Does Financial Liberalization Contribute To Economic Growth?

by

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Abstract

This essay studies the relationship between financial liberalization and economic growth using data from 30 countries that are divided into three groups for the period 1986-2006. The sample of countries include low income, medium income and high income countries. The study further addresses whether the relationship between financial liberalization and economic growth depends on the income level of the country. A comparison of the relationship is made both across the groups and over time. The results largely support the claim that there is a positive relationship between financial liberalization and economic growth and that the impact of financial liberalization on economic growth depends on the income level of the country. The coefficients of the indicators of financial openness are largest for the high income group implying that financial liberalization contributes more to the economic growth of high income countries than it does to low income countries. The comparison of the coefficients over time indicate that they declined over time implying that the economic benefits of financial liberalization fell over time.

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I am grateful to my supervisor Prof. Gregor Smith for his advice and guidance in writing this essay. This research would not have been possible without his consistent support. He did not only help me through this research but he has also sparked my interest in International Finance. Prof. Smith had significant contribution to my experience at Queen's University.

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1 Introduction

The topic of financial liberalization, particularly with regard to developing countries, has been a controversial one for decades in the literature of international finance and development economics. Financial liberalization is defined in the literature as all policies that are designed to free "repressed" economies from the harm of growth-retarding policies such as low interest rates and directed credit policies among others (Fowowe, 2008). Economists and policy analysts alike have yet to find a consensus on the calculus to measure the benefits and costs that come along with financial liberalization. The literature is full of accounts of financial liberalization with both an optimistic and forward looking perspective episodes on one hand, and gloomy ones on the other, making financial liberalization a two-edged sword. Lessons from the Great Depression as well as the Asian financial crisis are often cited as indicators of the painful consequences of financial liberalization while the economic triumph of the developed countries is partly associated with liberalized financial markets.

Theory predicts that capital ought to flow from capital-abundant countries to capital-scarce countries because of the celebrated economic reasoning that the marginal productivity of capital is higher in where capital is scarce. If this theory was practical, then many developing countries would have already been higher up in the ladder of economic growth than where they are currently. It is puzzling to find that the United States is running enormous trade and current account deficits of over 600 billion US dollars financed by foreigners out of which 200 billion dollars come from emerging market countries (Mishkin, 2007). Obsfeld and Taylor (2004) documented that financial liberalization is confined to industrialized countries. That is, despite the growth of international capital mobility, capital primarily flows from North to North (rich to rich countries) rather than from North to South (rich to poor countries). However, there are still some flows of capital from rich to poor countries but this is only one-fifth of the total international capital flows (Mishkin, 2007).

A study of the growth of capital flows from North to South indicates a declining trend. Obstfeld and Taylor (2004) reported that in 1919, over one-quarter of the world stock of foreign capital was invested in countries with per capita income less than one-fifth of that of the United States, but in 1997 this ratio was reduced to only one-twentieth. Taylor (1992) indicated that in 1914 about half of the capital in Argentina was supplied by foreign countries but by 2007 less than 6 percent of Argentina's capital was from foreign countries. This deterioration of financial markets integration reduces the chances for the emerging markets to catch up economically with the developed countries.

Financial liberalization is likely to lead to the development of domestic financial markets. This results from the fact that financial openness creates competition and efficient allocation of resources as well as the development of institutions to support the financial systems. Studies have shown that there is positive correlation between financial development and growth. Using data from 80 countries for the period 1960-1989 King and Levine (1993) found that financial development leads to economic growth. Such relationship would not only help developing countries improve their speed of convergence but would also help them attract investment from foreign investors.

Figure 1 depicts the pattern of GDP levels for various groups of countries. Although there is an overall upward trend of GDP levels, there is still a marked difference between the patterns of GDP levels for the developed and the developing countries. It is apparent in figure 1 that GDP growth around the world is imbalanced with the developed countries accounting for almost the whole of the world's GDP. Over time, the developed countries' economies grew at a faster pace compared to most groups of developing countries. The pattern of growth appears to have remained the same for the period indicated with each group remaining on the course it began with. That is, there was no change of regional position in terms of GDP growth although some specific countries might have switched ranks. As such, if the theories

and textbooks predictions hold in the real sense, then we would expect a catch-up in GDP growth through mechanisms such as financial liberalization as capital would flow from the capital-abundant countries to the capital-scarce countries.

