

Progress in Economics Research

Volume 51

The background of the lower half of the cover features a faint, stylized graphic. It consists of a line graph with several data series, each represented by a thin line with small circular markers at data points. Below the line graph is a bar chart with numerous vertical bars of varying heights. The entire graphic is rendered in a light gray color, creating a subtle, professional look.

Albert Tavidze
Editor

NOVA

Progress in Economics Research



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Albert Tavidze

Editor

Progress in Economics Research

Volume 51



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Preface

This volume includes eight chapters that detail recent progress in economics research. Chapter One uses the Ordinary Least Squares regression with robust standard errors to test for a relationship between nominal exchange rates and indexes. Chapter Two evaluates quality of life, using the human development index (HDI) as a proxy, in two countries: the United Kingdom and Qatar. Chapter Three details the growth story of emerging market economies, as well as prospects and challenges to suggest to policymakers the direction of an apt policy design. Chapter Four gives answers to the following academic and practical questions: “What is Agrarian Governance?” and “How to Assess Agrarian Governance?”. Chapter Five examines the effects of Bill Clinton’s income tax reform on welfare by conducting various computational experiments using a dynamic general equilibrium model. Chapter Six analyzes the economic performances of 18 emerging market economies (EMEs) over a 30-year sample period as well as attempts to identify changing dynamics after the global financial crisis (GFC). Chapter Seven discusses how the economy can be divided into two components – “constructive” and “speculative”. Finally, Chapter Eight details the relationship between taxation, affordability, and expenditure in the cigarette market.

Chapter 1

The Effect of Nominal Exchange Rates on the Indexes of the Domestic Stock Market Index: Evidence from Argentina, Brazil, Colombia, and Mexico

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Abstract

The nominal exchange rates used in this paper will be the USD/ARS (Argentina), USD/BRL (Brazil), USD/COP (Colombia), and the USD/MXN (Mexico). As to the index's SP Merval is used for Argentina, BOVESPA is used for Brazil, COLCAP is used for Colombia, and BMVIPC is used for Mexico. This paper will use the Ordinary Least Squares regression with robust standard errors to test for a relationship between the nominal exchange rates and the indexes. Secondly, the Granger causality model will be implemented to establish whether the variables have forecasting power. Lastly the GARCH-M model is used to test whether the volatility can be explained by the past volatility.

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Introduction

The stock exchange is a highly regulated platform which enables investors to trade financial securities. Most commonly it is associated with the trades of ordinary shares of the companies which are listed on the exchange. For a company to be listed on the exchange it has to go through a rigorous financial assessment before it is granted permission to trade its shares on the market. However, other financial instruments such as bonds and depositary receipts are also traded on the exchange. Since the beginning of stock exchanges scholars and investors have been attempting to understand the concept of how the stock markets work. Are there any indicators that could help predict the stock market? For the investors this could be the most important question for which they might seek an answer for. Afterall, if a variable would be able to predict and forecast the stock market, it would allow the investors to exploit it to create arbitrage. However, an answer has not been found, with the high volume of the literature surrounding the stock market.

The importance of the stock markets to the economy is vastly known, as the inefficiency and the poor performance can have detrimental effects not only on the domestic level but also on a global scale. This paper will aim to not only deepen the understanding of how the exchange rates could affect the market, but also fill in the gaps within the literature. The majority of the literature focuses on the effects of exchange rates in Asian and African nations, mostly in the times of the financial crises. However, the focus of this paper will be on the vastly omitted region of Latin America. The paper will analyse the nominal exchange rates with the US Dollar and conduct empirical tests whether they influence the domestic stock market indexes.

The nominal exchange rates used in this paper will be the USD/ARS (Argentina), USD/BRL (Brazil), USD/COP (Colombia), and the USD/MXN (Mexico). As to the index's SP Merval is used for Argentina, BOVESPA is used for Brazil, COLCAP is used for Colombia, and BMVIPC is used for Mexico. This paper will use the Ordinary Least Squares regression with robust standard errors to test for a relationship between the nominal exchange rates and the indexes. Secondly, the Granger causality model will be implemented to establish whether the variables have forecasting power. Lastly the GARCH-M model is used to test whether the volatility can be explained by the past volatility.

