



# Synchronization of the Economic Cycle and Financial Integration: The Case of the Maghreb Countries

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## Abstract

*Financial integration is largely dependent on the synchronization of business cycles of partner countries. The association agreements may participate in an increased degree of synchronization of business cycles in a group of countries belonging to the same geographical area or economic. Many economists have highlighted the role of financial integration and monetary cycle synchronization Fiess 2005. The analysis shows that the pulses are usually followed by pulses of equal magnitude. This reinforces the perception that the shocks are relatively persistent. It also seems that there is some tendency for the violent impulses of the INF and GDP occur together. These two results imply that during these years, the business cycle in Tunisia is defined by active movements with high volatility. More broadly, it appears that chronic cyclical innovations in Tunisia consists of a mixture of large and pulses of moderate size. If innovations were all calculated size, business cycles would most likely be similar. In Tunisia, each economic cycle is different.*

**Keywords:** financial integration, business cycle synchronization, Maghrebian countries, amplitude of cyclical economic, impulse function, VAR, variance decomposition.

**JEL classification:** G20, C33, c23

## I. Introduction

The international financial system is characterized by a process of financial globalization, liberalization and privatization that leads us to talk about the phenomenon of international financial integration. The appearance of the latter, which is often associated with the growth of trade and financial flows, has accelerated dramatically during the past two decades. Several developing economies like Asia and Latin America participated actively in the process of global integration and they have increased their export items substantially. Countries in developing as

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the Maghreb countries have dragged economies of the emerging market behind market economies Asians and Latin American markets. Performance of the Maghreb countries was marked by the region's capacity to utilize the benefits of global integration.

In this regard, the spread of financial crises in recent times was present theoretical models and case studies on the economies most affected. These theories admit of empirical studies in order to bring a global model. Every economy is modeled as a Vector Error Correction Model (VECM) and a widespread impulse response function (GIRF). The latter is generated to predict the specific reaction of an economy to shocks to foreign variables, whether financial or macroeconomic. The VAR model allows interaction between different economies through various channels but closely related, namely a direct dependence between national macroeconomic factors and their foreign counterparts (and the corresponding lagged variables), a dependency between the variables specific national or regional and global variables are common to all countries.

The aim of this paper is to verify the synchronization of business cycle with Tunisian cycles of the two North African countries following financial integration and see if there is a macroeconomic coordination. In fact, our analysis is based on recent techniques of cyclical fluctuations. Indeed, the existence of asymmetries in economic cycles contributes to the use of models of nonlinear time series. This work aims to emanate a set of stylized facts characterizing these relations in the case of the three Maghreb countries (Algeria, Tunisia and Morocco). The article is organized as follows: Section 2 is devoted to the presentation of the link between financial integration and synchronization of business cycles. It presents a review of the literature on a specific issue and outlines the methodology to explore the impact of financial integration on business cycle synchronization of the Maghreb countries. Section 3 presents the estimation results and their interpretation

## **II. Financial integration and business cycle synchronization**

Economic growth does not occur continuously. She goes through phases of rapid growth and lower growth or even decline temporarily or even economic crisis. The business cycle can be defined in many ways with a chronology necessarily different from "turning points". In the following empirical cycles, we generally retain three definitions: the conventional cycle<sup>4</sup>, the cycle of growth<sup>5</sup> and the acceleration cycle<sup>6</sup>. Coe-Rexecode focuses on monitoring types of cycles, as part of an integrated approach called ABCD<sup>7</sup>. Thus, the effects of financial integration on economic specialization and synchronization cycles are the subject of scholarly discussion. The financial integration boosts capital flows and allows better control the cost of financing

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<sup>4</sup> The classic cycle (business cycle) generated the upper level of activity overall economy. This is the most common definition in the literature. Turning points of this cycle define the periods of negative growth or recessions, periods of positive growth. Of course, in reality, a period of negative growth is known as a recession if it also gives the minimum requirements for length and / or intensity and a spread in the economy. The peaks and troughs of the cycle being the classic moments where growth is zero to become negative or positive, we call them respectively and out of recession.

<sup>5</sup> This cycle is defined as the difference of the series used (usually GDP) to its long-term trend. The peak of the growth cycle is when the growth rate drops back below the trend growth rate. Similarly, the depth D is the time it rises above

<sup>6</sup> The peak of the cycle is the maximum acceleration reached by the rate of growth, and the trough indicates that the rate of growth fell from its low point. It is difficult to give a name to the phases of the cycle.

<sup>7</sup> Jacques Anas and Laurent Ferrara (2007), "positioning the business cycle. " trends and forecasting

Kalemli-Ozcan, Sorensen and Yosha (2001) have shown that economic integration, especially financial, allows a better risk-sharing leads economies to specialize in sectors where they have competitive advantages, and to obtain uncorrelated cycles. One school of thought holds that reverse capital flows increase the synchronization of cycles. For example, the European business cycle synchronization is a consequence of financial integration and trade, and the trend towards specialization it implies.

In this framework, we s'intéressons characteristics of the financial system Tunisian, Moroccan and Algerian and their degree of integration into international financial system. During the last two decades, the Tunisian economy has led to high rates of evolution through the stabilization policy has beset the country. This change was also followed by periods of significant negative breaking expansionary periods. Some recessions were caused by internal or external shocks while the others were by the endogenous dynamic data creating inevitable evolution.

