

The effect of US fundamentals on the Moroccan stock market pre- and post- FTA

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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 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.

Key words: Trade Agreement; Stock Market; Emerging Countries

JEL classifications: E44; F36; G15

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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.

As globalization increases, financial markets become more and more integrated. First we will define the concept of integration. Integration of financial markets is the harmonization of markets, and this process is boosted by free access to different markets and fluent mobility of capital from a country to another. The evolution of this process depends on the particular situation in each individual country. According to (Bekeart ,1995) there are four different types of constraints that can discourage investors from investing in emerging markets a) legal constraints; b) differences in accounting standards ; c) instability of the political situation , and d) economic policy . The growing trend toward integration is motivated by deregulation and globalization. Central banks all over the world are trying to improve the financial markets particularly after several financial crises. Deregulation in emerging markets has resulted in the removal of constraints on pricing of many financial assets.

44 However it is appropriate to notice the difference between the concepts of
45 liberalization and integration .Stock market liberalization is the decision of a country's
46 government which gives the right to foreign investors to invest in that country's stock
47 markets (Henry, 2000a) . For example, a country can implement a law which stipulates
48 the removal of all the barriers to foreign investors. This is called liberalization but in
49 effect it cannot be an efficient liberalization since it does not result in market integration.

50 Market integration is very important since it plays a major role in developing market
51 efficiency and thus economic growth. In addition, it is mainly used by government to
52 communicate important price signals and finally, it's a good way to improve domestic
53 savings investment.

54 Following (Fama ,1970) and according to his theory of the efficient market ,stock
55 prices should incorporate all the future predictions about the forthcoming performance
56 of the company .In addition, all important information should also be reflected on stock
57 prices. However, the performance of each company is strongly influenced by the level of
58 the economy. Thus, while implementing the country's macroeconomic policy, authorities
59 consider the importance of the different relationships between stock prices and
60 macroeconomics variables.

61 Recently, countries all over the world, including Morocco, have engaged in a policy
62 for economic integration and liberalization. In fact Morocco officially liberalized and
63 opened its equity market to international investors in June 1988, and the first ADR was
64 issued in April 1996. In the same year, Morocco established new capital market laws
65 which intend to encourage private investment, increase investor protection, and enhance

the banks' role in stimulating and boosting capital markets by the creation of mutual funds. Seven years later in 2003, with the objective of achieving global integration, 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 and help Morocco 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. Morocco has imported and exported less than one billion dollars in 2003, while for the same year trade between Morocco and the EU was worth more than 14 billion euros. In comparison, in 2005 the total exports to the United States reached \$521 million. 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, which was signed with Tunisia, Jordan, and Egypt. The objective of this trade agreement was to establish the Greater Arab Free Trade Area, as well as free trade agreement with United States and recently, an agreement of free exchange with Turkey.

According to (Panagariya, 2002) FTAs between industrial and emerging economies are expected to have important effect on economies in general. This is because emerging countries typically depend more on trade and have very limited organized and regulated

88 markets. Consequently, they are more exposed to international competition than
89 developed economies. Since the 1960s, Morocco's industrial sectors have been very
90 specialized, relying principally on goods exported to the European market.

91 Moroccan exports to the United States have increased under the FTA. In 2008,
92 exports almost doubled compared to 2005. However, the financial crisis has affected
93 worldwide trade and has resulted in a decrease of Morocco's US sales. On the other hand,
94 Moroccan agricultural exports to the US increased by 30 percent. Taking into
95 consideration the extent to which Morocco is active abroad with regard to trade and
96 investment, in addition to Morocco's effort towards integration, the increasing level of
97 trade and investment between the two countries will absolutely impact their respective
98 economies and consequently, their financial markets .In addition, there is a greater
99 possibility that the countries will become more integrated. In 1960, Greek economist Béla
100 Balassa developed a theory which stipulates that the increase in trade between two or
101 more countries will certainly lead to increase in their GDP and thus, to better welfare.

102 However, recent research by other economists such as Samy BEN NACEUR, Samir
103 GHAZOUANI, and Mohammed OMRAN has shown that stock market liberalization has
104 no impact on economic growth, but rather has an important effect on the expansion of
105 the stock market in the long run.

2. Literature review

The following literature review is composed of two parts: The first part discusses the relationship between macroeconomics variables and stock return, while the second is mainly focused on the interaction among stock markets.

The relationship between stock return and macroeconomics variables has been the subject of many research studies. Analysts and financial policymakers have given particular attention to the effect of macroeconomics fundamentals on stock returns. In fact, the macroeconomics news plays a crucial role in affecting stock prices fluctuations. According to McQueen and Roley'; Siklos and Anusiewicz'; and Ewing, stock returns are directly influenced by news, especially monetary news.

