Dating of Moroccan Economy's Business Cycles

Table of Content

Executive Summary

Over the last few years, the Moroccan economy has known sustained growth, following a cyclical plan that combines alternative trends of expansion and recession with recurrent patterns of the 80's and the 90's. Business cycles in the Moroccan economy therefore warrant close examination.

This study tracks economic fluctuations by identifying turning points and assessing the scale as well as the severity of the various phases in the business cycle. It also shows how this cycle moves alongside major macroeconomic variables and how it synchronizes with business cycles of major European partners such as France, Spain, Belgium and Italy.

Findings suggest that Morocco has known eight complete cycles since the 1980's. The ninth cycle, which is still under way, started in the first quarter of 2000 and shows an expansion record high in 31 quarters. Over the last few years, the Moroccan economy has not only broken away from shorter business cycles, but also witnessed a significant decrease in GDP volatility. Such upward trend occurred without inflaming inflation or destabilizing macroeconomic fundamentals.

Findings also showed that the duration and the scale of expansion phases have been much longer than those of recession; and that severity related losses incurred over the recession phases have been largely set off by severity related gains during the period of expansion.

Gains in terms of sustainability and stability are to a greater degree due to more viable economic policies and institutional mechanisms. In recognition of these achievements, Fitch Rating Agency upgraded the Moroccan economy to 'the Investment Grade' while the European Union granted Morocco "Advanced Status". Morocco has been member of the Development Centre Committee of the OECDE since 2008.

Examination of the synchronization level between GDP cyclical components and macroeconomic variables (exports, imports, domestic consumption, and issues related to the economy and public spending) shows as a pro-cyclical trend as well as positive correlatives. It also reveals a statistically significant link between foreign exchange and the cycle of growth with a one-quarter delay.

As to synchronization levels with major European partners, a pro-cyclical behaviour is clearly noticeable in relation to countries such as France, Spain and Belgium that are one quarter ahead of the Moroccan economy. For its part, the Italian cycle shows a contra-cyclical behaviour and a four-quarterly delay even though the correlation is not significant.

Introduction

There has been renewed interest in the analysis of the business cycle following the profound changes in the global economy in recent years. Some of the ramifications of these changes include the proliferation of free trade agreements, the creation of regional economic clusters, the rise of emerging economies, the variety of financial tools as well as the development of new information and communication technologies. Consequently, cycles of domestic economies have become increasingly sensitive to the fluctuations of global markets.

The study of business cycles is now of paramount importance. The Moroccan economy witnessed inconsistent growth in the 80's and the 90's within a cyclical pattern that combines expansion and recession trends with recurrent variations. Fluctuations during this period were largely due to drought and economic changes on the international scene. Morocco has, nonetheless, seen steady growth since 2000 in spite of global economic setbacks and three consecutive years of drought (2001, 2005, and 2007).

This study addresses issues related to the relative irregularity in business cycles of the Moroccan economy and describes the trend of economic fluctuations. Using the Bry-Boschan algorithm, it offers a dating of turning points (peaks and lows) and highlights the salient features of these cycles.[1] It also assesses the scale as well as the severity of cyclical phases since the early eighties. The study offers an analysis of the co-movement between the major macroeconomic variables and the cycle of growth. Finally, it gauges the degree of synchronization between the cycle of growth with cycles of major European partners such as France, Spain, Belgium and Italy.

1. Brief Description of the Notion of Business Cycles and Bry Boshan's Non Parametric Procedures

A definition of 'economic cycle' is needed before we embark on analysis of the cyclical behaviour of the Moroccan economy. The notion of 'economic cycle' is a concept that highlights the fluctuations of economic activity by segmenting them in clearly identifiable successive phases that recur in an orderly fashion. There are two phases in the economic cycle: a phase of recession when economic activity slows down and a phase of expansion when economic activity picks up. The peak and the low indicate respectively the end of a period of expansion and the period of slowdown.

The business cycle is similar to the cycle of the overall level of activity. Here follows the most widely used definition of 'business cycle' given by the National Bureau of Economic Research (NBER):
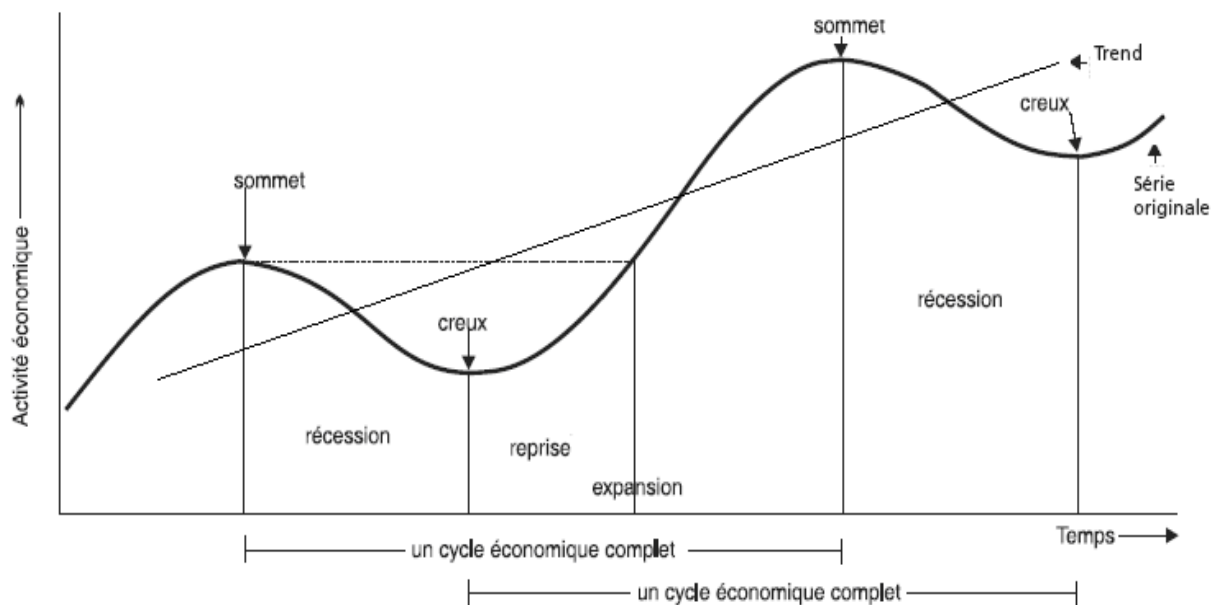
'A business cycle is a type of fluctuations that affect the overall activity of a country where production is generated by private companies. A cycle is made of upturns that occur simultaneously in various areas of activity and that are followed by phases of recessions, contractions and recoveries which in turn affect the overall economic activity. Recovery then spills into of the expansion phase of the following cycle. The sequence of these phases is not strictly periodic but simply recurrent. The duration

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[1] Such non-parametric method draws upon the identification procedure of the National Bureau of Economic Research (NBER), which is an organization in charge of setting the chronology of business cycles in the USA.

of business cycle varies between one and ten to twelve years. Business cycles cannot be segmented in shorter cycles with similar scales."[2]

The above definition shows that a business cycle features fluctuations in overall economic activity. Thus, fluctuations do not only involve production but also indicators related to prices of goods and services, interest rates, profit, share value and productivity.

Graph 1: different stages of business cycle

It must be stressed that the business cycle is different from the growth cycle and the cycle of the growth rate. **The growth cycle** is a period when growth accelerates or slows down and at times slumps. Overall economic activity fluctuates over a long term period. The growth cycle then shows inconsistency in the trend. In this cycle, phases of upturn mark the periods when the disparity between the rate of growth of the variable and that of its trend is positive. These periods are also considered periods of cyclical recovery. Phases of downturn mark periods when the said disparity is negative and are therefore considered periods of cyclical slowdown.

