Determinants of Domestic Investment:
A Case Study of Middle Income Asian Countries

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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 guideline to the policy makers who intend to boost domestic investment for attaining higher growth rates.

JEL Classification: D9; E2

Key Words: Investment; Economic Growth

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

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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.

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 dataonly (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.

The main objectives of our study is to quantify the impact of various indicators on the domestic investment in the middle income Asian countries, 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. 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.

The remaining part of this study is organized as follows. Section2 contains a review of the relevant literature. Theories of investment and some theoretical underpinnings are given in section3. Section4 explains the econometric model, estimation methodology and description of the data and variables. Empirical results are discussed in section 5 which is followed by the conclusions and policy implications in section 6.

2. Literature Review

In this section we are examining the existing empirical literature focusing the investment and its determining factors. The findings of some of the relevant studies on the topic are discussed below.

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 like Mileva (2008) in transition economies; Salahuddin et al. (2009) in developing countries from the Muslim regions, Donwa and Agbontaen (2010) on Nigeria and Janice et al. (2011)

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. Similarly studies by Oshikoya (1994) on African countries, Ghura

and Goodwin (2000) on countries from Asia, find positive relationship between investment and GDP or GDP growth.

Many studies report that investment is positively determined by saving. Bake (2011) and Salahuddin et al. (2009) find in their study that domestic investment is positively related with domestic saving. Mixed results are observed in literature regarding the role of interest rate and inflation in determining investment. Some studies find negative relation with private investment like Frimpong and Marbuah (2010) for Ghana in both short and long run. While, Seruvatu and Jayaraman (2001) find no significant impact of real lending rate on private investment, in Fiji.

A mixed role of inflation is observed, in existing literature, as determinant of domestic investment. Li (2006) finds a negative impact of inflation on domestic investment. Shahbaz et al. (2010) reports a positive impact of inflation on investment reinforcing the theory of Phillips curve. Some studies also end up with a conclusion that inflation has no effect on domestic investment Jaramillo (2010) and Salahuddin et al. (2009).

Investment increases with expansion in the quantum of exports and imports. According to the studies of Frimpong and Marbuah (2010), Salahuddin et al. (2009) domestic investment is positively explained by trade openness. Mileva (2008) in a study on 22 transition economies, however, reports an insignificant impact of trade in the long run.

Since 1980's, a vast literature reveals the importance of financial variables in explaining the behavior of investment. Financial models propose that domestic investment is influenced by the availability of internally generated funds Fazzari et al (1998)), Greenwald et al (1984). 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.

2.1 Theoretical Background

The way various factors are associated with investment can be viewed as follows. 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 and Villanueva (1991). 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. 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.

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)).

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. 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.

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.

3. Methodology and Data Description

The present study attempts to explore the determinants of domestic investment in the middle income Asian countries[4], the countries included in our analysis are Bhutan, China, Fiji, Indonesia, India, Sri Lanka, Malaysia, Pakistan, Philippine, Papua New Guinea, Thailand, and Vanuatu. The sample of Middle income countries is appropriate because Pakistan also falls in this category and mixing various non-homogeneous group may cause heterogeneity problems leading to results not valid for Pakistan. The model employed in our study and a brief description of the variables used is given hereunder.

3.1 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;

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

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

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

(4.2)

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

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)

3.2 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.

3.3 Methodology

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 (1987), 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.

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3.3.1 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.

3.3.2 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.

3.3.3 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.

3.3.4 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.

3.3.5 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.

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

(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;

$$[\beta_i | \, \mu, \Omega] \sim N(\mu, \Omega)$$

(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 Square results that is:

$$\Omega = [\Sigma_{i=1}^n \Lambda_i^{-1}]^{-1}$$

(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:

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

(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:

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

(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.

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

(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)).

4. 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.

4.1 Redundancy Test

We estimate equation 4.2, as a first step of formal estimation process, which include lagged investment[5] 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;

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***

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

$PRIVT_{it}$	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.

4.2 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}	-0.252	0.401	-10.209	0.000***
Y_{it}	-6.206	0.000***		
$PRIVT_{it}$	3.546	0.998	-4.90934	0.000***
D_{it}	-0.216	0.415	-5.80144	0.000***
GE_{it}	0.461	0.678	-10.209	0.000***
INF_{it}	-4.787	0.000***		
R_{it}	1.268	0.898	-12.7066	0.000***
S_{it}	-0.110	0.456	-10.9317	0.000***
$TRADE_{it}$	2.195	0.986	-8.78945	0.000***

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

In Table 5.2t-stats and the corresponding p-values for each of the variables show that only two variables (Y_{it}, INF_{it}) are stationary at level. 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 other variables, that is we are satisfied that there is co-integration between the variables.

