The Impact of fluctuation Margin Under Pegged Exchange Rate Regimes on Economic Growth

أثر معدل ربط العملة وفقا لأنظمة اسعار صرف العملات المربوطة على النمو الاقتصادي

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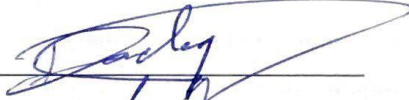أثر معدل ربط العملة وفقا لأنظمة أسعار صرف العملات المربوطة على النمو الاقتصادي

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Acronyms

FDI   Foreign Direct Investment

GDP   Gross Domestic Production

GMM   Generalize Method of Moments

IMF   International Monetary Fund

OCA   Optimum Currency Area

LLC   Levin-Lin-Chu test

IPM   Im-Pesaran-Shin

Abstract

In the last two decades, several studies studied the impact of exchange rate regimes on economic growth. For the purpose of studying the relation between pegging margin for pegged exchange rate regimes and economic growth, a panel dataset of 53 countries for the period 2000 – 2017 is used in this thesis. The study utilizes the generalized method of moments (GMM) to analyze the impact of pegging margin for pegged exchange rate regimes on GDP per capita. The results show that the growth rate is higher in countries with the higher fluctuation margin for exchange rate. In countries with no margin, the growth rate is the lowest. Moreover, the other control variables show that economic growth is enhanced by higher secondary schooling, lower government consumption as share of GDP, better maintenance of the rule of law, lower inflation, more of FDI and improvements in the terms of trade. Moreover, the results revealed that soft peg is less harmful than hard peg to economic growth.

ملخص

أولت الدراسات الاقتصادية اهتماماً كبيراً في العقدين الأخيرين لبحث أثر أنظمة سعر الصرف على النمو الاقتصادي. هدفت هذه الرسالة إلى دراسة أثر معدل ربط العملة على النمو الاقتصادي ضمن أنظمة أسعار صرف العملات المربوطة لـ 53 دولة من مختلف دول العالم التي تتبنى نظام صرف العملات المربوطة خلال الفترة الزمنية من عام 2000 الى 2017. اعتمدت الدراسة على تحليل نموذج GMM في تحليل البيانات لدراسة أثر معدل ربط العملة إلى جانب متغيرات ضبط كمعدلات التضخم والاستثمار الاجنبي والانفاق الحكومي و الاستقرار السياسي والتجارة الدولية بالإضافة الى رأس المال البشري على النمو الاقتصادي. كشفت النتائج أن هناك أثر إيجابي لمعدل ربط العملة على النمو الاقتصادي، فالدول التي تعتمد معدل أعلى لربط العملة حققت نمواً اقتصادياً أكبر من الدول التي تتبنى معدل ربط أقل للعملة.

Chapter 1: Introduction

1.1 Preamble

In the last few decades, the relation between exchange rate and economic growth has widened the attention of macroeconomists, policy makers and central bankers in both developed and developing countries, and the exchange rate policy remains as one of the most indicators that shapes the economic growth in the developing countries, and give it the priority of governments to manage all the time, thus because the external sectors depends on the exchange rate of local currency in terms of foreign currency (Uddin, Rahman & Quaosar, 2014).

After the announcement of Bretton Woods system in 1944 the currencies where pegged to US dollar, this economic turnover increased the uncertainty about its effect on the key macroeconomic variables specially the effects on economic growth. Then Nixon Shock in 1971collapsed the Bretton Woods system and a new floating exchange rate regime appeared in the foreign exchange market. As a result of economic volatilities the focus of economic research started to answer on two questions: Is there an impact of exchange rate regimes on macroeconomic variables? And how exchange rate regimes enhance economic growth? According to Ismaila (2016), the exchange rate in any perception is not only the relative price which connects the domestic and global markets for goods and assets, but it also points to its competitiveness power visa of a country versus the rest of the world. The researchers as Akpan and Atan (2012) explained that exchange rate policies in developing countries are very controversial and sensitive due to the structural changes as expanding exports or reducing imports, that leads to depreciation of local currency and affects demand and prices then enhance economic growth in the short run. But Isaac (1995) outlined the basic mechanism by which the exchange rate policy may influence economic growth under pegged exchange rate regime, he explained that the devaluation affects the real exchange rate and make exports more competitive and imports more expensive, that increases the trade balance and income. This is not the end of the story, when income increases the aggregate demand will increase

then rises prices and a rise in prices will increase imports and reduce exports. Because of exchange rate impacts on business and economy in general, investors and entrepreneurs prefer a stable exchange rate over more volatile exchange rate (Danladi & Uba, 2016).

Maintaining a fixed exchange rate restricts the monetary policy of central banks. Obstfeld and Rogoff (1995b) found that many countries officially adopting a pegged exchange regime could not maintain its commitment of fixed exchange rate. The loss of credibility in maintaining a fixed exchange rate had inset these countries in economic crises.

For small open economies there is more consensus that the best choice is a fixed exchange regime (Breedon, Pétursson & Rose, 2012). However, at least to our knowledge, the question of pegging margin has not been investigated. The IMF classification of *de facto* exchange rates for pegged regimes has three margins of exchange rate pegging; a completely fixed exchange regime using dollarization or currency boards, within 1% margin, or within 2% margin.

1.2 Study Objective

The main objective of the study is to investigate the effect of pegged margin in the pegged exchange rate regimes on economic growth in the study's sample countries, and it aims to find evidence that countries adopting a pegged exchange regime within a margin of exchange rate deviation 2% have higher growth rates or not.

1.3 The Problem Statement

This study aims to analyze the effect of fluctuation margin of pegged exchange rate regimes on economic growth, due to the importance of exchange rate volatility in the foreign exchange market in the world. The study will investigate the following questions:

1. What is the effect of fluctuation margin of pegged exchange rate regime on economic growth in the study's sample countries during the period of (2000-2017)?
2. How did the GDP change over the period 2000-2017 in the study's sample countries?

3. How did the Inflation rate, government spending, human capital, political stability, trade openness, population and FDI change over the period 2000-2017 in the study's sample countries?

4. What is the effect of Inflation rate, government spending, human capital, political stability, trade openness and foreign direct investment on economic growth under different pegged margins of pegged exchange rate regime in the study's sample countries during the period of (2000-2017)?

1.4 Significance of the Study

The importance of the study comes from the lack resources and research that investigated the impact of pegging margin on economic growth under pegged exchange rate regimes especially that more than 55% of countries according to IMF report (2017) adopting the pegged exchange rate regime. Then the long debate about whether the pegged exchange rate regimes lead to higher economic growth under different pegging margin . The optimal currency area theory which is the first theory of exchange rate explained the factors that affected on exchange rate and confirm that the stability of exchange rate is needed to enhance economic growth (Mundell, 1961), but it didn't determine the extent of pegged margin to achieve higher economic growth. If the study determines the pegged margin that lead to the highest economic growth, it will lead policymakers to adopt that margin in order to achieve economic growth. By such, this study can lead the way to enable researchers to move forward in investigating and developing the currency peg in the economic research field.

1.5 Study Scope

The analysis includes 53 countries that adopt pegged exchange rate regime. The list of countries is presented in Appendix A. Annual time series data will be used from 2000 to 2017 according to World Bank data base.

1.6 Structure of the Study

The study consists of: Chapter 2 which reviews the literature that focused on the exchange rate regimes effects on economic growth using different samples of countries. Chapter 3 includes the theoretical framework and explains the main related theories to the investigation. Chapter 4 represents the model and methodology that the study follows to find the results. Chapter 5 reviews the descriptive analysis for the study's variables in the study's sample countries. Chapter 6 includes the empirical an estimation result. And finally, Chapter 7 includes the conclusions and recommendations.

Chapter 2: Literature Review

For many years, researchers studied the relationship between exchange rate regimes and economic growth from the 19th century onwards. Since the economic theory did not explain the nature of this relationship nor did it specify which system should be adopted to achieve the highest economic growth, researchers tried, theoretically and empirically, to find which regimes can be result in higher growth rate. Thus, the determination of the impact is still debated and ambiguous until now.

For Obstfeld and Rogoff (1995a), the exchange rate dynamics depend on price setting. When prices are rigid in the short-run, consumption response to interest rate shocks is smooth. They developed a theoretical model to find that exchange rate dynamics is determined by consumption dynamics. For Devereux and Engel (1999), the optimal choice of exchange rate regime, in terms of welfare, depends on the price setting. When prices are set in the consumers' currencies, floating exchange regimes are preferred to fixed regimes. However, for small or risk-averse economies fixed exchange regimes are preferred (Devereux and Engel, 1999). Higher exchange risk-aversion (premium) implies that the nominal interest rate is lower than the risk-neutrality interest rate (Obstfeld and Rogoff, 1998). These theoretical general equilibrium models allow evaluating policy options in term of welfare implications. As a result, Obstfeld and Rogoff (1998) concluded that lower interest rate imply higher consumption level and higher welfare.

In a different context, Devereux and Engel (2002) found that exchange rate fluctuations have little effects on macroeconomic indicators when prices are set in the local currency. This explanation of low pass-through of exchange rate fluctuations to local consumer needs other elements of incomplete international financial markets, stochastic deviations from the uncovered interest rate parity and a similar structure of international pricing and product distribution of tradable and non-tradable commodities.

Through empirical studies, some researchers, like Mundell (2002), confirmed the relationship between fixed exchange rate regimes and economic growth. In his attempt to answer the question: *"Are fixed exchange rates more conducive to growth than flexible exchange rates?",* Mundell compared the economic status in the United States of America in two periods, where the first (1947 to 1967) reflected the variables under the anchored of gold dollar, and the second period (1968 to 1993) under the paper dollar. This comparison provided evidence for higher levels of growth rate, productivity and real wage growth and lower levels of inflation, unemployment and interest rate during the first period. In order to support his results, he made another comparison for growth rate between Europe, Japan, Canada and the United States of America for three decades from 1963 to 1992. He concluded that the decade with fixed exchange rate led to higher growth than in other decades in all compared countries except for Canada. Exchange rate stability is linked to monetary discipline, which means adopting pegged exchange rate, thereby matching reserve of foreign currency with money supply. This leads to lower inflation and unemployment, and consequently result in achieving higher level of economic growth.

Exchange rate pegging needs a long-run commitment of the monetary authorities to maintain its credibility. However, the expanding international capital markets may magnify any weaknesses in the commitment of the monetary authorities (Obstfeld and Rogoff, 1995b). A list of countries which had adopted fixed exchange regime was discussed by Obstfeld and Rogoff (1995b). Some of these countries could not maintain its commitment of exchange rate peg and even passed over the 2% exchange rate margin. Obstfeld and Rogoff (1995b) found that these countries were more exposed to inflation crises. Few fixer countries succeeded in maintaining its commitment. The only common factor among the success fixers is that they are small economies. Moreover, Edwards and Magendzo (2004) found empirical evidence that dollarized countries have lower growth rates over the period 1970 – 1998. However, empirical evidence of lower inflation rate for hard peg countries was found by Mandadjiev (2004) using a panel of 160 countries over the period 1970 – 1999. This result is consistent with Mundell (2002) findings. However, the expansion and increasing mobility in the

international capital markets in the last two decades needs to be reflected by an update of the dataset to include the period of the recent crises.

Ghosh, Gulde, et al. (1997) reached a contradicting conclusion to that of Mundell (2002). They found that countries under fixed exchange rate regimes recorded lower economic growth when compared to countries under more flexible exchange rate regimes. They proved their claim by testing the data for 136 countries between 1960 and 1990, and studied the classification of exchange rate regimes as mentioned in the IMF annual reports, in addition to other control variables such as investment, trade and government spending.

According to Baxter & Stockman (1989), the relationship between economic growth and the alternative regimes for exchange rate is not significant. This claim was based on examining the data of a sample of 49 countries under different types of exchange rate regimes. The examination aimed at testing the hypothesis proposed by Ghosh, Gulde, et al. (1997) and resulted negating it as Baxter & Stockman (1989) found that the behaviors of consumption, output, government spending and trade play a role in influencing economic growth.

Similarly, Mills & Wood (1996) investigated the British experience between 1855 and 1990 when the United Kingdom was under a floating regime. According to the cyclical trend of UK output, this resulted in creating inflation rates that affected the price level on one hand and the output on the other. Based on this, the exchange rate regime has not been the reason of macroeconomic volatility (Mills & Wood, 1996).

The previously mentioned studies, which investigated the relationship between economic growth and exchange rate regimes, showed different directions and results. However, these studies adopted the official classification of the IMF that did not take the real effect of exchange rate regime in consideration. Obstfeld and Rogoff (1995b) explored some differences in the de jure exchange regime reported to the IMF and the de facto exchange rate.

