The effects of monetary and fiscal policies on the stock exchange: evidence from an island economy

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Abstract

This research investigates the effects of monetary and fiscal policies on the Stock exchange of Mauritius. Money supply, interest rate and inflation have been used as proxies for monetary policy and budget deficit has been used as a proxy for fiscal policy. The SEMDEX was used as a proxy for the stock exchange of Mauritius. A unit root test was initially performed to test for the stationary of the variables. A combination of I(0) and I(1) was obtained and consequently an Autoregressive Distributed Lag (ARDL) model was used. A bound test was then performed to test for cointegration. After cointegration was obtained, the long run and short term coefficients were estimated using the ARDL approach. The research findings showed that significant long run relationships exist between the monetary variables: money supply, interest rate and inflation with stock price. However, only a short run significant relationship was obtained between money supply and stock price. Concerning the fiscal policy variable, neither a significant short term nor a long term relationship was obtained between budget deficit and stock price. Furthermore the Granger causality test confirmed a unidirectional causality from interest rate to stock price only.

Introduction

Financial markets, including stock markets play an important role in the allocation of resources to various sectors in an economy. In the future, more resources will be shifted to high value activities in the country and these markets will have an effective and efficient role to play. The stock market is the indicator of the economy's financial stability and strength. The growing importance of stock markets around the world has reinforced the belief that finance is one of the key elements for growth in a country.

The stock market of Mauritius was created in 1989 and has helped Mauritius, to become a financial centre. The SEM has evolved and has developed continuously and it is now part of the World federation of Exchanges (WTE). The SEM functions on two markets, namely the official market and the recently created Development Enterprise Mauritius (DEM).

In this new era of change, Mauritians no longer put their money safely in commercial banks as they used to do in the past. The conservative investment mentality of Mauritians is changing slowly. Nowadays they are more conscious about investing in stocks, bonds and funds, which will bring them higher returns even if they entail high risks.

The stock market is also a great way to attract foreign investment in the country. Mauritius, which had throughout its past history, demonstrated low correlation between market movements in the major developed and developing markets has now emerged into an attractive investment destination for foreign investors looking to secure positive alpha against their investment benchmarks.

The Financial authorities in Mauritius have the project of democratizing investment in the country. There are around 50,000 investors on the SEM and the FSC have the aim of doubling this amount by 2013 (Stated by Sunil Benimadhu, CEO of the SEM). To do so, the attractiveness of the SEM need to be increased and the factors affecting investment on the SEM must be studied deeply. Some of these are Speculation, company's earnings, economic downturn (Recession), monetary and fiscal policies. These cause investing and disinvesting on the SEM. The effects of central bank policies (monetary) and Government policies (fiscal) on the SEM will be focused on in this research. These two policies are the most common important policies that can be altered by the Government, and which are also analyzed by most investors.

This study can help the government, structure and modify their monetary and fiscal policy; knowing the effects these will cause on the SEM. Investors can then try to predict future stock prices of companies based on these policies and thus restructure their investments. Investors will thus deposit their money in banks, invest in fixed income securities or invest it on the SEM depending on the policies. Companies will also decide whether to raise money by issue of shares on the SEM or borrow money from banks as a source of finance (capital structure).

This study sets particular emphasis on the effects of monetary and fiscal actions on the stock exchange, in the Mauritian context. The objective is to provide theoretical and empirical analysis of the effects of monetary and fiscal variables on the stock exchange of Mauritius and also to show to which extent the macroeconomic variables/proxies affect the stock exchange. It is also possible that the macroeconomic variables/proxies concerned, do not have an impact on the stock exchange, and this will also be researched in the study.

The Augmented Dicker-fuller unit root test was the preliminary test and tested for the order of integration of the variables. The Autoregressive distributed lag (ARDL) model as per Pesaran and Shin (1999) and Pesaran et al (2001) was then used to test for short term and long term relationship between the monetary variables, as a combination of I(0) and I(1) was obtained. Finally a Granger causality test was performed to look for any causation among the variables.

Methodology and Analysis

Methodology

This research has the aim to demonstrate whether the monetary and fiscal policy actions taken in Mauritius have an effect on the Stock exchange of Mauritius. This chapter shows the econometric model used to make our hypothesis. This macroeconomic model has been extensively used in journals and articles and was mostly inspired by papers such as Al-Shiab (2004), Laopodis (2006) and Sharma (2010). In these papers, relationships were examined between monetary and fiscal variables which are the Independent variables (ex.: money supply, budget deficit, interest rate and inflation) with the Stock price which is the dependent variable.

