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Financial liberalization: Conditional convergence or divergence in the rates of growth of emerging economies and developed countries

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Abstract

The present study empirically tests whether financial liberalization is associated with greater conditional convergence separately, for the set of nine developed countries and nine emerging economies over a period of 1971 to 2013. We attempt to answer whether a relatively more financially liberalized country which has a lower initial real PCGDP acquires faster rate of growth and converges to its own steady state value. Using panel data models, we inspect IFI in the broad context of liberalization of capital account, equity markets and banking sector and estimate a two-step GMM. While we do not find any convergence in our set of developed countries, we find strong support in favour of conditional convergence in emerging economies.

Keywords: Conditional convergence, financial liberalization, panel data, emerging economies, two-step GMM

1. Introduction

The main motivations behind the push towards international financial integration of less developed countries have been the work of Domar (1946) [27] and Solow (1956) [65]. The influential article by Domar by predicting that growth is proportional to the ratio of investment to GDP (Gross Domestic Product) formed the basis of openness to international capital flows and to the belief that international capital flows from rich to poor countries can spur growth in poor countries and can close the gap between rich and poor. LDCs (Least Developed Countries) can thus accelerate the growth by attracting foreign capital which will be facilitated by removal of capital controls. Solow (1956) [65] model also predicts that capital account liberalization will cause resources to flow from capital abundant countries where expected returns on capital are low to capital scarce countries where expected returns are high. This flow of resources is expected to reduce the cost of capital, increase investment and raise output in the recipient country. According to Kruger (2006) [72], international trade has changed the structure of the world economy. Reduction of trade barriers led to acceleration of world output growth, reduction of poverty and improvement of living standards in most parts of the globe, and emergence of new players in the world economy. Numerous theoretical and empirical studies have shown that financial liberalisation is positively associated with the growth of economic activity. Financial liberalization, in these studies is viewed as a set of operational reforms and policy measures designed to deregulate and transform the financial system and its structure with a view to achieve a liberalized market oriented system within an appropriate regulatory framework. It thus includes lifting capital controls, allowing foreign investors to invest in domestic equity and deregulating banking sector. Degree of financial liberalization can be assessed by studying the following three areas (a) capital account liberalization (b) stock market liberalization (c) banking sector liberalization (Johnston and Sundararajan 1999) [43].

Financial liberalization permits the investors to allocate their funds wherever they expect to obtain the maximum rent as the barriers to perform financial transactions are eliminated. As a consequence, a reallocation of funds to the most productive investment opportunities will take place, with the productivity growth bonus accruing to the entire economic system. Thus the policy of capital account liberalization through capital accumulation augments domestic savings, which works on the principle of allocative efficiency. Stock market liberalization allows foreigners to purchase a domestic country's share. The standard asset pricing model predicts a reduction in country's cost of capital following equity market liberalization.

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This would mean a fall in equity premium and an increase in equity investment. Opening banking sector to foreign competition promotes productivity by improving the quality and pricing of banking services; also by increasing the variety of lending instruments available (Levine 1996); by making external finance available to private sector (Klein and Olivei 2005) [45] and by facilitating international portfolio diversification and risks (Obstfeld 1994) [58]. Financial Liberalization also complements growth through various indirect channels by enhancing productivity (a) adoption of new production method; (b) training of Labour-force; (c) efficient use of resources by domestic firms; (d) transfer of technological and managerial know-how and (e) development of forward and backward linkages with the domestic firms, via the FDI route. Borensztein and Lee (1998) [17]; Grossman and Helpman (1991) [32]; Haskel *et al.* (2007) [24]; Javorcik (2004) [42]; Atiken and Harrison (1999) [4] Lund (2010) [73]; Zhang (2001) [74]; Greenway *et al.* (2007) provide evidence in support of this.

In spite of the purported benefits of financial liberalization for the rich and poor countries, financial liberalization has remained one of the most controversial and least understood policies of today. The present literature provides ample theoretical and empirical evidence in support of financial liberalization. However, the most imperative question of whether emerging economies of the world can converge to the level of income per worker's of the rich countries by adopting the liberalized economic order of developed countries still remains unanswered. The present study empirically analyses whether countries with low levels of initial per capita income will converge to the growth rate of the world technology frontier through financial liberalization.

2. Literature Review
The theory of convergence is first established by Solow model (1956). The model predicts convergence of the income per worker of the poor countries to the level of the rich countries. There are two means by which poor country will converge towards the rich country. The first is that the rate of return on capital is lower in countries which have a higher ratio of capital per worker. As capital is allowed to freely flow between rich and poor countries, the capital will flow from rich to poor countries until the rate of return becomes equal and we will have convergence of capital per worker. Secondly, the rate of convergence will be even faster if a poor country can get access to newer technology being produced in rich country.

