The Impact of International Financial Integration: FDI and Remittances on Economic Growth in Developing Countries

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Abstract:

This paper examines the role of volatility of international capital inflows in analyzing the relationship between international financial integration and economic growth in developing countries by using 3SLS model between 1996 and 2016. This study ascertains whether high-income developing countries have benefited more from financial integration than other countries to stimulate growth. Empirical analysis shows that financial integration has a positive effect on economic growth in high and middle income developing countries through the examination of the joint international capital flows (foreign direct investment and remittances) and transmission channels (internal investment and household final consumption).

Keywords: economic growth, finance integration, FDI, remittances, 3SLS.

The Impact of International Financial Integration: FDI and Remittances on Economic Growth in Developing Countries

Globalization can be defined as the increased integration of economies, which translates into increased trade, capital, investment and migration flows. Although there are significant increases in the level of vile associated with globalization, these benefits are not evenly distributed throughout the world. Capital movements, financial companies and financial assets are part of the so-called process of financial globalization, Masson (2001). Thus, this financial globalization encourages the liberalization of capital flows, which has brought these countries various advantages in terms of better overall allocation of capital and an increase in the possibilities of international sharing of Risks.

International financial integration indicates that capital flows without limits around the world. National capital markets are being embraced as a single money market, so it is an ambivalent process that has an effect on the powerful development factor; it also subjects economies to more constraints, volatility and instability. The free movement of capital, services and investment across borders is a powerful engine of economic growth, development and employment. It also pushes competition and economic efficiency to the benefit of consumers and provfdis companies with financial resources and technological innovations. These assets have benefits in both the country of origin and the host country.

There is much empirical work on international financial integration, but it remains a difficult variable to define and measure. Various studies show that financial integration is a dynamic process that evolves over time in the function of financial, economic and socio-political innovations but without taking into account the volatility of capital flows.

Dornbush, Golfdajn , Valdes 1995 and Stigltiz (2002) have found that an economy with high capital mobility with a sudden halt in capital inflows that can occur and lead to reversals in the current account and processes very expensive adjustment. For example, Sula (2010) shows that declines in capital inflows undermine the economic production process. On the other hand, an increase in the inflow of international capital flows

encourages an expansion of domestic credit, increases the share of non-performing loans and pushes the financial system into a vulnerable situation.

To our knowledge, there are no applied studies on the verification of the volatility of international capital flows (foreign direct investment and money transfers) in the analysis of the relationship between integration international financial growth and economic growth. Therefore, in our research we will study the role of the volatility of international capital inflows in the analysis of the relationship between international financial integration and economic growth in developing countries.

I. Literature Review

International financial integration in developing countries to the international capital market was largely driven by economic growth in these countries, economic stability, and investment stimulus. However, this financial integration can have negative consequences for the economy by leading capital market turbulence and exchange rate volatility that could lead to macroeconomic imbalances.

Ayuso et Blanco, 2000 ; Carrieri et alii, 2002 have proven that financial markets have become more integrated. In fact, in recent years, the financial markets have undergone many reforms. This integration is characterized, in particular, by the gradual lifting of the various barriers to foreign investment and by the

removal of restrictions on international capital movements. These various reforms have led to major changes in the financial environment and have begun the process of international financial integration.

Nevertheless, this financial integration can have a negative impact on the economy by causing turbulence on the capital markets and exchange rate volatility that could lead to macroeconomic imbalances.
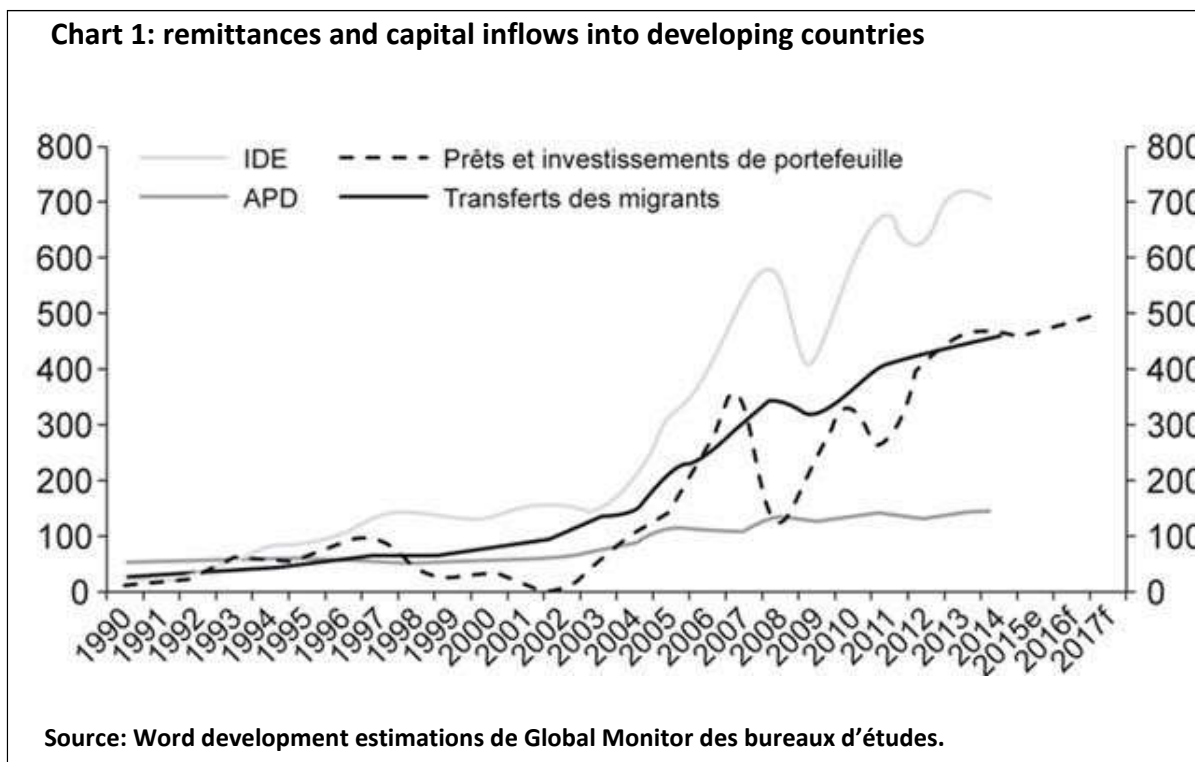
1. Volatility of capital flows and financial integration