The peak or low of the growth cycle corresponds to the time when the rate of growth is above or below the rate of growth in the trend. When the derivative of the disparity is wiped out, the derivative of the series is equal to the derivative of the trend.

For its part, the cycle of growth rate corresponds to variations the growth rate in the series or better still the margin between the rate of growth of the series and the long term rate of growth. The peak is, therefore, the highest point of the growth rate whereas the low indicates that the growth rate has reached its lowest point but started picking up.

Bry and Boschan's algorithm, the most widely adopted procedure in dating business cycles, uses a filter sequence in processing data to identify only significant turning points and their dates. It also uses as exclusion criteria a six-quarter minimum period for each full cycle and a two-quarter minimum period for each of the phases in the cycle. Therefore, a peak occurs in t if

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[2] Burns A.F and Mitchell W.C (1946), *Measuring Business Cycles*, NBER

$$\{x_t \succ x_{t\pm k}\}, K = 1,..., k.$$

In other words, if the series value to the t date is above the previous k values and the following k values or k=1 for the annual series and k=2 for quarterly values and k=5 for monthly values.

A low occurs in t if the series value to the t date is below former k values as well as subsequent values:
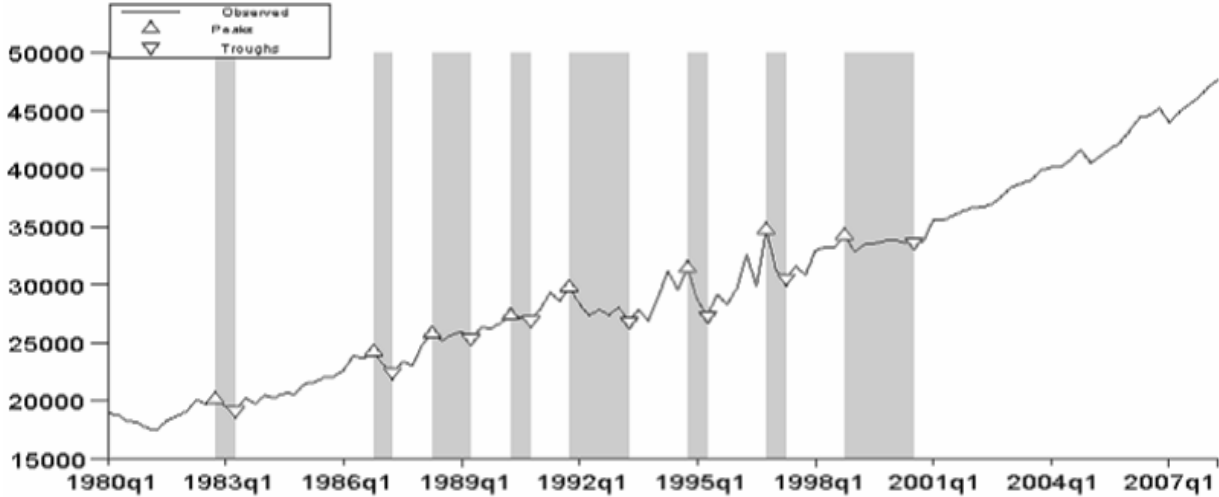
$$\{x_t \prec x_{t\pm k}\}, K = 1,...., k.$$

In order to avoid fortuitous phases, certain censoring rules are highlighted below:

Ø The alternation between peaks and lows must be ensured by selecting the highest and the lowest points of two consecutive peaks and lows. The peaks must be higher than their lows; otherwise the low must be deleted.

Ø The duration of a full scale should not be below the minimum time set beforehand (the value by default is 15 for monthly data and 5 for quarterly data). Otherwise, the turning points are deleted.

Ø The first peak should not be lower and the first low should not be higher than the first point in the series. The last low should not be lower and the last peak should not be higher than the first point in the series.

Ø The first peak or low should not be situated in less than 2 periods of the first point of the series under study. The last peak or low should not be situated in less than 2 periods of the last point in the series under study.

Ø The duration of a complete phase (which sets a peak off from a low) must be longer than the time frame set beforehand. (The value by default is 6 for monthly data and 2 for quarterly data). Otherwise, the qualifying turning points are deleted.

2. Dating Turning Points in Moroccan Economy's Business Cycles

The Bry and Boschan's algorithm is used here to outline the sequence of turning points in the cycle of the Moroccan economy. Quarterly GDP is taken into account as an indicator. The criteria used relate to a five-quarterly minimum period for a full cycle and a two-quarter minimum period for phases of expansion as well as phases of recession.

Graph 2: Business Cycle of Moroccan Economy

  * **The grey bars indicate periods of recession (decline in quarterly GDP for at least two consecutive quarters)**.

The above chart shows cyclical behaviour of economic activity based on the definition used. During the period starting from the first quarter 1980 to the second quarter 2008, the Moroccan economy witnessed eight full cycles, from one low to the next. The ninth cycle which is still under way, began in the last quarter of 2000 is part of an upturn phase, which is a record high of 31 quarters.

The table below features the findings advanced by Bry and Boschan's algorithm.

Table 1: Cyclical Characteristics of the Moroccan Economy

	Cycle	Peak	Peak-low	Peak-low	Low-low	Peak-Peak
Cycle 1	1981Q2-1983Q2	1982Q4	6	2	8	
Cycle 2	1983Q3-1987Q2	1986Q4	14	2	16	16
Cycle 3	1987Q3-1989Q2	1988Q2	4	4	8	6
Cycle 4	1989Q3-1990Q4	1990Q2	4	2	6	8
Cycle 5	1991Q1-1993Q2	1991Q4	4	6	10	6
Cycle 6	1993Q3-1995Q2	1994Q4	6	2	8	12
Cycle 7	1995Q3-1997Q2	1996Q4	6	2	8	8
Cycle 8	1997Q3-2000Q3	1998Q4	6	7	13	8
Average			6.25	3.38	9.63	9.14
Cycle 9	As of 2000Q4	--	31, Not achieved	--	--	--

Several observations could be advanced on the eight cycles that occurred over the 80's and the 90's.

- Cycle duration varies from 6 to 16 quarters
  - ü The average duration of low to low cycles is of 9.63 quarters
  - ü The average duration of peak to peak cycles is of 9.14 quarters

- Expansion phases are considerably longer than phases of recession with average durations of 6.25 quarters and 3.38 quarters respectively

- Recession phases varied from 2 to 7 quarters:
  - ü Recession phases for 1991Q4-1993Q2 and 1998Q4-2000Q3 were the longest because they occurred over periods of six and seven quarters respectively;
  - ü The shortest recession phases took only 2 quarters and occurred only five times.

- Expansion phases varied between 4 and 14 quarters:
  - ü The longest expansion phase concerned the period 1983Q1-1986Q4, which is a 14- quarterly duration. Of the 8 detected expansion phases, four took 6 quarters;
  - ü The shortest expansion phases took four quarters

- 75% pf the peaks occurred in the last quarter and 78% of the lows in the second quarter.

