DETERMINANTS OF DOMESTIC INVESTMENT

A CASE STUDY OF MIDDLE INCOME ASIAN COUNTRIES

By

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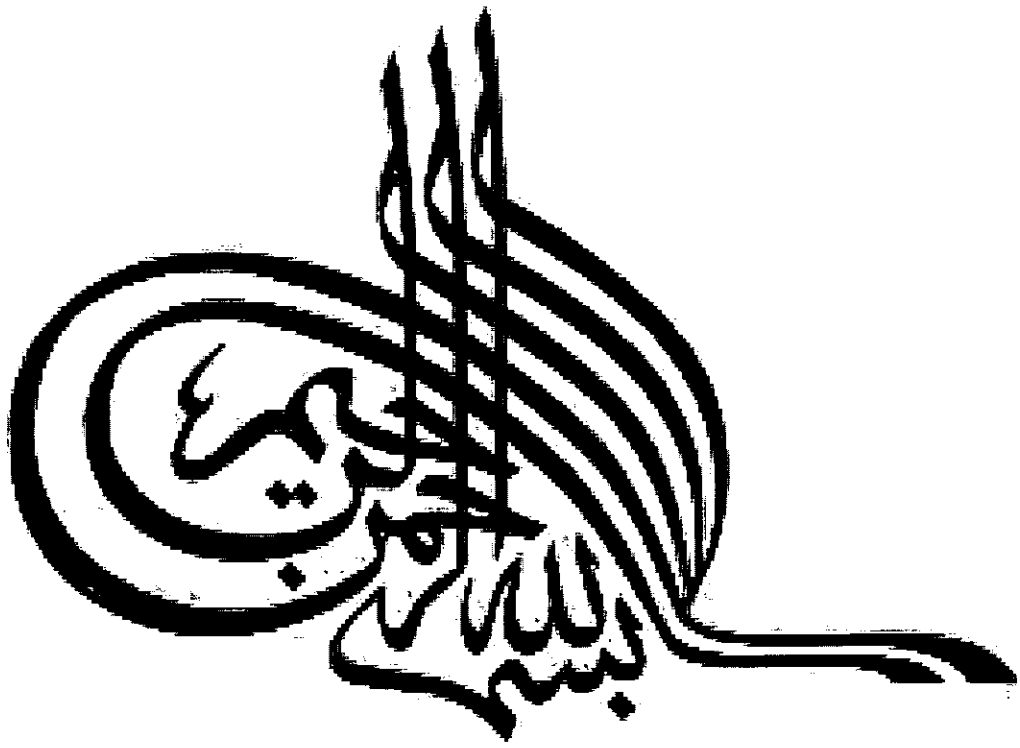

In the name of Allah, the Beneficent
and the most Merciful

DECLARATION

I, Nadeem Raza, hereby declare that this thesis entitled "Determinants of Domestic Investment: A Case Study of Middle Income Asian Countries", neither as a whole nor as a part thereof, has been copied out from any source. It is further declared that I have carried out this research independently on the basis of my personal efforts under the guidance and help of my supervisors. If any part of this thesis is proven to be copied out or earlier submitted, I shall stand by the consequences. No portion of work presented in this thesis has been submitted in support of any application for any other degree or qualification in this, or any other university or institute of learning. It is done in partial fulfillment of the requirements for the degree of Masters of Philosophy in Economics in International Islamic University, Islamabad.

Nadeem Raza: 

DEDICATION

I dedicate this acquiescent endeavor,

The rejoinder of my fortitude and erudition,

To my Parents

Whose Heartfelt Prayers always travel with me

In every fraction of life

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(Nadeem Raza)

CERTIFICATE

It is to certify that thesis titled "Determinants of Domestic Investment A Case Study of Middle Income Asian Countries", submitted by **Nadeem Raza** (Registration No.1538-SE/MS(Eco)/F07) has been accepted, towards partial fulfillment of the requirements for the award of degree of **Master of Philosophy in Economics,** as an evidence of the candidate's ability to do independent research.

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ABSTRACT

Investment is a catalyst for economic growth, and the efforts to explore the factors stimulating investment, whether domestic or foreign, public or private, are unstoppable. The present study attempts to investigate empirically, the factors responsible for shaping up domestic investment in the middle income Asian countries. We use a sample of twelve countries and the data extends over a period of 31 years ending at 2010. We employ empirical Bayesian approach for analysis, after undergoing the preliminary testing of data through panel unit root test, redundancy test and panel co-integration. The results suggest that domestic investment is positively determined by lagged investment, real GDP per capita growth, domestic credit to private sector, domestic saving, trade and government expenditures whereas a negative relationship of domestic investment is observed with inflation and interest rate. Findings of the study provide a torch to the policy makers who intend to boost domestic investment for attaining higher growth rates.

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CHAPTER 1

INTRODUCTION

Investment is an important component of aggregate demand in the economy and variations in investment have considerable long term effects on the economic strength of a country. Investment not only enhances the economic growth, but also promotes employment and provides livelihood to masses. The association of investment and long run economic growth is not only emphasized in the era of classical economists, but subsequently a number of studies are conducted to empirically test the importance of investment in experiencing higher growth rates (Kuznets (1973), McKinnon (1973), Shaw (1973); Barro and Lee (1994); Collier and Gunning (1999); Ndikumana (2000). All of these studies end up with a conclusion that investment is a strongly associated with economic growth. The investment-growth relationship in general and the Asian financial crises of late 1990's in particular have led to a mob of studies investigating the factors that bring about variations in the rate of investment in developing countries.

Investment, however, can be categorized into two major classes, i.e. foreign direct investment (FDI) and domestic investment (further divided into its public and private parts). There is a flood of studies that attempt to investigate the determinants of foreign direct investment in poor and middle income countries [see for example Juncki and Wunnava (2004); James and Jiangyan (2010); Blonigen and Piger (2011)] However, to explore the factors explaining domestic investment in such countries is relatively less explored area. FDI is subject to considerable costs in terms of

increased foreign interference, foreign dependence and flight of capital (in the form of repatriation of profits), Domestic investment, on the other hand is made by the native and more trustworthy, for smooth ongoing of the process of economic development. Although a variety of variables are suggested by various studies conducted elsewhere in the world to be the causing factors of investment in countries. In our study we endeavor to find the determining factors of domestic investment focusing a sample of middle income Asian countries.

1.1 Rationale of the Study

Work on investment can be viewed in two distinct dimensions; one set of studies concentrate on analyzing the determinants of Foreign Direct investment (FDI) and another group of studies focused on the determinants of domestic investment. As far determinants of FDI are concerned, lots of studies are available ending up with different covariates of FDI (like Juncki and Wunnava (2004); Blonigen and Piger (2011), For the domestic investment, some other studies that focus on identifying the macroeconomic and financial factor are either narrower in their scope because of considering time series data only (Shahbaz et al. (2010); Shah et al. (2012) in Pakistan; Tan and Lean (2010), Tan et al. (2011) in Malaysia; Seruvatu and Jayaraman (2001) in Fiji or directed towards other geographical zones (Salahuddin et al. (2009) in Muslim developing countries). However, the area of middle income countries from Asia is generally ignored and demands attention of the researchers.

