An Econometric Analysis of the Behavior of Investment Rate in Selected Developing Countries

Amirreza Attarzadeh

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Approval of the Institute of Graduate Studies and Research

_____

Prof. Dr. Serhan Çiftçioğlu
Acting Director

I certify that this thesis satisfies the requirements of thesis for the degree of Master of Business Administration.

_____

Assoc. Prof. Dr. Mustafa Tümer
Chair, Department of Business Administration

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Business Administration.

_____

Prof. Dr. Serhan Çiftçioğlu
Supervisor

Examining Committee

1. Prof. Dr. Serhan Çiftçioğlu   _____

2. Assoc. Prof. Dr. İlhan Dalcı   _____

3. Assoc. Prof. Dr. Mustafa Tümer   _____

ABSTRACT

This thesis aims to investigate the relationship between economic variables, e.g., inflation rate, interest rate, trade openness, growth rate of GDP with the investment function in South East Asian Nations (ASEAN) e.g., Malaysia, Philippines, Singapore, and Thailand from 1976 to 2013.

To meet this end, the panel regression analysis and OLS methods are used to investigate the effects of economic variables on the domestic investment with respect to each country. Additionally, the effects of economic variables in the group of countries in form of the panel data is used to find the relationship between of the economic variables is analyzed.

The result of this investigation revealed that the relationship between the real interest rate and domestic investment (I/GDP) is negative. Similarly, for the I/GDP and inflation rate a negative relationship was obtained. However, the trade openness and growth rate had a positive correlation.

Keywords: Inflation rate, Growth rate of GDP, interest rate and trade openness, investment function.

ÖZ

Tezin AMACI Bu, Malezya, Filipinler, Singapur Tayland gibi ASEAN ulkelerinde A.Ş. 1976 2013 ila yillari arasinda enflasyon, interest, disa açıklık Orani, gayri safi milli hasilanin Büyüme Orani Benzeri degiskenler ile yatirim fonksiyonlarinin iliskisini incelemektir .

Bu baglamda, ekonomik degiskenlerin Yerel yatirimlara etkisini inançsız amaciyla, Panel Veri Analizi A.Ş. Enkucuk Kareler Metotları onu Bir ulke icin kullanilmistir. Buna ek Olarak grup ulkelerinde Ekonomik degiskenlerin Etkileri paneli Verileri Olarak incelenip Ekonomik degiskenlerin birbirlerine Etkileri tahmin edilmistir.

Bu ARAŞTIRMANIN sonuclari gercek interest Orani ile Yerel yatirim (I/GSYH) iliskisinin negatif oldugunu ziyaretinde I/GSYH ile enflasyon baglantisinin da negatif oldugunu Ortaya koymaktadir. Tersine Olarak ticari disa acikligin Büyüme oranina Etkisi pozitif olmaktadir.

Anahtar Kelimeler: Enflasyon Orani, Gayri Safi millî hâsıla Büyüme Orani, Faiz Orani, Ticari Disa açıklık A.Ş. Yatırım Fonksiyonu

Herewith, I dedicate this thesis to my father and mother who taught me that

everything is possible and also my lovely sister Ghazal and her husband for their

unlimited support through all the way.

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Chapter 1

INTRODUCTION

This research study focuses on investigating the effect of economic variables such as inflation rate, trade openness, interest rate and growth rate on the domestic investment regarding the Association of Southeast Asian Nations (ASEAN) e.g., Malaysia, Philippines, Singapore, and Thailand from 1976 to 2013.

ASEAN was formed in 1967 involving five members including Indonesia, Malaysia, Philippines, Singapore, and Thailand with the purpose to improve their economy and security.

In the present research study, two different methods, e.g., individual regression and panel data have been used in order to analyze the economic data. The ordinary least square (OLS) has been used to map the data based on linear interpolation. For each country, the available economic data during a period of 36 years between 1976 and 2013 were collected for the individual regression. For the panel data, the economic relationship between the inflation rates, trade openness, interest rate and growth rate were analyzed for a group of four countries. This helps us to investigate whether or not a governing equation can be estimated to predict the economic behavior of these countries, whereas in the individual regression model the effects of the afore-mentioned economic parameters are studied for each country, separately.

The underlying rationales of using the OLS technique in our economic models are: (1) In this study, the proposed model is assumed to be linear so as the OLS technique can be an efficient tool for such models; (2) four economic variables are considered in this study e.g., the inflation rate, trade openness, interest rate and growth rate. Hence, the number of variables is not too many and the OLS method can handle it; (3) the variation in the data values are not excessively large or small, thus the OLS method is applicable in this sense.

Given the empirical ambiguity about the behavior of economic variables and their effect on the domestic investment, it is necessary to conduct studies dealing with investigating the relationship between these economic variables. The effect of the economic variables on the investment might be either significant or insignificant. Regarding the governmental monetary policies, it is necessary to investigate the effect of each single economic parameter to find whether its variation is significant or insignificant.

The scope of this research study is to investigate the effects of inflation rate, trade openness, interest rate and growth rate on the domestic investment. With this respect, the influential parameters affecting the economy of a country is studied. The impact of the aforementioned economic variables on the domestic investment is determined and explained. To the extent of the author's knowledge, there is no study in the literature of econometric which has studied the effects of these above-mentioned economic parameters in ASEAN countries including Malaysia, Philippines, Singapore, and Thailand during the time period between 1976 and 2013.

Thus, the present study focuses on analyzing and obtaining acceptable results to describe the effects of the economic variables on the domestic investment. It is expected to predict the impacts of variations in inflation rate, trade openness, interest rate and growth rate on the domestic investment. Additionally, it is investigated that either the outcome of the proposed methodology to estimate the effects of the economic parameters is beneficial or not.

This thesis has been divided into 6 chapters, which are categorized as:

In chapter 1, the ASEAN countries and their goals are described in details.

Chapter 2, gives a description about the investment concept and different types of investment. In the following, the effects of inflation, trade openness, interest rate and growth rate on the gross capital formation are described theoretically. The last part of this chapter provides an explanation concerning the different theories of investment.

Chapter 3, presents the proposed methodology of this research study, as well as simple and Multiple Regression Analysis and Ordinary Least Squared analysis techniques. Following this chapter, the disadvantage of these techniques, model, hypotheses and data are introduced.

Chapter 4, provides the readers with an insight about the obtained results. In this chapter, the relationship between the economic variables and domestic investment is analyzed and discussed. As it was expected, there exists a positive relationship between the trade openness, growth rate, and investment function. However, a

negative relationship between the interest rate, inflation and gross capital formation was obtained. Moreover, the results of multi regression and panel data are obtained.

Chapter 5, exhibits the figures and plots of the obtained results with an exhaustive explanation and discussion. Based on the results, a comparison between the inflation rates of the ASEAN countries from 1976 to 2013 is drawn. Other economic variables are also compared against each other regarding the economic performance of each country during 1976 to 2013.

The concluding marks of this study are presented in Chapter 6, and the effects of the different economic factors on the gross capital formation are explained. Some recommendations are also given in this chapter.

Chapter 2

LITERATURE REVIEW

2.1 Investment concept

The underlying concept of the investment can be found in the context of economy. The investment can be defined in terms of the concepts in macroeconomics, national accounts and financial economics. Accordingly, the gross capital formation in form of gross domestic investment is the level of inventories including the outlays in addition to the fixed assets of the company plus the net change in the level of the inventories. For example, a machinery equipment purchases or the construction of a road (worldbank, 2015). In the context of economy, the investment is defined as the "accumulation of newly produced physical entities" (Investment, 2015). For instance, machinery or good inventory and also buying goods that might not be useful currently but be beneficial/useful in the future for reaching wealth.

2.2 Alternative investment versus traditional investment

Nowadays, traditional investment is the definition of investing in the stock, bond, share and cash. However, the alternative investment is the opposite side of the coin in contrast with the traditional investment which is dependent on tangible assets such as gold, silver and etc. (Investopedia, 2015).

2.3 Types of investment

First, the investment is defined as purchasing something with money with the expectation to have an income and profit in the future. The investment is divided into the three parts: ownership, lending, and cash equivalents (Beattie, 2015).

2.3.1 Ownership investment

Ownership investment is the profitable part which is divided into four sections such as stocks, business, real estate and precious objects (Beattie, 2015).

- **Stocks**: own a share of a firm

- **Business**: using cash to start business

- **Real Estate**: buying house or apartments to rent/ repair

- **Precious objects**: gold, silver, and some kind of old goods such as Da Vinci paintings

2.3.2 Lending investment

In the lending investment, risk is lower than the ownership investment and the profit is the least when compared with other methods. Saving account and bonds are lending investment. The difference between bond holder and stock holder is that in the later approach the stockholders get nothing when the company is bankrupted; however in the former approach the bond holders get their money back. This proves that the risk is lower in lending investment (Beattie, 2015; Ivashina & Scharfstein, 2010).

