

Foreign Direct Investment Inflows and the US Economy: An Empirical Analysis

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ABSTRACT

Over the last two decades, the U.S. has attracted more inflows of foreign direct investment (FDI) than any other country. General indications have pointed to FDI inflows as being a positive contributing factor to key US macroeconomic indicators. This study examines two categories of macro variables over the period 1980-2003. First, various employment and wage measures of the US affiliates of foreign firms are analyzed. The results show a rising share of the American labour force as being employed by these affiliates, and that FDI inflows favour high-wage industries and sectors. Second, regression estimates confirm the existence of a positive and significant relationship between FDI and US economic growth rates. In light of the expected rise in economic interdependence among countries, it is becoming increasingly critical for the U.S. to maintain its living standards and advantages vis-à-vis others through sustained economic growth. The findings reported here imply that, as an economy lacking enough domestic savings and running ever-rising current account deficits, it is imperative for the U.S. to continue to attract foreign capital, especially FDI.

1. INTRODUCTION

THE TRADITIONAL METHOD of penetrating foreign markets has been exporting, reflecting the concept of comparative advantage, among other factors. Since the 1950s, though, an increasing number of international firms (so-called multinational corporations or MNCs) have selected to serve overseas markets by undertaking foreign direct investment, FDI — a form of private capital flow² — through the establishment of foreign subsidiaries/affiliates and by mergers and acquisitions. In helping to explain FDI, two key frameworks stand out: the *OLI Paradigm* (Buckley and Casson, 1976; Dunning, 1977) and strategic motives by MNCs. The former reflects “O” — owner-specific — advantages in an MNC’s home market, “L” — location-specific — characteristics abroad, and “I” — internalization — by which the firm controls the value chain in its industry. Meanwhile, the latter refers to firms who invest abroad and

become MNCs by seeking markets, raw material, production efficiency, knowledge, and/or political safety. Operating primarily in oligopolistic industries (Brainard, 1997; Glass and Saggi, 1999; Helpman *et al.* 2003; Markusen, 1995), MNCs' FDI entails managerial control,³ takes place for a variety of corporate, economic and financial reasons embedded within the above frameworks,⁴ and is designed for long-run, sustained operations.

The United States is the largest economy in the world and it has attracted, on a cumulative (stock) basis, more FDI than any other country. While economic size is a major determinant, a confluence of some additional key factors has also been instrumental: economic and political stability, an environment attracting immigrants (especially scientists and entrepreneurs), a highly-skilled, flexible and productive labour force, first-rate academic and research institutions, supportive governmental policies, protective patent laws, and a sophisticated financial/capital market system. Given this, to what extent have the country's labour force, output and its economic growth rates benefited from FDI inflows over 1980-2003?

The study is motivated by the following factors. First, a rising number of US educational institutions continue to offer to the marketplace individuals with international-based knowledge, skills, and training. Hence, the sustained presence in the US of foreign MNCs' affiliates and subsidiaries can make a positive contribution by providing these graduates (as a component of the total US work force) enhanced job opportunities in a highly competitive global environment. Next, wages — particularly those applicable to highly-skilled employees — are expected to improve if US FDI inflows continue their recent pattern of favouring high-wage industries and sectors. Finally, as globalization spreads and the world's economies converge further, it will become even more critical for the US — by being the largest debtor country in need of external capital to augment both its internal savings shortfall and current-account deficit — to maintain its living standards and advantages *vis-à-vis* other nations through sustained economic growth.⁵ Thus, it must continue to attract FDI. Indeed, the discussion devoted to this latter point is a distinguishing feature between this paper and other similar studies, as is the empirical support, based on the latest available data, found for the role that the US stock of human capital — represented by highly-educated labour and managerial forces — play in helping foreign MNCs' capital investments in the U S to be growth-enhancing.

This paper is organized as follows. Section 2 examines the evidence on FDI-related employment, wages, and output. Section 3 provides a review of prior research on the link between economic growth and FDI. Next, time series analyses and Instrumental-Variables (IV) based estimations are presented in Sections 4 and 5, respectively, followed by some discussion and concluding remarks in Section 6.

2. FDI INFLOWS AND U S EMPLOYMENT, WAGES AND OUTPUT

MNCs exploit micro-level wage differentials between host and source countries, causing FDI to flow from rich nations to developing/emerging economies⁶ (Glass and Saggi, 1999). The US, as the largest supplier of FDI, easily fits this wage-differential framework. However, its simultaneous status as the largest recipient country indicates that other contributing factors — among them well-documented higher productivity rates, innovations and technological advancements, flexible labour laws, strong consumer spending, and the aforementioned attractive features of the US economic and political landscapes — must be at work.⁷ Meanwhile, there is evidence that FDI inflows do benefit the host country labour force by raising wages there, especially in an skilled-abundant setting such as the U S (Glass and Saggi, 1999; Markusen and Venables, 1997), and that outward FDI has no negative effect on US labour (Skaksen and Sørensen, 2001; Slaughter, 2000).⁸

Following the approach used by Graham and Krugman (1991, 1995), we examine trends and patterns in US FDI flows, along with MNCs' method of penetration, i.e., mergers and acquisitions vs "establishments", the share of foreign affiliates in US employment and output, and value-added and compensation per worker for all US firms vs US affiliates of foreign firms (see the Data Appendix for definitions and sources). Based on 1980-2003 annual data, Panel A in Table 1 presents the inflow and outflow figures as well as their ratios. While the ratio registers a decline in the late 1980s to early 1990s, it does display a sharp up-turn during the mid to late 1990s as a significant jump takes place in FDI inflows. For 2001-2002, though, according to UNCTAD's *World Investment Report*, there occurred a significant decline in FDI flows worldwide, and for 2003 the US received still lower inflows, dragging the ratio to an unusually low level. As subsequent discussions make clear, it is important for the U.S. economy to reverse such trends.