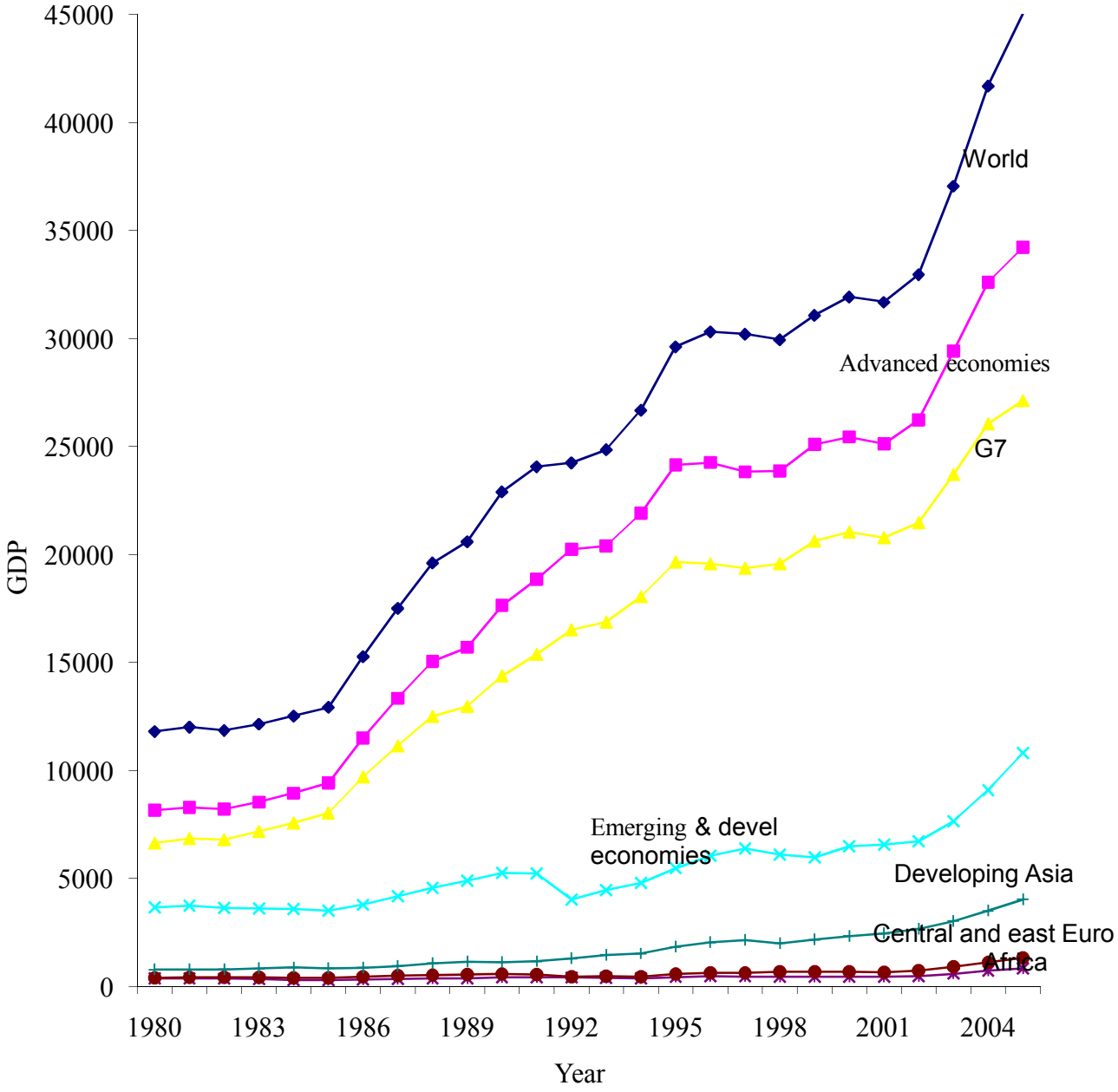

Figure 1: Annual real GDP (in billion US dollars) 1980-2004
Source: World Economic Outlook database

The empirical evidence of the relationship between financial liberalization and

economic growth is divided with some studies reporting a positive overall relationship while others argue that financial liberalization is detrimental to economic growth. Some studies such as (King and Levine, 1993, Beck *et al.*, 2000, Quinn, 1997) argue that financial liberalization enhances growth not only by raising the funds available for accumulation, but also by improving total factor productivity. Both King and Levine (1993) and Beck *et al* (2000) show the strong effect of financial development through financial liberalization on economic growth. Using a cross-section of 58 countries over the period 1960 to 1989, Quinn (1997) reports that financial liberalization has a strong and significant effect on the growth of GDP per capita. A number of studies in the literature have also argued that financial liberalization has no correlation with economic growth. Grilli and Milesi-Ferretti (1995) and Edwards (2001) are some of the most cited studies with regard to the lack of positive correlation between financial liberalization and economic growth.

This essay is aimed at contributing to the literature on financial liberalization and growth by first finding whether a relationship exists between financial liberalization and economic growth and then analyzing whether the relationship depends on the income level of the country. I particularly focus on GDP per capita growth and quantitative indicators of financial liberalization: direct investment[1], portfolio investment[2] and other investment.[3] The findings indicate that there is a positive correlation between financial liberalization and growth and that the extent of the relationship depends on the income level of the country. The impact of financial liberalization on growth is strongest in the high income countries. Both direct investment and other investment are the two types of capital flow with the strongest positive influence on economic growth.

[1] The International Financial Statistics (IFS) database manual defines direct investment as the category of cross border investment where residents of one country have significant control or influence on its management. This could include investment in equity or debt instruments

[2]Portfolio investment is defined as the cross-border transaction involving debt or equity securities that are not included in direct investment

[3]Other investment is the residual category that includes transactions other than those included in direct investment or portfolio investment. Other investments include: currency and deposits, loans (including IMF loans), trade credits, account receivables and SDR allocations

The rest of the essay is organized as follows. Section 2 describes the theoretical gains from financial liberalization by considering them both from the perspective of a producer and a consumer. Section 3 illustrates the existing methods that have been used to study this topic and also elaborates on the particular empirical model for this study. Section 4 describes the data used in the study while section 5 explains the empirical results. Finally, section 6 gives a concluding remark.

2 Economic Theory

The neo-classical growth model has long been the standard for the study of the trends of economic growth. Following Henry (2007) and Barro and Sala-i-Martin (2004), this section elaborates on the effects predicted by the theory in a financially liberalized economy both from the perspective of a producer and a consumer.

2.0.1 Producer perspective

Firms use labor L, capital K and knowledge T as the three principal inputs in the production function.

$$Y(t) = F(K(t), L(t), T(t)) \tag{1}$$

Let R be the rental price for capital and assume that capital depreciates at the rate $\delta > 0$. Therefore the net return to households for capital is $R - \delta$. Households also receive interest rate r on loans to other households. In a perfect capital market, capital and loans can be assumed as perfect substitutes (Barro and Sala-i-Martin, 2004). Therefore, $r = R - \delta$.