Sorensen *et al.* (2005) qualify the convergence theory into two types: (a) absolute convergence and (b) conditional convergence. They define absolute convergence as a condition where all countries converge to the same level of income per worker, capital-labour ratio and consumption per worker. An offshoot of absolute convergence is complete eradication of poverty as all countries; rich and poor converge to the same balanced growth path. The caveat of the theory of absolute convergence is that all countries differ in terms of basic structural characteristics, savings and investment levels. We find no evidence of absolute convergence in the literature. That is countries with low levels of initial income were not found to be converging to a given steady state value of PCGDP which is irrespective of country's initial conditions, compared to the countries which started with higher initial levels of real PCGDP.

What we actually observe is conditional convergence that is convergence which is conditional on a number of factors. Sorensen *et al.* (2005) define conditional convergence as a state in which each country has its own long-run balanced growth path to which it will independently converge. A country which starts with a lower level of income per worker than its own steady state value will grow faster. The steady state value is different for all countries and is conditional on the conditions prevailing in a country. The conditional convergence requires that similar countries will converge to same level of GDP per worker. Convergence will hence be observed amongst countries with similar initial structural conditions, savings rate and investment rate. For example, a poor country with low saving rate will converge to a rich country with low saving rate but will never converge to a rich country with high saving rate. This leads to the formation of 'convergence clubs'. It does not imply complete eradication of poverty, rather the hypothesis implies that only if a poor country can attain same level of structural conditions as the richer countries, it might overtime become richer. The neoclassical model also implies conditional convergence. In the model, the growth rate of a country decreases overtime as its income per worker approaches the steady state value. This steady state value for each country is contingent upon its saving rate, its population rate and on its technology. The steady state level of per capita GDP is positively associated with increase in technology and saving rate and is negatively associated with increase in population rate. The control variables in the neoclassical model determine the steady state levels of PCGDP of each country. With reforms such as liberalization, there is a change in the values of these control variables which in turn pushes up the steady state values of PCGDP.

Historically, there has been huge divergence in growth rates of rich and poor countries for a very long period. Pritchett (1997) has shown that per capita income gap between rich and poor countries grew more than five-fold from 1870 to 1990. Baumol (1986) is the first to empirically test convergence hypothesis using output growth over the period 1870-1970 and GDP per worker in 1870 as the initial level of income. His estimates show a convergence coefficient of almost equal to -1. Mankiw *et al.* (1992) test the convergence hypothesis of the Solow model on a data of 121 countries between 1960 and 1985. The authors find evidence of conditional convergence with a speed of about 2% per year. Barro *et al.* (1994) suggests that a simple cross-section analysis will be problematic. It is better to group countries according to their structural conditions, regions and then compares them within that group. Barro (1996) argues that conditional convergence will be observed that is, poorer countries will have higher per capita growth rates than richer countries, if one holds initial level of human capital and other determinants of the steady state level of PCGDP constant. Two authors Bekaert and Bonfiglioli have done some work with respect to conditional convergence as an outcome of financial liberalization. Bekaert *et al.* (2001) [9] in their study show that adding equity liberalization indicator increases the convergence coefficients in the developing country sample by almost one-third. Bekaert *et al.* (2005) [11] show that initial GDP enters with a significant negative coefficient suggesting that low initial GDP levels implies higher growth rates, conditional on other variables. Bekaert *et al.* (2011) [12] in

their study find that inclusion of capital account openness measure is associated with stronger conditional convergence everything else being equal. Bonfiglioli (2004) [15] on a sample of 90 countries from 1975 to 1999 finds significant evidence that countries with lower initial real PCGDP have grown faster than the initial richer ones, conditional on the other variables with a convergence rate of 1.5% per year. The past literature finds evidence of conditional convergence following liberalization in samples which included both developed and developing countries together. However, as the developed economies and emerging economies are inherently different, it is incorrect to club these economies together (Henry, 2007) [40].

3. Econometric Methodology
The present study empirically tests whether financial liberalization is associated with greater conditionally convergence separately, for the set of nine developed countries (U.S.A., Canada, Australia, Japan, France, Italy, Sweden, Spain and U.K.) and nine emerging economies (Chile, Mexico, Peru, India, Indonesia, Philippines, Malaysia, Korea and Thailand) spanning over the period from 1973 to 2013. We use panel data models to overcome the problem of omitted variable bias caused by time-invariant individual country specific effects which arise as one country is different from another like the geographical region in which a country lies, whether it is rich or poor, whether it has quality infrastructure or not. The use of panel data technique which allows each country to have its own steady state growth path based upon the different initial conditions captured by individual country specific effects also permits us to test for conditional convergence. We first estimate the results with a fixed effects model. Then we estimate the results through fixed effects model with robust standard errors in order to control for serial correlation, contemporaneous correlation and group-wise heteroskedaticity. We then estimate a two-step GMM model as the data may still suffer from the issue of endogeneity.