The functional model:

The model has been inspired from the above literatures but has been slightly modified, in order to fit the research. It is shown below:

$$SP=f(M2,CPI,GDP,BD,IR,EER) \quad (4.1.1.1)$$

The equation can be arranged in an econometric form as shown below:

$$SP=\beta_0+\beta_1 M2_t+\beta_2 CPI_t+\beta_3 GDP_t+\beta_4 BD_t+\beta_5 IR_t+\beta_6 EER_t+u_t$$

(4.1.1.2)

By placing natural logarithm on both sides of the equation, the equation obtained is as follows:

$$LnSP=\beta_0+\beta_1 LnM2_t+\beta_2 LnCPI_t+\beta_3 LnGDP_t+\beta_4 LnBD_t+\beta_5 LnIR_t+\beta_6 LnEER_t+u_t \quad (4.1.1.3)$$

The dependent variable SP, on the left hand side of equation 4.1.1.1 represents the Stock price, for which the SEMDEX has been used as a proxy. The SEMDEX has been collected from the SEM and it is a major index for all listed shares on the stock market, giving a clear indication of what is happening on the stock market (movement of stock prices). The unit of the SEMDEX is the basis point. All the variables on the right hand side of the equation are the independent variables; M2 stands for the money supply, CPI stands for consumer price index, BD stands for budget deficit of the economy, BR stands for bank rate, and EER represents the Effective exchange rate of the Mauritian rupee.

The period covered in the study is from 1991 to 2011. All variables in the model are denominated in Mauritian rupee and in percentage form and thus logarithms have been applied on both sides of the equation as shown in equation 4.1.1.3 for simplification purposes. The log linear model has been used so as not to make any distinction between dependent and independent variables and all the variables will be treated as "response variables". Data were collected on an annual basis and were input on the MICROFIT (4.0) econometric package, so as to perform the required tests.

The macroeconomic variables are explained in detail below:

Money supply (M2):

The money supply in an economy is an important proxy for monetary policy due to its impact on the Stock exchange. Its importance has been shown in many past empirical researches such as Tobin (1969), Rozeff (1974), Koy and Maysami (1996), Sellin (2001), M.S.Al-Shiab (2004) and Laopodis (2004). The money supply (M2) is also known as the aggregate monetary resources and it is the sum of the following components: Currency with public, demand deposits, savings deposits, time deposits and foreign currency deposits. Data for money supply was obtained from the BoM, in statistical publications and also from its website. Money supply and the SEMDEX are expected to have a positive relationship as a rate of growth of money supply boost the rate of change of stock prices increase. This is because the price of a stock is determined by the present value of all future cash flows, which is calculated by discounting the cash flows with a discount rate; money supply has an important relationship with the discount rate. Increasing the money supply decreases the real interest rates, which in turn reduce the discount rate, and this consequently leads to increase in value of stocks and vice versa, when there is a tightening in money supply (Bernanke and Kuttner, 2005). M.S.Al-Shiab (2004) in his study used a Vector Autoregressive model to find a relationship between stock prices and the money supply and the impulse test showed a significant positive effect of money supply on the market capitalization of the stock exchange.

Inflation (IF):

Inflation is an important indicator in an economy and it signals whether there is a general increase in the price level of goods and service. Increasing inflation signals the loss of purchasing power for consumers in an economy and it is thus important to investors. Headline inflation, measured by using CPI was used in the study and it was collected from the Central statistical office (CSO) on an annual basis (calendar year). According to Laopodis (2006), Fama and Schwert (1977), Geske and Roll (1983) and Mc Carthy et al (1990), stock prices are negatively correlated with inflation. Also, Glasner (2008) used regression analysis and his results demonstrated a negative reaction on the stock market due to changes in inflation level, clearly showing that market players, pay particular attention to inflation, before pricing their assets. This contradicts with the Fisherian hypothesis which stated that there is a positive correlation between stock prices and the expected inflation this research will test whether the relationship between stock prices and inflation is positive or negative.