A related but distinct measure is based on FDI stock. As highlighted in Panel B of Table 1, the ratio of inward to outward stock of FDI demonstrates a long-term positive trend, a point further emphasized in Panel C of Table 1. There, three separate ratios of inward FDI stock, measured in terms of GNP and both the market as well as historical values of the total net worth of U.S. non-farm non-financial assets, respectively, all show a similar (significant) rise over the period 1980-2003. Given the overall attractiveness (including the size) of the U.S. economy, the figures in Table 1 provide confirmation of a growing share of U.S. gross output being contributed to by the cumulative stock of inward FDI.

Next, the method of entry is examined whereby M&A vs 'establishments' by foreign MNCs are considered. The figures, illustrated in Panel A of Table 2, indicate that an overwhelming share of outlays committed by foreign direct investors in the U.S. during 1980-2003 consisted of M&A. Simply put, foreign MNCs prefer M&A through which they can target the U.S. for its advanced technology (e.g., biotechnology firms), well-known brands (restau-

Table 1: US Foreign Direct Investment (billions of dollars and percentages)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
<i>Panel A</i>														
Inflows ^a	16.9	25.1	13.8	11.5	25.5	20.5	36.1	59.5	58.5	69.0	48.4	22.8	19.2	50.6
Outflows	19.2	13.2	1.0	9.5	13.0	13.4	19.6	30.1	18.6	37.6	31.0	32.7	42.6	77.2
Ratio	0.88	1.90	13.8	1.21	1.96	1.53	1.84	1.97	3.14	1.83	1.56	0.69	0.45	0.65
<i>Panel B</i>														
Inward Stock	83.0	108.7	124.6	137.0	164.5	184.6	220.4	263.4	314.7	368.9	394.9	419.1	423.1	467.4
Outward Stock	215.3	220.4	207.7	212.1	218.0	238.3	270.4	326.2	347.1	381.7	430.5	467.8	502.0	564.2
Ratio	0.38	0.49	0.60	0.64	0.75	0.77	0.81	0.80	0.90	0.96	0.91	0.89	0.84	0.82
<i>Panel C: Inward Stock:</i>														
FDI/GNP	0.029	0.034	0.037	0.038	0.041	0.043	0.049	0.055	0.061	0.067	0.067	0.069	0.066	0.070
FDI/TNWNC-M	0.026	0.031	0.034	0.035	0.040	0.044	0.051	0.058	0.065	0.073	0.078	0.087	0.091	0.095
FDI/TNWNC-H ^b	0.058	0.069	0.080	0.080	0.081	0.085	0.096	0.108	0.121	0.137	0.142	0.142	0.141	0.142
<i>Memoranda</i>														
GNP	2,831	3,166	3,296	3,572	3,968	4,238	4,468	4,756	5,127	5,509	5,832	6,011	6,342	6,667
TNWNC-M	3,148	3,511	3,671	3,828	4,064	4,167	4,308	4,517	4,826	5,032	5,025	4,776	4,635	4,899
TNWNC-H	1,412	1,563	1,664	1,849	2,046	2,165	2,288	2,437	2,602	2,678	2,773	2,934	3,000	3,282

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<i>Panel A</i>										
Inflows ^a	45.0	58.7	84.4	103.4	174.4	283.3	314.0	159.4	62.8	29.7
Outflows	73.2	92.0	84.4	95.7	131.0	174.5	142.6	124.8	115.3	151.8
Ratio	0.61	0.63	1.00	1.08	1.33	1.62	2.20	1.27	0.54	0.19
<i>Panel B</i>										
Inward Stock	480.6	535.5	598.0	681.8	778.4	955.7	1,214.2	1,321.0	1,505.1	1,553.9
Outward Stock	612.9	699.0	795.2	871.3	1,000.7	1,173.1	1,293.4	1,381.6	1,839.9	2,069.9
Ratio	0.78	0.76	0.75	0.78	0.77	0.81	0.93	0.95	0.81	0.75
<i>Panel C: Inward Stock:</i>										
FDI/GNP	0.068	0.072	0.076	0.081	0.088	0.102	0.123	0.129	0.143	0.140
FDI/TNWNC-M	0.091	0.093	0.094	0.096	0.103	0.116	0.130	0.143	0.159	0.152
FDI/TNWNC-Hb	0.135	0.136	0.137	0.143	0.147	0.162	0.179	0.190	0.214	0.204
<i>Memoranda:</i>										
GNP	7,071	7,421	7,831	8,325	8,778	9,297	9,848	10,172	10,499	11,040
TNWMC-M	5,255	5,726	6,346	7,052	7,510	8,192	9,326	9,217	9,427	10,199
TNWMC-H	3,563	3,928	4,354	4,768	5,289	5,889	6,785	6,918	7,039	7,619

a See the Data Appendix for definitions and sources.

b TNWNC: Total net worth of U.S. non-farm non-financial corporations. M: Market value; H: Historical cost.

rant chains and food products), entertainment/media (theme parks), financial institutions (investment banks), etc. These results, while similar to those prevailing in Western European host countries (Horn and Persson, 2001), are different from those found in most developing and emerging economies where much FDI takes place via establishments.