The IFI-growth relationship suffers from the problems of endogenity and simultaneity as the relation runs both-ways. To address the problem, the two- step GMM approach requires use of instruments which are highly correlated with IFI but are not correlated with any of the included regressors. While the past literature largely used lag values of the IFI variables, we have included new array of instruments, namely, average level of capital account liberalization in the neighbouring region at a particular point of time, measured by (a) average of the kaopen index, (b) average volume of FDI and portfolio flows to GDP and (c) average volume of FDI and Portfolio liabilities to GDP; percentage of neighbouring countries with liberalized equity markets at a particular point of time and percentage of neighbouring countries with liberalized banking sector at a particular point of time. This wide array of instruments approximates liberalization more closely.

While both the developed and emerging economies have made progress to varying degrees on all the three fronts of financial liberalization, the past literature has only extensively looked at capital account liberalization. While equity liberalization is sparingly studied, we have come across no study that has looked at the effects of banking sector liberalization. Our study analyses the convergence effect of financial liberalization covering capital account liberalization, equity market liberalization and banking

sector liberalization. We measure capital account liberalization by three indicators, one de-jure indicator, kaopen, and two de-facto indicators, ratio of FDI and portfolio flows to GDP and ratio of FDI and portfolio liabilities to GDP. We measure equity market liberalization and banking sector liberalization with a 0/1 equity liberalization indicator and a 0/1 banking liberalization indicator, respectively.

We estimate equation 1 to test for conditional convergence. We have divided our sample into developed countries and emerging economies to study the convergence phenomenon in the two set of countries separately.

$$y_{it} = \alpha_0 + \Theta\, Q_{i,t-5} + \gamma'\, X_{i,t} + \alpha_1 Lib_{i,t} + \eta_i + \varepsilon_{i,t} \quad (1)$$

Where y_{it} is the growth rate of real per capita GDP calculated as the log difference, $y_{it} = \ln PCGDP_t - \ln PCGDP_{t-1}$. The subscripts i and t refer to the country and the year of observations where $t = 1971\text{-}2013$ for a set of developed countries and for a set of emerging economies.

$Q_{i,t-5}$ is the log of real per capita GDP for 1971, 1976, 1981, 1986, 1991, 1996, 2001, 2006, 2011 and serves as a proxy for initial PCGDP. This is reset at 5-year interval.

Θ is the conditional convergence coefficient which is expected to be negative.

$X_{i,t}$ is the matrix containing variables which control for different levels of long run PCGDP across countries. The matrix contains determinants of long run PCGDP such as human capital measured by human capital index (In logs) based on secondary school enrolment ratio, population (in logs) and investment rate measured by the ratio of Gross capital formation growth to GDP (In logs).

$Lib_{i,t}$ is a indicator of capital account liberalization/ equity market liberalization/ banking sector liberalization. The data for de-jure measure of capital account liberalization, ratio of FDI and Portfolio liabilities to GDP is available from 1971-2012.

η_i and $\varepsilon_{i,t}$ are respectively the unobservable country specific effects and the stochastic error process

We test whether a country which has a lower initial real PCGDP acquires faster rate of growth and converges to its own steady state value. That is we test for negative correlation between rate of growth of PCGDP and initial level of income given other control variables. We have included population, human capital and the ratio of GCF to GDP as the control variables. We have also included IFI indicator as an independent variable. The control variables in the neoclassical model determine the steady state levels of PCGDP of each country. With reforms such as liberalization, there is a change in the values of these control variables which in turn pushes up the steady state values of PCGDP.

For conditional convergence to occur, the coefficient of initial income, Θ, must be negative. That is when steady state per capita GDP is raised above initial income through reforms like liberalization, then a country with low levels of initial income will exhibit faster growth rates compared to a country with high levels of initial income belonging to the same country club and will thus converge to its own independent steady state value of real PCGDP.

4. Empirical Results

Tables 1 to 5 summarize the results of equation 1 for a set of nine developed countries and emerging economies. The dependent variable is the growth rate of real PCGDP calculated as the log difference and the control variables are initial income, population, human capital, investment rate and IFI. All variables are in logs except the IFI. Tables 1,2,3,4 and 5 summarizes the results of the equation 1 with kaopen index, the ratio of net FDI and Portfolio flows to GDP, FDI and Portfolio liabilities to GDP, equity market liberalization indicator (a 0/1 equity liberalization dummy) and banking sector liberalization indicator (a 0/1 banking sector liberalization dummy) as the liberalization variable respectively. The lower panel of the Tables 1 to 5 report the results for the F-test that all individual effects are 0, the Hausman test for fixed effects, the Breush- Pagan LM test of independence to test for contemporaneous correlation, the modified Wald statistic for group-wise heteroskedasticity, the LM test for serial correlation, the J statistic of Hansen (1982) to test for over identifying restrictions in 2SLS and GMM, the Anderson's statistic/ the Kleibergen-Paap rk LM statistic to test for relevance of instruments in 2SLS and GMM. Table 4 also reports Breush- Pagan LM test for random effects. The test statistics in the lower left panel correspond to the developed country group and in the lower right panel correspond to the emerging economies group.