The profit function for a representative firm becomes:

$$\Pi = F(K, L, T) - (r + \delta)K - wL \tag{2}$$

Here, knowledge T is assumed to be free.

A competitive firm maximizes profit by setting the marginal product of capital equal to the rental price

$$f'(k) = r + \delta \tag{3}$$

2.0.2 Implications for a closed and open economy

The set up of the growth model is the same for a country that has an open financial market and another that has a closed one. The only difference is the level of interest rate on borrowed funds and hence the return on capital. The country with open financial market has the same rate as the world interest rate r_{open} assuming that there are no market imperfections. The interest rate for the country with a closed financial market is r_{closed} . Assume that r_{open} is constant since every country is small and has negligible impact on the path of the world interest rate. The constant world interest rate implies that equation (3) results a constant level of capital productivity. That is,

$$f'(K_{open}) = r_{open} + \delta \tag{4}$$

The implication here is that for the financially opened country, the speed of convergence from any initial value of per capita capital K_0 to the steady-state level of per capita capital K_{open} is infinite (Barro and Sala-i-Martin, 2004). In addition, the constant level of the world interest rate also induces more capital accumulation because of the absence of the diminishing productivity of capital inherent in the closed economy.

2.1 Consumer perspective

The theoretical economic benefits of financial liberalization do not stop only at the production side of the economy but also extend to the consumption segment of the economy. This section establishes the theoretical consequences of financial liberalization to the consumer. In a closed economy the capital level, K, is determined

by the rate of domestic saving through its impact on investments. The saving rate is determined by households and firms that interact in the competitive domestic market. Assume that the households live infinitely and maximize their dynastic utility. Each household maximizes overall utility, U, as given by:

$$U = \int_0^\infty u(c(t))e^{nt}e^{-\rho t}dt. \tag{5}$$

Here it is assumed that household's utility at time 0 is a weighted sum of all future flows of utility, $u(c)$. The parameter ρ represents utility time preference (which can also be called the utility discounting rate). A positive discounting rate means that utilities are valued less the later they are received. Assume that $u(c)$ satisfies the Inada conditions: $u'(c)_{C\to 0} = \infty$ and $u'(c)_{C\to\infty} = 0$. Consider the constant intertemporal elasticity of substitution type of utility function given as,

$$U(c) = \frac{C^{1-\theta} - 1}{1-\theta} \tag{6}$$

where $-\theta$ is the elasticity of marginal utility. If we normalize the household members at time 0 to unity, the family size at time t is:

$$L(t) = e^{nt}, \tag{7}$$

where n is the population growth rate. Multiplying $u(c)$ in equation (5) by the family size, equation (7), indicates the total utility for the whole household at time t.

Households can lend and borrow from other households but the representative household will end up holding zero net loans in equilibrium since the economy is closed and hence has no international borrowing. Denote the household net assets per person by $a(t)$. Households take interest rate $r(t)$ and wage rate $w(t)$ as given. The total income received by the aggregate of households is the sum of income from wages and interest on assets:

$$w(t)L(t) + r(t)a(t) \tag{8}$$

Therefore, the budget constraint for the representative household becomes,

$$\frac{\partial a}{\partial t} = ra + wL - C \tag{9}$$

Putting the budget constraint in per capita terms by dividing equation (9) by L we get,

$$\dot{a} = w + (r - n)a - c \tag{10}$$

where $\dot{a} = \frac{1}{\mathrm{L}}(\frac{\partial a}{\partial t}) - na$

The representative household maximizes utility (5) using the budget constraint (10). Using optimization technique and setting the present-value Hamiltonian, the required equation becomes,

$$J = u(c(t))e^{-(\varrho - n)t} + v(t)(w(t) + (r(t) - n)a(t) - c(t)) \tag{11}$$

The variable $v(t)$ is the present-value shadow price of income. It represents the value of an increment of income at time t in units of utility at time 0. The first order condition of the Hamiltonian yields,

$$\begin{aligned} &\frac{\partial J}{\partial C} = 0 \Rightarrow c(t)^{-\theta} e^{-(\rho - n)} t = v(t) \\ &\frac{\partial J}{\partial a} = -v\dot{(t)} \Rightarrow (r(t) - n).v(t) = -v\dot{(t)} \end{aligned} \tag{12}$$

Differentiating the first FOC with respect to time:

$$\frac{v\dot{(t)}}{v(t)} = -\theta \frac{c\dot{(t)}}{c(t)} - (\rho - n) \tag{13}$$

And substituting into the second equation of the FOC gives:

$$\frac{c\dot{(t)}}{c(t)} = \frac{r(t) - \rho}{\theta} \tag{14}$$

2.1.1 Implications for a closed and open economy

The Euler equation (14) sets the stage for the path of consumption in a closed and open economy. The set up of the model remains the same for both the closed and

financially open economies. Similar to the production segment of the economy, the only difference in the consumption between the open and closed economies is the interest rate. For a closed economy, the interest rate is determined domestically and hence more likely to fluctuate. This mean the consumption path will also fluctuate up or down depending on the interest rate. In contrast, the consumption path for an open economy is more likely to remain smooth. This is because of the constant world interest rate.

Therefore, having developed the theoretical aspects of financial liberalization and its benefits in both the production and consumption sides of the economy, we now turn to paying a closer look at how financial liberalization affects growth and whether the impact is different for different countries at different stages of economic development.

