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## Foreign Portfolio Investment, Foreign Bank Lending, and Economic Growth

J. Benson Durham\*

**Abstract:** In contrast to the empirical literature's focus on foreign direct investment (FDI), this study examines the effects of foreign portfolio investment (FPI) and "other" foreign investment (OFI) on economic growth using data on 88 countries from 1977 through 2000. Most measures suggest that FPI has no effect, and some results indicate that OFI has a negative impact on growth that is somewhat mitigated by initial financial and/or legal development. However, these results are questionable due to possible simultaneity bias. The empirical analyses also examine whether non-FDI foreign investment affects growth indirectly. FPI does not correlate positively with macroeconomic volatility, but the results indicate that the negative indirect effect of OFI through macroeconomic volatility comprises a substantial portion of the gross negative effect of OFI on growth.

**Keywords:** foreign portfolio investment, economic growth, financial development

*JEL* classification: F3, F4, O1

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## 1. Introduction

Whether lower-income countries should have open capital accounts is a highly controversial question. Proponents of unrestricted cross-border investment flows cite positive externalities and productive technology transfers from higher- to lower-income countries (Fisher, 1999; Obstfeld, 1994), while detractors cite frequent financial crises, “boom-and-bust” cycles, and the volatility of foreign investment (FINV) in open economies (Bhagwati, 1998; Boyd and Smith, 1992). A growing empirical literature on the real effects of FINV addresses this theoretical debate. Some recent studies report positive effects of capital flows, namely foreign direct investment (FDI) and equity foreign portfolio investment (EFPI), on macroeconomic indicators (Borzenstein et al. 1998; Bekaert and Harvey, 1998, 2000). However, other studies suggest that the findings regarding these flows are highly sensitive to specification assumptions and/or methodological problems, particularly simultaneity bias (Edison et al., 2002, Durham, 2003).

This study attempts to advance the existing literature in two ways. First, previous studies primarily focus only on those manifestations of FINV that purportedly have positive effects on economic growth – FDI and EFPI. Therefore, this study examines in detail the effect of capital flows that supposedly deter growth, namely total foreign portfolio investment (FPI), bond foreign portfolio investment (BFPI), and other foreign investment (OFI), which includes cross-border bank lending. Recent literature examines the notion that the real effects of FINV on growth depend fundamentally on key initial conditions in recipient countries (Borzenstein et al., 1998; Alfaro et al., 2001; Edison et al., 2002; Durham, 2003). This paper similarly examines the impact of capital flows vis-à-vis the “absorptive capacity” of host countries and therefore approximates the conditions under which FINV promotes or deters growth. In the particular context of FPI, BFPI, and OFI, potential mitigating factors include financial development and legal infrastructure.

Most evidence in this paper suggests that (lagged) FPI does not have a statistically significant effect on economic growth and that absorptive capacity, notably measured across several dimensions, does not affect the impact of FINV (or total investment). More specifically, a few results indicate that OECD data on FPI has a negative impact on expansion, but these findings are somewhat sensitive to specification assumptions and simultaneity bias. In addition, BFPI does not have a negative impact on growth. Also, some evidence does suggest that OFI deters growth, but the results are sensitive to inclusion of an outlying case and, again, simultaneity bias. At least in the case of OFI, initial absorptive capacity conditions seem to play a role – some results suggest that OFI retards (advances) expansion but only for those countries with comparatively less (more) developed financial markets and less (more) favorable corruption ratings.

The second objective of this paper is to examine if FINV affects the real economy indirectly. The existing literature does not attempt to disentangle gross, direct, and indirect effects, and there are perhaps myriad possible channels. The following empirical analyses focus on the role of macroeconomic volatility and therefore address the detractors' emphasis on boom-and-bust cycles. The data indicate that most forms of FINV have no direct effect on the standard deviation of economic growth, all things being equal. The results for OFI suggest that its negative effect through volatility comprises a substantial part of its negative gross effect on economic growth, but the statistical significance of this finding is sensitive to the inclusion of an outlying case.

The organization of the paper is as follows. Section 2 briefly summarizes previous evidence on FINV, including FDI and EFPI, and outlines shortcomings in the empirical literature, with particular respect to the neglect of alternative forms of FPI, BFPI and OFI. Section 3 describes the research design and the specification of the growth regressions. Section 4 presents the empirical results, discusses additional results from instrumental variable (IV)

regressions, and further outlines the growth effects of absorptive capacity via total investment. Section 5 explores possible indirect effects of FINV through macroeconomic volatility, and Section 6 concludes.

## **2. Existing Empirical Literature on Foreign Investment and the Real Economy**

Similar to the theoretical debate, the empirical literature on foreign investment and growth is largely inconclusive. However, there is perhaps a very general tacit prior that some forms of cross-border capital flows are more beneficial or deleterious than others. For example, proponents of open capital accounts argue that FDI is preferable to FPI or OFI. Among its purported virtues, FDI disseminates advanced technological and managerial practices through the host country and thereby exhibits greater positive externalities compared with other forms of FINV. In addition, the data suggest that FDI flows tend to be more stable compared to FPI or FBL (Lipsey, 1999).<sup>1</sup> FDI, while still somewhat fungible, is more costly to reverse and less sensitive to global shocks than FPI or OFI – phenomena that detractors of open capital accounts emphasize. Some literature also distinguishes between different forms of FPI, as Rogoff (1999), for example, express a general preference for equity as opposed to debt finance across borders. To be sure, there is wide disagreement about the overall real effects of open capital accounts, but there also seems to be a subtle consensus that FDI and EFPI are more helpful (according to proponents) or are less harmful (according to detractors) than FPI or OFI.

The empirical literature mostly focuses on the effect of FDI. Most studies do not find a direct unqualified relation between FDI flows and real variables, but a growing literature suggests that whether FDI enhances growth is contingent on additional factors within the host country. These initial conditions that capture the absorptive capacity of host countries include the initial level of development (Blomström et al., 1992), existing human capital development (Borensztein et al., 1998), trade policy (Balaubramanyam et al., 1996), financial development

(Durham, 2003; Alfaro et al., 2001), legal-based variables (Durham, 2003; Edison et al., 2002), and general government policy (Edison et al., 2002).<sup>2</sup> The practical implication of this research is that FDI is not enough – host countries must also exhibit sufficient absorptive capacity to harness FDI toward economic expansion. The message is notably more pessimistic for poorer countries, which are less likely to extol the necessary initial conditions.

Fewer studies examine the effect of equity foreign portfolio investment (EFPI). For example, Bekaert and Harvey (1998, 2000) suggest that private equity flows have a positive direct effect on macroeconomic performance in emerging markets.<sup>3</sup> Also, Durham (2003) finds that the positive effect of EFPI on growth is contingent on financial and legal variables. In particular, EFPI inhibits (promotes) growth in countries with comparatively small (large) equity markets and pervasive (limited) corruption.

While there is some evidence with respect to FDI and EFPI, the empirical literature curiously neglects BFPI and OFI, the very forms of FINV that detractors of open capital accounts emphasize.<sup>4</sup> Therefore, previous studies do not satisfactorily evaluate which particular forms of FINV have beneficial (or deleterious) real effects, test the tacit preference for direct or equity investment, and thus neglect less optimistic views of the effect of open capital accounts. Hence, the first objective of this paper is to assess the real effects of various measures of FPI, BFPI, and OFI.

### 3. Research Design

The first set of empirical analyses of the effect of non-FDI and non-equity forms of FINV on growth include simple OLS cross-sectional regressions,<sup>5</sup> which follow

(1)

$$\text{GROWTH}_{(T)} = \beta_0 + \beta_1 \text{FINV}_{(t)} + \beta_2 \text{FINV}_{(t)} \times \text{FID}_{(t)} + \beta_3 \text{FID}_{(t)} + \beta_4 X + \varepsilon$$

where *GROWTH* is average annual real per capita economic growth over period *T*, *T* denotes 1982-2000; *t* denotes 1977-1981; *FINV* refers to various data sources for FPI, BFPI, or OFI; *FID* refers to some proxy for the level of financial and/or legal development; and **X** is a set of control variables. This paper considers five possible values of *FINV*, including FPI using OECD data, FPI using IFS data, the stock of FPI following Lane and Milesi-Ferretti (2001), BFPI using TIC data, and OFI using IFS data. The flow forms of *FINV* represent the average over *t*,<sup>6</sup> and the stock forms of *FINV* refer to the final year of *t*. The analyses cover six proxies for *FID*, valued at the last year of *t*. These included two financial development absorptive capacity variables in the literature – stock market capitalization to GDP and bank credit to GDP. In addition, four legal-based measures include a business regulation index, a property rights index, a corruption index, and *Institutional Investor's* measure of country credit risk.