3. Cyclical Characteristics of Moroccan Economy

In addition to the factor of duration, cycles could be approached on the basis of their scale and severity. The scale of a phase in an economic cycle can be determined simply by measuring the variation of the series level between two turning points. As to severity, we assess the loss or gain that the economy makes during each phase of the cycle. This is an indicator, which summarizes information as well as the scale noticed during the period, can be represented as follows: Severity = 0.5* Duration* Scale

Table 2: Characteristics of Business Cycles

Recession Phase				Expansion Phase		
	Duration	Scale	Severity-Loss		Duration	Scale	Severity-gain
1982Q4-1983Q2	2	-4.9	-4.9	1981Q2-1982Q4	6	15.1	45.3
1986Q4-1987Q2	2	-7.3	-7.3	1983Q2-1986Q4	14	26.7	186.9
1988Q2-1989Q2	4	-1.6	-3.1	1987Q2-1998Q2	4	14.9	29.8
1990Q2-1990Q4	2	-1.3	-1.3	1989Q2-1990Q2	4	7.5	14.9
1991Q4-1993Q2	6	-10	-30	1990Q4-1991Q4	4	10.6	21.2
1994Q4-1995Q2	2	-12.9	-12.9	1993Q2-1994Q4	6	17.2	51.5
1996Q4-1997Q2	2	-12.1	-12.1	1995Q2-1996Q4	6	27.2	81.7
1998Q4-2000Q3	7	-1.8	-6.2	1997Q2-1998Q4	6	11.9	35.9
Average	**3.38**	**-6.5**	**-9.8**	**Average**	**6.25**	**16.4**	**58.4**
				As of 2000Q4	31	--	--

Findings show that :

- Ø The average duration of expansion phases (6.25) is almost twice that of recession (3.38);
- Ø The average scale of expansion phases (16.4) is far above that of recession (-6.5)

These duration and scale differentials account for the ascending trend of the quarterly GDP of the Moroccan economy.

Ø The severity-gain (+58.4) is on average higher than the severity-loss (-9.8), which suggests that the gain accumulated over the expansion phases have alleviated and counterbalanced the loss accumulated over the recession phases.

4. Scale Factors of Business Cycles in Morocco.

Analysis of cyclical behaviour in economic activity reveals eight business cycles with unbalanced time frames of expansion and recession phases. The following explanations show that the phases detected in the 80's and the 90's and the turning points they ensued were extremely sensitive to factors related to the economic situation at the time; namely changes in the climate and the global economic scene.

Ø **The First Cycle: 1981Q2 – 1983Q2**

The first cycle, which started in the second quarter of 1981, lasted 8 quarters and reached its peak in the last quarter of 1982. The six quarters of expansion were largely due to the readjustment of the agricultural yield (47.4 MQX compared to only 20.2 MQX in 1981). Agriculture is a key sector in the economy and impacts domestic production and trade balance. This phase of expansion was further stretched thanks to the increase in private consumption following noticeable improvement in agricultural income and slowdown in the rate of inflation (10.6% in 1982 compared to 12.5% the year before). Expansion was also due to an increase in investment which accounted for 23% of the GDP and involved equipment, particularly materials and tools.

Moroccan economy was, thus, fairly adjusted for the year 1982 and the 5.6% growth rate achieved turned out to be the highest since 1977. Such a level of growth was possible despite slugging demand and a slack international trade that did not spare national economic activity.

For the two first quarters of 1983, national economic activity witnessed a phase of contraction on account of fiscal measures within the framework of a corrective finance act that aimed at increasing tax revenue and reducing standard expenditure and equipment costs. Following these measures, investments slackened and the pace of growth and consumption slowed down; resulting in a heightened pressure on fundamental equilibriums.

Ø **The Second Cycle: 1983Q3-1987Q2**

The second cycle, which spanned over 4 years (16 quarters) began in the third quarter of 1983 and was completed in the second quarter of 1987. It reached a peak in the last quarter of 1986 after a 14 quarter-expansion period during which the GDP growth rose from 2.2% in 1983 to 3.9% in 1984, 4.4% in 1985 to 5.8% in 1986. Such a level of growth was achieved in spite of a less conducive international environment with dwindling demand, decrease of basic commodity prices together with contraction of foreign investments and a resilient capital market.

Economic and financial policies adopted during this period were based on enhancing supply, especially with regard to exports and to a certain degree, stimulating domestic demand in order to promote growth without heightening inflation or exerting any pressure on external accounts.

Likewise, improved agricultural yields compared to earlier years (76.8 MQX in 1986 against 52.2 MQX in 1985 and 36.6 MQX in 1984) together with growth in other sectors of economic activity increased export potential and help keep down purchasing of foodstuffs. Decreasing prices of several raw materials on the international market, especially oil prices, the devaluation of the US dollar and the drop in nominal interest rates help maintain external equilibrium. For its part, budget deficit rested around 1.8%.

National economic activity retracted briefly for two quarters on account of lower agricultural yield in 1987 (542 MXQ) and to a lesser extent mineral production. The sector of agriculture, which had reached a record high in produce and livestock production, decreased by 13% owing to insufficient spring rainfall. In the face of impervious export channels, extractive industry also decreased by 1.2% after a 4.1% the year before.

During this cycle, Morocco launched, with the support of the International Monetary Fund and the World Bank, a structural adjustment plan that aimed to control domestic demand, mobilize national savings, rationalize the allocation of resources, liberalize foreign trade and exchange, restructure the public sector, deregulate prices and modernize the financial sector.

Ø The Third Cycle : 1987Q3-1989Q2

With a span of eight quarters, the third cycle came to an end in the second quarter of 1989. Economic activity regained its peak in the second quarter of 1988. This expansion phase was largely due to a favourable international market that witnessed a significant rise in the volume of international trade. Expansion in the period was sustained following an increase in demand for phosphates and its derivative at higher prices as well as a decrease in oil prices. Better agricultural yields (78.3% MQX in 1998 compared to 42.1% MQX in 1987) combined with significant development of other sectors of economic activity generated a 10.4% GDP growth in 1988.

Alongside Such rapid growth, fundamental disequilibrium was significantly absorbed. Inflation was brought down to 2.3%, the treasury fund deficit reduced to   3.1% whereas the surplus on the balance of current operations rested at 1.6%. These achievements were the outcome of an economic policy geared towards promoting production and controlling demand. This policy was aimed at keeping in check the increase of public as well as private revenue, reducing budget deficit and promoting savings through a reasonably high interest rate while reducing interest rate on equipment loans in order to enhance investment.

With regard to supply, several provisions were enforced to boost production potential. In addition to lower interest on equipment loans, concessionary rates were set in favour of investment loans. In order to boost supply, measures were taken to liberalize imports to facilitate procurement for the local market.

At the end of this cycle, economic activity was marked by a resurge of favourable trends, previously dominant at home as well as abroad. Growth seemed rather meager with no more than 1.3% and several financial indicators showed an abrupt deterioration. Internationally, demand for foodstuffs and phosphates decreased while exports dwindled both in volume and value and current prices dropped in the face of foreign competition. The situation was further exacerbated by volatility of oil and foodstuff prices as well as interest and exchange rates. This had a negative impact on exchanges and regulations.

A similar downturn occurred in other areas of national economic activity. Although the sector of agriculture showed signs of recovery, other sectors witnessed anemic growth and at times decline as it was the case for the mine sector, which was seriously affected by decreasing foreign demand.

Ø **The Fourth Cycle : 1989Q3-1990Q4**

Beginning in the third quarter of 1989 and ending in the last quarter of 1990, the fourth cycle proved to be the shortest. It lasted no more than 6 quarters: three expansion quarters and two quarters of recession. Its peak occurred in the second quarter of 1990.

The modest expansion phase was spawned by a sustained domestic demand following consolidated investment which reached DH 52.2 billion, an increase of 14% compared to the year before. Investment was further stepped up thanks to consolidation of state equipment expenditure and various measures to simplify investment agreement procedures, relax criteria of eligibility for central bank refinancing as well as assistance programs designed for small and medium size enterprise. The expansion phase was further stretched by improved conditions of supply, following the liberalization and lightening of exchange regulations as well as the cancellation of mandatory deposit prior to purchase of currency.

The short phase of recession was largely due to unfavourable climate conditions that resulted in a further 15.6% decrease in yield of the four main types of wheat in comparison to the previous season and subsequently a decline in wheat exports. Morocco resorted, once again, to imports of foodstuffs.