The remarkable growth of regional and international financial integration, as a result of the liberalization of capital movements and the opening up of financial markets, which affects some emerging countries, is consfdired one of the major changes in these areas last years. Thus, capital flows have undergone a fatal transformation and marked a new process of financial globalization. This change has brought substantial gains to advanced economies and has been one of the key factors for sustainable economic growth in developing countries.

The period of 1980 was marked by a strong and abundant flow of capital between the industrialized countries and the developing countries. Some countries have been able to benefit from this globalization, by increasing their growth rate, and other countries have experienced a periodic decline in growth rates and the emergence of financial crises. According to the World Bank, this period is characterized by three characteristics: the first is that a number of developing countries have entered the world market. The second is that a group of developing countries has become increasingly marginalized, with declining incomes and increasing poverty. The third is that international flows of capital, people and information have accelerated.

Ratha (2003) was the first to notice the recent exceptional trajectory of money market transfers relative to the evolution of other sources of external financing, such as foreign direct investment and official development aid. In addition, he found that remittances are more stable than ODA and FDI. This last finding has been confirmed by subsequent research (Buch and Kuckulenz (2004) and IMF (2005)).

Chart (1) represents the evolution of FDI, REM, ODA in developing countries, these financial flows

Chart 1: remittances and capital inflows into developing countries

Source: Word development estimations de Global Monitor des bureaux d'études.

represent today one of the most important forms of external financial flows of these countries. Between 1980 and 1997, FDI increased at an average rate of 13% per year against 7% in the previous decade, we also note that in 2000, total inflows of FDI reached their record level before experiencing a fall after the crisis.

For remittancess, their flows to developing countries have increased since the beginning of the 2000s to more than $ 305 billion in 2008. In 2013, these transfers amounted to $ 414 billion, an increase of 6%. 3%. These flows account for a major share of capital inflows in developing countries, as they represent

more than three times the amount of official aid and more than two thirds of FDI. The significant increase in remittances is the result, on the one hand, of the increase in the number of migrants, and on the other hand, of the improvement of the financial sector thus admitting a better accounting of these financial flows. Alpaslan Akcoraoglu, Senay Acikgoz and Atilla Gokce (2011), presented the relationship between FDI volatility and economic growth in the case of the Czech Republic and Hungary, they used the ARDL technique to study the Co integration between these variables and they found that FDI volatility has a negative and statistically significant response to economic growth.

Kornechi and Raghavan (2008) show how FDI affects economic growth in five Eastern European countries (Czech Republic, Poland, Hungary, Slovenia and Slovakia) during the period (1993-2003) and they found a relationship between FDI and economic growth.

Ileana C. Neagu and Maurice Schiff (2009) studied the stability and cyclicality of remittances in comparison with the same characteristics of international financial flows, namely foreign direct investment and public development aid for 116 developing countries during 1980-2007, they found that public aid is the most stable for these three financial flows with 56% compared to economic growth, followed by the remittances with 20% and FDI with 11%.

1. Theoretical advantages between financial integration and economic growth

The modeling of interactions between international financial integration and economic growth, and the identification of the determinants of financial integrations, will be based on a simultaneous equation structural model applied to panel data because some variables simultaneously influence financial integration and economic growth.

It should be noted that previous studies on this subject are almost non-existent for developing countries. Existing studies in this area have focused on the direct effect of financial integration and economic growth without identifying its determinants.

Mackinnon (1973), Schumpeter (1991), Gurley (1960), and shaw (1973) studied the relationship between international financial integration and economic growth. According to these authors, financial integration can enhance the functions of the financial system in the economy and have a positive effect on economic growth through the development of the financial system.