Budget deficit (BD):

A budget deficit occurs when a government's spending is higher that its revenue for a particular fiscal year. The economic indicator, Budget deficit to GDP ratio was collected from the Bank of Mauritius. In the past, Tobin, 1969 in his study concluded that budget deficit do matter for the stock exchange. It was later shown by Laopodis (2006), who used a Vector Autoregressive (VAR) framework to show that budget deficit (% of GDP), has short turn linkages with stock prices. Laopodis (2006) concluded that budget deficits do have an impact on the stock exchange, thus violating the Ricardian Equivalence Proposition as a negative relationship between budget deficit and stock prices was obtained. Some other literatures showed a positive relationship between the two macroeconomic variables, ex: Ewing **(**1997) and Roley and Schall (1988) who showed that increases in structural deficits cause small increases in stock prices.

Gross domestic product (GDP):

Gross domestic product boost the potential of the firm to produce cash flows. It is expected to be favorable on expected future cash flows, and thus has relationship with stock prices. Also, stock prices fluctuate greatly in times of economic decline (e.g.: falling of GDP during a recession) and decreases during the recovery phase**.** Udegbunam and Eriki (2000), Ibrahim (2003) and Chaudhuri and Smile (2004), Shiblee (2009) and Christopher, Rufus and Ezekiel (2009) all obtained positive relationships between GDP and stock prices. However Habibullah et al (2000) showed that equity prices lead to national income. GDP data was obtained from the Bank of Mauritius and was taken on a yearly basis. The standard deviation of the GDP for the time period of 1991 to 2011 was calculated and this was used in the study. The standard deviation of GDP is a measure of Country risk.

Interest rate (IR):

The repo rate was taken as a measure of interest rate. The Repo rate is the rate at which central banks lend money to commercial banks. A lower repo rate will allow commercial banks to get cheaper money which will consequently decrease their bank rates. A higher repo rate will cause commercial banks to get money more expensively and consequently they will have to charge higher bank rates. Repo rates were collected on an annual basis from the Bank of Mauritius. Past literatures showed a negative relationship between interest rate and stock price, which is because interest rate can affect the stock valuation, by varying the required rate of return. A change in the repo rate will cause a change in the bank rate which will consequently affect the risk free rate of return. The risk free rate of return is an important component in the required rate of return and thus the require rate of return will directly be affected.

Zhou (1996), by the use of regression analysis found out that interest rate has an important effect on stock returns, especially on the long run. Kim, (2003) obtained a negative long term relationship between stock prices and interest rates by using Johansen cointegration. Recent studies such as Alam and Uddin (2009**)** also showed a significant negative relationship between the 2 variables.

Effective exchange rate (EER):

In the study, the effective exchange rate has been taken. This is the weighted average of major exchange rates, to which the Mauritian rupee is associated. The effective exchange rate is rate of the Mauritian currency compared to a basket of major currencies. The rate tells us whether the Mauritian rupee is appreciating or depreciating. The effective exchange rate has been obtained from the International Monetary Fund institution (IMF). Past literature, such as Dornbusch and Fisher (1980), showed that fluctuations in exchange rates on the foreign exchange market, affect the competitiveness of firms, in the sense that it affects the cost of

getting funds on the foreign markets and thus affect the stock prices on the stock market; this is called the flow oriented model. Ma and Kao (1990), Ajayi and Mougoue (1996) and Soenen and Hennigar (1998) found a strong negative relationship between exchange rates and prices and opposingly Aggarwal (1981), Solnik (1987), Smith (1992) and Tsoukalas (2003) found a significant positive relationship. However, Giovanni and Jorion (1987), Bartov and Bodnor (1994) and Griffin and Stulz (2001) obtained a small/minimal relationship between exchange rates and stock prices

The Autoregressive Distributed Lag Model (ARDL)

In the study, the ARDL approach by pesaran et al (1991) and Pesaran and Shin (1999) will be used. Johansen *and* Juselius (1990), "*Maximum Likelihood* Estimation and Inference on Cointegration. More recently, Granger (1986) and Johansen and Juselius (1990) proposed to determine the existence of long-term equilibrium among selected variables through cointegration analysis, paving the way for a (by now) preferred. The ADRL approach as per Pesaran et al (2010) involves the conditional error correction of the ARDL model for stock prices and the macroeconomic variables that affect it.