2.3.3 Cash equivalents

The definition of the cash equivalent investment is that the investor can easily transform their investment (money market found) into cash (Beattie, 2015).

2.4 Effect of the economic variables on the investment

2.4.1 The effect of inflation rate on the investment

De Gregorio (1993) emphasizes on the negative influence of the inflation rate on I/GDP. High inflation increases uncertainty for the future investment and the people with fixed income are reluctant to invest. The concern about high inflation and the higher uncertainty in this situation which does not only consists of the risk but also includes the possibility of learning. If the uncertainty of the investor is increased, therefore the tendency to invest in goods is lowered. Consequently, most of empirical evidences point to a negative relationship (Thirlwall & Barton, 2014).

Inflation has various effects on the investment in different conditions. Growth of money supply is the most important parameter which is related to the inflation and if it is greater than the economic growth, the inflation rate will increase (Iqbal, 2009).

Able (1980) who is the most famous business economist, investigated these two important subjects. First, he obtained the correlation between the inflation rate and investment spending and he claimed that if the inflation rate increases the investment spending will decrease. In the second part, he found out that the high rate of inflation has negative effect on the tax policy (Able, 1980).

The negative inflation, also being known as deflation, is harmful when it can lead into to higher demands. In this condition, people prefer to stop their investment and they are reluctant to invest their money since they are expecting that the prices will fall down. On the other hand, in this condition, the unemployment increases. As the result, negative inflation has negative effect on the investment (Fung, 2003).

2.4.2 Effect of growth rate on investment

Kuznets (1955), a pioneering scholar who has conducted various studied on the fixed investment, noted that the acceleration in the rate of economic growth had positive effect on the domestic investment (Solomou, 1990). Most recently, Feldstein and Bacchetta (1991) investigated the relationship between economic variables on the income growth and investment rate. He concluded that there is a rationale connection between the income growth and saving rate (Feldstein & Bacchetta, 1991).

Blomstrom, Lipsey, and Zejan (1993) believed that the economic growth and saving rate are dependent on each other. In 1986, Ando and Hayashi investigated the income growth regarding the Japanese saving. They found a positive relationship between these two variables. According to their results, the positive connection between I/GDP and economic boost was spotted. In their research study, it was found that if the economic growth increases, the investment will be magnified. This results into a situation in which the people prefer to save their money rather than investing on the market.

2.4.3 Effect of trade openness on the investment

Razin, Sadka, and Coury (2002) investigated the effect of trade openness and instability in their study. They believed that the trade openness (TO) leads into more instability which affects the investment as it may appreciate or depreciate the TO (Razin et al., 2002).

Skipton (2007) studied the relationship between the TO, investment and long run economic boost. He concluded that if the trade openness is increased, then the opportunity of the domestic investment increases as well (Skipton, 2007).

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More recently, in an investigation done by Soltani (2012), the investment is shown to be the most important factor which reflects the relationship between the TO and GDP growth. He believed that the domestic investment decreases due to the strong global competition. With respect to this, he expected to achieve the positive relationship between the investment and TO (Soltani, 2012).

2.4.4 Effect of real interest rate on investment

Pettinger (2012), one of the economic teachers in the Oxford University, discussed the effect of high interest rate on economic variables. He believed that the inflation rate and interest rate have direct relationship. He insisted on the reverse relationship between the demand and economic growth with the interest rate (Pettinger, 2012).

The interest rate targets are vital regarding the monetary policies and are taken into account when dealing with variables such as investment, inflation and unemployment. The central banks attempt to lower the interest rate in order to increase their investment. However, when the real interest rate is low, it may cause economic bubble. Additionally, a higher interest rate means a higher cost of borrowing which discourages the consumers and firms to take out loans to finance greater spending. The investment and lower interest rates reduce the incentives to save and give a smaller return from saving.

High interest rate attracts people to save their money rather than spending it. When the interest rate increases, the value of money rises so people tend to save their money in the form of that currency. However, a higher interest rate has a negative impact on the investment and consumer spending. The reaction of the aggregated demand is opposite with the interest rate where high interest rate may cause recession and high unemployment (Desroches & Francis, 2010; Pettinger, 2012).

In Figure 1, when the interest rate increases, the investment decreases implying that there is a reverse relationship between these two variables. In Figure 2, the direct connection between saving and interest rate is considered (Lidderdale, 2001).

In the classical macroeconomic theories, the effects of saving and interest rate on the investment are very important and they have impact on the aggregate demand.
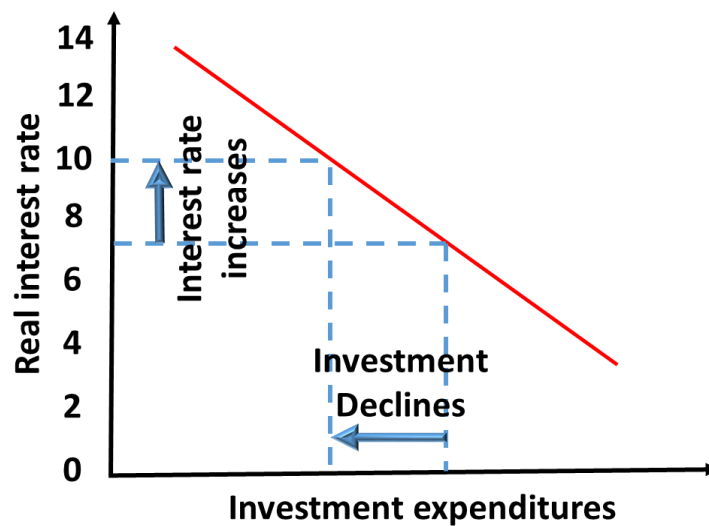
Figure 1. Relationship between investment and real interest (Lidderdale, 2001).
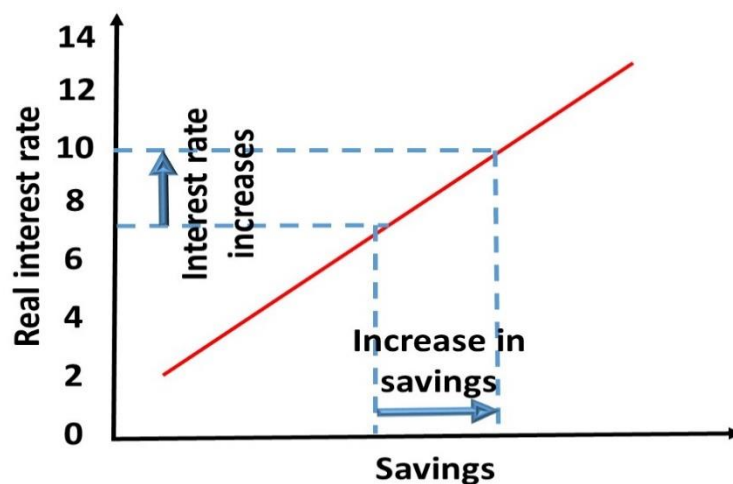
Figure 2. Relationship between interest rate and saving (Lidderdale, 2001).

2.5 The investment theory

Keynes (2006) believed that the demand for investment is the most important part in the classical theory as the rate of interest generates this issue. They desire to reach into an equilibrium considering the economic variables. Furthermore, their study shows that the investment governs the demand while saving is inter-related with the supply (Keynes, 2006).
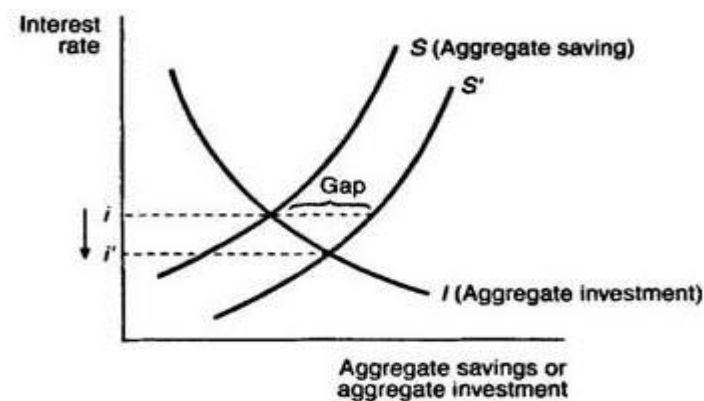
Figure 3. Classical theory of interest rate adjustment in money market.