This inconsistency of the results led other researchers to find the enigma of the right directions and built their own classification of exchange rate regimes, such as Reinhart and

Rogoff (2004) who found a mismatch in real classification of exchange rate regimes based on monthly volatility of nominal exchange rate for 153 countries during two or five years. Reinhart and Rogoff (2004) found that 45% of observations were announced officially as peg, where they should have been considered as freely floating, and 53% of the sample should have been considered as peg not freely floating. As for the impact of the exchange rate system on economic growth, which is the research objective, they concluded that there is no impact.

To support the positive findings of Mundell, Moreno (2001) work was investigated, where he shed light on the relationship between pegging and macroeconomic performance in East Asia by collecting monthly data for seven East Asian economics including Hong Kong, Indonesia, Malaysia, Philippines, Singapore, South Korea, and Thailand from 1975 to 1999. He acquired the required data from the international financial statistics of IMF, and studied the effect of pegged exchange rate regimes on CPI, budget balance, money growth and real Gross Domestic Production (GDP) by computing standard deviations and means under pegged and floating regimes. Moreno (2001), adopted the De – Facto classification for the exchange rate regimes according to the threshold volatility, that was 1/3 the volatility of DM-US$. Depending on Z test statistics and marginal significance for the mean under pegged and floating regimes, he found that average growth tended to be lower under floating regimes than under pegged regimes in East Asia, which particularly explains some important reasons for the appeal of pegged regimes.

The same results about the positive effect for pegging exchange rate regimes on economic growth were found by Bailliu, Lafrance and Perrault (2002) when they used De – Jure classification for the regimes. The researchers worked with a panel data for 60 developing and industrial countries through the period of 1973 to 1998. They examined their hypothesis using the dynamic Generalized Method of Moments (GMM) estimation using specific determinants of economic growth such as investment, government spending, trade, money growth, private sector credit to GDP, domestic credit to GDP and gross private capital to GDP. After adapting an expanded classification of currency exchange rate systems based on the presence of nominal policy anchor, they found that pegged regimes are linked to higher

economic growth although without anchors, but intermediate regimes without nominal policy anchors are negatively associated with economic growth, whereas other regimes have no clear impact on economic growth.

However, in order to choose between the De-Jure or De-Facto classifications and use them to help achieving the goals of this research, it is important to consult the IMF background about exchange rate regimes classifications. According to Bubula and Ötker (2002), the classifications for exchange rate regimes for all of IMF member countries from 1975 to 1998 were based on their official De-Jure announcements. The De-Jure classifications included three groups: pegged regimes, regimes with limited fluctuations and regimes that floated freely. These classifications nonetheless faced many shortfalls and failed to find the differences between what countries announced to adapt and what they actually adapted. Furthermore, these classifications could not differentiate between rigid types of pegged regimes and soft pegged regimes, which forced the IMF to modify their exchange rate classification system in 1999 to cover all types of pegged regimes, and providing more detailed classifications and to classify countries exchange regimes depending on their De-Facto policies.

As found in the literature review, a positive relationship between pegged exchange rate regimes and economic growth was defined, whereas other studies proved the opposite, such as Levy-Yeyati and Sturzenegger (2003). The researchers targeted 183 industrial and developing countries and investigated their economic performance over the period of post-Bretton Woods, following the De-Facto classifications of regimes and depending on three factors. These factor included the volatility of exchange rate measured as the monthly average of percentage changes in the nominal exchange rate to the related anchor currency or basket of currencies, the volatility of exchange rate changes measured by standard deviation of percentage changes in exchange rate per month, and finally the volatility of reserves.

After computing the variables that represented the exchange rate regimes, Levy-Yeyati and Sturzenegger (2003) found that economic development identified the exchange rate regimes

for each country, where most industrial countries tended to float more than to peg, while nonindustrial countries were prone to use fixed or intermediate regimes. The main variables they examined included investment, trade, government consumption, political instability, population, openness and secondary enrollment. The results indicated that growth rate was significantly lower in less flexible regimes than floater regimes. However, Petriski (2009) found that this relationship might be influenced by other policy variables, especially in the case of conventional peg, which reflects a limited range of flexibility. If exchange rate regimes change as a result of changing policies in the cases when hard peg becomes necessary, then policy variables are needed.

Just as there were differences in literature to determine the nature of the relationship, studies also varied in determining the variables that should be examined and measured to explain the effect of exchange rate regimes on economic growth in various economies of the world. Some studies, such as Ghosh, Gulde & Wolf (2002), examined the conditional linkages between the exchange rate regimes and inflation, and regressed inflation under the different types of exchange rate regimes depending firstly on official classification, and secondly on De-Facto classification, along with other control variables. This is based on the theoretical model that explained that "*Higher real GDP growth, Δy, by raising money demand, should reduce inflation. Conversely, faster growth of the money supply, Δm, should be associated with higher inflation*" (Ghosh, Gulde & Wolf, 2002). Not only that, but studies also checked the extent to which inflation is linked to other variables such as trade openness, money growth and turnover of central bank governor.

Regression results indicated that countries with fixed exchange rate regimes recorded lower rate of inflation in both testing process and correlated with what Fischer (2001) mentioned. He found that countries suffering from triple digit of inflation should follow hard peg regime for their currency as currency board, and supported his findings depending on some particular evidences about some countries such as Argentina in 1991, Estonia in 1992, Lithuania in 1994 and Bulgaria in 1997, when they joined the currency boards and successfully solved the inflation problem. Calvo and Mishkin (2003) considered this as the strongest argument for

preferring pegged exchange rate regimes for emerging countries, and as the most important weakness of floating regimes.

Going back to the theory of Optimal Currency Area (OCA) which owed much to Mundell (1961), it gave us logical vision about inflation under fixed exchange rate regime; when money supply or demand arise then the economy will fall in nominal shock, which leads to inflation, then fixed exchange rate regime will provide procedures to absorb the problem. The theory leads us to find out advanced arguments about the effect of openness under alternative exchange rate regimes, where the stability would be more difficult under pegged exchange rate regimes if short run capital were restricted over borders, but it would reflect the same effect under floating regimes if capital were mobile.

Proceeding from this theory, Alfaro (2002) presented some evidence about the relationship between inflation and trade openness under fixed exchange rate regimes. For the regression, Alfaro used panel data from 1973 to 1998 for 148 countries, and found that countries under fixed exchange rate regimes have been linked to lower inflation depending on GDP deflator as a measurement of inflation, and openness played a role as an important mechanism to reduce inflation. To investigate the effects of openness under our targeted regime, the researcher used both share of exports and imports of GDP as a measurement of trade openness, and the result was positive and supported this research to consider openness as one of the control variables. Alfaro's findings (2002) introduces the needed justifications that pegged exchange rate regimes reduce the exchange risk that would discourage trade, and floating regimes associated with uncertainty for expected investment will discourage trade too.

In their investigated models, most of the previous studies considered the political stability as an explanatory variable. Feng (1997) found the main effect of political stability on economic growth by adopting least square estimation for 96 countries for 20 years (1960 to 1980). He found that there is a higher economic growth in countries where the ruling party does not change and still in power, but countries with violence and little democracy recorded lower

economic growth. This has also been confirmed by Barro (1991) who studied the panel data for 98 countries for the period between 1960 and 1985, and found that the growth rate was positively related to political stability and negatively related to political instability.

Based on the theory explained by Cushman and De Vita (2017), fixed exchange rate regimes can attract and encourage foreign direct investment, unlike flexible regimes. Their finding was based on using propensity score matching for 70 countries and De-Facto classification for exchange rate regimes, and their findings coincided with what the theory had suggested from the beginning.

In order to get more accurate results in this research, we referred to the model of Yeyati and Sturzenegger (2003) who adopted secondary school enrollment as one of the explanatory variables to measure economic growth. Their approach was based on Barro's (1991) investigation about human capital investment and economic growth, and followed his results about the positive relation between the two variables.

Depending on the findings in the literature review, it is important for this study to find out the impact of pegging margin of fixed exchange rate regimes on economic growth. The effect of the explanatory variables mentioned earlier in the literature will be studies to investigate the direct effect on our dependent variable.

Chapter 3: Theoretical Framework

Indeed there is no ambiguity in the theoretical evidence which proposes that certain exchange rate regimes motivate economic growth more than the other, since the exchange rate is a nominal variable, it may not influence economic growth in the long run, but the literature theoretically explains the effects of exchange rate and economic growth through indirect channels, for example the level of certainty which pegged to the exchange rate affects trading and investment then affects economic growth (Petreski, 2009).

The following theories are relevant to the study to explain the effect of exchange rate fluctuations onto the economic growth:

3.1 The Optimal Currency Area Theory (OCA):

This theory is developed by Mundell (1961) and McKinnon (1963) which is considered as the earliest and most leading theoretical fundamentals to explain the relation between economic growth and exchange rate regime. The OCA theory is concerned with the stability of the business cycle and trade based on labor market mobility, symmetry of shocks and the level of openness. The theory shows that fixed exchange rate regimes can reduce the uncertainty of exchange rate and hedging costs, if the exchange rate is stable, trade, investment and thus output growth will increase, so it identified the channels through which economic growth can be achieved based on the impact of pegged exchange rate regime. According to this theory the study expect that as the margin crawls at a stable level the economic growth will be higher.

3.2 The Purchasing Power Parity Theory (PPP):

The concept of PPP dates back to the Salamanca School in the 16th-century Spain ,its modernistic use as a theory is developed by Gustav Cassel (1918), it illustrates the relationship between exchange rates and relative prices based on the law of one price (LOOP), this law states that the prices of homogeneous merchandise must be equal across countries if prices expressed in terms of local currency, as the following:

$$S = P/P^* \quad (1)$$

Where S denotes the exchange rate, P denotes the domestic price and P* denotes the foreign price. This simply means that exchange rate depends on relative prices, if the currency according to the LOOP is undervalued, the imports will be more expensive and exports more competitive that will increase inflation through cost push inflation, because imported goods are quiet a significant part of consumer price index then consumption, exports and output will decline (Dornbusch,1985). The theory outlined that exchange rate affects economic growth through the relative prices and with pegged exchange rate regime the monetary authority intervene on a daily basis to maintain the exchange rate with the required level (Handa, 2008).

The theory is invalid in the short run due to transportation cost, subsides, trade barriers and imperfect competition. So, the validity of PPP is stringent when it is anticipated to forecast the exchange rate and determine whether the currency is undervalued or over valued in order to adjust inflation especially in the developing countries (Yıldırım, 2017).

3.3 Assets Market Approach:

Assets market approach includes the monetary approach and portfolio-balance approach:

3.3.1 The Monetary Approach: The version of monetary approach is developed as a theory by the contributions of Frenkel (1976), Mussa (1976), and Bilson (1978), they approved that the exchange rate for any two currencies as a relative price of money, determined through money demand and money supply as the following:

$$S = (M - M^*) - \phi\,(Y - Y^*) + \lambda\,(\pi - \pi^*) \quad (2)$$

Where S is the exchange rate; M and M* denote respectively the log of domestic and foreign money supply; Y and Y* denote the log of domestic and foreign real income; π and π^* are represent the expected domestic and foreign inflation. This equation illuminates that an increase of domestic money supply, the exchange rate will devalued under fixed exchange rate regimes and encourage exports then economic growth will be higher in the short run then it will be declined as the prices increased. (Frankel, 1992).

According to this approach the monetary authority or central banks determine the exchange rate and intervene to prevent the devaluation of the currency.

3.3.2 The Portfolio Approach: It determines the exchange rate by assets supply and demand in the countries as mentioned in Frankel (1992). Equation (3) interprets that country's wealth depends on its assets and surplus of current its account and exchange rate as below:

W= B+SF   (3)

W denotes for wealth; B for assets; S for exchange rate and F for the current account balance, so if a country has surplus in its current account, the demand for its assets will increase then the price of domestic currency will increase.

Depending on this approach the study expect that as the exchange rate increase the country wealth will increase too, so under pegged exchange rate regime as the exchange rate fluctuate with higher margin the country wealth will be higher.

Chapter 4: Methodology and Model

The research depends on a quantitative approach using econometric models using different methods: GMM method, random effect method and fixed effect method, to analyze the significant relations and effects of pegged exchange rate margin, inflation rate, government spending, human capital, political stability foreign direct investment, trade openness and population on economic growth, involving panel data. This approach allows controlling the heterogeneity of countries, which eliminates biased results risk and provide other control for omitted variables effects. Additionally, it enhances the efficiency of the estimators. The most important justification for using panel data is the research topic that is related to dynamic issues, so panel data can reduce the collinearity between variables and can reduce the standard errors with higher number of observations (Hsiao, 2007). This study excludes floating exchange regime countries for two reasons. First, our objective is to evaluate the impact of the pegging margin on economic growth for pegged exchange adopted regimes. Second, the theory illustrated that fixed exchange regime is optimal for small and risk-averse countries.

