

**British Journal of Economics, Management & Trade**  
4(5): 769-785, 2014

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## The Effect of US Fundamentals on the Moroccan Stock Market Pre- and Post- FTA

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### Authors' contributions

*This work was carried out in collaboration between all authors. Author Abdelmounaim Lahrech carried out the methodology and analysis of the estimation. Author Sami Alabdulwahab finalized the estimation analysis, framed the conclusion and reviewed the script of the literature review and response to the auditor. Author Mounia Ammi wrote the introduction, literature review and finalized the conclusion. All authors read and approved the final manuscript.*

Original Research Article

Received 5<sup>th</sup> March 2013  
Accepted 29<sup>th</sup> November 2013  
Published 25<sup>th</sup> January 2014

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### ABSTRACT

The relationship between macroeconomics and the stock market in developed countries has been for many years the object of many studies and research. However, few studies have been conducted about emerging countries and especially in the case of Morocco there is a lack of studies in this area. Therefore, this paper will be the first to analyze the impact of US fundamentals, including industrial production, real money supply and the S&P 500 on Moroccan stock prices before and after the Free Trade Agreement (FTA) signature. This study enables us to reduce the gap between the theoretical framework and research conducted for other countries. Our results showed that US macro fundamentals have a slight impact on the Moroccan stock market after the signature of the FTA and that US industrial production in particular highly influences the Moroccan index compared to the other variables studied.

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*Keywords: Trade agreement; stock market; emerging countries.*

## **1. MOTIVATION AND BACKGROUND**

Because the stock markets play a crucial role in the market based system, they should reflect all the changes on the economy. In fact, financial markets serve as a conduit for the flow of resources from savers to borrowers hence they are vital for economic development.

[1] states that stock price should incorporate all information and the future predictions about the forthcoming performance of the company. However, the performance of each company is strongly influenced by the level of the economy. Taking this influence into consideration, policy makers should analysis the relationship between stock prices and macroeconomics variables.

As globalization increases, financial markets become more integrated than before. First, we will define the concept of integration. The integration of financial markets is the harmonization of markets that can be boosted by free access to different markets and level of capital mobility. The evolution of this process depends on the particular situation in each individual country. According to [2], there are four different types of constraints that can discourage investors from investing in emerging markets. Those four constraints are legal constraints, differences in accounting standards, instability of the political situation and economic policy. The growing trend toward integration is motivated by deregulation and globalization. As a result of financial crises in recent days, central banks all over the world are trying to improve the financial markets in order to be protected. Deregulation in emerging markets has resulted in the removal of constraints on pricing of many financial assets.

However, it is appropriate to notice the difference between the concepts of liberalization and integration. Stock market liberalization is the decision of a country's government which gives the right to foreign investors to invest in that country's stock markets, according to [3]. For example, a country can implement a law which stipulates the removal of all the barriers to foreign investors. On the other hand, this liberalization cannot be efficient if it does not ease market integration.

Market integration is very important to develop market efficiency and promote economic growth. In addition, it is mainly used by government to communicate important price signals. Also, it is a channel between domestic savings and domestic investment.

Recently, countries all over the world, including Morocco, have engaged in a policy for economic integration and liberalization. In fact, Morocco officially liberalized and opened its equity market to international investors in June 1988 and the first American Depositary Receipt (ADR) was issued in April 1996. In the same year, Morocco established new capital market laws which intend to encourage private investment and increase investor protection. Furthermore, the laws improve the banks' role in stimulating and boosting capital markets by the creation of mutual funds. In 2003, Morocco signed a free trade agreement with the United States which came into force on January 1, 2006. The main objective of this agreement was to encourage mutual economic, political and social relationships to help Morocco to become one of the most developed countries in the Arab world.

Morocco is an emerging country situated in a strategic location between Africa and Europe. Morocco is the first African and the second Arab country after Jordan to sign an agreement with the United States. In 2003, Morocco traded 0.82 billion dollars with United States. On

the other hand, Morocco traded more than 15 billion dollars with the European Union (EU) in 2003. In 2007, the total trade between Morocco and United States reached 2.19<sup>1</sup> billion dollars. Exports between Morocco and United states have not changed pre and post the trade agreement. Imports increased from 0.57 billion dollars in 2003 to 1.8 billion dollars in 2007. Furthermore, exports increased from 0.24 billion dollars in 2003 to 0.36 billion dollars in 2007 (Appendix A1). The exports consist mainly of agricultural products, such as processed vegetables, olive oil, and essential oils.

Morocco signed a free trade agreement (FTA) with many other countries, including the Euro-Mediterranean free trade area agreement with the European Union and the Agadir Agreement that was signed with Tunisia, Jordan and Egypt. The objective of this trade agreement was to establish the Greater Arab Free Trade Area. Also, Morocco signed a free trade agreement with Turkey.

[4] concludes that FTAs between industrial and emerging economies are expected to have important effect on emerging economies in general. This can be explained by the dependence of emerging economies on trade and less regulated markets. Since the 1960s, Morocco's industrial sectors have been very specialized, relying principally on goods exported to the European market.

Moroccan exports to the United States have increased under the FTA. In 2008, exports more than doubled compared to 2005 which increased from 0.27 billion dollars to 0.69 billion dollars. However, the financial crisis has affected worldwide trade and has resulted in a decrease of Morocco's US sales. On the other hand, Moroccan agricultural exports to the US increased by 30 percent. The increase in the level of trade and investment between the two countries will contribute to their respective economies and their financial markets. In addition, there is a greater possibility that the countries will become more integrated. In 1960, Greek economist Béla Balassa developed a theory indicating that the increase in trade between two or more countries will lead to an increase in their GDP and welfare.