This phenomenon plays a fundamental role in the financial system by channeling available capital into the most profitable projects and producing a rich field of information essential for the conclusion of financial contracts, so all these principles can produce a suitable macroeconomic framework to promote economic growth. As a result, endogenous growth models show that it can be an indispensable factor for the occurrence of growth.

Beck et al. (2000) argue that a liberalized financial system offers a much broader sense of opportunity and choice of investment. Various studies point out that financial liberalization has a direct and indirect effect on economic growth: an indirect effect through the acceleration of financial development, which has a positive impact on growth and a direct effect by directing capital towards most profitable projects.

It can be concluded, therefore, that financial integration promotes the free movement of capital, especially foreign direct investment and money transfers in developing countries, and increases the availability of lendable funds, intensify competition, which leads to a positive effect on financing conditions and optimal resource allocation processes. Mackinnon and Shaw (1973) recommended eliminating the constraints that hinder the smooth functioning of the financial system, in this case the so-called financial repression policy.

Markusen and Venables (1999) have shown that international financial integration can foster economic growth through the spillover effects associated with foreign direct investment. For its part, Echengreen (2001) argued that capital account liberalization increases growth by forcing governments to adopt more disciplined macroeconomic policies.

Rosine Confiance and Docquier (2017) verified the nature of the link between international financial flows (FDI, remittances, ODA) and economic growth in poor and middle-income countries for a sample of 124 developing countries. annual periods between 1990 and 2015 using the GMM method, they found that a 1% increase in FDI scork leads to additional economic growth of 0.28%, thus, a 1% increase remittances generates growth 0.17%, also the impact of the ADP is positive on the growth of developing countries, 1% growth in ODA leads to an economic growth surplus of 0.07%. Their study confirms their positive impact on growth and that these financial flows can bring benefits for countries in terms of capital inputs, technology acquisition, job creation, human capital formation improvement Thus, all of these international

flows to developing countries have a positive impact on economic growth, 1% growth in ODA leads to an economic growth surplus of 0.07%

I. Methodology of the study:

The question of the role of volatility of international capital inflows in the analysis of the relationship between international financial integration and economic growth in developing countries remains a subject to be determined. To this end, we have chosen international flows that have a major effect on economic growth, of course, foreign direct investment and money transfers for a sample of 29 developing countries that benefit more from these international flows over a period from 1996 to 2016 (N = 21).

East Asia and the Pacific: China, Philippines, Indonesia, Thailand, Malaysia.
• Europe and Central Asia: Ukraine, Romania, Tajikistan, Bulgaria, Albania, Turkey.
• Latin America and the Caribbean: Mexico, Brazil, Peru, Jamaica.
• Middle East and North Africa: Egypt, Morocco, Tunisia, Iran, Algeria.
• South Asia: India, Pakistan, Bangladesh, Nepal.
• Sub-Sahara Africa: Nigeria, Ghana, Senegal, Kenya, Sudan

1(Presentation of the model: Simultaneous equations structural model

In order to avoid the risk of endogeneity between the explanatory variables and to account for dynamic effects and the channels by which international financial integration and

economic growth interact, a simultaneous equation structural model applied to panel data was developed.

Les variables endogènes:

KAOPEN : Index of Chinn GDP: the growth rate

Les variables explicatives:

FDI : foreign direct investment. REM : remittances.

FF : Financial flows.

FD : Financial development.

INV : Gross fixed capital formation. COR : Commercial opening rate.

INF : Inflation.

CRP : Corruption.

DCFM : Final expenditure of final consomption of households.

Table 1: Definition and source of variables

Variables	Définition	Unité	Source
lngdp	GDP per capita at constant prices in 2010.	At constant prices (millions of 2010 dollars)	World Bank (World development indicator (2018))
lnrem	the log of staff transfers and employee compensation	At constant prices (millions of 2010 dollars)	World Bank (World development indicator (2018))
Reer	Official exchange rate.	local currency units per US $, average of the period) At constant prices	World Bank (World development indicator (2018))
popgr	The growth rate of the country 's population (i) at time t.	Percentage (%)	World Bank (World development indicator (2018))

