Macrothink Institute™

Journal of Management Research
ISSN 1941-899X
2015, Vol. 7, No. 1

An Analysis of Determinant on Private Investment in North Sumatra Province, Indonesia

Pinondang Nainggolan (Corresponding author)

Faculty of Economics Development, Simalungun University, Pematang Siantar, Indonesia

E-mail: pinondangnainggolan2014@gmail.com

Ramli

Faculty of Economics and Business

North Sumatera University, Medan, Indonesia

Murni Daulay

Faculty of Economics and Business

North Sumatera University, Medan, Indonesia

Rujiman

Faculty of Economics and Business

North Sumatera University, Medan, Indonesia

Received: Nov. 3, 2014 Accepted: Dec. 4, 2014 Published: January 1, 2015

doi:10.5296/jmr.v7i1.6541 URL: http://dx.doi.org/10.5296/jmr.v7i1.6541

Abstract

This study aims to analyze the factors that affect private investment in the province of North Sumatra. The observed variables are the regional gross domestic product (GDP), government investment, interest rate, exchange rate, investment credits, inflation, international interest rate and the economic crisis during the period of 1980-2011. Using an exploratory research survey approach, this study uses the secondary data of a 32-year period that were obtained from various agencies which were then analyzed by the Error Correction Model (ECM) method. The results have shown that in the long and short terms, the GDP, exchange rate and investment

credits have a positive and significant effect on private investment, while government investment, interest rates, inflation and economic crisis have a significant but negative effect on private investment. Meanwhile, the international interest rate (LIBOR) has a negative and insignificant effect on private investment in North Sumatra.

Keywords: Private investment, GDP, Government investment, Interest rates, Exchange rates, Investment credits, Inflation, International interest rate, Economic crisis

1. Introduction

In the development process, the investment is a very important component that is available through a variety of means of production, which will be optimized to produce the output, thereby increasing economic growth. Meanwhile, economic growth leads to an increase of the Aggregate Demand which will further encourage new investment, employment and exports. Given a pivotal role of investment, economists emphasize the role of capital formation as the starting point of economic development through the provision of societal income (savings) that will be used for the supply of capital goods which will increase the benefits on production. A study by Dehn (2000) stated that the private investment has a positive effect on economic growth, while Jayaraman & Singh (2007) posited that it has a positive effect on employment. Although there are researches showing that private investment has a significant effect on economic growth and employment, however in some developing countries like Indonesia, the ability to increase investment is relatively low, thus the economic growth is not able to be achieved as expected.

The investing activities are carried out in two main sectors; the public and the private sector. The public investment is generally carried out in the form of infrastructure development as well as the provision of facilities- both physical and non-physical- that will drive the businesses to sustain the economic activities. On the other hand, private investments in the form of domestic investment and foreign capital are used as an important prerequisite for the economic growth in a country because it allows entrepreneurs to develop their business through empowering economic resources to create goods and services for a better economic growth. Particularly so, the foreign direct investment (FDI) can provide a variety of positive effects such as the inclusion of experts, technical skills, renewal of product, organizational and management experiences, market information and training of local labor, all of which accelerate the regional development (the trickle - down theory of development). Moreover, in the increase in the private investment is an effort to spur the economic growth that occurs if the government provides infrastructure as a form of incentive to encourage and attract the investors (crowding-in). Moreover, it would be real progress if it is supported by other factors such as the availability of investment credits with low interest rates, controlled inflation and if the political situation is conducive. Conversely, low support on physical infrastructure becomes a disincentive to shift private investment (crowding-out), whereby this is often used as a weakness in the macro-economic competitiveness in a country.

North Sumatra province is one of the regions in the western part of Indonesia that had been trying to survive the unimpressive trend of the private investment since 1980 until the year 2011. During that period, the growth of the total value of the private investment (domestic and foreign) was very slow and volatile. This condition was exacerbated by the economic crisis that hit Indonesia, including North Sumatra in the middle of 1997 and 2003, which led to an unstable political situation, further causing a negative impact on investors' confidence to increase their investment.