Analysis

The SEMDEX, money supply, Gross domestic product, Budget deficit, Interest rate and Effective exchange rate are all stationary at level form whereas the Consumer Price index variable is non stationery at level form. As there is a mixture of I(1) and I(0), the Autoregressive Distributed Lag model (ARDL) approach can be used to test for cointegration between the variables. The Unit root test is done to avoid getting spurious regression as said by Ouattara (2004). The latter also stated that bound test is based on the assumption that the variables are I(0) and I(1).

Bound test :

As seen in the unit root test above, not all the independent variables are integrated of the same order; thus the Autoregressive Distribute Lag modeling approach by Pesaran et al (1997) and Pesaran and Shin (1999) will be used to find a relationship among the variables. The Variable addition test was performed on MICROFIT 4.1 and the F-statistics obtained upon computation, for bound testing cointegration revealed that lower bound at 5% significant level is 2.04 and the upper bound is 3.24 and the lower bound at 10% significant level is 1.75 and the upper bound is 2.87. The F-statistic is 3.5867 and thus it exceeds the upper bound at both 5% and 10% significance level; this implies that the null hypothesis of no cointegration is invalid. Thus, a cointegrating relationship exists between the variables. Savasa and Samiloglub (2010) also used the bound testing approach to look for cointegration between macroeconomic variables and stock market returns in Turkey and similar results were obtained. As cointegration has already been found among the variables in our study, the next step is to determine the coefficients of the long run relationships.

Long run coefficient

The long run coefficient is calculated by estimating equation 4.1.8.2 and the Error correction model (ECM) using the ARDL model. The long run estimates of the ARDL model are shown below in Table 5

Table 5: Estimated Long Run Coefficients using the ARDL Approach

ARDL (1,0,0,0,0,0,1) selected based on Schwarz Bayesian Criterion, SEM_t is the dependent variable.

Variables	Coefficient	Standard error	T-ratio	Probability
M2	0.83564***	0.093687	8.9194	0
CPI	-0.46717*	0.2721	-1.7169	0.114
GDP	0.34868***	0.042235	8.2557	0
BD	0.18807	0.10539	1.5845	0.112
IR	0.47156***	0.1548	3.0462	0.011
EER	-1.1075**	0.45647	-2.4261	0.034
CONSTANT	-1.0658	3.9817	-0.26767	0.794

Note: *** denotes significance at 1% level, **denotes significance at 5% level, * denotes significance at 10% level.

The estimated coefficients for the long run relationship as per the table above show that money supply, Gross domestic product and Interest rate are significant at 1% level, Effective exchange rate is significant at 5% level and lastly Consumer price index is significant at 10% level. A significant level at 1% level shows a relatively high significance level as compared to the significance at 5% and 10% level.

The estimated coefficients show a highly significant positive long term relationship between Money supply, Gross domestic product and interest rate with stock prices. A 1% increase in money supply will lead to approximately 0.84% increase in stock prices. Money growth rate is positively related with stock prices as shown by Tobin (1969) and Koy and Maysami (1996), who demonstrated that a rise in money supply has a direct positive liquidity effect on the stock market that increase company's profits and thus increase equity prices.

A 1% increase in the interest rate, more specifically the repo rate, as used in this study, will approximately lead to a 0.47% increase in stock prices. The positive relationship coincides with Kwrarish, Ziam and Jaradat (2008) who examined the impact of interest rates on the stock market capitalization rate on Amman stock market from 1999 to 2008 and they showed that there is a significant positive relationship between the interest rates and the stock market capitalization rate. Other studies such as Nasseh and Strauss (2000) and Mc millan (2001) also showed a positive relationship between stock prices and short term interest rates. Note that the repo rate is a short term interest rate, as it changes regularly in monetary policy committee meetings.

However our results obtained are not in line with previous studies such as Habibullan and Baharumshah (1996), who stated that money supply changes have direct negative effects on stock prices. An example is that an expansionary monetary policy will lower interest rates and this will make bonds less attractive than stocks; this will consequently lead to an increase demand for stock and stock prices will eventually increase. Alam and Uddin (2009) also showed that there is a significant negative relationship between stock prices and interest rate in both

developed and developing countries; however in the case of Japan, a positive relationship was obtained between interest rate and stock price. It must be noted that according to our theoretical backgrounds and also from most past studies, a negative relationship should have been obtained between stock prices and interest rates. One of the plausible reasons might be that Mauritius is an island with few investors on the Stock exchange of Mauritius (SEM), with around 50,000 investors. Mauritians have a conservative investment culture and they actually put most of their savings in banks, instead of investing on the SEM. The Financial crisis in 2008 and the recent Euro crisis in 2010 have further made Mauritians more conservative, just like many investors across the world. Thus a change in interest rate may not have the negative impact that is was supposed to have according to theories, as Mauritian continue to prefer keeping their money safely in banks. The positive impact may be caused by other random disturbances.