In Tables 1-5, Columns 2, 3 and 4 present the results for a set of developed countries and columns 5, 6 and 7 do the same for a set of emerging economies. In Tables 1, 2, 3 and 5, Columns 2 and 5 correspond to the Fixed Effect model, Columns 3 and 6 correspond to the Fixed Effect model with robust standard errors after checking and controlling for group-wise heteroskedasticity, contemporaneous correlation and serial correlation in the data. Columns 4 and 7 report the result of the Fixed Effects model by using Instrumental variable and the system Generalized Moment Method approach of Bundell and Bond (1998) [13] to control for the simultaneity/ endogeneity problem. In Table 4, Columns 2 and 4 correspond to the pooled OLS model, Columns 3 and 6 correspond to the OLS model with panel corrected standard errors as each T observations are not independent from each other for an individual, i. Columns 4 and 7 correspond to the two step GMM model.

Table 1 examines the convergence hypothesis after controlling for the benchmark regressors with IFI indicator, kaopen as an independent variable. The coefficients on the initial PCGDP, though negative is insignificant for the set of developed countries (Columns 2-4). These countries are not found to be converging to their steady state values post liberalization. The coefficient estimates of population and human capital are also insignificant across all three specifications. The coefficient estimate of the ratio of GCF to GDP is statistically significant at 1% significance level. A 1% increase in physical capital will increase the growth rate of PCGDP by 0.04%. The IFI indictor, kaopen, has a positive and significant coefficient. An increase of 1 unit in the kaopen measure will increase the economic growth by 0.3% to 0.4%. The fixed effects are found to be important (the lower left panel).The IFI indicator, kaopen, is instrumented with the 1st and 2nd lags of kaopen and the average level of capital account liberalization in the neighbouring countries at a given point of time. The instrumental variables do a good job in explaining cross-country variation in the IFI indicator.

The coefficient estimate of the initial income is negative and statistically significant at 1% significance level across all the three specifications that is the FE model, the FE Robust model and the two step GMM model for the set of emerging economies (Columns 4-6). This signifies that this group of nine emerging economies witness convergence towards their steady state levels of income per head when with reforms like liberalization, their respective steady state levels are raised above their initial levels of per capita income. In other words, these emerging economies grow faster to catch up with their steady state levels when their levels of initial income fall below the steady state levels. The coefficient estimates of other control variables are significant. The coefficient estimate of the IFI indicator, kaopen, is however, insignificant across all the three specifications. Our selection of FE model is consistent (the lower right panel). To control the problem of endogenity, we instrumented kaopen with the first and second lags of kaopen and the average level of capital account liberalization in the neighbouring countries at a given point of time.

Table 2 reports the convergence hypothesis after controlling for the benchmark regressors along with IFI indicator, the ratio of net FDI & Portfolio flows to GDP as an independent variable. The coefficient estimate of initial PCGDP remains insignificant for the developed countries (Columns 2-4). The sign and statistical significance of all other control variables is same as before. The IFI indictor, ratio of net FDI and Portfolio flows to GDP, has a positive and significant coefficient. An increase of 1 unit in the ratio of the net FDI and Portfolio flows to GDP measure will increase the economic growth by 0.2%. We find that the fixed effects are important (the lower left panel). The IFI indicator is instrumented with the 1st and 2nd lags of the ratio of net FDI and Portfolio flows to GDP and the average level of flows in the neighbouring countries at a given point of time. The instruments are adequate. The coefficient estimate of the initial income for emerging economies is negative and statistically significant at 1% significance level for all the three specifications that is the FE model, the FE Robust model and the two step GMM model (Columns 5-7). This signifies that this group of nine emerging economies witness convergence towards their respective steady state levels of income per head when with reforms like liberalization, their respective steady state levels are raised above their initial levels of per capita income. The coefficient estimates of the other control variables have same signs and significance as above. The IFI indicator, the ratio of net FDI and Portfolio flows to GDP is significant at 1% level and a unit increase in the ratio will increase the growth rate by 0.3%-0.8%. We select the FE model from the p-values of the test statistics (The lower right panel) and instrumented the ratio of net flows to GDP with its fifth and sixth lags and the average level of flows in the neighbouring countries at a given point of time.