**Table 2. The Role of FDI in the U.S. Economy
(billions of dollars and percentages)**

	<i>Panel A: Investments in:</i> ^a		<i>Panel B: Share of Foreign Affiliates in:</i> ^b			
	M&As	Establishments	US mfg. assets	US empl't	US GNP	US value added
1980	9.0	3.2	5.9	2.7	2.5	3.3
1981	18.2	5.1	7.8	3.1	3.1	4.2
1982	6.6	4.3	8.0	3.2	3.1	4.3
1983	4.8	3.2	8.2	3.3	3.1	4.2
1984	11.8	3.4	8.3	3.4	3.2	4.4
1985	20.5	3.0	8.8	3.4	3.2	4.3
1986	31.5	7.7	9.5	3.5	3.2	4.3
1987	33.9	6.4	10.5	3.7	3.3	4.4
1988	64.9	7.8	12.6	3.5	3.1	3.8
1989	59.7	11.5	14.9	3.9	3.0	4.0
1990	55.3	10.6	16.4	4.2	3.2	4.3
1991	17.8	7.7	16.9	4.4	3.3	4.6
1992	10.6	4.7	17.0	4.3	3.3	4.5
1993	21.7	4.4	17.6	4.1	3.3	4.4
1994	38.7	6.8	17.9	4.1	3.4	4.5
1995	47.2	10.2	17.6	4.0	3.4	4.5
1996	69.7	11.2	17.3	4.1	3.6	4.6
1997	60.8	9.0	18.3	4.1	3.7	4.9
1998	182.3	32.9	21.9	4.3	4.0	5.2
1999	265.1	9.8	23.0	4.6	4.2	5.6
2000	322.7	12.9	22.8	5.0	4.5	5.9
2001	138.0	9.0	24.2	4.9	4.1	5.4
2002	43.4	11.0	21.1	4.9	4.3	5.8
2003	50.2	13.3	20.7	4.7	4.4	5.8

^{a, b} See the Data Appendix for definitions and sources.

In Panel B of Table 2, meanwhile, more specific information is revealed as several key measures of US affiliates of foreign firms are analyzed: assets of affiliates in manufacturing as a share of total US manufacturing assets; employment of non-bank affiliates as a percentage of total US private-industry employment; gross product (output) of non-bank affiliates as a share of US

nominal GNP; and gross product (output) of non-bank affiliates as a percentage of US private industry gross domestic product. Once again, the data confirm the positive aspects associated with FDI inflows: the US economy, its employment, and especially its manufacturing activities have benefited from the presence of foreign investments during the last two decades.

Finally, we compare two series of figures on per-worker value added and compensation, contrasting the US affiliates with all US firms. The results are displayed in Table 3. While there may exist variations across industries over time (a conclusion reached by Graham and Krugman, 1995), it is clear that on average for all industries (excluding banking), investments by foreign multinationals have yielded higher output (value added) per worker and involved more compensation per employee. In sum, our data analysis provides solid confirmation of the importance of FDI to economic output, employment, and compensation in the US over the last two decades.

**Table 3: Value Added and Compensation per worker:
U.S. affiliates of Foreign Firms and All US Firms^a**

	Value added per worker US\$		Compensation per worker US\$	
	US affiliates	All US firms	US affiliates	All US firms
1980	34,862	28,416	19,689	16,789
1981	40,895	31,554	22,676	18,397
1982	42,273	33,338	25,117	19,700
1983	43,781	35,877	26,234	20,732
1984	47,438	38,137	26,952	21,876
1985	47,114	39,818	27,980	22,921
1986	48,374	41,331	29,441	23,861
1987	48,962	42,824	29,776	24,882
1988	49,524	44,850	31,108	26,109
1989	49,522	49,636	31,953	27,017
1990	50,539	49,126	34,553	28,368
1991	52,881	51,328	36,119	29,624
1992	54,481	53,956	38,613	31,122
1993	59,958	55,916	40,498	32,118
1994	64,658	57,960	41,445	32,998
1995	65,286	59,378	41,756	33,719
1996	70,143	61,516	43,219	34,608
1997	74,863	63,929	44,883	35,746
1998	74,357	65,800	46,423	37,387
1999	75,935	68,046	48,564	38,951
2000	81,229	70,575	51,279	41,114
2001	76,369	72,981	55,018	42,924
2002	83,696	77,352	56,663	44,218
2003	92,584	80,098	60,527	46,150

^a See the Data Appendix for definitions and sources

3. FDI AND ECONOMIC GROWTH

Following the major contributions made by Solow (1956; 1957), further theoretical advancements on the neoclassical growth model have allowed for endogenous growth (in real GDP *per capita*) to take place due to a number of variables, among them FDI.⁹ The neoclassical model constrained the potential influence of a variable such as FDI as it called for an aggregate production function — *identical* across countries — with diminishing returns to capital, and it regarded as exogenous rates of saving and population growth, yielding a steady-state level of income *per capita*. In contrast, within the ‘New Growth Theory’ framework modifications, including the use of a panel data approach, have been proposed, taking into account the influence of individual ‘country effects’ such as knowledge, transfer of technology, accumulation of both physical and human capital, and the role played by energy in explaining technical progress and economic growth (Romer, 1986; Lukas, 1988; Mankiw *et al.*, 1992; Islam, 1995; Kümmel *et al.*, 2002).

Based on this ‘new framework’, research studies centred on the specific relationship between FDI and economic growth have looked at FDI flows as an ‘externality’, influencing both the level of *per capita* output as well as long-run economic growth rates (Calvo and Sanchez-Robles, 2002). FDI’s impact is shown to take place through a number of channels and mechanisms, including enhanced domestic investment and capital accumulation,¹⁰ knowledge and technology spillovers, raising the skill and training levels of labour force, introduction of new corporate/management structures and practices, and higher export competitiveness (de Mello, 1999; Ramachandran and Goebel, 2002; Calvo and Sanchez-Robles, 2002; Campos & Kinoshita, 2002). In the case of developing countries, additional research findings show that a country’s absorptive capacity — including a minimum level of indigenous income and stock of human capital — is crucial for FDI to have a significant influence on the development of industrial sectors, domestic investment and economic growth (Blomström *et al.*, 1994; Borensztein *et al.*, 1998; UNCTAD, 1999; Markusen and Venables, 1999; Görg and Strobl, 2002).