Ø **The Fifth Cycle: 1991Q1-1993Q2**

The fifth cycle, comparatively longer than the two previous ones, lasted 10 quarters: four expansion quarters followed by six recession quarters after a peak in the last quarter of 1991. This peak was, for the most part, the result of increasing supply due, an exceptionally high agricultural yield (85 MQX) as well as rising demand. An unprecedented agricultural yield, coupled with improvement in various sectors except mining, generated a 5.1% GDP growth for the year 1991, twice the year before.

This growth was boosted by final investment and consumption, improvement in agricultural income and pay raise for consumers with potential spending power. Investment was stepped up, following lower interest rates and further concessionary measures in favour of small and medium size enterprises. Public authorities shored up foreign investment by appointing a deputy minister in charge of external investments. Bigger volume foreign capitals, which flowed into Morocco in the form of donations, loans and investments, further consolidated equipment, eased regulations and boosted currency reserves.

A significant decline in agricultural yield for two consecutive years (28.6 MQX for 1992 and 26.9 MQX for 1993) slowed down economic activity, leading to a six-quarter recession period. Indeed, failed crops and lower income in rural areas have affected the entire spectrum of economic activity. The slowdown was compounded by the Gulf crisis characterized by rocketing oil prices and the closedown of some markets in the Middle East.

Decrease in domestic and international demand further slackened economic activity and left economic operators utterly baffled.

Ø **The Sixth Cycle : 1993Q3-1995Q2**

The sixth cycle, which lasted eight quarters and reached a peak in the last quarter of 1994, included six-quarter expansion period. The latter phase was marked by an exceptionally high growth rate

of 11.7% generated mostly by a leap in agricultural yield (94.5 MQX), as well as improved levels of income and consumption.

Other industrial services and activities witnessed growth during this phase. Positive developments on the international market had a favourable impact on economic activity at home following an increase in foreign demand. There was a marked increase in production and sales levels of phosphates and its derivatives as well as in exports of fishing and agriculture related products. Inflation together with deficit in public spending and foreign account were contained thanks to appropriate financial and monetary policies and upward trend in savings.

During the recession phase, Moroccan economy was negatively affected by a new and difficult drought in 2005 (17.5 MQX). The unprecedented fall in agricultural production, which, in turn, affected numerous sectors, particularly a decrease in revenues that they used to generate, was translated by a decline in domestic demand. Balance of trade was consequently affected by a shortage in agricultural production, and its deficit witnessed an aggravation which negatively affected the balance of current operations with foreign markets. This actually led to a decrease in tourism revenues and private and public transfers.

Ø The seventh cycle : 1995Q3 – 1997Q2

The seventh cycle, that lasted 8 quarters, reached its peak in the fourth trimester in 1996, wherein national economy benefited from a remarkable expansion in agricultural production (99, 8 MQX), from an upturn in the trend in the tourism sector and recovery of fund transfer from Moroccans residing abroad, who have played an important role in consolidating currency reserves, despite the heavy charges of external running debt.

This upward trend, together with sustaining a vigilant budgetary and monetary policy, has reduced internal and external imbalance. The pace of private and public savings' trend was readjusted, which limited the economy's need for financing.

Economic upturn remained low in sectors other than agriculture and did not affect other industrial activities, notably those geared towards export, caused by the sluggishness to foreign demand.

Ø The Eighth cycle : 1997Q3 – 2000Q3

The 8th business cycle was relatively longer and lasted thirteen quarters: 6 expansion quarters and 7 recession ones. The peak level was in the fourth quarter of 1998 after an improvement in the economic context in the agricultural sector (65, 5 MQX), an increase in consumption, thanks to a good agriculture revenues and a momentum in household loans. In addition, the strategy adopted by the monetary authority to ease bank rates played a crucial role in the improvement of the economy's financing conditions, hence enhancing investment and stimulating economic activities.

This stimulation did not last for long as national economy has undergone a low recession phase since the first term of 1999, with an amplitude and rigour far lower than the cycles of the nineties. Despite a severe fall in agricultural production in 1999 and 2000 (37 and 19 billion quintals respectively, with its aftermath on other sectors of the economy, GDP growth remained positive (0.5% and 1, 6% respectively) which means an increasingly limited impact of drought on economic activities other than that of agriculture. Such a thing occurred following the consolidation of actions destined to fight against drought effects and sustain the purchasing power through subsidising prices of certain products.

Ø **Expansion phase carried out in 2000Q4 and which have yet been achieved**

The 8th business cycle of the eighties and nineties was marked by the recording of thirteen years of drought that led to strong oscillation of agricultural products and sectors of the economic activities which are associated upstream and downstream

As for the fourth quarter of 2001, two qualitative specificities characterized Moroccan economy, which relate to the following:

Ø A significant increase of volatility, measured by standard deviation of quarterly GDP variation, to reach 1.38 against 4.2 in the nineties, and 2.9 in the eighties.

Ø A break with short term business cycles through carrying out a longer expansionist phase of 31 quarters.
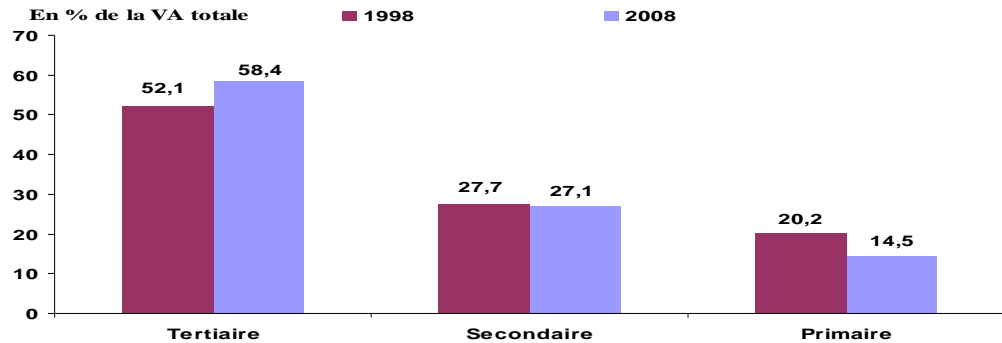
The expansionist phase that Morocco's economy is subject to is characterized by the an accumulated experience in recent years as it was achieved in difficult and unstable context, hindered by vagaries of a terrible weather conditions (2001,2005 and 2007). The instability of international financial markets also made it difficult for this economy to rise; adding to that, there was a rocketing of oil prices and sluggishness of the economies of Morocco's main business partners. This upturn context distinctly shows to what extent the Moroccan economy has succeeded in initiating a positive change of economic structures, and developing the capacity of adaptation and protection.

The stability and sustainability recorded in recent years are largely due to the improvement of economic policy and efficient institutional tools.

As a matter of fact, focus was geared towards supporting sector-based pools of economic growth that are related to industry, services, internal trade and tourism. A process of structural transformation was then started to transform Moroccan economy towards consolidating the tertiarization of its productive fabric, whose real added value moved from 52.1% to 58.4% between 1998 and 2008.