3 Model and Method

There has been a growing debate on the method to apply to study the economic consequences of financial liberalization. This debate stems from the fact that there is no unique approach to identifying and quantifying financial liberalization across countries. This is because most of financial liberalization indicators are qualitative and rule-based as indicated in the paper by Edison, *et al.*, (2004). The debate mainly centres on the use of cross-section analysis which according to Henry (2007) does not perform well with the neo-classical model. The use of cross-section regressions purely looks for a positive correlation between capital account openness and economic growth which implicitly refers to permanent effects in the long run growth rates across countries. Studies that use a pure cross-section approach, for example Eichengreen (2001) and Edison *et al* (2004) find very little or no significant relationship between financial openness and growth.

The literature does not only cite differences in the empirical models applied but

also in the set of countries used, data period and estimation techniques. Consequently, different studies end up with different findings making financial liberalization a topic with divided opinions. Using data from some sub-Saharan African countries, Fowowe (2008) arrives at a similar conclusion as Henry (2007) in that financial openness has a positive significant relationship with economic growth. The results of Fowowe's (2008) study are not surprising because his method is in line with Henry's in that he avoided the traditional cross-section approach.

3.1 Model Specification

To study the relationship between financial liberalization and growth, I used an ordinary least square regression of the GDP per capita growth on capital flows and a conditioning information set as shown in equation (15). This model is in line with the literature and has been used in previous studies such as Beck *et. al* (2004) and Fowowe (2008).

$$\Delta lnY_{it} = \alpha + \Delta lnFI_{it}\beta + \gamma X_{it} + \epsilon \tag{15}$$

Here ΔlnY_{it} is the difference of log GDP per capita for group i between year t and year $t-1$; $\Delta lnFI_{it}$ is the difference of log financial openness indicators for group i between year t and year $t-1$ and X_{it} is the conditioning information set used as the control variables. FI represents the variables of interest in the study which comprise of direct investment, portfolio investment and other investment. The control variables include the initial per capita GDP to measure convergence, inflation to measure macroeconomic stability and current account balance as a share of GDP to measure trade openness.

To analyze the type of capital flow that has the highest impact on GDP, I used a second regression shown by equation (16) for each group of countries:

$$\Delta lnY_{it} = \alpha + \Delta lnD_{it}\beta_1 + \Delta lnP_{it}\beta_2 + \ + \Delta lnO_{it}\beta_3 + \gamma X_{it} + \epsilon \tag{16}$$

Here ΔlnY_{it} is the difference log GDP per capita for group i between year t and year

$t-1$, ΔlnD_{it} is the log direct investment difference between year t and year $t-1$, ΔlnP_{it} is the log portfolio investment difference between year t and year $t-1$, and ΔlnO_{it} is log other investment difference between year t and year $t-1$. X_{it} is the conditioning information set for group i in year t.

This approach to study financial liberalization is slightly different from the numerous qualitative approaches used in the previous studies and to the best of my knowledge has not been adequately used in the previous studies. Of importance is the fact that this approach takes into consideration the direct impacts (actual performance) of economic variables of international capital flow on growth as opposed to the qualitative measures that are based on indicators from regulatory bodies such as the International Monetary Fund. This study particularly dissects total capital flows into their components and analyzes which type of capital flow has the highest impact on growth. The tradition in the literature has been to use total capital flows as a single indicator of financial openness.

The measure of financial openness in this essay is analogous to the traditional quantitative approach that is used to measure trade openness. Just like the sum of imports and exports over GDP that has been used to measure trade openness, the various forms of capital flows can also be used as indicators of capital movement and hence be used to study about growth. However, the fluctuation of the capital flows from year to year (*e.g* large swings in private capital such as equity) may not easily be reflected in GDP. But the long span of data considered in this study gives a considerable amount of time for changes in capital flows to impact GDP as argued by Edison *et al* (2004).

The model applied in this study is that of a pure linear regression using time series data which is in accordance with the style advocated for by Henry (2007). Henry argues that financial openness leads to a temporary increase in the growth rate of GDP per capita. The temporary increase in the growth rate, according to Henry (2007), can be studied through a time series technique as opposed to the cross-

sectional approach which are is supported by the neo-classical growth model because of the fact that cross-sectional regressions tend to seek for permanent growth in GDP per capita. The cross-section approach has been criticized in the literature as the source of inconsistency with regard to the consequences of financial liberalization. A pure linear regression is not only convenient for studying the direct implications of the different types of capital flows but also easy to understand and apply. In addition, this approach takes into consideration the direct implications of capital flows on growth. This approach also gives a quantitative measure of the impacts of capital flows as to opposed qualitative measures adopted by financial institutions and regulatory bodies such as IMF.

3.2 Econometric Methods

The dynamic model used in this study is estimated with the Ordinary Least Squares (OLS). However, this model is not short of criticism in the literature. The coefficient estimators of OLS are criticized as being inconsistent and biased except under a set of conditions as outlined in Wooldridge (2006). This section considers some possible sources of inconsistent and biased OLS estimators and a possible modification suggested in the literature to eliminate these problems. These include problems resulting from omitted variables, endogeneity and heteroscedasticity.

The explanatory variables that determine the growth rate of GDP per capita are more than the variables considered in this study as indicated by the R^2 values from the regression. The empirical analysis and the implications of the results would have been more solid if all the variables that determine growth were part of the regressors in the equation. However, it is difficult to obtain all the necessary data to incorporate these variables into the equation. As such, insofar as all the variables are not complete, any econometric model is doomed to face the problems of omitted variables. Wooldridge (2006) indicates that the omitted variable bias can be eliminated by using suitable proxy variables for the unobserved explanatory variables. Unfortunately, the proxy

variables are too not always available.

The type of OLS considered in this paper (first difference method) eliminates the fixed effect problem as indicated in Hansen and West (2002). In addition, Fowowe (2008) asserts that the fixed effect model takes account of the unobservable country specific effects which are assumed to be fixed parameters in the model.