The US — along with a few other OECD members and some non-OECD countries — is examined in de Mello’s (1999), paper whereby a panel data analysis takes individual country differences into account, finding evidence which is ‘suggestive of a dominant complementarity effect between FDI and domestic investment’. In another study also involving the US, Keller and Yeaple (2003) demonstrate that FDI makes a positive contribution to the host nation through the transfer of technology, resulting in higher productivity rates. Based on 1987-1996 data, they find that ‘FDI leads to significant productivity gains for domestic firms ... accounting for about 14% of productivity growth in US firms’ over this period.¹¹

Although industrialized and developing economies share some commonalities, there are major differences between them in terms of attracting FDI. For the US, an overwhelming majority of its inward FDI takes the form

of M&A as opposed to the establishment of 'new' operations (see Section 2 above and also the findings by Horn and Persson, 2001, and Evenett, 2003). While exceptions do exist,¹² foreign MNCs have relied on M&A as a primary method of targeting a wide ranging set of sectors and industries in the US. Through M&A, these firms penetrate the US and take advantage of: advanced technology, higher productivity associated with highly-skilled labour, formation of a global corporate strategy, market-share consolidation, ownership of unique brands, the offering of differentiated products in oligopolistic industries, long-term currency movements, and avoiding tariff and non-tariff barriers.¹³ Unique country characteristics differentiate the US as a recipient of FDI from not only emerging economies but many other advanced countries as well.

Given this background information, is there a robust relationship in the US between economic growth, FDI inflows and certain 'country-specific' characteristics during 1980-2003?

4. TIME SERIES ANALYSIS

In order to analyze the linkage between FDI inflows and economic growth, a standard production function consisting of capital and labour is assumed, with physical capital comprised of domestic and foreign components. Based on this model, the 'linearity hypothesis' (de Mello, 1999) posits that any externalities and spillovers induced by FDI-based capital inflows and accumulation should result in higher output growth. This, in turn, requires an investigation of the degree of complementarity/ substitutability between FDI and domestic investment. To assess these relationships empirically, the impact of FDI on output growth rates, capital accumulation and total factor productivity is estimated (see the Data Appendix for details on the variables).

We begin by examining the time-series behaviour of each variable. To do so, growth rates of output, capital accumulation, total factor productivity, and FDI are subjected to unit root tests, utilizing the augmented Dickey-Fuller, ADF, procedure, designed to confirm whether each is individually integrated of order one. As an additional test, a time-trend equation is estimated for output growth rates, g_t , and for each of the other data series:

$$g_t = c_0 + c_1 t + u_t \quad (1)$$

where u_t is a white noise term.

The results are shown in Panel A of Table 4. All the series are found to be $I(1)$ processes and they all follow a time trend. Thus, over this study period, output growth rates in the US exhibit movements consistent with the linearity hypothesis, i.e. FDI and/or total capital accumulation contribute to linear endogenous growth.

To investigate further the long-term relationship between FDI and the other variables, and following the confirmation of $I(1)$ integration for each variable, cointegration for g_t is tested by applying the Johansen likelihood ratio test. The procedure is based on estimating the following regression equation

(in vector form):

$$\Delta \mathbf{g}_t = \boldsymbol{\pi} + \boldsymbol{\Pi}_1 \Delta \mathbf{g}_{t-1} + \dots + \boldsymbol{\Pi}_{k-1} \Delta \mathbf{g}_{t-(k-1)} + \boldsymbol{\Gamma} \mathbf{g}_{t-k} + \mathbf{u}_t \quad (2)$$

where k is the number of lags assumed for the VAR in levels, $\boldsymbol{\pi}$ is a vector of constant terms, $\boldsymbol{\Pi}_t$ and $\boldsymbol{\Gamma}$ represent the $(n \times n)$ matrices of OLS coefficients, and \mathbf{u}_t denotes the $(n \times 1)$ vector of OLS residuals. The likelihood ratio test is of the null hypothesis of zero cointegrating relations against the alternative hypothesis of n cointegrating relations (where n is the number of elements of \mathbf{g}_t). The results of this test, shown in Panel B of Table 4, provide additional support by confirming that US output growth rates and FDI are cointegrated, as is FDI when paired with the other series.

Table 4: Time Series Analysis

PANEL A: UNIT ROOT TESTS (LEVELS) AND TREND REGRESSIONS

<i>Series</i>	<i>ADF Statistics</i>	<i>Trend Results</i>
Output Growth	-2.90	0.0012*** (3.76)
FDI	-2.98	0.0081*** (4.35)
Capital Investment	-2.41	0.0041*** (6.61)
Total Factor Productivity (TFP)	-3.34	0.0022*** (4.75)

PANEL B: JOHANSEN'S COINTEGRATION TESTS - PAIRED SERIES

	<i>FDI</i>
Output Growth	26.26**
Capital Investment	17.40**
TFP	25.12**

PANEL C: OLS REGRESSION TESTS

<i>Variable</i>	<i>Test Results</i>
GDP Growth	0.1074*** (4.20)
Capital Investment	0.3906*** (10.69)
TFP	0.2231*** (7.89)

Notes: Augmented Dickey-Fuller (ADF) test statistics are for the null hypothesis of a unit root in levels. Tests were conducted with an intercept and a deterministic trend, with the lag automatically set by the Schwarz criterion. The tests fail (at any of the reported significance levels) to reject the null hypothesis of a unit root in levels, implying that each data series is I(1). For trend output, the coefficients (along with the t-statistics) are reported, with each coefficient significant at the 1% level.