The expansion of these activities was supported by a downturn of the primary sector's added value that moved from 20.2% of GDP in 1998 to 14.5% in 2008 and by a quasi-stagnation of the weight of secondary sector's activities set at around 27% between these two dates. Accrued diversification of the economy and sources of growth have, nonetheless, allowed the modernisation of the national productive fabric and volatility of growth and its dependence on vagaries of the wealth

Trend 3: Tertiarization of the national productive fabric

En % de la VA totale — 1998 — 2008

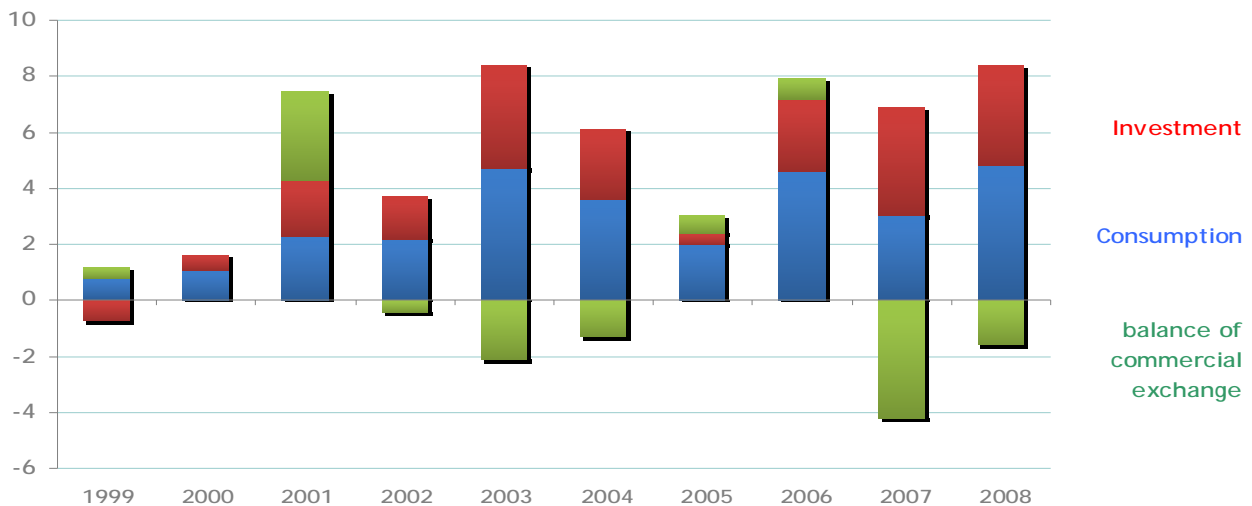|	Tertiaire	Secondaire	Primaire
1998	52,1	27,7	20,2
2008	58,4	27,1	14,5

The new dynamic that tertiary activities enjoy is the result of different structural and sector-based reforms that have been implemented. These reforms relate to programme contracts signed with private operators to support financing investment, promote tertiary activities, simplify bureaucratic procedures, lift land constraints and liberalise sectors of paramount importance to the economy like telecommunications, electrical energy, transport etc…

The consolidation of this expansionist phase was also due to the pivotal role of internal demand, boosted by household consumption and investment. In a context marked by inflation control and easing of interest rate, household consumption witnessed a yearly 7.5% growth between 2003 and 2008 to climb to MAD billion 399 in nominal value; that is, 59.5% of GDP nominal in 2008.
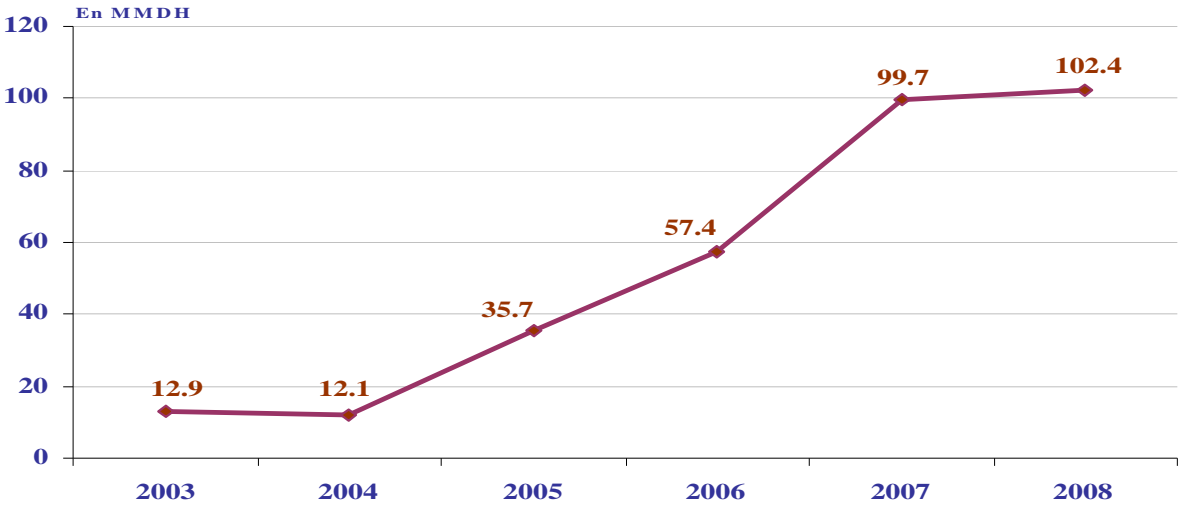
Dynamism of household consumption is largely due to the consolidation of the job market, the implementation of social dialogue dispositions, good yield year, except those of 2005 and 2007, consolidation of money transfer of Moroccans Residing Abroad and finally inflation maintaining at an average of 2% between 2001 and 2008.

Trend 4: A Trend more and more dependent on Domestic Demand

Investment, on the other hand, was boosted by the effort input in terms of modernisation of the financial sector through lifting the constraints that heavily weighed on the Moroccan banking system, the development of capital markets and the liberalisation of the treasury's financing mode. These efforts have been concretised by a significant decrease of interest rate, allowing enterprises easy access to financing, diversification of savings' instruments, both of financing and development of the stock exchange market. This favourable context allowed an important increase of bank loans to the economy (off outstanding debt): around MAD 102.4 in 2008, compared with MAD 12 in 2004; that is, an increase of about 8 times the initial figure.

14

Trend 5: a Positive Evolution of bank loan influx (Off Outstanding Debt)*

En MMDH

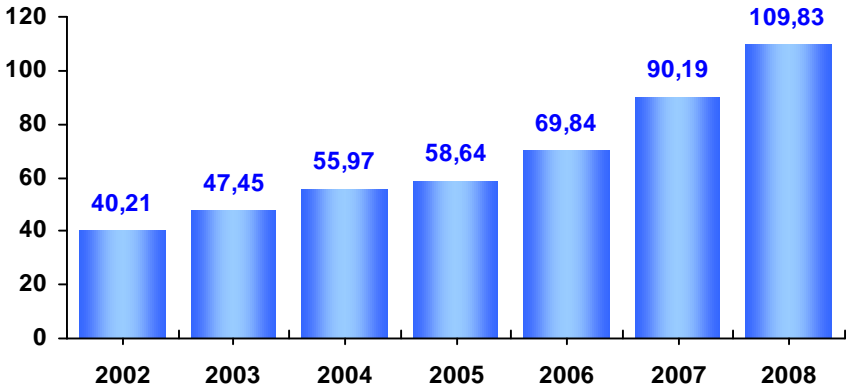|	2003	2004	2005	2006	2007	2008
	12.9	12.1	35.7	57.4	99.7	102.4

- *Off Outstanding Debt*

Correspondingly, gross fixed capital formation recorded an average annual growth of 11, 6% between 2003 and 2008 to attain MAD 217 billion in 2008; that is, 32.2% of GDP. Its contribution in economic growth totalizes to more than 2.6 points within this period to reach 3 points in 2008.

The same dynamic was noticed at the level of public investment that recorded a strong progression with an average annual growth of 13.4% between 2001 and 2008 with an acceleration of 14, 7% since 2003 to reach 47.7 to MAD 109.8 points.

Trend 6: A Public Investment Effort with high progression

2002	2003	2004	2005	2006	2007	2008
40,21	47,45	55,97	58,64	69,84	90,19	109,83

Among the factors that contribute to the expansion of public investment, there is:

Ø Operational restructuring with adapted social schemes, reinvigorating the economic viability of public enterprises and allowing supplementary margins of auto-financing.