The differences between the neoclassical theory and classical theory is that the former believes that the investment and saving are not equal. Thus, this opinion is far opposite from the opinion of classical theory which believes that the investment and saving are equal as any rise in the saving results into an escalation in I/GDP (Jorgenson, 1967; Keynes, 2006).

As shown in Figure 3, S shows aggregate saving and I represents the aggregate investment. Aggregate saving and interest have positive correlation which implies that if the interest rate is increased, more saving is achieved and the interest rate will have a negative impact on the aggregate demand. When saving increases, S curve

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shifts to the right side and a gap appears between the investment and saving at $i^{'}$. The equilibrium point of saving and investment at the same i can be noticed (Keynes, 2006).

The two studies done by Kopke (1985) and Chirinko (1986), explain and define the standard neoclassical theory. Accordingly, in order to increase the profit, involving firms tend to select their input and output factors. If the production function has a constant flexibility of replacement, the real cost of the capital determines the capital severity of the production as the output. The coefficient of the capital cost has a direct impact on the investment demand as connoted by the neoclassical commentary in terms of the outputs (Ford & Poret, 1990).

Keynes believed tomorrow is created by today and decision for future is not predictable. Based on the Keynesian theory, the effect of interest rate on the investment can be described as done in previous sections which is focused on the growth and safety objectives. This managerial theory determines the investment in terms of both growth and safety (Crotty, 1990, 1992).

Chapter 3

METHODOLOGY

3.1 Framework of regression analysis

Herein, the hypotheses are discussed first, along with the effects of macroeconomic variables, namely, trade openness, growth rate, inflation rate and interest rate on the investment function.

Regression analysis (Draper, Smith, & Pownell, 1966) is the best technique when compared with the other techniques, e.g., high/low graph due to the overall result. This method is a statistical technique to study and examine the connection among variables. Moreover, the outcome of this method can help the researchers to find the effects of economic variables on each other. Researchers can access the statistical significance and find the confidence levels according to the result.

In this research, the simple linear model and panel regression analysis is used considering four ASEAN countries, e.g., Malaysia, Philippines, Singapore and Thailand. The Gross capital formation expresses the function of other variables where the E-VIEWS software has been used to find the results.

3.2 Simple regression analysis

Simple linear model is

$$Y = c + \beta_1 X + \mu$$

In the simple linear regression (Chatterjee & Hadi, 2006) model two variables, Y and X exist. Based on this method, the investigators are able to know "what is the relationship between Y and X".

Y: is called criterion variable (dependent variable)

X: is called interpreter variable (independent variable)

β_1: is slope of the line

μ: is called error

C: is intercept parameter

If other factors are constant, it is expected that the error parameter equals to zero and the effect of X is linear on Y.

3.3 Multiple regression analysis

Multiple regression (Chatterjee & Hadi, 2006) model has several independent variables where the researchers are able to impart more variables to better the accuracy of the economic model. It is able to add an extra variable in order to explain the dependent variable. This method is the best method in predicting the dependent variable.

Multiple regression model:

$$Y = c + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_k X_k + \mu$$

Y: dependent factor

X: independent factor

μ: error parameter

C: intercept factor

β: parameter that is linked with X.

3.4 Ordinary least square (OLS)

Ordinary Least Square (Leng, Zhang, Kleinman, & Zhu, 2007) is a well-known technique to conduct regression analysis. The underlying concept of the OLS is to estimate the function that can estimate the input data. Totally, the OLS tries to fit a model based on the observed data and the distance of any point from the linear line, also known as the residuals.

In a simpler manner, the researchers try to find the line that can minimizes the distance of the actual data points and the linear line.

OLS model is:

$$\hat{Y} = c^{\wedge} + \beta_1^{\wedge}X_1 + \beta_2^{\wedge}X_2 + \beta_3^{\wedge}X_3 + \cdots + \beta_k^{\wedge}X_k$$

$\hat{Y}$: Dependent variable

$c^{\wedge}$: intercept estimate

$\beta_1^{\wedge}$: Slope of each variable

X: independent variable

3.4.1 OLS disadvantages

Unfortunately, excessively small or large values for one variable may create disproportionality result. The other problem occurs when too many variables are added into the model and the performance of the method will decrease. However, in nonlinear models the OLS method cannot be used (ClockBackward, 2009).

3.5 Panel data regression

The panel data regression is to find the relationship between the variables of multiple countries, simultaneously. For instance, the investment can be taken as the dependent variable whereas the inflation can be considered as the independent variable to be used with the purpose to find the relationship of these variables in two or more countries. Therefore, it is necessary to use the panel data analysis to find the connection of these two variables.

Panel data (Leng et al., 2007) is called longitudinal and it is a mix of cross sections and time series. In the other word, in this method there exist various cross-sections over time and both of them together are used. Many economists prefer to use panel data regression because of the advantages of this method. For example, as the number of observation increases, biased data is reduced due to aggregation and control factors that cannot be regressed because of unmeasured or unobserved (Hurlin, 2010).

3.6 Data

The data of macroeconomics variables, namely, the interest rate, inflation rate, trade openness, growth rate of GDP and gross capital formation are used according to the World Bank (worldbank, 2015).

For the investment function the gross capital formation (% of GDP) is used. This variable is similar to the gross domestic investment.

The independent variables are as follows:

Real interest rate (%)

Inflation (annual %)

Trade openness as percentage of GDP (Export + Import)

Growth rate of GDP (annual percentage)

The data is gathered from 1976 to 2013 where 37 data for each country are collected. Four ASEAN countries, namely, Malaysia, Philippines, Singapore, and Thailand are considered in the present study.

3.7 Model

In this paper, the relationships between the inflation (INF), interest rate (R), trade openness (TO) and growth rate of GDP (GR) with the investment (INV) function are investigated.

The equation is

$$INV = C + \beta_1 INF + \beta_2 R + \beta_3 TO + \beta_4 GR$$

3.8 Hypotheses

The proposed model is based on some hypotheses which are expected to be happened in the model. These hypotheses are as follows:

Hypothesis 1: An increase in the inflation has a negative influence on gross capital formation.

Hypothesis 2: A rise in the real interest rate has a negative impact on gross capital formation.

Hypothesis 3: An increase in the trade openness has positive consequence on gross capital formation.

Hypothesis 4: An escalation in the growth rate has positive influence on gross capital formation

Chapter 4

RESULTS

4.1 Results of the regression analysis

In this part, the individual regression results for Malaysia, Philippines, Singapore, and Thailand from 1976 to 2013 are presented. In all the aforementioned countries, the stationary of the input data was also checked, and in cases when the results needed to be improved through considering the stationary, the difference and lag were used.

Gross capital formation = f (inflation rate, growth rate of GDP, interest rate, trade openness)

Inflation rate (annual %)   INF

Real interest rate (%)   R

Growth rate (annual % of GDP)   GR

Trade openness (Export+Import % of GDP)   TO

Gross capital formation (% of GDP)   INV

Constant term   C

The main goal of this method is to investigate the relationship between the input variables knowing that R, INF, GR and TO have significant effect on the investment.

37 observations for each country are available and the EViews software is used to run the data and obtain the results.

To examine the results, α=95% was chosen with the value of t=2.064 and also α=90% with the value of t=1.711. If the results lie between the interval of [-2.064, 2.064] at α=95% it means that variables are significant and also if the results are more than 1.711 or under -1.711 it means that variables are significant.

4.2 Philippines

4.2.1 The effect of inflation rate, interest rate, GDP growth and trade openness on gross capital formation in Philippines

The number of observations is 38 from 1976 to 2013.

$$INV = -1.914202 \ +0.061266 TO \ +0.416343 \ GR \ -0.163227 \ INF \ -0.194265 \ R$$

T-Statistic(-3.593446) (1.002611) (3.741564)**[1] (-2.465570)**[2] (-2.111371)**[3]

R-squared = 0.458959

In this case, R-squared is equal to 45% and if we have 1% increase in the trade openness, there is an increase of 0.061266% in the gross capital formation. Moreover, if we have 1% increase in the growth rate, 0.416343% increase in the gross capital formation is observed. As we expected, the relationship between the trade openness and I/GDP is positive. However, the trade openness is not significant in 95% and 90%.

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[1] Significant at 5% level
[2] Significant at 5% level
[3] Significant at 5% level

The effect of inflation rate is negative and if the inflation increases by 1%, the I/GDP will fall down by 0.163227%. Likewise, the effect of real interest rate is negative and if there is an increase of 1% in the interest rate, the gross capital formation will decrease by0.194265%.

The probability of the growth rate of GDP is equal to 0.0007 and it shows that this variable is significant when the level of 95% confidence is considered.

The probability of the inflation rate is equal to 0.0192 and it is significant in level of 95% confidence.