For cointegration tests, the stated number is the trace statistic. The results show that the hypothesis of no cointegration can be rejected for all the paired series. The tests were conducted with an intercept, linear deterministic trend in the data, and a lag interval of 1.

Regression tests are conducted with FDI as the independent variable. The coefficients (along with the t-statistics) are reported. Significance is shown at the 1% (***), 5% (**), or 10% (*) level.

The final time series test consists of estimating OLS regressions for each of the data sets against FDI as the independent variable:

$$\mathbf{g}_t = \mathbf{c}_0 + \mathbf{c}_1 \mathbf{FDI}_t + \mathbf{u}_t \quad (3)$$

The findings are reported in Panel C of Table 4. Statistically, FDI is found to have a significantly positive relationship with output growth rates, capital investment, and total factor productivity,¹⁴ with the results suggesting a complementary relationship between FDI and domestic capital accumulation for the period under study. In economic terms, combining these findings with the earlier results shown in Tables 1 to 3 suggests that FDI inflows are a positive contributing factor to the US economy. Overall, our analysis underscores the importance for a debtor economy such as the US, wishing to sustain its economic growth and thus its lead vis-à-vis other nations, to continue to attract foreign capital, especially the more stable, long-term FDI commitments.

5 ADDITIONAL EMPIRICAL TESTS

It is well known that a major criticism of time series analysis rests on the frequent violation of OLS's basic assumption, namely that the independent variables should be uncorrelated with the disturbance terms. Often, this violation can result from having endogenously determined variables on the right-hand side. The standard 'remedy' is to utilize a set of instruments (variables) that are correlated with the right-hand side variables and yet have no relation with the disturbances. Following recent advances in growth theory, and to confirm the robustness of the results obtained in our time series analysis, an alternative empirical approach is implemented whereby country-specific characteristics are used as instruments.

Research findings by Harrigan (1999), combined with our empirical evidence presented in the previous section, suggest that TFP may be one such instrument.¹⁵ Another variable is the human capital stock (Barro and Lee, 1993; 1996). Specifically, the labour component/variable of the production function is designated to capture the impact of the human capital stock. This variable is among the country-specific attributes analyzed by prior research (Borensztein *et al.*, 1998; Noorbakhsh *et al.*, 2001; Edison *et al.*, 2002). By using the average years of male secondary schooling, the findings of Borensztein *et al.* (1998) show that 'there is a strong complementary effect between FDI and human capital, that is, the contribution of FDI to economic growth is enhanced by its interaction with the level of human capital in the host country.' Meanwhile, Edison *et al.* (2002) report a 'positive relationship between educational attainment of the workforce and future economic growth,' and, for a large sample of developing countries, Noorbakhsh *et al.* (2001) conclude that 'human capital is a statistically significant determinant of FDI inflows.' Hence, given the established relationship between FDI and human capital and that the US, unlike developing nations, possesses a 'deep'

stock of both physical and human capital, with the latter encompassing educational attainments well beyond the secondary level (Ramcharan, 2002; Rangazas, 2002), it would seem appropriate to use this variable (see the Data Appendix) as an instrument.

Borensztein *et al.* (1998) also consider a variable designed to capture a number of political and economic aspects — so-called state of ‘environment’ — posited (by Barro and Sala-i-Martin, 1995) to be among the determinants of growth in cross-country analyses. They fail, though, to find significant evidence in support of several of these attributes. This lack of support, combined with the unique economic, political, and social conditions prevailing in the US and the aforementioned motivations behind much of the US FDI inflows, compel us either to preclude or modify these other country-specific variables. Among those excluded are Political Instability and Political Rights; Government Consumption; Level of Financial Development;¹⁶ Inflation Rate; a measure of Quality of Institutions;¹⁷ and the Black Market Premium on Currency Conversion. Insofar as foreign exchange rates are concerned, though, prior research does provide support for a link between FDI and currency movements (Froot and Stein, 1991; Klein and Rosengren, 1994; Stevens, 1998; Baek and Okawa, 2001; Bénassy-Quéré, *et al.*, 2001). Thus, our analysis will consider a real trade-weighted index of the US dollar (detailed in the Data Appendix) as the final instrument.

The alternative empirical analysis, using IV, will test the following relationship:

$$g_t = c_0 + c_1 FDI_t + c_2 g_{t-1} + u_t \quad (4)$$

in conjunction with a set of instruments comprised of the lagged dependent variable, TFP , H (representing the stock of human capital), and E (standing for long-term currency movements). Table 5 depicts the main findings.

It is clear that the inclusion of either an individual instrument or the entire set does not alter our prior conclusion regarding the positive and significant relationship found between FDI inflows and US economic growth rates. What is different, however, is the mechanism through which FDI’s influence is taking place. Unlike the time series outcome, the IV-based tests do not support the existence of any significant relationship between FDI and capital accumulation, but do find in favour of a strong link between TFP and FDI. It appears that FDI inflows may not stimulate domestic investment — which is not an unexpected outcome in the world’s largest economy where the greatest share of total capital formation comes from domestic sources. Meanwhile, the results confirm the stock of human capital (and currency movements) to be significant instruments in shaping the relationship between FDI and TFP. Thus, highly-educated labour and managerial forces in the US play a positive role as foreign MNCs’ capital investments enter the US — primarily through M&A — and become growth-enhancing by contributing to total factor productivity through a variety of previously-identified channels and

mechanisms involving knowledge, transfer of technology, and high-wage and high-tech industries and sectors.