lndcfm	Household final consumption expenditure (i) at time (t) is the market value of all goods and services purchased by households.	At constant prices (millions of 2010 dollars)	World Bank (World development indicator (2018))
Sch	Measure human capital. It is the ratio of girls to boys enrolled at secondary level in public and private schools.	Percentage (%)	UNESCO Institut de Statistique. (http://uis.unesco.org/)
lninvf	The logarithm of gross fixed capital formation that measures the investment.	At constant prices (millions of 2010 dollars)	World Bank (World development indicator (2018))
Kaopen	The Chinn-Ito (Kaopen) index is a measure of the external financial liberalization of country i at time t.		Chinn, Menzie D. and Hiro Ito (2006). "What Matters for Financial Development? Capital Controls, Institutions, and Interactions," Journal of Development Economics, Volume 81, Issue 1, Pages 163-192 (October).
lnfdi	These are international capital movements made to develop, create or maintain a foreign subsidiary and / or exercise control over the management of a foreign company.	At constant prices (millions of 2010 dollars)	World Bank (World development indicator (2018))
Ff			World Bank (World development indicator (2018))
Fd	Measure financial development for country i at time t.	At constant prices (millions of 2010 dollars)	World Bank (World development indicator (2018))
COR	Measures the share of international trade in an economy ((exp + imp) / 2) / gdp	At constant prices (millions of 2010 dollars)	World Bank (World development indicator (2018))
INF	Inflation measured by the Deflator Deflator's annual growth rate of GDP, which indicates the rate of change in	At constant prices (millions of 2010 dollars)	World Bank (World development indicator (2018))

	the economy as a whole.		
crp	Corruption is the abuse of a power received in delegation for private purposes.	The estimate gives the country's score to the aggregated indicator, in units of a standard normal distribution, that is, from -2.5 to 2.5.	International Country Risk Gufdi (ICRG) Researchers Dataset.

The structure of the simultaneous equation model is as follows:

$$Kaopen_{i,t} = \alpha_{i,t} + \alpha_1 ide_{i,t} + \alpha_2 tfm_{i,t} + \alpha_3 f_{i,t} + \alpha_4 DF_{i,t} + \alpha_5 toc_{i,t} + \alpha_6 tcr_{i,t} +$$

$$\alpha_7\, crp_{i,t} + \varepsilon_{i,t} \text{ (eq1)}$$

$$PIB_{i,t} = \beta_{i,t} + \beta_1 kaopen_{i,t} + \beta_2 ide_{i,t} + \beta_3 tfm_{i,t} + \beta_4 dcfm_{i,t} + \beta_6 fbc_{i,t} + \qquad f$$

$$\beta_7 in_{i,t} + \delta_{i,t} \text{ (eq2)}$$

1) Estimation methodologies:

a) Method of identifying the model:

The estimation method for the simultaneous equation depends on the criterion of identification of the model, (Bourbonnais, 2002).
- If the model is just-identified, the indirect least squares or least squares least squares method can be applied.
- If the model is over-identified, the least squares model is applied.
- If the model is under-identified, there is no estimate possible.

<div align="center">The necessary conditions of identification</div>

g - g'+ k - k'< g - 1	The equation is under-identified	Estimate is not possible
g - g'+ k - k'= g - 1	The equation is just-identified	MCI directs ou bien DMC
g - g'+ k - k' > g - 1	The equation is under identified	DMC

The necessary conditions for our model

Equations	Identification procedure	Results	Estimation
Equation 1	$2 - 2 + 9 - 7 > 2 - 1$	$2 > 1$	DMC
Equation 2	$2 - 2 + 9 - 6 > 2 - 1$	$3 > 1$	DMC

a) Estimation method: 2SLS or 3SLS

Our table indicates for the two equations: g - g '+ k - k'> g - 1, so we will estimate our model with the 2SLS (DMC) and since we have two endogenous variables we will estimate our model with the 3SLS. The term 3SLS refers to an estimation method that combines the system equation, sometimes known as regression (SUR), with the (2SLS) method. A form of estimating instrumental variables allows correlations between unobserved perturbations across multiple equations, as well as restrictions between the coefficients of different equations and improves the efficiency of the equation by taking into account such correlations between equations. Unlike the (2SLS) method which estimates the coefficients of each equation separately, the (3SLS) estimates all the coefficients simultaneously. It is assumed that each equation of the system is at least just fdintified. The under-fdintified equations are not taken into account in the (3SLS) method.

b) The descriptive statistical tes

The results show that the variables related to the exchange rate, inflation and financial development are the most volatile. On the other hand, the rate of economic growth and human capital are the least volatile (the smallest standard deviation).

c) Correlation test between variables

The first equation:

Table (2) represents the correlation matrix of the first equation, this table shows positive correlations between the measure of financial integration and economic growth in developing countries (+0.36), foreign direct investment (+0.12), and weak correlations

with money market transfers (0.03), financial flows (+0.05), trade opening rate (+0.08), exchange rate (+0.06) and the stability of the government (+0.04). In contrast, the financial integration index is negatively correlated with financial development and inflation.

➢ **The second equation**

Table (3) shows the correlation matrix of the second equation, this table shows positive correlations between economic growth and the financial integration index (+0.32), foreign direct investment (+0.57), money market transfers (+0.13), the exchange rate (+0.10), domestic investment (+0.47), household consumption (+0.47) and corruption with (0.08). On the other hand, economic growth is negatively correlated with human capital and household population growth.

d) Stationarity of the series:

This section makes it possible to test the stationarity of the explained and explanatory variables of the model. The stationarity test avoids the risk of fallacious regressions between endogenous variables and exogenous variables. The various stationarity tests were carried out under the STATA 14 software. Table (5) shows that the variables: economic growth, foreign indirect investments, money market transfers, gross fixed capital formation, final consumption expenditure Households and the exchange rate are stationary in prime differences and the other variables are stationary in level.