In order to fill this gap the present study is an attempt to add in literature a comprehensive work focusing on determining factors of domestic investment covering the horizons of financial and macroeconomic indicators by taking into

account latest data and employing Empirical Bayesian approach on a sample of middle income Asian countries.

1.2 Objectives of the study

Given the vital role of domestic investment in the process of economic growth and also taking into consideration the financial sector reforms in Asian region, our study endeavors to develop an investment model aimed to establish a link between the domestic investment, financial development and macroeconomic performance. The main objectives of our study include;

- To quantify the impact of various macroeconomic and financial indicators on the domestic investment in the middle income Asian countries,
- To apply modern estimation techniques and follow a sophisticated econometric process in constructing a parsimonious model of investment, in order to arrive at reliable results, and
- To tender policy recommendations that can help in boost up domestic investment in the Asian countries.

1.3 Significance of the Study

Various socioeconomic indicators improve by the domestic investment. For example, Unemployment is one of the alarming features of developing economies which lead to poverty and underutilization of the economic resources in such countries. Investment therapy can turn to be the most effective solution to such diseases of unemployment, poverty and underutilization of resources and get an underdeveloped state on the highway of progress and prosperity. Since this study is specifically designed to find

macroeconomic and financial determinants of domestic investment in the developing economies of Asia, it would be useful for the institutions and individuals seeking promotion in the employment and exports, like Ministry of Trade and Manpower and the NGO's engaged in promotion of livelihood and employment.

1.4 Organization and Set-up

The remaining part of this study is organized as follows. Chapter 2 contains a review of the relevant literature. Theories of investment and some theoretical underpinnings are given in Chapter 3. Chapter 4 explains the econometric model, estimation methodology and description of the data and variables. Empirical results are discussed in chapter 5 which is followed by the conclusions and policy implications in chapter 6. References and Appendix are given at the end of the thesis.

CHAPTER 2

LITERATURE REVIEW

In this chapter we are examining the existing empirical literature focusing the investment and its determining factors. The researchers study the role of a variety of factors including macroeconomic variables and financial market factors, in explaining the investment behavior. The studies not only differ from each other on the basis of factors included in the model and the estimation techniques applied but also on basis of results arrived and a spectrum of conclusions. In a broader sense, the empirical literature on investment behavior in the developing countries focuses on macroeconomic variables and the financial variables. The findings of some of the relevant studies on the topic are discussed below.

2.1 Studies Focusing on Macroeconomic Variables

The variable that is found significant by the most of empirical studies is lagged investment. Investment practice in the preceding year gives an indication to the investors regarding economic climate in the country and thus, has a potential to affect investment positively. This relationship is observed in many earlier studies based on empirics. Mileva (2008) finds a positive relationship between investment and its lag, in his study conducted on 22 transition economies. Salahuddin et al. (2009) reports a positive and significant effect of lagged investment, in their study on 21 developing countries from the Muslim regions. The results of the studies by Donwa and Agbontaen (2010) on Nigeria and Janice et al. (2011) are also consistent with the above-mentioned proposition. Taghavi (2011) while carrying out a study on a panel of

India, China, Pakistan, Iran, Turkey, Indonesia and United Arab Emirates also concludes that lagged investment is a strong determinant of domestic investment.

Another important factor that affects domestic investment is Aggregate demand. An increase in the aggregate demand motivates firms to increase supply and this may require an increase in the installed capacity and thus stimulate investment. Wolf (2002) examines that GDP per capita significantly explains domestic investment, in a positive way, in South African developing countries. The studies of Tan and Lean (2010) in Malaysia, Salahuddin et al. (2009) on Muslim developing countries also find a positive impact of the variable on domestic investment.

Similarly studies by Oshikoya (1994) on African countries, Ghura and Goodwin (2000) on countries from Asia, Latin America and Sub Saharan Africa, Seruvatu and Jayaraman (2001) in Fiji. Acosta and Loza (2005) in Argentina, Mileva (2008) on 22 transition economies, Peltonen et al. (2009) on emerging markets of Asia, Latin America and Europe, Frimpong and Marbuah (2010) in Ghana and Tan et al. (2011) in Malaysia find positive relationship between investment and GDP or GDP growth.

Many studies report that investment is positively determined by saving. Salahuddin et al. (2009) find in their study that domestic investment is positively related with domestic saving for the case of 21 Muslim developing economies. The work of Baker (2011) also finds the similar results in relation with private investment for Nigeria. The study of Feldstein and Horioka (1980) suggests that saving-investment correlation is high in OECD countries, which implies low capital mobility among these countries; this is known as F-H puzzle. Some studies find small regression coefficient of saving in the developing countries like Wong (1990) and Dooley et al.

Stiglitz and Weiss (1981) and Greenwald et al (1984) also recommend that it is the availability of capital which significantly affect investment rather than cost of capital.

Several studies are conducted to measure the impact of financial development on domestic investment in order to highlight the degree of association of investment to financial sector. Although, a variety of variables are used as proxy for financial development, like M2, M3, Broad Money etc. domestic credit to private sector is preferred in most of the studies on investment.

Ndikumana (2000) examines a positive relationship between financial development (domestic credit to private sector as a percentage of GDP) and domestic investment in 30 Sub-Saharan countries in Africa. The study also suggests that financial development stimulates economic growth through the channel of capital accumulation. The study of Wolf (2002) on South African developing countries replicates the findings of Ndikumana (2000). Similar findings are reported by Salahuddin M. et al. (2009) in 21 Muslim developing economies and Akanbi (2010) in Nigeria.

The above-mentioned results are also consistent with the studies focusing only on the determinants of private investment, for example, the works of Oshikoya (1994) on African countries, Ghura and Goodwin (2000) in the developing countries of Asia, Latin America and Sub Saharan Africa, Asante Y. (2000) for Ghana, Taghavi (2011) for Iran and separately for the panel of India, China, Pakistan, Iran, Turkey, Indonesia and United Arab Emirates find that credit to private sector significantly explains private domestic investment.

2.3 Concluding Remarks

A review of the existing literature implies the potential of a number of factors to be responsible for bringing changes in the domestic investment patterns. However, the scope of specific variables may change depending upon the sample attributes e.g. region of study, degree of growth rate in the economy etc., or the techniques of estimation employed for analysis. This persuades us to conduct a comprehensive study on the middle income Asian countries and employ a reliable econometric technique to arrive at inferable results.

CHAPTER 3

THEORETICAL BACKGROUND

Although a large quantum of literature revolves around investment behavior and the researchers are interested in exploring an investment model which may be comprehensive and applicable to a significant number of developing countries, the struggle still continues and not yet over. The conventional models embody certain type of shortcomings which reduce their scope for the developing countries. For example accelerator model of investment may better explain the investment patterns in the industrial countries but assumptions of no liquidity constraints and the existence of perfect capital markets etc. turns it of lesser interest for the developing countries. A theory of some of the conventional investment models is briefly discussed hereunder for better understanding the model which we will develop in the light of existing models of investment.