Aims and Objectives

The aim of this study is to conduct an empirical analysis on the effects of the nominal exchange rates on the domestic stock market indexes. The study will aim to achieve this by comparing the returns of the nominal currencies to the returns of the indexes. The study will aim to achieve this by using the data available over a ten-year period between January 2010 and December 2020 using weekly intervals. Lastly, the research will try to draw conclusions of any possible relationship between the variables.

Research Questions:

1. Does the nominal exchange rate of the Argentinean Peso have a significant effect on the SPMERVAL?
2. Does the nominal exchange rate of the Brazilian Real have a significant effect on the BOVESPA?
3. Does the nominal exchange rate of the Colombian Peso have a significant effect on the COLCAP?
4. Does the nominal exchange rate of the Mexican Peso have a significant effect on the BMVIPC?

Overview of the Sections

The remainder of this study will focus on the theoretical ideologies which will aim to provide some foundations as to why and how the results reported might have come to existence. The section will tie up the theories between the exchange rates, the stock market and how they all might be linked together. This will be followed by the review of the past literature which is available, and the evaluation of the previous studies. This will provide a deeper understanding on the previous results and conclusions reached by the scholars. The methodology and description of data will follow to present the empirical framework of this paper. This will be followed by the report of the empirical results, which were obtained using the empirical framework set in the section leading before. The discussion of results will follow. In this section the researcher will make further comments on the empirical results and comparing the findings to previous literature. In addition to this, the discussion section will aim to evaluate the study and bring forward issues which the study might have omitted. The conclusion will summarize the findings and will be followed by a section of recommendations for further research.

Theoretical Framework

Emerging Market Economy

Emerging market economies can be described as the development of a nation's markets and the integration with the global markets. This can be a very lucrative prospects for investors as developing economies can have a higher potential for growth in comparison to already established markets. However, the prospects are not without drawbacks as the markets are well known for the higher volatility and therefore are a higher risk investment. Aggarwal et al. (1981) suggested that the emerging economies such as Argentina were highly susceptible to the country specific political, social, and economic events which resulted in large volatility shifts. However, the higher risk is not the only difference which can be observed in emerging economies in comparison to the developed markets. Caramazza and Aziz (1998) suggested that developed economies have taken on the flexible exchange rate whereas the emerging markets preferred the pegged exchange rate. However, with the expansion of globalisation more emerging economies have started to adapt the floating exchange rate as the inflation rate has gradually decreased for the floating rate. Furthermore, for a pegged exchange rate to hold it needs to be credible and still flexible enough for the shocks caused by economic events. In addition to this, Feenstra (2014) suggested that in the flexible exchange rates regime the government does not interfere with the valuation of the currency, which can lead to a wider range of appreciation and depreciation.

The Concepts of Currency Appreciation and Depreciation

Salvatore (1995) describes the concept of depreciation as an increase in price of the foreign currency in the domestic market. The concept of appreciation can be explained as a decrease in price of the foreign currency in the domestic market. This therefore means that as the domestic currency appreciates in value the more buying power it has against the foreign currency. Since the floatation of the exchange rate is based on the supply and demand of the currency, it can be used as an indicator of how international investors perceive the currency. If the investors see the market as a high potential for investment, then the currency should appreciate by the laws of supply and demand. However, Sakti and Harun (2013) suggested that the value of the domestic