Ø Sector-based liberalisation in the field of telecommunication, media, port, road transport, open sky, …

Ø Delegated management of public services, water, electricity, sewage, …

Ø Innovative institutional framework: Tangiers-Med, the Agency for Planning of the Bouregreg valley.

Ø Very important projects that have the backing of international financial institutions: PERG, PAGER, PNRR, PPD Energy, PPD Water …

Ø Financing resources generated from privatisation scheme: MAD 35 billion allocated to Hassan II Funds.

Ø The creation of new funds: Special Fund for Housing, the Fund for financing road projects, Universal Telecoms Service …

National savings also increased to represent 31.4% of GDP from 2001 to 2008, which was at 24.8% from 1998 and 2000. This improvement was largely due to the substantial increase of money transfer of Moroccans Residing Abroad, tourism revenues, which reached MAD 53.7 billion and 56.6 billion respectively in 2008, allowing an important source of hard currency revenues.

Such a progression allowed balance of payment to reach an average financing capacity of 1.5% of GDP between 2001 and 2008, against a financing need of 0.7% of GDP between 1997 and 2000.

Much effort was equally deployed to consolidate principles of participative governance to follow up and assess public policies. This involved the improvement of the state's financial auditing on enterprises and public institutions, the conclusion of programme contracts with Enterprises and Public institutions (ONEP, RAM, ONCF, …), the setting up of regulation agencies for the liberalised public sector , transformation of historically renowned institutions into business corporations to be subjected to private law, separation between public service functions and that of commercial ones, and finally guaranteeing competition of these agencies.

This upward trend recorded in national economy has allowed Morocco to promote its image inside international specialised organisations and institutions in matters related to its economic context, investment opportunities. This move has actually offered Morocco an "investment grade" rank by Fitch Rating Agency. It has equally allowed the country to get an "Advanced Status" with the European Union and be member of the committee of the development centre of OECD

5. Cycle Co-movement with other macroeconomic variables

The objective here is to assess the degree of synchronisation of the economic cycle with a some macroeconomic variables to determine whether this co-movement is pro-cyclical, a-cyclical or contra-cyclical and to check if the macroeconomic indicator surpasses, delays or follows the cycle of national economy.

It is to note, however, that business cycles refer to the fluctuations of the series' rate and calculus of its correlation with the long term trends of other macroeconomic variables, likely to identify fallacious correlations because of its stationary state.

To carry out the analysis of this evaluation efficiently, it would be adequate to resort to the approach of a growth based on identification and analysis of deviations at the long term trend of

variables. What this means is that the approach relies on the filtering of statistical series in a way to extract the cyclical component (stationary) and to later identify the turning point of the activity independent of the upward trend followed in short and medium terms

In practical terms, many filtering techniques have been developed, but the most widely used of filters are: Hodrick-Prescott (HP), Baxter-King (BK) and that of Christiano-Fitzgerald (CFF)[3].

Trend 7: Filtering of a quarterly GDP according to HP, BK and CF

The application of these three filters on quarterly GDP of Moroccan economy highlights quasi-similar profiles with a phase coincidence and some turning points. However, some minor differences in terms of scale can be noticed.

It is to note, all along this study, that Christiano-Fitzgerald filter was implemented in a good number of empirical works on these cycles[4] because of important estimation robustness at the end of period and its capacity to eliminate low and high frequencies and delete all the "noise" surrounding the underlying upward trends.

The evaluation of co-movement is carried out by measuring the instantaneous correlation coefficient ρ (0), between the cyclical component of reference aggregate (quarterly GDP) and cyclical component of each macroeconomic variable

The following convention is adopted for the calculation of correlations between the different components:

The macroeconomic variable is:
ü   Procyclical if ρ (0) > 0 ;
ü   Acyclical if ρ (0) = 0
ü   Contra-cylical if ρ(0) < 0.

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[3] See appendix 1 for a brief presentation of these 3 filters.
[4] Avouyi-Dovi et Matheron, 2003 ; Artis, Marcellino et Proietti, 2004.

Parallel to that, the macroeconomic variable is:

- ü Ahead in relation to cycle k period(s) if for k negative, $|\rho(0)|$ is maximum;
- ü Behind in relation to cycle k period(s) if for k positive, $|\rho(0)|$ is maximum;
- ü Synchronise with the cycle if for k = 0, $|\rho(0)|$ is maximum.

Table 3 represents the result or a calculation of dynamic correlations between cyclical components of GDP and those of macroeconomic variables, displaced from 0 to 4 quarters back to the past or to the future. These variables mainly concern export, import and domestic consumption[5], and assistance granted to the economy and public spending.

All the macroeconomic indicators considered have displayed positive correlation, thus indicating their trend to be pro-cyclical.

A positive and significantly statistical link is developed between foreign exchange and the cycle of growth with coefficients from 0.45 for import and of 0.39 for export. The pro-cyclical behaviour of these two indicators is displayed with a temporal displacement delayed by on quarter.

As to assistance granted to the economy, it is in the form of pro-cyclical relationship with the growth cycle with a correlation coefficient of 0.34. This co-movement is carried out with a temporal displacement ahead by one quarter.

The same temporal displacement is noticed at the level of domestic consumption, which equally displays pro-cyclical co-movement and a correlation of 0.23. As to public expenditure, they exhibit a pro-cyclical behaviour and a temporal displacement of one quarter ahead, but with a relatively low correlation (0.12).

	K=-4	k=-3	k=-2	k=-1	k=0	k=+1	k=+2	k=+3	k=+4	Cyclicality	Décalage chronologique

Table3: Dynamic Correlations with Quarterly GDP

	K=-4	k=-3	k=-2	k=-1	k=0	k=+1	k=+2	k=+3	k=+4	Cyclicality	Décalage chronologique
l Imports 1	0.2419	0.2252	0.2754	0.3816**	0.4356*	0.4537*	0.3859**	0.2495	0.0955	Procyclical	Retard +1
l Exports 1	0.1874	0.1629	0.2090	0.3055**	0.3675**	0.3885**	0.3439**	0.2330	0.0948	Procyclical	Retard +2
stance granted he economy2	0.2144	0.2675	0.3203**	0.3448**	0.3130**	0.2536	0.1932	0.0969	-0.0253	Procyclical	Avance -1
nal Consumption 3	0.1580	0.1997	0.2206	0.2310	0.2270	0.1848	0.1412	0.1071	0.0805	Procyclical	Avance -1
ic Expenditure 3	0.0789	0.1087	0.1202	0.1234	0.1222	0.0942	0.0673	0.0510	0.0547	Procyclical	Avance -1