Chen, Roll and Ross (1986) 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, and interest rate and exchange rate variables. They concluded by confirming a strong relationship between the market returns and those variables.

Diacogiannis et al. conducted a study to investigate the linkage between the Greek stock market and 18 variables between 1980 and 1992 and found that there is an important relationship between stock returns and 13 out of the 18 variables. Muradoglu et al. showed a strong relationship between four macroeconomic variables and the stock returns of nineteen countries for the period 1976 – 1997. They concluded that the size of the stock market has a major impact on the degree of linkage between the variables and

stock prices. Wongbangpo and Sharma studied the relationship between the stock returns for the ASEAN-5 countries of Indonesia, Malaysia, the Philippines, Singapore, and Thailand and five macroeconomic variables. The results showed that growth was the main macroeconomic variable that impacted the Asian stock return, but in contrast the price level was considered as being not significant. Mukhopadhyay and Sarkar studied the linkage between macroeconomic variables and the Indian stock market and to what extent the removal of economic constraints impacted the linkage stated above. They found that the main variables that generated the changes in the Indian stock market were: NASDAQ-index, the foreign direct investment and finally inflation. However, the results showed that the nominal exchange rate has no impact on the Indian stock price during the period of post-liberalization, compared to the pre-liberalization period (1989-1995) where the nominal exchange rate had a major impact on the Indian stock market. Fung and Lie (1990) concluded that the changes in money supply and domestic production does not impact the return on stocks in Korea. In other words, investors think that stock prices cannot be influenced by changes in the level of economic activity. Dhakal, Kandil, and Sharma (1993) used a vector autoregression (VAR) model to analyze the impact of a variation of the money supply on a variation in the stock market index. They found an important relationship between these two variables in the United States. Additionally (Abdullah and Haywarth, 1993) concluded from their study that the rate of inflation and the money supply are the two significant macroeconomic variables that affect the stock return. Moreover (Fama, 1981) while analyzing the linkage between inflation and stock returns argues that most economics factors except inflation showed a positive correlation with the market index.

Mukherjee & Naka (1995) employed Johansen's (1998) vector error correction model to analyze the association between the inflation money supply exchange rate, real economic activity, long-term government bond rate, and the Japanese stock market. The results showed the existence of a cointegration between those factors and the Japanese stock price.

More importantly, (Maysami and Koh 2000) have proven in a study conducted in Singapore that inflation, money supply growth, and interest rate affected Singapore's stock market. Islam & Watanapalachaikul (2003) concluded that there is an important long-run linkage between stock prices and various macroeconomic variables such as market capitalization, bonds price, foreign exchange rate, and consumer price index during the period 1992-2001 in Thailand.

De Santis, G. and Gerard, B. (1997) explored the effect of exchange rate, interest rates, inflation, and the money supply and analyzed the effect of the 1997 Asian financial crisis. The results showed the influence of fundamentals on the stock market indices in Malaysia, Singapore, Hong Kong, Thailand, Japan and South Korea. McQueen and Roley (1993) studied the impact of economic news during the different economic stages. They discovered that the reactions of the stock market depend mainly on the state of the economy. Maghyreh (2002) investigated the long-run linkage between the Jordanian stock prices and macroeconomic fundamentals, by employing cointegration analysis and monthly data for the period from January 1987 to December 2000. The study showed that the Jordanian stock market was largely influenced by macroeconomic variables.

Wasserfallen (1988) 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 results showed that there were no very significant effects of macroeconomics fundamentals on stock return. Ibrahim (1999) found that stock prices included the impact of consumer prices in the Malaysian equity market.

In his study of the linkage between Malaysian stock return and both money supply, and GDP (Habbibullah et al ,1996) showed that there is a positive relationship among the above stated variables .Moreover ,(Fazal and Mahmood ,2001) used VECM procedure to prove the existence of the relationship between the Pakistani stock return and investment, spending, and consumption expenditure economic activity, and found evidence of a relationship. Al-Sharkas(2004) used Johansen's procedure to analyze the linkage between macroeconomic variables, including interest rate, money supply, real economic activity, the relationship among equity market, and inflation and Jordanian stock return and found a positive relationship among these variables

Omran (2003) studied the relationship between interest rate and the Egyptian stock market using cointegration and found that Egyptian stock prices reflect the impact of the interest rate. In the same context, Vuyyuri (2005) explored the impact of many macroeconomics variables, (e.g., exchange rate, inflation rate, and interest rates) using Johansen's protocol and found that stock prices in India are mainly influenced by industrial production. Pisedtasalasai and Power (2004) investigated the linkage between the Colombo All Share price index and three macroeconomic variables(the exchange

rate, money supply, and the consumer price index), and the results showed the existence of a significant relationship among these variables

Liaquat Ali and Nadeem Ahmed(2008) used DF-GLS procedure to investigate the relationship between the economic growth rate and stock return based on data gathered between 1971 to 2006. They found that stock prices are influenced by economic growth.