3.1 Theories of Investment

Various theories of investment differ from each other depending upon the emphasis to different variables e.g. the income level, rate of interest and the uncertainty factor etc. Generally, four approaches are common to modeling investment in the existing literature. These broad categories are expected profit theory, accelerator theory, Neo-classical theory and Tobin Q theory (Ghura and Goodwin (2000)). Following Schumpeter (1932), modern theories also incorporate some other factors of financial nature reflecting performance of the financial sector known as Neoliberal Approach. A brief introduction of some of the investment theories is given hereunder;

3.1.1 Keynes Theory of investment

Keynes (1936) is considered to be the pioneer in studying investment as an independent variable. The main aspect of the Keynesian analysis is the critical observation that although saving and investment must be equal ex-post, but in general, investment decisions are made by the different decision makers and there is no basis why ex-ante saving should be identical to ex-ante investment.

According to the Keynesian model expected profit rate has a great impact on the investment. If the future expected rate of profit is high then there is great charm to invest. On the other hand, high interest rate and macroeconomic uncertainty will depress investment because it is becomes riskier to invest in investment projects under the circumstances.

3.1.2 Accelerator Theory

Carver and Aftalion developed the accelerator theory early in the twentieth century. They suggested that the firms may either pay no heed to a rise in demand and this will lead to an increase in price level and thus pulling down the shifts in demand to get the market clear. The firms, however, more often respond to upward demand shifts by boosting the supply levels. This requires firms to increase their production capacities by accumulating capital stocks. The theory explains that growth attracts investors which further accelerate growth through the accelerator effect[1]. The pace of growth further gears up by means of expansion in consumers' income and expenditure. This channel is known as multiplier effect.

[1] The accelerator effect refers to the positive impact of growth on private fixed investment, in a market economy. Rising GNP implies a general increase in sales, cash flows, profits which results in greater use of accessible capacity. Thus, it leads to boost business confidence that encourages investors to build new factories and install more machinery.

3.1.3 Flexible Accelerator Model

Flexible accelerator model is more general form of accelerator model. The basic idea behind the model is that "the greater the gap between desired capital stock and existing capital stock, higher would be the rate of investment'. The model hypothesizes that the investors plan to narrow down a fraction of the gap between actual capital stock K, and the desired capital stock K*. Numerically, it can be expressed as follows;

$$I = \delta(K^* - K_{-1})$$

Where, 'I' is net investment, 'K*' is desired capital stock, 'K_{-1}' is the last period's capital stock and 'δ' is the partial adjustment coefficient. Under the framework of this model K* may be determined by internal fund, output and/or cost of external financing (Chirinko, 1993).

3.1.4 Neoclassical Approach

Neoclassical theory was developed by Jorgenson (1971) and it is an updated version of flexible accelerator model. According to this approach, the desired capital stock is proportional to the user cost of capital and output which in turn depend upon the real rate of interest, price of capital goods, tax structure and the rate of depreciation. Under the Neo-classical investment model interest rate is considered as a key element of the user cost of capital so it affects investment negatively. One of the criticisms on neoclassical model is that it is based upon unrealistic assumptions, e.g. the assumptions of reversibility (that a firm can convert its fixed investment into liquidity any time) of fixed capital.

3.1.5 Q-Theory of Investment

Q-Theory of investment was proposed by Tobin (1969). This theory stresses on the relationship between investment and stock market. It describes that the q-ratio, i.e. a ratio of the market value of the existing capital stock to its replacement costs is the basic driving force of investment. The theory suggests that q-ratio is a good proxy for the investment opportunities open to a firm and thus a firm keep on investing, with a view to maximize its value, up to a point where the ratio turns to be unity. Thus, Q-theory of investment suggests that investment decisions not only explained by current economic policies but also depend on the expected future policies. Q-Theory, however, is more appropriate for the studies at firms' level.

3.1.6 Neoliberal Approach

Neoliberal is another modern approach which highlights the importance of financial deepening and interest rate in the process of economic development. McKinnon and Shaw (1973), who are the prominent advocates of the approach, claim that most of the developing countries stress on a low interest rate and thus suffer from financial repression which results in below the mark savings. Thus, the low level of savings cannot turn the investment wheel on a required pace. In this scenario, promulgate various types of financial reforms may generate higher volumes of savings putting larger funds available for investment which, when channelized into investment, lead to economic growth.

The approach thus establishes a positive relationship between investment and real interest rate, in contradiction with the neoclassical framework. The demand for investment may reduce due to the increased real interest rate but the realized investment actually increases due to the enhanced availability of funds. The

phenomenon is often called "Conduit effect", and applies only when the excess demand for funds sets the capital market in disequilibrium.

3.2 Domestic Investment and Its Determinants-A Foundation Stone

We can divide the variables that can potentially affect domestic investment into two streams i.e. financial variables and the variables of macroeconomic nature. The way various factors are associated with investment can be viewed as follows.

3.2.1 Domestic Investment and Macroeconomic Factors

The neo classical approach, on one hand, establishes a negative relationship between the real interest rate and investment due to a push in user's cost of capital, McKinnon and Shaw (1973) on the other suggest that this relationship should be positive, particularly in the developing countries. They argue that investment projects cannot be initiated due to limited access to credit and therefore an increase in the real interest rate promotes savings which in turn stimulate investment by bolstering access to capital. Whatever sign the interest rate carries, it is a candidate variable to be included in the model, for testing determining factors of investment.

The growth rate of real output depicts variations in aggregate demand for output which is a matter of concern for the investors and they respond to the higher output growth rates with higher investments (Wai & Wong (1982), Greene & Villanueva (1991), Fielding (1993), (1997)). This phenomenon is known as accelerator effect, in the literature and it forms a rationale for the GDP per capita annual growth rate to be incorporated in our model of investment.

The role of government expenditures in shaping up investment can also be postulated on two grounds. First is that it may crowd out domestic investment by escalating interest rate and compressing the volume of funds in the market. On the contrary, it may encourage domestic investment by playing the accelerator wheel. Hence, which of the two roles is dominant in the middle income countries needs to be tested.

High inflation rates not only indicate high degree of uncertainty in the economic environment but it also signals a failure of the government in terms of macroeconomic policy making. According to Fisher (1993)

> "In essence, the inflation rate serves as an indicator of the overall ability of the government to manage the economy. Since there are no good arguments for very high rates of inflation, a government that is producing high inflation is a government that has lost control" (p.487)

Similarly, the study of Akpokodje (1998) describes that high rate of inflation in the developing countries reduces private investment because high rate of inflation indicate the lack of government ability to manage the economy and private investors avoid to invest under the circumstances. In addition, it discourages the financial intermediaries to advance long term funds, thereby further trimming down the investment rate. Thus a negative impact of inflation is assumed in explaining domestic investment.

Another picture of the inflation-investment is portrayed by Philips (1958). Philips curve describes a negative relationship between Inflation and unemployment; it implies that increase in employment is outcome of improved investment. Hence, what is the case in middle income countries needs to be tested.

The volume of international trade or the degree of trade openness can also boost up domestic investment through export and import components. An increase in exports results in the expansion of market for domestic goods and a rising trend of imports, if caused by the purchase of capital goods, leads to higher level of investment. However, if the imports mainly consist of consumer goods, it may discourage domestic products and thus native investors. Trade liberalization may also negative impact on domestic investment due to the increase in risk, as the risk averse investors prefer to invest in financial sector rather than real sector (Demir (2005)), monopoly of satates or private enterprises for any particular product and lack of investment incentives provided by the government (Ouattara (2004)).

