Private Capital Flows, Financial Development and Economic Growth in the North African Region

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Abstract. *Today, one of the sources of growth and development of nations is the entry of private international capital flows. The objective of our paper is to study the effects of private capital flows on economic growth in North African countries from 1995 to 2017. The GMM econometric technique shows that the "KAOPEN" index and financial development affect economic growth in North African countries and the entry of capital flows reinforces the financial development effect on economic growth.*

Keywords: *capital flows, financial development, panel data, GMM.*

JEL: O20, O21.

Introduction

The change in the financial macroeconomic sphere, the results of the opening of the capital account and the lack of consensus among economists on the nature of the effect of capital flows on economic growth make it more difficult to confirm that the liberalization of the capital account contributes to improving the well-be.

The phenomenon of the globalization of capital flows is explained by the heavy weight of the economy of emerging countries in the world economy following the adoption of new integration strategies. The change in the destination of private capital flows to emerging and developing countries are mainly explained by international division of labour and the intensification of world trade.

Marc et Bruno (2018) explain that the liberalization of the capital account in emerging countries by the liberalization of banking markets to different categories of investor and domination of foreign shareholders.

The effects of the opening of the capital account on economic growth are of three types; one is the positive effect such as the diversification of risks and capital costs and the increase in investment, the other type denotes the negative effect as the crowding out effect, financial instability and the spread of crises Finally, beneficial effects such as the transfer of new technologies, development and macroeconomic stability.

This paper is organized as follows: The first section presents a brief overview of the literature on the positive and negative effects of private capital flows on economic growth. The second section deals data, econometric specification and results obtained.

1. Literature Review

1.1. Positive effects of capital flows

The entry of capital flows encourages economic growth through the better allocation of resources and jobs, the distribution of risks, the improvement of portfolio efficiency, research and the adoption of new sources of funding, diversification of investment and financing opportunities, reduction of financial intermediary costs and exploitation of foreign savings for domestic needs.

According to Vincent (2015), the commitment in the processes of opening the capital account improves the availability of savings; the financing of the current account deficit reduces the debt in currency and subsequently the elimination of the negative effects of external debt.

Badr (2018) distinguishes two channels of transmission between financial intermediation and economic growth:

- Accumulation of capital increases the rate of accumulation,
- Technological innovation leads to the improvement of production processes.

The development of the banking system increases the savings rate and allocates external resources. The combination of these factors facilitates the creation of profitable new investments. Schumpeter (1912) announces that the development of the banking sector affects economic growth by directing resources towards the most productive projects

Khmekhem (2017) has shown that the liberalization of the capital account affects long-term economic growth and develops the financial system of developing countries.

Louis (2018) justified that remittances from migrants and the inflow of FDI flows are the main factors explaining the improvement of well-being in developing and poor countries.

Fatima and Fethi (2016) measured financial liberalization through the agreement of bank loans to the private sector. They justified the positive relationship between the agreement of bank loans to the private sector and long-term economic growth. It is noted that it is important for developing countries to limit the size of the informal financial sector and to develop the financial sector through the facilitation of private sector credit operations, interest rate liberalization, etc.

Fatimata (2018) showed that human capital development and the high degree of trade openness are two factors of attractiveness of FDI; FDI has a positive effect on economic growth through the transfer of new technologies. But, FDI degrades the environment by the effect of carbon dioxide emissions.

On the accounting side, the cost of capital is defined as the sum of dividends distributed to shareholders and the net actual interest paid and the debt ratio of equities and the debt ratio are two factors that explain the risk.

Florian (2018) has shown that the cost of capital generates the accumulation of productive capital for enterprises; the cost of capital is a consequence of the creation of the new financial performance standards applied to companies and represents the debt engine of some countries over a long period.

Finally, Findlay and Arraw (1978), Nasri (2018), Louis (2018) et Gritli et Rey (2018), Khmekhem (2017), Fatima and Fethi (2016), Fatimata (2018) and Florian (2018) note that the liberalization of the capital account affects economic growth

through their own components (FDI, portfolio investment (stock flows) and bank loans (bank loans)). They contribute to increased investment, risk diversification, lower capital costs, innovation, research and development, transfer of new technologies and knowledge, increasing the availability of savings and capital accumulation, efficiency and stability of the financial system and macroeconomic discipline, etc.