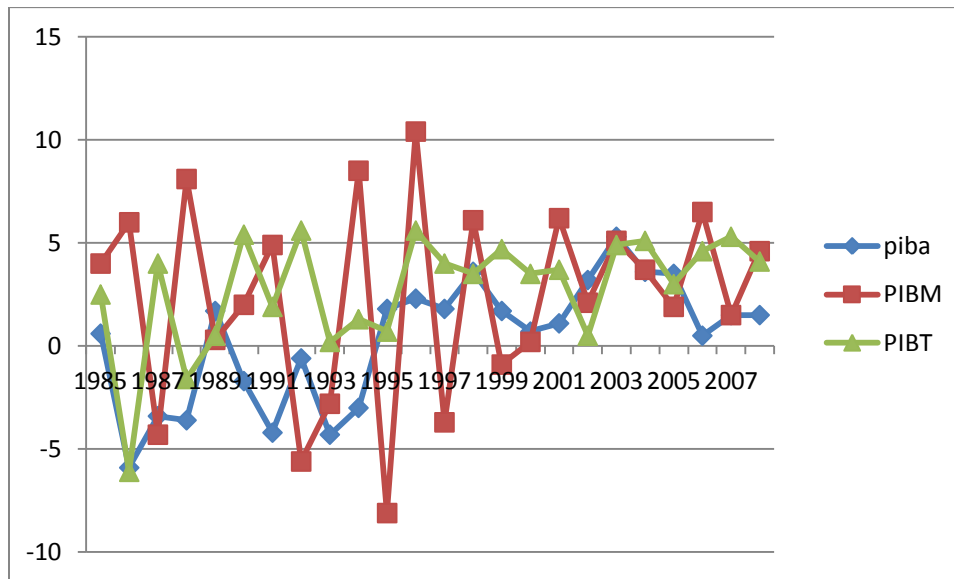
For Morocco, the medium-term objective of the authorities is to relax the monetary and exchange to better adapt to the changing international environment. In particular, the establishment of a system of explicit inflation targeting, combined with increased flexibility in the exchange rate, could be beneficial, especially in a context of low inflationary pressures and deteriorating current account balance greater than expected. Morocco has benefited from macroeconomic stability and favorable borrowing costs resulting from fiscal consolidation in recent years. Indeed, the crisis is a transient phenomenon and the authorities have shared in all the opinion of staff that the government finances in the medium term, aiming to bring the deficit below 3% of GDP to stabilize the debt / GDP ratio. "Directors stressed that maintaining macroeconomic stability through sound fiscal policy, an important achievement of recent years is essential. They note with satisfaction that the authorities are determined to resume their efforts at fiscal consolidation, and it gradually from 2011. This will be important to stabilize the ratio of public debt to GDP, preserve the low cost of borrowing in the economy and facilitate the implementation of monetary policy. The gradual replacement of the system of universal subsidies by a system of targeting vulnerable populations will improve efficiency and reduce fiscal risks"<sup>8</sup>. Then, the positive performance of the Algerian economy has been affirmed by the International Monetary Fund (IMF), which relies on a continued growth of GDP in 2011, with a relatively higher rate observed over the previous year.

The main macroeconomic and financial indicators of Algeria have significantly consolidated in 2010, despite the external turbulence, which will enable the country to continue without difficulty the public investment program for the next five years, in parallel with continuing Policy crop economy.

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<sup>8</sup> IMF 2010, Morocco: Views of 2009 under Article IV - Staff Report; public information notice on the discussion of the Board of Directors and notification of Moroccan authorities / administrator for Morocco

Figure 1: GDP growth in the Maghreb countries



Source: Author's Graph

The chart above shows interest in the evolution of the growth rate of GDP in the Maghreb. It compares the economic dynamism of countries considered. In fact, Tunisia has always been observed during the country where GDP is the strongest.

Finally, "The Maghreb countries are they all the same interest for the construction of the Maghreb economy? To see the benefit of Morocco an advanced status with Europe, well established in Africa and a free trade agreement with the U.S., it's hard to believe the country needs this to be a stakeholder in a Maghreb economic integrated. This vision is short thermal replica Mr Saïdane, stowage of Morocco to the United States, Europe and Africa may be advantageous in this situation except that he cut the umbilical cord with its natural area that is the Maghreb".<sup>9</sup>

The unilateral policy or interests in certain North African countries can not in any way slow down economic progress. What is essential is the establishment of institutions that will consolidate the building of a Maghreb economic. They are exposed as organizations that have the role to control the flow of investment and allow different operators in the region to evolve into a global player"strategy"Regional give more clarity for foreign investors. Financial integration is to increase economic ties, trade and investment between the countries. In a number of countries, macroeconomic relationships is a new way to understand the dynamics of savings. Kalemli-Ozcan, Sorensen and Yosha (2001) have shown that economic and financial integration, allows for better risk sharing leading economies to specialize in sectors where they have competitive advantages, and therefore to obtain cycles decorrelated. Several authors have highlighted the role of economic integration, financial and monetary cycle synchronization (Artis et al. (1997), Frankel and Rose (1998), Rose (2002), Fiess (2005), etc.). An opposite school of thought argues that capital flows increase the synchronization of cycles. For example, the European business cycle synchronization is a consequence of financial integration, and the trend towards specialization it implies.

<sup>9</sup> Tunisia: D. Saidane "If the Maghreb Bank had been created by private, she would have started ages ago" in April 2010. [www.webmanagercenter.com](http://www.webmanagercenter.com).

The timing of macroeconomic policies in an economic region is desirable and may even open a monetary union if the business cycles of the countries are similar and shocks are common. For example, the current crisis is global and it spreads systemically. The United States is the first country affected but the crisis quickly spread into other countries. Effects are distinguished in all countries according to their degree of integration in the financial system and trade. Indeed, "The governments of developed countries have embarked on a proactive phase imbalance correction in the short term. In practice, this is a package consisting of such injections of liquidity, lower interest rates, recovery of demand (Keynesian), direct support to large enterprises in difficulties and sometimes equity participation of State in the past. But the economies of developing countries (DCs) are weakly integrated into the international financial system"<sup>10</sup>. However, developing countries participate in trade, record inflows of Foreign Direct Investment (FDI) and get help from rich countries for the majority of them. In other words, the crisis shows a different way economies according to their specificities, their degree of integration on trade and financial system. However, if shocks are country-specific in this case of independent monetary and fiscal policies are necessary insofar as they help an economy adjust to a new equilibrium. Henceforth, the study of the degree of synchronization of business cycles is important in order to see the possibility of whether or not the coordination of macroeconomic policies and to retain or not independent monetary and fiscal policies.

### **III. Methodology and data**

#### **1. The degree of synchronization of business cycles between a group of countries**

In literature, different measures were used to determine the degree of business cycle synchronization between a group of countries. Created a static analysis on the examination of cross-correlations of business cycles (Beine and Coulombe (2002)), improved dynamic analysis based on VAR models (Bayoumi and Eichengreen (1994)) are considered the main methods used for determining the degree of synchronization. The static approach is based on a review of the matrix cross-correlations of business cycles that are extracted from the series on gross domestic product (GDP) or industrial production index (IPI), seasonally adjusted for different countries. To extract the cyclical component, we must use a filter that separates the trend cycle. Several methods have been used in the literature to make this separation. In this section we are interested in the flow of capital from North African countries to identify their impact on the timing of its economic cycle.