Gross domestic product (GDP) and Stock prices are shown to have a long term positive significant relationship as per the results obtained. A 1% increase in the GDP causes a 0.35% increase in the SEMDEX. This is mostly because an increase in GDP leads to economic growth which is a good signal to invest in the economy; demand for shares will increase and the stock prices will consequently increase. This result is in conjunction with past results, such as Udegbunam and Eriki (2000), Ibrahim (2009), Chaudhuri and Smile (2004) and more recently Oseni (2009) who all obtained a significant positive relationship between stock prices and Gross domestic product.

The effective exchange rate has a lower level of significance as compared to money supply, interest rate and gross domestic product, but it still more significant as compared to budget deficit and the consumer price index. The effective exchange has a negative significant relationship with stock prices. A 1 % increase in the effective exchange rate cause a -1.11% decrease in stock prices. This coincides with the results of Soenen and Hennigar (1988) which obtained a significant negative long term relationship between US stock indexes and a weighted basket of 15 currencies to the dollar (effective exchange rate). The results reflects an argument that Abdulla and Murinde (1997) made, stating that governments of emerging countries must be careful in implementing their exchange rate policies as these can have unfavorable effects on local stock markets.

Consumer price index has the lowest level of significance among the other independent variables. It is significant at 10% level and a 1% increase in the Consumer price index will cause a 0.47% decrease in the stock prices. The consumer price index is negatively related to stock prices implying that is inflation has an effect on investors, as it causes lose of purchasing power and they decide to sell their stocks, leading to a consequent fall in prices. This coincides with Laopodis (2006) who obtained a negative relationship between stock prices and inflation rates, suggesting that the stock exchange takes into consideration inflation information before pricing the stocks. Other past research such as Geske and Roll (1983) and McCarthy et al (1990), also showed a negative relationship between stock prices and inflation.

As it can be seen from the findings in the figure 2, budget deficit does not have a long run relationship with stock prices. This result coincides with the results of Barro (1974) who researched and came up with the Ricardian Equivalence Proposition (debt neutrality); this states that budget deficits do not matter. However this result contradict with the results of Frenkel and Raziin (1986) , Zahid (1988) and Geske and Roll (1983), who obtained a negative relationship between budget deficits and stock prices, which according to them arise due to uncertainty on the stock market and a lack of predictability by investors.

The estimation of the autoregressive distributed lag estimates with long run estimates using Schwartz Bayesian Criterion (SBC) is illustrated in table 6.

Table 6: Results of ARDL (1,0,0,0,0,0,1) based on SBC

Regressor	Coefficient	Standard error	T-ratio	Probability
SEM(-1)	-0.58311	0.2968	-1.9647	0.75
M2	1.3229	0.30533	4.3326	0.001
CPI	-0.73958	0.40338	-1.8335	0.94
GDP	0.552	0.12899	4.2794	0.001
BD	0.29774	0.1814	1.6414	0.129
IR	0.74653	0.31306	2.3846	0.036
EER	1.1354	1.0885	1.043	0.319
EER(-1)	-2.8886	1.2367	-2.3357	0.039
Constant	-1.6873	6.3706	-0.26486	0.796
R^2		0.97886		
Adjusted R^2		0.96349		
F-statistics		63.6779		
F significance		0		
Durbin-Watson statistics		2.5677		

The results above show that budget deficit, Consumer price index and effective exchange rate are not statistically significant whereas money supply, gross domestic product and interest rate have significant effects on stock prices. Concerning inflation, this shows that the stock market player, make correct evaluations/predictions of inflation rates before the actual inflation rate is made public. This is in line with the principle macroeconomic aim of the government of Mauritius (including that of the Bank of Mauritius), which is to stabilize the level of prices in the Mauritian economy. Aga and Kocaman (2006) also did not find a significant relationship impact of consumer price index on stock returns in accordance with the results of Rapach (2002) who showed that inflation does not affect the long run value of stocks. Concerning budget deficit, no significant was found to be caused by budget deficit on stock prices, in accordance with Barro's (1974), Ricardian Equivalence proposition. It must be noted that effective exchange rate is significant when lagged by one; this shows that that exchange rate in the past year affect exchange rate of the present year.