The probability of the interest rate is equal to 0.0426 and it is significant in level of 95% confidence.

The probability of the trade openness is equal to 0.3236 and it is insignificant in both level.

4.2.2 Additional notes for Philippines

As it can be observed, the trade openness is not significant and the EViews software is run by using only TO and INV (independent variable).

INV= -0.403696 +0.113673 TO

T statistic   (-0.900534)   (1.505736)

R-squared is equal to 0.060837

As it can be observed, the result of TO remain insignificant and this variable does not affect the gross capital formation. In all these cases, the stationary of the input data is

checked, and if there was the need to consider the stationary, the difference and lag is used to resolve the issue and improve the results.

4.3 Singapore

4.3.1 The effect of inflation rate, interest rate, GDP growth and trade openness on I/GDP in Singapore

The number of observations is 34 from 1980 to 2013.

$$INV = -0.976272 \quad +0.002819 \text{ TO} \quad +0.294733 \text{ GR} \quad -0.727708 \text{ INF} \quad -0.337244 \text{ R}$$

T-Statistic (-0.516288)   (0.123405)   (1.931082)*[4]   (2.625264)**[5]   (-1.506010)

R-squared = 0.368903

In this case, R-squared is equal to 36%. Furthermore, if there is 1% increase in the trade openness, then there would be an increase of 0.002819% in the I/GDP. If there is 1% increase in the growth rate, an increase of 0.294733% occurs in the I/GDP. This is in-line with our expectations about the positive relationship between the trade openness and I/GDP. However, the trade openness is not significant in 95% and 90%, however the growth rate is significant in 90% confidence level.

The effect of the inflation rate is negative and if there is 1% increase in the inflation, as its result a decrease of 0.727708% in the gross capital formation is seen. Moreover, the effect of the real interest rate is negative and if there is an increase of 1% in the interest rate as a result we will decrease 0.337244% in gross capital formation. To ensure the validity of the obtained results the stationary is checked, and if there was the need to consider stationary, the difference and lag was used to rectify the results and improve the model.

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[4] Significant at 10% level
[5] Significant at 5% level

The probability of growth rate of GDP is equal to 0.0640 and it shows that this variable is significant in 90% confidence level.

The probability of inflation rate is equal to 0.0141 and it is significant in 95% confidence level.

Here, the trade openness and interest rate are not significant and the EViews software is used to know the effect of these two variables on investment.

4.3.2 Additional notes for Singapore

As it can be observed, both TO and R are insignificant and the EViews software is used for only TO, INV, R, and INV.

INV= -0.423004 +0.025993 TO

T statistic (-0.687902)   (1.044162)

R-squared is equal to 0.035068

As it can be noticed from the results, the TO remains insignificant which demonstrates that this variable does not have any impact on the gross capital formation.

INV= 1.433137 -0.395439 R

T statistic: (1.218170) (-1.860161)*[6]

R-squared is equal to 0.103412

In this case, when the EViews software with the inflation trade openness and growth rate was used, the result was not significant. However, in individual results, this

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[6] Significant at 10% level

parameter is significant so that the interest rate affects the investment and in this model, it does not have any effect on the gross capital formation.

4.4 Thailand

4.4.1 The effect of inflation rate, interest rate, GDP growth and trade openness on I/GDP in Thailand

The number of observations is 38 from 1976 to 2013.

$$INV = -2.686359 + 0.135096 \, TO + 0.642632 \, GR - 0.060411 \, INF - 0.140029 \, R$$

T-Statistic (-2.437734) (2.643032)**[7] (7.261854)**[8] (-0.568740) (-1.264860)

R-squared = 0.672972

In this case, R-squared is equal to 67% and if there is 1% increase in the trade openness, an increase of 0.135096% in the gross capital formation is noticed. On the other hand, if there is 1% increase in growth rate, an increase of 0.642632% is seen in the gross capital formation. As it was expected, the relationship between the trade openness and gross capital formation is positive. However, the trade openness is not significant in 95% and 90% and the growth rate is significant in 90% confidence level.

The effect of the inflation rate is negative and if the inflation increases by 1%, a decrease of 0.060411% in the gross capital formation is expected. In contrast, the effect of R is negative implying that if it is increased by 1%, the gross capital formation decreases by 0.140029% in gross capital formation.

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[7] Significant at 5% level
[8] Significant at 5% level

The probability of the growth rate of GDP is equal to 0.0 which implies that this variable is significant in 95% confidence level.

The probability of the trade openness rate is equal to 0.0.126 which was significant in 95% and 90% confidence levels.

In this case, the inflation and interest rates are not significant and to ensure about the quality of the results the EViews software was used.

4.4.2 Additional notes for Thailand

As it can observed from the results, the inflation and real interest rate are not significant. Therefore, in the EViews software, once INF and INV were only considered and in another case R and INV.

INV= -0.943098   -0.125326 R

T statistic(.0730114) (-0.709878)

R-squared is equal to 0.014194

According to the obtained results, R remains insignificant and this variable does not affect the gross capital formation.

INV= -0.071193   +0.046421 INF

T statistic(-0.070498)   (0.270957)

R-squared is equal to 0.002093

The INF and R variables remained insignificant implying that these two variables do not have any effect on this model.

4.5 Malaysia

4.5.1 The effect of inflation rate, interest rate, GDP growth and trade openness on I/GDP in Malaysia

The overall observations were 27 from 1987 to 2013.

$$INV = -1.704971 + 0.009141\ TO + 0.897062\ GR - 1.139705\ INF - 0.138089\ R$$

T-Statistic (-1.106391) (0.218308) $(7.544276)^{**[9]}$ $(-2.985134)^{**[10]}$ (-1.063866)

R-squared = 0.766265

In this case, R-squared is obtained 76%. Accordingly, with a similar manner of investigating the effects, if the trade openness increases by 1%, the gross capital formation is raised by 0.009141%. On the other hand, if 1% increase in the growth rate, the gross capital formation is then increased by 0.897062%. As it was expected the relationship between TO and I/GDP is positive. However, the trade openness is not significant in 95% and 90% confidence levels, and the growth rate is significant in 90% confidence level.

The effect of inflation rate is found to be negative. To this respect, it can be concluded that if 1% increase in the inflation, the gross capital formation is reduced by 1.139705%. Additionally, the effect of real interest rate is negative, hence as the interest rate increases by 1%, the gross capital formation will be reduced by 0.138089%.

The probability of the growth rate of GDP is 0.000 which shows that this variable is significant in 95% confidence level.

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[9] Significant at 5% level
[10] Significant at 5% level

The probability of inflation rate is 0.0071 and it is significant in 95% and 90% confidence levels.

In this case, the trade openness and interest rate are not significant and to ensure about the quality of the obtained results the EViews software was used.

4.5.2 Additional notes for Malaysia

As it can observed, the inflation and real interest rate are insignificant. Once in the model of EViews software only TO and INV were considered and in another case, only R and INV were taken into consideration.

INV= 0.789798   -0.153506 R

T statistic(0.616830) (-0.627888)

R-squared is equal to 0.016161

As it can be concluded from the results, the interest rate remains insignificant which can be interpreted as this variable does not have any impact on the gross capital formation.

INV= 0.158092   +0.026267 TO

T statistic (0.178597) (0.340698)

R-squared is equal to 0.004813

Based on the results, both TO and R variables remain insignificant implying that these two variable do not have any effect on the proposed model.

4.6 Panel regression analysis

4.6.1 The influence of inflation rate, interest rate, growth rate, and trade openness on the I/GDP

In this part, 104 observations ranging from 1988 to 2013 have been considered.

$$INV = -3.787083 + 0.013476\ TO + 0.565231\ GR + 0.182120\ INF - 0.017010\ R$$

T-Statistic (-4.461532)　(0.652255)　(7.396741)**[11]　(1.726786)*[12]　(-0.177238)

R-squared = 0.384672

In this case, R-squared is obtained as 38%. In a similar manner of analyzing the results, if there is a 1% increase in the trade openness, there would be 0.013476% growth in the gross capital formation. On the other hand, if the growth rate increases by 1%, there would be a 0.0.565231% increase in the gross capital formation. As it was expected, the relationship between the trade openness and gross capital formation is positive. However, the trade openness is not significant in 95% and 90% confidence levels, and the growth rate is significant in 95% confidence level.

Furthermore, the effect of inflation rate was found to be positive which contradicts with the existing economic theories. Analyzing the results revealed that if there is 1% increase in the inflation, gross capital formation increases by 0.182120%. Moreover, this variable is significant in 90% confidence level. On the other hand, the effect of the real interest rate is negative and if the interest rate is raised by 1%, then the gross capital formation is decreased by 0.017010 %.