Song-zan-chiou-wei(2000) analyzed the linkage between the Asian stock market and the following macroeconomics variables :exchange rate and oil prices. The results showed that oil prices and inflation have a significant impact on the Asian stock market. Moreover, using Johansen's protocol (Lahrech ,2009) 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. Hess (2004) found that German shocks have an important effect on the Switzerland market. According to (Arshanapal H and Doukas, 1993) European stock markets are more directly influenced by changes in the US than in Japan. In addition, (Yu ,1996) showed that changes in exchange rates in Tokyo and Hong Kong markets impact stock prices on Singapore .

In their study of the US equity and the association between stock price and exchange rates (Li Lian Ong and H.Y.Izan ,1999) , they concluded that information communicated about the French and Japanese currencies have a significant impact on US share price .In addition (Gay,2008) analyzed the impact of oil price and exchange rate for India, Russia, China, and Brazil on the Indian stock market and found no significant linkage .

219 Many other researchers and economists have also studied the effect of trade
220 agreements and the major role they play in developing integration between economies all
221 over the world

222 Lahrech and Boujir (2008) studied the linkage between the Moroccan and the US
223 equity markets after the signature of the free trade agreement in 2004. They used the
224 Autoregressive Conditionally Heteroscedastic (GARCH) model. The results have shown
225 that the US and Moroccan stock markets were not significantly related at the moment of
226 the signature and establishment of the free trade agreement.

227 In addition, (Maghyreh and AlZuobi ,2005) analyzed the impact of the signature
228 of the trade agreement between Jordan and US. They found that the agreement has
229 increased the market linkage between the two countries. BenDavid (1993) gave the
230 example of the trade agreements signed between members of the European Union and
231 showed the impact of this agreement on the integration and convergence of their
232 economies. He also proved that economies that are easily integrated on the international
233 financial system are those which are more likely to grow and develop. Eun and Shim
234 (1989) proved that a higher economic integration will certainly lead to higher market
235 integration .They also showed that US markets can impact the world markets. However, a
236 country taken apart cannot influence US market returns.

237 Moreover (Darrat, Elkhail and Sam, 2000) have showed in their study that the
238 degree of integration of each market can differ from one country to another.

239 In the same context (Tambi ,2005) has studied the market linkage between
240 developed countries and emerging markets. He found that emerging markets are slightly

241 integrated with developed countries such as Canada,UK, andUS. Syriopoulos (2004)
242 showed that the free flow of capital between countries will result in the integration of
243 emerging markets, thus lowering the opportunity of diversification.

244 Chung and Liu (1994) examined the relationship between stock prices in the US
245 and five countries: Korea, Singapore, Japan, HK, and Taiwan. They found that all
246 countries are strongly related to the US market except Taiwan.

247 Phylaktis and Ravazzolo (1998) analyzed stock market linkages of many
248 countries in the PacificBasin with Japan and the US in order to detect the progress and
249 evolution of the linkage. The results showed that the existence of portfolio
250 diversification opportunities in those markets ,have encouraged many international
251 investors to invest their capital .Goetzmann and Jorion, (1999) showed that investors
252 who invest in emerging markets can still take advantage of potential portfolio
253 diversification compared to certain countries such as Turkey, Egypt, and Morocco that
254 are already integrated with the world financial markets

255 In addition (Hamao ,1990); (Koch and Koch ,1991); (Roll ,1992), found the
256 existence of important linkages between international stock markets. In their paper,
257 Sharkasi, Ruskin and Crane (2006) found that the linkage between the US and the
258 emerging countries is not significant. In his paper , (Antoniou ,2003) analyzed the
259 linkage between free markets Germany, France, and the UK using the GARCH model
260 and found that there is a strong linkage between those countries .Cheung and Mak.(1992)
261 and Kwan el at (1996) also showed the important impact of the US market on the
262 financial markets of the other countries.

In Kanas (1998) analyzed the relationship between US and European stock markets including Switzerland, Netherlands, France, and Germany. He concluded that there is no linkage between the US and European stock markets. In contrast, (Berben and Jansen Kohers and Kohers ,1995) investigated the relationship between 11 European stock markets and other countries and found that the 11 countries were integrated to each other , and with rest of the world.