Four types of data were examined in this work:

- The gross domestic products of Mediterranean countries (annual data) for the period 1985-2008.
- The index of import prices relative to Tunisia, Algeria and Morocco.
- The flow of capital from North African countries for the period 1985-2008 (foreign direct investment, portfolio investment).
- The inflation rate for each Maghreb countries.

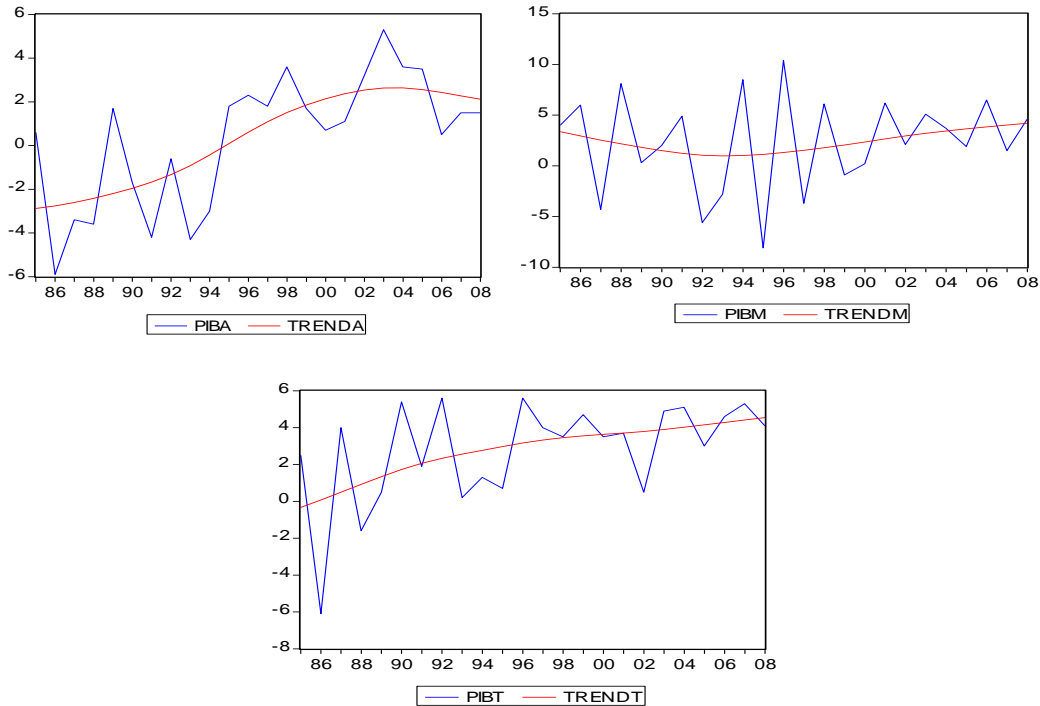
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<sup>10</sup> Kalidou Thiaw and Serigne Moustapha SENE (2009), the international financial crisis: what effects on the economy Senegal?, Directorate of Forecasting and Economic Studies: Discussion Paper No. 12, May 2009.

### a) Cyclic steps by countries around the static approach

Before considering the cyclical characteristics by country we are interested in analyzing the timing of GDP in this region. This is to determine the correlations of cyclical components of GDP in the Maghreb countries.

Figure 2: Overview of the evolution of GDP and its trend



After extracting the cyclical component<sup>11</sup> of GDP series of each country, we calculated the correlations between their cyclical components. The correlation results are presented in the following table:

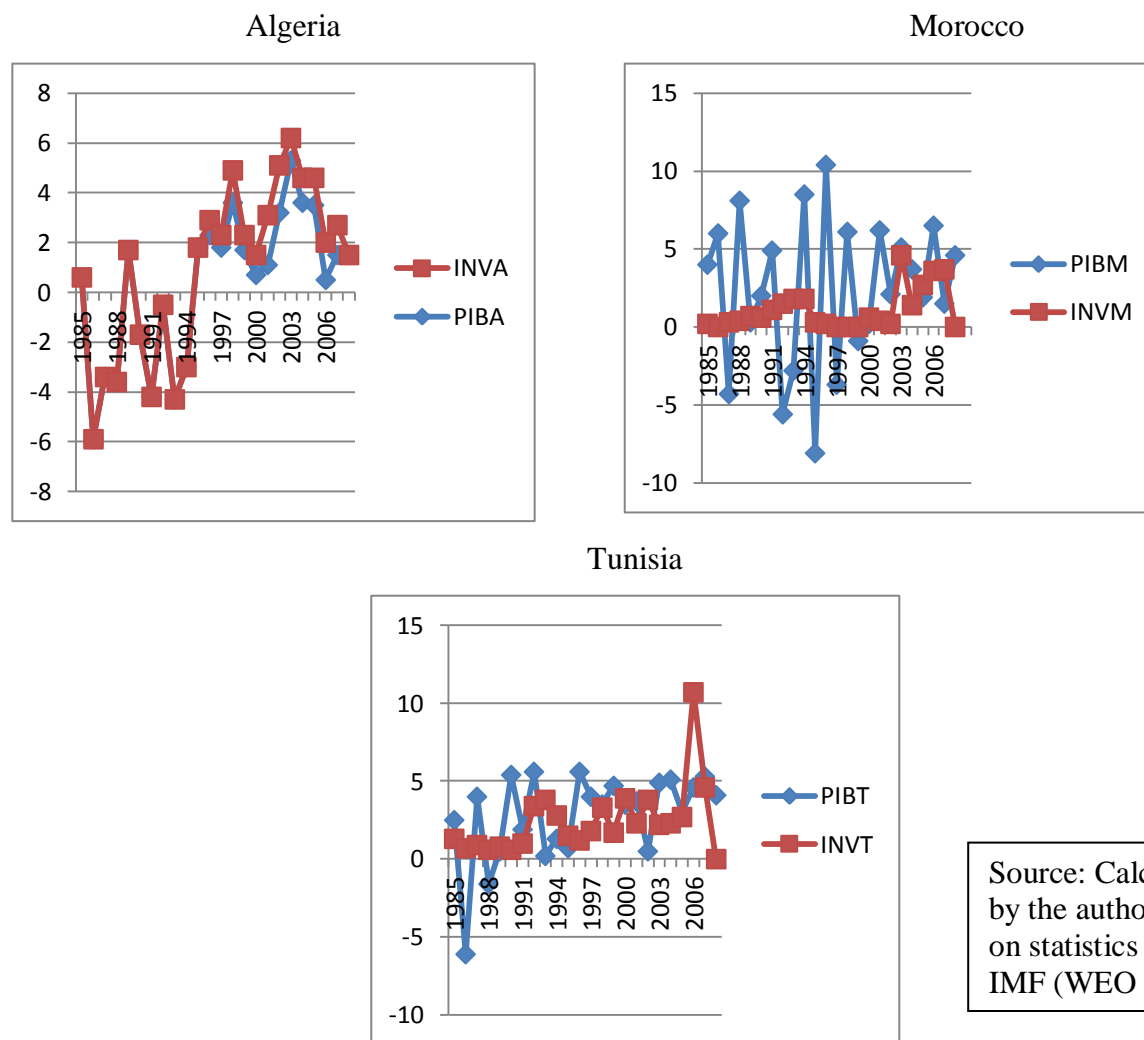
Table 1: Correlation of cycles between the Maghreb countries