## **2. LITERATURE REVIEW**

In recent studies, the relationship between stock returns fluctuations and macroeconomics variables has been proven by many research studies [5,6,7,8,9,10,11,12,13,14,15].

[16] used a multivariate arbitrage pricing theory (APT) to analyze the relationship between the market returns and macroeconomic factors, especially the impact of risk related to the different factors on the asset's return. Their study included data of industrial production, the money supply, inflation, interest rate and exchange rate variables. They found a strong relationship between the market returns and those variables. Also, [17] studied the impact of economic news during different economic stages. They discovered that the reactions of the stock market depend mainly on the state of the economy.

[18] conducted a study to investigate the linkage between the Greek stock market and 18 variables between 1980 and 1992. They found that there is an important relationship between stock returns and 13 out of the 18 variables. Also, [19] studied the relationship between the stock returns and five macroeconomic variables for the ASEAN-5, which includes Indonesia, Malaysia, the Philippines, Singapore and Thailand. Their result showed that money growth was the main macroeconomic variable that impacted the Asian stock

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<sup>1</sup> *Direction of Trade (DOT) IMF data*

return in Malaysia, Singapore and Thailand. Furthermore, [20] studied the linkage between macroeconomic variables and the Indian stock market and to what extent the removal of economic constraints impacted that linkage. They found that the main variables that generated the changes in the Indian stock market are the NASDAQ-index, the foreign direct investment and inflation. However, the results showed that the nominal exchange rate has no impact on the Indian stock price during the period of post-liberalization, in respect to the pre-liberalization period (1989-1995) where the nominal exchange rate had a major impact on the Indian stock market.

In analyzing the effect of macroeconomic variables on stock market returns, studies have been focusing on particular variables for example the inflation and exchange rate. [9] argued that most economic variables except inflation have a positive correlation on stock returns. Furthermore, [21] found that inflation and money supply are the two significant variables affecting stock returns in their study. Also, [22] proved a positive relationship between money supply and GDP on stock returns. [23] found that inflation is fundamental among exchange rate, interest rates and money supply on affecting stock returns in the Asian crisis. On the other hand, [24] found that inflation has a negative impact on stock returns. Other studies have proven the linkage and the importance of macroeconomic variables on stock returns [25,26,27]).

Studies also have shown that globalization and interaction among economies have been increasing. Thus, stock markets are not only affected by their host country's macroeconomics variables but also by other economies' macroeconomics variables. [28] found that European stock markets are more directly influenced by changes in the US than in Japan economies. [29] found that changes in the exchange rates of Japanese Yen and Hong Kong Dollars have an impact on stock returns in the Singapore stock market. [30] have found that French and Japanese exchange rates have a significant impact on US stock returns. Furthermore, [31] studied the linkage between macroeconomic variables and Asian stock returns. He found that oil prices and inflation have a significant impact on the Asian stock market. [32] explored the impact of both US and Canadian macroeconomics variables on the Canadian stock returns. The results showed that this impact is mainly explained by the business cycle.

However, there are studies which find either a minimal effect of macroeconomics variables on stock returns or an insignificant effect. [33] examined the relationship between stock indices and a number of macroeconomic variables (e.g., industrial production, money supply, interest rates, and exchange rates) for the UK, Germany and Switzerland. The result showed that there were no very significant effects of macroeconomics fundamentals on stock returns. Furthermore, [34] found that the changes in money supply and domestic production have no impact on the stock returns in Korea. [35] analyzed the impact of oil price and exchange rates for India, Russia, China and Brazil on the Indian stock returns. He found no significant linkage between those variables and stock returns.

A Free Trade Agreement (FTA) can slant the economic activity toward a small economy if this trade agreement has been signed between countries with a small and large economy respectively [36]. Also, the integration of higher economies will spillover on markets integration [37]. [38] showed that the trade agreements signed between members of the European Union have had an impact on their economies. This impact can be expressed through income convergence among those signed countries. Since a FTA will have an impact on the macroeconomics variables, thus the stock market will be affected by that impact. [39] analyzed the impact of the signature of the trade agreement between Jordan

and US. They found that the agreement has increased the markets' linkage between the two countries. Other studies have argued that the strength of linkage is different from one country to another, according to [40]. Also, the free flow of capital between countries will result in the integration of emerging markets. However, this integration lowers the opportunity of diversification among those integrated markets [41]. [42] studied the linkage between the Moroccan and the US equity markets after the signature of the FTA in 2004. Their results indicated that the US and Moroccan stock markets were not significantly related at the moment of the signature and establishment of the free trade agreement. Therefore, will US macroeconomics variables have an impact on the Moroccan stock market even if there is no significant linkage between their stock markets? This question can be answered by investigating the period before and after the FTA signature. If the result shows no change in both periods, this will prove that the FTA has no effect on the Moroccan stock market. Otherwise, the results will prove the effect, and investors can predict the direction of the Moroccan stock market by paying attention to US economy.

### **3. MODEL SPECIFICATION**

#### **3.1 Money Supply**

The relationship between money supply and stock returns was developed by [43]. They argued that an increase in prices can be explained by the fact that money supply increases (M2). This will inject more money into circulation and thus the demand on securities will increase. Increasing the demand on securities will raise the prices of those securities. However, [10] stated that an increase in (M2) will result in an increase in the price level, and thus will raise the discount rate and stock returns will decrease. Moreover, an increase in the price level will encourage investors to sell their securities and other assets which explain the decline of securities and assets prices. Furthermore, [44,45] found an important relationship between the stock return and price level. On the other hand, [46,47] in their study found no relationship between the variables stated above.