High ratio of external debt is also expected to reduce investment because a large proportion of the domestic resources have to be spared for servicing external debt which results in reduction of domestic investment (Fielding (1997)).

3.2.2 Domestic Investment and Financial Factors

During the last decade of the twentieth century, research in the area of investment has shifted towards the role of financial development in promoting investment and economic growth in the developing countries. The underlying reason is the flood of financial sector reforms introduced by most of the economies during 1980's following the idea of Schumpeter (1932) related to the potential role of financial Sector in the progress of technology. These studies also implant the idea of Keynes that "state of credit" plays a vital role as determinant of investment (Keynes (1937)). The study of Gurley and Shaw (1955) gave a momentum to the idea of Schumpeter & Keynesian and suggested that an economy grows at a rapid pace when financial intermediaries are developed to provide services to the borrowers and the lenders.

According to Gurley and Shaw (1955), the key difference between the developed and developing economies is the financial intermediaries, services offered by the financial institutions and facilitation of the cash flow between the investors and savers. Their study suggests that financial intermediaries provide a link between the savers and investors. Hence, one of the main reasons for the low investment in the developing countries is the limited financial instruments provided by the financial institutions to the investor like limited long term lending, insufficient lending practice and government borrowing from the financial institutions for the consumption purpose.

A vast number of subsequent studies suggest that financial markets and financial intermediation contribute to economic growth through their impact on capital accumulation (rate of investment) and technology innovation (Levine (1997), Temple (1999), Levine *et al.*, (1999), Levine *et al.*, (2000)). Greater financial development gives rise to better mobilization of savings and then allocation of investment funds to the projects of highest returns. Access of consumers and producers to the financial markets helps to diversify saving and portfolio choices, and increase the opportunities of consumption and income.

We, therefore, are compelled on theoretical grounds to augment our model with financial indicator to test the effect of financial development in our sample countries. The variable included for the purpose is the domestic credit available to private sector and it is expected to have a positive impact on domestic investment in our model.

3.3 Concluding Remarks

Based on the above mentioned discussion we find a queue of potential variables to be included in our model aimed to highlight significant determinants of domestic

investment in the middle income Asian countries. Many of these variables can have dual signs supported by different theories, so it is worth investigating what actual relationship is between these variables and the investment. Constrained by the data availability, we are unable to consider the whole list of candidate variables and the factors primarily incorporated in our model include lagged investment, real GDP per capita growth, domestic credit to private sector, domestic saving, government expenditures, trade, inflation, interest rate and external debt.

CHAPTER 4

METHODOLOGY AND DATA DESCRIPTION

The present study attempts to explore the determinants of domestic investment in the frame of financial development and macroeconomic factors. Our sample is, however, confined to the middle income Asian countries[2], the countries for which data is available (A list of sample countries used in our study is provided in Appendix A). The model employed in our study and a brief description of the variables used is given hereunder.

4.1 Econometric Model

In order to find the role of financial and macroeconomic variable on the domestic investment we use an investment model which is a variant of the model earlier used by Ndikumana (2000). The model in its general form is presented below;

$$INV_{it} = \alpha + \beta\, INV_{it-1} + \delta\, X_{it} + u_{it} \qquad (4.1)$$

Where INV_{it} is the investment (as a percentage of GDP) of country i at time t. X indicates the set of all possible variables.

As the main objective of our study is to search for the factor explaining domestic investment, therefore we are compelled to include all the possible relevant variables in the model to get unbiased estimators of potential variables of domestic investment.

[2] The classification is based on the World Bank 2011.

A general model, developed on the basis of existing studies for domestic investment is presented as follows;

$$INV_{it} = \alpha + \beta_0 INV_{it-1} + \beta_1 Y_{it} + \beta_2 Y_{it-1} + \beta_3 PRIVT_{it} + \beta_4 PRVT_{it-1} + \beta_5 R_{it} + \beta_6 R_{it-1} + \beta_7 S_{it} + \beta_8 S_{it-1} + \beta_9 TRAD_{it} + \beta_{10} TRAD_{it-1} + \beta_{11} GE_{it} + \beta_{12} GE_{it-1} + \beta_{13} D_{it} + \beta_{14} D_{it-1} + \epsilon_{it} \quad (4.2)$$

Where;

INV_{it} = Gross Fixed Capital Formation as a percentage of GDP.

$PRVT_{it}$ = Domestic credit to private sector as a percentage of GDP

Y_{it} = GDP per capita growth (Annual %)

R_{it} = Lending interest rate (%)

S_{it} = Gross domestic savings (% of GDP)

$TRAD_{it}$ = Trade (% of GDP)

INF_{it} = Inflation, GDP deflator (annual %)

GE_{it} = General government final consumption expenditure (% of GDP)

D_{it} = External Debt (% of GNI)

4.1.1 Gross Fixed Capital Formation (% of GDP)

Gross fixed capital formation (a proxy for gross domestic investment) represents dependant variable in our model and includes land improvements (fences, drains, ditches, and so on); plant, equipment purchases, machinery; and the construction of railways , roads, , and the like, including offices, schools, hospitals, commercial and industrial buildings and private residential dwellings. The same variable is used by Manuel et.al (2000), Mileva (2008) and Arazmuradov (2011).

4.1.2 GDP Per Capita Growth (Annual %)

GDP per capita growth is the annual growth rate of GDP per capita (the ratio of gross domestic product and the midyear population). The neo classical theory states that, real GDP growth is positively related with the domestic investment through the accelerator effect. It is expected that our results will follow the theory of neo classical.

4.1.3 Domestic Credit to Private Sector (% of GDP)

Domestic credit to private sector, a variable of financial development, designates the role of banks in the provision of finance to private corporations. It is normally believed that credit to private sector yields greater returns as compared to credit allocated to public sector (Rousseau, and Vuthipadadorn (2005)).

4.1.4 Lending Interest Rate (%)

Lending interest rate is the rate of interest charged by banks on loans from the lender.

4.1.5 Gross Domestic Savings (% of GDP)

Gross domestic saving is calculated by taking the difference between GDP and final consumption expenditures.

4.1.6 Trade (% of GDP)

Trade is the sum of imports and exports of the goods and services as a percentage of GDP.

4.1.7 Inflation, GDP Deflator (Annual %)

Inflation is measured by the GDP deflator which indicates the rate of change in price as a whole in the economy.

4.1.8 General Government Final Consumption Expenditure (% of GDP)

General government final consumption expenditure indicates current expenditures of the government for goods and services and expenditure on security and national defense, although the expenditures on the government military are excluded from it.

4.1.9 External Debt (% of GNI)

External debt means the ratio of total external debt to gross national income and means debt payable to nonresidents in foreign currency, or goods and services. It is the sum of public, publicly guaranteed, private nonguaranteed long-term debt, short-term debt and use of IMF credit. Short-term debt includes all debt having an original maturity of one year or less and interest in amount outstanding on long-term debt.