	<b>Algeria</b>	<b>Morocco</b>	<b>Tunisia</b>
Algeria	1.000	0.4474	0.9488
Morocco	0.4474	1.000	0.2919
Tunisia	0.9488	0.2919	1.000

<sup>11</sup> We have applied the HP filter (Hodrick-Prescott) for extracting the cyclical component. This filter is most applied in practice. Since we have annual data, we set a smoothing parameter  $\lambda = 100$ .

Table 1 shows that the correlations were significantly positive between the Maghreb countries, they are strong between Tunisia and Algeria, while they are small between the Tunisia and Morocco. We can admit that Algeria and Tunisia are close members of the European Union.

Thus, financial integration of the Maghreb countries was displayed in increasing their financial ties with European countries under the Euro-Mediterranean partnership. These financial ties include bank loans granted to the partner countries of Europe, and capital flows passing through the two geographical areas, particularly foreign direct investment. Furthermore, the significant integration of the Maghreb countries to the European Union, and financial integration is evident from a major attraction for foreign direct investment (FDI) from the European Union. Financial integration would be a possible way to revive the Maghreb economic integration, namely the mechanisms of promotion of intra-zone and the creation of financial institutions dedicated to financing major infrastructure projects. It is in this spirit that the current efforts supported by the IMF, which organized two meetings on financial integration in the region to Algiers and Rabat<sup>12</sup>. Figure 3: Evolution of capital inflows (FDI) and economic growth for the three Maghreb countries.



Source: Calculated by the author based on statistics from the IMF (WEO (2009))

<sup>12</sup> Economic and Financial Report 2008.



The Algeria appears the only country in the Maghreb, which attracts foreign investors enough. The presence of foreign companies in energy production is 15%, is among the countries that have attracted FDI. At the end of June 2010, it had concluded 109 contracts, including 25 co-production, 4 and 66 service concessions for a total area of 2357 sqm<sup>13</sup>. The 2007 report prepared by the World Bank (WB) on the investment climate in the world, the position of Algeria in 104th place out of 150 countries. Algeria is seen as the only country in Africa where the economy is changing, especially with a privatization program that affects all sectors. Since 2005, 350 enterprises have opened their capital to private. 100 public companies will be privatized in the first half of 2008.

Contrasting with the implementation of the policy of openness is vital to ensure sustainable development and to Algeria, a country of excellence open to investment, the government introduced new laws and regulations, so that economic openness is addressed throughout its range and better definition of measures and practical means to Algeria to represent a better option for investors and simplify the investment process, including through the process of ANDI.

Algeria in the framework of market economy on an economic development incentive. The new economic strategy being used to quickly boost the local economy so that it converged with the international economic environment. The legislation establishes a framework conducive to private investments without favoring one class of investors in particular, whether domestic or foreign investors already established in Algeria or wishing to settle there. The existence in Algeria of a policy, regulatory and commercial strengthening economic stability and institutionalize the rule of law, shows real progress, which is likely to attract investors in the country where already the ease of Economic activity is required and no return.

For Morocco signed a free trade agreement with Turkey as well as Egypt, Tunisia and Jordan as part of the Agadir Declaration. Consistent with commitments made by the Mediterranean countries under the Barcelona Declaration in 1995, especially for the part relating to regional integration. These agreements include significant opportunities in terms of increased trade flows and improving the region's attractiveness for foreign direct investment. These agreements would promote intra-industry complementarities and contribute to the emergence of new types of industrial specialization. Similarly, increased market size could encourage the establishment of large international firms in the region.

The Agadir Agreement between Morocco, Tunisia, Egypt and Jordan seeks to accelerate the regional integration process of South-South. It provides for the elimination of most of the tariff and nontariff barriers on trade, the prospect of establishing a free trade Euro-Mediterranean in 2012. Industrial products enjoy a total exemption from the implementation of the agreement. Agricultural products and agro-industrial products will be liberalized according to the program executive on the introduction of the Greater Arab Free Trade Area (GAFTA). Liberalization of services will be negotiated between the member countries according to the General Agreement on Trade in Services (GATS).