Based on the explanation above, this study is intended to analyze the factors that influence private investment (both domestic and foreign private investments) during the period of

1980-2011, both short and long-terms. There are variables that presumably affect the private investment, namely; economic growth, government investment, interest rate, exchange rates, investment credit, inflation, international interest rates, and economic crisis. Meanwhile, the results of this study are expected to be the inputs for policy makers of the North Sumatran provincial government in encouraging private investment as well as to design the policies that manage the economic variables, such as the economic growth and employment.

2. Review of Literature

There were previous researches which have discussed the determinants of private investment. A summary of the studies is given below:

Author/Year/ Country	**Findings (Independent variables)**	**Sig. (effect)**	**Methods**	**Range of Data Collection**
Chhibber and Wijnbergen (1988) in Turkey	Level of capacity utilization, availability of credit and government investment.	Positive	Error Corection Model (ECM)	1988
	Real interest rate	Negative		
Carruh, et al. (1997) in United Kingdom	Real GDP and profit.	Positive	ECM	Period of 1963-1995
	Interest rate and international gold price	Negative		
Dehn (2000) in 44 developing countries	Economic growth & availability of credit to private sector	Positive	ECM	Period of 1971-1992
	Domestic real interest rate & real price of capital goods	Negative		
Seruvatu and Jayamaran (2001) in Fiji	Public investment, real GDP and private sector credit	Positive and Significant	ECM	Period of 1996 - 2000
	Real interest rate, inflation rate and labor cost per unit.	Significant and Negative		
	Exchange rate and the index of trade	No effect		
Ribeiro and Teixeira (2001) in Brazil	Economic growth, public investment and credit to the private sector	Positive	ECM and Ciontegration	Period of 1956 - 1996
	Inflation and exchange rate	Negative		
Agrawal (2001) in Korea, Malaysia & Thailand	Real interest rate, term a of trade, private capital inflows & exchange rates	Positive	OLS analysis and ECM.	Period of 1960-1996
Robert (2003) in United States	Real GDP and public investment	Positive	Vector Autogressive	Period of 1965 - 2001
	Inflation and interest rate	Negative		
Suwarsih (2004) in Indonesia	Private savings, accelerate revenue and capital flows	Significant	Multiple Regression Analysis	2004
	Exchange rate and interest rate	No Effect		
Ouattara (2004) in Senegal	Public sector investment, real GDP and foreign aid	Positive	Johansen and Cointegration	Period of 1970 - 2000

	Private sector credit variable and the terms of trade	Negative		
Valila & Mehrotra (2005) in 14 developed countries (Europe)	Real GDP, the level of interest rate, budget policy and foreign debt).	Positive	ECM	Period of 1970 - 2003
Jongwanich & Kohpaiboon (2006) in Thailand	Inflation and public investment	Negative	OLS analysis Metode	Period of 1970 - 1999
	GDP growth, growth of real capital costs, availability of financing, real exchange rate, terms of trade and the output gap.	Positive		
Setyari, et al. (2008) in Indonesia	Exchange rate	Significant and Positive	ECM	Period of 1989 - 2005
	Government investment & interest rate	Negative		
	GDP and inflation	No significant		
Record & Davies (2007) in Malawi	Employee, profit, Asian owner, European owner, manager education, foreign ownership	Positive	OLS analysis Metode	Period of 1994 - 2004
	Economic growth	Negative		
Author/Year/ Country	**Findings (Independent variables)**	**Sig. (effect)**	**Methods**	**Range of Data Collection**
Khan & Khan (2007) in Pakistan	Investment public and economic growth	Positive	Cointegration	Period of 1972-2005
	Real interest rate, investment credit, debt and foreign exchange rates	Negative		
	Economic growth	Positive	ECM	
	Public investment, real interest rate, investment, debt & foreign exchange rates	Negative		
Al khatib et al. (2011) in Jordan	Real GDP growth, exports, the amount of real money, foreign investment, human capital and domestic credit	Positive	OLS analysis Metode	2011
Bakare (2011) in Nigeria	Macroeconomic instability and saving rate	Positive	ECM	Period of 1988-2000
	Public investment, nominal exchange rate, corruption perception index, infrastructure	Negative		
Imtiaz & Qayyum (2008) in Pakistan	Macroeconomic stability	Positive	ECM	Period of 1972 - of 2005
	Public consumption expenditure, the changes in interest rate	Negative		
Acosta & Loza (2005)	Trade liberalization statistically of	Negative	Cointegration	Period of