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[11] Significant at 5% level
[12] Significant at 10% level

Chapter 5

COMPARISON OF ECONOMIC VARIABLES

Chapter 5 of this thesis deals with comparing the economic variables, e.g., inflation rate, interest rate, gross capital formation, trade openness, growth rate of GDP, which are related to all the four countries under investigation from 1976 to 2013. This comparison comprises the explanation of the underlying rationales concerning the sudden drops or peaks in the economic variables. As a significant achievement of this study, the footprint of Asian economic crisis was noticed in the figures which is described in details in the according section.

5.1 Gross capital formation of selected countries
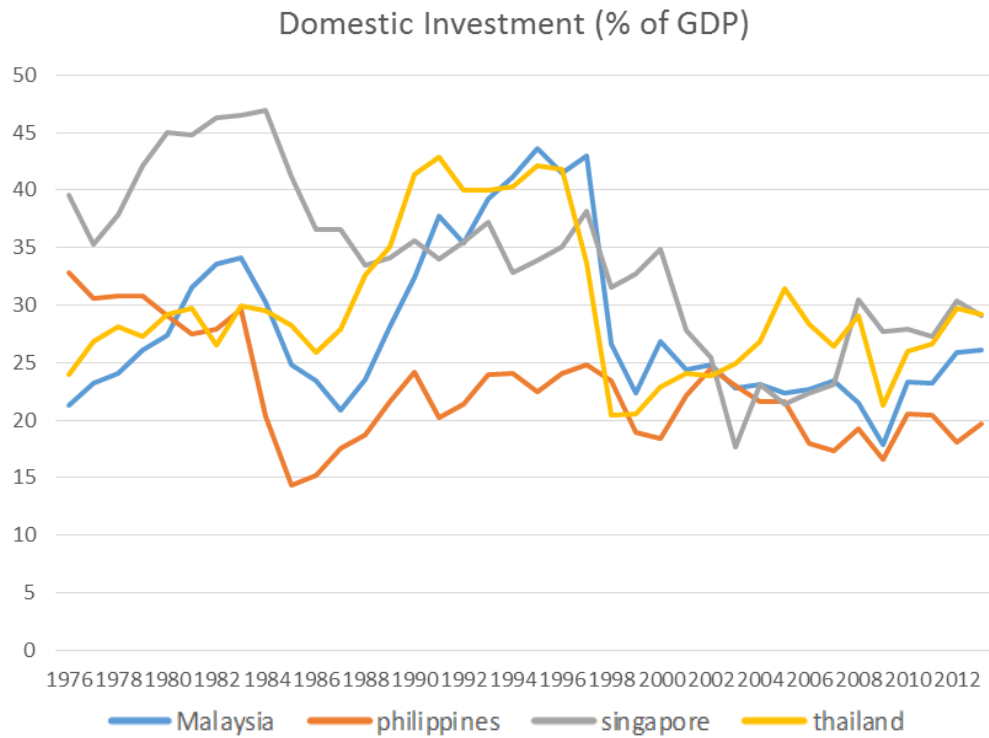
Figure 4. Annual gross capital formation from 1976 to 2013 (% of GDP).

According to Figure 4, the domestic investment increases in Singapore during 1976 to 1984, whereas in the following years it is slightly decreased up to 1998.

In Thailand, in 1996, the domestic investment was 41.81 percent for GDP; however, there is a dramatic decline from 1997 to 2004, and it reached to the minimum of 26.79%.

In Malaysia, during 1982 to 2013, several fluctuations have occurred. Furthermore the highest rate of gross capital formation achieved in 1995 with 43.64% (% of GDP) and in addition, the lowest rate of the domestic investment is related to Philippines which was 14.34 (as % GDP) in 1985.

5.2 Growth rate of selected countries
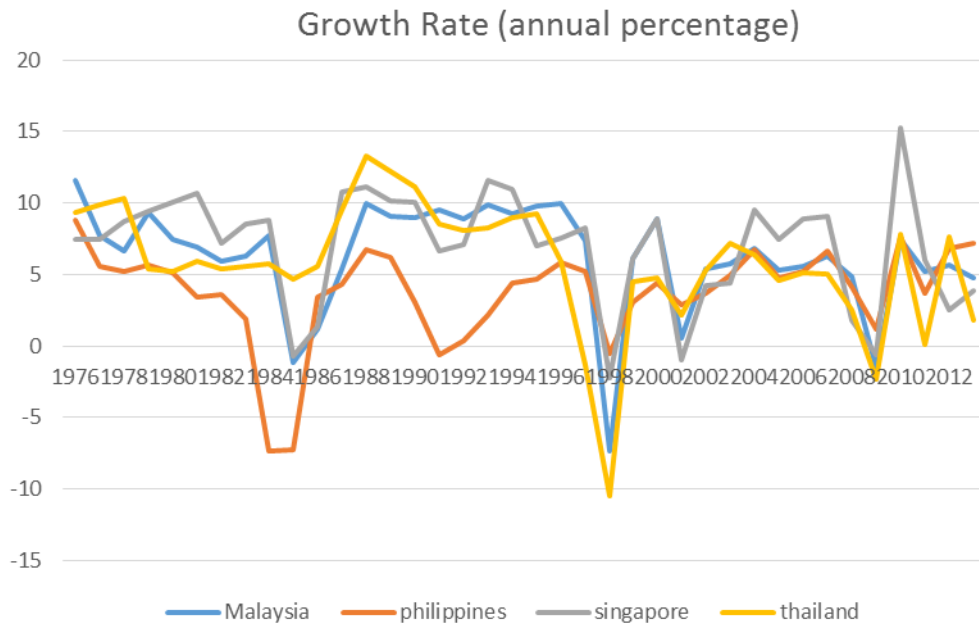
Figure 5. Annual growth rate of GDP from 1976 to 2013.

According to Figure 5, Philippines had the lowest growth rate up to 1986 and during the following years it is increased and reached 6.20% of GDP in 1989. In 2011 Singapore reached the highest growth rate when compared with the other countries and they reached 15.24% of GDP. However, after one year, it was dramatically declined and reached 6.05% of GDP.

In 1997, during the Asian crisis in Thailand, with the financial collapse of the Thai bath when the stock market lost its value, the growth rate of these counties dramatically decreased.

In 1998, the growth rate of Thailand is -10.51% of GDP, which was the lowest growth rate in that decade. Following those years, the government increased the interest rate to attract foreign investor in order to improve their economy.

5.3 Trade openness of selected countries
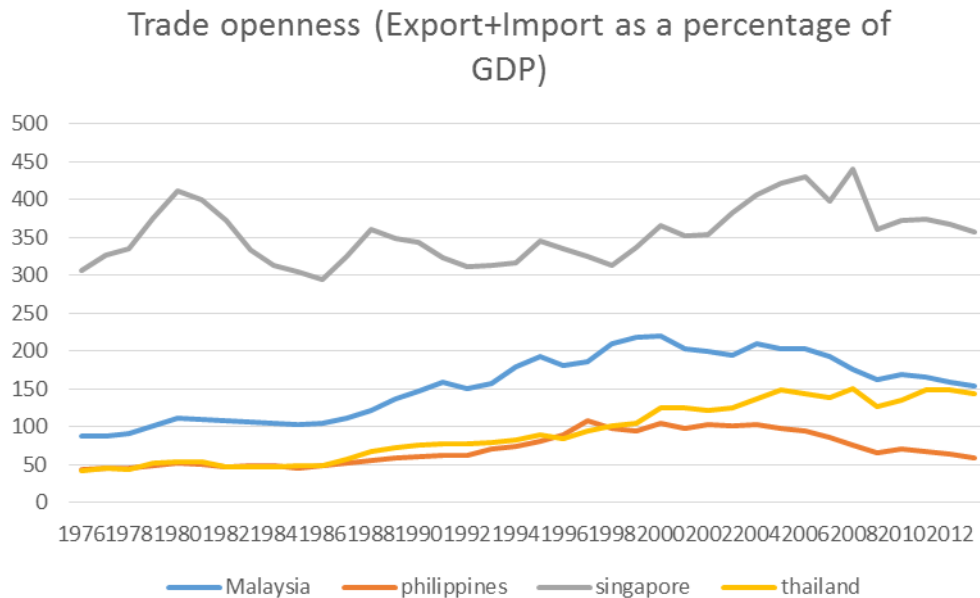
Figure 6. Annual trade openness from 1976 to 2013 (% of GDP).

In general, one of the important goals for each country is creating a good condition in order to trade goods and/or service with other countries and it is an engine of growth for the ASEAN countries.

Singapore is very different in terms of the trade openness and they have huge open economy in comparison with the other countries since it reaches 439 (%of GDP) in 2008

In 2008, the global economic crisis happened which was called the great recession and as it can be tracked down in the figures, the trade openness declined in all case.