Arellano and Bond (1991) suggested some modifications to the Generalized Method of Moments (GMM) estimator in order to improve the empirical performance of GMM. As used by Blundell and Bond (1998), the Arellano-Bond GMM improves the empirical properties of the standard first-difference method. Fowowe (2008) asserts that the extended GMM not only solves the problem of endogeneity and the econometric problems arising from the inclusion of the initial GDP per capita as a regressor but also provides proxies for the omitted variables. The extended GMM uses the lag of the regressors in levels as instruments. Surprisingly, the first difference method is more commonly used in the literature than the Arellano-Bond GMM. However, for the purpose of comparison and robustness the results of the Arellano-Bond GMM are presented in section 5.4.

4 Data

One of the difficulties in the study of financial liberalization is the lack of adequate data to test the theories. The lack of a consensus on the type of data to be used has generated variations in the conclusions of the various studies. I have particularly chosen countries that have data available for the period under study. To increase the chances of having a fair representation of the different regions in the countries chosen, I narrowed the period under study to between 1986 and 2006. The majority of the countries have their data reported in the databases since the 1980's.

The data for this study has been retrieved from the *International Financial Statistics* (IFS) database and that of the *World Economic Outlook* (WOE). I have used the IFS database to get the different types capital flows whereas the WOE has been utilized to

retrieve the GDP and GDP per capita. The data for the variables in the conditioning information set have also been retrieved from WOE. All the variables were measured in US dollars which made the data relatively easy to handle and compare.

Using the WOE database I first retrieved the GDP per capita for all the 182 countries available in the database. All the countries that had their GDP per capita missing for some years were then excluded. This is because there are high chances that the other variables of interest in the study are also missing once a country does not have its GDP per capita reported in the WOE database. With the remaining 148 countries, I then took the average GDP per capita for each country over the period under study (1986-2006). I then averaged all the averages for the 148 countries resulting to an overall average of 7,021 US dollars.

In order to study the impact of financial liberalization on different countries that are at different stages of economic development, I divided the 148 countries into three groups. Using the average GDP per capita for the whole group as a reference point, I partitioned the countries into low income, middle income and high income countries. The low income countries have average GDP per capita less than 45 percent of the group average, the middle income countries have GDP per capita between 45 percent and twice the average of the 148 countries and the high income countries have more than twice the average. The selection criteria resulted in 85 countries in the low income group, 35 countries in the middle income group and 28 countries in the high income category. Following the categorization of the countries into the three groups, I then chose 10 countries from each category. Since data is relatively available for the high income countries, I considered the top ten with the highest GDP per capita. However, the same decision rule could not be applied to the low and middle income countries as some of the top ten countries had missing data. Therefore, except for the high income category, I randomly chose countries from the other two categories to achieve ten in each category that had reliable data available. The list of the countries in each category is presented in Table 1.

Table 1: Categories of countries based on GDP per capita

Low income	Middle income	High income
Niger	South Africa	Finland
Jordan	Argentina	Austria
Tunisia	Turkey	Sweden
Thailand	Korea	United States
Peru	Greece	Iceland
Romania	Portugal	Japan
Colombia	Bahrain	Denmark
Cambodia	Hungry	Norway
Mali	Poland	Switzerland
Togo	Costa Rica	Luxembourg

The IFS has been used as the source of the capital flows for the all the countries. For each country, under the International Investment Position section of the IFS report, I retrieved the figures for the direct investments abroad, portfolio investments and other investments. All the capital flow variables are retrieved in gross terms. Fortunately, this section of the IFS database is reported in US dollars for all the countries.

5 Empirical Analysis

This section presents the results of the regressions of GDP per capita growth on financial openness indicators and the controlled information set as illustrated in equations (15) and (16).

A preliminary visual study of the relationship between total capital flow and GDP is shown in figures 2 to 4. The plots show a positive relationship between total capital flow and GDP levels for all the three categories of countries (low income, medium income and high income). I do not argue conclusively here whether or not this relationship results from the endogeneity problem between GDP and capital flow *i.e* whether it is the high GDP level that leads to high capital flow or the vice versa. Rather, my focus is on which type of capital flow has the strongest impact on GDP

and whether the relationship depends on the income level of the country.

The results of the pooled regression are shown in Table 2.[4] Most of the variables have the expected signs and are consistent with previous studies such as Fowowe (2008) and Beck *et al* (2000). All of the capital flow types have positive coefficients indicating that they are positively related to GDP per capita growth. Both direct investment and other investment are significant at the 1 percent significance level. Consistent with the economic theory on growth and convergence, the initial GDP per capita has a negative co-efficient which implies that financial openness allows countries that started with low per capita income to grow faster than those with higher initial per capita income hence leading to growth convergence.

A comparison of the impacts of the different types of capital flows on GDP per capita growth indicates that other investment has the highest impact on GDP growth. Other investment has a coefficient of 0.204 indicating that a 1 percent increase in other investment raises GDP growth by 0.204 percent.

The results of the regression are consistent with some of the findings of the previous studies. For example, Reisen and Soto (2001) report that foreign direct investment and portfolio equity flows increase growth. However, this regression does not support some of the findings of Reisen and Soto (2001)— that portfolio flows has the highest impact on growth.

5.1 Comparative Analysis of the groups

In order to compare the effect of the country group on the coefficients of the capital flows, a similar regression as the one applied previously has been run for each category of countries. The results of the regressions are presented in Table 3.

The comparative regressions for the three groups of countries give the expected results on the impact of financial openness on GDP per capita growth. The ini-

[4] A pooled regression is the regression estimate for the whole sample without any consideration of the country group.