Table 3 reports the results of equation 1 with the ratio of FDI and Portfolio liabilities as the IFI indicator in the regressions. We obtain a negative and statistically significant coefficient estimate of initial income for developed countries (Columns 2-4). All other control variables have signs and significance as above. The coefficient estimate of the IFI indicator, the ratio of FDI and Portfolio liabilities to GDP is statistically significant for the FE and FE robust models. We select the FE model (lower

left panel) and instrumented the IFI indicator with its fourth and fifth lags, which are adequate. The coefficient of initial income is negative and significant for the emerging economies group, thus implying conditional convergence (Columns 5-7). The significance and sign of all other control variables are same as in Table 2. The ratio of FDI and Portfolio liabilities to GDP is positive and statistically significant. We find the presence of country-specific fixed effects and so, we choose the FE model (Lower right panel). The endogenous variable; ratio of FDI and portfolio liabilities to GDP is instrumented with its seventh lag and with the average of the ratio of FDI and portfolio liabilities to GDP of the neighbours at a particular point of time.

Table 4 reports the results of equation 1 with 0/1 equity indicator as the IFI indicator in the regressions. Columns 2, 3 and 4 of Table 4 report the results for the developed country group for the pooled regression model, OLS model with panel corrected standard errors and the pooled regression with GMM model, respectively. The F-test that all individual specific effects are 0 has a p-value of 0.13 which means non presence of fixed effects in the regression equation (Lower left panel). The Hausman test for the presence of FE has a p-value of 0.05 which also means that the FE model is inconsistent. The BP LM test for RE has a p-value of 1.00 again reinforcing that the pooled model is consistent and the individual effects model is inconsistent. Hence, we report the results of pooled regression in Table 4. The coefficient of initial income is negative and statistically significant implying conditinal convergence. The coeffcient estimate of population is also significant at 10% level. The coefficient estimate of human capital and equity indicator are insignificant. The coeffcient estimate of physical capital is significant at 1% level. The pooled OLS estimator is consistent if the pooled model is appropriate and regressors are uncorrelated with the error term that is, $Cov\left[u_{it}, x_{it}\right] = 0$. However, the usual OLS variance matrix based on identically and individually distributed (iid) error is inappropriate as the errors for a given individual i are almost certainly positively correlated over t. One therefore needs to use panel corrected standard errors. Column 3 of Table 4 reports the results with panel-corrected standard errors. The results of pooled regression with panel corrected standard errors are similar to the results of the pooled regression. The coefficient of initial income is now statistically significant at 5% level while the coefficient

estimate of population is now statistically insignificant. Column 4 of Table 4 reports the results of pooled regression with IV and GMM. The equity liberalization indicator is instrumented by the third and fourth lag of equity liberalization indicator and the percentage of neighbouring countries with liberalized equity markets at a given point of time (Lower left panel). The coefficient of initial income remains negative and significant at 1% level thereby pointing towards conditional convergence.

Columns 5-7 of Table 4 report the results for the emerging country group. The negative coefficient associated with initial level of income denotes that emerging economies grow faster to converge to their respective steady state levels if their steady state levels are above their initial per capita income levels. The coefficient estimates of other control variables are as above. The equity indicator dummy is statistically significant. The FE model is chosen (Lower right panel) and the 0/1 equity indicator is instrumented with its first and second lag and with the percentage of neighbouring countries with liberalized equity markets at a given point of time.

Table 5 reports the results with 0/1 banking sector liberalization indicator as the IFI indicator. The coefficient estimate of initial income is negative but statistically insignificant for developed country sample thus refuting conditional convergence amongst this group (Columns 2-4). The coefficient estimate of other control variables are as obtained in earlier results. The IFI indicator, 0/1 banking indicator is statistically significant for the FE model and the GMM model. After selecting the FE model (lower left panel), we instrumented the IFI indicator with its second and third lag and with the percentage of neighbouring countries with liberalized banking sector. The coefficient of initial income is found to be negative and statistically significant for the emerging economies sample (Columns 5-7). Thus, these emerging economies experience conditional convergence towards their respective steady state values in case their initial income falls short of their steady state levels. All other control variables have coefficient estimates as above. The coefficient estimate of banking indicator is insignificant across all the three specifications. We choose the FE model (lower right panel). We instrumented the endogenous variable; 0/1 banking indicator with its first and second lag and with the percentage of neighbouring countries with liberalized banking sector.

Table 1: Effects of kaopen as IFI Indicator on Convergence to Steady State Real PCGDP: The Results of Regression Analysis