The set of control variables, **X**, is similar to the “base regressors” from Levine and Renelt (1992). These include the logarithm of the initial level of real per capita income (valued at the first year of *T*), the average total investment ratio to GDP over *T*, the logarithm of the average years of secondary schooling in the population over the age of 25 (measured in the first year of *T*), and the average population growth rate over *T*. Given the inclusion of the investment ratio in **X**, the regressions test whether FDI affects growth beyond its contribution to total investment. (In addition, the analyses consider alternative components of **X** that include regional dummy variables and exclude the investment ratio.)<sup>7</sup>

This study covers as many cases as possible, given available data on all variables to estimate (1). Data for all six absorptive capacity variables are available for only a very limited number of cases. Therefore, the regressions include all cases for which data are available for each specific measure of *FINV* and *FID*. The complete cross-sectional analysis covers data on 88 low- and high-income countries for at least one absorptive capacity regression.<sup>8</sup>

Some commentary on the particular form of (1) is instructive. If  $\beta_1$  is negative and  $\beta_2$  is positive, the appropriate threshold would be the value of *FID* that makes the sum of the second and third terms positive. The precise break-even point is therefore

(2)

$$FID \geq -\frac{\beta_1}{\beta_2}$$

Of course, if  $\beta_1$  and  $\beta_2$  are both positive (negative), then *FINV* has an unambiguously positive (negative) real effect. With respect to threshold estimates, explicit assessment of the effect of initial financial and legal development levels produces some comparative leverage with respect to the very poorest countries. In the case of a  $\beta_1 < 0$  and a  $\beta_2 > 0$ , the obvious inference for countries with nascent financial markets and lax corporate governance structures would be that unfettered flows are deleterious. With respect to policy, such a result would suggest sequencing from legal reform and/or domestic capital market development to (eventual) liberalization (Durham, 2003).

#### 4. Econometric Results

Tables 1-5 include the results for the five forms of *FINV*, which are evaluated vis-à-vis the six absorptive capacity measures. The analyses also include reference to estimates that address simultaneity bias as well as to additional evidence of the effect of absorptive capacity on the total investment ratio.

#### *4.1. Foreign Portfolio Investment: OECD Data*

Table 1 summarizes the results on FPI using OECD data, which only include flows from OECD countries to lower income countries. In general, most of the evidence suggests that FPI (the average from 1977-1981) does not have a statistically significant impact on growth (the average from 1982-2000). However, Model 1 suggests that FPI is unambiguously deleterious to growth, as the regression suggests that a one percentage point increase in the ratio of FPI to GDP corresponds with an approximate  $-1.396$  percentage point decline in average annual per capita growth rates, although the parameter estimate is only significant with 10 percent confidence.<sup>9</sup> Considering the lowest (Botswana) and highest (Argentina) ratios of FPI to GDP in the regression sample, the coefficient implies about a 2.6 percentage point difference in average annual growth rates (among non-OECD countries). The regression also includes the interaction between FPI and stock market development, which is statistically insignificant and therefore indicates no threshold over which FPI is beneficial for expansion.

None of the remaining models produce significant estimates for FPI, as bank development (Model 2), the business regulation index (Model 3), the property rights index (Model 4), the corruption index (Model 5),<sup>10</sup> and country credit ratings (Model 6) do not have statistically significant effects via their interaction with FPI.

#### *4.2. Foreign Portfolio Investment: IFS Data*

Table 2 examines the effect of FPI on growth using IFS data,<sup>11</sup> which do not distinguish country of origin. The IFS regression sample notably includes developed countries, which might provide useful leverage for estimating thresholds. Turning to the results, none of the regressions produce significant results for FINV or FINV×FID. In addition, alternative compositions of **X** that include regional dummy variables similarly produce no statistically significant results. Also,

regressions that exclude the overall investment ratio (also available on request) suggest a statistically significant, but perverse, interaction between FPI and bank credit – the effect of FPI on growth is positive, but only for cases in which bank credit to GDP is below approximately 80 percent of GDP.<sup>12</sup>

#### 4.3. *The Stock of Foreign Portfolio Investment: Lane and Milesi-Ferretti (2001)*

Both the OECD and the IFS data FPI measure capital *flows*. In contrast, Table 3 examines the effect of the *stock* of FPI inflows (Lane and Milesi-Ferretti, 2001) – a nation’s gross stock of foreign liabilities as a share of GDP.

The results clearly suggest that the stock of FPI (in 1981) does not affect economic growth (during the 1982-2000 period), as none of the six regressions that alternatively include each initial conditions proxy produce a statistically significant coefficient for FINV or FINV×FID. The estimates are similarly insignificant given inclusion of regional dummy variables in **X**, and only the corresponding regression for Model 3 that does not include the investment ratio produces a statistically significant threshold effect vis-à-vis property rights.

#### 4.4. *Bond Foreign Portfolio Investment: TIC Data*

The analysis in this section uses the United States Department of Treasury’s ‘International Capital Form S’, (TIC) which is published on a monthly basis in the *Quarterly Bulletin*.<sup>13</sup> These data indicate fixed income and equity inflows and outflows between United States investors and over 60 countries. Similar to the IFS data, these series also include developed countries, but the data only cover investment flows to and from the United States.

The results in Table 4 refer to the average flows of BFPI over the 1977-1981 period, and notably none of the estimates of BFPI or BFPI×FID are statistically significant.<sup>14</sup> The corresponding regressions that include regional dummy variables also produce insignificant

estimates. Also, the corresponding regression for Model 3 that excludes the investment ratio suggests a significant interaction between BFPI and the business regulation index, at least with 10 percent confidence, but not other estimate is robust.<sup>15</sup>

#### 4.5. OFI: IFS Data

Again, OFI refers to financial flows, primarily bank lending, which are classified as neither FDI nor FPI. These data are from the IFS, and the regression samples include higher-income countries. Presumably, these flows are among the least favorable manifestations, given no equity stake or direct investment in plant, property, and equipment.

Some results suggest that OFI is somewhat deleterious for growth. For example, as Model 5 in Table 5 indicates, the coefficient for OFI is negative, albeit with 10 percent confidence, and the parameter estimate suggests that average per capita growth rates decline about 0.069 percentage points for a one percentage point increase in the size of OFI relative to GDP. The economic significance of the estimate is considerable – in terms of the lowest (New Zealand) and highest (Panama) proportions of OFI in the regression sample, the coefficient implies about a 9.8 percentage-point discrepancy in average growth rates among the extreme values. The interaction term with the *Institutional Investor* country credit rating in Model 5 is positive as expected but statistically insignificant, which suggests that the effect is unambiguously negative. But, these results are somewhat sensitive to the inclusion of an outlying case in the regression sample.<sup>16</sup>

Some results also suggest that OFI only inhibits growth for countries below a certain threshold of financial and/or institutional absorptive capacity. For example, Model 1 indicates that OFI promotes growth, but only for countries with developed stock markets. The parameter estimates produce a comparatively high threshold of stock market development equal to approximately 17 percent of GDP, which only 9 of the 50 cases (18 percent) in the sample

pass.<sup>17</sup> (The regression sample does not include the outlying case of Panama.) Also, the regression (Model 5) that includes the corruption index suggests that OFI is deleterious for growth but only for countries with more prevalent corruption.<sup>18</sup> The threshold is approximately equal to a 3.67 value on the corruption scale, which 44 of the 57 cases (77 percent) pass.<sup>19</sup>

#### *4.6. Potential Simultaneity Bias*

A potential estimation problem with these results is that economic growth, FINV, and FID are perhaps all determined simultaneously. Indeed in general, most empirical studies of economic growth neglect simultaneity bias. Blomström et al. (1992), Borensztein et al. (1998), Balasubramanyam et al. (1996), Alfaro et al. (2001), and Edison et al. (2002) find that simultaneity bias does not affect their inferences, while Durham (2003) notes that simple two-stage least squares (2SLS) regressions are largely unidentified.