Table 5: IV-Based Tests

Series	Coefficient (t-statistic)			
	<i>All</i>	<i>TFP</i>	<i>H</i>	<i>E</i>
Output Growth	0.1214 (2.68**)	0.1197 (2.60**)	0.1404 (2.98***)	0.1342 (2.86***)
Capital Investment	-0.0107 (-0.181)	-0.0335 (-0.462)	-0.0588 (-0.718)	-0.0819 (-0.842)
TFP	0.1656 (2.42**)	----	0.1640 (2.33**)	0.1906 (2.45**)

Notes: Coefficients represent c_1 , *FDI*, in Equation (4). Instruments used in conjunction with Equation (4) include lagged values of the dependent variable, *TFP*, index of human stock (*H*), and an exchange rate index (*E*). 'All' refers to estimations involving the entire set of instruments, while each of the other tests are carried out with just the lagged dependent variable and one additional instrument as specified. Significance is shown at the 1% (***) or the 5% (**) level. Tests were conducted by using the two-stage least squares method, TSLS, which is a special case of the instrumental variables (IV) regression.

6. CONCLUDING REMARKS

This study has considered the interactions taking place between foreign direct investment inflows, economic growth, and wage and employment aspects of the US economy over 1980-2003. The findings show that: a rising share of the US gross output has been contributed to by the cumulative stock of inward FDI; an overwhelming share of outlays committed by foreign direct investors in the US has consisted of M&A; a number of measures confirm that the US economy, its employment, compensation per employee, value added per worker, and especially its manufacturing activities have benefited from the presence of foreign investments; and there is strong evidence in favour of FDI inflows having a significantly positive long-run relationship with US economic growth rates.

The study and its results are of significance. To begin with, it is worth noting that in recent years, more governments around the world have come to recognize the importance of higher education to economic advancements. Moreover, high international debt levels, a sharp slowdown in bank lending, and advice from the IMF and the World Bank have led to more countries opening up their respective economies to privatization and further inflows of long-term capital. Continued trends along these lines will see the US face heightened degrees of competition on the global stage. Citing China as an example, it seems that its economic reforms since the late 1970s and its potential

prospect of becoming the largest consumer nation in the world (based on purchasing power), have combined to bring into the country the second highest amount of FDI in recent years. Other nations, ranging from Russia and India to many in Eastern and Central Europe, Latin America, Asia, and even Africa, are undertaking the necessary reforms and market liberalizations as well. Also, while the US attracts FDI, its own MNCs continue to seek less-costly labour in overseas markets in both manufacturing and services.

Of course, the US differs from developing and emerging economies by receiving more FDI in the form of M&A, involving high-tech, high-wage activities; and that it has continued to be host to the lion's share of the global FDI inflows. With respect to the latter, the trend must be sustained since, as a trade-deficit economy lacking sufficient indigenous savings, it is imperative that foreign capital inflows (both short- and long-term) bridge the gap between investments and savings and support the continued imbalance in the economy's current account.

As a magnet attracting both millions of highly educated and motivated immigrants as well as the major share of the world's supply of investment capital, the unique position enjoyed by the US will increasingly be challenged. We hope that the findings reported here will help individuals, educational institutions, private firms, and government officials to further coordinate their efforts aimed at maintaining an attractive environment where long-term capital inflows will continue to bring prosperity and economic growth to the US.

Accepted for publication: 19th September 2005

DATA APPENDIX

- FDI - Flows: Balance of Payments basis. Flows represent capital received from a foreign direct investor by an FDI enterprise, and consist of three components: equity capital, reinvested earnings and inter-company loans. Stock: measured on a historical-cost basis, equals the value of the share of capital and reserves (including retained profits) attributable to the parent firm, plus the net indebtedness of affiliates to the parent enterprise. Source: UNCTAD. (http://stats.unctad.org/fdi/eng/ReportFolders/Rfview/Explorererp.asp?CS_referer=).
- GNP: Nominal terms (billions of dollars; rounded). It equals GDP plus income receipts from the rest of the world, minus income payments to the rest of the world. Source: U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Tables (1.2.5 and 4.1). (<http://www.bea.doc.gov/bea/dn/nipaweb/SelectTable.asp?Selected=Y#S1>).
- TNWNC: Total net worth of U.S. non-farm non-financial corporations (Market value and Historical cost figures; billions of dollars, amounts outstanding end of period, not seasonally adjusted). Source: Federal Reserve Board, Flow of Funds Accounts of the United States, Annual Flows and Outstandings, 'Balance Sheet of Non-farm Non-financial Corporate Business', Table B.102: (<http://www.federalreserve.gov/releases/Z1/>).
- Method of Entry: Acquisitions and establishments are defined by the BEA as outlays

committed by foreign direct investors for the purpose of acquiring and establishing U.S. business enterprises, either directly or through existing U.S. affiliates (billions of U.S. dollars). Sources: Data for 1980-2000 from BEA, 'Foreign Direct Investment in the United States: U.S. Business Enterprises Acquired or Established by Foreign Direct Investor,' (http://www.bea.gov/bea/uguide.htm#_1_9); Data for 2001-2003 from *Survey of Current Business* (<http://www.bea.gov/bea/pubs.htm>).

- U.S. Affiliates of Foreign MNCs:

- Assets of foreign affiliates in manufacturing as a share of assets of all U.S. manufacturing firms. Affiliates' data from *SCB* and BEA, 'FDIUS: Operations of U.S. Affiliates of Foreign Companies,' Table B-1, various years; Total U.S. manufacturing assets data from the Bureau of the Census, 'Quarterly Financial Report for Manufacturing, Mining and Trade Corporations,' Table 1.1, various years (<http://www.census.gov/prod/www/abs/qfr-mm.html>).