Variables (1)	Developed Countries			Emerging Economies		
	FE Model (2)	FE Robust Model (3)	Two step GMM Model (4)	FE Model (5)	FE Robust Model (6)	Two step GMM Model (7)
Initial PCGDP	-.0177 (.0141)	-.0177 (.0236)	-.0150 (.0162)	-.0500* (.0083)	-.0500* (.0123)	-.0556* (.0095)
Population	.0159 (.0204)	.0159 (.0233)	.0191 (.0217)	-.0047* (.0016)	-.0047* (.0023)	-.0049* (.0018)
Human Capital	-.0410 (.0407)	-.0410 (.0473)	-.0575 (.0489)	.1392* (.0280)	.1392* (.0479)	.1620* (.0330)
GCF to GDP	.0429* (.0101)	.0429* (.0116)	.0418* (.0116)	.0867* (.0097)	.0867* (.0110)	.0895* (.0122)
kaopen	.0027*** (.0015)	.0027 (.0017)	.0037** (.0016)	.0027 (.0017)	.0027 (.0020)	.0027 (.0019)
Constant	.0337 (.0821)	.0337 (.1244)		.0755 (.0554)	.0755 (.0678)	
F-test that all u_i = 0	1.79***, p-value: 0.077			4.97*, p-value: 0.000		
Hausman test for FE	13.01**, p-value: 0.023			21.12*, p-value: 0.000		
BP LM Correlation	413.650*, p-value: 0.000			139.645*, p-value: 0.000		
Wald test	15.86***, p-value: 0.069			13.01, p-value: 0.162		
LM for serial correlation	62.981*, p-value: 0.000			22.110*, p-value: 0.001		
Hansen J test	3.442, p-value: 0.180			0.093, p-value: 0.9545		
Kleigerben Paap LM test	146.104*, p-value: 0.000			102.905*, p-value: 0.000		

Note (1) *, **, *** indicate significance at 1%, 5% and 10%, respectively.

(2) The standard errors are in parentheses

Table 2: Effects of the Ratio of net FDI & Portfolio Flows to GDP as IFI Indicator on Convergence to Steady State Real PCGDP: The Results of Regression Analysis

Variables	Developed Countries			Emerging Economies		
	FE Model (1)	FE Robust Model (2)	Two step GMM Model (3)	FE Model (4)	FE Robust Model (5)	Two step GMM Model (6)
Initial PCGDP	-.0187 (.0138)	-.0187 (.0222)	-.0143 (.0158)	-.0512* (.0080)	-.0512* (.0120)	-.0651* (.0112)
Population	.0015 (.0192)	.0015 (.0201)	-.0025 (.0208)	-.0046* (.0015)	-.0046** (.0021)	-.0050** (.0024)
Human Capital	-.0241 (.0355)	-.0241 (.0440)	-.0310 (.0429)	.1255* (.0280)	.1255* (.0439)	.1540* (.0362)
GCF to GDP	.0411* (.0099)	.0411* (.0111)	.0424* (.0113)	.0806* (.0098)	.0806* (.0105)	.0658* (.0126)
Net FDI & Portfolio flows to GDP	.0020* (.0004)	.0020* (.0003)	.0022* (.0006)	.0034* (.0010)	.0034* (.0008)	.0080* (.0022)
Constant	.0869 (.0813)	.0869 (.1244)		.1090*** (.0556)	.1090 (.0699)	
F-test that all u_i = 0	1.78***, p-value: 0.079			4.95*, p-value: 0.000		
Hausman test for FE	13.02**, p-value: 0.023			25.86*, p-value: 0.000		
BP LM Correlation	413.273*, p-value: 0.000			46.663*, p-value: 0.000		
Wald test	13.30, p-value: 0.149			10.24, p-value: 0.331		
LM for serial correlation	57.026*, p-value: 0.000			20.733*, p-value: 0.001		
Hansen J test	1.608, p-value: 0.447			5.636, p-value: 0.059		
Kleigerben Paap LM test	15.397*, p-value: 0.001			31.877*, p-value: 0.000		

Note (1) Table reports b-coefficients and the standard error. *, **, *** indicate significance at 1%, 5% and 10%, respectively.
(2) The standard errors are in parentheses

Table 3: Effects of the Ratio of FDI & Portfolio Liabilities to GDP as IFI Indicator on Convergence to Steady State Real PCGDP: The Results of Regression Analysis

Variables (1)	Developed Countries			Emerging Economies		
	FE Model (2)	FE Robust Model (3)	Two step GMM Model (4)	FE Model (5)	FE Robust Model (6)	Two step GMM Model (7)
Initial PCGDP	-.0370** (.0149)	-.0370 (.0271)	-.0346** (.0164)	-.0619* (.0085)	-.0619* (.0134)	-.0877* (.0146)
Population	.0086 (.0200)	.0086 (.0211)	.0263 (.0233)	-.0023 (.0017)	-.0023 (.0020)	-.0004 (.0029)
Human Capital	-.0118 (.0372)	-.0118 (.0509)	.0206 (.0457)	.0884* (.0318)	.0884*** (.0477)	.1166** (.0494)
GCF to GDP	.0362* (.0103)	.0362* (.0117)	.0479* (.0119)	.0902* (.0095)	.0902* (.0102)	.0904* (.0121)
FDI & Portfolio liability to GDP	.0002* (.0000)	.0002* (.0001)	.0000 (.0001)	.0008* (.0002)	.0008* (.0002)	.0012* (.0004)
Constant	.2354** (.0984)	.2354 (.1589)		.1776* (.0615)	.1776** (.0831)	
F-test that all u_i = 0	1.90***, p-value: 0.058			5.78*, p-value: 0.000		
Hausman test for FE	13.88**, p-value: 0.016			27.76*, p-value: 0.000		
BP LM Correlation	454.590*, p-value: 0.000			124.432*, p-value: 0.000		
Wald test	12.44, p-value: 0.189			14.45, p-value: 0.107		
LM for serial correlation	46.25*, p-value: 0.000			19.563*, p-value: 0.002		
Hansen J test	0.000, p-value: 0.983			2.779, p-value: 0.0955		
Kleigerben Paap LM test	65.635*, p-value: 0.000			72.105*, p-value: 0.000		