Perhaps a controversy in the literature with respect to instrumentation is that some studies – including Blomström et al. (1992), Borensztein et al. (1998), Balasubramanyam et al. (1996), and Alfaro et al. (2001) – use lagged flows as instruments for contemporaneous FINV, while Durham (2003) instruments for lagged FINV, the independent variable in the cross-sectional regressions. The problem with treating lagged flows as instruments rather than as endogenous variables (i.e. Borensztein et al., 1998) is that even lagged flows reflect expectations of economic growth for the contemporaneous sample period (Durham, 2003; Edison et al., 2002).<sup>20</sup> That said, of course, the estimates of the impact of lagged FINV in Tables 1-5 still might exhibit some simultaneity bias.

Therefore, another design follows IV estimation and entails a four-equation 2SLS system with growth, lagged flows, the absorptive capacity variable, and the interaction term as the endogenous variables.<sup>21</sup> The 2SLS regressions use the following instruments, which are similar to those in Durham (2003) and Edison et al. (2002). With respect to FINV, the IV regressions

use legal origin – a dummy variable for British legal heritage, with French, German, and Scandinavian origins as the collective omitted condition (La Porta et al., 1997, 1998, 1999). The instruments for financial and/or legal absorptive capacity follow the growing literature on the determinants of financial system development and growth (Beck et al., 2001). To consider initial political conditions following Rajan and Zingales (2000), the instrument is the index of democracy at the time of independence (following the Polity IV dataset), and to capture the “endowments view” (Acemoglu et al., 2000), the IV regressions employ absolute latitude as a proxy given the limited data availability of mortality rates.

Notably, these simple 2SLS regressions produce no significant estimates for FINV or FINV×FID for any of the alternative measures of foreign investment. Therefore, Tables 1-5 produce few statistically significant results, and those that are robust are possibly subject to simultaneity bias.<sup>22</sup>

#### *4.7. Absorptive Capacity and Total Investment*

With the exception of the interactions between OFI and stock market development and OFI and the corruption index, none of the results in Tables 1-5 suggest that the benevolent impact of FINV is (positively) contingent on the absorptive capacity of the host country. Neither financial variables nor legal-based measures seem to mitigate the effect of FPI or BFPI on growth, and therefore these results do not provide encouraging policy implications.

While recent empirical literature explores the effect of initial conditions on *foreign* investment, these studies do not examine the effect of absorptive capacity on the *total* investment ratio. Simply, the argument that more developed financial markets and legal systems potentially mitigate cross-border investment flows seems equally applicable to overall investment, but previous studies curiously only apply this logic to the small fraction of investment from abroad. For example, Borzenstein et al. (1998) argue that higher-educated populations more efficiently

allocate FDI, but, even though FDI might comprise advanced technologies, similar logic posits an interaction between education and total investment. In addition, the same rationale seems applicable to legal-based measures – the literature suggests that FINV more likely promotes growth given sufficient legal infrastructure, but surely this logic is also germane to domestic capital, as local entrepreneurs are conceivably less likely to invest with, say, insecure property rights.

Therefore, the following regressions examine the six proxies for FID in Tables 1-5, as well as the education rate,<sup>23</sup> vis-à-vis total investment, and the general specification follows

(3)

$$\text{GROWTH}_{(T)} = \gamma_0 + \gamma_1 \text{INV}_{(t)} + \gamma_2 \text{INV}_{(t)} \times \text{FID}_{(t)} + \gamma_3 \text{FID}_{(t)} + \gamma_4 X + \varepsilon$$

where INV is the total investment ratio. Note that (3) permits a threshold effect, but the hypothesis is that  $\gamma_1$  and  $\gamma_2$  are both positive, as overall investment is expected to have an unambiguously positive effect on growth that is pronounced with favorable initial conditions.

Table 6 presents the results for (3) with alternative proxies for FID, including stock market capitalization (Model 1), bank credit to GDP (Model 2), the business regulation index (Model 3), the property rights index (Model 4), the corruption index (Model 5), the *Institutional Investor* country credit rating (Model 6), and initial schooling (Model 7).

None of the regressions support the hypothesis that the positive effect of investment on growth is mitigated by FID variables. In fact, two equations produce very perverse results and suggest that investment has a negative effect on growth for more favorable index values for property rights (Model 4) and corruption (Model 5). However, the precise parameter estimates are out of sample – no country in either regression sample exhibits the negative threshold value for property rights or corruption. The coefficients imply that investment promotes growth but decreasingly so for countries with more secure property rights and less corruption. At the same

time, given the positive and statistically significant values for  $\gamma_3$ , countries with more favorable property rights and corruption ratings on average have faster growth rates.

In general, estimates of (3) do not support the view that FID variables mitigate the effect of total investment on growth. While proxies are ultimately crude, these ambiguous results are curious and somewhat discouraging, given that financial and legal development is largely superlative and unproblematic. At this juncture, the data seem to suggest that absorptive capacity measures largely do not contribute to our understanding of the effect of total investment, much less FINV, on growth.

### 5. Possible Indirect Effects: Macroeconomic Volatility

The previous section and indeed the existing literature exclusively examine whether there is a direct effect of foreign investment on growth. But, cross-border investment might affect growth indirectly through other channels. In particular, again, some economists (Bhagwati, 1998) argue that capital flows precipitate financial crises and “boom-and-bust cycles” that in turn presumably deter economic expansion, as in

(4)

$$FINV \Rightarrow \uparrow \text{MacroeconomicVolatility} \Rightarrow \downarrow \text{EconomicGrowth} .$$

Some empirical literature, including Ramey and Ramey (1995) and Aizenman and Marion (1996), supports the second half of this simple transmission mechanism and suggests that the mean of economic growth correlates negatively with its variance. The problem seems particularly germane to lower income countries, and Caprio and Honohan (1999) note that non-OECD countries in Sub-Saharan Africa, the Middle East, and North Africa exhibited more than twice the volatility of GDP growth compared to higher-income countries from 1970 to 1997.

This section briefly explores the relations between FINV, macroeconomic volatility, and growth with respect to the following set of regression equations, as in

$$\text{GROWTH}_{(T)} = \alpha_0 + \alpha_1 \mathbf{X} + \alpha_2 \text{FINV}_{(t)} + \varepsilon_a$$
(5b)

$$\text{GROWTH}_{(T)} = \beta_0 + \beta_1 \mathbf{X} + \beta_2 \text{FINV}_{(t)} + \beta_3 \sigma_{\text{GROWTH}_{(T)}} + \varepsilon_b$$
(5c)

$$\sigma_{\text{GROWTH}_{(T)}} = \delta_0 + \delta_1 \mathbf{Z} + \delta_2 \text{FINV}_{(t)} + \varepsilon_c.$$

where  $\sigma_{\text{GROWTH}}$  is the standard deviation of annual growth rates during  $T$  (1982-2000), and  $\mathbf{Z}$  includes the control variables – the initial level of per capita GDP (1981) (as a proxy for the general diversification of the economy), the mean and variance of inflation during  $T$  (as a proxy for supply-side shocks), average exchange rate volatility, trade openness, and the interaction between exchange rate volatility and trade openness during  $T$  (Denizer et al. 2002).

If FINV in fact influences growth through macroeconomic volatility, then estimates of  $\alpha_2$  are biased –  $\alpha_2$  measures the gross (indirect and direct) effect of FINV on growth.<sup>24</sup> Assuming FINV affects growth exclusively through its impact on volatility, then (5b) should produce statistically insignificant coefficients for FINV ( $\beta_2$ ). Also, if FINV works through boom-and-bust cycles, then (5b) should produce statistically significant and positive estimates for  $\delta_2$ . In general, (5a, 5b, and 5c) enable direct comparisons between the direct effect of FINV,  $\beta_2$ , and its indirect effect,  $\delta_2 \times \beta_3$ , under the key assumption that (5b) is the true specification of growth.