currency can have, both, a positive and a negative effect on the domestic stock market. This is because the effect of the change in value of the currency will be dependent on the ratio of imports and exports in the economy. Therefore, if the economy is focused mainly on exports a depreciation of the domestic currency can have a boosting effect on the local stock market as the volume of exports could potentially increase. This could further boost the GDP of the country, further supporting its transition into a developed economy. However, the appreciation of a currency could make the imports cheaper while the demand for exported goods might decrease due to businesses not wanting to decrease their profit margins. The work of Davidson (2009) suggests that this can be explained by the Marshall Learner condition where a depreciation of the currency can result in an improvement of the country's trade balance. However, as the floating exchange rate is based on the supply and demand law, leading to the changes being short term the Marshall Learner condition might not be satisfied (Södersten and Reed, 1994). This could therefore suggest that emerging markets could use a pegged exchange rate regime, where they control the exchange rates through the introduction of policies. This would allow the government and the bank of the country to devalue the currency for a prolonged period which could satisfy the Marshall Learner condition.

The Trade Balance and the J Curve

The trade balance of the country refers to the value of the difference in the country's exports and imports. A nation which exports more goods than it imports can be said to have a trade surplus, whereas the country with higher value of imports has a trade deficit (Mankiw and Taylor, 2011). This therefore suggests that the nation's trade balance might be affected by the changes in the exchange rate fluctuations. This effect can be described in the terms of a J curve which is dependent on the Marshall Learner condition. The Marshall Learner condition suggests that the depreciation or devaluation of the currency will be met by an initial decrease in the trade balance. However, if the Marshall Learner condition stands then the trade balance will recover and eventually surpass the initial performance. The work of Rose and Yellen (1989) proposed a symmetric linear model which were used for defining the J-curve and the short-term deterioration in trade and the long-run improvement. However, Shin, Yu, and Greenwood-Nimmo (2014), introduced the asymmetric and error-correction model which has created new interest into the J-curve phenomenon.

The asymmetric analysis uses non-linear models which separate the appreciations from the depreciations in the real exchange rates.

The study of Petrović and Gligorić (2010), has found the existence of the J curve in the Serbian economy. The findings concluded that a 1% change in the real depreciation results in a 0.92 to 0.95 percentage increase to the trade balance. Furthermore, the work of Raza et al. (2013) suggests that an inverse relationship can be observed between the exchange rates and the trade balance caused by inelastic imports and exports. Therefore, the extent of the benefit that a country might experience from a depreciation or appreciation of a currency depends on the elasticity of the imports/exports. Further, the study of Kansel and Bari (2020), suggested that in the case of Turkey the trade balance has a negative relationship with the real effective exchange rate. The researchers suggest that this relationship could be explained by the high level of imports in commodities such as oil and natural gas which is required for Turkey's manufacturing and exporting industry.

The study of Iqbal et al. (2021), has applied linear analysis using ARDL models which were used to research the effect of the real exchange rates on the trade balance in Pakistan. The researchers have found that in the case of Pakistan the exchange rates do not have a symmetric effect on the trade balance. However, the research presented changes in results for some countries when the non-linear model was implemented, illustrating that the exchange rates did influence the trade balance as evidence for the J-curve has been discovered. Similarly, the work of Ibrahim and Bashir (2021), has also used non-linear model and correction models for cointegration. This resulted in the conclusions that the devaluation of the currency did not have a significant positive long-term effect on the trade balance in Sudan.

Trade Balance and the Stock Market

The trade balance could have significant implications for the stock market. Firstly, although a negative trade balance might be viewed negatively it could suggest that the economy is developing as it is importing more goods to aid its growth. However, it could also suggest that the country's goods are not as high quality as competing nations, resulting in a struggle to export the domestic goods. However, Thorbecke (1994) has suggested that the US crash in 1987 could have been caused by the high deficit which the US had in the 1980's. This resulted in a decline for US manufactured goods which could have resulted in a poor performance of US exporting firms. This would decrease