- Employment of non-bank U.S. affiliates of foreign companies as a percentage of total U.S. private-industry employment. Source: 'U.S. Affiliates of Foreign Companies,' *SCB*, various issues (<http://www.bea.gov/bea/pubs.htm>).

- Gross product (output) of non-bank foreign affiliates as a percentage of U.S. nominal GNP. Affiliates' figures from 'U.S. Affiliates of Foreign Companies,' *SCB*, Various issues (<http://www.bea.gov/bea/pubs.htm>); U.S. GNP figures: see above.

- Value added. Gross product (output) of non-bank foreign affiliates as a percentage of U.S. private industry gross domestic product. Source: 'U.S. Affiliates of Foreign Companies,' *SCB*, various issues (<http://www.bea.gov/bea/pubs.htm>).

- Value Added and Compensation per worker. Figures for non-bank U.S. affiliates of foreign companies represent the ratio of gross product (output) and compensation, respectively, over the number of employees. Affiliates' data on gross output, employment and compensation from various issues of *SCB* and from BEA, 'FDIUS: Operations of U.S. Affiliates of Foreign Companies,' various years, Table F-1 (1980-1991) and Table G-1 (1992-2000); similar ratios calculated for all U.S. firms, with data from BEA, National Income and Product Accounts, Tables 1.1.5, 6.2 and 6.4 (<http://www.bea.gov/bea/dn/nipaweb/index.asp>).

Regression variables

All estimations carried out by the 'Eviews' package.

- *Output*. The growth figures are based on per capita real GDP (2000-based), obtained from (<http://www.bea.doc.gov/bea/dn/nipaweb/TableView.asp#Mid>).

- *FDI*. Inward FDI stock. See above for details.

- *Capital Investments*. For 1979, the value of Produced Assets in the US (in current billions of dollars, from BEA, NIPA, Table 5.16) is used as a base. Capital Stock for 1980-2003 is approximated by adding to this base value each year's investments comprised of: Domestic Component which equals the sum of Gross Private Domestic Investment and Gross Government Investment, from BEA, NIPA, Table 5.1:(<http://www.bea.doc.gov/bea/dn/nipaweb/SelectTable.asp?Selected=N#S5>); and Foreign Component representing FDI inflows (from sources identified above).

- *Total Factor Productivity*. Following de Mello (1999), TFP growth is measured as the difference between the growth in GDP *per capita* and the growth in total capital investments *per capita*.
- *H*: Stock of human capital. This variable represents the percentage of U.S. individuals, males and females and covering all races, aged 25 or older, who have completed four or more years of college education. Figures from the US Department of Education (<http://nces.ed.gov/programs/digest/d03/tables/dt008.asp>); and author's estimates.
- *E*: Real trade-weighted US dollar exchange rate (broad index, weights as of February 3, 2005). Annual values based on monthly data, from: (http://www.federalreserve.gov/releases/H10/Summary/indexbc_m.txt), (<http://www.federalreserve.gov/releases/H10/weights/>)

ENDNOTES

1. Department of Finance, College of Business Administration, San Diego State University, San Diego, CA 92182-8236 USA. E-mail: mehdi.salehizadeh@sdsu.edu Financial support provided by the SDSU's CIBER and College of Business Administration is gratefully acknowledged. Also, the author wishes to thank two anonymous referees for valuable comments and suggestions. The usual disclaimer applies.
2. FDI involves long-term commitments, whereas short-term (equity and bond) investments are regarded as being highly liquid and mobile. In general, private capital flows can be explained in terms of the well-established theories of international diversification (see, e.g., Divecha *et al.* 1992; Heston and Rouwenhorst, 1994; Ibbotson and Brinson, 1993; Jorion and Rossenber, 1993; Park and Van Agtmael, 1993; Speidell and Sappenfield, 1992; and Solnik, 1996). Distinguishing between FDI and exports, Helpman *et al.* (2003) use data on U.S. MNCs' activities to show that 'sector/country specific transport costs and tariffs have a strong negative effect on export sales relative to FDI,' and that more firm-level heterogeneity 'leads to significantly more FDI sales relative to export sales.' For a theoretical and empirical treatment of FDI benefits compared to those of foreign portfolio investments, see Mody *et al.* (2003).
3. According to the U.S. Department of Commerce, foreign direct investment takes place when a single investor (e.g., an MNC) has acquired a stake of 10 percent or more in a US entity.
4. Factors influencing FDI-flows include: labour's relative cost, level of skills and productivity; corporate/product advantages and product life cycle model; long-term currency movements; proximity to consumers and raw material; and other relative conditions contrasting host and home economies such as educational level, taxation, inflation, consumer and government spending, ease of immigration, protection of property rights, patents and trademarks, and tariff and non-tariff barriers. For a detailed treatment of some of the complexities — especially integration strategies and the role played by industry characteristics — surrounding MNCs' decisions to commit FDI, see Yeaple (2003).
5. Our study takes on added significance once it is noted that, as Arora and Vamvakidis (2001) emphasize, there is a 'significant positive impact of US growth on

growth in the rest of the world,' due to the 'significance of the United States as a global trading partner.'

6. It is worth noting that OECD figures for the year 2000 show the US as having the third highest labour costs behind Germany and Japan. Thus, on a relative basis, it can be argued that portions of FDI flows from Germany and Japan into the U.S. may have been influenced by wage differentials between the countries. Of course, it is important to consider specific industries, sectors, and even states within the U.S. In support of this view, Axarloglou et al. (2002) show that FDI's impact on wages and employment does vary across the states in the US, with a primary influence coming from the foreign investments' industry composition.