Turning to the results in Table 7, Model (1a) indicates that FPI using the OECD has a statistically significant and negative (gross) effect on economic growth, as the coefficient implies that a one percentage-point increase in the ratio of FPI to GDP corresponds with a 0.227 percentage point decline in average growth rates. Considering the lowest (Trinidad and Tobago) and highest levels (Panama) of FPI in the regression sample during the 1977-1981 period, the coefficient implies about a 2.14 percentage point differential in growth rates between these

extremes. According to Model (1b), the direct effect of FINV on growth is smaller, as  $\beta_2$  is equal to  $-0.178$ , which implies the gross affect also comprises some indirect effect through macroeconomic volatility. However, while the coefficient for volatility ( $\beta_3$ ) in Model 1b is statistically significant, the estimate of the effect of FINV on  $\sigma_{\text{GROWTH}}$  from Model 1c is not robust – FPI does not appear to exacerbate the severity of the business cycle.

The results for the remaining proxies for FPI, the IFS and stock data, indicate that the estimates of  $\alpha_2$  (Models 2a and 3a),  $\beta_2$  (Models 2b and 3b), and  $\delta_2$  (Models 2c and 3c) are statistically insignificant from zero, although  $\sigma_{\text{GROWTH}}$  seems to have a negative impact on growth. In other words, the gross, direct, and indirect effect of FDI on growth is insignificant using the IFS and stock data, and FINV does not affect  $\sigma_{\text{GROWTH}}$ . Similarly, Models 4a-4c in Table 7 (continued) suggest that BFPI does not have a direct or an indirect effect on growth or a direct effect on macroeconomic volatility.

However, the gross negative effect of OFI on growth can be decomposed into statistically significant and negative direct and indirect effects. According to Model 5a, the gross effect is negative and statistically significant, as  $\alpha_1$  suggests that average growth declines about 0.007 percent for a one percentage-point increase in OFI to GDP. Considering the cases in the regression sample with the lowest (New Zealand) and the highest (Panama) values of OFI, the coefficient implies a one percentage-point annual discrepancy in average annual growth rates. The direct effect controlling for  $\sigma_{\text{GROWTH}}$  is smaller, as  $\beta_2$  is equal to  $-0.004$ . The indirect effect,  $\delta_2 \times \beta_3$ , given that  $\sigma_{\text{GROWTH}}$  is statistically significant in Model 5b, and that OFI is statistically significant and positive in Model 5c, is approximately equal to  $-0.0038$ . Therefore, the direct negative effect of OFI and its indirect effect through macroeconomic volatility are roughly equivalent.<sup>25</sup>

While this paper focuses on FPI and OFI, possible indirect effects given other forms of flows, particularly FDI and EFPI, are noteworthy.<sup>26</sup> In short, the results for FDI are somewhat contradictory. The OECD data suggest that FDI has a statistically significant gross negative direct effect on growth, is primarily composed of a direct effect, although the indirect effect through  $\sigma_{\text{GROWTH}}$  is also statistically significant, however smaller in magnitude. But, the IFS data, which include higher-income countries, indicate that FDI has a positive gross and direct effect on growth,<sup>27</sup> with an insignificant indirect effect, while the stock data on FDI produce no significant estimates for  $\alpha_2$ ,  $\beta_2$ , or  $\delta_2$ . Finally, data on EFPI also produce no significant estimates.

## 6. Conclusions

There is little consensus in the empirical literature on the real effects of foreign investment, although some studies emphasize the effect of initial conditions or “absorptive capacity” of host countries on their ability to harness foreign capital toward productive enterprises. The growing list of potentially important factors includes human capital, trade openness, financial development, and various legal variables. Previous studies primarily focus on FDI, and indeed the conventional wisdom suggests that direct investment in plant, property and equipment, or to a less degree, equity investment is preferable to fixed income flows or foreign bank loans. Again, however ambiguous the effect of FDI on growth, the literature does not satisfactorily examine the effect of FPI, BFPI, and OFI on growth – forms of capital flows that are presumably more deleterious to growth.

Most results in this paper suggest that FPI, BFPI, and OFI have no statistically significant effect on growth – among the 60 estimates of the effects of foreign investment (FINV) and its interaction with absorptive capacity (FINV×FID), only six are statistically significant. Some results using the OECD data on FPI indicate a negative impact that notably is not contingent on

the absorptive capacity of host countries, and additional data suggest that OFI is more likely to enhance expansion the larger equity markets and the more favorable corruption ratings in the host country. However, the exogenous components of  $FINV$  and  $FINV \times FID$  in these regressions are statistically insignificant given IV estimation.

Future empirical work might proceed in two directions. First, additional research on absorptive capacity variables would be instructive. Existing proxies are somewhat crude, and the results in Section 4 as well as in other recent studies (Edison et al., 2002; Durham, 2003), largely indicate that most of these proxies are insignificant. Moreover, the results in Section 4.7 indicate that the expanding set of possible initial conditions also does not advance our understanding of the effect of total (much less foreign) investment on growth. However, as Edison et al. (2002) note, higher-income countries tend to have comparatively open capital accounts, developed financial markets, and secure legal systems. Whatever the econometric results, this fact suggests that these variables are somehow related.

Second, similar to other variables in the wider empirical literature on economic growth, future research on the indirect effects of cross-border financial flows on growth would be useful. Section 6 briefly focuses on one possible path through macroeconomic volatility, which detractors of open capital accounts commonly emphasize. With the exception of OFI, the results suggest that  $FINV$  does not affect macroeconomic volatility, and growth regressions that include the standard deviation of growth are no less likely to produce statistically significant estimates of  $FINV$  or  $FINV \times FID$ . Nonetheless, empirical analysis of additional indirect channels might be instructive.

Meanwhile at this juncture, the evidence implies that the case for FDI and EFPI as opposed to FPI and OFI has been somewhat overstated. At the same time, comparatively few data support the view that other forms of foreign investment retard growth either directly or indirectly through boom-and-bust cycles and financial crises. Also, the data do not necessarily

support tacit proscriptions regarding absorptive capacity that lower income countries must have certain financial systems or legal standards in order to effectively allocate foreign investment. In short, neither the proponents nor the detractors of open capital accounts are completely wrong.

## Endnotes

<sup>1</sup> Alfaro et al. (2001) also note that FDI has become more common as opposed to other forms of FINV.

<sup>2</sup> These studies vary in their assessment of the robustness of the results. On the one hand, Blomström et al. (1992), Borensztein et al. (1998), Balaubramanyam et al. (1996), and Alfaro et al. (2001) generally suggest that the relation between FDI and the respective intervening variable under consideration is robust. On the other hand, Durham (2003) finds that most estimates are not statistically significant, but a few results are notably robust to sensitivity analyses, while Edison et al. (2002) maintain that there are very few statistically significant relations.

<sup>3</sup> Specifically, they find that growth increased in 14 of 19 lower-income countries under study.

<sup>4</sup> Edison et al. (2002) include (IFS data on) FPI in their measure of flows and inflows of capital – which also comprises FDI. They note that their results are insensitive to separate inclusion of either FDI or FPI. As indicated below, this paper also uses OECD and TIC data, which notably distinguish between fixed income and equity flows, on FPI.

<sup>5</sup> The regressions use the Huber/White/sandwich estimator for robust standard errors.

<sup>6</sup> Cases must include data for each year of the averaging period to be included in the sample.

<sup>7</sup> Complete results for all compositions of **X** are available on request.

<sup>8</sup> The 88 countries are listed in Appendix 2.

<sup>9</sup> This result is not sensitive to alternative compositions of **X**. For example, if **X** includes regional dummy variables, Model 1 produces a significant estimate with at least 5 percent confidence. Also, if **X** excludes the overall investment ratio, then Model 1 similarly produces significant negative estimates of the effect of FPI, at least with 10 percent confidence.

<sup>10</sup> Curiously, Model 5 produces a significantly positive (with 10 percent confidence) estimate for FINV if **X** includes regional dummy variables.

<sup>11</sup> Again, Edison et al. (2002) also use IFS data but include FDI in their proxies for flows and inflows of capital.

<sup>12</sup> Approximately 69 percent (21 of 32 cases) of the regression sample is below this threshold.