5.4 Inflation rate of selected countries
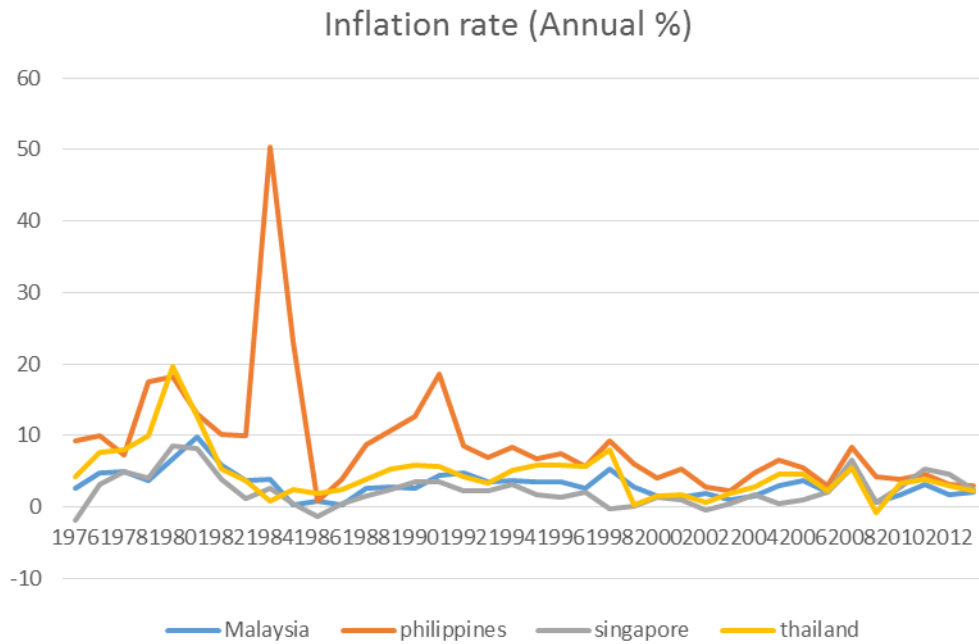
Figure 7. Annual inflation rate from 1976 to 2013 (annual %).

As in Figure 7, there exist fluctuation rates in all four cases. The government tries to decrease inflation and increase the domestic investment.

In 1983, as the economic crisis happened in Philippines, the inflation rate increased and it reached 50.33% in 1984. Following, 59 percent of Philippians were experiencing a life style which was under the normal standards of living. The World Bank investigation showed unemployment increased during this time (Solon & Floro, 1993).

In 1980, the inflation rate increased in Thailand and reached 19%. During the upcoming years it was declined and reached to 0.84% in 1984.

5.5 Interest rate of the selected countries
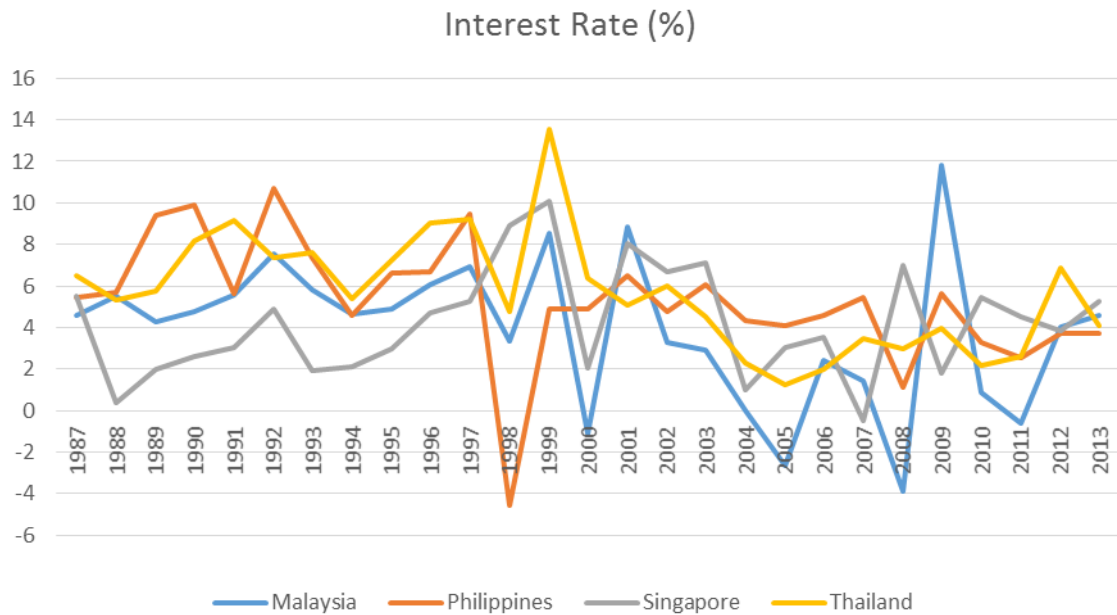
Figure 8. Annual real interest rate from 1976 to 2013.

As shown in Figure 8, in 1998, the interest rate in Philippines was the lowest value during the last decades and it reached to the minimum of -4.5%. During the following years, the government increased the interest rate to 6.0%, in 2003. The highest interest rate in Philippines was 10% in 1992.

The highest interest rate as it can be noticed from Figure 8 is related to Thailand with 13.56 % in 1999 which is due to the economic crisis happened in the country in 1997. In 1999, the government increased the interest rate to encourage foreign investor to invest in this county.

In 2008, the global economic crisis happened and the interest rate in Malaysia was -3.90%. The year after, the real interest rate increased and reached to 11.78%.

Chapter 6

CONCLUSIONS

According to the aforementioned materials and obtained results the concluding marks of this research study can be drawn so as there exist a negative relationship between the interest rate and inflation rate with the investment function. Moreover, the trade openness and growth rate of GDP have positive relationships with gross capital formation.

As we consider the individual regression results, regarding the Singapore, both trade openness and R are not significant. The EViews software was used considering only TO and INV, which led into understanding that TO does not have any effect on the investment in this model. In contrast, when R and INV were considered, the result was different and R was significant which might be the result of other variables effect on R to make it insignificant. The growth rate was significant and had a positive impact on the investment function which is incompliance with the existing theoretical backgrounds. The inflation rate with a negative impact on the investment was significant, this is in-line with the expected assumptions accompanying this study. In brief, the growth rate and inflation rate had positive and negative effects on the investment function, respectively, and they were significant.

With respect to Philippines, the growth rate had positive effect on gross capital formation and it was significant. Moreover, the inflation rate which was significant

as well, had a negative impact on the investment function. Accordingly, it can be concluded that if the inflation rate is increased, the domestic investment is decreased in result. In contrast, if the GDP growth is increased, the domestic investment is inclined. The economic boost encourages the investors to be absorbed to the capital market. Thus, the governments tend to keep down the inflation rate in order to boost the economy.

According to the existing theories, and it was expected, as the inflation rate increases the domestic investment will decrease. This is also highlighted in the results of this thesis. The interest rate when increased, the saving of the companies is increased, which encourages the companies to save their money into banks accounts. Thus, the tendency for investment is lowered. Referring to the obtained results, the effect of real interest rate was negative and it was significant.

Trade openness is beneficial for economy boost, with this respect, it gains capital in the capital market which results into an increase in the investment. As it was expected, the trade openness had positive effect on the investment; however, in this case it was insignificant, thereby after checking the trade openness and investment function, it was remained insignificant. As a conclusion, the trade openness has no effect on the investment in this special case.

In the case of Thailand, the trade openness when increased, the local investment is increased. The trade openness is significant in our developed model. Any increase in the trade liberalization, applies a positive effect on the investment since it discards the barriers for the investors in the capital market. In brief, when the trade openness

is increased the confidence of the investors is also heightened and as a result the domestic investment is strengthened.

According to the underlying theoretical hypotheses, when the growth rate is increased, the investment is raised. This can also be noticed in the Thailand case study, where the growth rate was increased and consequently, the investment is strengthened. In this case the growth rate was significant.

The inflation rate had a negative impact on the investment, and it was insignificant. The EViews software was used considering only INF and INV, it was remained insignificant and had no effect on the investment. Briefly speaking, the inflation rate had a positive relationship with the gross capital formation and also they were insignificant which implies the fact that no direct connection between the inflation rate and the investment rate exist.

The real interest rate was not significant and had a negative impact on the investment which was remained insignificant in this case. Following, the inflation and investment and also interest rate and investment were checked. It was found out that these two variable did not have any effect on the investment function.