the stock price of the exporting firms. Although, the study of Bhattacharya and Mukherjee (2003) has concluded that the effect of trade balance on the stock market was not significant at both 5% and 10% significance level. However, Antonakakis, Gupta, and Tiwari (2018), suggest that the trade balance can have an impact on the stock market. This is because the trade balance can have inflationary effects which could lead to changes in policies which can increase the interest rates, resulting in a decrease in stock market investments. Further, the study suggests that the correlations between the trade balance and the stock market are following a heterogeneous trend overtime. Antonakakis, Gupta, and Tiwari (2018), also suggest that in the modern economic framework there is a negative correlation between the two variables. However, the study also suggests that a time varying casual approach with the use of wavelets could be used to determine the causality effects on short-term to long-term basis. In addition to this, Alam et al. (2020) found that a relationship between the trade balance and the stock market exists in the case of the Shanghai exchange, however, the relationship is of a positive nature.

Integration of Exchange Markets

The concept of market integration allows the trade of services in other economies. This means that the economies can trade intensively without any formal trade agreements being in place. Therefore, it introduces the concept of trade liberalisation (Aminian, 2008). This can benefit the economies by stimulating the markets as well as the infrastructure which can have a positive effect on the trade balance of the domestic and foreign economies. Further, the integration could result in the prices of goods following a similar pattern over time, as suggested by the PPP.

One of the ways to test for the integration of the markets is the use of Johansen (1988) cointegration tests. The test uses the regression of stock market indexes of the markets which are tested, this provides residuals from the regression model. If the residuals are stationary, then this suggests that the markets have a long-run relationship with each other.

Exchange Rates

The exchange rate can be described as the rate at which the domestic currency trades against a foreign currency. The exchange rates can be explained in two

different ways: nominal and real exchange rate. The nominal exchange rate can be described in the terms of the value which it trades at compared to another currency. This means that the main determinant of the nominal exchange rate is subject to the laws of supply and demand (Mankiw and Taylor, 2011). On the other hand, the real exchange rate is determined by the quantity of foreign goods a person can exchange for a specific amount of domestic goods (Mankiw and Taylor, 2011). One of the theories which suggest the determination of exchange rates is the Purchasing Power Parity.

Purchasing Power Parity

The purchasing power parity (PPP) is a theoretical idea of how the exchange rates are determined. The theory suggests that the changes that occur in domestic and foreign relative price levels over a period of time determine the exchange rate between the two currencies (Dornbusch, 1985). This is because there should be a high correlation in the aggregate price levels as the law of one price should force parity in prices over a range of individual goods (Rogoff, 1996). In essence a unit of the domestic currency should have the same purchasing power in a foreign market. The PPP can be broken down into two sections where the PPP might hold. Firstly, the absolute PPP suggests that one unit of domestic currency will have an exactly the same purchasing power in a different country. However, this uses a standardised basket of goods, and therefore it might be hard to determine whether the same goods are available two different countries. This therefore means that the relative PPP is usually tested. This is because the relative PPP offsets the difference in inflation rates by holding a percentage change in the exchange rate over a specific period. If the absolute PPP holds, then the relative PPP must also hold. However, if the relative PPP holds the absolute PPP does not have to hold.

Over the years many scholars have tested whether the PPP stands. The study of Al-Gasaymeh et al. (2019) has found evidence that the PPP stands in the case of India and Pakistan. The study suggests that the PPP stands as the markets are cointegrated with each other.

Macroeconomic Factors

The study of Sarno et al. (2016), suggests that the main macroeconomic factors which can have implications for the value of an exchange rates are the

productivity, quality of exported goods, net foreign assets, and the output gap. Sarno et al. (2016) suggest that the productivity of the domestic economy can have a positive effect on the exchange rates. This can be due to the fact a more productive economy might seem as a more lucrative economy to invest in. In addition to this, Sarno et al. (2016), suggest that if the PPP holds then an increase in productivity can have a positive effect on the non-tradable sector which is linked with an increase in the tradable sector. This can lead to a higher disposable income of the population which lead to higher price levels. Further, the study suggests that countries with higher quality of exports can have a stronger real exchange rate. This is because the goods are bought in the domestic currency, through the use of exchange rates and therefore increasing the demand for the domestic currency. Finally, the output gap can also affect the exchange rates due to its importance to central banks which control the monetary policies.