In 2004, Kumar and Smyth explored the linkage between the Australian stock market and the stock market of G7 countries. The results showed that there is a strong relationship between the Australian market and the stock exchange of Japan, Canada and the US .In the same context , (Manning and Ratanapakorn , 2002) found a positive relationship among US Asian and , European markets. Pagan and Soydemir (2004) analyzed the relationship between the stock market of Mexico and the US and concluded that a significant relationship among those two equity markets.

Niarchos et al. (1999) concluded that the US and Greek stock markets are not related since there is no international flow of information among the two markets. On the other hand, (Harvey, 1995) concluded that there is no relationship among developed and emerging countries.

Henry (2000) argued that liberalization leads to higher investment and thus to increased economic growth. On the other hand, (Achy, 2005) while analyzing the impact of liberalization on economic growth found that liberalization has a negative effect on growth and investment in Morocco Egypt, Turkey, and Jordan.

3. Model specification

3.1 Money supply

The relationship between money supply and stock return was developed by (Friedman and Schwartz, 1963). They argued that the increase in prices can be explained by the fact that when money supply increases (M2) it means that there is more money in circulation so the demand for buying securities will increase and thus will result in the rise of prices.

According to Fama (1990) an increase in M2 will result in an increase in the price level and thus a rise of the discount rate and decrease on stock returns. Moreover, an increase in the price level will encourage investors to sell their shares and other assets which explains the decline of stock prices .

In the same context (Kraft, 1977) and Hamburger and Kochin (1972) found an important relationship between the stock return and price level. However, Cooper (1974) and Nozar and Taylor (1988) in their study found that there is no relationship between the variables stated above.

3.2 Industrial production

Tainer (1993) claims that there is a positive relationship between the industrial production and the returns on stock since industrial production represents an indicator of the production of the industrial sector .Thus a rise in industrial production would reflect an increase on corporations' profit and growth of the economy, and consequently on higher dividends which lead to an increase in shares prices.

Fama (1990) and Geske and Roll, (1983) found the existence of a relationship between industrial production and future cash flows.

3.3 Consumer Price Index

Many researchers investigated the relationship between inflation and stock returns. Kryzanowski and Zhang (1992), Chen and Hsieh (1985), Chen and Jordan (1993) showed a negative relationship between the two variables thus when the consumer price level increases the stock return decreases.

3. Methodology

The relationship between macroeconomic variables and stock returns can be analyzed through many procedures, either Granger (1987) and Engle or Johansen and Juselius (1990). In this paper we will use Johansen and Juselius because it will give us more relevant estimators of cointegrating vectors. Also, in this paper we will use Johansen's test where all variables are transformed into (5) VECM and takes the form of

$$\Delta Y_t = C + \Pi Y_{t-k} + \Gamma_1 \Delta Y_{t-1} + \Gamma_2 \Delta Y_{t-2} + \dots + \Gamma_{k-1} \Delta Y_{t-k+1} + \varepsilon_t \quad (1)$$

Where:

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

And:

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

328 In addition, we have:

329 I: the identity matrix

330 Δ : difference operator

331 Johansen suggests two tests statistics for cointegration. The maximum eigenvalue
332 and the trace statistics

333 The maximum eigenvalue's equation

334
$$\lambda_{\max}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1}) \quad (4)$$

335 The maximum eigenvalue's hypothesis

336 HO: There are r cointegrating vectors

337 H1: There are r+1 cointegrating vectors

338

339 The trace statistics's equation

340
$$\lambda_{\text{trace}}(r) = -T \sum_{i=r+1}^p \ln(1 - \hat{\lambda}_i) \quad (5)$$

341

342 The trace statistic's hypothesis

343 HO: The number of cointegrating vectors is less or equal to r

344 H1: The number of cointegration vectors is superior to r

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

347 4. Data

348

349 We will use monthly data from January 2000 to December 2009. Data on money
350 supply, industrial production, and price level are available on [www.EconStats .com](http://www.EconStats.com).

351 Also, we need the Moroccan stock market price index which is available on the

Casablanca stock exchange web site. In addition, the US stock index (S&P500) can be found on EconStats. 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.

5. 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 represent the date of the conclusion of the free trade agreement (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 presents the findings for the unit root tests. The analysis is carried over the sub-periods of pre-FTA and post-FTA.

From Table 1, 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. The results generated from this test show that all variables are stationary and integrated of order one, and since our paper

uses the cointegration procedure all variables need to be integrated of the same order, which here is order 1 .

5.1 Cointegration

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 cointegration is the attractor the concept of the attractor 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, cointegration 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 cointegrated. However, if the residuals follow a random path, then the two variables are not cointegrated.