The other results in table 3 show that most of the variables (Money supply, Gross domestic product, Interest rate and Effective exchange rate) have significant impacts on stock prices. The adjusted square, also called R-Bar square is 0.97, which signify a high level of correlation among the macroeconomic variables. The F statistic is also significant at 1% which shows a general goodness of fit. The Durbin-Watson (DW) statistic has a value of 2.5677, which is quite close to two; this indicates the absence of autocorrelation problems.

Short-run coefficient

The Error correction model (ECM) has been used to research on the short term linkages between the macroeconomic variables as reported in table 3. The ECM based on the ARDL approach, shows that changes in money supply, gross domestic product at 1% significance level, meaning that they have a significant short term impact on stock prices. Consumer price index, interest rate, budget deficit and effective exchange rate, on their sides, are not statistically significant in the short term. The ECM findings are show in table 7.

Table 7: Error Correction Representation for the selected ARDL model

Variable	Coefficient	Standard error	T-ratio	Probability
DM2	1.3229***	0.30533	4.3326	0.001
DCPI	-0.73958	0.40338	-1.8335	0.92
DGDP	0.55200***	0.12899	4.2794	0.001
DBD	0.29774	0.1814	1.6414	0.127
DIR	0.74653	0.3136	2.3846	0.34
DEER	1.1354	1.0885	1.043	0.317
DCONSTANT	-1.687	6.3706	-0.26486	0.796
ECM(-1)	-1.5831***	0.2968	-5.3339	0
R^2		0.79501		
Adjusted R^2		0.64592		
F-statistics		6.0943		
***F* significance**		0.003		
Durbin-Watson st statistic		2.5677		

Note that * denotes a significance level of 1%**

According to the findings obtained, the short term elasticities of money supply and gross domestic product are 1.32 and 0.55 respectively. It is worth noting that the elasticity for money supply on a short term basis is higher than that on a long term; this shows that the variable takes its effect more quickly on the short term. However the elasticity for Gross domestic product is lower on the short term as compared to the long term, showing that the variable take a lapse of time to have it complete effect, and it not quickly incorporated on stock prices.

There is a high significance of Gross domestic product on stock prices on the short term, at 1% significance level. This is quite obvious as the Mauritian economy has made an average real economic growth of 4.68% from the period of 1991 to 2011, and GDP has keep on rising dramatically in the 21st century with the creation of new pillars in the Mauritian economy, such as the financial services sector. A rise in GDP, causing economic growth releases a good signal in the economy, which eventually boost the optimism of investors, leading to an increase demand for stocks in the short run. Our results is in accordance with Olukayode and onabanjo (2009) study in Nigeria, who also showed that a change in the GDP causes a significant impact on the Nigeria Stock exchange index in the short run at a significance level of 10%.

There is also a highly significant short run relationship between money supply and stock prices, at 1% significance level. Husain and Mahmood (1999) and Olukayode and Onabajo (2009) conducted studies in Nigeria and Pakistan respectively and they both obtained significant relationship between money supply and stock prices in the short run.

Concerning Mauritius, a positive significant short term relationship was found as money supply has keep increasing from 1991 to 2011 at an average annual growth rate of 12.79%. The Lombard/repo rate and the Bank rate in Mauritius has been on average 9.76% and 9.19% respectively, causing people to put their money safely in the banks and getting a good return rather than making risky investments; this has led to excess liquidity on the market in 2011. The excess liquidity on the market. Also note that the banking sector has flourish considerably from 1991 to 2011, with banking profits increasing. Increase in money supply is a sign that the banking business is good shape. The Banking sector market capitalization of the Stock exchange of Mauritius was at 83.85 billion rupees, at a percentage of 44.11% of the total market capitalization as at end of June 2011. The Mauritius Commercial Bank, one of the biggest commercial banks in Mauritius has market capitalization of approximately 24% of the total market capitalization. Thus is can clearly be seen than an increase in money supply leads is good thing for the banking sector , boosting their profits and this consequently reflects an increase stock prices of banks listed on the SEM; this increases the SEMDEX.