Portfolio Approach

The portfolio approach suggests that a negative relationship exists between the exchange rates and the stock market. This is because as the domestic stocks increase in value more of the investors will turn to the domestic products. This in turn will increase the demand for the domestic currency and will encourage the investors to sell foreign assets. This could result in an increase of the interest rates which could foreign investment into the domestic market. This could result in the domestic appreciating against the foreign currency which shows a negative relationship (Sarno et al., 2016).

Traditional Approach

The traditional approach suggests the existence of a positive relationship between the exchange rate and the stock market (Sarno et al., 2016). The theory suggests that as the currency depreciates it leads to domestic firms becoming more competitive which could lead to an increase in overall exports. This in turn will lead to the performance of domestic companies increasing, creating more demand for shares. This, in theory, should result in an improvement of the overall domestic stock market. However, this also suggests that currency appreciation could result in the loss of competitive advantage for the domestic businesses, which could lead to a downturn in the

stock market's performance. However, Mensah (1982) stated that there are limitations to this approach. The traditional approach suggests that the change of exchange rates induces a change in the trade balance then this implies that the exchange rate is the relative price of the country's output. Whereas the Asset market approach suggests that the exchange rates are the relative price of the monies.

Asset Market Approach

On the other hand, the asset market approach suggests that there is weak or no interaction between the exchange rates and the stock market (Sarno et al., 2016). This is because the theory suggests that both variables are driven by different factors. Mensah (1982) suggested that the main emphasis of the model is the way it perceives stocks of national monies and financial assets. The model suggests that the availability of monies stocks and financial assets must be equal to demand for the assets to create equilibrium. However, the model implies that all assets that can be held by investors are perfect substitutes for each other but not the monies.

The Efficient Market Hypothesis

The efficient market hypothesis states that the markets operate efficiently and therefore the prices of the financial securities which are traded are reflected by the information available. This suggests that the securities will always trade at their fair value and therefore it is impossible for the investors to buy and sell undervalued/overvalued securities. Further, the theory suggests that the investors will not be able to take advantage of using trading techniques to create arbitrage. This means that the only way for investors to maximize their returns is through investment in higher risk securities. The theory can be distinguished into three different forms of strength: the weak form, semi-strong, and strong.

The weak form of the efficient market hypothesis suggests that the stock prices already illustrate the information which can be obtained from historical data, such as past prices, volumes, and short interest. This therefore suggests that analysis of the past data will not provide any advantage to the investors and therefore cannot be used to create arbitrage. This is because the data is easily obtainable and therefore if data could be exploited the investors would

be able to exploit it to create arbitrage. Furthermore, this is the stage at which the random walk hypothesis starts to apply. This suggests that the prices of financial assets are random and therefore cannot be predicted (Malkiel, 1989).

The semi-strong version builds on the foundations of the weak form, and therefore states that the historical data is reflected by the prices of the financial assets. However, unlike the weak form of the hypothesis, it also suggests that the information about the firm's performance. This type of data can include financial statements, firm's portfolio, and quality of management. This form could apply more in today's times than when the theory first was suggested due to the development of the digital era, making this information available to everyone.

Finally, the strong form of the efficient market hypothesis suggests that the historical data and firm's performance cannot be used to create arbitrage. However, the strong version also suggests that all of the information which exists is reflected in the price of the assets. This means that the information held by the insiders of the company is also reflected in the prices.

Literature Review

Over the years many researchers have debated on the topic if macroeconomic variables can be used as indicators to create arbitrage in the stock market. Although many studies concentrate on multiple macroeconomic factors, some have searched for a relationship between the exchange rates and the stock market in emerging economies. This section of the research will concentrate on reviewing the literature on the effects of the exchange rates and the stock market which is available up to date.