In this section we use the method proposed by Johansen (1988, 1991) and Johansen and Juselius (1990) to test for the existence of the cointegrating vector for the two variables Moroccan composite index MASI and the US composite index S&P 500 in the pre-FTA subperiod. All cointegration tests contain an intercept and a linear trend.

Both the Trace and the Max-eigenvalue tests indicate no cointegrating equation in the pre-FTA period. We conclude that in the pre-FTA period there is no cointegration 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
ADF-Level				
-0.94	-1.33	-0.13	-1.69	-2.43
ADF-First Difference				
-3.20**	-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
ADF-Level				
-1.81	-0.66	-1.21	-2.20	-2.11
ADF-First Difference				
-4.03**	-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.

5.1.1 Cointegration between MASI and S&P500

Table 3 Trace statistic Pre FTA

Trace statistic				
Null Hypothesis	Alternative Hypothesis	t-Statistic	Critical Value at 5%	Critical Value at 1%
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

Maximum eigen-value				
Null Hypothesis	Alternative Hypothesis	t-Statistic	Critical Value at 5%	Critical Value at 1%
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

Maximum eigen-value				
Null Hypothesis	Alternative Hypothesis	t-Statistic	Critical Value at 5%	Critical Value at 1%
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

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

5.1.2 Cointegration 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 Trace statistic Post- FTA (Cointegration between MASI and US fundamentals)

Trace statistic				
Null Hypothesis	Alternative Hypothesis	t-Statistic	Critical Value at 5%	Critical Value at 1%
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

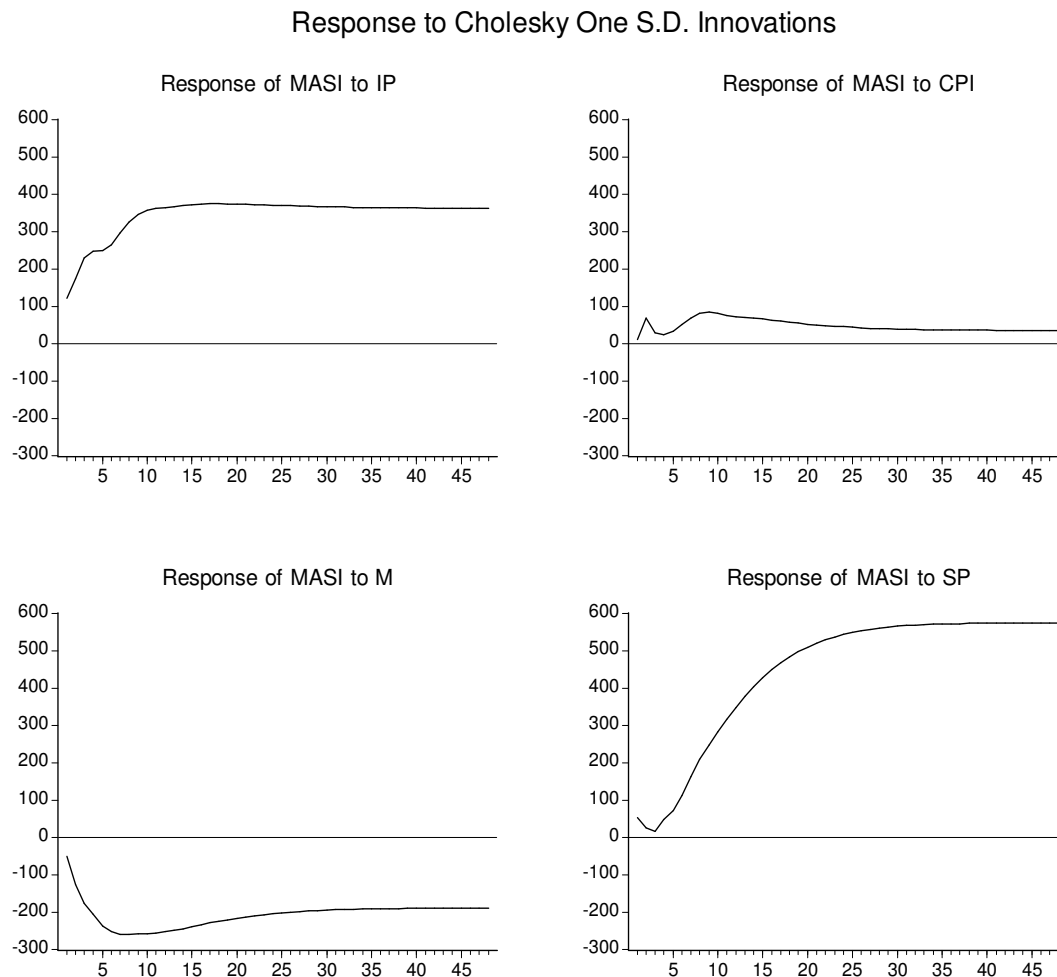
422 **Table 8 Maximum eigen value tests Post- FTA (Cointegration between MASI and US fundamentals)**