#### **3.2 Industrial Production**

There is a positive relationship between the industrial production and stock returns, according to [48]. Moreover, an increase in industrial production will reflect the increase in corporations' profit, growth of the economy and consequently a higher dividend that will lead to an increase in share prices. [10,13] found a significant relationship between industrial production and stock returns.

#### **3.3 Consumer Price Index**

Many studies have found a significant relationship between inflation and stock returns. Moreover, the relationship between stock returns and inflation has been negative, according to studies by [49,50,51]. Furthermore, an increase in the CPI will lead to decrease the real interest rate thus the investment decision will slant toward more investment and that will increase the return.

### **4. METHODOLOGY**

There are many methods to analysis the relationship between macroeconomics variables and stock returns. One of these methods is Vector Auto regression (VAR). [52] used VAR to

investigate the impact of a variation of the money supply on a variation in the stock market index. This method has strength in analyzing the effect of variable on other variable. Another method is Vector Error Correction Model (VECM). [20] used VECM to analyze the association between the inflation, money supply, exchange rate, real economic activity, long-term government bond rate and the Japanese stock market. This method can be used to find the deviation of the relationship from long-run state. Another method is Autoregressive Conditionally Heteroscedastic (GARCH). [42] used (GARCH) to study the linkage between the Moroccan and the US equity markets after the signature of the free trade agreement in 2004. This method will model the variation in one variable to spillover to other variables. Finally, from these three methods we will use [53] because it will give us more relevant estimators of co integrating vectors. Also, in this paper we will use Johansen's test where all variables are transformed into (5) VECM and takes the form of

$$\Delta Y_t = C + \Pi Y_{t-k} + \Gamma_1 \Delta Y_{t-1} + \Gamma_{t-2} \Delta Y_{t-2} + \dots + \Gamma_{k-1} \Delta Y_{t-k+1} + \varepsilon_t \dots\dots\dots (1)$$

Where:

$$Y_t = C + \sum_{i=1}^k B_i Y_{t-i} + \varepsilon_t, \quad t=1,2,\dots \dots\dots\dots (2)$$

And:

$$\Gamma_i = \sum_{j=1}^i B_j - I_p, \quad \Pi = \sum_{i=1}^k B_i - I_p, \quad \dots\dots\dots\dots (3)$$

In addition, we have:

- I: the identity matrix
- $\Delta$ : difference operator

Johansen suggests two tests statistics for co integration: the maximum eigenvalue and the trace statistics

The maximum eigenvalue's equation

$$\lambda_{\max}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1}) \dots\dots\dots\dots (4)$$

The maximum eigenvalue's hypothesis

- HO: There are r co-integrating vectors
- H1: There are r+1 co-integrating vectors

The trace statistics' equation

$$\lambda_{\text{trace}}(r) = -T \sum_{i=r-1}^p \ln(1 - \hat{\lambda}_i) \dots\dots\dots\dots (5)$$

The trace statistic's hypothesis

- HO: The number of co-integrating vectors is less or equal to r
- H1: The number of co-integration vectors is superior to r

In this section of the paper the Augmented Dickey-Fuller (ADF) is used in order to find the order of integration of the time series.

## **5. DATA**

We will use monthly data from January 2000 to December 2009. Data on money supply, industrial production, and price level are available on [www.EconStats.com](http://www.EconStats.com). Also, we need the Moroccan stock market price index in US dollar which is available on the Casablanca stock exchange website<sup>2</sup>. In addition, the US stock index (S&P500) can be found on Econ Stats. All variables are in natural logarithm form. The logic behind taking the sample period between 2000 and 2009 is that on 2004 the free trade agreement between the US and Morocco was signed, and we want to evaluate the impact of this agreement. Thus, we will use data before and after 2004. We used Production index as a proxy for GDP because GDP is not available in monthly based. Also, Production index is a good proxy for GDP since it is highly the two are highly correlated. Furthermore, we used M2 instead of M1 because in the last 20 years there has been a significant link between M2 and economic spending due to technological innovations in banking system. Thus make it much easier to transfer saving assets that are part of M2 into checking accounts to be used for spending.

## **6. EMPIRICAL RESULTS**

Taking into consideration the important impact of the signature of the FTA on the economy of Morocco, the objective of this study is to investigate the degree of the impact of US fundamentals on Moroccan stock markets before and after June 15, 2004 which represents the date of the conclusion of the FTA.

The first step is to perform unit root test using ADF (Augmented Dickey-Fuller) which is applied on the variables in levels and first differences in order to find out the order of integration of the variables and to ensure that they are integrated in the same order.

Table 1 and Table 2 present the findings for the unit root tests for pre and post FTA period. The analysis is carried over the sub-periods of pre-FTA and post-FTA.

From Table 1 and Table 2, we can conclude that all variables are non-stationary since the ADF statistics are not statistically significant. Then we perform the test on first difference to make sure that all variables are integrated in level one. Table 3, Table 4, Table 5 and Table 6 show the results that have been generated from ADF test for the period pre and post FTA to conclude that all variables are stationary and integrated of order one. Since we are using the co-integration procedure, all variables need to be integrated of the same order, which here is order one.

### **6.1 Co-integration**

The long run equilibrium relationships represent an important component of the economic theory. In fact, the majority of those econometric studies involving time series are based on the assumption of stationary. In order to attain this assumption two conditions are necessary. First, all trends should be removed and eliminated from the data. Second, all stationary series must have a constant mean and variance. Another important concept of co-integration

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<sup>2</sup><http://www.casablanca-bourse.com/bourseweb/en/index.aspx>

is the attractor, which stipulates that two variables can diverge in the short run, but in long run they should converge to a specific area called the attractor region.