The study of Ajayi, Friedman and Mehdian (1998), has studied the Granger causality between the exchange rates and the stock market. The study conducted the analysis on daily data on seven developed economies from April 1985 to August 1991 and data for emerging markets from December 1987 to September 1991. The study has found existence of uni-directional Causality in the case of the developed economies. However, the Granger model has failed to find any significant relationship in the case of the developing economies (Romei, 2019). Further the study has also provided an insight into the contemporaneous determination as the study has found significance in the case of the developed economies but has found the adjustments to be weak in developing economies. The findings are supported by the study of Ibrahim (2000) which concentrated on the Granger causality

in Malaysia. Although the study has suggested that the bivariate model has failed to illustrate a long-run relationship between the two variables. However, when expanded into a multivariate model, the study has found a uni-directional Causality between the stock market and the exchange rates. Further, the study suggests that, both, the stock prices and the exchange rates adjust to the correct deviation in the long term. The study therefore suggests that the exchange rates might have a useful role for the economy in the short run. Similarly, the researcher of this paper will conduct a Granger causality test in the form of the bi-variate model.

The research of Granger, Huangb, and Yang (2000) suggests that the during the Asian flu the exchange rate had a leading effect on the Korean stock market. However, the reverse relationship was found in the cases of the Hong-Kong and the Philippines. The four other economies were found to have the exchange rates can lead the prices in the stock market and vice versa. The study concluded that the results obtained are relative to the findings which are suggested by the portfolio approach. In addition to this, the work of Fang and Miller (2002) has studied the effects of currency depreciation on the Korean stock market during the Asian financial crisis. However, the study researches the relationship by the use of the GARCH-M model rather than the Granger causality model. The study finds that the depreciation has a statistically significant negative relationship with the stock market. This therefore suggests that the results can be explained by the portfolio approach just like in the work of Granger, Huangb, and Yang (2000). Further, the use of the GARCH-M model allows for the study of volatility between the variables. Fang and Miller (2002) have found that a positive relationship exists between the volatility of depreciation and the stock exchange. The study of Paik (2014) aimed to research the relationship between the currency value and the stock market in the case of South Korea. The study finds a negative correlation between the currency value and the stock market. The results of the study suggest a similar relationship between the variables as the other studies mentioned before. However, the study of Paik (2014) finds that the results are not conclusive as they are not conclusive as the results vary at different time periods. This is because the study finds the correlation between the variables to fluctuate, in the sense that the correlation is present at some points but missing at other times.

The study of Sakti and Hauran, (2013), aimed to test the relationship between the macroeconomic factors and the Islamic stock market. The findings suggest an existence of a negative relationship between the exchange rates and the stock market. However, the researchers suggest that the

relationship could be negative or positive for other economies. The researchers propose that the composition of the economy and its trade balance could have an effect on the type of relationship that is observed. This is a crucial suggestion for the researcher in this paper, as it outlines the importance of considering the type of the economies that are being tested. The researcher must establish the composition of the markets that are being tested and compare the findings to the trade balance of the nations.

On the other hand, Patro et al. (2014) have conducted a study into the devaluation of a currency by the central bank. The study concluded that the devaluation of the currency by the central bank can have a negative relationship with the stock market. However, the study suggests that this effect is a short-term effect as the effects last only up to the first quarter following the announcement of devaluation.

The majority of the studies are focused on the Asian market in the times of financial crisis. This creates a large proportion of literature being tied to the specific continent. However, this creates a gap in the literature within other continents. The researcher of this paper, unlike other studies, will aim to conduct the research in the widely omitted Latin American region. Similarly, the researcher has decided to implement the GARCH-M model within the research. This is because the volatility of the emerging markets and the exchange rates must be taken into consideration. However, the researcher has decided to not focus on a specific event, to attempt to find the relationship between the exchange rates in a larger picture. However, the research in this paper will use weekly data to allow the events to settle.