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[5] Because of a shortage of quarterly data, domestic consumption was analysed through VAT revenues.
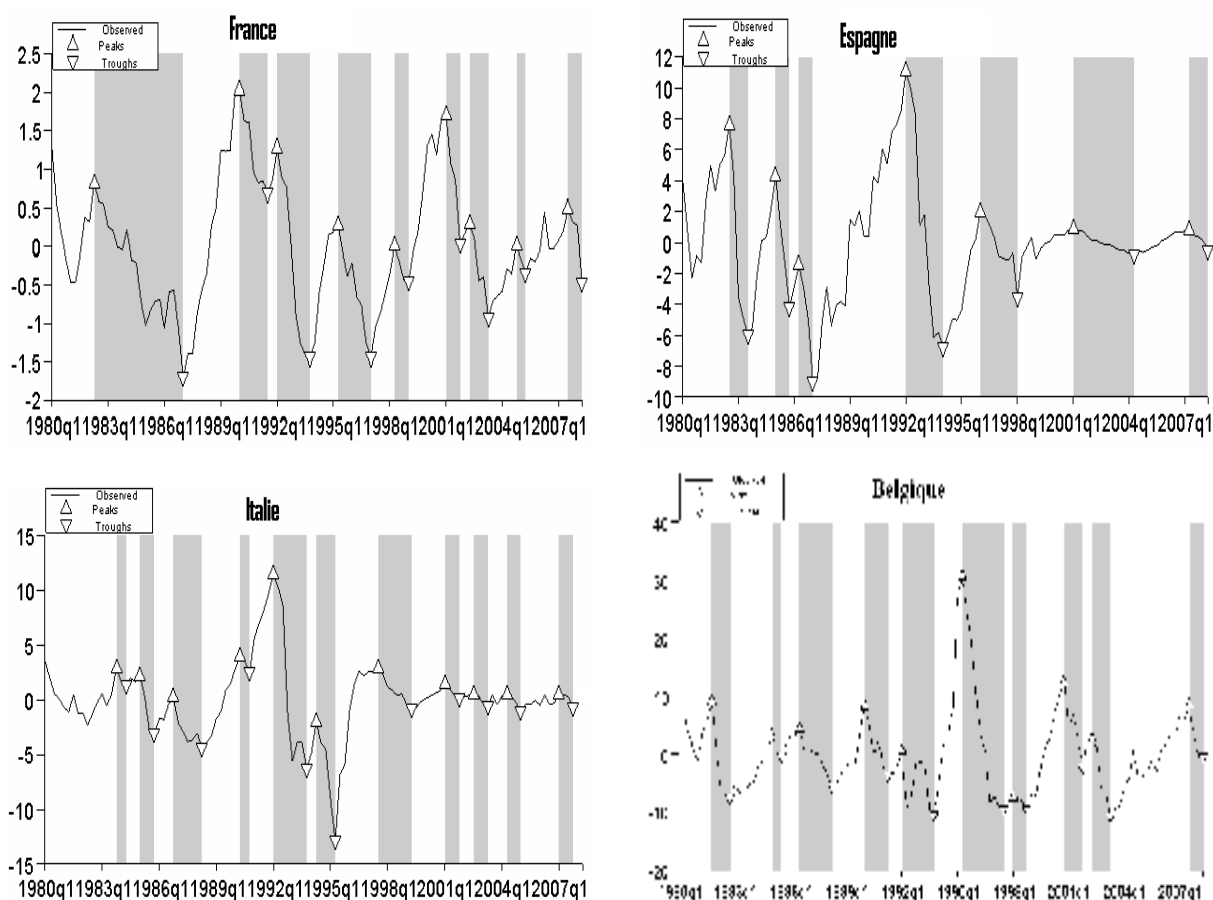
* (**) : signifiant correlation at 5% (10%).

1. The estimation is related to the period 1981Q1-2008Q2
2. The estimation is related to the period 1997Q2-2008Q2
3. The estimation is related to the period 1990Q1-2008Q2

6- Co-movement Analysis between Moroccan Cycles and those of Major partners

After highlighting the cyclicality of Moroccan economy, a question arises as to the degree of correlation with major European partners' cycles; mainly that of France, Spain, Belgium and Italy, to check whether there is a profile similarity and appreciate a potential sensitivity of the Moroccan economic activity to these countries' cyclical fluctuations.

Trend 8 (a, b, c, d): Partners' Profile Cycles [6]

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[6] The turning points of these countries are in appendix 1. The results obtained related to French cycle dating corroborates those of OECD countries. The turning points obtained are at 90 % (18/20) the same as those detected by OECD, of course allowing a difference of two quarters.

The four trends above offer an overview on profile cycles of these countries. Interesting profile similarity can be noticed during the period anterior to 2000 both at the level of form and at the nature of changes. It is also to note that an important recovery occurred in a quasi-synchronised manner in the early nineties of the last Century, with a slight delay behind Belgium.

At the beginning of 2000, volatility attenuation was noticed in Italy and Spain. This latter's profile cycle was characterised by less frequent turning points and an average life cycle (low-low of 15.8 quarters, peak-peak of 16.5 quarters) far superior than that of Italy (9.3 and 9.3 respectively), France (12 and 12.6 respectively), and Belgium (9.9 and 11.4 respectively).

Table 4: Average Life Cycles and Phases

	Expansion	Recession	Low-low	Peak-peak
France	6.4	4.4	10.7	10.8
Spain	9.6	6.7	15.8	16.5
Belgium	6.1	5.0	9.9	11.4
Italy	6.3	7.4	13.4	14.0

The following tables, representing the results of dynamic correlation, highlight the existence of a significant link between Moroccan economy's growth cycles and that of the main partners, except Italy, with which Moroccan cycle seems to display counter-cyclical behaviour and an advanced temporal slippage of 4 quarters, despite the fact that the correlation is non significant

20

In analysing its rapprochement with French, Spanish and Belgian cycles, it seems that the Moroccan cycle evolves according to a pro-cyclical behaviour, with positive correlations of 0.48 with France, 0.61 with Spain and 0.51 with Belgium. It also seems that these cycles are well ahead of Morocco by one trimester.

Table 5(a and b): Cycle Co-movement with partner countries

	k=-4	k=-3	k=-2	k=-1	k=0	k=+1	k=+2	k=+3	k=4
France	0.1004	0.2480	0.4089**	**0.4810****	0.4021**	0.2373	0.1492	0.1555	0.1987
Spain	0.2113	0.3799***	0.5520*	**0.6118***	0.4939**	0.3035***	0.1910	0.1619	0.1572
Belgium	0.2550	0.3576***	0.4675**	**0.5120***	0.4392**	0.2694	0.1583	0.1145	0.0909
Italy	-0.1644	-0.1372	-0.1047	-0.0695	-0.0342	-0.0051	0.0081	0.0263	0.0650

*, **, ***: a significant Correlation at 1%, 5%, and 10% respectively.

	Co-movement	Chronological slippage
France	Pro-cyclical	ahead -1
Spain	Pro-cyclical	ahead -1
Belgium	Pro-cyclical	ahead -1
Italy	Countercyclical (*n.s.*)	ahead -4

n.s: non significant

The fact that there is a significant correlation is due to the important flow of bilateral trade and investment exchange. This group of nations actually represents 60% of the global exchange volume and 70% of direct investment to Morocco. It is also considered the first client, supplier and partner in financial cooperation and the main provider for the Moroccan tourist market.

Conclusion

This study has tried to provide a retrospective analysis of business cycles in Moroccan economy. The main findings show that Morocco has witnessed since the beginning of the eighties eight complete business cycles and a ninth one not yet finished. This latter started at the fourth quarter of 2000 and registered since then a record of an expansion phase of 31 quarters. In addition to breaking with relatively short business cycles, another qualitative characteristic of Moroccan economy in recent years has been the notable decrease in GDP volatility. This positive context was concretised by an inflationist tension and disequilibrium on the macroeconomic fundamentals

The results have also shown that the duration and scale of expansion phases were substantially longer than those of recession and that cumulated rigour-loss during recession phase were largely compensated for by the cumulated rigour-gain during expansion phases

These stability and perenity gains are to a larger extent due to the improvement of the economic policy and the quality of institutional dispositions, which allowed Morocco to accede to "Investment Grade" rank granted by Fitch Rating Agency, to get the "Advanced Status" with the EU and be also granted a seat in the OECD Development Centre.

These gains raise, however, some questions as to their sustainability in an international context marked by an uncertainty and severe recession in the most important developing countries, following an acute financial crisis.