1.2. Negative effects of capital flows

On the basis of Kant (2002), the flight of capital is a chronic and growing problem with no finite resolution. It is a problem in some countries. The flight of capital out of the national territory is explained by the idea that savers and investors are looking for higher returns and a safer business environment. It is therefore important for countries with capital flight to improve the business climate and increase the interest rate in order to increase the yield of flows. This explanation is compatible only for portfolio investments and bank debts.

Bensliman and Bakretil (2018) point out that the establishment of foreign banks increases the rate of economic growth and lowers the rate of unemployment. But the latter exerts repression on domestic banks. It found that it is important for poor countries to help domestic banks to compete, to encourage domestic banks to finance investment projects to improve the balance of payments situation.

Pinshi (2017) has shown that retroactive loops between capital flow volatility and financial stability cannot prevent financial instability. It prefers the practice of a prudential policy, insists on the intervention of the central bank to stabilize the financial sphere and mitigate the volatility of capital flows by adopting a macro prudential policy.

The loss of financial stability is not only due to the intensification of the competitive sphere but also to the credit boom effect. In this regard, Rousseau and Wachlel (2017) have shown that episodes of credit expansion to the private sector do not contribute to the short-term but long-term financial crisis, which disrupts the macroeconomic framework by the high availability of liquidity.

Florent et al. (2018) have shown that the transfer of funds has a negative and significant impact on growth. The negative relationship between the transfer of funds and economic growth is explained by the behavior of moral hazard of the residents, the inhabitants of the countries are benefitted from the sending of money as an insurance system facing their daily needs

Azeroual (2016) showed the negative effect of FDI on TFP in the short and long term. She explained the inverse relationship between the two by the small

technological gap between home and host countries. This explanation shows that it is important for some countries to attract foreign direct investment from advanced countries in order to benefit more from new technologies.

In conclusion, the opening of the capital account has negative effects on economic growth and welfare, such as the presence of risks associated with the penetration of foreign banks, increased risks and the flight of capital, the loss of macroeconomic stability, the lack of monetary autonomy, and the effects of volatility, short-term flows contagion.

2. Empirical investigation

2.1. Data

Our study analyses data from the 4 North African countries over the period 2000 to 2017. We chose only Tunisia, Egypt, Algeria and Morocco to have a continuous and complete database and to avoid the problem of missing values.

Economic growth (GDP): Economic growth is measured by the rate of growth of real GDP per capita. Indeed, real GDP per capita refers to the total gross domestic product (Gross National Product) divided by the number of the population during a year. In our study, real GDP per capita refers to the independent variable. Real GDP per capita is calculated from World Bank data (2018). Growth data are logarithmic and are calculated as follows:

$$\Delta GDP_t = log \frac{GDP_t}{GDP_{t-1}} = log\ GDP_t - log\ GDP_{t-1} \tag{1}$$

Financial development: Financial development can be measured by loans provided by the banking sector as a percentage of GDP. The credit index provided by the banking sector measures the degree of intimidation of the banking system in the overall activity of the economy. This includes both private and public sector credits.

Capital flows: Capital flows can be measured by the jure or de facto index, the chin and Ito index, the Quinn index, the decomposition of capital flows, the net inflow of FDI flows as a percentage of GDP. We measured capital flows by the Chinn Index and Ito Index also known as the KAOPEN Index. According to Chinn and Ito (2017) the KAOPEN index includes between -1.86 and 2.44. In our study the KAOPEN index refers to the independent variable. This series is from http://web.pdx.edu/~ito/Chinn-Ito_website.htm.

Institutional Development: In our study, we measured institutional development through the Economic Freedom Index. Indeed, economic freedom is an economic and political concept born by the classics that integrates the arrangement of an economic and political dimension. Economic freedom positively affects economic growth thanks to the ease of the processes of exchange of goods and property and the increase in the degree of confidence of investors. The Economic Freedom Index database is collected from the Fraser Institute (2018).

Gross fixed capital formation: In our study we measure gross fixed capital formation by net acquisitions of valuables according to the World Bank database (2018).