<sup>13</sup> For a detailed discussion of the TIC data see Griever et al. (2001).

<sup>14</sup> These results are available on request.

<sup>15</sup> Regressions that include the standard deviation of BFPI are available on request. None of these estimates are statistically significant.

<sup>16</sup> As Appendix 2 indicates, the level of OFI for Panama (139.91 percent of GDP) is exceptional, greater than 20 times the average value. Moreover, average annual per capita growth in Panama from during the 1982-2000 period (0.66 percent) was approximately half the average (1.30 percent). Notably, the corresponding regression that excludes this outlying case produces a larger negative coefficient, but the estimate is statistically insignificant.

<sup>17</sup> The regression sample for Model 1 does not include Panama, and therefore this particular result is not sensitive to the inclusion of an outlying case (which might, in fact, be particularly interesting). Countries in the regression sample that do not pass the threshold include Argentina, Austria, Bangladesh, Belgium, Bolivia, Botswana, Brazil, Cameroon, Central African Republic, Colombia, Costa Rica, Dominican Republic, Ecuador, France, Germany, Ghana, Guatemala, Guyana, Haiti, India, Italy, Kenya, Korea, Lesotho, Malawi, Mali, Mauritius, Nicaragua, Niger, Pakistan, Paraguay, Philippines, Portugal, Rwanda, Senegal, Spain, Sri Lanka, Sweden, Thailand, Tunisia, and Turkey. Australia, Canada, Greece, Japan, Malaysia, Netherlands, Switzerland, the United Kingdom, and the United States do pass the threshold for stock market development.

<sup>18</sup> The alternative compositions of **X** produce somewhat different results. For example, the regressions that include regional dummy variables in **X** only corroborate the statistically significant threshold relation with stock market development (with 10 percent confidence). The regression that exclude the investment ratio only corroborate the findings for Model 1, but the interaction term with the business regulation threshold relation is statistically significant.

<sup>19</sup> Bangladesh, Bolivia, Guatemala, Guyana, Haiti, Honduras, Jamaica, Pakistan, Panama, Paraguay, Philippines, Sierra Leone, and Togo do not pass the corruption threshold. Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Finland, France, Germany, Ghana, Greece, Iceland, India, Ireland, Israel, Italy, Japan, Kenya, Korea, Malaysia, Malta, Netherlands, New Zealand, Niger, Norway, Peru, Portugal, Senegal, Spain, Sri Lanka, Sweden, Switzerland, Syria, Thailand, Trinidad and Tobago, the United Kingdom, the United States, and Zimbabwe do pass the threshold.

<sup>20</sup> Perhaps FDI is more problematic in this regard. Direct investment in plant, property, and equipment might not inform growth rates until later periods.

<sup>21</sup> Complete 2SLS regressions are available on request.

<sup>22</sup> But then again, the extent to which the instruments fully identify the endogenous variables limits the 2SLS results.

<sup>23</sup> Section 5 does not consider the education rate as a potentially intervening factor with respect to FPI. Rather, following the literature, human capital seems more relevant to FDI.

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<sup>24</sup> Alternatively,

$$\alpha_2 = \beta_2 + \delta_2\beta_3 + \mu$$

where  $\mu$  is an error term.

<sup>25</sup> The corresponding set of regressions that exclude the outlying case of Panama produce insignificant estimates of  $\alpha_2$ ,  $\beta_2$ , and  $\delta_2$ , although  $\alpha_2$  and  $\beta_2$  are larger.

<sup>26</sup> Complete results using OECD, IFS, TIC, and stock data for FDI and EFPI are available on request.

<sup>27</sup> This is generally consistent with Durham (2003). He finds that OECD (IFS) data produce a marginally significant negative (positive) effect using somewhat different samples and averaging periods.

**Table 1: Cross-Sectional OLS Growth Regressions (Robust Standard Errors)  
FPI (OECD data)**

	(1)	(2)	(3)	(4)	(5)	(6)
Investment Ratio (Average)	0.178 (0.039)**	0.179 (0.024)**	0.196 (0.024)**	0.172 (0.029)**	0.177 (0.023)**	0.170 (0.027)**
Initial GDP per capita (log)	-0.176 (0.391)	-0.560 (0.247)*	-0.903 (0.274)**	-0.877 (0.247)**	-1.249 (0.262)**	-0.897 (0.292)**
Population Growth (Average)	-0.532 (0.606)	-0.654 (0.268)*	-0.431 (0.319)	-0.387 (0.311)	-0.741 (0.252)**	-1.114 (0.322)**
Initial Schooling	0.388 (0.278)	0.471 (0.243)+	0.905 (0.384)*	0.974 (0.302)**	1.072 (0.266)**	0.728 (0.616)
FPI (OECD)	-1.396 (0.714)+	-0.952 (0.650)	-0.468 (1.073)	-0.801 (0.547)	0.318 (0.424)	0.218 (1.167)
FPI (OECD) × Stock Market Capitalization/GDP	-0.047 (0.081)					
Stock Market Capitalization/GDP	0.010 (0.022)					
FPI (OECD) × Bank Credit/GDP		0.011 (0.009)				
Bank Credit to GDP		-0.002 (0.013)				
FPI (OECD) × Regulation Index			0.104 (0.359)			
Regulation Index			0.285 (0.422)			
FPI (OECD) × Property Rights Index				0.221 (0.183)		
Property Rights Index				0.400 (0.307)		
FPI (OECD) × Corruption Index					-0.111 (0.124)	
Corruption Index					0.500 (0.152)**	
FPI (OECD) × II Country Credit Index						-0.010 (0.029)
II Country Credit Index						0.018 (0.017)
Constant	1.568 (3.211)	4.179 (1.910)*	5.065 (2.251)*	4.561 (2.210)*	6.922 (2.181)**	7.049 (2.520)**
Observations	38	59	37	37	37	43
Adjusted R-squared	0.54	0.50	0.58	0.61	0.66	0.52

Robust standard errors in parentheses

+ significant at 10%; \* significant at 5%; \*\* significant at 1%

**Table 2: Cross-Sectional OLS Growth Regressions (Robust Standard Errors)  
FPI (IFS data)**

	(1)	(2)	(3)	(4)	(5)	(6)
Investment Ratio (Average)	0.180 (0.039)**	0.169 (0.021)**	0.173 (0.028)**	0.154 (0.029)**	0.180 (0.031)**	0.162 (0.026)**
Initial GDP per capita (log)	-0.665 (0.289)*	-0.707 (0.228)**	-1.003 (0.197)**	-1.016 (0.184)**	-1.313 (0.239)**	-0.953 (0.248)**
Population Growth (Average)	-0.363 (0.430)	-0.590 (0.213)**	-0.664 (0.289)*	-0.567 (0.275)*	-0.729 (0.260)**	-0.919 (0.250)**
Initial Schooling	0.452 (0.305)	0.432 (0.255)+	0.642 (0.284)*	0.686 (0.242)**	0.714 (0.267)**	0.504 (0.447)
FPI (IFS)	-0.146 (0.336)	1.222 (0.854)	-1.138 (1.631)	0.295 (1.264)	0.486 (0.747)	0.576 (1.011)
FPI (IFS) × Stock Market Capitalization/GDP	0.010 (0.016)					
Stock Market Capitalization/GDP	-0.010 (0.013)					
FPI (IFS) × Bank Credit/GDP		-0.015 (0.011)				
Bank Credit to GDP		0.001 (0.008)				
FPI (IFS) × Regulation Index			0.393 (0.529)			
Regulation Index			0.302 (0.338)			
FPI (IFS) × Property Rights Index				-0.036 (0.290)		
Property Rights Index				0.448 (0.294)		
FPI (IFS) × Corruption Index					-0.040 (0.088)	
Corruption Index					0.256 (0.106)*	
FPI (IFS) × II Country Credit Index						-0.005 (0.012)
II Country Credit Index						-0.001 (0.013)
Constant	4.228 (2.987)	4.905 (1.933)*	6.364 (1.864)**	5.876 (1.845)**	8.110 (1.791)**	7.591 (2.221)**
Observations	51	77	58	58	58	60
Adjusted R-squared	0.45	0.48	0.56	0.56	0.57	0.45