Table 2: Pooled Regression Results

Variable	Coefficient
Constant	0.059
	[0.13]
Initial GDP per capita	-0.034
	[0.53]
Direct Investment	0.14*
	[0.01]
Portfolio investment	0.028
	[0.58]
Other Investment	0.204*
	[0.00]
Inflation	-0.032
	[0.53]
Current Account balance	-0.003
	[0.95]
Diagnostic tests	
Wald test of joint significance	[0.000]
R^2	0.074
Number of countries	30
Observations	384

Notes: The regression estimated is Growth = $\beta_0 + \beta_1$Initial income per capita+β_2Financial openness+β_3Inflation+β_4Current account balance.
The dependent variable is the change of log per capita GDP. Initial income is the log of the per capita GDP in 1986. Financial openness is represented by direct investment, portfolio investment and other investments. Inflation is the annual inflation percentage change based on average consumer prices. The inflation data is obtained from the World Economic Outlook database. The current account is the percentage of the current account to GDP which is obtained from the WOE database. Figures square brackets are p-values. The coefficients have been rounded to three decimal places. * indicates that a co-efficient is significant at 1 percent level, ** is significant at 5 percent level and *** significant at 10 percent level.

tial GDP per capita has a negative coefficient in both the low and medium income countries and is weakly positive in the high income group. Direct investment has a positive effect on GDP per capita growth for all the groups with the high income group exhibiting the strongest co-efficient. Contrary to what many economists and policy analysts argued— that financial openness creates destructive economic consequences for the low income countries— it is surprising to learn that none of the financial openness indicators in the regression has a negative co-efficient for the low

Table 3: Regression results for each group

Variable	Low Income	Medium Income	High Income
constant	0.050	0.279	-0.034
	[0.49]	[0.27]	[0.94]
Initial GDP per capita	-0.030	-0.089	0.005
	[0.79]	[0.39]	[0.95]
Direct investment	0.149	0.093	0.222*
	[0.17]	[0.34]	[0.00]
Portfolio investment	0.158	0.016	-0.035
	[0.14]	[0.87]	[0.63]
Other Investment	0.021	0.165***	0.354*
	[0.84]	[0.08]	[0.00]
Inflation	-0.047	-0.243**	0.111
	[0.67]	[0.03]	[0.13]
Current account balance	-0.16	0.062	0.146***
	[0.14]	[0.51]	[0.06]
Diagnostic tests			
Wald test of joint significant	[0.30]	[0.08]	[0.00]
R^2	0.08	0.1	0.24
Number of countries	10	10	10
Observations	90	116	178

Notes: The regression estimated is Growth = $\beta_0 + \beta_1$Initial income per capita+β_2Financial openness+β_3Inflation+β_4Current account balance.
The dependent variable is the growth rate of per capita GDP. Initial income is the log of the per capita GDP in 1986. Financial openness is represented by direct investment, portfolio investment and other investments. Inflation is the annual inflation percentage change based on average consumer prices. The inflation data is obtained from the World Economic Outlook database. The current account is the percentage of the current account to GDP which is obtained from the WOE database. Figures in square brackets are p-values. The coefficients have been rounded to three decimal places. * indicates that a co-efficient is significant at 1 percent level, ** is significant at 5 percent level and *** significant at 10 percent level.

income group.

The results of the comparative regressions are theoretically paradoxical and do not conform to the economic reasoning. Theoretically, we would expect the coefficients of the variables to be strongest in the low income group. For example, direct investment should lead to a higher GDP per capita growth in the low income group than the high income group because of the higher marginal productivity of capital

in low income countries. Surprisingly, this is not shown in the results. Direct investment has a coefficient of 0.149 for the low income group and 0.222 for the high income group. Therefore, it is apparent that there should be other forces that are at play insofar as financial liberalization and the income level of the country is concerned. According to Durham (2004), the benefits of cross-border investment are contingent on the financial and institutional "absorptive capacity" of the hosting country. The reasons for this unexpected deviation from the theory is a topic that warrants further research.

5.2 Coefficients over time

The previous section gave an indication of the relationship between country group and the coefficients of the indicators of financial openness. This section considers the evolution of the coefficients with time. That is, are the coefficients of the indicators of financial openness for a particular group different between the two periods 1986-1996 and 1997-2006? It is theoretically logical to assume that the strength of the coefficients would decrease with time. This is because, as mentioned earlier, the economies grew over time leading to the accumulation of capital. As such, the marginal productivity of capital should decline with time, assuming a constant level of technology. In other words, we expect the coefficients of the first period to be higher than those of the second period. In that way, we can be able to deduce the impact of capital accumulation through capital flows. In order to study the pattern of the coefficients over time and for the purpose of simplicity, I divided the period under study into two segments of ten years each. The first segment covers from 1986 to 1996 while the second segment covers from 1997 to 2006. The motivation for this analysis is that significantly different coefficients of the variables under study for the two periods imply that financial liberalization has had an impact on GDP growth. That is, if the benefit of financial openness is higher where there are lower capital levels, then the magnitudes of the coefficients should decrease over time since the GDP levels of the

countries increased with time as shown in Figure 1. For example, we would expect the coefficients the of the low income group for the period 1997-2006 to be lower than those for the period 1986-1996 because over this time these countries must have accumulated higher levels of income leading to higher levels of capital. The same holds for the other groups. This is what the data has shown. The results of the regressions are shown in Table 4. The coefficient for direct investment for example, for the low income group for the period 1986–1996 is 0.169 while for the period 1997-2006 it is 0.123. Both direct investment and other investment which are the focus variables in the literature have shown the declining trend of significance for all the groups of countries.