2) Results and estimates

We will estimate our model with the Ordinary Least Squares (3SLS) estimator, using the Stata 14 software and the reg3 package. Moreover, according to Cameron and Trivedi (2005), the presence of heteroscedasticity could make the estimates inconsistent; therefore, the LMHREG3 package developed by (Shehata, 2011) is used to test for heteroscedasticity. Thus, LMAREG3 developed also by (Shehata, 2011) is used to test the aucororrelation of the system.To properly analyze the effect of international financial integration on the integration of economic growth in developing countries through foreign direct investment and money transfers, we will come up with four different specifications according to gross national income:

➢ Specifications 1: introduce all countries into the model
➢ Specification 2: Introducing low-income countries
➢ Specifications 3: introduce countries with income
➢ Specification 4: Introducing countries with income

a) Estimation of the first specification: Introduce all countries in the model

Table (7) represents the linear regression of the 3SLS model during the period 1996-2016. The second column shows the model estimate result of the International Financial Integration Index. In this estimate, the parameter of interest is to determine the effect of economic growth on financial integration from foreign direct investment channels and money market transfers. We note the existence of a positive relationship and a significance level of (1%) between the index of financial integration and economic growth and a 1% increase in the index of international financial integration. economic growth in developing countries increases by 13%.For the impact of foreign direct investment on financial integration, we note that the presence of a negative and significant relationship at a threshold of 5% between FDI and financial integration indicates that an increase of 1% of the financial integration index, foreign direct investment decreases by 0, 15% and also the existence of a negative and significant relationship at a 10% threshold between financial Integration and inflation means that a 1% increase in financial integration, the inflation rate decreases by 0.002%. For the third column, it refers to the estimation result of the economic growth model; this evaluation makes it possible to test the impact of financial integration on economic growth.The conclusions of our model show that international financial integration has no effect on economic growth in developing countries and that FDI, REM, GFCF and DCFM have positive and

significant results at a threshold of 1 %, and also the results show the existence of a positive and significant relationship of 10% between economic growth and human capital.Tables (8), (9) and (10) show that the 2 equations are homoscedasticity but the presence of heteroscedasticity for the entire model, thus the absence of aucororrelation for both equations and for the all model.To conclude, economic growth in developing countries increases the index of international financial integration and shows that the impact of external capital inflows on economic growth depends mainly on the initial conditions and the policies implemented in order to attract foreign investment, increase domestic investment, household consumption and human capital to stimulate growth. On the other hand, we note that international financial integration has no significant effect on economic growth, these results are confirmed by Grilli and Milesi-Ferretu 1995; Rodrick 1998; Kraay 1998; Edison et al 2002.For Dhrifi Abdelhafidh (2015), he confirms that FDI has a significant positive impact on economic growth in developing countries; we also note that transfers of money market funds positively affect economic growth in developing countries. Furthermore, neoclassical models confirm our findings that human capital (accumulation of capital) and physical capital (investment) are two main and necessary elements for achieving economic growth.**Second specifications: countries with high incomes**

Table (12) shows the estimation result for our model for developing countries with high incomes. A negative and significant effect is found at a 1% threshold between economic growth and growth index of financial integration. Thus, the presence of a positive relationship between remittances, financial flows, foreign direct investment and the commercial opening rate on the index of financial integration at a significance level of 1%.We also note a negative impact of financial development and the stability of the government on financial integration at a significance level of 1%. For the effect of financial integration on economic growth, there is a positive and significant effect at a 1% level, which indicates a 1% increase in the economic growth of the developing country with a high income, international financial integration increases by 0.15%. Similar to the impact of real exchange rate on economic growth, the results show the existence of a positive and significant relationship at a threshold of 5%. Thus, the appearance of a positive relationship between households' final consumption expenditure and corruption on economic growth at a significance level of 1%. For human capital there is a negative effect on economic growth at a threshold of 1%.

In conclusion, commercial openness has a positive effect on financial integration, these results are certified with the work of Chinn and Ito (2006); Haggard and Maxfield (1993), and they found that in developing countries the rate of trade openness was a prerequisite for financial openness. Our findings confirm the work of Kose, Prasad et al (2009), who have studied the process of financial integration and economic policies by examining whether economic policies can help developing countries effectively manage the process of economic growth and financial integration. Their main results from their research show that economic policies fostering the development of the financial sector, the quality of institutions and trade openness help developing countries benefit more from financial integration. Thus, our estimates show that external capital flows have a positive impact on financial integration for high-income developing countries. For our variable of interest, we find that financial integration stimulates economic growth through households' final consumption expenditure channels and exchange rates.