Note (1) *, **, *** indicate significance at 1%, 5% and 10%, respectively.
(2) The standard errors are in parentheses

Table 4: Effects of the Equity Dummy as IFI Indicator on Convergence to Steady State Real PCGDP: The Results of Regression Analysis

Variables (1)	Developed Countries			Emerging Economies		
	OLS Model (2)	OLS Robust Model (3)	Two step GMM Model (4)	FE Model (5)	FE Robust Model (6)	Two step GMM Model (7)
Initial PCGDP	-.0250* (.0064)	-.0250** (.0081)	-.0334* (.0071)	-.0502* (.0081)	-.0502* (.0120)	-.0551* (.0094)
Population	.0018*** (.0010)	.0018 (.0011)	.0020*** (.0012)	-.0044* (.006)	-.0044** (.0020)	-.0046** (.0019)
Human Capital	.0191 (.0120)	.0191 (.0115)	.0322* (.0122)	.0963* (.0353)	.0963** (.0472)	.1173** (.0395)
GCF to GDP	.0315* (.0073)	.0315* (.0076)	.0407* (.0080)	.0868* (.0095)	.0868* (.010)	.0875* (.0122)
Equity Indicator	.0040 (.0037)	.0040 (.0029)	.0283* (.0072)	.0171** (.0072)	.0171** (.0079)	.0160** (.0078)
Constant	.1293** (.0619)	.1293 (.0704)	.1442** (.0623)	.1003*** (.0558)	.1003 (.0698)	
F-test that all u_i = 0 Hausman test for FE BP LM for RE BP LM Correlation Wald test LM for serial correlation Hansen J test Kleigerben Paap LM test	1.55, p-value: 0.1381 11.03***, p-value: 0.050 0.000, p-value: 1.000 4.236, p-value: 0.118 34.176*, p-value: 0.000			4.96*, p-value: 0.000 31.15*, p-value: 0.000 148.914*, p-value: 0.000 11.67, p-value: 0.232 20.343*, p-value: 0.002 0.346, p-value: 0.841 139.692*, p-value: 0.000		

Note (1) *, **, *** indicate significance at 1%, 5% and 10%, respectively.
(2) The standard errors are in parentheses

Table 5: Effects of the Banking Dummy as IFI Indicator on Convergence to Steady State Real PCGDP: The Results of Regression Analysis

Variables (1)	Developed Countries			Emerging Economies		
	FE Model (2)	FE Robust Model (3)	Two step GMM Model (4)	FE Model (5)	FE Robust Model (6)	Two step GMM Model (7)
Initial PCGDP	-.0195 (.0141)	-.0195 (.0233)	-.0240 (.0158)	-.0525* (.0081)	-.0525* (.0122)	-.0577* (.0096)

Population	.0114 (.0198)	.0114 (.0206)	.0331 (.0216)	-.0049* (.0016)	-.0049** (.0022)	-.0050* (.0018)
Human Capital	-.0218 (.0367)	-.0218 (.0524)	-.0288 (.0421)	.1501* (.0293)	.1501* (.0465)	.1842* (.0343)
GCF to GDP	.0442* (.0101)	.0442* (.0111)	.0455* (.0116)	.0897* (.0096)	.0897* (.0111)	.0939* (.0125)
Banking Indicator	.0072** (.0036)	.0072 (.0045)	.0271* (.0066)	-.0001 (.0061)	-.0001 (.0063)	-.0071 (.0083)
Constant	.0416 (.0823)	.0416 (.1277)		.0794 (.0564)	.0794 (.0692)	
F-test that all u_i = 0	1.86***, p-value: 0.064			4.86*, p-value: 0.000		
Hausman test for FE	13.30**, p-value: 0.020			18.22*, p-value: 0.002		
BP LM Correlation	448.488*, p-value: 0.000			140.522*, p-value: 0.000		
Wald test	17.76**, p-value: 0.038			12.82, p-value: 0.171		
LM for serial correlation	59.647*, p-value: 0.000			20.340*, p-value: 0.002		
Hansen J test	4.616, p-value: 0.099			0.006, p-value: 0.9970		
Kleigerben Paap LM test	53.288*, p-value: 0.000			95.451*, p-value: 0.000		