Inflation: The term inflation refers to the general increase in the prices of consumer goods and services. We measure inflation by the Consumer Price Index, which reflects the annual percentage change in the cost to the average consumption of purchasing a basket of goods and services, which can be set or modified at specific intervals. This series is extracted from the World Bank's global indicators (2018).

2.2. Econometric specification

The growth model adopted is part of the theoretical framework of endogenous growth models. According to the theory of endogenous growth, economic growth is determined by human capital (Romer (1986) et Lucas (1988)), public expenditure (Barro (1990)), government policies, international capital flows (Bolsoom (1998)). The complete formulation of our econometric model is inspired by the work of Alfaro et al. (2004, 2010) et Chiang and Birtch (2012) which is written as follows:

$$\log \Delta GDP_{it} = \log GDP_{i_{(t-1)}} + \log INF_{it} + \log FD_{it} + \log CF_{it} +$$
$$+ \log ID_{it} + \log GFCF_{it} + \varepsilon_{it} \qquad (2)$$

With: t = 1995…… 2017 and i = 1, 2, 3, 4

When we eliminate the log we get the following equation:

$$\Delta GDP_{it} = \alpha_0 + \alpha_1 GDP_{it-1} + \alpha_2 CF_{it} + \alpha_3 FD_{it} + \alpha_4 INF_{it} + \alpha_5 ID_{it} +$$
$$+ \alpha_6 GFCF_{it} + \varepsilon_{it} \qquad (3)$$

To identify the role of financial development whose improvement of economic growth through capital flows we have estimated the following model:

$$\Delta GDP_{it} = \alpha_0 + \alpha_1 GDP_{it-1} + \alpha_2 CF_{it} + \alpha_3 FD_{it} + \alpha_4 INF_{it} + \alpha_5 ID_{it} +$$
$$+ \alpha_6 GFCF_{it} + \alpha_7 (FK_{it} . DF_{it}) + \varepsilon_{it} \qquad (4)$$

- **Unit root test**

The IPS approach has several advantages over the Levin, Lin and Chu test by taking into account the heterogeneity of the autoregressive root under the alternative. Im, Pesaran and Shin propose a test statistic based on the average of the individual DF and ADF statistic. The Im, Pesaran and Shin (2003) tests are ranked among the first generation stationarity tests.

The table below summarizes the unit root test of the different series.

Table 1. *Stationarity test*

Im, Pesaran and Shin					
variables	Level		1st différence		2nd différence
GDP	0.056	(0.522)	-1.270	(0.101)	-6.801	(0.000)
FD	1.490	(0.931)	-1.447	(0.073)	-6.529	(0.000)
CF	-0.023	(0.490)	-0.738	(0.230)	-4.523	(0.000)
ID	-2.823	(0.002)	-7.968	(0.000)	-10.726	(0.000)
INF	2.682	(0.996	-3.802	(0.000)	-7.405	(0.000)
GFCF	2.439	(0.992)	-2.240	(0.012)	-6.198	(0.000)

Source: Calculated by author using STATA 15.

The table above does not reject the null assumption of a unit root at the level of GDP, gross fixed capital formation, financial development, inflation and the KAOPEN index. That is, GDP, gross fixed capital formation, financial development, inflation and the KAOPEN index are not flat at the level. Still at the level, the development index of institutions is stationary. When we go to 1st difference we notice that all the variables become stationary except the GDP and the KAOPEN index. In the second difference all variables become stationary.

- **Correlation test**

The non diagonal variance-covariance matrix type indicates the presence of an auto-correlation problem. The objective of the multi-colinearity test is to verify the presence of a correlation between the variables in the model. Indeed, the good regression model is which does not hold a correlation between the variables. In our model, if real gross domestic product, KAOPEN, institutional development, inflation and gross fixed capital formation are correlated, then they are not orthogonal. Multi-colinearity is said if the coefficient of correlation between the variables is greater than 0.9.

The following table summarizes the correlation coefficients between the different variables in the model.