## **b) The amplitude of the economic cycle**

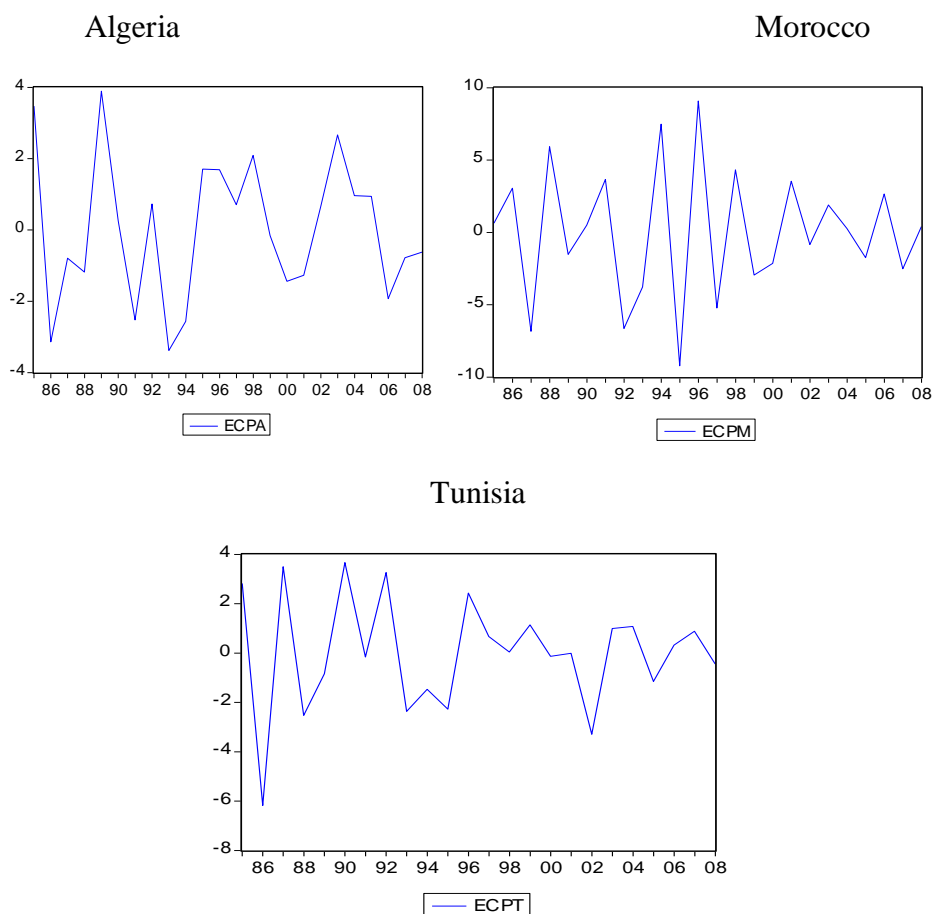
This section presents general data on the evolution of business cycle synchronization in the economies of North Africa and several factors affecting the international transmission. And to explain the reduction in the amplitude of the economic cycle, it is important to distinguish between changes in pulse (or shocks) and changes in the factors that determine the transmission

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<sup>13</sup> The Maghreb: the daily economy.



of shocks across the economy. It is likely that part of the reduction in volatility stems from the fact that the extent and nature of shocks has changed over time. The results presented here were obtained with the Hodrick-Prescott (HP), which provides a mechanical decomposition cycles between the contributions of various items of expenditure. This approach contrasts with the method of the production function, which is used more generally to the OECD to measure potential output<sup>14</sup> and the output gap<sup>15</sup> and enables an analysis of sources of growth, thus providing a more useful starting point for consideration of cyclical pressures, inflation and fiscal developments<sup>16</sup>. Figure 4: Output gap for each country<sup>17</sup>



<sup>14</sup> Potential output (potential output English) means the level of gross domestic product on higher sustainable long term for a given economy. If the production level stood above potential output, the economy affects its limits in terms of production factors (capital or labor), technology or management techniques. Thus, the remuneration of a factor will increase, leading to rising demand (the income of this factor increases) while supply is limited. The demand is outstripping supply, prices rise (inflation). Conversely, if the economy is below its potential output, inflation tends to decrease, companies lowering their prices to increase their production because they have spare production capacity.

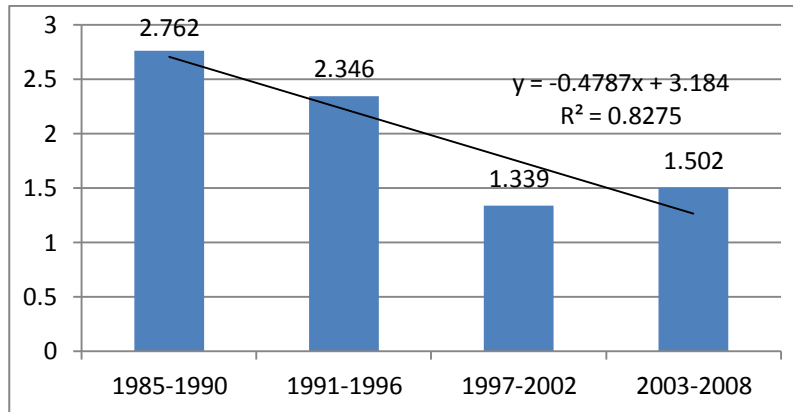
<sup>15</sup> The output gap (the term is used more Anglophone output gap) represents the difference between the actual level of GDP and its potential: potential output. In periods of high economic cycle, the output gap is positive: the production is temporarily above its equilibrium level as there are on-investment. In this case, inflation is rising. Conversely, in periods of economic trough, the difference is negative.

<sup>16</sup> See Giorgio et al. (1995). The overall results for the business cycle are quite similar on the basis of two measures.

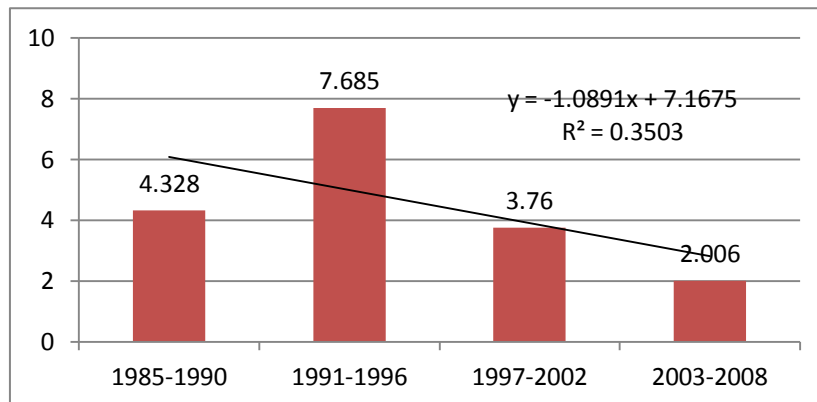
<sup>17</sup> The differences are calculated using a Hodrick-Prescott.

Visual examination of the output gap presented in Graph No. 4 above suggests that, in general, there was a decrease in amplitude over time, which represents the standard deviation and the average size absolute difference between actual and potential output over periods of six years.