Moreover, co-integration simply stands for the correlation between variables whereas spurious regression stipulates that actually there is no correlation among variables. For instance, if there are two variables and there is a linkage between them, then the series of residuals in the short and long run will be the same. Thus, the two variables are considered co-integrated. However, if the residuals follow a random path, then the two variables are not co-integrated.

In this section we use the method proposed by [53,55,54] to test for the existence of the co-integrating vector for the two variables of the Moroccan composite index MASI and the US composite index S&P 500 in the pre-FTA subperiod. All co-integration tests contain an intercept and a linear trend.

Both the Trace and the Max-eigenvalue tests indicate no co-integrating equation in the pre-FTA period. We conclude that in the pre-FTA period there is no co-integration between MASI and S&P500.

**Table 1. Unit root tests using ADF (Null hypothesis: Unit root) Pre FTA**

Masi	Money Supply	CPI	S&P 500	Industrial Production
-0.94	ADF-Level -1.33	-0.13	-1.69	-2.43
-3.20**	ADF-First Difference -3.02	-3.59	-3.98**	-3.41**

Note: The MacKinnon critical values at 1%, 5% and 10% levels are: -3.48;-2.88;-2.57 .Significance at a 1% and 5% level is denoted by \*\* and \* respectively

**Table 2. Unit root tests using ADF (Null hypothesis: Unit root) Post FTA**

Masi	Money Supply	CPI	S&P 500	Industrial Production
-1.81	ADF-Level -0.66	-1.21	-2.20	-2.11
-4.03**	ADF-First Difference -3.17	-3.99	-3.33**	-2.82**

Note: The MacKinnon critical values at 1%, 5% and 10% levels are: -3.48;-2.88;-2.57 .Significance at a 1% and 5% level is denoted by \*\* and \* respectively.

**6.1.1 Co-integration between MASI and S&P500**

**Table 3. Trace statistic Pre FTA**

Null hypothesis	Alternative hypothesis	Trace statistic		Critical value at 1%
		t-Statistic	Critical value at 5%	
None	$r \geq 1$	5.23	15.14	20.04
At most 1	$r \geq 2$	0.00034	3.76	6.65



**Table 4. Maximum eigen value tests Pre FTA**

Null hypothesis	Maximum eigen-value			Critical value at 1%
	Alternative hypothesis	t-Statistic	Critical value at 5%	
None	$r \geq 1$	5.24	14.07	18.63
At most 1	$r \geq 2$	0.00034	3.76	6.65

**Table 5. Trace statistic Post- FTA**

Null hypothesis	Maximum eigen-value			Critical value at 1%
	Alternative hypothesis	t-Statistic	Critical value at 5%	
None	$r \geq 1$	21.80	15.14	20.04
At most 1	$r \geq 2$	3.41	3.76	6.65

**Table 6. Maximum eigen value tests Post- FTA**

Null hypothesis	Maximum eigen-value			Critical value at 1%
	Alternative hypothesis	t-Statistic	Critical value at 5%	
None	$r \geq 1$	18.39	14.07	18.63
At most 1	$r \geq 2$	3.41	3.76	6.65

### **6.1.2 Co-integration between MASI and US macroeconomic fundamentals**

In this section we will check whether there is a long-run association between MASI and US macroeconomic fundamentals in the post-FTA period. Specifically, we want to analyze the impact of US macroeconomic fundamentals on the MASI after the signature of the free trade agreement.

Table 7 shows the Trace test that indicates two co-integrating equations at the 5% level and one co-integrating equation at the 1% level. Table 8 shows the Max-eigenvalue test that indicates two co-integrating equations at the 5% level and one co-integrating equation at the 1% level. These results clearly show that there are long-run relationships between the Moroccan stock price MASI, and US macroeconomic fundamentals, namely industrial production, consumer price index, money supply and the US stock market.

**Table 7. Trace statistic Post- FTA (Co-integration between MASI and US fundamentals)**

Null hypothesis	Trace statistic			Critical value at 1%
	Alternative hypothesis	t-Statistic	Critical value at 5%	
None	$r \geq 1$	15.85	15.41	20.04
At most 1	$r \geq 2$	0.68	3.76	6.65
At most 2	$r \geq 3$	24.93	29.68	35.65
At most 3	$r \geq 4$	10.77	15.41	20.04
At most 4	$r \geq 5$	2.82	3.76	6.65

**Table 8. Maximum eigen value tests Post- FTA (Co-integration between MASI and US fundamentals)**

Null hypothesis	Maximum eigen value		Critical value at 1%	
	Alternative hypothesis	t-Statistic		Critical value at 5%
None	$r \geq 1$	53.97	33.46	38.77
At most 1	$r \geq 2$	22.81	27.07	32.24
At most 2	$r \geq 3$	14.15	20.97	25.52
At most 3	$r \geq 4$	7.95	14.07	18.63
At most 4	$r \geq 5$	2.822	3.76	6.65