4.2 Data

Keeping in view the objectives of our study and our specific model, we have obtained data for the middle income Asian countries over the period 1980 to 2010. Non-availability of data on some of the variables induced us to drop some countries from the study and finally we have 12 cross sectional units in our sample. The data is taken from WDI 2011 online data base. Before we move on to the regression analysis, an appropriate methodology followed in this study is explained hereunder;

4.3 Methodology

To achieve the objectives of this study, the methodology adopted is explained as under;

The methodology comprises following: Penal Unit Root, Co-integration test, Redundancy test and the Empirical Bayes Estimation. Classical econometrics is valid only for stationary series and since panel data includes both components, time series as well as cross sections, thus the time series dimension makes it necessary to apply Unit Root test in order to ensure that the results are reliable. Nelson and Plassor (1982) explain that most of the economic series are Unit Root, and as suggested by Engel and Granger (1982), the regression of unit root series is valid only if they are co-integrated. Thus as a first step of estimation process, we have employed unit root test with a view to find whether the series are stationary or not. Series of I (0) are believed to be ideal which mean that there is no unit root, thus signifying that a particular series is stationary at its level. However, if two or more series are found to be non-stationary then the estimated regression yields spurious results [Granger and Newbold (1974)], than co-integration between variables is necessary to be tested.

4.3.1 Panel Unit Root Test

Before we proceed to identify the long run relationship we need to investigate the order of integration in order to verify whether the series is stationary or unit root. A Stationery series is characterized by the constant variance, constant mean and constant covariance of each given lag. For the identification of the order of integration we have used a modern technique of panel unit root developed by Im, Pesaran, Shin (2003) (hereafter referred to as IPS). It specifies a separate ADF regression for every cross section by individual effect and no time trend.

4.3.2 Panel Co-integration

Finding more than one variable non-stationary urges us to test whether the series are co-integrated. So in the second step of estimation we apply penal co-integration test

introduced by Kao (1999) which is Engel-Granger (1987) two step residual based tests to measure the long run relationship among the selected variables.

4.3.3 Redundancy Test

For the purpose of obtaining meaningful results, econometric model should be parsimonious and unimportant variables must be excluded from the model. Where inclusion of insignificant variable enlarges the variability of estimators on one hand, the exclusion of any important variable from the model yields biased estimator on the other. Thus, the process of dropping some variable from the equation is not a hit and trial method but this ought to be done in a systematic manner. Therefore, we have applied coefficient test of redundant variable to obtain a parsimonious model. Test of redundant variables is basically the comparison of the original model and model with redundant variables, in order to decide which variables are to be excluded from the initial equation.

4.3.4 Empirical Bayesian Estimator

Although classical techniques are frequently used in econometrics, Empirical Bayesian is an alternative to such techniques and getting popular due to its advantages as compared with the classical methods. Classical approach ignores the prior knowledge about the parameters and the variability of the parameters. The fact that Bayesian approach incorporates the prior information in the model enhances the power and flexibility of the model and provides results in natural form. It also deals with the complexities inherent in the classical approach. Keeping in view the merits of Bayesian technique we have used Empirical Bayesian approach to estimate the investment model in our study.

4.3.5 Bayesian Estimation Procedure

It is believed that Empirical Bayesian procedure is efficient over the class of others estimators especially in case of small samples. Bayesian approach has various advantages over the other estimators that lead to more precise and reliable coefficients. It assumes that prior information about unknown must be incorporated in the density function.

$$\hat{\beta}_i \,/\, \beta_i \sim N(\beta_i, \Lambda_i) \tag{4.4}$$

$\hat{\beta}_i$ Indicates the estimated elasticities and β_i is true values of elasticity. It shows that 'estimated values' of parameters is normally distributed with mean β_i and variance Λ_i given the true values of parameters. The empirical Bayesian estimators are attained by assuming that β_i is normal prior distribution of the form;

$$[\beta_i |\, \mu, \Omega] \sim N(\mu, \Omega) \tag{4.5}$$

Equation 4.5 implies that β_i is normal distribution with μ and Ω. Where, Ω indicates the variance of the prior density which has been calculated from the Ordinary Least Squares results that is:

$$\Omega = [\textstyle\sum_{i=1}^{n} \Lambda_i^{-1}\,]^{-1} \tag{4.6}$$

Ω is the variance of prior density which is simply the weighted average of the variance covariance matrices of the OLS estimates. We follow the procedure of Corrington and Zaman (1994) to calculate the variance covariance matrices of parameters by using the standard errors of OLS estimates obtained in the first stage. μ in equation 4.5 is the mean of prior density which is given below:

$$\mu = \Omega^{-1}\left[\sum_{i=1}^{n} \Lambda_i^{-1}\ \hat{\beta}_i\right] \tag{4.7}$$

μ is precision weighted average of coefficients of all countries.

Finally the Empirical Bayesian estimator obtained from the posterior density is given as follows:

$$\hat{\beta}^{EB} = V_i\ (\Lambda_i^{-1}\ \hat{\beta}_i\ + \Omega^{-1}\mu) \tag{4.8}$$

Formula of Empirical Bayesian is given in equation 4.8. $\hat{\beta}^{EB}$ Means the parameter estimates of the Empirical Bayesian and standard error of the estimates are obtained from 'V_i' which is the variance of the posterior density.

$$V_i = (\Lambda_i^{-1} + \Omega^{-1})^{-1} \tag{4.9}$$

Estimates of the Bayesian methods are more precise as compared to the classical estimates. Standard errors of the Bayesian are smaller than those of classical which helps in getting more reliable conclusions (Berger (1985)). Some other authors also recommend Empirical Bayesian for the panel data analysis including Koop (1999) and Peseran (2005) whereas a number of researchers have employed Empirical Bayesian approach in their studies Efron and Morris (1972), (Rubin (1981), Hsiao, pesaran and Tahmiscioglu (1999)).

CHAPTER 5

EMPIRICAL RESULTS

In this study we empirically test the role of financial and macroeconomic variables in the determination of domestic investment, with a view to conclude the debates on the subject.

5.1 Redundancy Test

We estimate equation 4.2, as a first step of formal estimation process, which include lagged investment[3] and all the variables of financial and macroeconomic nature, in their level and lag forms, which can potentially affect the domestic investment. The model in equation 4.2 is a general model and to get a parsimonious model from model 4.2 we apply the redundancy test to all variables in the model. The findings of this test are given in Table 5.1 below;

[3] Lagged investment is included to control the economic condition in the last year (Li, 2006)

Table 5.1 Results of Exclusive Restriction (Redundancy Test)		
Variables	F-statistics	Prob
I_{it-1}	25.34	0.000***
Y_{it}	9.21	0.000***
Y_{it-1}	3.69	0.000***
$PRIVT_{it}$	3.47	0.000***
$PRIVT_{it-1}$	1.45	0.147
S_{it}	15.56	0.000***
S_{it-1}	3.51	0.000***
$TRADE_{it}$	2.81	0.002***
$TRADE_{it-1}$	2.83	0.002***
INF_{it}	2.13	0.018**
INF_{it-1}	4.22	0.000***
R_{it}	3.34	0.000***
R_{it-1}	2.56	0.004***
GE_{it}	2.99	0.001***
GE_{it-1}	2.03	0.025**
D_{it}	2.64	0.003***
D_{it-1}	1.32	0.210

Significance at 1% level (***), Significant at 5% level (**)

According to the results of redundancy test, as shown in Table 5.1, we reject the null of redundancy for all the variables except lag of private credit and external debt. The

corresponding p-values for rest of the variables indicate the variable is not redundant and hence cannot be excluded from the model.