Figure 5: The amplitude of output gaps  
Algeria



Morocco



Tunisia

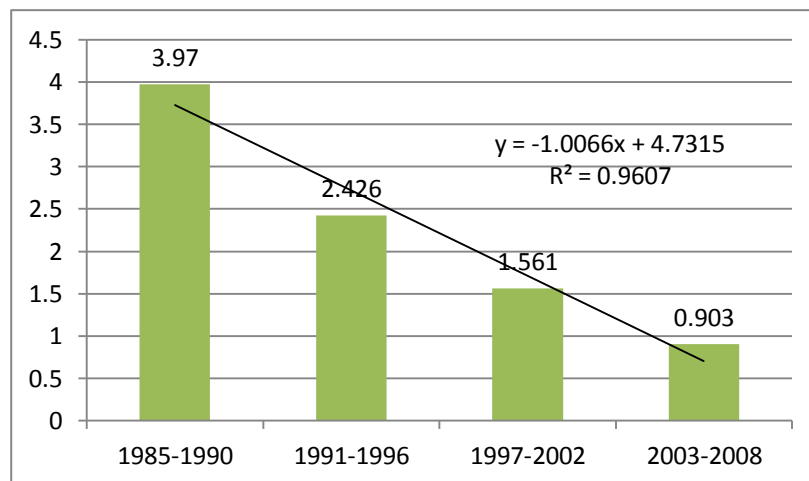
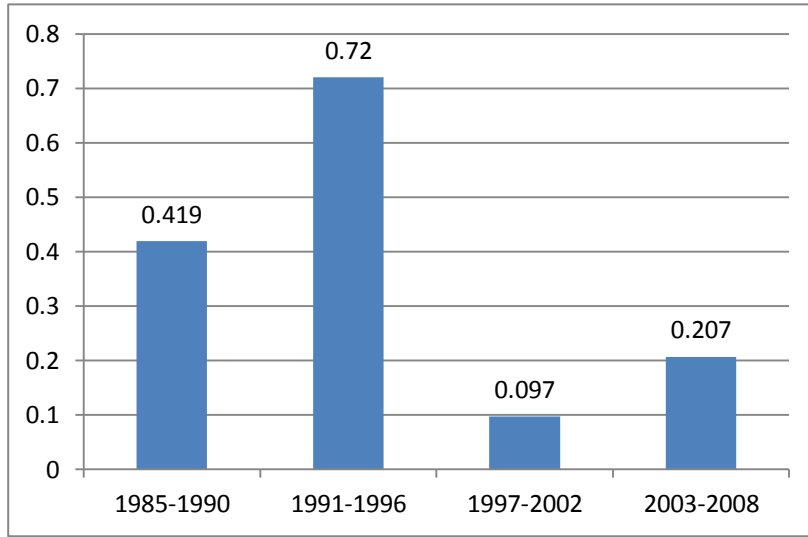
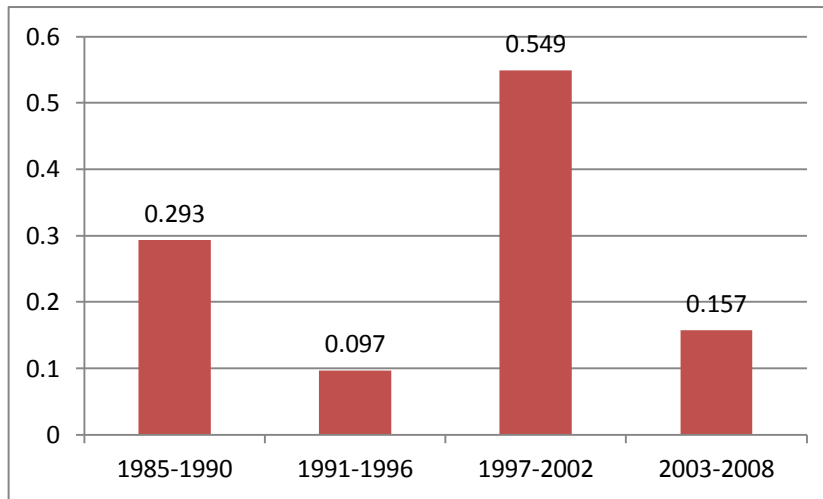


Figure 6: Average absolute size of output gaps

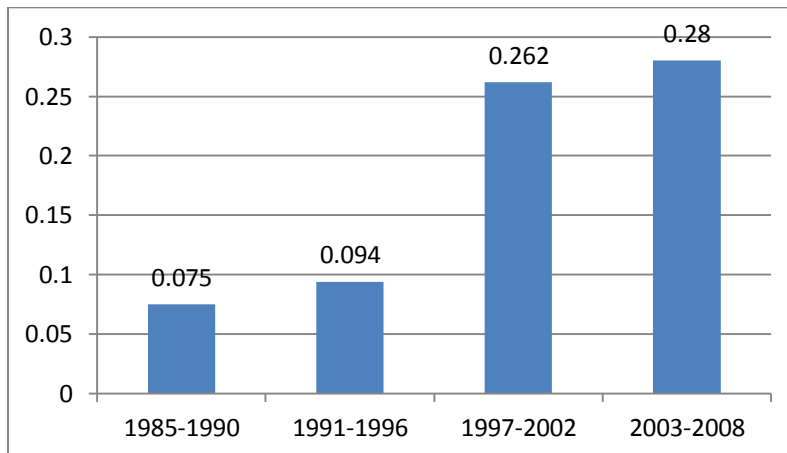
Algeria



Morocco



Tunisia



From these graphs, we see a volatile business cycle appears to have decreased for the case of Algeria and Morocco, A notable exception is Tunisia, where the amplitude of the cycle has increased significantly in the years 1997 - 2002.

Table 2: Contributions to the variance of output gaps<sup>18</sup>

	<b>Total variance output gaps<sup>19</sup></b>	<b>Contribution of Request Total domestic</b>	<b>Contribution of trade</b>	<b>Residue</b>
<b>Morocco</b>				
1985-1990	4.328	3.017	-0.031	1.342
1991-1996	7.685	1.705	-1.338	7.318
1997-2002	3.760	0.529	-0.221	3.452
2003-2008	2.006	3.804	-3.928	2.13
<b>Algeria</b>				
1985-1990	2.762	4.33	-4.059	2.491
1991-1996	2.346	1.17	-1.1296	2.305
1997-2002	1.339	2.605	-3.501	2.235
2003-2008	1.635	2.395	-2.811	2.051
<b>Tunisia</b>				
1985-1990	3.970	3.09	-3.017	3.897
1991-1996	2.426	2.17	-1.921	2.177
1997-2002	1.561	1.066	-0.128	0.623
2003-2008	0.903	2.015	-1.731	0.619

Source: estimates made by the author

<sup>18</sup> The variance of the output gap is an approximation of the average size of the gap (since it measures the average distance squared away means of production, which is close to zero). The contributions of total domestic demand and trade to the total variance of output gaps are calculated as weighted averages of individual variances and their covariance. The residual is the difference between the variance of total output and the sum of its parts, and this difference is due to statistical errors, the averaging effect and the non-additivity of real expenditure components for countries using indices chain for the national accounts. See Dalsgaard et al. (2002) for details.