4.1 Sample

The sample covers all countries that follow the pegged exchange rate regimes according to IMF. It includes countries in South America, Africa and Asia. Due to lack of information, the sample excludes some islands and small countries. The study analyzes balanced panel data for annual observations for 53 countries from different regions around the world over the period from 2000 to 2017. The list of countries included in the study is presented in Appendix A.

4.2 Data Sources

The data needed for this investigation is derived from the annual report for IMF and the World Bank database, and from consulting the statistical department of Singapore to use their data for school enrollment.

4.3 Model

The theoretical framework leads the researcher to derive the required endogenous growth model, it determined the factors that affected on exchange rate as inflation, income and trade. The model includes the common variables effect on output as government spending, political stability, human capital and populations. The model used in this research is the one proposed by Levy Yeyati and Sturzenegger (2003). However, it is slightly modified to meet the main goals of this study. The modified and used model is:

$$\text{Log(Y)= F (Exch, FDI, GGS, IN, PolS, SSEROLL, TO)}$$

Y:GDP per capita

FDI: Inflows as % of GDP

GGS: Government spending as % of GDP

INF: Inflation rate

PolS: Political stability index (PO)

SSEN: Secondary school enrollment as a proxy of human capital

TO: Trade openness (sum of exports and imports as % of GDP)

The researcher's modifications include the use of GDP per capita instead of GDP and FDI instead of investment variable and adding inflation. The justifications to modify the model are related to the objective of the study that focused on Pegged regimes only. Since countries with pegged exchange regime countries did so to stabilize inflation, we need to control for this later in this model. According to the theoretical modeling for Froot and Stein (1991) who investigated the relationship between FDI and exchange rate, They argued that the devaluation of the local currency will increase the FDI and the appreciation will decrease

foreign inflows to the hosting country, which reflected a clear effects for exchange rate to attract new foreign investment.

4.4 Variables

The Purpose of the study is to find the effects of pegged margin under pegged exchange rate regimes on economic growth using the suggested model. Accordingly, the following is brief definitions for variables:

4.4.1 GDP per Capita: Is gross domestic product divided by midyear population(World bank, 2018). The study considered this variable to denote economic growth as an independent variable.

4.4.2 Inflation: Inflation in accordance with the Consumer Price Index (CPI) reflects the annual percentage change in cost for the average consumer to obtain a basket of goods and services that may be fixed or variable at specific time intervals, such as annually (World bank, 2018). Endogenous Growth Theory explained the relation between inflation and economic growth. In this theory the growth rate is determined by rate of return on capital which includes physical capital and human capital, and inflation reduce this return and level of output (Gokal and Hanif, 2004). Stockman (1981) developed a model interpreted a negative relation between inflation and economic growth. This model postulates that if inflation rates increase the output and individual's welfare decrease, where the relation between money and capital is complimentary, so the relationship between output and the inflation rate is negative.

4.4.3 Government Spending: is considered one of the most attractive tools of fiscal policies that countries adopt to stimulate their economy. It refers to all government expenses and net of non-financial assets during a period, including operating expenditure such as wages and salaries, debts, subsidies and supply services, along with development expenditure such as education, health, social services (World bank, 2018). The measurement needed in this investigation is the general government final consumption expenditure as a percentage of

GDP. In 1930 John Keynes developed his theory which focused on government spending as an essential factor to motivate demand then economic growth. He argued that the general government spending on infrastructure, education and unemployment benefits causes an increase in consumers demand then level of output (Mitchell, 2005).

4.4.4 Openness of Trade: Many factors influence the openness of trade, like country size, geographic characteristics, borders and government policies. Each country is keen to establish trade relations with its neighboring countries through exports and imports. The measurement is the sum of total of exports and total of imports as a percentage of GDP. According to Ricardo's theory who supposed that openness to the rest of the world allowed countries to redirect its resources to the most effective sectors, which achieve economic growth (Zahonogo, 2016). From this logic we expect a positive relation between economic growth and openness, this conclusion comes too from the optimum currency area theory which ensures that labor and capital mobility play a remarkable role to consider any region optimal currency area.

4.4.5 Foreign Direct Investment (FDI): IMF defined the FDI as any investment that takes place by individuals, corporates or governments in some business for one country located in other countries. IMF determines in its fifth edition of IMF's balance of payment manual the percentage of business ownership by 10% or more of voting power or shares to consider any investment as FDI (Duce and España, 2003). For this research, FDI inflows as a percentage of GDP is the proxy of FDI. The impact of FDI on economic growth is expected to be positive. This conclusion is derived the neoclassical model of Solow (1956), which considered the investment as most important factors for economic growth in the short run, then the endogenous growth theory supports the research to add FDI to analytical model, the theory justified that since FDI is most important source for technology transfer which affected positively on economic growth as mentioned in Petrakos, Arvanitidis and Pavleas (2007). Because investment which ran into the country will create new job vacancies then influence on aggregate demand and economic growth, this result is conditional with the existence of well-developed financial markets in the countries. (Alfaro et. al, 2004). But what about the

relation between pegged exchange rate & FDI? Yuqing (2006) found from Chines experience with Japanese FDI that pegged exchange rate regime in China which maintained the volatility between Yuan & Yen is one of the variables that motivate the Japanese FDI to China.

4.4.6 Political Stability: This variable is defined as Political stabilization and absence of terrorism and violence. It measures the conception of political stability and politically adopt violence, including terrorism. The measurement gives the country's score on the total index, in the normal distribution units, that is, from 2.5 to -2.5, for example the high score represents more political stability (World Bank, 2018). The high the tendency for government to change will lead to high risk comes from new policies associated by the new government, then the discussions to stay or to enter the economy will affected negatively on economic growth, where economic and political environment is stable any domestic and foreign investor prefer to be part of this economy without any risk related especially to policy uncertainty about rights of property (Alesina et. al, 1996).

4.4.7 Human Capital: the secondary school enrollment is considered as a measurement tool for this variable, taking into consideration the population growth rate to estimate the secondary age. The following equation postulate the World Bank (2018) measurement for this variable:

$$\text{Secondary school enrollment} = \frac{Actual\ secondary\ enrollment}{\text{Secondary age \%} * \text{Population}}$$

This study used the data mentioned in World Bank for all countries, except for Singapore where the researcher returned to their official resources; the statistical department. The argument about human capital & its importance to economic growth started since 1776 till 1960 with Schultz who announced the birth of human capital theory, the theory focused on the investment in education and training to improve the labor performance and increase

productivity, that will lead to higher economic growth. Schultz & Baker (1961) believed that when economic resources utilized in effective ways, the profitable gains for society, firms and individuals increased (Blaug, 1976). Classical & neoclassical growth theory considered labor as one of economic growth factors which supported our adoption of this variable within the model.

4.4.9 Pegged Exchange Rate Regimes: This is a categorical variable which will be introduced in the model by dummy variables. The countries were classified according to their De-Facto classification of exchange rate with different fluctuation margins. In this study, the IMF classifications are followed for pegged regimes, which include seven different classifications as follow:

*4.4.8.1 Exchange Arrangement with No Separate Legal Tender***:** This includes the countries where the currency for another country circulates as the main and sole currency in the country, like dollarization form in Ecuador. This type of exchange rate has no margin to fluctuate because the country does not have the authority to control over the currency volatility (IMF, 2017).

*4.4.8.2 Currency Board***:** This type involves any country that has complete convertibility of its local currency into other currency based on a fixed exchange rate. According to IMF (2017) it means "a monetary regime based on an explicit legislative commitment to exchange domestic currency for a specific foreign currency at a fixed exchange rate, combined with restrictions on the issuing authority". There is no pegging margin for the currency.

*4.4.8.3 Conventional Peg***:** This type involves the countries that peg their local currency with another currency or basket of currencies at fixed rate, the central banks in this case will intervene to maintain the currency at a fixed level of fluctuations with narrow margin around 2 percent for six months at least (IMF, 2017).

*4.4.8.4 Stabilized Arrangement***:** when a country let its local currency to fluctuate with another currency or basket of currencies, but the monetary authorities must maintain the spot market exchange rate fluctuate within a margin of 2 percent for six month or more (IMF, 2017).

*4.4.8.5 Crawling Peg***:** In this classification the currency is allowed to fluctuate within band of rates, the currency value and bands can be adjusted anytime especially when the currency is expected to face devaluation due to inflation, and the fluctuation margin is around 1 percent (IMF, 2017).

*4.4.8.6 Pegged Exchange Rate Within Horizontal Bands***:** According to IMF (2017) this arrangement means:

 "The value of the currency is maintained within certain margins of fluctuation of at least ±1 percent around a fixed central rate, or the margin between the maximum and minimum value of the exchange rate exceeds 2 percent".

*4.4.8.7 Crawl-Like Arrangement***:** According to IMF (2017) this arrangement is:

 "The exchange rate must remain within a narrow margin of 2 percent relative to a statistically identified trend for six months or more (except for a specified number of outliers) and the exchange rate arrangement cannot be considered as floating. Normally, a minimum rate of change greater than allowed under a stabilized (peg-like) arrangement is required. However, an arrangement will be considered crawl-like with an annualized rate of change of at least 1 percent, provided that the exchange rate appreciates or depreciates in a sufficiently monotonic and continuous manner".

4.4.10 Dummy Variable Categories: It includes the different fluctuation margin of pegged exchange rate regimes. Based on the IMF classifications of pegged exchange rate regimes, the sample is distributed on three categories based on the fluctuation margins. Group C will be selected to test the required differences and comparisons as a reference point due to high frequentist.

Table (1): Margin Categories

Categories	Margin	Group
Exchange arrangement with no separate legal tender	0	A
Currency board arrangement	0	
Crawling peg	1%	B
Pegged exchange rate within horizontal bands	1%	
Stabilized arrangement	2%	C
Crawl-like arrangement	2%	
Conventional pegged arrangements	2%	

4.6 Methodology

4.6.1 Unit Root Tests

Data analysis started by checking the stability of variables, ensuring that the time series variable is stationary at level and does not possess unit root problems, which shall allow completing the estimations and test the hypothesis of regression parameters.

In this research, the researcher will depend on the Levin-Lin-Chu test (LLC) for stationary because the study uses panel data. This test investigates as Levin, Lin and Chu (2002), the stability for each variable separately and the essential point and necessity condition to use it comes from its power of rejecting the null hypothesis when it contains unit root. This test is performing well when T lies between 5 and 250 where T denoted to time series, if T is less than 5 the test loses its power, and N should lie between 5 and 250 and it denoted for the number of countries in the sample.

The following hypothesis to be tested:

H0: Panels contain unit roots.

H1: Panels are stationary.

The procedure of LLC works as:

1- run augmented Dickey-Fuller (ADF) for each cross-section on the equation:

$$\Delta y_{it} = \rho_i y_{i,t-1} + \sum_{L=1}^{p_i} \theta_{iL} \Delta y_{it-L} + \alpha_{mi} d_{mt} + \varepsilon_{it}$$

Where d_{mt} is a vector of deterministic terms (constant, trend etc.) and ρ is the lagged differences terms.

2- Run the auxiliary regressions:

a. Δy_{it} on $\Delta y_{i,t-L}$ and d_{mt} and obtain the residuals e_{it}.

b. $y_{i,t-1}$ on $\Delta y_{i,t-L}$ and d_{mt} and obtain the residuals $v_{i,t-1}$.

3- Standardization the residuals by divide them on the standard error from ADF, as following:

$$e'_{it} = e_{it}/\hat{\sigma}_{it}$$

$$v'_{i,t-1} = v_{it}/\hat{\sigma}_{it}$$

4- Run the pooled OLS regression

$$e_{it}' = \rho v'_{i,t-1} + \varepsilon_{it}$$

The null hypothesis is $\rho = 0$.

4.6.2 Coefficients Estimations

4.6.2.1 GMM Modeling:

The results obtained shown in the unit root tests show that we can depend on GMM modeling to estimate the coefficients for each variable in order to determine the right effect for each

one. This model helps to derive the estimators when N > T and solve the endogeneity problem of the data.

The GMM method is an estimator designed for situations with (Baum, 2013):

- few T and large N.
- a linear functional relationship.
- one left-hand variable that is dynamic, depending on its own past realizations.
- right-hand variables that are not strictly exogenous: correlated with past and possibly current realizations of the error.
- fixed individual effects, implying unobserved heterogeneity.
- heteroscedasticity and autocorrelation within individual units' errors, but not across them.

The equations of GMM can represented by the equations:

$$Y_{it} = X_{it}\beta 1 + W_{it}\beta 2 + v_{it}$$

$$Vit = ui + \varepsilon it$$

where X_{it} includes strictly exogenous regressors, W_{it} are predetermined regressors (which may include lags of y) and endogenous regressors, all of which may be correlated with u_i, the unobserved individual effect. First-differencing the equation removes the u_i and its associated omitted-variable bias.