b) Third specifications: countries with middle income

Table (17) shows the model for estimating the impact of financial integration on economic growth for middle-income developing countries. Note that economic growth has no effect on the index financial integration, however the index of financial integration positively affects growth at a threshold of 1%, which indicates that if economic growth increases by 1%, financial integration increases by 0.32%. Thus for transmission channels, foreign direct investment has no effect on financial integration and money market transfers have a negative impact on integration at a significance level of 1%, in return these two channels have a positive effect on economic growth at a significance level of 1%. For the governorship's stability index, it has a positive effect on financial integration at a 10% threshold but has no impact on economic growth. The rate of trade openness and financial development has a positive and significant effect at a 1% threshold on international financial integration. For transmission channels, human capital, population growth and gross fixed capital formation have a negative and significant effect at a 1% threshold on economic growth. These results confirm the work of Brezigar-Masten et al. (2007) who studied the effects of financial development and international financial integration on economic growth, and found that the effects of financial integration are significant in student levels of financial development.

a) The fourth specification: countries with low incomes

Table (22) presents the estimation results of our model show that economic growth in low-income developing countries does not have an impact on international financial integration as well, estimates show that financial integration does not affect economic growth. Similarly, international capital flows and transmission channels do not have an impact on economic growth for low-income developing countries.

Conclusion:

The objective of this research is to study the relationship between international financial integration and economic growth through the volatility of foreign direct investment and remittances for developing countries using the 3SLS method over the period 1996 -2016. Our research estimates are based on two endogenous variables (financial integration and economic growth). The results confirm that financial integration has positive effects on economic growth in developing countries that have high and intermediate incomes through the examination of the joint international capital flows (foreign direct investment and economic growth) and transmission channels (Internal investment and household final consumption expenditure), so the rate of trade openness is a key variable through which the elimination of trade barriers and the free movement of capital are ensured. On the other hand, we note that the economic growth does not affect the final integration except for the first specification. Indeed, we note that foreign direct investment and money transfers have an impact on international financial integration and that trade openness is a necessary condition for financial openness for developing countries with high incomes, and intermediate. It was also noted that the stability of the governorate is a critical factor for economic development but it is an important factor in determining whether the country has the capacity to use its resources to promote economic growth for developing countries that have a low and middle income.

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Annexes :

Table 3: Correlation Matrix eq (1)

	Kaopen	Lngdp	lnfdi	Lnrem	Ff	Fd	Lncor	Reer	Lngov	inf
Kaopen	1,000									
Lngdp	0,3628	1,000								
Lnfdi	0,1246	0,5723	1,000							
Lnrem	0,0302	0,1359	0,5157	1,000						
Ff	0,0531	0,1129	0,0494	0,0084	1,000					
Fd	-0,0340	0,3278	0,2929	0,0945	-0,0312	1,000				
Lncor	0,0825	-0,0037	-0,2989	0,0885	0,0492	-0,0992	1,000			
Reer	0,0649	0,1090	0,0611	0,0050	-0,0403	-0,0606	0,0966	1,000		
Lngov	0,0476	0,5458	0,7175	0,4099	0,0737	0,2784	-0,1134	0,1167	1,000	
Inf	-0,0446	-0,0084	-0,0810	-0,1825	-0,0286	-0,1206	0,0089	0,0063	-0,0499	1,000

Table 4: Correlation Matrix eq (2)

	Lngdp	Kaopen	lnfdi	Lnrem	reer	lninv	Lndcfm	popgr	sch	crp
Lngdp	1,000									
Kaopen	0,3628	1,000								
Lnfdi	0,5723	0,1246	1,000							
Lnrem	0,1359	0,0302	0,5157	1,000						
Reer	0,1090	0,0649	0,0611	0,0050	1,000					
lninv	0,4700	0,0303	0,7563	0,4687	0,2525	1,000				
Lndcfm	0,4708	0,0660	0,7558	0,6174	0,2091	0,8581	1,000			
Popgr	-0,4688	-0,1568	-0,2196	0,0144	0,0085	-0,0940	-0,0618	1,000		
Sch	-0,0443	0,0402	0,1780	0,0057	0,1505	0,0602	0,0867	-0,1242	1,000	
crp	0,0832	0,1607	0,1581	0,0981	0,5529	0,3110	0,2350	-0,0204	0,0495	1,000

Table 5: Stationarity test

Variables	Stationnarité
Lngdp	I(1)
Lnfdi	I(1)
Lnrem	I(1)
Lninv	I(1)
Lndcfm	I(1)
lngov	I(0)
Lncor	I(0)
Kaopen	I(0)
Fd	I(0)
Ff	I(0)
Inf	I(0)
Sch	I(0)
Popgr	I(0)
Reer	I(1)
crp	I(0)