<sup>19</sup> The total variance of the output gap is equal to the contribution of the total domestic demand more than the contribution of trade + residue.

From Table No. 2, considering the contribution of different elements of the application to the overall gap between actual and potential output shows that reducing the gap in Tunisia mainly to guard the greater stability of domestic demand. The net contribution of trade to change the output gap was negative for most countries and most periods, ie the trade balance has helped weaken the amplitude of cycles in these countries. The stabilizing action of the trade balance shows that exports and imports have an impact that is compensated vice versa on domestic demand. In general, the two tend to move pro-cyclically, but for exports, such a development contributes positively to the change in the output gap, while for imports, the contribution is negative. However, variations in cycle time can be assessed from changes in the persistence of output gaps, measured by the variation in time of the autocorrelations of first order AR (1)

Table 3: An AR (1) is estimated over a rolling period of 19 years.

	<b>Algeria</b>	<b>Morroco</b>	<b>Tunisia</b>
The coefficient AR (1)	0.0019	-0.723	-0.467

Source: estimates made by the author

The regularity of the economic cycle appears to have remained more or less unchanged in Algeria (the coefficient is positive sign). In fact, to measure the importance of the divergence of business cycles across countries, we are creating the standard deviation production differentials between countries. This gap is zero for all periods when the economic cycle had the same frequency and same amplitude in all countries. Thus, the higher the standard deviation is small, economic cycles are less divergent (Table No. 4).

Table 4: standard deviation of the output gap

	<b>Algeria</b>	<b>Morroco</b>	<b>Tunisia</b>
Standard deviation Output gap	2.005	4.579	2.339

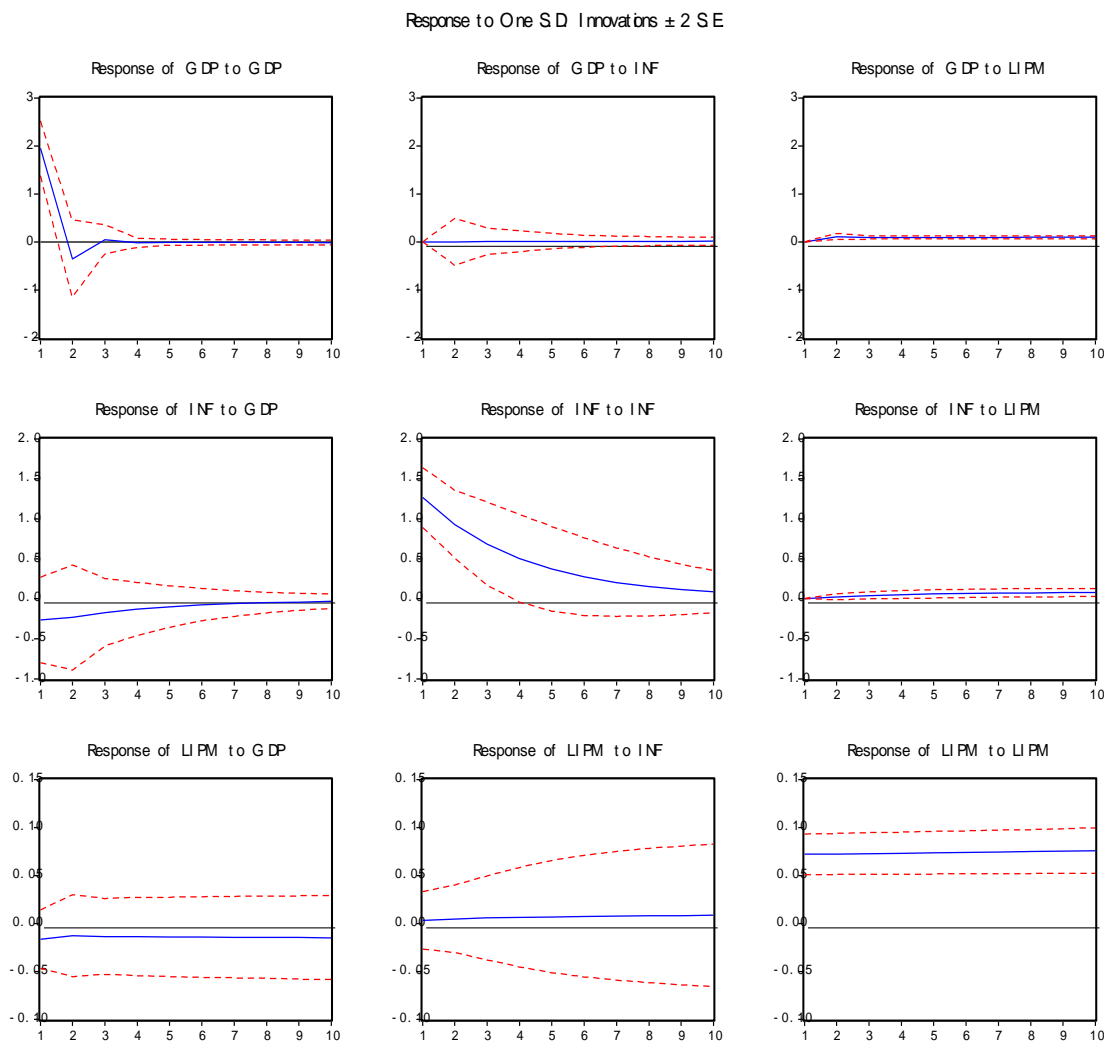
Source: estimates made by the author

## 2. VAR model (case of Tunisia)

A classification of cycles allows then to separate these causes shocks in supply and demand, both internal and external. A VAR model of a small open economy to determine the actual weight of the various shocks in the cyclical and separate the active phases of high volatility, the quiet phases of low volatility. we show: (i) that Tunisian economy is fragile domestic shocks, supply and demand, and changes in the global economy, (ii) there is a superiority of supply shocks internal explanation of the economic cycle (iii) and that the participation of external shocks is relatively weak and is being developed by supply shocks. We have to divide the causes of the economic cycle in Tunisia, a simple model of aggregate supply and aggregate demand in open economies. In this model, we can separate the supply shocks of

domestic supply shocks and external demand shocks internal external demand shocks<sup>20</sup>. We therefore define two blocks of variables: one for external variables and variables for a second home. Domestic variables selected are given by the index of industrial production (IP) and the index of consumer prices (CPI, external variables are selected, in turn, donated by the world price index for imports (PMI) and GDP. We are interested in the response functions of shocks and variance decompositions of forecast errors. Both instruments can link most of the information involved in the dynamics of the VAR system estimated. The variance decompositions show us the relative importance of each shock in explaining the cyclical fluctuations of macroeconomic variables considered. The functions of response to shocks, we admit them to highlight the nature of the effects of various shocks on the variables.