4.6.2.2 Fixed Effects Modelling:

The researcher will estimate the coefficients based on fixed effects modelling and compare their results with GMM results in order to determine the correct model for estimation according to the level of significance results and the direction of the coefficients.

"Fixed effect estimation method explores the relationship between variables within an entity (country in this research). Each entity has its own individual characteristics that may or may not influence the predictor variables. When using fixed effect method, we assume that

something within the individual may impact or bias the predictor or outcome variables and we need to control for this. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables. Fixed effect removes the effect of those time-invariant characteristics so we can assess the net effect of the predictors on the outcome variable. Another important assumption of the fixed effect model is that those time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics. Each entity is different therefore the entity's error term and the constant should not be correlated with the others" (Reyna, 2007).

The equation for the fixed effects can represented by:

$$Y_{it} = \beta_1 X_{it} + \alpha_i + u_{it}$$

Where α_i is the unknown intercept for each entity and $i = (1.... n)$; Y_{it} is the dependent variable (DV) where I represent the entity and t represents time. X_{it} represents one independent variable (IV), $- \beta_1$ is the coefficient for that IV, $- u_{it}$ is the error term which includes both µit + vit.

4.6.2.3 Random Effects Modelling:

The researcher will estimate the coefficients based on random effects modelling too, and compare their results with GMM results and fixed effect since the dummy variables are omitted in the fixed effect modeling and in order to determine the best fit model for estimation according to the level of significance results and the direction of the coefficients.

Random effects modeling according to Bell and Jones (2015) is based on the assumption that there is a random variation across the entities (countries in this research) and it is not correlated with the Xit. It can be presented by the following equation:

$$Y_{it} = \beta_{0i} + \beta_1 X_{it} + e_{it} + u_{it}$$

Where Y_{it} is denoted the dependent variable, β_{0i} is denoted the intercept for each entity, X_{it} is denoted the independent variable and β_1 is its coefficient, e_{it} is within entity error and u_{it} is between entity errors.

4.6.3 Dealing with Data Bias:

Dealing with data bias requires in addition to the basic model, to estimates three separate models for the three categories of pegged exchange rate regimes, in order to solve the problem of data bias to category C. The study follows using the methods of random model and fixed model for category A and B as the following:

1- Using LLC test for each category to find out the stationarity at level for each variable per category. If there is a nonstationary problem the regression will depend on lags.
2- Run the fixed effect model regression with lags difference if the variables have a unit root problem.
3- Testing for heteroscedasticity for the fixed effect model by using modified Wald test for GroupWise heteroscedasticity.
4- Testing for serial correlation by using Wooldridge test for autocorrelation in panel data.
5- If there is a heteroscedasticity or autocorrelation problem, we will run fixed effects estimator with Driscoll and Kraay Standard Error.
6- Run the random effect model regression with lags difference if variables contain a unit root problem.
7- Testing for serial correlation by using Wooldridge test for autocorrelation in panel data.
8- If there is an autocorrelation problem, we will run random effects estimator with Driscoll and Kraay Standard Error.
9- Run the Hausman Test to decide between the two models (fixed or random).

The study will adopt GMM model for category C due to N>T.

4.6.4 Dealing with Multi-Collinearity:

Multi-collinearity as defined by Mansfield and Helms (1982) means that there is a correlation between independent variables which make identifying effects for each variable separately difficult.

The following procedures to find this problem:

Run linear regression of Xi over Xj (where Xi and Xj are exogenous variables) with robust for all variables, get Adjusted R^2, then

Run the Variance- inflation factor test (VIF) which reflects:

$$VIF_j = \frac{1}{1 - R_j^2}$$

If R^2 is close to 1 this implies that VIF is very high, which is an indication of the presence of multicollinearity. As R^2 goes to zero then VIF is close to 1, which implies the absence of multicollinearity problem. It is common that if VIF less than 10 then there is no multicollinearity problem.

Chapter 5: Descriptive Analysis

This chapter explores the characteristics of the macroeconomic variables of the study by categories of pegging margin: Gross Domestic Product per capita, Foreign Direct Investment (as share of GDP), inflation rate, government spending (as share of GDP), political stability index, and secondary school enrollment ratio. In brief, we can observe in the below graphs that countries in category C experienced more stable macroeconomic variables and lower average inflation rate during the study period. However, countries in category A experienced more volatile FDI than countries in categories B and C. Countries in category A had also experienced high inflation rates in the early 2000s but then could stabilize it after 2005. This is a major reason to explain their choice of a zero margin of exchange rate fluctuation. Countries in category B experienced an increasing trade openness rate over the study period. Moreover, secondary school enrollment ratio has a positive trend over time in countries of categories A and B.

5.1 Category A: This category includes two classifications of pegged exchange rate regimes, with fluctuation margin equal to 0. Bulgaria and Hong Kong adopt a currency board arrangement. Panama, Ecuador and El Salvador adopt exchange arrangement with no separate legal tender as the dollarization (IMF, 2017). Ecuador, El Salvador and Panama share the same region which is Latin America and Caribbean, and its dependency on agricultural, Industrial and service sectors, where the proportions ranged respectively 8%, 25.6% and 66.4%. Bulgaria and Honk Kong are in different regions, but they are more oriented to the services sector than the industrial sector. In Hong Kong the services sector recorded the highest rate for all countries of category A around 90.6% and the industrial sector recorded 9%. In Bulgaria the industrial sector recorded 30% compared to 60% for the services sector (World Bank, 2018). Panama adopted the dollarization system in 1904. It considered as one of the oldest countries that has been adopted the dollarization around the world (Quispe-Agnoli, 2002). Hong Kong has pegged the Hong Kong dollar to the US dollar in 1983 due to trade deficit, High level of interest rate abroad and rapid expansion of money supply and bank

credit with the failure of government policies to control such changes (TSOI, 2015). In Bulgaria the high rate of inflation on food basket was the main reason to adopt pegged exchange rate regime in 1997 (Gulde, 1999), and for the same reason Ecuador and El Salvador adopted officially the dollarization system in 2000 and 2001 respectively (Swiston, 2011).

5.2 Category B: This category includes two classifications of pegged exchange rate regimes, with fluctuation margin equal to 1%. Botswana and Nicaragua adopt crawling peg and Tonga adopts pegged exchange rate with horizontal band (IMF, 2017). The countries with this category are different in region and the reasons for adopting pegged exchange rate regime. For region the distribution, Botswana in Sub Saharan Africa, Nicaragua in Latin America and Caribbean and Tonga in Oceania. Botswana has been adopted adjusted pegged regime since 1976 due to its membership Of the Rand Monetary Area which is a regional monetary union controlled by South Africa (Masalila & Motshidisi, 2003), But In Nicaragua there was a different story, The long period of freely floating sinked the country in hyperinflation in 1991, that forced the government to peg the currency, and since 1993 the currency has been crawling peg (Kim & Papi, 2005). Tonga has been pegged its currency to the Australian dollar since 1980, and in 1991 it has been pegged to basket of currencies (Bowman, 2004). These different countries share the same contribution of service sector in economic growth which is about 52%. The industrial sector recorded higher proportion than agricultural sector which were respectively 33.8% and 14% (World Bank, 2018).

5.3 Category C: This category includes 45 countries. The Countries adopt three different pegged exchange rate regimes with fluctuation margin equal to 2%. Conventional peg arrangement is adopted by 21 countries from this category, and stabilized arrangement is adopted by 18 and crawl like arrangement is adopted from only 6 countries. The category contains countries from different regions, briefly as an example for each region, Nigeria and Congo from Sub-Saharan Africa, and China, Pakistan and Singapore from Asia, but Costa Rica, Bolivia and Jamaica from Latin America and Jordan, Qatar and Kuwait from the Middle East. The variation extended to the main reasons that forced each country to adopt pegged

exchange rate regime, for example China has adopted the pegged exchange rate regime since 1994 to expand its exports and receives more foreign direct investment after the multinational firms focused on production platform for sales (McKinnon & Schnabl, 2014). But Singapore has characterized its monetary policy based on pegged exchange rate regime since 1980, because it suffered from low international credibility and to achieve price stability as a basis for sustainable economic growth (Mele, 2015). Most of Sub-Saharan African countries have pegged their currency since 1980 for reducing inflation, controlling the level of debts and improving competitiveness (Razafimahefa, 2012).

. For more clarifications of this category's properties, the study makes the following comparison as mentioned in table (2):

Table (2): Properties of category C

Direction	Population	Area	GDP per capita (USD)	Agriculture share of GDP	Industry share of GDP	Service share of GDP
Max	1313,973,713	9,596,960	31100	55%	80%	90%
Min	71,891	193	600	0%	7%	20%
Average	513,973,17	638,018	6738	20%	28%	51%

Source: World Bank Database (2018) https://data.worldbank.org/

Since it is difficult to list all countries in this category as same graphs for each variable, a sample of 10 countries has been selected according to population, since it reflects the size of the country and there is a closely linked between the country size and the choice of exchange rate regime (Levy-Yeyati and Sturzenegger, 2003).

5.4 Variables Analysis Per Category:

For more clear view point the study analyzes the variables per category as the following:

5.4.1GDP Per Capita: Figure (1) shows the variation of GDP per capita of some countries for each category before and after the adoption of pegging policy. It is clear that GDP per capita has increased after countries adopted the pegged exchange rate regime. The Figure below reflects a sample of the countries studied in the research as an example for each category, where the line in the middle for each graph denotes the applying year of pegged exchange rate regime for each country.

Figure (1): GDP Per Capita Before and After Pegged Policy

Source: World Bank Database: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD
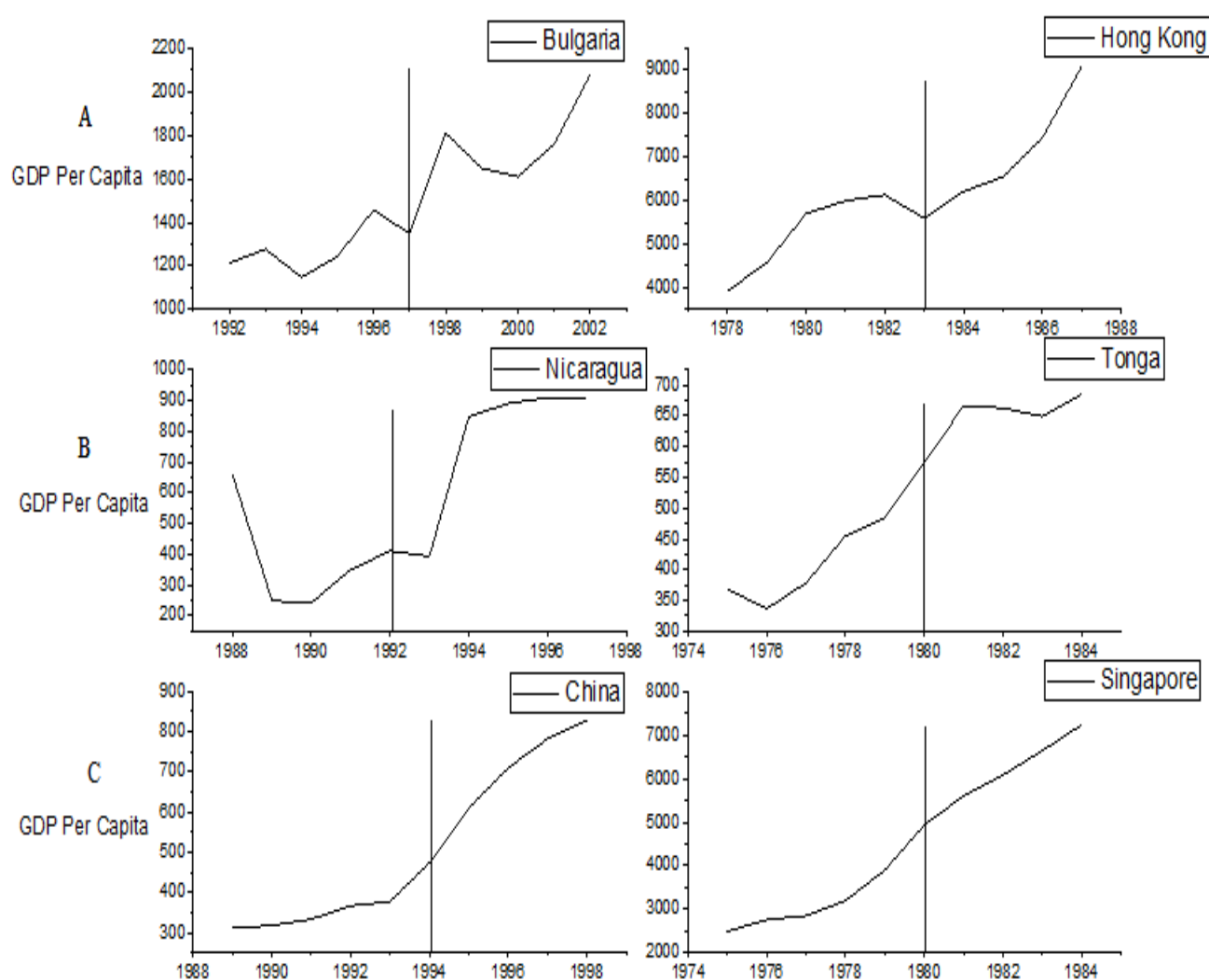
But Figure (2) shows the fluctuations of GDP per capita per category. It is clear that GDP per capita is increasing over the years of the study for all categories, where Hong Kong recorded the highest margin in category A, it has been fluctuated between 25000$ and 45000$, and Botswana recorded the highest value in category B, it has been fluctuated between 3500$ and 8000$ but it is lower than the highest margin in category A. For category C Singapore recorded a very high fluctuation margin comparing to the countries in same category and in other categories, it has been fluctuated between 23000$ and 60000$.