Table 2. *Correlation matrix*

	GDP	FD	ID	GFCF	INF
GDP	1				
FD	0.390649	1			
ID	0.034672	0.017481	1		
GFCF	-0.114230	-0.150202	-0.399311	1	
INF	0.081149	0.113932	0.188795	-0.457243	1

Source: Calculated by author using STATA 15.

Table 2 shows that the correlation coefficient between variables does not exceed the Ghozali coefficient (2013). So, we are talking it is not a problem of multi-colinearity between the different variables of the model. According to the correlation table, we say:

The most correlated variable in the growth of North African countries from 1995 to 2017 is financial development. Indeed, the correlation coefficient is equal to 0.990649. The variable least correlated with GDP is gross fixed capital formation. The correlation coefficient between the two equals -0.114230.

▪ **Serial autocorrelation test**

The serial autocorrelation test is used to test an error autocorrelation greater than the unit. The autocorrelation test, also known as the Breusch-Godfred test (1980). The serial autocorrelation test is based on a search for a significant relationship between the residues and the same shifted residue. The Breusch-Godfred (1980) hypothesis is formulated as:

H0: Absent autocorrelation

H1: Autocorrelation

The decision is taken by the classical Fischer test of nullity of the coefficients or by the distributed LM statistic according to a Khi-two law at p degrees of freedom.

With: $\text{LM} = T \times R^2$

If LM $> \chi_p^2$ read, the error independence hypothesis is rejected. The table below displays the error independence test results.

Table 3. *Breusch-Pagan LM serial autocorrelation test*

Test	Breusch-Godfred	
Models	Model 3	Model 4
χ^2	26.093	23.625
P. χ^2	0.000	0.000

Source: Calculated by author using STATA 15.

According to the results of the Breusch-Pagan LM test the null hypothesis of independence of errors is rejected. That is, there is a serial autocorrelation problem for the 2 models.

- **Individual heteroscedasticity test**

In econometric terms, heteroscedasticity is said if the variances of the residuals of the variables are different. homoscedasticity correspond to the case where the residues of the variables are constant. The most commonly used test for heteroscedasticity is the Wald test (2000). The null hypothesis of the Wald test assumes homoscedasticity. So the heteroscedasticity test problem is this:

H0: Homoscedasticity

H1: heteroscedasticity

If the probability associated with the test is less than 5% H0 is rejected. If the probability is greater than 5%, then the null hypothesis is verified. The table below displays the results of the Wald test.

Table 4. *Wald test*

Test	Wald test	
Models	Model 3	Model 4
χ^2	35.78	22.90
P. χ^2	0.000	0.001

Source: Calculated by author using STATA 15.

Based on this table, we reject the homoscedasticity hypothesis and assume the heteroscedasticity hypothesis in most models.

- **Estimate**

After processing the data on STATA 15 the following results are obtained. The table below shows the result of the GMM.

Table 5. *Effect of independent variables on GDP*

Variable	without interaction		with interaction	
Constant	3.29	(0.000) ***	3.599	(0.000) ***
FD	0.027	(0.000)***	0.049	(0.086)*
ID	0.006	(0.049)**	0.021	(0.053)*
INF	-0.113	(0.000) ***	-0.096	(0.000)***
CF	0.052	(0.000) ***	0.123	(0.055)*
GFCF	0.093	(0.001)***	0.105	(0.000)***
GDP-1	-0.010	(0.000) ***	-0.005	(0.0043) ***
CF*FD		-	0.244	(0.020) **
Sargan Test	2.12	(0.83)	6.23	(0.94)

*: significance at 10%; ** significance at 5%; *** significance at 1% and n.s: not significant
Source: Calculated by author using STATA 15.

The table above shows that all variables have a positive and statistically significant effect except for inflation and the delayed variable.

According to Sargan test results, we reject H0. That is, the error terms are not correlated with the exogenous variables and therefore the estimation instruments in model 3 and 4 are valid. In order to verify the validation of the estimation instruments, we will therefore proceed to the economic interpretation of the results.