5.3 Sensitivity Analysis of the Regression Results

I made changes to the model specification in order to find out whether the robustness of the result depends on the model that is used to study this topic. Particularly I changed the dependent variable and used GDP growth instead of GDP per capita growth and have also included other regressors such as government size.[5] The result of the modified regression leads to conclusions that are similar to those already presented in the essay— that financial openness has a positive impact on economic growth. The coefficients of the indicators of financial openness are all positive. The coefficient of the initial GDP level (GDP of 1986) is negative for two of the three groups. The results of the modified regression are presented in Table 5.

5.4 Arellano-Bond GMM Estimator

The results of the Arellano-Bond GMM model are shown in Table 6. The results of this regression are slightly different from the regression of the first difference method shown in Table 3. The first difference method shows that all the financial openness

[5]Government size has been used as a regressor in previous studies (Beck. et al 2000) and it does improve the fit of the model. However, I did not use it in my core regression because there was not enough data on this variable for the low income countries considered in this study.

Table 4: Period Partitioned Regression Results

Group	Low Income		Medium Income		High Income	
	1986-1996	1997-2006	1986-1996	1997-2006	1986-1996	1997-2006
Constant	0.036	0.070	0.019	0.087**	0.188**	0.042
	[0.38]	[0.12]	[0.83]	[0.04]	[0.03]	[0.28]
Initial GDP per capita	0.009	-0.059	0.013	-0.078	-0.146**	-0.009
	[0.89]	[0.37]	[0.86]	[0.21]	[0.04]	[0.87]
Direct investment	0.169**	0.123	0.185*	0.117**	0.241*	0.123**
	[0.02]	[0.04]	[0.01]	[0.05]	[0.00]	[0.02]
Portfolio investment	0.083	0.039	-0.058	0.056	0.000	0.039
	[0.23]	[0.50]	[0.38]	[0.33]	[0.99]	[0.46]
Other investment	0.192*	0.164*	0.214*	0.191*	0.310*	0.201*
	[0.01]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]
Inflation	-0.028	-0.040	-0.028	-0.071	-0.024	-0.075
	[0.69]	[0.49]	[0.68]	[0.22]	[0.73]	[0.16]
Current account balance	-0.027	-0.034	0.041	-0.014	0.152**	-0.050
	[0.71]	[0.60]	[0.57]	[0.82]	[0.02]	[0.38]
Diagnostic tests						
Wald test	[0.01]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]
R^2	0.08	0.05	0.1	0.07	0.21	0.08
Number of countries	10	10	10	10	10	10
Observations	205	280	217	295	222	347

Notes:
The regression estimated is Growth = $\beta_0 + \beta_1$Initial income per capita+β_2Financial openness+β_3Inflation+β_4Current account balance.
The dependent variable is the growth rate of per capita GDP (calculated as the log change of GDP per capita). Initial income is the log of the per capita GDP in 1986. Financial openness is represented by direct investment, portfolio investment and other investments. Inflation is the annual inflation percentage change based on average consumer prices. The inflation data is obtained from the World Economic Outlook database. The current account is the percentage of the current account to GDP which is obtained from the WOE database. Figures in square brackets are p-values. The coefficients have been rounded to three decimal places. * indicates that a co-efficient is significant at 1 percent level, ** is significant at 5 percent level and *** significant at 10 percent level.

indicators except portfolio investment for the high income group have a positive effect on economic growth. However, the Arellano-Bond model indicates that it is only direct investment that has a positive impact on economic growth for all the groups. On the other hand, when the sample is considered as a whole without respect to the

Table 5: Modified Regression To Test Robustness

Variable	Low Income	Medium Income	High Income
Constant	0.098	0.069	0.014
	[0.21]	[0.56]	[0.75]
Initial GDP	-0.078	0.021	-0.014
	[0.49]	[0.82]	[0.84]
Direct Investment	0.148	0.113	0.247*
	[0.17]	[0.24]	[0.00]
Portfolio investment	0.169	0.015	-0.025
	[0.12]	[0.88]	[0.73])
Other Investment	0.000	0.162***	0.321*
	[0.93]	[0.09]	[0.00]
Inflation	-0.061	-0.221**	0.100
	[0.58]	[0.03]	[0.18]
Current account balance	-0.152	0.077	0.121
	[0.17]	[0.42]	[0.14]
Government size			0.015
			[0.85]
Diagnostic tests			
Wald test of joint significance	[0.22]	[0.08]	[0.00]
R^2	0.09	0.09	0.24
Number of countries	10	10	10
Observations	90	116	178

Notes: The regression estimated is Growth = $\beta_0 + \beta_1$Initial GDP+β_2Financial openness+β_3Inflation+β_4Current account balance+β_5Government size.
The dependent variable is the growth rate of GDP (calculated as the log change of GDP). Initial GDP is the log of GDP in 1986. Financial openness is represented by direct investment, portfolio investment and other investments. Inflation is the annual inflation percentage change based on average consumer prices. The inflation data is obtained from the World Economic Outlook database. The current account is the percentage of the current account to GDP which is obtained from the WOE database. Government size is the ratio of government budget to GDP. Group dummies have also been used that are not reported in the table. Figures in square brackets are p-values. The coefficients have been rounded to three decimal places. * indicates that a co-efficient is significant at 1 percent level, ** is significant at 5 percent level and *** significant at 10 percent level.

income group, both direct investment and other investment have positive impacts on economic while portfolio investment has a negative impact. Although the Arellano-Bond model eliminates problems associated with endogeneity, omitted variables and heteroscedasticity, it is not clear whether the lack of support for the growth model is

a reason for its inadequate use to study the topic of financial liberalization. To my knowledge, the first difference method seems to be more popular. The first difference method employs a time series regression approach while the Arellano-Bond GMM estimator uses the cross-section approach. Perhaps, the different results shown by the two models is an indication of the facts pointed out by Henry (2007). That is, models that use the pure cross-section technique are prone to finding no positive correlation between financial openness and economic growth since such models do not measure the transitional effects.