Figure (2): GDP Per Capita For Each Category

Source: World Bank Database: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD
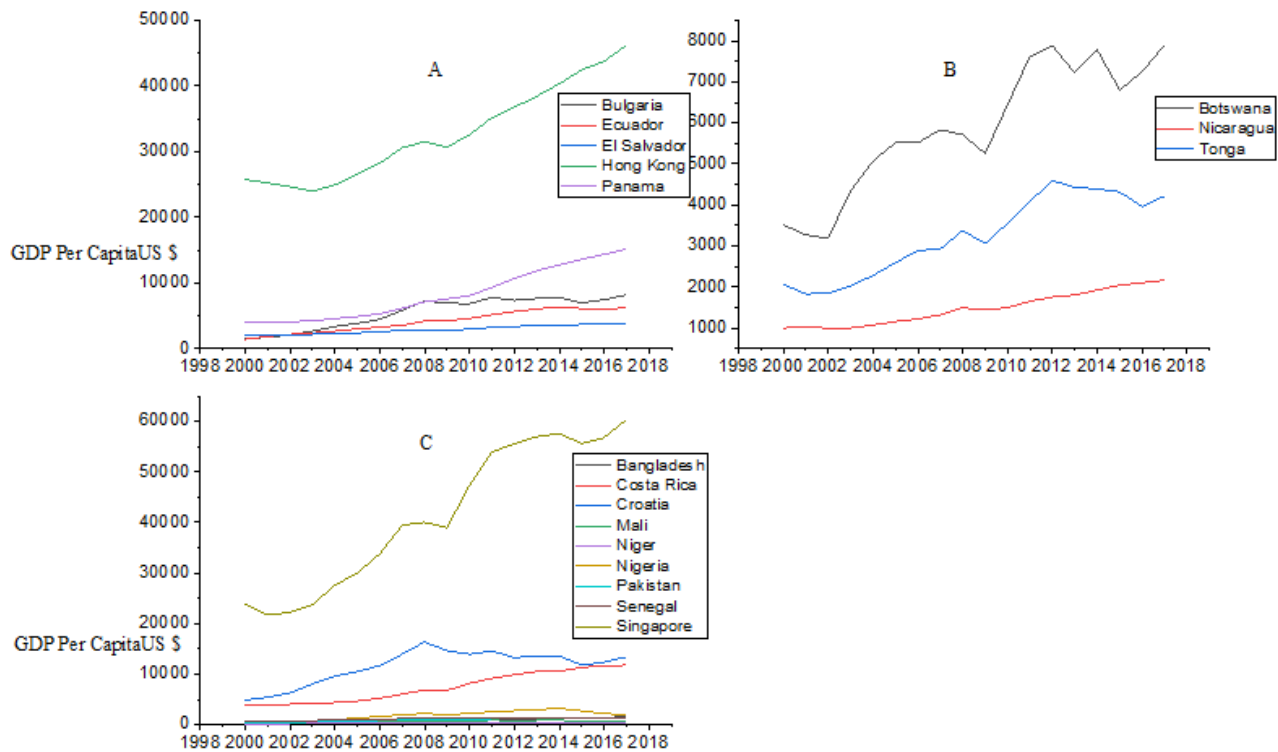
5.4.2 Government Spending: The ratio of government spending to gross domestic product (GDP) for Category A ranged between 5% and 21%. Countries in category A experienced a growth in their government spending at the first three years of study period with the exceptions of Bulgaria, since the Bulgarian government restraint the spending and adopted a

contractionary fiscal policy during the last decades to pay buckets debt. Figure (3) shows that in general the government spending for Bulgaria, Hong Kong and Panama is in decline, in contrast to Ecuador & El Salvador, where there was an increase in their shares of government spending by around 1% annually. For Category B the share of government spending of GDP has generally increased for Nicaragua and Tonga. The reason for Nicaraguan increase was consist with the programs that the Nicaraguan government adopted from 2002 to reduce poverty and hunger. The share sharply increased in the end of 2005 due to hurricanes, then governments adopted programs to rebuild the damages (Franzoni, 2013). Tonga suffered from the same Hurricanes and storm damages in 2011, that forced the government to compensate and rebuild damaged houses (Franklin et. al, 2004). Botswana recorded a different direction of government spending during the study period. It experienced a sharp decrease at the first six years and fluctuated between increasing and decreasing for the last period of the study. The main reason for such fluctuations is referred to adopting the government a new scope to reduce military spending to enhance the economy (Beaulier and Subrick, 2006). But for Category C the government spending fluctuated between 5% and 20%. Largest rate of government spending was in Croatia due to improving education and health care levels which required high costs, although the Croatian authorities adopted a program to decline government spending from 2007 to 2010 (Gunnarsson and Jafarov, 2008).

Figure (3) Government Spending For Each Category

Source: World Bank Database: https://data.worldbank.org/indicator/NE.CON.GOVT.ZS
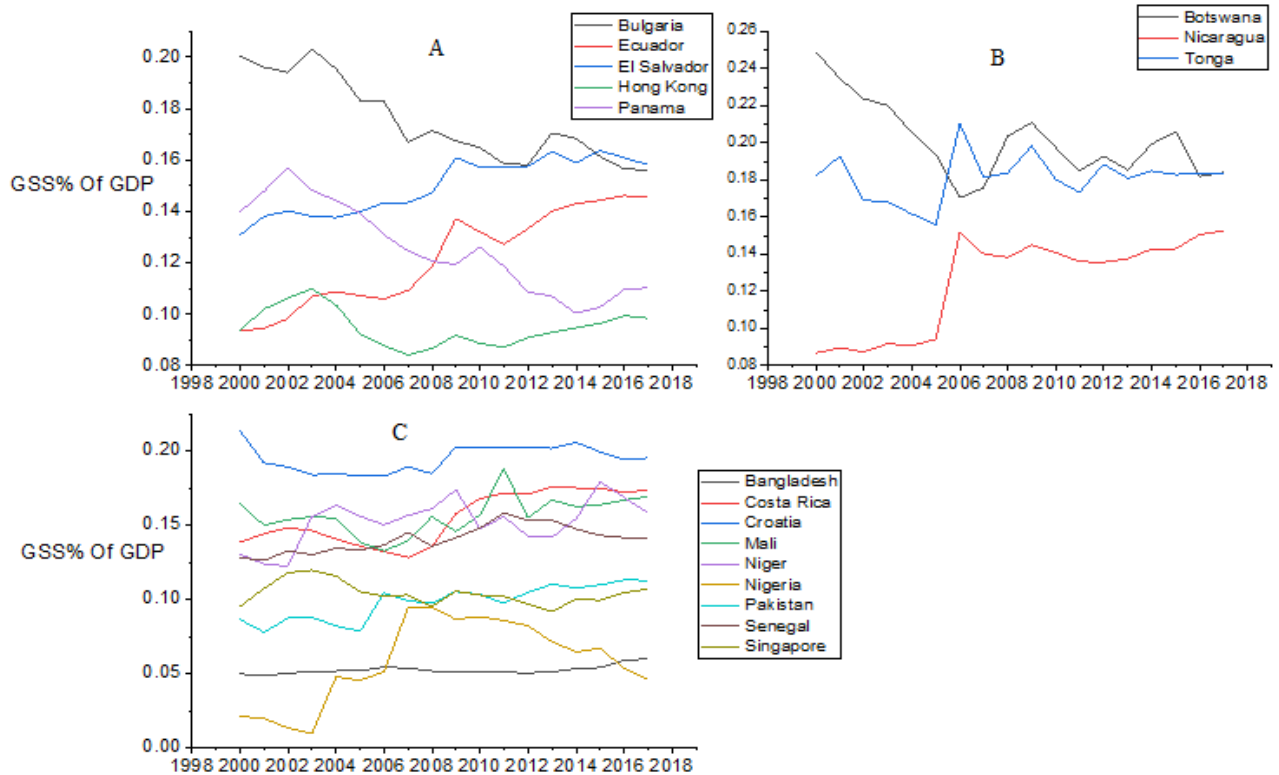
5.4.3 Inflation Rate: Figure (4) shows that inflation rates for various countries within category A are almost and close except Ecuador, which reflects higher inflation rate than the rest of countries in the first three years of the study period. Quispe-Agnoli & Whisler (2006) investigated the official dollarization in Ecuador and El Salvador. They pointed out that Ecuador engaged in full dollarization during its economic crisis and banking system problems, these crises led to a high rate of inflation, unemployment and liquidity problems. All economic development contributions are slumped in 1999, then the decision of president Jamil Mahuad in 2000 to adopt full dollarization was the start of solving problems and achieve low and stable rate of inflation in 2003 till 2017. In category B the fluctuations of inflation rate for the countries ranged between 1% and 15% during the period of study. As shown in figure (4) there was a significant increasing for all countries from 2007 to 2009, that

referred to the financial crisis which affected generally on prices level around the world. Tonga transferred from deflation in 2015, by recording about 5% increasing in its general price level, due to lack of agricultural water resources during the dry weather, that affected and raised the prices of goods and services as food (IMF, 2017). Countries in category C had been affected by the financial crisis too. The figure shows clear fluctuation in the general price level from 2007 to 2009, it was between 5% and 15%. Costa Rica; Niger and Pakistan were the most affected and there was a sharp increasing in its inflation rate, that expressed the weakness in its monitory authority to face the crisis.

Figure (4) Inflation Rate for Each Category
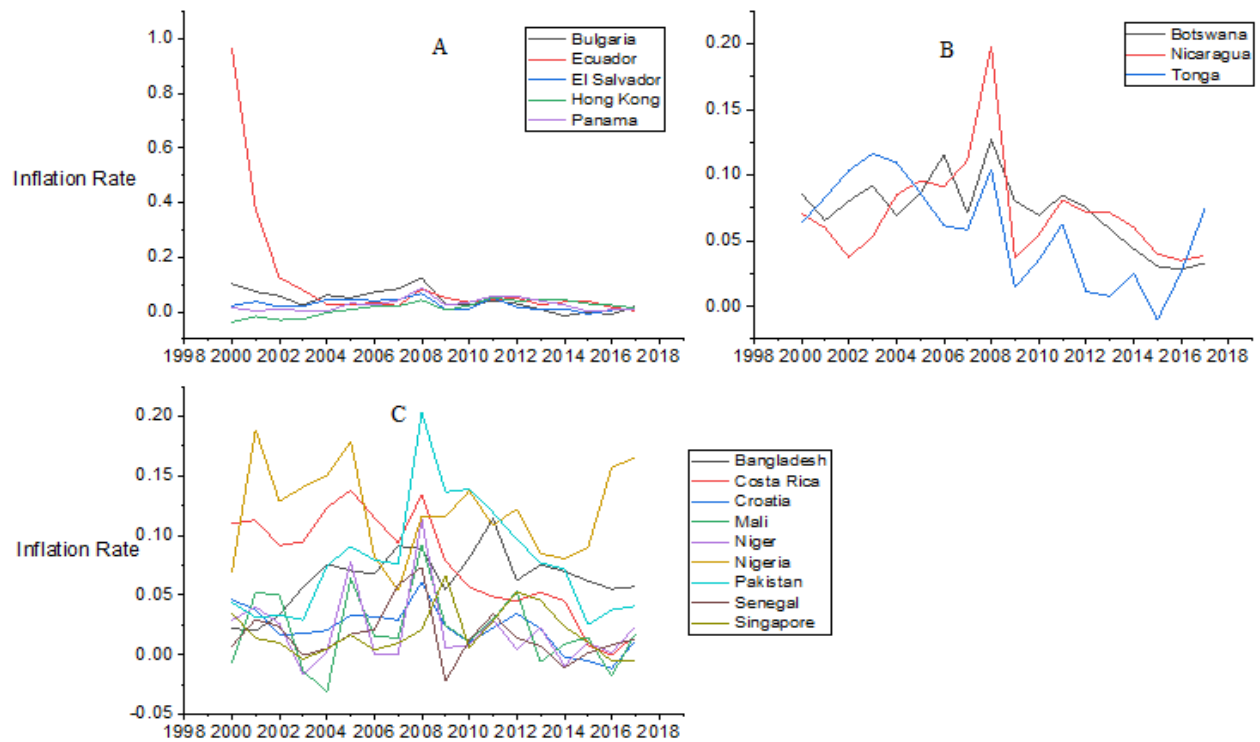
5.4.4 Political Stability: Figure (5) shows that Hong Kong Got the highest political stability score between 0.5 and 1.3 during the study period, and these results came from legal system of Hong Kong common law which respects civil liberties and high degree of autonomy

(Martin, 2007). El Salvador, Panama and Bulgaria got a score range between -0.5 and 0.5. Ecuador Achieved the lowest score for the first 10 years, and it was still suffering from political instability till 2017. Going back to the history of governance problems for Ecuador, Solimano (2003) justified the lower political stability score due to president ousting in 2000 and the military reinvestment, then instability continued to be caused by the vicissitudes of governments in power. But Nicaragua got the lowest score for its political stability, which fluctuated between -0.5 and 0.5, due to Ethnic tension and local conflicts to get more democratic policies from the king (Langa'oi, 2009). But for Nicaragua the lower score came from autocratic polices for Ortega's government who took power with his wife for five times elections (Feinberg, 2018). Pakistan recorded the worst political stability of category C with score fluctuations between -1 and -3as shown in figure (5).