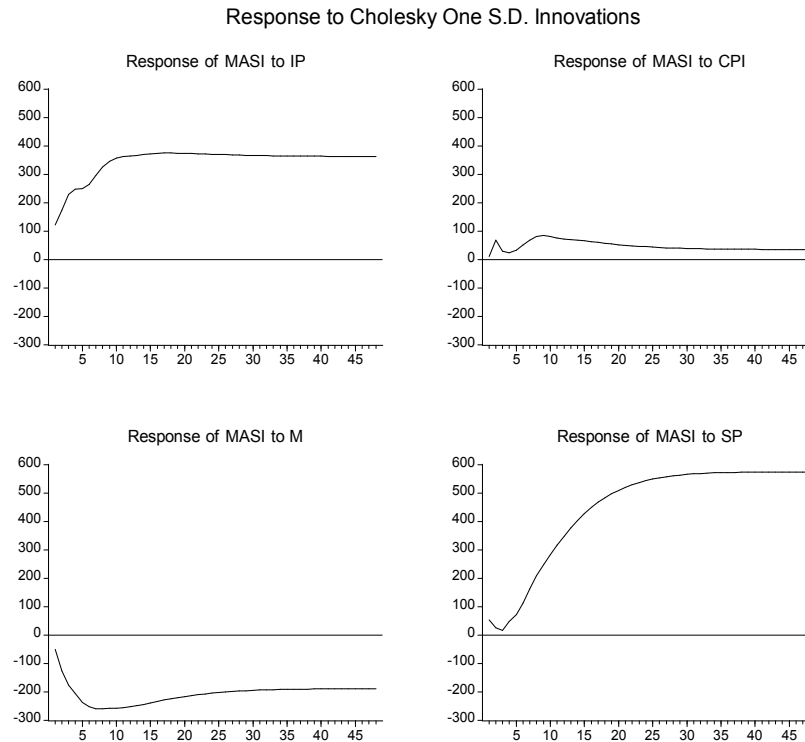
### **6.1.3 Impulse responses in the post-FTA period**

Before starting to analyze the results of the impulse responses we will present some reasons that explain the impact of foreign fundamentals on domestic stock price. According to [56] two major models can explain this impact:

“[57] employed ‘The general equilibrium multi country model’ which stipulates that domestic production is impacted by foreign production”.

“The consumption-based model developed by [5] shows that stock prices are influenced by income. Thus, according to these two propositions domestic stock price is mainly influenced by foreign production”.

Since trade share between Morocco and the US has increased in the post-FTA period, we suppose that US production will affect Moroccan production and so affect the Moroccan stock price. We observe that Moroccan stock price is influenced by US industrial production shocks in the post-FTA period that can be seen in Fig. 1. The Moroccan stock price reacts positively to consumer price index shocks and S&P500 shocks. One explanation of this is that both an increase in CPI and S&P 500 may signal an increase in demand in the US market which positively affects the US industrial production and hence the Moroccan industrial production. From the results we also observe that the Moroccan stock price reacts negatively to money supply shocks. One explanation of this is that an increase in money supply will decrease the short-term interest rate which leads to an increase in stock price and hence the Moroccan stock price.



**Fig. 1. Presents the impulse responses of the Moroccan stock price to shocks in US macroeconomic fundamentals over the post-FTA period. The impulse responses are calculated from a  $2^3$  lag-vector error correction model (VECM (2)) with one cointegrating equ**

#### **6.1.4 Variance decomposition in post-FTA period**

In this section we analyze variance decompositions for the Moroccan stock price after the signature of the FTA. The main objective of variance decomposition is to provide the information each variable participates to the other. In other words, what are the US fundamentals that particularly affect Moroccan stock price?

Table 9 gives the variance decomposition for the Moroccan stock price for 6, 12, 24, 36 and 48-month-ahead forecast error variance. Results from 48-month-ahead forecast error variance shows that about 58.38% of the Moroccan stock price variation is due to its own shocks and about 4.62% is explained by US macroeconomic fundamentals in the post-FTA period. Moreover, industrial production explained about 24% of the variation in the Moroccan stock price and only 12.75 % of the variation is explained by S&P500<sup>4</sup>. This clearly explains that it is the US real economic activities, not the financial system, that mostly affect the Moroccan equity market in the long-run, which really makes sense since the Moroccan financial market is not well integrated in the world financial market.

<sup>3</sup> Based on AIC criteria.

<sup>4</sup> The correlation between S&P 500 and MASI for per days of trade in monthly data is 0.34 which is low and that explains the minimal effect of S&P 500 on MASI.

**Table 9. Variance decomposition for the Moroccan stock price for 6, 12, 24, 36 and 48-month-ahead forecast error variance**

Months	S.E	Industrial production	Consumer price index	Money supply	S&P 500	MASI
6	2.24	11.11	0.36	8.16	0.90	79.45
12	5.12	14.09	0.62	8.69	6.48	70.09
24	10.22	13.87	0.31	6.37	16.92	62.39
36	14.02	13.14	0.31	5.18	21.75	59.61
48	17.03	23.99	0.25	4.61	12.75	58.38

## 7. CONCLUSION

This study has analyzed the effect of four macroeconomic fundamentals, specifically industrial production, consumer price index, money supply and finally S&P500 on the Moroccan Stock Exchange. The paper was based on data from the period 2000 until 2009. Since we are dealing with time series data, the first step was to test for stationarity. According to the ADF test, all the first differences are stationary and integrated of order one. Moreover, we used co-integration analysis, especially the VAR Johansen's protocol in order to investigate the long-run relationship between US fundamentals and the Moroccan Stock Market Index (MASI). The result shows at first the existence of a co-integration vector between MASI and S&P 500 after the signature of the FTA. On the other hand, during the period pre-FTA there was no co-integration between those two indexes. Furthermore, we have conducted a co-integration test between US macroeconomics variables (e.g. money supply, industrial production and price level) and the Moroccan stock index, and the result shows a positive relationship among MASI and US macroeconomics variables. Thus, we can notice that our findings are similar to [58] who found that German fundamentals have an important effect on the Switzerland market, and moreover [32] who suggested that US fundamentals' impact on the Canadian stock markets was closely influenced by the stage of the business cycle. Nevertheless, this finding can be explained by Table 10. The total trade between US and Morocco has increased doubly post-FTA relatively to pre-FTA. Increasing the trade will increase the linkage between the two economies. Thus the macroeconomics variables in the two economies will be affected by each other. In our case, Morocco's economy will be affected the most since Morocco's economy is a small economy in comparison to the US economy.