In Malaysia, if the inflation rate increases, the investment will decline according to the theory which was significant in this model and also the effect of growth rate was positive and it was significant as well. Trade openness had positive influence on investment but it was not significant. The trade openness and investment are checked only which led into the conclusion that this variable did not have any impact on the

investment and also the same condition with real interest rate was observed which had no influence on the investment referring to Malaysia.

According to the obtained outcomes in the panel data, the TO has positive effect on the investment, and thereby by any increase in the trade openness, the investment is increased which is in-line with background theory concepts. However, the trade openness was not significant. The interest rate has negative impact on the investment, which was insignificant. According to the theoretical backgrounds, the growth rate has positive effect in the panel data, and it is significant as well. Contrary to real practice, the inflation rate is believed to have negative effect on the investment, however, the results of the panel data has shown that it has a positive effect on the investment.

6.1 Implications and policies

In the present study, according to the investigations regarding the different effects of economic parameters in each country, different policies can be suggested for each country. In Philippines, Malaysia and Singapore, based on the Panel data results, the trade openness effect was not significant. Additionally, further investigations can be done with respect to the real interest rate. Respecting this, it can be claimed that the real interest rate, has not effect on the investment according to the proposed model. In contrast, the role of the inflation and growth rates in the above-mentioned countries is significant. Thus, the governments should take into the consideration the variation in inflation rate and growth rate in order to achieve better economic prospective in the future. On the other hand, any increase or decrease in these parameters causes changes in the domestic investment of such countries. Generally, the obtained results revealed that the two parameters, inflation and growth rates, are

significantly influential on the economy of these countries. From another perspective, according to the economic variations and crisis during this time period, any decrease in the growth rate, leads into significant reduction in the investment. For example, in 1984, when an economic crisis happened in Philippines, with a reduction in the growth rate, a 15% decrease in the domestic investment was noticed.

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APPENDICES

Appendix A: The results of regression individually

Thailand

Table 1. The influence of inflation rate, R, growth rate of GDP and TO on I/GDP.

Dependent Variable: INV
Method: Least Squares
Sample (adjusted): 1977 2013
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.686359	1.101990	-2.437734	0.0205
TO	0.135096	0.051114	2.643032	0.0126
GR	0.642632	0.088494	7.261854	0.0000
INF	-0.060411	0.106218	-0.568740	0.5735
R	- 0.140029	0.110707	-1.264860	0.2151

R-squared	0.672972	Mean dependent var	0.142097
Adjusted R-squared	0.632094	S.D. dependent var	3.798049
S.E. of regression	2.303718	Akaike info criterion	4.632014
Sum squared resid	169.8277	Schwarz criterion	4.849706
Log likelihood	-80.69226	Hannan-Ouinn criter.	4.708761
F-statistic	16.46274	Durbin-Watson stat	1.729118
Prob(F-statistic)	0.000000		

Table 2. The influence of inflation rate on I/GDP.

Dependent Variable: INV
Method: Least Squares
Sample (adjusted): 1977 2013
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.071193	1.009857	-0.070498	0.9442
INF	0.046421	0.171324	0.270957	0.7880

R-squared	0.002093	Mean dependent var	0.142097
Adjusted R-squared	-0.026418	S.D. dependent var	3.798049
S.E. of regression	3.847892	Akaike info criterion	5.585466
Sum squared resid	518.2194	Schwarz criterion	5.672543
Log likelihood	-101.3311	Hannan-Ouinn criter.	5.616165
F-statistic	0.073418	Durbin-Watson stat	1.658158
Prob(F-statistic)	0.788016		

Table 3. The influence of R on I/GDP.

Dependent Variable: INV
Method: Least Squares
Sample (adjusted): 1977 2013
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.943098	1.291713	0.730114	0.4702
R	-0.125326	0.176546	-0.709878	0.4825

R-squared	0.014194	Mean dependent var	0.142097
Adjusted R-squared	-0.013972	S.D. dependent var	3.798049
S.E. of regression	3.824491	Akaike info criterion	5.573266
Sum squared resid	511.9357	Schwarz criterion	5.660343
Log likelihood	-101.1054	Hannan-Ouinn criter.	5.603965
F-statistic	0.503927	Durbin-Watson stat	1.727555
Prob(F-statistic)	0.482483		

Malaysia

Table 4. The influence of inflation rate, R, growth rate of GDP and TO on I/GDP.

Dependent Variable: INV
Method: Least Squares
Sample (adjusted): 1988 2013
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.704971	1.541020	-1.106391	0.2811
TO	0.009141	0.041874	0.218308	0.8293
R	-0.138089	0.129799	-1.063866	0.2995
GR	0.897062	0.118906	7.544276	0.0000
INF	-1.139705	0.381793	-2.985134	0.0071

R-squared	0.766265	Mean dependent var	0.200689
Adjusted R-squared	0.721774	S.D. dependent var	4.388631
S.E. of regression	2.315000	Akaike info criterion	4.687738
Sum squared resid	112.5437	Schwarz criterion	4.929679
Log likelihood	-55.94059	Hannan-Ouinn criter.	4.757408
F-statistic	17.21137	Durbin-Watson stat	1.648220
Prob(F-statistic)	0.000002		

Table 5. The influence of R on I/GDP.

Dependent Variable: INV
Method: Least Squares
Sample (adjusted): 1988 2013
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.789798	1.280414	0.616830	0.5432
R	-0.153506	0.244480	-0.627888	0.5360

R-squared		0.016161	Mean dependent var	0.200689
Adjusted R-squared d		-0.024832	S.D. dependent var	4.388631
S.E. of regression		4.442786	Akaike info criterion	5.894244
Sum squared resid		437.7203	Schwarz criterion	5.991020
Log likelihood		-74.62517	Hannan-Ouinn criter.	5.922112
F-statistic		0.394243	Durbin-Watson stat	1.805690
Prob(F-statistic)		0.536007		

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Table 6. The influence of TO on I/GDP.

Dependent Variable: INV
Method: Least Squares
Sample (adjusted): 1988 2013
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.158092	0.885187	0.178597	0.8598
TO	0.026267	0.077099	0.340698	0.7363

R-squared	0.004813	Mean dependent var		0.200689
Adjusted R-squared	-0.036653	S.D. dependent var		4.388631
S.E. of regression	4.468335	Akaike info criterion		5.905712
Sum squared resid	479.1845	Schwarz criterion		6.002489
Log likelihood	-74.77426	Hannan-Ouinn criter.		5.933580
F-statistic	0.116075	Durbin-Watson stat		1.826537
Prob(F-statistic)	0.736295			

Singapore

Table 7. The influence of inflation rate, R, growth rate of GDP and TO on I/GDP.

Dependent Variable: INV
Method: Least Squares
Sample (adjusted): 1982 2013
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.976272	1.890946	-0.516288	0.6099
TO	0.002819	0.022844	0.123405	0.9027
GR	0.294733	0.152626	1.931082	0.0640
R	-0.337244	0.223932	-1.506010	0.1437
INF	-0.727708	0.277194	-2.625264	0.0141

R-squared	0.368903	Mean dependent var	-0.458187
Adjusted R-squared	0.275407	S.D. dependent var	3.478338
S.E. of regression	2.960866	Akaike info criterion	5.151442
Sum squared resid	236.7017	Schwarz criterion	5.380463
Log likelihood	-77.42307	Hannan-Quinn criter.	5.227356
F-statistic	3.945663	Durbin-Watson stat	2.153292
Prob(F-statistic)	0.011968		

Table 8. The influence of TO on I/GDP.

Dependent Variable: INV
Method: Least Squares
Sample (adjusted): 1982 2013
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.423004	0.614920	-0.687902	0.4968
TO	0.025993	0.024894	1.044162	0.3048

R-squared	0.035068	Mean dependent var		-0.458187
Adjusted R-squared	0.002904	S.D. dependent var		3.478338
S.E. of regression	3.473285	Akaike info criterion		5.388540
Sum squared resid	361.9112	Schwarz criterion		5.480149
Log likelihood	-84.21664	Hannan-Ouinn criter.		5.418906
F-statistic	1.090274	Durbin-Watson stat		2.135573
Prob(F-statistic)	0.304752			

Table 9. The influence of R on I/GDP.

Dependent Variable: INV
Method: Least Squares
Sample (adjusted): 1982 2013
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.433137	1.176468	1.218170	0.2327
R	-0.395439	0.212583	-1.860161	0.0727

R-squared	0.103412	Mean dependent var	-0.458187
Adjusted R-squared	0.073526	S.D. dependent var	3.478338
S.E. of regression	3.348023	Akaike info criterion	5.315078
Sum squared resid	336.2777	Schwarz criterion	5.406687
Log likelihood	-83.04126	Hannan-Ouinn criter.	5.345444
F-statistic	3.460199	Durbin-Watson stat	2.606102
Prob(F-statistic)	0.072692		

Philippines

Table 10. The influence of inflation rate, R, growth rate of GDP and TO on I/GDP.