Figure (5) Political Stability for Each Category
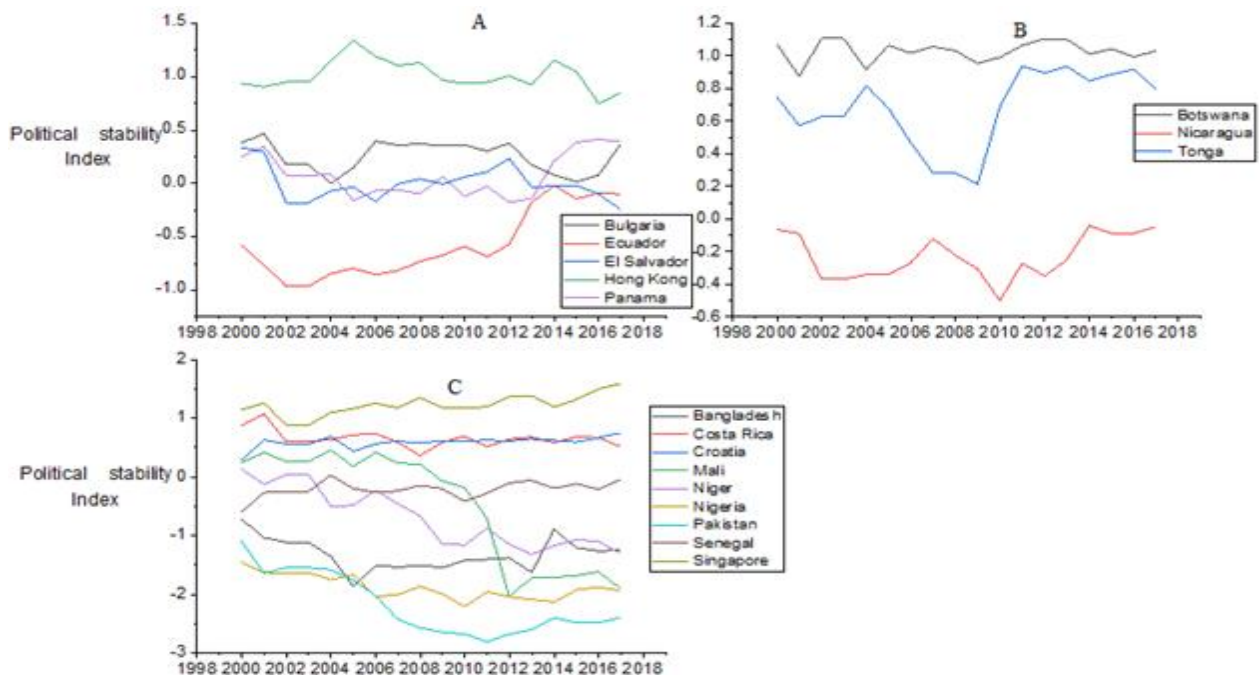
5.4.5 Secondary School Enrollment: In general figure (6) shows that all countries have recorded a rise in enrollment rates in secondary education, which reflects the desire of countries to invest in human capital. Ecuador and El Salvadore recorded the lower rate in the period from 2000 to 2004 due to the natural disasters as earthquacks and hurricanse, But what is striking, the steady rise in Ecuador, where the percentage rose from 55% to 65% in the first 8 years, and accelerated in the last years to reach more than 100%, because Ecuador's government adopted the compulsory policy for primary and secondary education in 2011 (world Bank, 2018).. The data for Botswana reflected higher rate of secondary enrollment than the countries in category B, it fluctuated between 80% and 120% Through the study period. For category C almost all countries fluctuated between 20% and 100%, Except Singapore recorded the highest rate of secondary enrollment about 150% from 2002 to 2008, while Niger recorded the lowest rate of secondary enrollment between 6% and 24%. The rate of 100% and more means that the secondary enrollment includes all students who are officially in the secondary age and who are exceed the official age of secondary education (World Bank, 2018).

Figure (6) Secondary School Enrollment for Each category

Source: World Bank Database: https://data.worldbank.org/indicator/SE.SEC.ENRR
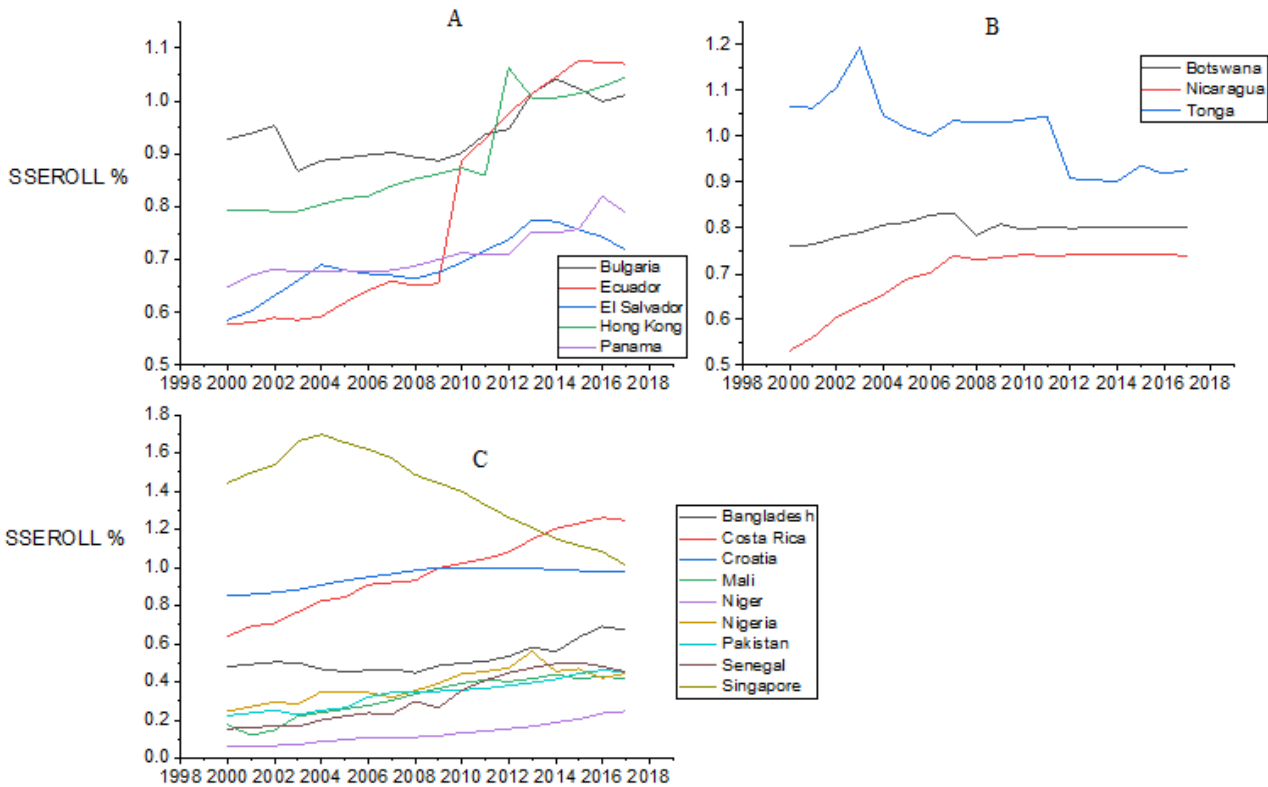
5.4.6 Trade Openness: All countries under category A were affected by the subprime mortgage and financial crisis in the USA from 2007 to 2010 according to figure (7), where trade has recorded a significant decline due to price changes for several goods especially for oil and primary goods. During the crisis, trade financing decreased, and the debt cost increased by five percentage points above the policy rate. This increased difficulty in gaining commercial loans which was a contributing factor to explain the significant decline in trade during the crisis. In addition, as uncertainty increased during the crisis, exporters refused to give importers merchandise on credit (Shelburne, 2010). All countries in category B reflected declines in the period from 2012 to 2015 except Tonga which experienced an increase in its trade openness for the same period due to its small size and high rate of imports (Chen, et al.,

2014). Singapore represented the highest rate of trade openness of the sample study due to its high rate of exports, it was around 200% of GDP and its import rate was around 170% of GDP. The rest of countries in category C fluctuated between 20% and 90% as for example Croatia; Bangladesh; Pakistan and Costa Rica.

Figure (7) Trade Openness for Each Category

Source: World Bank Database: https://data.worldbank.org/indicator/NE.EXP.GNFS.ZS, https://data.worldbank.org/indicator/NE.IMP.GNFS.ZS
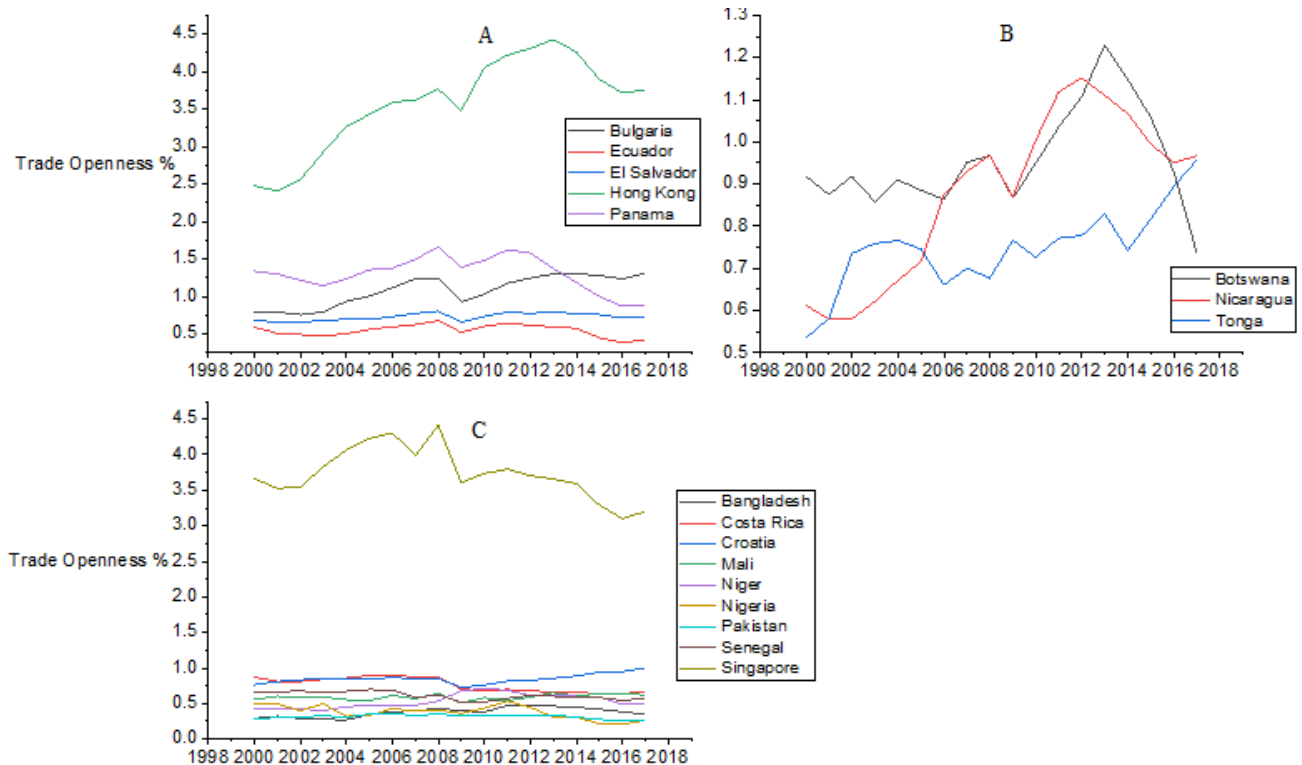
5.4.7 Foreign Direct Investment: Figure (8) shows clearly that there was a shock affected on countries FDI inflows between the period from 2007 to 2009, that means that the global financial crisis affected negatively on FDI inflows. But in some countries the fluctuations occurred for different reasons. For example, in Botswana the government didn't approve policies to attract FDI flows to expand its economic base like investor protections policy

(Makoni, 2015). Singapore; Niger and Costa Rica recorded respectively the highest rate of FDI inflow shares of GDP. The fluctuation margin for category C was between 8% and 25% for Singapore, and between 2% and 15%for Niger and between 5% and 8% for Costa Rica. In the rest countries the FDI fluctuated between 1% and 5% of GDP. What is striking in this figure the slight sharp decline in FDI in Singapore during the financial crisis, but it recovered again in 2010.