**Table 10. Total Trade between Morocco and USA (Billions of dollars)<sup>5</sup>**

Years	1980-1984	1985-1990	1991-1994	1995-1999	2000-2004	2005-2009	2010-2012
Total trade	1.820	2.137	3.186	3.900	4.274	9.836	11.589

However, in order to gain better insight into what specific macroeconomic variable among the four has the highest impact, we analyzed variance decompositions for the Moroccan stock price index in the post-FTA period. From variance decomposition we can conclude that MASI reacts positively to all variables except money supply. Moreover, industrial production explained about 24% of the variation in the Moroccan stock price, and only 12.75 % of the variation is explained by S&P500.

<sup>5</sup> Direction of Trade DOT-IMF eLibrary

## **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

## **REFERENCES**

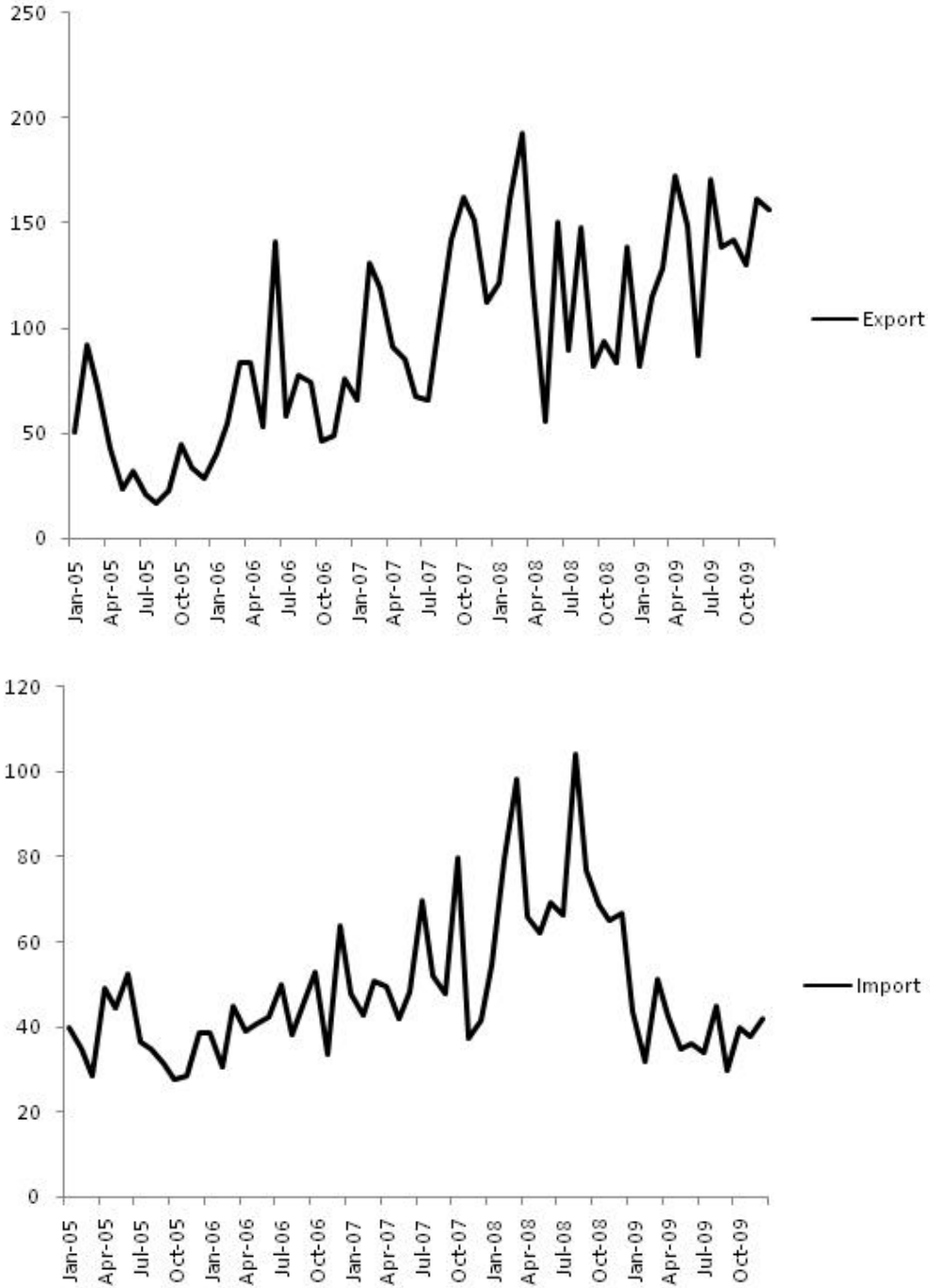
1. Fama EF. Efficient Capital Markets: A Review of Theory and Empirical work. *Journal of Finance*. 1970;25(2):383-417.
2. Bekeart G. The time Variation of Expected Returns and Volatility in Foreign-Exchange Markets. *Journal of Business and Economics Statistic*. 1995;13(4):397-408.
3. Henry PB. Stock Market Liberalization, Economic Reform, and Emerging Market Equity Prices. *Journal of Finance*. 2000;55(2):529-64.
4. Panagariya A. EU preferential Trade Arrangements and Developing Countries. *The World Economy*. 2002;25(10):1415-1432.
5. Balvers RJ, Cosimano TF, McDonald B. Predicting Stock Returns in an Efficient Market. *Journal of Finance*. 1990;45 (4):1109-1128.
6. Barro RJ. New classical and Keynesians, or the Good Guys and the Bad Guys. *Swiss Journal of Economics and Statistic*. 1989;125(3):263-273.
7. Barro RJ. The Stock Market and Investment. *Review of Financial Studies*. 1990;3(1):115-131.
8. Cosharne JH. Volatility tests and efficient markets: A review essay. *Journal of Monetary Economics*. 1991;27(3):463-485.
9. Fama EF. Stock Returns, Real Activity, Inflation and Money. *American Economics Review*. 1981;71(4):545-565.
10. Fama EF. Stock Returns, Expected Returns and Real Activity. *Journal of Finance*. 1990;45(4):1089-1108.
11. Fama EF, French KR. Business conditions and expected returns on stocks and bonds. *Journal of Financial Economics*. 1989;25:23-49.
12. Fama EF, Ruback RS, Schwert GW. Effects of nominal Contracting on Stock Returns. *Journal of Political Economy*. 1983;91(1):70-96.
13. Geske R, Roll R. The monetary and fiscal linkage between stock returns and inflation. *Journal of Finance*. 1983;38:1-33.
14. Lee BS. Causal relations among stock returns, interest rates, real activity, and inflation. *The Journal of Finance*. 1992;47:1591-1603.
15. Schwert WG. Stock Returns and Real Activity: A Century of Evidence. *Journal of Finance*. 1990;45(4):1237-1257.
16. Chen N, Roll R, Ross S. Economic forces and the stock market. *Journal of Business*. 1986;59:383-403.
17. McQueen G, Roley V. Stock Prices, News and Business Conditions. *Review of Financial Studies*. 1993;6:683-707.
18. Diacogiannis GP, Tsiritakis ED, Manolas GA. Macroeconomic factors and stock returns in a changing economic framework: The case of Athens stock exchange. *Managerial Finance*. 2001;27(6):23-41.
19. Wongbangpo P, Sharma SC. Stock market and macroeconomics fundamental dynamic interactions: ASEAN-5 countries. *Journal of Asian Economics*. 2002;13(1):27-51.
20. Mukhopadhyay D, Sakar N. Stock returns and macroeconomic fundamentals in model specification framework: Evidence from Indian stock market. *Indian Statistical Institute, Economic Research Unit, ERU 2003-2005 Discussion Paper*. 2003;1-28.