This is in line with the research results of many real activity economists (Sellin, 2001) who showed that changes in money supply, gives investors information on money demand, which arise due to future output expectations. A rise in money supply means that money demand is increasing and thus is a sign that economic activities is increasing and this will lead to higher cash flows in the future which consequently lead increases in stock prices.

The ECM(-1) is the one period lag value of the error terms, that we get from the long term linkages. The coefficient of the ECM(-1) given an indication of how much of the imbalance in the short term will be fixed/disappear in the long run. The coefficient of ECM(-1) is negative and is statistically significant at 1% level, and clearly shows that there is a stable long run relationship moving towards a long term cointegration between the macroeconomic variables. The coefficient of the ECM gives an overview of the adjustment channel and its speed of adjustment. In this case, the ECM coefficient is -1.58, showing that the adjustment evolution is very fast and 158% of the precedent year's disequilibrium in stock prices from its equilibrium course is going to be adjusted in the present year. Our study shows that the Stock exchange of Mauritius is very informationally efficient, just like Adam and Tweneboah (2008) who also obtained a high adjustment speed of 60%. Our results obtained contradict with that of Seetana (2011), who obtained an adjustment speed of 9.55% after each quarter. The ECM coefficient in our study can be very high and rather unrealistic as data were collected on an annual basis and a lag order of 1 has been used; maybe if data were collected on a quarterly basis and a lag order of 4 used, a more realistic figure would have been obtained. Due to unavailability of quarterly data of some key macroeconomic variables, data were collected on an annual basis.

To find, whether there is causation between stock price and the macroeconomic variables, the Pairwise Granger causality test has been used. A causality was obtained only between interest rate and stock prices. The empirical results obtained between interest rate and stock prices are summarized in table 8, for a lag order of 1.

Table 8: Granger causality tests for interest rate and stock price

	Interest rate granger cause stock price (IR→ SP)		Stock price granger cause Interest rate (SP →IR)	
Lag	F statistic	Probability	F statistic	Probability
1	4.06	0.0600*	1.87	0.1897

Note: *denotes significance at 10% level

As shown by the results of the Pairwise Granger causality test, the F-statistic for the causality test from interest rate to stock price one lag length is, 4.06, with a significance level of 0.06. Lag 1 has been chosen, as data have been collected on a yearly basis. Panda (2008), obtained similar unidirectional causality from interest rate to stock prices, when the study was conducted on the Bombay Stock exchange. This shows that changes in the interest rates disturb the discount rate in the valuation model of stock and thus affect current and also future stock value of firms' cash flows. This is because; the change in interest rate decreases/increases borrowing costs and thus affect the profitability of firms. Muradoglu and Metin (1996), Adam and Tweneboah (2008) also showed that interest rate plays an important role in explaining stock market returns

Conclusion

The short term and long term relationships between monetary and fiscal variables with stock prices have been examined in Mauritius, covering a time period of 20 years, from June 1989 to June 2011, on a yearly basis by using the ARDL approach to cointegration. As stock prices are not just affected by monetary and fiscal variables, other variables, such as gross domestic product and effective interest rate have been included in the economic model. The causal relationship between stock prices and the macroeconomic variables has been tested using the granger causality.

The empirical findings showed that the relationship between stock prices and most of the macroeconomic variables were statistically significant. A long run significant relationship was obtained between stock prices and most of the macroeconomic variables, except for budget deficit. A short run significant relationship was found between stock prices and both money supply and GDP. Therefore money supply and GDP have both short term and long term linkages with stock prices. Money supply is a key monetary variable or simply a proxy for monetary policy actions. This clearly confirms that monetary policy affects the stock exchange of Mauritius in both the short run and the long run, coinciding with past studies such as Sellin (2001) who also obtained a positive long term and short term relationship between money supply and stock prices .On the contrary, the fiscal variable, budget deficit has no impact on stock prices, neither on the short term, nor on the long term. This implies that the SEMDEX is not affected by fiscal policies in Mauritius as compared to developed countries where fiscal policies have a direct impact on stock prices. This may arise because the stock market in developing countries, like Mauritius is not as developed as those of the developed countries. Lastly, the granger causality showed a causal relationship between interest rate and stock prices; a unidirectional relationship from interest rate to stock prices was obtained.

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