Figure (8) Foreign Direct Investment for Each Category

Source: World Bank Database:

https://data.worldbank.org/indicator/BX.KLT.DINV.WD.GD.ZS
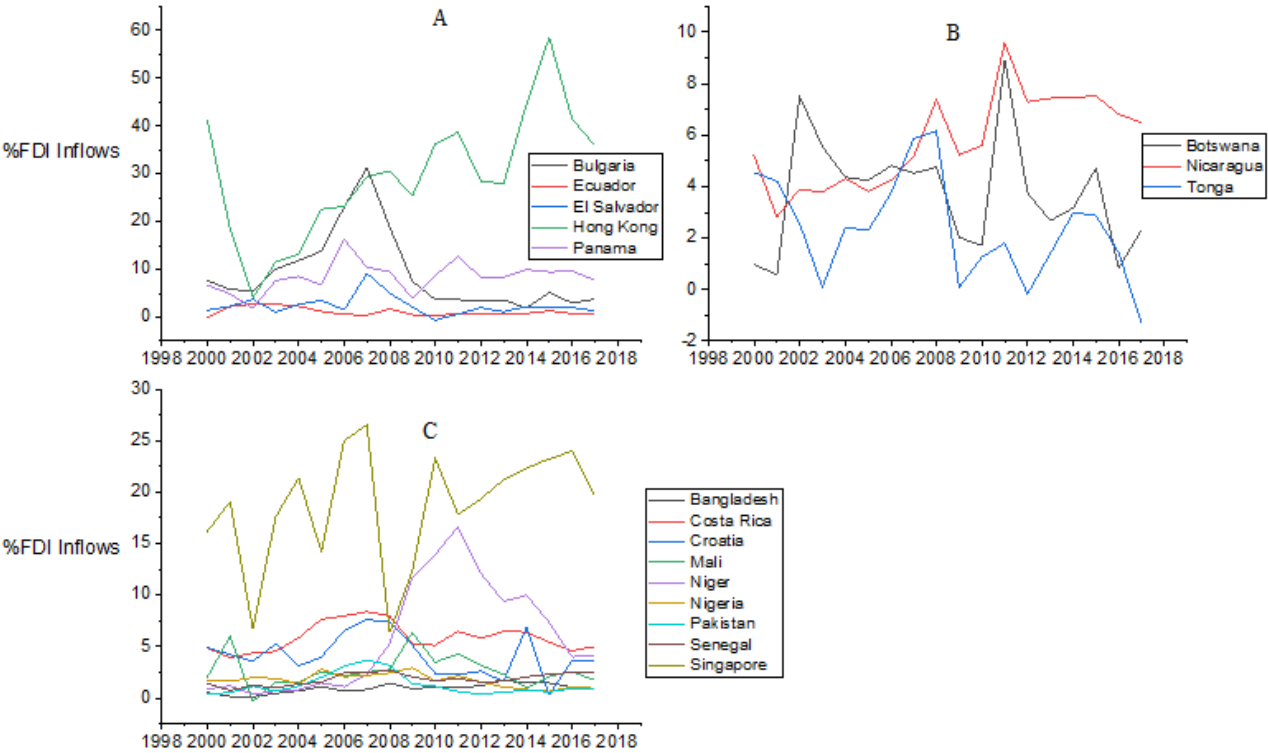
Chapter 6: Data Analysis and Empirical Evidence

6.1 Panel Unit Root Testing Results

In order to check the stationary of the variables, we depend on Levin-Lin-Chu unit-root test to investigates the stationary for each variable separately. The following indicators are used:

H0: Panels contain unit roots.

H1: Panels are stationary.

Table (3) shows the t-statistics values, demonstrating statistical probability for each variable. The results indicate that the variables INF, FDI, GGS, SSEROLL, POLST, TRADOPEN, Log GDP per capita were stable at level.

Table (3): The Results of LLC Test

Variables	Number of panels	(t-value)	(p-value)	Status
Log GDP per Capita	53	(-7.4285)	0.0000	Stationary
INF CPI	53	(-42.0775)	0.0000	Stationary
FDI	53	(-7.3173)	0.0000	Stationary
GGS	53	(-4.3986)	0.0000	Stationary
SSEROLL	53	(-4.6437)	0.0000	Stationary
POLST	53	(-3.5135)	0.0002	Stationary
TRADOPEN	53	(-3.3753)	0.0004	Stationary

For more evidence we used another unit root test. Im-Pesaran-Shin unit root test assumes that all-time series data are non-stationary under the null hypothesis as below:

Ho: All panels contain unit roots

Ha: Some panels are stationary

Table (4) shows the t-bar values, demonstrating statistical probability for each variable. The results indicate that the all variables are stable at level except the variable of trade openness.

Table (4): The Results of IPS Test

Variables	Number of panels	(t-bar)	(p-value)	Status
Log GDP per Capita	53	(-2.3449)	0.0066	Stationary
INF CPI	53	(-3.9349)	0.0000	Stationary
FDI	53	(-3.0664)	0.0000	Stationary
GGS	53	(-2.1414)	0.0000	Stationary
SSEROLL	53	(-2.0035)	0.0010	Stationary
POLST	53	(-2.9676)	0.0000	Stationary
TRADOPEN	53	(-1.6309)	0.2530	Non-Stationary

6.2 Dealing with Multi-Collinearity

Table (5) below shows that VIF results are less than 10 for all explanatory variables which means that there is no correlation between explanatory variables.

Table (5): VIF Test Results

Variable	VIF	1/(1-R^2)
FDI	1.82	0.549601
GGS	1.44	0.693120
INFCPI	1.05	0.951885
PolST	2.17	0.460917
SSEROLL	1.91	0.523202
TRADOPEN	2.50	0.399211

6.3 GMM, Fixed Effect and Random Effect Regression Results Estimation

Table (6) below shows the results of different estimations; GMM, fixed effect and random effect. According to the results below and after the comparison between the estimations, this study will depend on the GMM results due to many reasons. First, the GMM method is an estimation of a dynamic model taking into account the lagged GDP per capita. The second one is that all variables are statistically significance at 5% or 10% level in GMM results except the political stability variable and population variable, but in fixed effect there are only two significant variables (SSEROLL and TRADOPEN), and in the random effect model the results show only three significant variables (INFCPI, SSEROLL and TRADOPEN. The last reason is due to that the signs of coefficients for all significant variables are consistent with economic theory in GMM estimation except GGS due to the function of GMM estimation, while in fixed effect and random effect, the variable of GGS is not consistent with economic theory since the models don't satisfy the exogeneity assumption. A and B denoted the dummy variable of pegged exchange rate regime, where A denoted the pegged exchange rate regime with 0% fluctuation margin and B denoted the pegged exchange rate regime with 1% fluctuation margin.

Table (6): GMM (of step one lag (1)) and Fixed Effect, Random Effect Estimation Results

Number of obs = 901	Wald chi2(9) = 22796.07 Prob > chi2 = 0.0000			R-sq: overall = 0.6202			R-sq: overall = 0. 6497		
Variable	GMM results			Fixed effect (lagged difference variables)			Random effect (lagged difference variables)		
Log GDP per Capita	Coef	Std. Err.	P> | t |	Coef	Std. Err.	P> | t |	Coef	Std. Err.	P> | t |
L1	.8934	.0111	0.000	——	——	——	——	——	——
FDI	.0046	.0010	0.000	0.0006	0.0031	0.8450	0.0004	0.0031	0.876
GGS	-2.242	.1887	0.000	-1.617	.8204	0.049	-1.405	.8287	0.090
INFCPI	-.1945	.0290	0.000	-.2038	.0875	0.020	-.2018	.0886	0.023
PolST	.03935	.0147	0.008	-.0327	.0547	0.550	-.0054	.0551	0.921
SSEROLL	.2407	.0831	0.004	2.049	.3789	0.000	2.143	.3825	0.000
TRADOPEN	.0902	.0194	0.000	.5037	.0999	0.000	.5342	.0991	0.000
A	-1.0886	.1387	0.000	Omitted			.4779	.3770	0.205
B	- .0502	.1531	0.743	Omitted			-.3256	.4748	0.493

Based on GMM results, the signs of all estimators except GGS are consistent with the economic theory, and to our expectations about the relationship between the explanatory variables and economic growth. This conclusion concerns the foreign direct investment, secondary school enrollment, inflation rates, trade openness and political stability variables. The negative and positive signs of the coefficients help to define the nature of this relationship.

It is expected that higher fluctuation margin for exchange rate under pegged exchange rate regimes, will lead to lower economic growth. This expectation is based on the economic stability that stimulates investment, consumption and trade, according to economic theory.

On the other hand, the negative signs of the dummy variables' coefficients are the contrast to this expectation, and this is particularly significant as it is consistent with the research hypothesis and objectives. This proves that there is a relationship between pegged margin for exchange rate regimes and economic growth, which explains the different results of the effects of fixed exchange rate regimes on economic growth as was explained in the literature review.

According to these results and with reference to category C, as the pegged margin becomes lower, economic growth declines by 0.05% for 1% pegged margin, and declines by 1.08% for 0% pegged margin. Which means that economic growth for countries with 1% fluctuation with its exchange rate regime is lower than economic growth for countries with 2% fluctuation in its exchange rate regime. Countries with no margin for exchange rate to fluctuate in the sample countries, such as Bulgaria, recorded the lower economic growth. On the other hand, China recorded the higher economic growth as its exchange rate can fluctuate within a margin of 2%.

These results correspond to Levy-Yeyati & Sturzenegger (2003), Ghosh, Gulde (1997), and Baxter & Stockman (1989), who proved that fluctuated exchange rate regime recorded higher economic growth, and in the tested sample more fluctuations led to higher economic growth but with low proportions, which contradicts to what Mundell (2002), Moreno (2001), and Bailliu, Lafrance & Perrault (2002) claimed.

On the other hand, the results show that government expenditure has a negative impact on the GDP per capita; as government expenditure increases, the rate of economic growth will decline by 2.24%, hence there is an inverse relationship between the two variables. Levy-Yeyati and Sturzenegger (2003) confirmed this result by proving the negative effect of government consumption on the GDP under the different types of exchange rate regimes and

they didn't explain the reason. Nonetheless, this contradicts with the Keynesians theory which suggested the positive impact of public consumption to motivate economic growth. This result stems from the nature of developing countries whose government spending focus on public sector development, leading to lower economic growth, in addition to the fact that the sample contains a large set of countries relative to the time series (N>T). Thus, the results of the GMM estimation can be interpreted as cross-country comparisons. The sample contained some countries with large government spending and low economic growth as Niger, and in contrast there were some countries which achieved higher economic growth compared to its government spending as Singapore.

The results obtained in this study are consistent with Levy-Yeyati and Sturzenegger (2003) with regards to government spending, Inflation and secondary school enrollment. The results showed that higher rates of economic stability and the subsequent increasing in economic growth could result from political stability, lower levels of violence, terrorism and more democracy in the country. This result coincides with the expectation that there is a positive effect of political stability on economic growth.

As for secondary school enrollment, the coefficient is significantly positive at the 5% level of significance, which means that there is a direct correlation between education and economic growth. As education rate increases by 1%, economic growth will increase by 0.24%. This result reflects the same effect provided by Levy-Yeyati and Sturzenegger (2003) and Barro (1991) and supported by the human capital theory that focused on investing on human capital to increase productivity and raise the GDP.

The coefficient for trade openness on the other hand reflects a significant positive relationship between trade openness and economic growth. This finding corresponds to the initial expectations that trade will stimulate growth. Frankel & Romer (1999) also reached the same result. They claimed that if trade openness rate increases by 1%, the GDP will increase by 0.02%. By checking the sample countries, it is found that the GDP of most of them depend on high rate of imports, where imports exceed exports by 14.5%.