2.3. Results and recommendations

The coefficient associated with financial integration is equal to 0.052 at a probability of 0.000. That is, the effect of financial integration on economic growth is positive and statistically significant at the 1% level. This finding corroborates the results of Samuel et al. (2017) and Fredrick (2019). As an economic lifeline, the positive effect of the opening of the capital account on economic growth in the North African region is explained by the transfer of new technologies following the entry of FDI. In the light of our result, it is noted that it is important for the leaders of the North African countries to open the capital account more through the adaptation of several exchange rate regimes, the removal of restrictions on current account movements (export, import, transfer of income) and capital account (FDI, portfolio investment, foreign bank credit) but on condition of developing the financial system in order to avoid risks related to financial integration.

The coefficient associated with the financial development variable is equal to 0.027 at probability of 0.000. Our result corroborates the results of Khalouki (2016). As an economic point of view, the authorities of the North African countries are urged to liberalize the interest rate completely in order to mobilize savings and to cap the loans granted to the private sector according to the forecast of private investment.

According table 5, the coefficient associated with the quality of institutions variable is equal to 0.006 at probability of 0.049. This relationship can be explained by the openness of the North African region to the outside world, respect for the private property rights of foreign investors, good regulation and lack of corruption. In a low-quality regulatory environment, foreign investors prefer to turn to areas where the likelihood of their gain would be greater and more certain. Our result shows that the North African region is characterized by a good business climate characterized by a low degree of corruption, violence and a high degree of economic openness. Our result corroborates the studies of Komlan (2006), Sobhee (2016), and Mihaela and al. (2018).

In our study the sign associated with the variable public expenditure is positive by 0.093 and statistically significant at the 1% threshold. Our result corroborates Rajesh (2018) study (2018). The positive relationship between gross fixed capital formation and economic growth may explain why the largest share of expenditure is directed towards productive projects in the North African region. In light of our findings, we conclude that it is important for North African countries to reprogram the distribution of public spending. In other words, North African countries are recommended to increase the share of public spending that goes to the financial system.

According table 5, the coefficient relative to the economic growth rate of the previous year is equal to -0.69 with a probability of 0.010. That is to say, the level of economic growth of the previous year had a negative and significant impact at the 1% threshold. Our result corroborates the study by Jlassi (2015). The negative relationship can be explained by the assumption that countries in the North African region are converging towards a steady state of the real GDP growth rate per capita. In this respect, the convergence hypothesis is the case in which the country's most excluded from the steady state of economic growth converges more rapidly than the other countries towards the steady state.

Historically, the general increase in prices threatens purchasing power. This situation can contribute to the decrease in demand, which threatens the pace of production. In our study, inflation has a negative and significant effect on economic growth in North African countries. This relationship is explained by the increase in the prices of energy and cosmetic products in the North African region, which weakens demand. According to our result and explanation, we see that it is important for North African countries to control inflation.

According to the academic work it is noted that financial development is a prerequisite among the prerequisites for successful opening of the capital account. Financial development effectively mobilizes external resources to finance investment projects and subsequent economic growth. In developed financial system bank rationally anticipate the risks accompanied by the inflow of short-term capital flows (equities, bonds and bank loans). This operation avoids financial crises Kyriakas (2019) and Neanidis (2019). The interaction between financial integration and financial development strengthens the economic growth of North African countries. The interaction effect is explained by the implementation of strategies for attracting foreign capital flows. These strategies are based on the removal of barriers to private sector credit, the adoption of a flexible exchange rate regime, and the liberalization of financial services. In other

words, the financial system of North African countries allocates and mobile external resources. This operation contributes to increased economic growth.

Conclusion

In this paper, we have guided our empirical work to identify the impact of financial integration on economic growth in the North African region. We tested the econometric model on dynamic panel data from a sample of 4 countries belonging to the North African region over the period 1995 to 2017. After the processing of the database by the econometric technique GMM it is concluded that all the results obtained are consistent with the teaching of our theoretical analysis. It is therefore concluded that financial integration and financial development have a positive and significant effect at the 1% threshold. Institutional development and gross fixed capital formation positively affect economic growth. Conversely, for inflation and the previous year's economic growth rate which have a negative and significant impact on economic growth. The positive and significant effect between financial development and capital flows has justified. This relationship is explained by the complementarily between financial integration and financial development. In other words, the capacity of the financial system to mobilize external resources to the private sector and to forecast risks related to international capital flows.

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