Figure 7: Response function variables to a shock



<sup>20</sup> A supply shock is a shock which affects aggregate supply and the economy is moving towards a new equilibrium. Similarly, a demand shock is a shock which affects aggregate demand and the economy converges towards a new equilibrium position.

In the graphs, we show the responses of inflation, output and price index of goods in international trade following a shock of each variable.

The effect of low inflation shocks on import prices is certain. Tunisia has adopted a policy until 1987 high protection and strict control on imports, ranging from quantitative restrictions of administrative complications. "For example, in 1986, 93% of imports were subject to licensing and the effective rate of protection on manufactured goods was 124%. Only with the structural adjustment program, implemented in 1986, that foreign trade has partially liberalized. The rate of effective protection has been reduced from 124 to 84% and the share of imports subject to licensing fell from 93 to 35%"<sup>21</sup>.

The contribution of GDP to IPM indicates that Tunisia was unable to capitalize on the growth of its partners. This is mainly due to the protective system on the external trade and the overvalued dinar against foreign currencies before 1987.

### a) Variance decomposition

Table 5: Variance Decomposition of GDP

Perio	S.E.	GDP	INF	LIPM
d				
1	1.951654	100.0000	0.000000	0.000000
2	1.987009	99.72707	8.96E-05	0.272837
3	1.989367	99.54032	0.000202	0.459478
4	1.991573	99.33810	0.000628	0.661268
5	1.993653	99.13661	0.001464	0.861922
6	1.995782	98.93293	0.002681	1.064392
7	1.997935	98.72750	0.004229	1.268273
8	2.000115	98.52024	0.006049	1.473715
9	2.002323	98.31116	0.008088	1.680753
10	2.004558	98.10027	0.010301	1.889426

<sup>21</sup> Elachhab Fathi (2007) "a historiographical analysis of the causes of the economic cycle in Tunisia. " L'Actualité économique, Vol. 83, No. 3, 2007, p. 359-397.



Variance Decomposition of INF

Period	S.E.	GDP	INF	LIPM
1	1.951654	4.216857	95.78314	0.000000
2	1.987009	4.869805	95.10961	0.020590
3	1.989367	5.029135	94.90634	0.064524
4	1.991573	5.128469	94.73859	0.132941
5	1.993653	5.191737	94.58425	0.224017
6	1.995782	5.235746	94.42910	0.335156
7	1.997935	5.266923	94.26979	0.463290
8	2.000115	5.289088	94.10550	0.605409
9	2.002323	5.304684	93.93650	0.758820
10	2.004558	5.315423	93.76331	0.921270

Variance Decomposition of LIPM

Period	S.E.	GDP	INF	LIPM
1	1.951654	4.983204	0.172051	94.84475
2	1.987009	4.040263	0.268974	95.69076
3	1.989367	3.866941	0.361628	95.77143
4	1.991573	3.785456	0.447136	95.76741
5	1.993653	3.750589	0.523789	95.72562
6	1.995782	3.734375	0.591458	95.67417
7	1.997935	3.727470	0.650686	95.62184
8	2.000115	3.725260	0.702317	95.57242
9	2.002323	3.725483	0.747276	95.52724
10	2.004558	3.726943	0.786460	95.48660

The variance decomposition indicates that the variance of the forecast error of GDP is 98% due to its own innovations, to 0.01% compared to 1.88% and inflation than the consumer price index to importation. Also the error variance of INF is due to 93% to its own innovations and those of 5.3% GDP. And the error variance of IPM is due to 95% to its own innovations and those of 3.72% to GDP. These results confirm the study: "The benchmark: To evaluate the trend of inflation, the central bank finds it very helpful to use a benchmark which is a variance of the price index consumption. The index represents 16% of the CPI basket most volatile. But, provided that the variations of its eight components have only temporary effects on inflation, the benchmark index and the CPI will show a profit similar paths in the medium term. The deflator of GDP: it provides the average price of goods in GDP and therefore final goods produced in the economy. This measure provides a more comprehensive and more accurate inflation, but its timing and preparation are much longer."<sup>22</sup>

#### **IV. Conclusion**

The integration of the Maghreb has become a vital economic necessity in a context of complementarity. The revival of the Arab Maghreb Union (AMU) could be a powerful lever to lend credibility to the partnership with the European Union and strengthen the region's attractiveness for FDI flows, through its positive effects on regional stability and expansion of market size which represents 80 million consumers. Today, despite an obvious complementarity between the economies of the Maghreb, the economic and trade intermaghrébins remain low compared to their foreign trade with the European Union. Of a total of 137 billion dollars in trade, only 2% are exchanged between the AMU countries, against 66% with the European Union, 13% with the rest of the industrialized countries and 19% with other regions. Following this study, three major determinants were demonstrated for the case of Tunisia. These are:

- GDP;
- inflation(INF);
- IPM.

Empirical investigations carried out allow us to confirm all the basic assumptions of the structural model specifies. Using a VAR model suitable for a small open economy, we were able to assess the contributions of different shocks to the economic cycle in Tunisia. The results associated with the identification schemes tend to give a certain robustness to the distinction between these types of pulse.

The empirical results are unfavorable to the central hypothesis of fluctuations caused only by shocks from the INF. GDP shocks contribute, in fact, cyclical volatility, their share in explaining the business cycle is 35% to a four-year horizon. Among these shocks IPM, institutional reforms are important.

It is worth noting the limitations of this study. We can reconcile the results of more sophisticated methods of identification, such as VAR models multiéquations (Dungey and Pagan, 2000 and Buckle et al. 2002), or more models formulated in terms of calibration-simulation. It remains useful as a first analysis of the economic cycle, to launch an empirical view on the effect of shocks on global economic trends.

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<sup>22</sup> [http://www.lexpertjournal.com/dossiers/dossier\\_4259\\_inflation.html](http://www.lexpertjournal.com/dossiers/dossier_4259_inflation.html)

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