One of the most important economic variables for each country is price stability. The economic theory derives a negative relationship between changing price level and economic growth. The coefficient for inflation in this study shows a strong negative relation at 5% significant level, which corresponds with theory and literature. As the inflation rate increases by 1%, GDP will decline by 0.19%. This result can be logically explained when prices increase, demand for goods and services goes down, hence consumption will decrease and eventually exports will decrease too, which leads to lowering the GDP.

It may seems also that the coefficient on the foreign direct investment is positively statistically significant, given that many empirical studies find the relationship between the foreign direct investment and economic growth in cross-country regressions to be quite robust as claimed by Alfaro, et al. (2004). However, the traditional assumption is that higher rate of investments (FDI is considered as investments) will be translated into faster economic growth.

Borensztein, De Gregorio and Lee (1998) who interpreted this by saying that the relationship between FDI and economic growth is linked with the ability of human capital in host country to absorb the technological transfer that comes from FDI. This means that FDI leads to higher economic growth when efficient capability of the new technology is available in developing countries.

6.4 Estimation Results by Pegging Category

6.4.1 Estimation Results For Group A

6.4.1.1 Unit Root Test

Table (7) shows the results of the LLC test for unit root problem, where some variables are not stable at level in this category as inflation, Secondary school enrollment, political stability and population. According to the results below the study will adopt the difference for explanatory variables to solve the nonstationary problems.

Table (7): The Results Of LLC Test For Group A

Variables	Number of panels	(t-value)	(p-value)	Status
Log GDP per Capita	5	-1.9895	0.0233	Stationary
INF_CPI	5	4.0903	1.0000	Non stationary
FDI	5	-2.4028	0.0081	Stationary
GGS	5	-2.2424	0.0125	Stationary
SSEROLL	5	-0.2041	0.4191	Non stationary
POLST	5	-1.1716	0.0851	Non stationary
TRADOPEN	5	-1.9194	0.0275	Stationary

6.4.1.2 Hausman Test

To decide between fixed effect or random effect with Driscoll and Kraay Standard Error, we will depend on Hausman test, which detect whether the unique errors (ui) are correlated with the regressors (predicted variables), the null hypothesis is they aren't (the preferred model is random effects).

According to the test results we can reject the null at 5% level of significance since the p-value of the test is about (0.000) which is less than 5%. So we can conclude that the preferred model is the fixed effect estimation, where results are as the following:

b = consistent under Ho and Ha

B = inconsistent under Ha, efficient under Ho

Test: Ho: difference in coefficients not systematic

chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)

=   71.80   Prob>chi2 =   0.0000

6.4.1.3 Testing For Heteroscedasticity For Fixed Effect Model

To detect the problem of heteroscedasticity, this study uses modified Wald test for GroupWise heteroscedasticity, which have the null hypothesis of that there is no heteroscedasticity. According to the heteroscedasticity test, Chi2 (5) = 178.85 and Prob > Chi2 = 0.0000, so we can reject the null hypothesis at 5% level of significance, which will be considered as an indication of the presence of heteroscedasticity problem.

6.4.1.4 Testing For Serial Correlation

To detect the problem of serial correlations, this study uses Wooldridge test for autocorrelation in panel data, which have the null hypothesis of that there is no first-order autocorrelation. According to the serial correlation test, F (1, 4) = 189.939 and Prob > F = 0.0002, so we reject the null hypothesis at 5% level of significance, which will be considered as indication of the presence of serial correlation problem.

6.4.1.5 Fixed Effects Estimator with Driscoll and Kraay Standard Error.

To solve the problems of heteroscedasticity, and serial correlation, we will depend on the fixed effects estimator with Driscoll and Kraay standard error.

Table (8) shows the results of the fixed effect model, it is clear that there is no statistically effect for all variables except FDI, on economic growth for group A of pegged exchange rate regime (margin is zero). In the other hand, there is a statistically positive effect for FDI on economic growth.

Table (8): Fixed Effects Model for Group A (Dependent variable: D(log GDP per Capita)
with Driscoll-Kraay Standard Errors

Independent variables	Coefficient	(p-value)
FDI	.0037	0.002
GGS	.0702	0.898
LD. INFCPI	-.0261	0.305
LD.SSEROLL	-0.0026	0.888
LD.POLST	-.00015	0.997
TRADOPEN	-.008	0.784
Constant	.0305	0.746
Number of obs	80	
Number of groups	5	
F(6,69)	2.61	
Prob>F	0.0245	
within R2	0.1849	

6.4.2 Estimation Results for Group B

6.4.2.1Unit Root Test

Table (9) shows the results of the LLC test for unit root problem, where some variables are not stable at level in this category as inflation, log GDP and trade openness. According to the results below the study will adopt the lagged difference for explanatory variables to solve the nonstationary problems.

Table (9): The Results of LLC Test for Group B

Variables	Number of panels	(t-value)	(p-value)	Status
Log GDP per Capita	3	-1.0727	0.1417	Non stationary
INF_CPI	3	-0.1623	0.4355	Non stationary
FDI	3	-2.6742	0.0037	Stationary
GGS	3	-2.0666	0.0194	Stationary
SSEROLL	3	-4.4545	0.0000	Stationary
POLST	3	-2.2948	0.0109	Stationary
TRADOPEN	3	-1.0893	0.1380	Non stationary

6.4.2.2 Hausman Test

According to Hausman test results, we can't reject the null at 5% level of significance. So we can conclude that the preferred model is the random effect estimation.

b = consistent under Ho and Ha

B = inconsistent under Ha, efficient under Ho

Test: Ho: difference in coefficients not systematic

Test: Ho: difference in coefficients not systematic

chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 0 .84   Prob>chi2 =   0.9970

6.4.2.3 Random Effects Results

Table (10) shows that there are no statistical relations for all variables on economic growth for group B of pegged exchange rate regime (margin is 1%). In the other hand, there is a statistically positive effect for FDI on economic growth under 10% probability.

Table (10): Random Effects Model for Group B (Dependent variable: D(log GDP per Capita) with Driscoll-Kraay Standard Errors

Independent variables	Coefficient	(p-value)
FDI	.0086	0.09
GGS	-.4851	0.577
LD. INFCPI	-.2086	0.622
SSEROLL	.1356	0.116
POLST	.0347	0.482
LD.TRADOPEN	.1328	0.330
Constant	-.03571	0.609
Number of obs	48	
Number of groups	3	
Wald chi2(7)	15.39	
Prob>chi2	0.0174	
R2	0.0743	

6.4.3 Estimation Results for Group C

6.4.3.1 Unit Root Test

Table (11) shows the results of the LLC test for unit root problem, and it is clear that all variables within this category are stationary at level. The suitable modelling is GMM because N>T in this category.

Table (11): The Results of LLC Test for Group C

Variables	Number of panels	(t-value)	(p-value)	Status
Log GDP per Capita	45	-7.8240	0.0000	Stationary
INF_CPI	45	-44.1600	0.0000	Stationary
FDI	45	-6.4989	0.0000	Stationary
GGS	45	-3.4364	0.0003	Stationary
SSEROLL	45	-3.9547	0.0000	Stationary
POLST	45	-2.9053	0.0018	Stationary
TRADOPEN	45	-2.7139	0.0033	Stationary

6.4.3.2 GMM Estimation

Table (12) shows that there is a statistically negative effect for government spending and inflation rate on economic growth for group C of pegged exchange rate regime (margin is 2%). But there is a statistically positive effect for FDI and trade openness on economic growth. Human capital and political stability variables have no statistical relation with economic growth.

Table (12): GMM Model for Group C (Dependent variable: log GDP per Capita)

Independent variables	Coefficient	(p-value)
L1(log GDP per Capita)	.9237	0.0000
FDI	.0024	0.048
GGS	-1.987	0.0000
INFCPI	-.1981	0.0000
SSEROLL	.0758	0.368
POLST	.0161	0.285
TRADOPEN	.0737	0.001
Constant	.8447	0.0000
Number of obs	765	
Number of groups	45	
Wald chi2(8)	19171.14	
Prob>chi2	0.00000	

Chapter 7: Conclusions and Recommendations

Does the pegging margin for pegged exchange rate regimes matter for macroeconomics?

This thesis tried to provide and embodies empirical evidence on the implications of different categories of pegged exchange rate regimes, with different fluctuation margins on economic growth. Using a panel-data set of 53 countries over the years 2000 – 2017; the study assessed their economic growth and its dependence on the pegging margin.

The findings using the generalized method of moments suggest that the pegging margin for pegged exchange rate regimes has a significant positive influence on economic growth, where the lower economic growth will be associated with harder pegged exchange regimes. Thus, stabilized arrangement, crawl-like arrangement and conventional pegged arrangement with fluctuation margin equal to 2%, are the least affected with the negative effects of pegging their exchange regimes. But exchange arrangement with no separate legal tender and currency board arrangement, are linked with the lowest economic growth. Crawling peg and Pegged exchange rate within horizontal bands with fluctuation margin equal to 1%, effect negatively on economic growth but lower than the classifications with no fluctuation margin.

The study depends on (Levin-Lin-Chu Test) for unit root test, to confirm the stationary of variables, the results reflect stationary at level for all variables, and no need to use the co integration test to check the long run relations between variables. Also, the study depends not only on GMM for estimation, but it used the Hausman test to choose between fixed and random effect for each margin category separately. The results coincide with the optimal currency area theory about the effects of stable exchange rate fluctuation on economic growth through affecting the stability.

The effects of political stability are not significant except for all categories. FDI enhance economic growth under different pegged exchange rate regimes. Trade openness and human capital improvement have positive implications on economic growth regardless to the pegged

margin. Inflation has negative influence on economic growth for all pegged exchange rate classifications.

These results thus suggest that economic growth is influenced by the presence of a pegged margin for pegged exchange rate regimes, but is not depended on the type of exchange rate regime per se. Furthermore, the obtained results that soft peg is less harmful than hard peg to economic growth should lead policymakers to arrange fluctuations of exchange rates with a margin equal to 2% and ensuring that the monetary authority must intervene to control the fluctuations of exchange rates. However, this recommendation requires stability of inflation and competitive international trade as prerequisite for larger pegging margin.

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Table 2: The sample contries used in the study, with their relative exchange rate regime and groups

Country Name	Exchange rate	Group
Bulgaria	Currency board arrangement	A
Ecuador	Exchange arrangement with no separate legal tender	A
El Salvador	Exchange arrangement with no separate legal tender	A
Hong Kong	Currency board arrangement	A
Panama	Exchange arrangement with no separate legal tender	A
Botswana	Crawling peg	B
Nicaragua	Crawling peg	B
Tonga	Pegged exchange rate within horizontal bands	B
Aruba	Conventional pegged arrangement	C
Bahamas	Conventional pegged arrangement	C
Bahrain	Conventional pegged arrangement	C
Bangladesh	Stabilized arrangement	C
Barbados	Conventional pegged arrangement	C
Bolivia	Stabilized arrangement	C
Burundi	Crawl-like arrangement	C
Cameroon	Conventional pegged arrangement	C
Chad	Conventional pegged arrangement	C
China	Stabilized arrangement	C
Congo	Conventional pegged arrangement	C

Costa Rica	Crawl-like arrangement	**C**
Croatia	Stabilized arrangement	**C**
Denmark	Conventional pegged arrangement	**C**
Dominican Republic	Crawl-like arrangement	**C**
Fiji	Conventional pegged arrangement	**C**
FYR Macedonia	Stabilized arrangement	**C**
Guyana	Stabilized arrangement	**C**
Jamaica	Crawl-like arrangement	**C**
Jordan	Conventional pegged arrangement	**C**
Kenya	Stabilized arrangement	**C**
Kuwait	Conventional pegged arrangement	**C**
Lao	Stabilized arrangement	**C**
Lebanon	Stabilized arrangement	**C**
Malawi	Stabilized arrangement	**C**
Mali	Conventional pegged arrangement	**C**
Morocco	Conventional pegged arrangement	**C**
Namibia	Conventional pegged arrangement	**C**
Nepal	Conventional pegged arrangement	**C**
Niger	Conventional pegged arrangement	**C**
Nigeria	Stabilized arrangement	**C**
Oman	Conventional pegged arrangement	**C**
Pakistan	Stabilized arrangement	**C**
Qatar	Conventional pegged arrangement	**C**
Saudi Arabia	Conventional pegged arrangement	**C**
Senegal	Conventional pegged arrangement	**C**
Serbia	Stabilized arrangement	**C**
Singapore	Stabilized arrangement	**C**
Sri Lanka	Crawl-like arrangement	**C**

Sudan	Stabilized arrangement	**C**
Tajikistan	Stabilized arrangement	**C**
Tanzania	Stabilized arrangement	**C**
Togo	Conventional pegged arrangement	**C**
Vietnam	Stabilized arrangement	**C**