Table 7: 3SLS model regression

Variables	kaopen	dLngdp
Kaopen	-	0.708 (.0047076)
dLngdp	0.007* (13.63762)	-
dLnfdi	0.034** (-.1549501)	0.002* (.0059705)
dLnrem	0.200 (-.2196062)	0.001* (.0125237)
Ff	0.662 (4.52e-11)	-
Fd	0.376 (-.0004931)	-
lngov	0.442 (.0186485)	-
dLncor	0.718 (.066253)	-
dreer	0.971 (-3.96e-06)	0.742 (-9.32e-07)
inf	0.086*** (-.0022353)	-
Lndcfm	-	0.002* (.0069617)
Sch	-	0.084*** (.0171378)
Popgr	-	0.061** (-.0051632)
lninv	-	0.000* (.0099774)

crp	-	0.250 (.0005254)
Constant	0.064*** -1.033584	0.080*** (.0171984)
R²	-0.1765	0.0917
Observations	555	555

Tableau 8: heteroscedasticity test

Single Equation Heteroscedasticity Tests:	Eq:kaopen	Eq:dlngdp
Test Engle LM ARCH	P-Value > Chi2(1) 0.0103	P-Value > Chi2(1) 0.8946
Hall-Pagan LM Test: E2 = Yh	P-Value > Chi2(1) 0.6493	P-Value > Chi2(1) 0.3436
Hall-Pagan LM Test: E2 = Yh2	P-Value > Chi2(1) 0.0004	P-Value > Chi2(1) 0.2478
Eq. kaopen: Hall-Pagan LM Test: E2 = LYh2	P-Value > Chi2(1) 0.0272	P-Value > Chi2(1) 0.2198
Overall System Heteroscedasticity Tests		
Breusch-Pagan LM Test	P-Value > Chi2(1) 0.0000	
Likelihood Ratio LR Test	P-Value > Chi2(1) 0.0000	
Wald Test	P-Value > Chi2(1) 0.0000	

Tableau 9 : aucororrélation test

Single Equation aucororrelation Tests:	Eq:kaopen	Eq:dlngdp
Harvey LM Test	P-Value > Chi2(1) 0.9388	P-Value > Chi2(1) 0.6966
Durbin-Watson DW Test	1.9208	1.7758
Overall System aucororrelation Tests		
Harvey LM Test	P-Value > Chi2(2) 0.9241	
Guilkey LM Test	-	

Tableau 10

Breusch-Pagan LM Diagonal Covariance Matrix Test (3sls)	
Lagrange Multiplier Test	157.67726
Degrees of Freedom	1.0
P-Value > Chi2(1)	0.00000

Table 11: Stationarity Test for High Income Countries

Variables	Stationnarité
Lngdp	I(0)
Lnfdi	I(0)
Lnrem	I(0)
Lninv	I(0)
Lndcfm	I(0)
lngov	I(0)
Lncor	I(0)
Kaopen	I(0)
Fd	I(0)
Ff	I(0)
Inf	I(0)
Sch	I(0)
Popgr	I(0)
Reer	I(1)
crp	I(0)

Table 12: Estimation Result for High Income Developing Countries

Variables	kaopen	Lngdp
Kaopen	-	0.001* (.1559981)
Lngdp	0.027** (-.9165032)	-

Lnfdi	0.015**	0.163
	(.1477185)	(-.0202301)
Lnrem	0.000*	0.339
	(.2732156)	(-.0273729)
Ff	0.006 *	-
	(3.63e-10)	
Fd	0.000*	-
	(-.0027579)	
lngov	0.000*	-
	(-.1605678)	
Lncor	0.000 *	-
	(.1816087)	
dreer	0.103	0.039**
	(-.0001645)	(.0000586)
inf	0.161	-
	(-.0016242)	
Lndcfm	-	0.000*
		(.0573269)
Sch	-	0.000*
		(-1.415788)
Popgr	-	0.162
		(-.0356089)
lninv	-	0.124
		(.0222695)
crp	-	0.000*
		(.5527285)
Constant	0.828	0.000*
	(.4712355)	(9.048843)

Tableau 15:

Breusch-Pagan LM Diagonal Covariance Matrix Test (3sls)

Lagrange Multiplier Test	36.71045
Degrees of Freedom	1.0
P-Value > Chi2(1)	0.00000

Table 16: Stationarity test for countries with middle income

Variables	Stationnarité
Lngdp	I(0)
Lnfdi	I(0)
Lnrem	I(0)
Lninv	I(0)
Lndcfm	I(0)
lngov	I(0)
Lncor	I(1)
Kaopen	I(0)
Fd	I(0)
Ff	I(0)
Inf	I(0)
Sch	I(0)
Popgr	I(0)
Reer	I(1)
crp	I(0)

Table 17: Result of estimation for developing countries with intermediate income

Variables	kaopen	dLngdp
Kaopen	-	0.000* (.3210069)
Lngdp	0.308 (-.1454706)	-

Lnfdi	0.452 (-.052236)	0.000* (.1366161)
Lnrem	0.002* (-.2167088)	0.004* (.088431)
Ff	0.244 (-1.47e-10)	-
Fd	0.000* (.008105)	-
lngov	0.091*** (.1497527)	-
dLncor	0.000* (.1796012)	-
dreer	0.383 (.0002632)	0.260 (-.0001524)
inf	0.129 (.0174286)	-
Lndcfm	-	0.161 (.0218306)
Sch	-	0.000* (-1.070983)
Popgr	-	0.000* (-.3483918)
lninv	-	0.000* (-.1385639)
crp	-	0.000* (.0332526)
Constant	0.828 (.4712355)	0.000* (7.094492)