Maximum eigen value				
Null Hypothesis	Alternative Hypothesis	t-Statistic	Critical Value at 5%	Critical Value at 1%
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

423

424 The Trace test indicates two cointegrating equations at the 5% level and one
425 cointegrating equation at the 1% level. The Max-eigenvalue test indicates two
426 cointegrating equations at the 5% level and one cointegrating equation at the 1% level.
427 These results clearly show that there are long-run relationships between the Moroccan
428 stock price MASI, and US macroeconomic fundamentals, namely industrial production,
429 consumer price index, money supply, and the US stock market.

430 5.2 Impulse responses in the post-FTA period



431
432 **Figure 1** Presents the impulse responses of the Moroccan stock price to shocks in US macroeconomic fundamentals
433 over the post-FTA period. The impulse responses are calculated from a 2 lag-vector error correction model (VECM
434 (2)) with one cointegrating equ

435
436 Before starting to analyze the results of the impulse responses we will present some
437 reasons that explain the impact of foreign fundamentals on domestic stock price.
438 According to Nasseh and Strauss (2000) two major models can explain this impact:

439 “Canova and De Nicolo (2002) employed “The general equilibrium multicountry
440 model” which stipulates that domestic production is impacted by foreign
441 production”.

“The consumption-based model developed by Balvers *et al* (1990) 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. 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 short-term interest rate which leads to an increase in stock price and hence the Moroccan stock price.

5.3 Variance decomposition in post-FTA period

In this part 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 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

The above table 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. 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 make sense since the Moroccan financial market is not well integrated in the world financial market.

6. 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 1. Moreover, we used cointegration analysis, especially the VAR Johansen's protocol in order to investigate the long run relationship between US fundamentals and the Moroccan stock market. The results showed first the existence of a cointegration vector between MASI and S&P 500 after the signature of the FTA ,while for the period pre-FTA there was no cointegration between those two indexes . Then a cointegration test was carried out between all variables and the Moroccan index, and the results showed a positive relationship. Thus, we can notice that our findings fit perfectly with those of (Hess,2004) who found that German fundamentals have an important effect on the Switzerland market, and moreover Lahrech (2004) suggested

that US fundamentals' impact on the Canadian stock markets was closely influenced by the stage of the business cycle .

However, in order to get a closer 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.

This positive relationship between US macroeconomics and the Moroccan stock market can help investors make the right investment decisions at the right time. By estimating the future direction of the US money supply, industrial production and consumer price index investors can easily predict the trend of Moroccan equity prices and thus can use their resources more efficiently. In the same way, policy makers in the US will be very cautious while making monetary decisions as stock markets all over the world react to those decisions . Moreover, this long run linkage between the US and the Moroccan equity market will encourage foreign investors to invest in the domestic market since the FTA abolishes all entry barriers. As a result, US investors will be more willing to invest in Morocco .This will increase the US FDI and certainly boost economic growth by making the equity market more liquid and more productive.

In addition, this positive relationship between US fundamentals and the Moroccan stock market will increase the risk related to portfolio diversification since any proxy that affect the US macro variables will certainly have an impact on the Moroccan stock

market. Therefore, risk-averse investors will avoid any combination of stocks that will yield negative returns.

Concerning policy makers, this linkage between US and Moroccan markets means that instability in the US market can easily affect all the other countries, which may cause a financial meltdown. That is what happened during the last crisis when many economies of other countries were strongly affected by the crisis in United States. However, to extend this paper and gain more evidence we can include, for instance, oil prices, interest rates, exchange rates and impact of monetary news as additional factors that may impact the stock price index.