Many reasons can actually be put forward, which favour the consolidation of predominance of a rigour that is gain-oriented over a rigour oriented toward loss, and consequently of an attenuation of activity slowdown currently observed worldwide on national economy. The following reasons, among others, can be cited;

- Ø The effects of the long 31 quarter expansion phase which started since 2001;
- Ø The positive effects of sector-based policy operationalisation.
- Ø The cumulated effects of budgetary and fiscal policies adopted lately and those proposed in the 2009 Finance Law;
- Ø The announcement of a promising agricultural year;
- Ø The stability of the macroeconomic fundamentals with a balanced budget, leading to an increase in fiscal revenues, and a decrease in public debt. Such a stability will renew the confidence of economic operators and international partners in Moroccan economy and will favour the emergence of investment circles and job opportunities.

The consolidation of predominance of a rigour related to gain over a one that is related to loss in the short and medium term will consolidate the important role of domestic demand, to sustain some strategic sectors of national economy in difficulty and carry on reinforcing economic governance. It will also be in charge of consolidating the productive fabric on the basis of diversification, productivity, and technological innovation and valorisation of human and institutional capital

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Appendix 1: Growth cycle Dating of Moroccan Partners

	France		Spain		Belgium		Italy	
	Low	**Peak**	**Low**	**Peak**	**Low**	**Peak**	**Low**	**Peak**
	1981q2	1982q2	1980q3	1982q3	1981q1	1981q4	1982q2	1983q4
	1987q1	1990q1	1983q3	1985q1	1982q4	1985q1	1984q2	1985q1
	1991q3	1992q1	1985q4	1986q2	1985q3	1986q3	1985q4	1986q4
	1993q4	1995q2	1987q1	1992q1	1988q2	1990q1	1988q2	1990q2
	1997q1	1998q2	1994q1	1996q1	1991q2	1992q1	1990q4	1992q1
	1999q1	2001q1	1998q1	2001q1	1993q4	1995q2	1993q4	1994q2
	2001q4	2002q2	2004q2	2007q2	1997q3	1998q1	1995q2	1997q3
	2003q2	2004q4			1998q4	2000q4	1999q2	2001q1
	2005q2	2007q3			2001q4	2002q2	2001q4	2002q3
					2003q2	2007q3	2003q2	2004q2
							2005q1	2007q1
Medium life duration Peak-Low	6,4		6,5		5.0		3,9	
Medium life duration Low-Peak	6		9,7		6.1		5,4	
Medium life duration Peak-Peak	12,6		16,5		11.4		9,3	
Medium life duration Low-Low	12		15,8		9.9		9,3	

Appendix 2: Hodrick-Prescott, Baxter-King, Christiano and Fitzgerald Filtres

Hodrick-Prescott (HP), Baxter-King (BK, band-pass filter), Christiano and Fitzgerald are the filters that are widely used in trend and cycle decomposition.

HP filter is user-friendly and allows getting smooth and flexile trends. This filter estimates trend-based production by simultaneously minimising the weighed average of the conjunctural error variance and growth variance of trend-based production. Formally, the filtered cycle is a solution of the following minimizing programme

$$\sum_{t=1}^{T}(y_t - y_t^*)^2 + l\sum_{t=2}^{T-1}((y_{t+1}^* - y^*) - (y_t^* - y_{t-1}^*))^2$$

Where y* is the trend to extract and λ is the weight factor that controls the degree of the obtained trend smoothness: the more this parameter is elevated, the less the trend is sensitive to short term fluctuations and vice-versa. Hodrick and Prescott fixed three reference values: λ=14400 for monthly data, λ=1600 for a quarterly data and λ=100 for yearly data.

HP filter actually calculates a moving average on the studied cycle. This filter has, however, two disadvantages. On the one hand, mediation between the proximity of the trend-based component of the observed cycle and its smooth nature is left to the user's free choice. On the other hand, this analytical method allows some important "fringing". The filter is then symmetrical. To smooth a given point, we use anterior and posterior information to this point. At the end of the period, the filter becomes asymmetrical, thus generating a bias in the estimation of the trend.
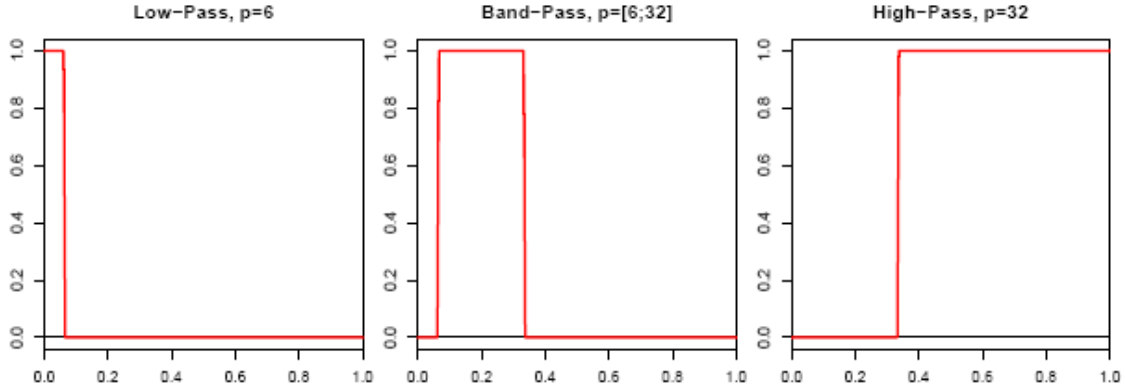
Baxter and King follow an incidental approach to define their filter. This latter associated to the intervals of frequencies (w_a, w_b) allows frequencies comprised between $w_a\,et\,w_b$, and nullifies other frequencies. Such a filter is achieved as a difference of two filters. Consequently, on the basis of economic considerations, we initially get the transfer function of this ideal filter:

$$j(e^{-iw}) = \sum_{j=-\infty}^{j=+\infty} B_j e^{-ijw}$$. It is equal to 1 if $w_a \prec w \prec w_b$ and otherwise at 0.

BK defines the cycle as a part of cycles, whose period falls within two borders, typically 6 and 32 quarters. Above high frequency, the cycle is irregular (and partly seasonal), below, it is a long term trend. As such, the cycle/trend decomposition has a filtering problem in the spectral domain, as their definition corresponds to a pass-band filter.

The high-pass filter does not allow higher frequency at a given frequency. In the following table (in abscissa, frequencies are indicated in fraction of π), underneath are answer functions for these three filters:

- ü The first filter, pass-band, allows all low frequencies at 2π/32, consequently all the components of high periods, that is to say, "trends";
- ü The pass-band filter in the middle uniquely conserves the components whose period falls within 6 and 32 quarters, thus the "cycle";
- ü The high pass filter, on the right, does not conserve high frequencies (low period) and is thus irregular;

Low-Pass, p=6   Band-Pass, p=[6;32]   High-Pass, p=32

BK's pass-band filter then extracts an initially defines the interval of frequencies and deletes the other frequencies. However, this filter requires an indefinite number of observations and is not used in treating economic cycles. BK approximation is optimal in relation to the whole set of frequencies, thus for the whole temporal cycles. Christiano and Fitzgerald (CF) propose an optimal approximation for each cycle.

The Optimality criterion retained by CF to approximate an infinite filter by a finite filter consists on minimizing the expectation of quadratic error

$$\min E\left[\left(y_t - y_t^*\right)^2 \mid \mathrm{x}\right]$$

This error is measured between y_t from the ideal filter, and y*t from the approximated filter for each t. An optical filter for each observation of the considered cycle is then determined.

The method consists then on minimizing mathematical expectations of quadratic deviation between the cycle ideally filtered and the filter approximately filtered, wherein expectation is conditional upon the available data.

The filter with a pass band proposed by Christiano and Fitzgerald has the advantage of eliminating low and high frequencies and allows to delete the completeness of the "noise" surrounding trend-based evolutions.