R²	0.1148	0.4745
Observations	234	234

Tableau 18: aucororrelation test

Single Equation aucororrelation Tests:	Eq: kaopen	Eq: lngdp
Harvey LM Test	P-Value > Chi2(1) 0.0040	P-Value > Chi2(1) 0.1510
Durbin-Watson DW Test	2.2253	1.7318
Overall System aucororrelation Tests		
Harvey LM Test	P-Value > Chi2(2) 0.0057	
Guilkey LM Test	-	

Tableau 19: Heteroscedasticity test

Single Equation Heteroscedasticity Tests:	Eq:kaopen	Eq:lngdp
Test Engle LM ARCH	P-Value > Chi2(1) 0.0218	P-Value > Chi2(1) 0.4938
Hall-Pagan LM Test: E2 = Yh	P-Value > Chi2(1) 0.0000	P-Value > Chi2(1) 0.0022

Hall-Pagan LM Test: E2 = Yh2	P-Value > Chi2(1) 0.0000	P-Value > Chi2(1) 0.0019
Eq. kaopen: Hall-Pagan LM Test: E2 = LYh2	P-Value > Chi2(1) 0.0000	P-Value > Chi2(1) 0.0024
Overall System Heteroscedasticity Tests		
Breusch-Pagan LM Test	P-Value > Chi2(1) 0.0001	
Likelihood Ratio LR Test	P-Value > Chi2(1) 0.0000	
Wald Test	P-Value > Chi2(1) 0.0000	

Tableau 20: Resultat Heteroscedasticity

Breusch-Pagan LM Diagonal Covariance Matrix Test (3sls)	
Lagrange Multiplier Test	15.98002
Degrees of Freedom	1.0
P-Value > Chi2(1)	0.00006

Table 21: Stationarity Test for Low Income Countries

Variables	Stationnarité
Lngdp	I(1)
Lnfdi	I(0)
Lnrem	I(0)
Lninv	I(0)
Lndcfm	I(0)
lngov	I(0)
Lncor	I(0)
Kaopen	I(0)
Fd	I(0)
Ff	I(0)
Inf	I(0)
Sch	I(0)
Popgr	I(0)
Reer	I(0)
crp	I(0)

Table 22: Estimation Result for Low Income Countries

Variables	kaopen	dLngdp
Kaopen	-	0.218 (.0571815)
dLngdp	0.107 (7.92272)	-
Lnfdi	0.984 (.0008756)	0.895 (.0004413)
Lnrem	0.938 (.0041333)	0.777 (-.0012134)

Ff	0.361 (7.23e-10)	-
Fd	0.335 (-.002231)	-
lngov	0.091*** (.1557769)	-
Lncor	0.196 (.1733306)	-
reer	0.996 (-1.31e-06)	0.738 (.0000108)
inf	0.950 (-.0001783)	-
Lndcfm	-	0.997 (.0000483)
Sch	-	0.419 (-.0482302)
Popgr	-	0.240 (-.0068593)
lninv	-	0.159 (-.015891)
crp	-	0.353 (-.0206521)
Constant	0.004* (-7.449081)	0.009* (.4150855)
R²	0.0567	0.1222
Observations	75	75

Single Equation aucororrelation Tests:	Eq:kaopen	Eq:lngdp
Harvey LM Test	P-Value > Chi2(1) 0.8742	P-Value > Chi2(1) 0.5589
Durbin-Watson DW Test	1.7785	1.8610
Overall System aucororrelation Tests		
Harvey LM Test	P-Value > Chi2(2) 0.8325	
Guilkey LM Test	-	

Tableau 23: Heteroscedasticity Test

Single Equation Heteroscedasticity Tests:	Eq:kaopen	Eq:lngdp
Test Engle LM ARCH	P-Value > Chi2(1) 0.2944	P-Value > Chi2(1) 0.2590
Hall-Pagan LM Test: E2 = Yh	P-Value > Chi2(1) 0.0005	P-Value > Chi2(1) 0.4977
Hall-Pagan LM Test: E2 = Yh2	P-Value > Chi2(1) 0.0028	P-Value > Chi2(1) 0.1408
Eq. kaopen: Hall-Pagan LM Test: E2 = LYh2	P-Value > Chi2(1) 0.0002	P-Value > Chi2(1) 0.5355
Overall System Heteroscedasticity Tests		
Breusch-Pagan LM Test	P-Value > Chi2(1) 0.0000	
Likelihood Ratio LR Test	P-Value > Chi2(1) 0.0000	
Wald Test	P-Value > Chi2(1) 0.0000	

Test 24:

Breusch-Pagan LM Diagonal Covariance Matrix Test (3sls)	
Lagrange Multiplier Test	50.12621
Degrees of Freedom	1.0
P-Value > Chi2(1)	0.00000