Robust standard errors in parentheses

+ significant at 10%; \* significant at 5%; \*\* significant at 1%

**Table 3: Cross-Sectional OLS Growth Regressions (Robust Standard Errors)  
FPI (stock data, Lane and Milesi-Ferretti, 2001)**

	(1)	(2)	(3)	(4)	(5)	(6)
Investment Ratio (Average)	0.179 (0.041)**	0.184 (0.027)**	0.170 (0.025)**	0.161 (0.027)**	0.162 (0.031)**	0.175 (0.024)**
Initial GDP per capita (log)	-0.907 (0.279)**	-1.134 (0.312)**	-1.046 (0.217)**	-0.945 (0.212)**	-1.262 (0.170)**	-1.356 (0.276)**
Population Growth (Average)	-0.944 (0.408)*	-1.051 (0.240)**	-0.831 (0.237)**	-0.661 (0.263)*	-0.861 (0.197)**	-1.092 (0.251)**
Initial Schooling	-0.456 (0.526)	-0.074 (0.505)	0.291 (0.318)	0.301 (0.322)	0.323 (0.327)	0.415 (0.397)
FPI (Stock) (Lane and Milesi-Ferretti, 2001)	0.007 (0.207)	-0.008 (0.138)	0.293 (0.345)	-0.214 (0.442)	-0.063 (1.019)	0.050 (0.409)
FPI (stock) × Stock Market Capitalization/GDP	-0.000 (0.008)					
Stock Market Capitalization/GDP	0.008 (0.016)					
FPI (stock) × Bank Credit/GDP		0.000 (0.002)				
Bank Credit to GDP		0.000 (0.008)				
FPI (stock) × Regulation Index			-0.079 (0.085)			
Regulation Index			0.462 (0.260)+			
FPI (stock) × Property Rights Index				0.039 (0.090)		
Property Rights Index				0.283 (0.297)		
FPI (stock) × Corruption Index					0.002 (0.102)	
Corruption Index					0.271 (0.097)**	
FPI (stock) × II Country Credit Index						-0.001 (0.004)
II Country Credit Index						0.006 (0.014)
Constant	7.445 (2.696)*	9.282 (2.459)**	6.789 (1.923)**	6.239 (2.058)**	8.515 (1.279)**	10.868 (2.343)**
Observations	36	51	40	40	41	49
Adjusted R-squared	0.50	0.53	0.63	0.60	0.63	0.60

Robust standard errors in parentheses

+ significant at 10%; \* significant at 5%; \*\* significant at 1%

**Table 4: Cross-Sectional OLS Growth Regressions (Robust Standard Errors)  
BFPI (TIC data)**

	(1)	(2)	(3)	(4)	(5)	(6)
Investment Ratio (Average)	0.188 (0.030)**	0.175 (0.025)**	0.178 (0.023)**	0.158 (0.031)**	0.176 (0.031)**	0.170 (0.026)**
Initial GDP per capita (log)	-1.209 (0.264)**	-1.183 (0.218)**	-1.523 (0.255)**	-1.128 (0.245)**	-1.642 (0.211)**	-1.209 (0.209)**
Population Growth (Average)	-0.973 (0.425)*	-0.985 (0.287)**	-1.194 (0.282)**	-0.775 (0.320)*	-1.215 (0.295)**	-0.907 (0.271)**
Initial Schooling	0.273 (0.383)	0.158 (0.389)	0.644 (0.346)+	0.097 (0.473)	0.360 (0.364)	0.120 (0.479)
BFPI	-0.457 (1.174)	0.539 (0.985)	-1.866 (1.949)	0.346 (1.816)	0.425 (1.136)	0.377 (0.897)
BFPI (TIC) × Stock Market Capitalization/GDP	0.027 (0.031)					
Stock Market Capitalization/GDP	0.004 (0.014)					
BFPI (TIC) × Bank Credit/GDP		-0.002 (0.009)				
Bank Credit to GDP		0.002 (0.007)				
BFPI (TIC) × Regulation Index			0.530 (0.512)			
Regulation Index			0.587 (0.332)+			
BFPI (TIC) × Property Rights Index				-0.031 (0.418)		
Property Rights Index				0.565 (0.359)		
BFPI (TIC) × Corruption Index					-0.006 (0.138)	
Corruption Index					0.252 (0.130)+	
BFPI (TIC) × II Country Credit Index						0.000 (0.012)
II Country Credit Index						0.010 (0.016)
Constant	9.338 (2.409)**	9.396 (1.707)**	10.583 (1.777)**	6.779 (2.814)*	11.792 (1.644)**	9.165 (1.699)**
Observations	32	40	35	35	36	41
Adjusted R-squared	0.67	0.58	0.72	0.69	0.66	0.56

Robust standard errors in parentheses

+ significant at 10%; \* significant at 5%; \*\* significant at 1%

**Table 5: Cross-Sectional OLS Growth Regressions (Robust Standard Errors)  
OFI (IFS data)**

	(1)	(2)	(3)	(4)	(5)	(6)
Investment Ratio (Average)	0.193 (0.039)**	0.169 (0.022)**	0.171 (0.029)**	0.162 (0.027)**	0.182 (0.030)**	0.160 (0.025)**
Initial GDP per capita (log)	-0.631 (0.250)*	-0.645 (0.221)**	-0.913 (0.181)**	-1.002 (0.181)**	-1.288 (0.239)**	-0.977 (0.251)**
Population Growth (Average)	-0.196 (0.401)	-0.630 (0.205)**	-0.569 (0.271)*	-0.494 (0.261)+	-0.654 (0.245)*	-0.854 (0.253)**
Initial Schooling	0.453 (0.264)+	0.463 (0.262)+	0.570 (0.276)*	0.786 (0.228)**	0.824 (0.260)**	0.699 (0.472)
OFI (IFS)	-0.151 (0.074)*	-0.043 (0.040)	-0.267 (0.160)	-0.116 (0.071)	-0.044 (0.024)+	-0.069 (0.040)+
OFI (IFS) × Stock Market Capitalization/GDP	0.009 (0.005)+					
Stock Market Capitalization/GDP	-0.055 (0.040)					
OFI (IFS) × Bank Credit/GDP		0.001 (0.001)				
Bank Credit to GDP		-0.009 (0.007)				
OFI (IFS) × Regulation Index			0.087 (0.053)			
Regulation Index			0.025 (0.393)			
OFI (IFS) × Property Rights Index				0.037 (0.023)		
Property Rights Index				0.205 (0.298)		
OFI (IFS) × Corruption Index					0.012 (0.007)+	
Corruption Index					0.182 (0.106)+	
OFI (IFS) × II Country Credit Index						0.002 (0.001)
II Country Credit Index						-0.008 (0.014)
Constant	4.239 (2.527)	5.153 (1.788)**	6.505 (1.717)**	6.374 (1.674)**	8.136 (1.730)**	8.156 (2.343)**
Observations	50	76	57	57	57	59
Adjusted R-squared	0.48	0.46	0.56	0.57	0.57	0.43

Robust standard errors in parentheses

+ significant at 10%; \* significant at 5%; \*\* significant at 1%

**Table 6: Cross-Sectional OLS Growth Regressions (Robust Standard Errors)  
Total Investment Interaction Terms**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Investment Ratio (Average)	0.192 (0.041)**	0.219 (0.035)**	0.152 (0.108)	0.335 (0.109)**	0.310 (0.071)**	0.249 (0.071)**	0.184 (0.024)**
Initial GDP per capita (log)	-0.761 (0.274)**	-0.910 (0.272)**	-1.009 (0.185)**	-1.019 (0.184)**	-1.202 (0.227)**	-1.285 (0.273)**	-0.892 (0.300)**
Population Growth (Average)	-0.457 (0.395)	-0.783 (0.229)**	-0.633 (0.258)*	-0.524 (0.242)*	-0.712 (0.228)**	-0.904 (0.258)**	-0.744 (0.217)**
Initial Schooling	0.446 (0.293)	0.566 (0.276)*	0.674 (0.270)*	0.692 (0.202)**	0.799 (0.244)**	0.742 (0.384)+	0.685 (0.277)*
Investment Ratio × Stock Market Capitalization/GDP	-0.000 (0.001)						
Stock Market Capitalization/GDP	0.009 (0.022)						
Investment Ratio × Bank Credit/GDP		-0.001 (0.001)					
Bank Credit to GDP		0.007 (0.015)					
Investment Ratio × Regulation Index			0.008 (0.034)				
Regulation Index			0.294 (0.635)				
Investment Ratio × Property Rights Index				-0.043 (0.025)+			
Property Rights Index				1.135 (0.469)*			
Investment Ratio × Corruption Index					-0.024 (0.012)*		
Corruption Index					0.643 (0.238)**		
Investment Ratio × II Country Credit Index						-0.001 (0.001)	
II Country Credit Index						0.032 (0.023)	
Investment Ratio × Initial Schooling							-0.014 (0.022)
Constant	4.831 (2.860)+	6.300 (2.263)**	6.382 (2.512)*	3.194 (2.244)	5.468 (2.125)*	8.404 (2.554)**	6.533 (2.425)**
Observations	57	86	62	62	61	69	90
Adjusted R-squared	0.48	0.53	0.57	0.61	0.62	0.55	0.52
Robust standard errors in parentheses							
+ significant at 10%; * significant at 5%; ** significant at 1%							