21. Abdullah DA, Hayworth SC. Macro econometrics of stock price fluctuations. *Quarterly Journal of Business and Economics*. 1993;32:46-63.
22. Habibullah MS, Baharumshah AZ. Money, Output and Stock Prices in Malaysia: An Application of the Cointegration Tests. *International Economics Journal*. 1996;10(2):121-130.
23. De Santis G, Gerald B. International Asset Pricing and Portfolio Diversification with Time-varying Risk. *Journal of Finance*. 1997;52:881-1912.
24. Ibrahim MH. Macroeconomic variables and stock prices in Malaysia: An empirical analysis. *Asian Economic Journal*. 1999;13(2):219-231.
25. Maysami RC, Koh TS. A Vector Error Correction Model of the Singapore Stock Market. *International Review of Economics and Finance*. 2000;9(1):79-96.
26. Islam M, Watanapalachaikul S. Time series financial econometrics of the Thai stock market: a multivariate error correction and valuation model. Paper presented to Global Business and Economic Development, Asian Institute of Technology, Bangkok, Thailand; 2003.
27. Pisedtasalasai A, Gunasekarage A, Power DM. Macroeconomic Influence on the Stock Market: Evidence from an Emerging Market in South Asia. *Journal of Emerging Market Finance*. 2004;3(3):285-304.
28. Arshanapal AH, Doukas LA. On the Kolmogorov-Smirnov tests for normality with mean and variance unknown. *Journal of the American Statistical Association*. 1993;62:399-402.
29. Yu Q. Stock Prices and Exchange Rates: Experience in Leading East Asian Financial Centers: Tokyo, Hong Kong and Singapore. *Singapore Economic Review*. 1997;4:47-56.
30. Li Lian Ong, Izan HY. Stock and Currencies: are they related? *Applied Financial Economics*. 1999;9(5):523-532.
31. Song-zan-chiou-wei. The Financial Integration of Asian Market Revisited. *Journal of Environment and Management*. 2000;2(2):177-188.
32. Lahrech A. The Impacts of US and Canadian Fundamentals on Canadian Stock Market. *Journal of Money, Investment and Banking*. 2009;7:1450-288.
33. Wasserfallen W. Macroeconomic news and the stock market. *Journal of Banking and Finance*, 1989;13(4/5): 613–626.
34. Fung H, Lie C. Stock Market and Economic Activities: A Causal Analysis. In *Pacific-Basin Capital Markets Research II*, Amsterdam: Elsevier Science Publishers; 1990.
35. Gay D. Effects of Macroeconomic Variables on Stock Market Returns for Emerging Economies: Brazil, Russia, India and China. *International Business and Economic Research Journal*. 2008;7(3):1-8.
36. Abou-Zaid AS, Alabdulwahab S. NAFTA and sources of real exchange rate fluctuations in North America. *International Journal of Sustainable Economy*. 2013;5(3):239-267.
37. Eun C, Shim S. International transmission of stock market movements. *Journal Financial and Quantitative Analysis*. 1989;24:241–256.
38. Ben-David D. Equalizing Exchange: Trade Liberalization and Income Convergence. *Quarterly Journal of Economics*. 1993;108:653–679.
39. Maghyereh A, Al-Zuobi H. Free trade agreements and equity market integration: the case of the US and Jordan. *Applied Financial Economics*. 2005;15(14):955-1005.
40. Darrat AF, Elkhal K, Hakim SR. On the Integration of Emerging Stock Markets in the Middle East. *Journal of Economic Development*. 2000;25(2):119-129.
41. Syriopoulos S. International portfolio diversification to Central European stock markets. *Applied Financial Economics*. 2004;14(17):1253-1268.