4.3 Penal Co-integration

A panel co-integration test introduced by Kao (1999)[6] 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

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

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

4.4 Findings of the Empirical Bayes

Table 5.4 shows the estimates of the empirical Bayes of the investment model. 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[7], 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 0.17percent. 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), Ndikumana (2000), Wai and Wong (1982), Fielding (1997), Wolf S. (2002), Mbanga (2002), Akpalu (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.

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[7]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 plode, in the form of increased capital stock. This further leads to economic growth by raising consumer expenditure through the multiplier effect.

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_{it}	R_{it-1}	GE_{it}	GE_{it-1}
Bhutan	Coefficient	0.63	0.2	0.1	0.04	0.2	-0.06	0.01	-0.04	-0.02	-0.05	0.02	-0.15	0.13	-0.03
	t-value	23.32***	9.80***	4.56***	4.61***	8.66***	-2.72***	1.36	-4.73***	-1.35	-3.55***	0.48	-3.84***	2.31**	-0.4
China	Coefficient	0.59	0.22	0.11	0.05	0.24	-0.06	0.01	-0.04	-0.01	-0.04	-0.02	-0.18	0.12	-0.02
	t-value	22.71***	10.70***	5.27***	5.82***	10.14***	-2.59***	0.83	-4.69***	-0.86	-2.84***	-0.53	-4.88***	2.15**	-0.24
Fiji	Coefficient	0.62	0.2	0.09	0.04	0.24	-0.07	0.02	-0.04	-0.01	-0.04	0	-0.16	0.14	-0.06
	t-value	22.96***	9.57***	4.05***	4.45***	10.05***	-2.99***	1.63	-4.56***	-0.82	-3.09***	0.05	-4.22***	2.43**	-0.83
Indonesia	Coefficient	0.63	0.2	0.09	0.05	0.2	-0.06	0.02	-0.05	-0.01	-0.02	-0.06	-0.16	0.19	-0.07
	t-value	23.77***	9.94***	4.23***	5.38***	8.40***	-2.55***	1.55	-5.16***	-0.99	-1.74*	-1.72*	-4.70***	3.18**	-0.98
India	Coefficient	0.61	0.19	0.07	0.04	0.27	-0.04	0.02	-0.05	-0.02	-0.07	0.06	-0.16	0.19	-0.11
	t-value	22.99***	10.23***	3.56***	4.30***	12.63***	-1.91*	1.98*	-5.04***	-1.75*	-4.94***	1.69*	-4.42***	3.47**	-1.71*
Sri Lanka	Coefficient	0.62	0.21	0.11	0.04	0.21	-0.06	0.02	-0.05	-0.02	-0.05	0.01	-0.12	0.13	-0.06
	t-value	22.81***	10.15***	4.84***	4.55***	8.65***	-2.61***	1.71*	-4.79***	-1.25	-3.32***	0.28	-3.35***	2.23**	-0.89
Malaysia	Coefficient	0.66	0.29	0.13	0.04	0.18	-0.05	0.02	-0.03	-0.02	-0.06	0.01	-0.14	0.1	-0.04
	t-value	26.66***	14.72***	5.96***	4.61***	7.29***	-2.08**	2.17**	-3.73***	-1.61	-4.58***	0.19	-3.61***	1.64*	-0.54
Pakistan	Coefficient	0.63	0.19	0.11	0.04	0.22	-0.06	0.02	-0.04	0	-0.05	0.03	-0.17	0.12	-0.05
	t-value	23.29***	9.50***	5.18***	4.59***	9.35***	-2.86***	1.64*	-4.58***	-0.36	-3.87***	0.76	-4.40***	2.23**	-0.78
Philippine	Coefficient	0.63	0.2	0.09	0.04	0.23	-0.06	0.02	-0.04	-0.03	-0.07	0.05	-0.13	0.15	-0.03
	t-value	23.02***	9.59***	4.28***	4.71***	9.40***	-2.42**	1.68*	-4.36***	-2.33**	-5.23***	1.29	-3.62***	2.46**	-0.51
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	-0.11	0.15	-0.05
	t-value	24.17***	8.51***	4.18***	4.63***	9.31***	-3.38***	1.71*	-4.71***	-1.13	-4.43***	0.42	-2.92***	2.63**	-0.73
Thailand	Coefficient	0.64	0.23	0.11	0.03	0.19	-0.03	0.01	-0.03	-0.02	-0.05	0.05	-0.17	0.16	-0.04
	t-value	24.10***	11.53***	5.09***	3.20***	8.04***	-1.47	0.74	-3.80***	-1.3	-3.49***	1.34	-4.41***	2.65**	-0.63
Vanuatu	Coefficient	0.61	0.22	0.11	0.05	0.19	-0.06	0.01	-0.05	-0.02	-0.05	0.02	-0.15	0.15	0.05
	t-value	22.93***	10.43***	4.93***	5.11***	8.01***	-2.40**	0.98	-4.92***	-1.08	-3.53***	0.38	-4.01***	2.65**	0.71

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

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), 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) 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.

5. Conclusion and 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 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. 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.

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. 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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