Dependent Variable: INV
Method: Least Squares
Sample (adjusted): 1977 2013
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.914202	0.532693	-3.593446	0.0011
TO	0.061266	0.061106	1.002611	0.3236
GR	0.416343	0.111275	3.741564	0.0007
INF	-0.163227	0.066202	-2.465570	0.0192
R	-0.194265	0.092009	-2.111371	0.0426

R-squared	0.458959	Mean dependent var	-0.356655
Adjusted R-squared	0.391329	S.D. dependent var	2.767646
S.E. of regression	2.159245	Akaike info criterion	4.502482
Sum squared resid	149.1948	Schwarz criterion	4.720174
Log likelihood	-78.29593	Hannan-Ouinn criter.	4.579229
F-statistic	6.786310	Durbin-Watson stat	1.814216
Prob(F-statistic)	0.000450		

Table 11. The influence of TO on I/GDP.

Dependent Variable: INV
Method: Least Squares
Sample (adjusted): 1977 2013
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-40.3696	0.448285	-0.900534	0.3740
TO	0.113673	0.075493	1.505736	0.1411

R-squared	0.060837	Mean dependent var		-0.356655
Adjusted R-squared	0.034004	S.D. dependent var		2.767646
S.E. of regression	2.720183	Akaike info criterion		4.891814
Sum squared resid	258.9789	Schwarz criterion		4.978891
Log likelihood	-88.49856	Hannan-Ouinn criter.		4.922512
F-statistic	2.267241	Durbin-Watson stat		1.778089
Prob(F-statistic)	0.141107			

Appendix B: The results of panel regression

Table 12. The influence of TO, growth rate, inflation rate and R on I/GDP.

Dependent Variable: INV
Method: Panel Least Squares
Sample (adjusted): 1988 2013
Periods included: 26
Cross-sections included: 4
Total panel (balanced) observations: 104

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.787083	0.848830	-4.461532	0.0000
TO	0.013476	0.020661	0.652255	0.5157
R	-0.017010	0.095973	-0.177238	0.8597
INF	0.182120	0.105468	1.726786	0.0873
GR	0.565231	0.076416	7.396741	0.0000

R-squared	0.384672	Mean dependent var	-0.011994
Adjusted R-squared	0.359810	S.D. dependent var	3.712882
S.E. of regression	2.970746	Akaike info criterion	5.062386
Sum squared resid	873.7080	Schwarz criterion	5.189520
Log likelihood	-258.2441	Hannan-Ouinn criter.	5.113892
F-statistic	15.47244	Durbin-Watson stat	1.828467
Prob(F-statistic)	0.000000		

Appendix C: Data

Table 13. Inflation rate.

Year	Inflation rate			
	Malaysia	Thailand	Singapore	Philippines
1976	3	4	-2	9
1977	5	8	3	10
1978	5	8	5	7
1979	4	10	4	18
1980	7	20	9	18
1981	10	13	8	13
1982	6	5	4	10
1983	4	4	1	10
1984	4	1	3	50
1985	0	2	0	23
1986	1	2	-1	1
1987	0	2	1	4
1988	3	4	2	9
1989	3	5	2	11
1990	3	6	3	13
1991	4	6	3	18
1992	5	4	2	9
1993	4	3	2	7
1994	4	5	3	8
1995	3	6	2	7
1996	3	6	1	8
1997	3	6	2	6
1998	5	8	0	9
1999	3	0	0	6
2000	2	2	1	4
2001	1	2	1	5
2002	2	1	0	3
2003	1	2	1	2
2004	2	3	2	5
2005	3	5	0	7
2006	4	5	1	5
2007	2	2	2	3
2008	5	5	7	8
2009	1	-1	1	4
2010	2	3	3	4
2011	3	4	5	5
2012	2	3	5	3
2013	2	2	2	3

Table 14. Real interest rate.

Year	Real interest rate			
	Malaysia	Thailand	Singapore	Philippines
1976	-	6	-	3
1977	-	5	-	3
1978	-	1	4	2
1979	-	4	3	-1
1980	-	3	0	0
1981	-	8	7	3
1982	-	11	6	9
1983	-	11	6	4
1984	-	15	9	-16
1985	-	14	10	9
1986	-	12	8	14
1987	5	7	6	5
1988	5	5	0	6
1989	4	6	2	9
1990	5	8	3	10
1991	6	9	3	6
1992	8	7	5	11
1993	6	8	2	7
1994	5	5	2	5
1995	5	7	3	7
1996	6	9	5	7
1997	7	9	5	9
1998	3	5	9	-5
1999	9	14	10	5
2000	-1	6	2	5
2001	9	5	8	6
2002	3	6	7	5
2003	3	5	7	6
2004	0	2	1	4
2005	-3	1	3	4
2006	2	2	4	5
2007	1	3	-1	5
2008	-4	3	7	1
2009	12	4	2	6
2010	1	2	5	3
2011	-1	3	5	3
2012	4	7	4	4
2013	5	4	5	4

Table 15. Gross capital formation.

Year	Gross capital formation			
	Malaysia	Thailand	Singapore	Philippines
1976	21	24	40	33
1977	23	27	35	31
1978	24	28	38	31
1979	26	27	42	31
1980	27	29	45	29
1981	32	30	45	27
1982	34	27	46	28
1983	34	30	46	30
1984	30	29	47	20
1985	25	28	41	14
1986	23	26	37	15
1987	21	28	37	17
1988	24	33	33	19
1989	28	35	34	22
1990	32	41	36	24
1991	38	43	34	20
1992	35	40	35	21
1993	39	40	37	24
1994	41	40	33	24
1995	44	42	34	22
1996	41	42	35	24
1997	43	34	38	25
1998	27	20	32	23
1999	22	21	33	19
2000	27	23	35	18
2001	24	24	28	22
2002	25	24	25	24
2003	23	25	18	23
2004	23	27	23	22
2005	22	31	21	22
2006	23	28	22	18
2007	23	26	23	17
2008	21	29	30	19
2009	18	21	28	17
2010	23	26	28	21
2011	23	27	27	20
2012	26	30	30	18
2013	26	29	29	20

Table 16. Growth rate.

Year	Growth rate			
	Malaysia	Thailand	Singapore	Philippines
1976	12	9	7	9
1977	8	10	7	6
1978	7	10	9	5
1979	9	5	9	6
1980	7	5	10	5
1981	7	6	11	3
1982	6	5	7	4
1983	6	6	9	2
1984	8	6	9	-7
1985	-1	5	-1	-7
1986	1	6	1	3
1987	5	10	11	4
1988	10	13	11	7
1989	9	12	10	6
1990	9	11	10	3
1991	10	9	7	-1
1992	9	8	7	0
1993	10	8	12	2
1994	9	9	11	4
1995	10	9	7	5
1996	10	6	8	6
1997	7	-1	8	5
1998	-7	-11	-2	-1
1999	6	4	6	3
2000	9	5	9	4
2001	1	2	-1	3
2002	5	5	4	4
2003	6	7	4	5
2004	7	6	10	7
2005	5	5	7	5
2006	6	5	9	5
2007	6	5	9	7
2008	5	2	2	4
2009	-2	-2	-1	1
2010	7	8	15	8
2011	5	0	6	4
2012	6	8	3	7
2013	5	2	4	7

Table 17. Trade openness.

Year	Trade openness			
	Malaysia	Thailand	Singapore	Philippines
1976	88	43	306	45
1977	88	45	327	45
1978	91	44	335	46
1979	102	52	375	48
1980	111	54	411	52
1981	109	54	400	51
1982	109	48	373	46
1983	107	47	333	49
1984	105	48	313	49
1985	103	49	304	46
1986	105	49	295	49
1987	112	57	325	53
1988	123	67	360	55
1989	137	72	348	58
1990	147	76	344	61
1991	159	78	324	62
1992	151	78	311	63
1993	158	80	313	71
1994	180	83	316	74
1995	192	90	346	81
1996	182	85	336	90
1997	186	95	325	108
1998	209	102	314	99
1999	218	104	338	95
2000	220	125	366	105
2001	203	125	353	99
2002	199	122	354	102
2003	194	125	383	102
2004	210	137	406	103
2005	204	148	422	98
2006	203	144	430	95
2007	192	138	399	87
2008	177	150	440	76
2009	163	126	360	66
2010	170	135	372	71
2011	167	149	374	68
2012	159	149	368	65
2013	154	144	358	60