5.2 Testing Panel Unit Root

Before switching to the formal estimation process we first test unit root of the series of candidate variables in our econometric model. We employ Im, Pesaran and Shin (2003) test for the purpose of finding unit root. The results of the test are given below.

Table 5.2: Test results of Panel Unit Root (Im, Pesaran and Shin (2003))

	Levels		First Difference	
Series	t-statistics	p-value	t-statistics	p-value
INV_{it} (Gross Fixed Capital Formation (%GDP))	-0.252	0.401	-10.209	0.000***
Y_{it} (GDP per capita growth (annual %))	-6.206	0.000***		
$PRIVT_{it}$ (Domestic credit to private sector %GDP)	3.546	0.998	-4.90934	0.000***
D_{it} (External Debt (%GNI))	-0.216	0.415	-5.80144	0.000***
GE_{it} (Govt Expenditure %GDP)	0.461	0.678	-10.209	0.000***
INF_{it} (Inflation, GDP deflator (Annual %))	-4.787	0.000***		
R_{it} (Lending interest rate (%))	1.268	0.898	-12.7066	0.000***
S_{it} (Gross Domestic Saving (%GDP))	-0.110	0.456	-10.9317	0.000***
$TRADE_{it}$ (Trade as % of GDP)	2.195	0.986	-8.78945	0.000***

Note: *** denote level of significant at 1%

Table 5.2 shows results of the test for the variables at level form, and the series which are not stationery at level, the test is further extended to the variables in their first difference form. The null of the test specifically states that the series is a Unit root (signifying that the series is not stationary), whereas under the alternative hypothesis

the series is not a unit root (that the series is stationary). The t-stats and the corresponding p-values for each of the variables show that only two variables (Y_{it}, INF_{it}) are stationary at level or integrated order zero I(0). Other series are non-stationary at level, however, these are integrated order one I(1), that is the series become stationary at first difference.

Since more than one variable are non-stationary, we cannot proceed further for the analysis unless we find a long run relationship between the investment and the financial and macroeconomic variables, that is we are satisfied that there is co-integration between the variables.

5.3 Penal Co-integration

A panel co-integration test introduced by Kao (1999)[4] is employed to examine the long run relationship between the variables. Table 5.3 below, yields the output of the test.

Table 5.3: Test results of Penal Co-integration

Series	ADF	
	t-statistics	Prob
INV_{it} , Y_{it} , $PRIVT_{it}$, S_{it} , $TRADE_{it}$, INF_{it} , R_{it} , GE_{it}, D_{it}	-4.239	0.000***

Null Hypothesis: No Co-integration

The results presented in Table 5.3 provide sufficient evidence to reject the null hypothesis of no co-integration, at 1% level. This reveals the existence of a long run

[4] Kao (1999) test is based on the (Engel Granger (1987) two step residuals.

relationship between the investment, financial and macroeconomic variables. The fact that the variables are co-integrated allows us to proceed to the estimation process.

5.4 Findings of the Empirical Bayes

For reasons discussed earlier we employ Empirical Bayesian technique in our final stage of estimation process. Table 5.4 below shows the estimates of the empirical Bayes of the investment model. As compared with OLS estimates (Results of OLS are given in Appendix B), under the empirical Bayesian analysis, the estimates become more precise because of incorporation of the prior information, with the data information.

Table 5.4: Results of Empirical Bayesian Estimation

Countries		I_{it-1}	Y_{it}	Y_{it-1}	P_{it}	S_{it}	S_{it-1}	T_{it}	T_{it-1}	INF_{it}	INF_{it-1}	R_i
Bhutan	Coefficient	0.63	0.20	0.10	0.04	0.20	-0.06	0.01	-0.04	-0.02	-0.05	0.
	t-value	23.32***	9.80***	4.56***	4.61***	8.66***	-2.72***	1.36	-4.73***	-1.35	-3.55***	0.
China	Coefficient	0.59	0.22	0.11	0.05	0.24	-0.06	0.01	-0.04	-0.01	-0.04	-0
	t -value	22.71***	10.70***	5.27***	5.82***	10.14***	-2.59***	0.83	-4.69***	-0.86	-2.84***	-0
Fiji	Coefficient	0.62	0.20	0.09	0.04	0.24	-0.07	0.02	-0.04	-0.01	-0.04	0.
	t -value	22.96***	9.57***	4.05***	4.45***	10.05***	-2.99***	1.63	-4.56***	-0.82	-3.09***	0.
Indonesia	Coefficient	0.63	0.20	0.09	0.05	0.20	-0.06	0.02	-0.05	-0.01	-0.02	-0
	t -value	23.77***	9.94***	4.23***	5.38***	8.40***	-2.55***	1.55	-5.16***	-0.99	-1.74*	-1
India	Coefficient	0.61	0.19	0.07	0.04	0.27	-0.04	0.02	-0.05	-0.02	-0.07	0.
	t -value	22.99***	10.23***	3.56***	4.30***	12.63***	-1.91*	1.98*	-5.04***	-1.75*	-4.94***	1.
Sri Lanka	Coefficient	0.62	0.21	0.11	0.04	0.21	-0.06	0.02	-0.05	-0.02	-0.05	0.
	t -value	22.81***	10.15***	4.84***	4.55***	8.65***	-2.61***	1.71*	-4.79***	-1.25	-3.32***	0.

Significant at 1 % (***), Significant at 5% (**), Significant at 10% (*)

Table 5.4: Results of Empirical Bayesian Estimation (Continued)

Countries		I_{it-1}	Y_{it}	Y_{it-1}	P_{it}	S_{it}	S_{it-1}	T_{it}	T_{it-1}	INF_{it}	INF_{it-1}	R_{it}
Malaysia	Coefficient	0.66	0.29	0.13	0.04	0.18	-0.05	0.02	-0.03	-0.02	-0.06	0.01
	t -value	26.66***	14.72***	5.96***	4.61***	7.29***	-2.08**	2.17**	-3.73***	-1.61	-4.58***	0.19
Pakistan	Coefficient	0.63	0.19	0.11	0.04	0.22	-0.06	0.02	-0.04	0.00	-0.05	0.03
	t -value	23.29***	9.50***	5.18***	4.59***	9.35***	-2.86***	1.64*	-4.58***	-0.36	-3.87***	0.76
Philippine	Coefficient	0.63	0.20	0.09	0.04	0.23	-0.06	0.02	-0.04	-0.03	-0.07	0.05
	t -value	23.02***	9.59***	4.28***	4.71***	9.40***	-2.42**	1.68*	-4.36***	-2.33**	-5.23***	1.29
Papua New Guinea	Coefficient	0.65	0.17	0.09	0.04	0.21	-0.08	0.02	-0.04	-0.02	-0.06	0.02
	t -value	24.17***	8.51***	4.18***	4.63***	9.31***	-3.38***	1.71*	-4.71***	-1.13	-4.43***	0.42
Thailand	Coefficient	0.64	0.23	0.11	0.03	0.19	-0.03	0.01	-0.03	-0.02	-0.05	0.05
	t -value	24.10***	11.53***	5.09***	3.20***	8.04***	-1.47	0.74	-3.80***	-1.30	-3.49***	1.34
Vanuatu	Coefficient	0.61	0.22	0.11	0.05	0.19	-0.06	0.01	-0.05	-0.02	-0.05	0.02
	t -value	22.93***	10.43***	4.93***	5.11***	8.01***	-2.40**	0.98	-4.92***	-1.08	-3.53***	0.38