6 Conclusion

This essay studied the relationship between financial liberalization and growth. I exploited the econometric technique of time-series regression using the first difference method estimator. The results indicate that there exists a positive relationship between financial liberalization and growth and the strength of the relationship depends on the income level of the country. The impact of financial liberalization was found to be the highest for the high income group. The significance of the coefficients of the variables indicating financial liberalization evolved over time. The coefficients were found to be stronger for the first half of the period under study than the second half of the period. Direct investment and other investment are the two types of capital flows with the highest impacts on economic growth.

The empirical results of the study do not entirely conform to the theoretical predictions. It was expected that the impact of financial liberalization on economic growth would be strongest for the low income group. However, the essay has shown that the impact is strongest for the high income group. The reasons for the reversal of the implications of the economic theories is an area that calls for further research under this topic.

The literature on financial liberalization and growth is divided over the conclusion

Table 6: Arellano-Bond GMM regression

Variable	Low Income	Medium Income	High Income
Constant	0.023**	0.094*	-0.004
	[0.03]	[0.00]	[0.77]
Lagged dependent	0.302*	0.061	0.202 *
	[0.00]	[0.52]	[0.00]
Direct Investment	0.020**	0.028	0.117***
	[0.05]	[0.60]	[0.07]
Portfolio Investment	0.023*	-0.010	-0.017
	[0.01]	[0.74]	[0.65]
Other Investment	-0.017	0.08*	0.200*
	[0.58]	[0.01]	[0.01]
Inflation	-0.002	-0.007*	-0.003
	[0.55]	[0.01]	[0.58]
Current Account balance	-0.002	0.002	0.003*
	[0.41]	[0.62]	[0.00]*
Diagnostic tests			
Wald test of joint significance	[0.037]	[0.000]	[0.000]
First-order serial correlation	[0.160]	[0.178]	[0.008]
Second-order serial correlation	[0.650]	[0.502]	[0.747]
Sargan test	[0.561]	[0.156]	[0.397]
Number of countries	10	10	10
Observations	80	103	153

Notes: The regression estimated is Growth = $\beta_0 + \beta_1$Initial income per capita+β_2Financial openness+β_3Inflation+β_4Current account balance+λInstruments.
The dependent variable is the growth rate of GDP (calculated as the log change of GDP). Initial income is the log of GDP in 1986. Financial openness is represented by direct investment, portfolio investment, equity investment and other investments. Inflation is the annual inflation percentage change based on average consumer prices. The inflation data is obtained from the World Economic Outlook database. The current account is the percentage of the current account to GDP which is obtained from the WOE database. Instruments are the lagged logs of the explanatory variables. Figures in square brackets are p-values. The coefficients have been rounded to three decimal places. * indicates that a co-efficient is significant at 1 percent level, ** is significant at 5 percent level and *** significant at 10 percent level.

on whether or not a positive relationship exists between financial liberalization and growth. As shown by Henry (2007), this research indicates that the conclusion one reaches on the relationship between financial liberalization and growth depends on the method and model applied. The two models applied in this essay arrived at

somewhat different conclusions with the first difference method indicating a positive relationship while the Arellano-Bond GMM gave a somewhat inconclusive results.

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Figure 2: GDP per capita and Total Flow for Low Income Group 1986-2006

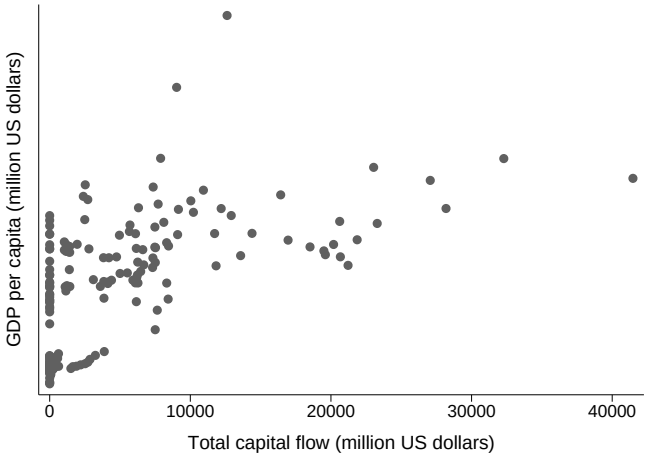

Figure 3: GDP per Capita and Total Flow for Medium Income Group 1986-2006

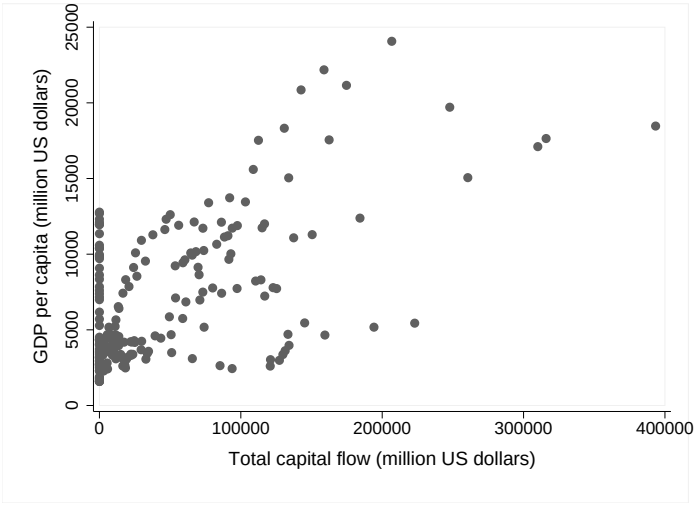

Figure 4: GDP per capita and Total Flow for High Income Group 1986-2006