Note (1) *, **, *** indicate significance at 1%, 5% and 10%, respectively.
(2) The standard errors are in parentheses

5. Conclusion

The present study assesses whether our two group of countries, namely, developed and emerging converge to their respective steady state levels of income per head when their respective steady state levels are raised above their respective initial per capita income levels as a result of reform process like financial liberalization. For conditional convergence to take place, the coefficient of initial income must be significantly negative. In our sample of developed countries, we find the coefficient of initial income to be insignificant when we included the IFI indicators; kaopen index, the ratio of net FDI and portfolio flows to GDP and the banking indicator and to be significantly negative when we included the ratio of FDI and Portfolio liabilities to GDP and equity indicator one at a time in equation 1. However, both the IFI indicators, namely, the ratio of FDI and Portfolio liabilities to GDP and equity indicator are statistically insignificant in these regressions. Thus we may infer that we do not find any convergence in our set of developed countries. The reason for this occurrence may be that this set of developed countries has already converged to their steady state levels. There is no remarkable difference in their levels of initial income and in their steady state levels of income. Hence we do not observe these economies to be growing faster to catch up with their respective steady state levels as their respective initial income levels are too close to their respective steady state levels. The past literature has found ample evidence of conditional convergence but the past literature has looked at the convergence debate after clubbing both the developed and emerging economies together.

We find the coefficient estimate of initial income to be statistically significant and negative when we estimated equation 1 for our group of nine emerging economies with the control variables and the five different IFI indicators included in the regression equation one by one. While the coefficient of initial income is negative and statistically significant when we include the five different IFI indicators one at a time in equation 1, we find three out of five IFI indicators to be statistically significant themselves. The IFI indicators namely the ratio of net FDI and Portfolio flows to GDP, the ratio of FDI and Portfolio liability to GDP and equity indicator are statistically significant while the de-jure measure of capital account liberalization, kaopen index and banking indicator are not statistically significant. In our paper, Bhatia and Sharma (2019), we have observed banking indicator to have insignificant impact on real income of emerging economies. Thus we may infer that banking liberalization indicator has no impact on the level of real PCGDP and the growth of PCGDP in our sample of emerging economies. Referring to the convergence hypothesis in our sample of emerging economies, we find strong support in favour of conditional convergence in emerging economies. We conclude by saying that the emerging economies witness conditional convergence and grow faster when their steady state levels of income are raised above initial income levels on account of reforms like international integration.

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Appendix

Table A1: Variables Description and Data Sources

Variables	Definition	Source
Dependent Variable		
Growth rate of real per capita GDP	Calculated as the log difference, $$y_{it} = \ln PCGDP_t - \ln PCGDP_{t-1}$$	The Conference Board Total Economy Database™, Sept 2015
Control Variables		
Human Capital	Index of human capital per person	Penn World Tables 9.0
Population	Population (in millions)	Penn World Tables 9.0
GCF to GDP	Gross capital formation (% of GDP)	World Development Indicators
Liberalization Measures		
a) Capital Account Liberalization		
kaopen	Dejure measure capturing regulatory controls over current or capital account transactions, the existence of multiple exchange rates, and the requirements of surrendering export proceeds	Notes on the chinn- Ito Financial openness index- 2013 update
net FDI + Portfolio Flows to GDP	Portfolio equity includes net inflows from equity securities. FDI is direct investment equity flows in the reporting country.	World Development Indicators
FDI and Portfolio Liabilities to GDP	The ratio of FDI and Portfolio liabilities to GDP	Lane and Milesi-Ferretti (1999 and 2006)
b) Equity Market liberalization		
a) Equity Liberalization Dummy	Official equity market liberalization date is a date of formal regulatory change after which foreign investors can invest in domestic equity securities and domestic investors can transact in foreign equity securities abroad	Data on Official equity market liberalization dates for emerging markets are from Bekaert *et al.* (2003) and for developed countries are from Zhen Li (2012)
c) Banking Sector Liberalization		
a) Banking Liberalization Dummy	The measure takes into account the chronology of bank liberalization taking into account regulations on deposit interest rates, lending interest rates, allocation of credit, foreign currency deposits.	Data on Official domestic financial sector liberalization dates are from Kaminsky and Schmukler (2003)

Table A2: Acronyms

Acronyms	
2SLS	Two Stage Least Square
BPLM	Breusch Pagan Lagrange Multiplier
FDI	Foreign Direct Investment
FE	Fixed Effect
GDP	Gross Domestic Product
GCF	Gross Capital Formation
GMM	Generalized Moment Method
IFI	International Financial Integration
IV	Instrumental Variables
LDCs	Least Developed Countries
LM	Lagrange Multiplier
OLS	Ordinary Least Squares
PCGDP	Per Capita Gross Domestic Product
RE	Random Effect
U.K.	United Kingdom
U.S.	United States of America