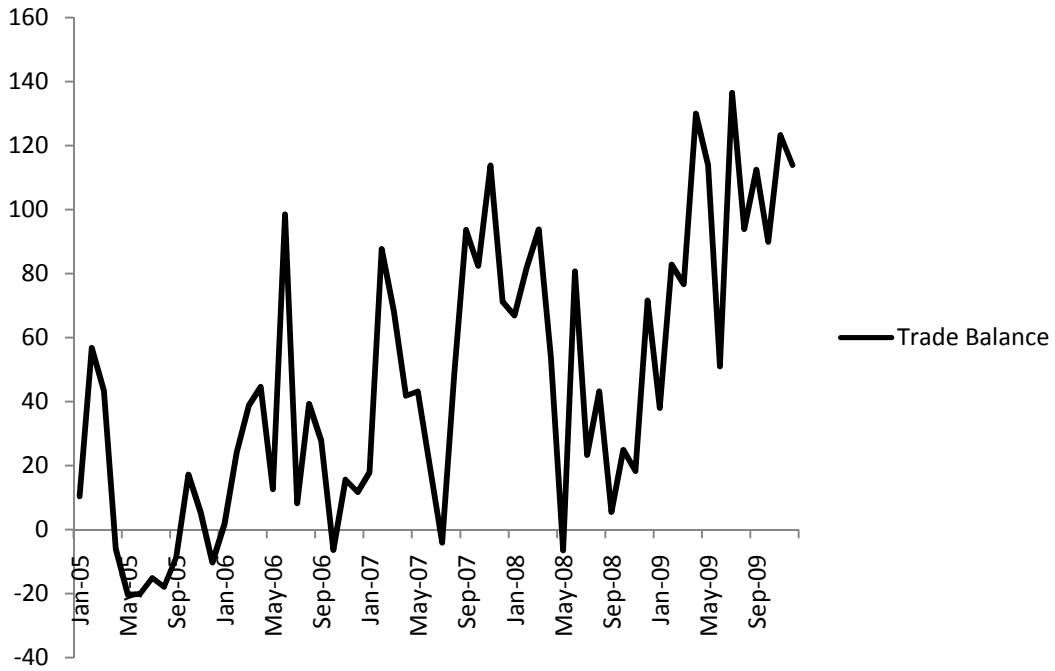
42. Boujir A, Lahrech A. Morocco and US Equity Markets linkage after FTA signature for International Portfolio Diversification. *International Research journal of Finance and Economics*. 2008;21:112-123.
43. Friedman M, Schwartz AJ. *A Monetary History of the United States. 1963;1867-1960*. Princeton: Princeton University Press.
44. Kraft J, Kraft A. Determinants of Common Stock Prices: A Time Series Analysis. *Journal of Finance*. 1977;32 (2):417-425.
45. Hamburger MJ, Kochin LA.). Money and Stock Prices: The Channels of Influences. *The Journal of Finance*. 1972;27(2):231-249.
46. Cooper R. Efficient capital markets and the quantity theory of money. *Journal of Finance*. 1974;29(3):887-908.
47. Nozar H, Taylor P. Stock Prices, Money Supply and Interest Rates: The Question of Causality. *Applied Economics*. 1988;20:103-161.
48. Tainer RH. Does inflation depress the stock market? *Federal Reserve Bank of Philadelphia, Business Review*. 1993;1991:3-12.
49. Kryzanowski L, Zhang H. The Contrarian Investment Strategy does not Work in Canadian Markets. *Journal of Financial and Quantitative Analysis*. 1992;27:383-395.
50. Chan KC, Chen N, Hsieh DA. An exploratory investigation of the firm size effect. *Journal of Financial Economics*. 1985;14:451-471.
51. Chen SJ, Jordan B. Some Empirical Tests in the Arbitrage Pricing Theory: Macro-variables vs. Derived Factors. *Journal of Banking and Finance*. 1993;17:65- 89.
52. Dhakal D, Kandil M, Sharma SC. Causality between the Money Supply and Share Prices: A VAR Investigation. *Quarterly Journal of Business and Economics*. 1993;32:52-74.
53. Johansen S, Juselius K. Maximum Likelihood Estimation and Inference on Cointegration –With Applications to the Demand for Money. *Oxford Bulletin of Economics and Statistics*. 1990;52(2):169-210.
54. Johansen S. Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control*. 1988;12(2-3):231-254.
55. Johansen S. Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models. *Econometrica*. 1991;59(6):1551-1580.
56. Nasseh, A., J. Strauss. Stock Prices and Domestic and International Macroeconomic Activity: A Cointegration Approach. *The Quarterly Review of Economics and Finance*. 2000; 40: 229-45.
57. Canova F, De Nicolo G. Monetary disturbances matter for business fluctuations in the G-7. *Journal of Monetary Economics*. 2002;49(6):1131-1159.
58. Hess MK. Dynamic and asymmetric impacts of macroeconomic fundamentals on an integrated stock market. *Journal of International Financial Institutions and Money*. 2004;14:455-471.

### Appendix A

#### A 1 Trade Statistic between Morocco and USA







\* All in millions of dollars.  
\* Source of the data is DOT-IMF

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