On the other hand, the study of Dimitrova (2005) has studied the effect of exchange rates on the stock market using data for the US and the UK. The study finds evidence that a depreciation of the exchange rate can result in a downturn in the stock markets in the UK and the US. The study suggests that the stock market can experience a downturn of less than one percent for a depreciation of one percent of the currency. However, Dimitrova (2005) acknowledges that the statistical significance of the results is rather weak. These results could differ from the previously discussed due to the nature of the US and the UK's economy. Both of the countries have been developed economies for a long period of time and have a large trade deficit. This suggests that the nations import more than they export. Therefore, for the economies such as the US and the UK it might be more beneficial to have a stronger exchange. Furthermore, the work of Batori, Tsoukalas, and Miranda (2010) studied the effect of exchange rates on the stock market in the case of European countries. The study uses cointegration analysis, VEC and VAR

models and the Granger Causality test. The study has found that the decrease in the exchange rate will be mirrored with a decrease in the stock market. The authors suggests that this could be due to the fact that the foreign direct investment might have a larger effect on the stock market than the benefits the exporting firms might experience from the depreciation. Further, the study suggests that the markets are integrated and therefore no causality can be observed from the Granger test. Similarly, Nefir et al. (2021), researched the relationship between the macroeconomic factors and the UK stock market. The results have indicated that the exchange rates have the highest effect on the UK stock market. Correspondingly to the previous studies into the developed markets, Malika et al. (2021), found a positive correlation between the exchange rate and the stock market. The researchers attribute this phenomenon to the idea that appreciation of the UK sterling will attract higher levels of foreign direct investment. In addition to this the findings of Kumar (2017) suggests that no long-term relationship can be observed between the macro variables and the US stock market. Therefore, the study suggests that the relationship only exists between the exchange rates and the stock market in the short-term. The study uses monthly data, on which the researchers employ the ADF model to test the stationarity of the data. Further the researchers use the Granger causality model to test for an interaction between the variables.

The results obtained in the literature which focuses on the developed economies vary vastly to the findings reported from the results reported in the developing economies. Firstly, the results suggest that a positive relationship between the variables exists, rather than the relationship of a negative nature in the emerging markets. This could be a result of several factors. Firstly, the developed economies are perceived as a lower risk and therefore the demand for their currency might be higher. Secondly, the more stable economy might be more lucrative to the foreign investors than the high volatility emerging economies. Thirdly, it is more beneficial for developed economies to hold a stronger currency than the emerging markets as they tend to be in a trade deficit.

After the review of existing literature, the researcher has been able to identify some interesting suggestions. Firstly, the review of literature varies vastly in the methodology which is used for the studies. Some of the reviewed literature simply uses correlation and regression. However, the main model which are consistently used over the reviewed literature is the Granger causality model. The researcher will implement this model as it can be an important tool to establish the relationship between the variables. Further, the

researcher will implement the GARCH-M model to analyse the volatility between the variables. This has been widely omitted in the literature discussed previously. However, both the stock market and the exchange rates are subject to volatility, and therefore it can be advantageous to test the relationship of the volatility to obtain more meaningful models. Although regression has been used to test the relationship between the variables, the problem of heteroscedasticity can be easily missed. To ensure the validity of the models the researcher will use the robust standard error to account for this, as well as analysing the residuals from the regressions.

Data and Methodology

Data Description

The study will be carried out in a quantitative manner and therefore will use secondary data. The study will rely on the data collected on Yahoo finance. To accommodate for the constant changes in the exchange rates weekly data will be used and will cover the period of January 2010-December 2020. The data will include 537 observations for each of the stock market indexes and exchange rates. Previous studies have implemented either monthly or daily observations in the study. However, the researcher has decided to use weekly data. This is because the exchange rates and the stock markets, especially in emerging economies, are volatile. Therefore, to accommodate for this the researcher has decided to use weekly data rather than monthly. However, there could be a delay between the impulse and the response and therefore the use of daily data might not be appropriate.