**Table 7: Cross-Sectional Growth and Volatility OLS Regressions  
FPI (OECD, IFS, and stock data (Lane and Milesi-Ferretti, 2001))**

	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)
	Average Annual per capita GDP growth	Average Annual per capita GDP growth	Annual per capita GDP growth (Std. Dev.)	Average Annual per capita GDP growth	Average Annual per capita GDP growth	Annual per capita GDP growth (Std. Dev.)	Average Annual per capita GDP growth	Average Annual per capita GDP growth	Annual per capita GDP growth (Std. Dev.)
Investment Ratio (Average)	0.179 (0.021)**	0.167 (0.021)**		0.164 (0.021)**	0.158 (0.023)**		0.184 (0.024)**	0.190 (0.022)**	
Initial GDP per capita (log)	-0.494 (0.266)+	-0.363 (0.242)	-0.243 (0.331)	-0.713 (0.213)**	-0.714 (0.188)**	-0.574 (0.192)**	-1.130 (0.286)**	-1.157 (0.272)**	-0.254 (0.177)
Population Growth (Average)	-0.659 (0.255)*	-0.705 (0.217)**		-0.626 (0.216)**	-0.553 (0.196)**		-1.053 (0.235)**	-0.893 (0.231)**	
Initial Schooling	0.462 (0.283)	0.180 (0.269)		0.416 (0.270)	0.226 (0.266)		-0.071 (0.508)	-0.090 (0.483)	
FPI (OECD)	-0.227 (0.104)*	-0.178 (0.105)+	0.133 (0.092)						
FPI (IFS)				0.165 (0.293)	0.250 (0.300)	0.312 (0.240)			
FPI (Stock) (Lane and Milesi-Ferretti, 2001)							0.015 (0.028)	0.001 (0.022)	-0.022 (0.042)
Annual per capita GDP growth (Std. Dev.)		-0.297 (0.116)*			-0.251 (0.089)**			-0.275 (0.115)*	
Inflation (Average)			-0.000 (0.003)			0.001 (0.003)			0.004 (0.006)
Inflation (Variance)			0.000 (0.001)			-0.000 (0.001)			-0.001 (0.002)
Exchange Rate Volatility			0.936 (0.990)			1.239 (0.823)			0.699 (0.888)
Trade Openness (Exports + Imports (% GDP))			0.002 (0.005)			0.005 (0.004)			0.006 (0.004)
Exchange Rate Volatility × Trade Openness			-0.010 (0.019)			-0.009 (0.015)			-0.001 (0.015)
Constant	3.600 (2.228)	4.034 (1.866)*	5.466 (2.509)*	5.142 (1.962)*	5.951 (1.596)**	7.114 (1.856)**	9.276 (2.352)**	10.024 (2.217)**	4.402 (1.634)*
Observations	61	61	61	78	78	78	51	51	51
Adjusted R-squared	0.52	0.59	-0.09	0.48	0.53	0.16	0.55	0.59	0.11

Robust standard errors in parentheses

+ significant at 10%; \* significant at 5%; \*\* significant at 1%

**Table 7 (Continued): Cross-Sectional Growth and Volatility OLS Regressions  
BFPI (TIC data) and OFI (IFS data)**

	(4a)	(4b)	(4c)	(5a)	(5b)	(5c)
	Average Annual per capita GDP growth	Average Annual per capita GDP growth	Annual per capita GDP growth (Std. Dev.)	Average Annual per capita GDP growth	Average Annual per capita GDP growth	Annual per capita GDP growth (Std. Dev.)
Investment Ratio (Average)	0.177 (0.021)**	0.179 (0.021)**		0.165 (0.021)**	0.159 (0.023)**	
Initial GDP per capita (log)	-1.155 (0.199)**	-1.182 (0.196)**	-0.461 (0.239)+	-0.684 (0.215)**	-0.670 (0.194)**	-0.514 (0.187)**
Population Growth (Average)	-0.927 (0.278)**	-0.844 (0.259)**		-0.590 (0.218)**	-0.517 (0.199)*	
Initial Schooling	0.237 (0.365)	0.166 (0.412)		0.443 (0.264)+	0.262 (0.260)	
BFPI	0.348 (0.357)	0.326 (0.311)	0.176 (0.516)			
OFI (IFS)				-0.007 (0.002)**	-0.004 (0.002)+	0.016 (0.004)**
Annual per capita GDP growth (Std. Dev.)		-0.160 (0.132)			-0.240 (0.089)**	
Inflation (Average)			-0.006 (0.005)			0.001 (0.003)
Inflation (Variance)			0.004 (0.002)**			-0.000 (0.001)
Exchange Rate Volatility			1.302 (1.486)			1.274 (0.825)
Trade Openness (Exports + Imports (% GDP))			0.008 (0.004)+			0.005 (0.004)
Exchange Rate Volatility × Trade Openness			-0.012 (0.030)			-0.009 (0.015)
Constant	9.149 (1.639)**	9.770 (1.593)**	5.986 (2.360)*	4.938 (1.944)*	5.593 (1.605)**	6.623 (1.841)**
Observations	41	41	41	77	77	77
Adjusted R-squared	0.57	0.59	0.37	0.47	0.51	0.17

Robust standard errors in parentheses  
+ significant at 10%; \* significant at 5%; \*\* significant at 1%

## Appendix 1: Data Sources

<u>Variable(s):</u>	<u>Source:</u>
Real per capita GDP, Population Growth	World Development Indicators 2000, The World Bank (WDI 2002)
Total Investment	Penn World Table 6.1
Male Education Rates	Barro and Lee (2000)
Stock Market Size	WDI 2002, <i>Emerging Markets Factbook</i> (IFC), various issues, Levine and Zervos, 1998a
Bank Credit to GDP	WDI 2002
Business Regulation Index	Levine (2000)
Property Rights Index	La Porta et al. (1998)
Corruption Index	Knack and Keefer (1995)

