)		(0.34)		(0.26)		(0.25)		(0.20)	
PCTB	-0.08		-0.08		-0.08		-0.08		-0.08	
	(-3.51)**		(-3.37)**		(-3.64)**		(-3.55)**		(-3.85)**	
NW	-2.44		-1.80		-2.29		-2.29		-2.61	
	(-0.41)		(-0.30)		(-0.39)		(-0.39)		(-0.45)	
FDIGDP		0.71		4.04		2.34		0.64		3.29
		(1.08)		(1.09)		(0.90)		(0.94)		(1.22)
GDSGDP		-0.09		-0.03		-0.08		-0.09		-0.05
		(-1.15)		(-0.28)		(-1.02)		(-1.17)		(-0.69)
EMPLGR		0.25		0.14		0.24		0.27		0.13
		(1.40)		(0.61)		(1.26)		(1.44)		(0.64)

Table C1 (Continued)

Explanatory Variables	(1)	(2)	(1a)	(2a)	(1b)	(2b)	(1c)	(2c)	(1d)	(2d)
FDISGDP		0.002		0.01		0.005		−0.05		0.008
		(0.12)		(0.51)		(0.22)		(−0.30)		(0.42)
EXGR		0.12		0.19		0.14		0.10		0.19
		(1.43)		(1.56)		(1.23)		(0.97)		(1.66)*
FDIGDP1				−3.06						
				(−0.88)						
FDIGDP2				0.38						
				(0.14)						
FDIGDP3						−2.85				
						(−1.19)				
FDIGDP4						−1.70				
						(−0.66)				
FDISGDP1								0.05		
								(0.31)		
FDISGDP2								−0.08		
								(−0.33)		
FDISGDP3										−0.44
										(−3.17)**
FDISGDP4										−0.79
										(−1.12)
R^2	0.48	0.29	0.47	0.10	0.48	0.24	0.48	0.30	0.48	0.40

Note: See Table 1.

Table C2

THE EIGHTIES (1983-1986), N = 27

Explanatory Variables	(1)	(2)	(1a)	(2a)	(1b)	(2b)	(1c)	(2c)	(1d)	(2d)
Constant	10.	-4.92	10.70	-4.15	10.75	3.82	10.65	-4.41	10.61	-4.58
	(0.75)	(-2.50)*	(0.79)	(-1.64)	(0.80)	(-1.66)	(0.78)	(-2.06)*	(0.77)	(-2.13)*
PCGDPGR	3.69		2.97		2.76		3.21		3.36	
	(1.42)		(1.21)		(1.15)		(1.29)		(1.33)	
PCGDP	0.01		0.01		0.01		0.01		0.01	
	(1.71)*		(1.84)*		(1.89)*		(1.80)*		(1.77)*	
PCTB	-0.09		-0.09		-0.09		-0.09		-0.09	
	(-4.80)**		(-4.94)**		(-4.98)**		(-4.90)**		(-4.87)**	
NW	-23.77		-24.11		-24.21		-23.99		-23.92	
	(-2.06)*		(-2.16)*		(-2.19)*		(-2.12)*		(-2.10)*	
FDIGDP		0.26		-1.33		-2.68		0.15		-0.03
		(0.37)		(-0.27)		(-1.15)		(0.20)		(-0.04)
GDSGDP		0.13		0.11		0.12		0.13		0.14
		(2.14)*		(1.47)		(1.84)*		(2.03)*		(2.11)*
EMPLGR		-0.03		0.007		-0.03		0.04		-0.04
		(-0.17)		(0.03)		(-0.17)		(0.22)		(-0.25)
FDISGDP		0.08		0.08		0.10		-0.07		0.05
		(0.97)		(0.78)		(1.06)		(-0.33)		(0.32)

Table C2 (Continued)

Explanatory Variables	(1)	(2)	(1a)	(2a)	(1b)	(2b)	(1c)	(2c)	(1d)	(2d)
EXGR		0.37 (3.58)**		0.38 (3.32)**		0.38 (3.41)**		0.33 (3.00)**		0.35 (3.21)**
FDIGDP1				1.52 (0.32)						
FDIGDP2				−0.99 (−0.02)						
FDIGDP3						−3.22 (−0.47)				
FDIGDP4						2.67 (1.25)				
FDISGDP1								0.16 (0.84)		
FDISGDP2								0.12 (0.65)		
FDISGDP3										0.001 (0.01)
FDISGDP4										0.08 (0.57)
R^2	0.71	0.52	0.73	0.51	0.73	0.50	0.72	0.54	0.72	0.54

Note: See Table 1.

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