Independent Variables (RHS)

The research aims to find the effect of the exchange rates on the stock market and therefore the exchange rates will set as the independent variable. The exchange rates can be explained in two different ways: nominal and real exchange rate. The nominal exchange rate can be described in the terms of the value which it trades at compared to another currency. This means that the main determinant of the nominal exchange rate is subject to the laws of supply and demand (Mankiw and Taylor, 2017). On the other hand, the real exchange

rate is determined by the quantity of foreign goods a person can exchange for a specific amount of domestic goods (Mankiw and Taylor, 2017). The researcher will use the exchange rate between the domestic currencies compared to the US Dollar, as most commodities are traded in USD. This will further reduce the bias which could occur from the appreciation of the currency to which the domestic currencies are compared to. The Independent variables will be the Argentinean Peso, Brazilian real, Colombian peso, and the Mexican peso.

Dependent Variables (DV)

The dependent variables will consist of the indexes of the local stock markets. The Argentinian stock market Buenos Aires Stock Exchange was founded in 1854 and was capped at \$140Bn in 2018. The main index for the analysis of the performance is the Merval index which the researcher has decided to use in the study. The Brazilian stock market has been founded 1890 and has since developed to be one of the largest stock markets in the world with a cap of \$1tr in 2018. The researcher has decided to use the BOVESPA index as a dependent variable for the Brazilian stock exchange. The Colombian stock exchange, BVC, came into existence from the mergers of three different local stock exchanges in the 20th century. The index for the Colombian stock market is COLCAP which will be used as a dependent variable in this paper. Finally, the Mexican stock exchange was founded in 1933, since then the BMV has developed into one of the largest stock exchanges in the Latin America with a cap of \$530bn in 2020. The index used by the researcher will be the BMV IPC.

This study will use nominal exchange rates as the RHS and the index of domestic stock markets as the DV. Since the Indexes are composed of domestic firms with the highest market cap in the domestic stock market, they include many of the local exporting firms which will have to use the exchange rates for international transactions. Since many of the firms trade in commodities the exchange rates for the commodities are usually traded in dollars. Hence, the use of the nominal exchange rate being paired with the USD.

Methodology

This paper will use three main econometric models for the analysis of data. The first model will be the Ordinary Least Squares (OLS). This will be used to establish whether any relationship exists between the domestic exchange rates and the domestic stock market. Secondly, the Granger Causality model will be applied, this will allow the researcher to examine the relationship between the exchange rates and the stock exchange. Thirdly, the GARCH-M model will be applied to test for the dependence of the returns on volatility.

To begin with the correlation matrix will be employed on all the domestic exchange rate and the stock exchange index. This will allow the researcher to gather information if any relationship is present between the domestic exchange rate and market. One of the largest problems that arises from analysing time series data is the bogus regression. This can occur when the data is nonstationary, which can create unreliable results leading to false conclusions. To tackle this issue the researcher has decided to employ the Augmented Dickey-Fuller test (ADF). This will allow the researcher to test whether the data is stationary or nonstationary. To obtain the full understanding of the model the correct number of lags will be determined by the Akaike Selection Criterion (AIC) using Stata. If the first set of data will be nonstationary the AIC will be used to test for stationary data by increasing the number of lags used.

Many researchers in the past have used the Johansen Cointegration to test cointegration of variables. The Johansen cointegration test is usually employed when there are more than two variables in the model. However, since the ADF has provided that the variables are stationary, the Johansen Cointegration test can be omitted. This is because the OLS model will not suffer from bogus regression as all variables can be described as stationary through the ADF.

Augmented Dickey Fuller Test (ADF)

The Augmented Dickey-Fuller test is a frequently employed statistical tool when dealing with univariate time series data. The ADF allows to test the null hypothesis which suggests that the data has a unit root and therefore is nonstationary. If the unit root is not detected, then the alternative hypothesis is accepted at the specified significance level as specified by the model. The