7. Horn and Persson (2001) analyze the critical role played by international mergers and acquisitions (M&A). They cite the relevant figures for the 1980s and 1990s, stating that an overwhelming majority of U.S. and Western European inward FDI took the form of M&A. Their analysis indirectly supports the overall attractiveness of the U.S. as measured in terms of technological superiority and corporate structure, leading to the selection of M&A as the primary mode of entry into the US by foreign MNCs.

8. On inward FDI, Glass and Saggi (1999) observe that host-based (local) firms tend to suffer as a consequence, thus compelling a number of countries, including Japan, to place restrictions on FDI inflows in order to protect local entities. On outward FDI, Skaksen and Sørensen (2001) state that 'whether home workers gain or lose on FDI depends on which kinds of activities the firm moves to the host country,' and that 'if there is a big degree of substitutability (complementarity) between activities in the home country and activities in the host country, it is likely that the workers lose (gain) on FDI.' Their conclusion is that 'if a firm moves activities abroad, it does not necessarily decrease demand in the home country for labor involved in that activity,' a finding backed by Slaughter (2000) as it reports no evidence on FDI outflows causing a lowering of demand for American 'production workers relative to non-production workers.'

9. See Calvo and Sanchez-Robles (2002) and the references cited therein. They emphasize the important role played by the following mechanisms leading to endogenous growth: 'human capital ... public infrastructure ... incentives to innovate ... constant returns to scale in the production function ... and technological diffusion ... among others.'

10. Various studies support the positive relationship between FDI and domestic investment. Insofar as the latter is integrated with stock price movements, an indirect linkage can be expected between FDI and stock prices. In a study conducted by Hassapis and Kalyvitis (2002), a simple growth model tested on data from the G-7 economies shows that 'real stock price changes and output growth are strongly related.'

11. On the other hand, in a firm-level study, Benfratello and Sembenelli (2002), looking into the effect of foreign ownership on productivity for a large sample of Italian firms, conclude that 'after controlling for unobserved heterogeneity, simultaneity and measurement errors, foreign ownership has no effect on productivity.' However, they also find that foreign firms' nationality matters, since 'firms under US ownership tend to be more productive than firms under national ownership,' suggesting that 'the trans-

fer of knowledge implied by the internalization theory occurs only if the difference between the recipient and the investment country is sufficiently pronounced.’ For a further examination of the role of FDI-related knowledge spillovers, see Bitzer and Kerekes (2005).

12. In the automobile industry, substantial US FDI inflows involving Japanese MNCs have taken place through ‘establishments.’ Evidence shows these firms as possessing relatively more efficient production processes, resulting in lower per-vehicle costs and higher profit margins compared to their American counterparts. For instance, measured in terms of ‘man-days per vehicle’ for North American plants, 1998 data (contained in The Harbour Report, reproduced in *The Economist*, October 10, 1998) show Nissan, Honda and Toyota as operating at less than 2.5, with Ford, Chrysler and GM exceeding 3.0 on the same scale. Another set of data, covering North American operations, released by Harbour and Associates (and reported in *The Wall Street Journal*, June 19, 2003) show these same Japanese firms generating ‘profits per vehicle’ in the range of \$1,214 - \$2,069 vs. Detroit’s Big Three earning \$701 to a negative \$114 during 2002. Similarly, Goldman Sachs’ estimates for 2002 ‘return on invested capital’ for auto manufacturers places Honda, Nissan, and Toyota in the 8% to 12% range, with DaimlerChrysler, GM and Ford achieving rates of between 2% and 4%. For the auto industry, the evidence supports the association between FDI inflows and the lowering of the cost of goods production (Borensztein *et al.*, 1998).

13. Borensztein *et al.* (1998) state that: ‘foreign direct investment flows from industrialized to developing countries to close the technological gap. Foreign direct investment taking place between countries with roughly the same level of technological development may respond to a large extent to other factors, including global firm strategy and market penetration, or to allow firms to circumvent trade restrictions and offset other advantages accorded to domestic producers.’ Also, de Mello (1999) comments that ‘the incorporation of new technologies in countries undergoing a process of industrialization is likely to differ a great deal from that in industrial, technologically advanced economies.’

14. In UNCTAD (1999), similar OLS regressions contain lagged variables. Our tests were repeated using lagged FDI. The results, not reported, are — in terms of both coefficients and significance — quite similar to those found in Table 4.

15. Harrigan (1999) emphasizes the existence of large-size differences between cross-country TFP figures, attributing them to ‘technological differences across the developed countries,’ and to ‘differences in the legal, social, and political environments across countries which have major effects on TFP.’

16. Financial development is shown by prior research to be related to long-run growth. Of course, the U.S. has the most advanced financial and capital markets. Foreign MNCs raise funds in the U.S. through a variety of channels, including listing their shares in the form of American Depository Receipts. This variable, however, may be more pertinent to movements of portfolio flows than direct investments.

17. As outlined by Borensztein *et al.* (1998), this measure reflects ‘(a) government repudiation of contracts, (b) risk of expropriation, (c) rule of law, and (d) bureaucratic quality,’ attributes usually associated with developing countries. Obviously, the U.S. possesses well-established legal and governmental institutions, designed to protect both

corporate entities and individuals. Although considered to be an important positive factor, nonetheless it is reasonable to assume that foreign MNCs are not likely to base their long-term investment decisions in the U.S. on these attributes. Hence, this measure will not be included in our analysis.

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