7. References

1. Abdullah, D. A., & Hayworth, S. C. (1993). Macroeconometrics of stock price fluctuations. *Quarterly Journal of Business and Economics*, 32, 46-63.
2. Arshanapal, A. H. & Doukas ,L. A.1993 . On the Kolmogorov-Smirnov tests for normality with mean and variance unknown. *Journal of the American Statistical Association*, 62, 399-402.
3. Al-Sharkas, D. F. 2004. Econometric modeling with cointegrated variables: An overview. *Oxford Bulletin of Economics and Statistics* 48(3) 201-212.
4. Antoniou A, Pescetto G, and Violaris A. (2003). “Modeling international price relationships and interdependencies between the stock index and stock index futures markets of three EU countries: A Multivariate analysis”. *Journal of Business Finance*, pp 645 – 667.
5. BenDavid , T. K.(2004) Is there a long-run relationship between stock returns and monetary variables: evidence from an emerging market. *Applied Financial Economics* VII(6): 641-649.
6. Ben Naceur, S., Ghazouani, S., and Omran, M., 2007, “The determinants of stock market development in the Middle-Eastern and North African region”, *Managerial Finance* 33,
7. Bekaert, G., Harvey, C.R., and Lundblad, C., 2005, “Does financial liberalization spur growth?”, *Journal of Financial Economics* 57, pp.3-55.
8. Chen N. F., Roll R., & Ross S. A. (1986). Economic forces and the stock market. *Journal of Business*, 59, 383-403.
9. Cheung, Y. Wong and Ng, L. K (1998), International evidence on the stock market and aggregate economic activity, *Journal of Empirical Finance*, 5, 281–296.
10. Chung and Liu (1994) Chung P.J. and Liu D.J. (1994). “Common Stochastic trends in pacific rim stock markets”, *The Quarterly Review of Economics and Finance*, pp. 241-259.

11. Diacogiannis , G. P., Tsiritakis, E. D., & Manolas, G. A. (2001). Macroeconomic factors and stock returns in a changing economic framework: The case of the Athens stock exchange. *Managerial Finance*, 27, 6, 23-41.
12. De Santis, G. and Gerard, B. (1997) Stock prices and domestic and international macroeconomic activity: A cointegration approach. *Quarterly Review of Economics and Finance* 40(2): 229-245.
13. Eun and Shim (1989) Eun, C. and Shim, S. (1989). “International transmission of stock market movements”. *Journal of Financial and Quantitative Analysis*, pp 24, 241–56.
14. Fama E. F. & Schwert, W.G. 1977. Asset returns and inflation. *Journal of Financial Economics* 5: 115-146.
15. Fazal, F, K.& Mahmood L. E.,2001. Investment Analysis and Portfolio Management. Orlando, USA: The Dryden Press.
16. Fifield S., Power D. & Sinclair C. 2000. A study of whether macroeconomic factors influence emerging market share returns. *Global Economy Quarterly* 1(1): 315- 335.
17. Goetzmann, A. and Jorion, P. (1999). “Reemerging Markets”. *Journal of Financial and Quantitative Analysis*, pp 34, 1–32.
18. Habibullah, M. S. & Baharumshah, A.Z. (1996). Money, output, and stock prices in Malaysia: An application of the cointegration tests. *International Economic Journal*, 10, 2, Summer 1996, 121-130.
19. Hamao,T.Z ,1990 “Explaining the Cross-Section of UK Expected Stock Returns”, *British Accounting Review*, 29:1-23.
20. Hess, M. K., 2004. “Dynamic and asymmetric impacts of macroeconomic fundamentals on an integrated stock market”. *Journal of International Financial Institutions and Money* 14, 455-471.
21. Ibrahim, M. H. (1999). Macroeconomic variables and stock prices in Malaysia: An empirical analysis. *Asian Economic Journal*, 13, 2, 219-2
22. Kraft, J. & Kraft, A. Determinants of common stock prices: a time series analysis. *Journal of Finance* 32(2): 417-425.

23. Kumar, T. M. (1997). "A Test of Integration between Emerging and Developed Nations' stock Markets". *International Advances in Economic Research*, pp 330-333
24. Lahrech, A. Boujir, 2008. "Morocco and US Equity Markets linkage after FTA signature for International Portfolio Diversification", *International Research Journal of Finance and Economics*.
25. Maghyereh, A. and Alzuobi, A. (2005). Causal relations among stock prices and macroeconomic variables in the small, open economy of Jordan.
26. Maysami, R. C. & Koh, T. S. 2000. A vector error correction model of the Singapore stock market. *International Review of Economics and Finance* 9: 79-96.
27. Maysami, R. C. & Sim H. H. 2001b. Macroeconomic forces and stock returns: a general-to-specific ECM analysis of the Japanese and South Korean markets. *International Quarterly Journal of Finance* 1(1): 83-99.
28. Mukherjee, T. K. & Naka, A. 1995. Dynamic relations between macroeconomic variables and the Japanese stock market: an application of a vector error correction model. *The Journal of Financial Research* 18(2): 223-237.
29. Muradoglu G., Metin K. & Argae R. 2001. Is there a long-run relationship between stock returns and monetary variables: evidence from an emerging market. *Applied Financial Economics* VII(6): 641-649.
30. Omran, P., 2003. Exchange rate management in Singapore. In *Economic Policy Management in Singapore*, ed. Lim Chong Yah, 237-273. Singapore: Addison-Wesley.
31. Pagan, S. & Soydemir, K. H. 2004. "Stock Market Linkages in Emerging Markets: Implications for International Portfolio Diversification". *Journal of International Financial Markets, Institutions & Money*, pp 91-106
32. Robert D. Gay, Jr. (2008), Effect of macroeconomic variables On stock market returns For four emerging economies: Brazil, Russia, India, and China, *International Business & Economics Research Journal*, 7(3), 1
33. Sharkasi, H. J., Ruskin D. G. and Crane, O. T., 2006. A critique of the asset pricing theory's tests: Part I: On the past and potential testability of the theory. *Journal of Financial Economics*, March, 129-176