Significant at 1 % (***), Significant at 5% (**), Significant at 10% (*)

Variables for most of the countries in the table bear expected sign of the estimators are statistically significant. The coefficient of one period lagged investment (hereafter referred to as lagged investment), ranging from 0.59 to 0.66 across countries, shows its positive impact on current investment at 1% level for all cross sectional units. The positive coefficient of lagged investment divulges that investment practice in the previous year acts as an indicator of the economic condition in a particular country, thereby stimulating investment in the following year. Our results are consistent with the findings of Ndikumana (2000) and Salahuddin et al (2009).

The coefficient of GDP per capita growth bears a positive sign and is statistically significant at 1% level for all the countries, with a value ranging from 0.17 to 0.29. It implies that 1% increase in GDP per capita growth has a potential to expand domestic investment by 0.17% to 0.29% in the sample countries. This provides evidence in support of the endogenous growth theory (Locas (1988) and Romer (1986)). The philosophy of neo classical theory of investment, that output growth is positively related with the investment due to the accelerator effect[5], also sustains by this relationship. In terms of quantitative importance, the variable is least important for Papua New Guinea where one percent increases in GDP per capita growth stimulates investment by about 0.17 percent. On the other extreme, one percent change in GDP per capita growth changes domestic investment by 0.29 percent for Malaysia. The results are consistent with the findings of Levine and Rental (1992), Barro and Lee (1994), Ghura and Hadjimicheal (1996), Ndikumana (2000), Hernadez-Cata (2000), Wai and Wong (1982), Fielding (1997), Wolf S. (2002), Mbanga (2002), Akpalu

[5]The accelerator effect theory states Gross Domestic Product (GDP) stimulates investment. In response to a rise in GDP, firms increase their investments and thus the profits go up. Consequently the fixed investments of firms explode, in the form of increased capital stock. This further leads to economic growth by raising consumer expenditure through the multiplier effect.

(2002), Greene and Villanueva (1991). Furthermore, it is not only the current level of per capita income that affects domestic investment but its lagged value (one year lag) also determines investment positively (although its quantitative importance is lesser than the variable at level). The variable is significant at 1% and its value stands between 0.07 and 0.11, for the middle income Asian countries.

The estimated coefficient of domestic credit to private sector, which is also considered a measure of financial development, is found to have a positive impact on domestic investment. The fact that availability of funds in the credit market promotes investment cannot be undermined despite a small range of the coefficient between 0.03% and 0.05%. Our results are similar to the studies of Stiglitz and Weiss (1981), Greenwald et al. (1984), Islam and Wetzel (1991), Ronge and Kimuyu (1997) and Ghura and Goodwin (2000).

The coefficient of saving is also found to affect the domestic investment positively, for the entire sample and the results are significant at 1% level. India has a coefficient of 0.27, which is highest in the sample whereas Malaysia is on the tail with a value of 0.18. A positive relationship of gross domestic saving with domestic investment implies that the two variables are complimentary; however, a relatively smaller coefficient indicates the higher mobility of capital from these countries. These results are consistent with the findings of Dooley et al. (1987), Wong (1990), Salahuddin and Islam (2008) and Arazmuradov, A. 2011.

We find the coefficient of trade (current level) positive and significant at 5% for Malaysia while for India, Pakistan, Philippine, Sri Lanka and Papua New Guinea, it is significant at 10% level. Its role, however, is not of worth mentioning for rest of the

countries in the sample. Positive relationship implies that domestic investment is affected by both exports and imports. Increase in Exports increases the foreign exchange which is necessary for purchase of imported capital goods that is helpful to increase in domestic products. While, the greater access to investment good due to high imports helps to stimulates domestic investment. These results follow the findings of Ghura and Goodwin (2000) and Mileva (2008).

On the other, the estimated coefficient of first lag of trade is negative and significant at 1% level for all the countries ranging between -0.05 and -0.03. This is consistent with the study of Demir (2005) and Ouattara (2005). It advocates that an increase in risk after the trade liberalizations induces risk averse investors to switch investment in financial sector rather than real sector.

The current inflation level does not seem to affect investment significantly, with the exception of India and Philippine where it is significant at 10% and 5% level of significance respectively, and has negatively sign. These findings encompass the studies of Mehrara and Karsalari (2011) and Ghura and Goodwin (2000).

However, the lagged inflation is found to discourage investment (coefficient ranges between -0.02 and -0.07) and the results are significant at one percent level, for all the countries except Indonesia for which the significance stands at 10% level. These results provide evidence in favor of the Fisher's (1993) stand point that inflation curbs investment by raising the risk associated with long-term projects. High rate of inflation indicates poor governance by the government and therefore investors are discouraged. The cost of production is also escalated by high inflation rates which further reduces domestic investment. The results support the findings of Oshikoya

(1994), Nazmi (1996), Akpokodje (1998), Asante (2002) and Salahuddin M. et al (2009).

The negative sign of estimated coefficients of interest rate advocates the Neo-classical theory of investment that the cost of capital escalates as the interest rate increases, resulting in cuts in the capital expenditures at firms level. For India and Indonesia for which current interest rate is negatively related with investment (at 10% level), the estimator becomes significant in its lag form, at 1% level for all the cross sections. These findings are in line with the results of Green and Villanueva (1991), Serven, and Solimano (1992), Ghura and Goodwin (2000) and Peltonen et al. (2009).

Government expenditures bear a positive coefficient and significant at 1% level for India, Indonesia, Papua New Guinea, Thailand and Vanuatu, at 5% for Bhutan, China, Fiji, Sri Lanka, Pakistan, Philippine and at 10% for Malaysia. With respect to the quantitative important Indonesia and India lead with 0.19% leaving Malaysia farthest behind at 0.10%. The government spending, in our study reveals crowed in effect in contradiction with the study of Ghura and Goodwin (2000). This may be due to the fact that government expenditures in infrastructure (communication, transport and irrigation) and government spending on national defense and security creates a climate favorable for investment as also suggested by Greene and Villanueva (1991).

Although, external debt is believed to be an indicator of macroeconomic uncertainty, it does not constrain domestic investment in the middle income Asian countries and the coefficient is insignificant for the entire sample. One of the reasons behind irrelevance of external debt with that of domestic investment could be the fact that most of the developing countries depend on the loans from official sources at

concessional terms rather than from the private sector as suggested by Fitz Gerald et al (1994). Earlier studies of Ghura and Goodwin (2000) and Nabende and Salater (2005) also arrive at the similar findings.

In nutshell, the results suggest that lagged investment, real GDP per capita growth, domestic credit to private sector, domestic saving, government expenditures, lagged of trade, inflation, interest rate are the key determinants of domestic investment in the middle income Asian countries and for the period under study.