## Appendix 2: Data Values, 1977-1981, 1982-2000

Country	GROWTH	FPI (OECD)	FPI (IFS)	FPI (stock)	BFPI (TIC)	OFI (IFS)	Stock Market Size/GDP	Bank Credit/GDP	Regulation Index	Property Rights Index	Corruption Index	II Country Credit
Algeria	-0.23	1.09	0.00	0.00		6.71		65.07				55.30
Argentina	0.49	1.28	0.42	0.00	0.02	1.83	1.79	33.70	4	4	6.01	42.73
Australia	2.03		0.93	2.00	0.07	1.03	19.66	40.84	3	5	8.51	89.40
Austria	2.03		1.99	0.08	0.09	5.53	3.11	86.06	3	5	8.57	82.48
Bangladesh	2.28	0.00	0.00			3.26	0.23	16.70	1	2	1.01	
Barbados	1.26	-0.16	0.23			9.53		41.67	3	3		
Belgium	1.96		0.59		0.44	25.76	13.26	6.02	3	5	8.81	75.71
Benin	0.35	0.04	0.00			8.88		19.57				
Bolivia	-0.23	0.33	-0.02	0.00		10.95	0.00	26.81	2	3	2.80	15.51
Botswana	4.27	-0.60	0.13	0.00		2.40	0.00	4.27				
Brazil	0.79	0.94	0.09	0.00	0.03	3.46	13.50	48.63	3	3	6.31	50.93
Cameroon	-1.05	0.93	0.00			5.11	0.00	24.80				
Canada	1.58		2.14	18.99	1.43	4.57	28.05	72.41	4	5	10.00	91.15
Central African Republic	-0.88	0.08	0.00			4.34	0.00	22.20				
Chile	3.51	1.27	0.04	0.00	0.02	9.92		45.25	4	5	5.30	50.30
China	8.15			0.00				47.38				63.02
Colombia	1.07	0.57	-0.02	0.00	0.01	2.50	4.62	30.50	3	3	5.00	55.78
Congo, Republic of	-1.17	0.84						25.92				15.94
Costa Rica	1.50	0.16	0.63	0.00		8.04	0.00	45.88	3	3	8.33	17.22
Denmark	1.92				0.16		10.32	45.50	4	5	10.00	71.36
Dominican Republic	2.24	-0.20	0.00	0.00		4.28	0.00	41.38	2	2	5.00	21.58
Ecuador	-0.49	1.26	0.16	0.00	0.01	8.14	0.00	21.80			5.18	44.19
Egypt	2.66	0.04	0.00	0.00	0.00	1.14		83.35				35.35
El Salvador	1.13	-0.02	0.00	0.00		4.65		38.43	3	3	3.69	7.24
Fiji	-0.06	0.12						24.42	2	3		
Finland	2.23		0.79	4.74	0.29	2.91		44.51	3	5	10.00	75.08
France	1.71		0.25		0.08	4.23	7.15	99.42	4	4	9.05	83.47
Gambia, The	-0.10	0.66						40.14				
Germany	1.74		0.17	1.62	0.04	2.69	12.65	83.24	3	5	8.93	93.95
Ghana	0.58	0.01	0.00			1.51	0.00	26.99	2	3	4.17	
Greece	1.20		0.00		0.00	3.05	17.86	64.58	3	4	7.26	57.98
Guatemala	-0.03		0.04	0.00		2.41	0.00	18.83	2	3	3.33	16.46
Guyana	0.67	-0.21	0.00			4.49	0.00	89.49	2	3	1.96	
Haiti	-2.40	0.15	0.00			4.96	0.00	36.69	1	1	1.37	
Honduras	-0.13	0.19	0.00			9.05		35.61	2	3	3.33	15.63
Hong Kong	3.63	0.20			0.73		70.25					75.02
Iceland	1.52		0.37			4.33		28.41	3	5	10.00	54.59
India	3.52	-0.02	0.00	0.00	0.00	0.46	3.41	38.94	2	3	4.58	46.65
Indonesia	3.28	0.11		0.00	0.00		0.01	13.91				56.02
Iran	1.29	0.20	0.00			-1.67						12.28
Ireland	4.81		2.00			9.01		37.66	4	5	8.51	67.20
Israel	1.88	1.74	1.01	0.00	2.28	13.58		128.92	4	4	8.33	34.56
Italy	1.85		-0.02	0.91	0.01	3.66	2.55	96.91	3	4	6.13	72.05
Jamaica	0.63	0.23	0.00	0.00		0.91		59.09	3	4	3.57	17.25

## Appendix 2 (Continued)

Country	GROWTH	FPI (OECD)	FPI (IFS)	FPI (stock)	BFPI (TIC)	OFI (IFS)	Stock Market Size/GDP	Bank Credit/GDP	Regulation Index	Property Rights Index	Corruption Index	II Country Credit
Japan	2.31		0.67	0.43	0.23	1.47	28.90	183.01	4	5	8.51	95.78
Jordan	-0.65	0.23	0.00	0.00		10.06		58.71				38.04
Kenya	-0.15	0.18	0.01			6.12	0.00	37.54	2	3	4.82	33.66
Korea, Republic of	6.10	0.17	0.11	0.00	0.03	7.29	13.07	50.31	3	5	5.30	57.01
Lesotho	2.22	-0.12	0.00			6.98	0.00	9.87				
Malawi	0.71	0.09	0.76			7.91	0.00	33.85				19.44
Malaysia	3.65	0.05	1.24	0.00	0.43	1.67	21.25	64.48	4	4	7.38	72.21
Mali	0.04	0.01	0.00			5.37	0.00	38.58				
Malta	3.97	0.12	0.00			2.07		27.47	3	3	5.76	
Mauritius	4.50	0.32	0.00	0.00		3.03	0.00	51.13				19.67
Mexico	0.48	1.18		0.00	0.14		5.08	46.85	2	3	4.76	57.23
Nepal	2.28		0.00			2.05		16.70	2	3		
Netherlands	2.04		1.25	8.26	0.25	6.12	19.75	122.67	4	5	10.00	87.11
New Zealand	1.13		0.00			-2.25		30.21	4	5	10.00	74.91
Nicaragua	-2.03	0.28	0.00			6.38	0.00	49.74				7.03
Niger	-2.37	0.67	0.00			9.75	0.00	12.37	2	3	5.83	
Norway	2.46		2.63		0.46	2.29		79.12	3	5	10.00	87.20
Pakistan	2.30	0.04	0.00	0.00	0.00	3.01	4.01	46.43	2	4	2.98	21.60
Panama	0.66	8.63	2.34	0.00	1.38	139.91		72.19	3	3	3.51	40.43
Paraguay	-0.80	0.09	0.02	0.00		4.82	0.00	17.59	3	3	2.14	43.00
Peru	-0.66	-0.10	0.00	0.00	0.01	0.21		26.23	2	3	4.70	38.99
Philippines	-0.07	0.43	0.03	0.00	0.08	7.55	8.57	51.49	3	4	2.92	39.23
Portugal	2.86		-0.01	0.01	0.00	3.80	0.50	90.39	3	4	7.38	54.96
Rwanda	-1.61	-0.03	0.02			2.85	0.00	4.69				
Senegal	0.73	0.26	0.09			10.06	0.00	44.94	2	4	5.00	19.61
Sierra Leone	-3.63	-0.02	-0.02			6.32		29.09	3	2	2.65	10.92
Singapore	4.71	0.86	0.94	2.95	1.03	15.61		50.37				78.42
South Africa	-1.05		-0.19	1.96	0.00		63.00	83.77	4	3	8.91	60.27
Spain	2.60		0.03	0.12	0.01	2.32	13.10	82.97	3	4	7.38	65.35
Sri Lanka	3.20	0.03	0.00	0.00		5.09	0.00	37.67	4	3	5.00	
Swaziland	1.72		0.00			6.19		10.30				
Sweden	1.71		0.16	0.00	0.30	1.19	9.10	101.94	3	4	10.00	79.18
Switzerland	0.79		0.00		0.48	5.48	49.13	115.62	3	5	10.00	95.78
Syria	0.50	-0.02	0.00	0.00		2.83		57.75	4	2	3.87	23.07
Thailand	4.65	0.36	0.28	0.82	0.01	5.65	4.55	57.47	3	5	5.18	51.02
Togo	-1.54	0.87	0.13			10.92		29.74			3.33	
Trinidad and Tobago	0.44	-0.80	0.57	0.00	0.42	4.26		-4.50	3	5	4.29	54.23
Tunisia	2.01	0.41	0.22	0.00		6.61	0.00	56.65				46.51
Turkey	2.36	0.06	0.00	0.00	0.00	0.92	1.18	36.51				19.00
United Kingdom	2.31		0.47	1.86	1.11	10.39	45.46	38.58	4	5	9.11	88.15
United States	2.14		0.67	1.83		1.20	45.92	94.58	4	5	8.63	97.19
Uruguay	0.80	0.09		0.00	0.10		0.00	38.10	3	4	5.00	39.56
Zambia	-2.24	-0.14					0.00	62.00				12.14
Zimbabwe	-0.35	0.01	-0.28	0.00		2.18		34.74	2	3	5.42	26.02
Average	1.30	0.42	0.31	0.91	0.30	6.93	9.49	48.63	2.94	3.77	6.14	50.25

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