- 629 34. Syriopoulos, T., Athanassiou, E. and Kollias, C. (2004) 'The effect of external
630 security related shocks on financial markets', European Association of
631 Evolutionary Political Economy International Conference, Crete.
- 632 35. Wongbanpo, P. & Sharma, S. C. (2002). Stock market and macroeconomic
633 fundamental dynamic interactions: ASEAN-5 countries. *Journal of Asian*
634 *Economics*, 13, 27-51.
- 635 36. Yu (1996) Mookerjee, R. & Yu, Q. (1997). Macroeconomic variables and stock
636 prices in a small open economy: The case of Singapore. *Pacific-Basin Finance*
637 *Journal*, 5, 377-388.
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Appendix A

A 1 Trade Statistic between Morocco and USA in 2005

Month	Exports	Imports	Balance
January 2005	50.2	39.8	10.4
February 2005	91.7	34.9	56.8
March 2005	71.7	28.3	43.4
April 2005	43.0	49.0	-5.9
May 2005	23.9	44.3	-20.4
June 2005	32.4	52.5	-20.1
July 2005	21.2	36.3	-15.1
August 2005	16.8	34.7	-18.0
September 2005	22.7	31.3	-8.7
October 2005	44.8	27.6	17.2
November 2005	34.0	28.5	5.5
December 2005	28.4	38.7	-10.3
Total	480.8	445.8	35.0

* Source of the data is

A 2 Trade Statistic between Morocco and USA in 2006

Month	Exports	Imports	Balance
January 2006	40.5	38.7	1.8
February 2006	54.6	30.5	24.1
March 2006	83.8	45.0	38.8
April 2006	83.6	39.0	44.5
May 2006	53.2	40.6	12.7
June 2006	141.0	42.5	98.5
July 2006	58.2	50.0	8.1
August 2006	77.5	38.2	39.3
September 2006	74.1	46.3	27.8
October 2006	46.4	52.8	-6.4
November 2006	49.3	33.7	15.7
December 2006	75.7	64.0	11.7
Total	837.9	521.4	316.6

* Source of the data is

664 **A 3 Trade Statistic between Morocco and USA in 2007**

Month	Exports	Imports	Balance
January 2007	65.7	47.8	17.8
February 2007	130.5	42.8	87.8
March 2007	119.1	50.8	68.3
April 2007	91.4	49.6	41.8
May 2007	85.3	42.1	43.2
June 2007	67.6	48.1	19.5
July 2007	65.8	69.9	-4.0
August 2007	101.0	52.2	48.9
September 2007	141.6	47.9	93.7
October 2007	162.4	80.0	82.4
November 2007	151.2	37.4	113.8
December 2007	112.5	41.3	71.2
Total	1,294.2	609.9	684.2

665 * Source of the data is

666 **A 4 Trade Statistic between Morocco and USA in 2008**

Month	Exports	Imports	Balance
January 2008	121.4	54.5	66.9
February 2008	161.3	79.5	81.7
March 2008	192.4	98.6	93.8
April 2008	119.4	65.8	53.6
May 2008	55.7	62.2	-6.6
June 2008	150.2	69.5	80.7
July 2008	89.8	66.5	23.3
August 2008	147.5	104.3	43.2
September 2008	82.2	76.7	5.5
October 2008	94.0	69.1	24.9
November 2008	83.5	65.2	18.4
December 2008	138.4	66.8	71.6
Total	1,435.9	878.7	557.1

667 * Source of the data is

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673 **A 5 Trade Statistic between Morocco and USA in 2009**

Month	Exports	Imports	Balance
January 2009	81.8	43.8	38.1
February 2009	114.7	31.9	82.7
March 2009	128.1	51.4	76.7
April 2009	172.4	42.4	129.9
May 2009	148.6	34.7	113.9
June 2009	86.9	35.9	51.0
July 2009	170.3	33.8	136.6
August 2009	138.7	44.8	93.9
September 2009	142.1	29.6	112.4
October 2009	129.6	39.7	89.9
November 2009	161.2	37.9	123.3
December 2009	155.9	42.0	113.9
Total	1,630.3	468.0	1,162.3

* Source of the data is