CHAPTER 6

CONCLUSIONS

6.1 Summary of the Findings

In this study we attempted to explore the role of various factors in the determination of domestic investment. Our sample consisted of twelve middle income Asian countries and the sample period extended over 31 years ending up to 2010. Empirical Bayesian approach was used for estimation purpose, after undertaking preliminary data testing through the unit root and panel co-integration. We started with a general model of investment incorporating a variety of variables having their candidature on ground of various theoretical considerations. The parsimonious model, however, was arrived at by undergoing the redundancy test. The model, finally used for analysis, included lagged investment, real GDP per capita growth, domestic saving, domestic credit to private sector, interest rate, Inflation, trade, government expenditures and external debt (with lags for all variables except GDP and Debt) as explanatory variables.

The results of this research are consistent with findings of most of the studies in the existing literature. We found that past outcomes of domestic investment strongly influence the possibility for the investors to reinvest. A positive relationship between growth and investment was also observed implying that increased output is assumed to be an indication of better performance of the economy thereby attracting further investment. Our study also provides evidence in favor of the classical positive relationship between investment and savings. A positive impact of 'availability of

domestic credit to private sector' on domestic investment signifies that higher the availability of funds in the credit market, higher would be the rate of investment. It also acknowledges the proposition that financial development results in higher rates of investment and, in turn, accelerates the rate of economic growth. Inflation, being an indicator of macroeconomic uncertainty, exhibits cuts in the rate of investment and thus bears a negative relationship with domestic investment. Interest rate is found to affect the domestic investment negatively speaking in favor of the neoclassical approach that the interest rate hurts investment by raising the cost of capital. Furthermore, government expenditures in infrastructure are also found helpful in stimulating domestic investment.

The results of this study, thus, highlight the importance of macroeconomic factors and indicators of financial development in determining domestic investment and consequently achieving higher rates of economic growth.

6.2 Policy Recommendations

In response to the debates in literature over the potential role of macroeconomic and financial factors in affecting investment, our study arrives at a conclusion that these factors are important in the middle income Asian countries. These findings are helpful in policy formulation and guide the bureaucratic machinery to boost the rate of domestic investment by altering and regulating these variables.

Policies directed towards achieving higher growth rates can also act as a stimulus for capital formation, as growth rate significantly determines investment by improving confidence of the investors. Savings should be promoted to increase investment but it cannot be done via interest channel because an increase in interest rate acts as an

impediment to domestic investment. Inflation ought to be contained within reasonable limits, since it is an indicator of uncertainty and higher rates of inflation discourage domestic investment.

The factors of financial development also require attention as these financial intermediaries push up levels of investment. An introduction of financial reforms directed towards increasing availability of domestic credit to private sector may convert funds into investments and help attaining higher growth rates in the middle income Asian countries. A crowd-in effect observed in our study asks government to increase her spending, particularly in the avenues of security and national defense and infrastructure, to attract private investors.

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APPENDIX A

A List of Sample Countries

Bhutan	Malaysia
China	Pakistan
Fiji	Philippine
Indonesia	Papua New Guinea
India	Thailand
Sri Lanka	Vanuatu

Appendix: B. Results of OLS Estimation (Continued)

Countries		I_{it-1}	Y_{it}	Y_{it-1}	P_{it}	S_{it}	S_{it-1}	T_{it}	T_{it-1}	INF_{it}	INF_{it-1}
Malaysia	Coefficient	0.822	0.723	0.418	0.025	-1.266	0.573	0.037	-0.002	-0.189	-0.290
	t -value	14.382***	14.310***	5.741***	1.347	-8.638***	2.728***	1.864*	-0.125	-2.418**	-4.806*
Pakistan	Coefficient	0.690	-0.102	0.370	0.078	0.241	-0.133	0.147	-0.168	0.065	-0.059
	t -value	5.440***	-1.104	3.707***	1.150	3.094***	-1.841*	1.674*	-1.954*	1.883*	-1.501
Philippine	Coefficient	0.575	-0.228	-0.118	0.062	0.750	-0.058	0.041	-0.017	-0.165	-0.195
	t -value	4.134***	-1.732*	-0.868	1.538	4.541***	-0.271	1.066	-0.513	-3.804***	-5.271***
Papua New Guinea	Coefficient	0.906	-0.232	-0.092	0.204	0.197	-0.203	0.091	-0.182	0.016	-0.216
	t -value	8.831***	-3.450***	-0.911	1.952*	2.972***	-3.209***	1.569	-2.646***	0.211	-3.907***
Thailand	Coefficient	0.707	0.576	0.283	-0.040	-0.397	0.840	-0.044	0.038	-0.098	0.043
	t -value	8.279***	7.292***	3.104***	-2.027**	-3.210***	5.678***	-1.600*	1.275	-0.903	0.399
Vanuatu	Coefficient	0.424	0.382	0.250	0.532	-0.296	-0.029	-0.105	-0.133	0.041	-0.009
	t -value	4.033***	3.323***	2.539***	6.212***	-2.738***	-0.323	-2.036***	-2.980***	0.512	-0.129

Significant at 1 % (***), Significant at 5% (**), Significant at 10% (*)

APPENDIX: B. Results of OLS Estimation

Countries		I_{it-1}	Y_{it}	Y_{it-1}	P_{it}	S_{it}	S_{it-1}	T_{it}	T_{it-1}	INF_{it}	INF_{it-1}	R
Bhutan	Coefficient	0.655	-0.351	0.220	0.351	0.056	-0.092	-0.009	-0.136	-0.937	0.073	3
	t-value	5.561***	-1.581	1.024	2.308**	0.674	-1.373	-0.198	-2.404**	-3.217***	0.238	3
China	Coefficient	0.318	0.286	0.227	0.078	0.693	-0.109	-0.087	-0.078	0.040	0.097	-(
	t -value	4.196***	3.945***	3.287***	4.113***	6.719***	-1.092	-2.143**	-1.853*	0.876	2.035**	-3
Fiji	Coefficient	0.509	-0.134	-0.111	0.006	0.504	-0.283	0.056	-0.067	0.278	0.309	-(
	t -value	3.873***	-1.241	-1.230	0.083	5.770***	-2.821***	1.076	-1.311	2.644***	3.119***	-2
Indonesia	Coefficient	0.680	0.086	-0.020	0.093	-0.028	-0.050	0.027	-0.189	0.013	0.112	-(
	t -value	7.231***	1.071	-0.263	3.499***	-0.326	-0.859	0.617	-4.177***	0.341	3.614***	-4
India	Coefficient	0.426	0.115	-0.015	-0.016	0.481	0.038	0.072	-0.076	-0.041	-0.154	0.
	t -value	4.430***	3.151***	-0.427	-0.372	10.354***	0.708	2.027**	-2.734***	-1.500	-4.353***	3.
Sri Lanka	Coefficient	0.490	0.279	0.555	0.057	0.014	-0.207	0.180	-0.250	-0.030	0.040	-0
	t -value	2.820***	1.844*	3.156***	0.866	0.130	-1.450	2.164**	-3.376***	-0.442	0.662	-0

Significant at 1 % (***), Significant at 5% (**), Significant at 10% (*)