in Argentina	international		(long-term)	1970-2000
	Real GDP and credit to private sector - effect	Positive and Significant		
	Public investment, exchange rate and inflation	Negative	ECM	
	Real GDP, credit to the private sector and foreign debt	Positive and Significant		
Lesotlho (2006) in Bostwana	Public investment (short-term)	Negative	Johansen analysis, cointegration and ECM methods	Period of 1976 - 2003
	Credit to the private sector, real interest rate & exchange rate (short-term)	Positive		
	Public investment (long-term).	Negative		
	GDP growth, credit to the private sector, inflation, interest rates and real exchange rate (long-term).	Positive		
Parenta (2008) in Indonesia	Government consumption expenditure	Significant and Positive	CES method	Period of 1980 - 2002
	Government investment	Insignificant		
Frimpong & Marbuah (2010) in Ghana	Real GDP, the availability of credit, inflation, exchange rates, and international trade	Significant and Positive	OLS analysis methods and ADRL	Period of 1970 -2002
	Government investment	Positive but Insignificant		
	Foreign debt and interest rate.	Negative		
Dewata & Swara (2013) in Indonesia	Total exports	Positive	OLS models	Period of 1990 - 2012
	LIBOR (international interest rate)	No Effect		
	Labor costs	Negative		
Author/Year/ Country	**Findings (Independent variables)**	**Sig. (effect)**	**Methods**	**Range of Data Collection**
Adugna (2013) in Ethiopia	Public investment, real GDP per capita, inflation, international trade, corporate tax, external debt.	Positive	ECM model	Period of 1981 - 2010
	Interest rate and exchange rate	Negative		
Naa-Idar, Ayentimi & Frimpong (2012) in Ghana	GDP, investment, inflation, external debt, exchange rate (short-term)	Positive	ECM	Period of 1960-2010
	Public investment (short-term)	Negative		
	GDP, public investment, the amount of credit and inflation (long-term)	Positive		
	External debt and exchange rate (long-term)	Negative		

3. Methodology

3.1. Data

The data used in this study are the secondary data with the time period of 1980-2011. There are 9 variables deployed to estimate the model of factors that affects the private investment in North Sumatra. Moreover, the data were collected from the Central Statistics Agency (BPS) of North Sumatra, Board of Investment and Promotion of North Sumatra, North Sumatra Financial Statistics Report and Bank Indonesia.

3.2. Specification of Model

In explaining the determinants of the private investment models, the previous theories and empirical studies were reviewed. The model is as follows:

$$PrI = f\ (PDRB, GvI, R, ExR, CrI, INF, LIBOR, CRS,)\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Where:

PrI is a private investment, PDRB (GDP) is Gross Regional Domestic Product depicting economic growth, GvI is a public (government) investment, R is the rate of investment credit, ExR is the exchange rate, CrI is a private investment credit, INF is the inflation rate, LIBOR (London Interbank Offered) as the international interest rate, CRS is the economic crisis that is created as a dummy variable (D), where D = 1 is the year 1997 to 2003 (the economic crisis) and D = 0 is the year 1980 - 1996 and the year 2004 to 2011 (not the economic crisis).

Error Correction Model (ECM)

The error correction model (ECM) is often regarded as one of the dynamic models which have been widely applied in empirical studies because of the capabilities of the ECM that covered more variables in the analysis of the economic phenomena both in short and long-terms, as well as to assess whether or not the ECM is consistent with the empirical models of the economic theory. In short-term, the relationship of a particular variable may experience disequilibrium problem; while in the long run, the relationships of these variables are sustainable. The appearance of this distinction needs to be corrected with some adjustments. Further ECM models are used in the search for solutions to the issue of time series variables that are not stationary or which has spurious regression/correlation in the econometric analysis. Related to this, the ECM models incorporate an adjustment coefficient to correct the short-term model. Thus, the equation is formulated as follows:

Long-term Equation/Cointegration:

$$PrI_t = \beta_0 + \beta_1 PDRB_t + \beta_2 GvI_t + \beta_3 R_t + \beta_4 ExR_t + \beta_5 CrI_t + \beta_6 INF_t + \beta_7 LIBOR_t + \beta_8 CRS_t + e_t$$

Short-term Equation:

$$\Delta PrI_t = \beta_0 + \beta_1 \Delta PDRB_t + \beta_2 \Delta GvI_t + \beta_3 \Delta R_t + \beta_4 \Delta ExR_t + \beta_5 \Delta CrI_t + \beta_6 \Delta INF_t + \beta_7 \Delta LIBOR_t + \beta_8 \Delta CRS_t + \beta_9 EC_t + e_t$$

where:

PrI = Private Investment CrI = Investment Credits

PDRB/GDP = Gross Domestic Product INF = Inflation

GvI = Government Investment LIBOR = International Interes Rate

R = Interest Rate CrS = Economic Crisis

ExR = Exchange Rate e_t = *error term*

3.3. A Priority Assumptions

There are priority assumptions that are made in this study, namely:

a. Gross Domestic Product (PDRB/GDP) affect positively on private investment in North Sumatra (β1> 0)

b. Government investment (GvI) affect positively on private investment in North Sumatra (B2> 0)

c. Interest rates (R) affect negatively on private investment in North Sumatra (β3 <0)

d. The exchange rate (ExR) affect negatively on private investment in North Sumatra (β4 <0)

e. Credit Investment (CrI) affect positively on private investment in North Sumatra (β5> 0)

f. Inflation (INF) affect negatively on private investment in North Sumatra (β6 <0)

g. International interest rate (LIBOR) affect negatively on private investment in North Sumatra (β7 <0)

h. Economic crisis (CRS) affect negatively on private investment in North Sumatra (β8 <0)

4. Findings and Discussion

4.1. Test Unit Roots

The stationarity is an important requirement as the starting step in the estimation equation regression models with time series data. If the data series is not stationary, it will generate a spurious regression. The data stationarity test procedure is usually done by using the Augmented Dickey-Fuller test (ADF), Phillips-Perron (PP). Meanwhile, the degree of the integration testing is done before the data can be confirmed to have been stationary at the same degree, either in the first or second difference. The results of the unit root test at the degree level are established as follows:

Table 1. The Results of Unit Roots Test on Grade Level

ADF-Stat (Absolute Value)	Sign	CV 1% (Absolute Value)	CV 5% (Absolute Value)	CV 10% (Absolute Value)	Remarks
Variable PrI					
-5.238896	>	-4.284580	-3.562882	-3.215267	Stationary
Variable PDRB/GDP					
-4.186952	>	-4.339330	-3.587527	-3.229230	Stationary
Variable GvI					
-2.051802	<	-4.284580	-3.562882	-3.215267	Not Stationary
Variable R					
-3.365834	<	-4.284580	-3.562882	-3.215267	Not Stationary
Variable ExR					
-4.391744	>	-4.284580	-3.562882	-3.215267	Stationary
Variable CrI					
-1.373217	<	-4.284580	-3.562882	-3.215267	Not Stationary
Variable INF					
-6.509509	>	-4.284580	-3.562882	-3.215267	Stationary
Variable LIBOR					
-4.305883	>	-4.296729	-3,568379	-3.218382	Stationary
Variable CRS					
-1.595483	<	-4.284580	-3.562882	-3.215267	Not Stationary

Based on the above results, there are some variables that are not stationary at a certain level. Therefore, to conduct the ECM regression, it necessitates the differentiation process to be performed on the data, so that the data are stationary at the same degree. With the same procedure as the steps done above, the test results on the unit root on the first degree of difference are illustrated in the table below:

Table 2. Test Result of Unit roots in the First Degree of Difference

ADF-Stat (Absolute Value)	Sign	CV 1% (Absolute Value)	CV 5% (Absolute Value)	CV 10% (Absolute Value)	Remarks
Variable PrI					
-5.317119	>	-4.339330	-3.587527	-3.229230	Stationary
Variable PDRB					
-5.113265	>	-4.296729	-3.568379	-3.218382	Stationary
Variable GvI					
-6.066728	>	-4.296729	-3.568379	-3.218382	Stationary
Variable R					
-6.211307	>	-4.309824	-3.574244	-3.221728	Stationary
Variable ExR					
-7.201201	>	-4.309824	-3.574244	-3.221728	Stationary
Variable CrI					
-2.993098	>	-3.670170	-2.963972	-2.621007	Stationary
Variable INF					
-12.26044	>	-4.296729	-3.568379	-3.218382	Stationary
Variable LIBOR					
-5.621617	>	-4.296729	-3.568379	-3.218382	Stationary
Variable CRS					
-5.253739	>	-4.296729	-3.568379	-3.218382	Stationary

The results of the unit root test on the first-degree show that all the data are stationary on the same degree.

4.2. Granger Causality

The Granger test shows the two-way relationship, known as the concept of causality. If there is causality in the economic behavior, the econometric model thus, has no independent variables or all variables are dependent variables. In this study, there are couples of variables that are observed to be tested by the Granger causality method, namely; PrI and GDP, PrI and GvI, PrI and R, PrI and ExR, PrI and CrI, PrI and INF, PrI and LIBOR, and PrI and CRS. The Granger model test in this study is the causality with lag-2. Below is the table of Granger test results:

Table 3. Results of Granger Causality Test

Null Hypothesis	F-Statistics Value	Prob.
PrI is not Granger caused by PDRB	1.91136	0.1689
PDRB is not Granger caused by PrI	0.00462	0.9954
PrI is not Granger caused by GvI	4.26641	0.0255**
GvI is not Granger caused by PrI	0.12576	0.8824
PrIis not Granger caused by R	3.89812	0.0336**
R is not Granger caused by PrI	0.18361	0.8334
PrI is not Granger caused by ExR	3.89812	0.0336**
ExR is not Granger caused by PrI	0.18361	0.8334
PrI is not Granger caused by CrI	0.17242	0.8426
CrI is not Granger caused by PrI	1.43136	0.2579
PrI is not Granger caused by INF	0.21970	0.8043
INF is not Granger caused by PrI	2.64969	0.0904
PrI is not Granger caused by LIBOR	0.10298	0.9025
LIBOR is not Granger caused by PrI	0.06411	0.9381
PrIis not Granger caused by CRS	0.24298	0.7861
CRS is not Granger caused by PrI	0.95276	0.3992

Note: *** *Significant at 1 persent; ** Significant at 5 persent*

Table 3 is the result of the Granger causality test between private investment with variables assumed to have a causal relationship. The variables are; economic growth, government investment, interest rates, exchange rates, investment, inflation, international interest rates, and economic crisis with private investment. As illustrated in the table above, it appears that variables of PrI affect GvI at $\alpha = 5\%$, PrI affects R at $\alpha = 5\%$, and PrI affects ExR at $\alpha = 5\%$. From this test, it is concluded that there is no two-direction causality between PrI and GDP, PrI and GvI, PrI and R, PrI and ExR, PrI and CrI, PrI and INF, PrI and LIBOR, and PrI and CRS, that have occured on lag-2.

4.3. Cointegration Test

The cointegration test is performed to determine whether or not there is a long-term relationship between the variables. In this case, the test is done by using the residual-based method. The result of the unit root test on the residuals with the ADF test is as follows:

Table 4. Results of Unit Roots Test on the Residual

ADF-Stat (Absolute Value)	Sign	CV 1% (Absolute Value)	CV 5% (Absolute Value)	CV 10% (Absolute Value)	Remarks
Variable RESID01					
-6.000179	>	-4.284580	-3.562882	-3.215267	Stationary

Based on stationary tests in the table above, it is found that the residual in the long-term equation is stationary at the degree level because the ADF statistic has an absolute greater than the critical value at 1%, 5% and 10%. This indicates that the residuals do not contain the

roots unit. Furthermore, the condition becomes a prerequisite for modeling the ECM has been fulfilled.

4.4. Long-term Relationship

The results of estimating the regression of the long-term relationship is to estimate the factors which influence the private investments (domestic and foreign) in the North Sumatra province in the year of 1980 to the year 2011.

Table 5. Estimation Results of Long Term Relationship

Variable	Regression Coefficient	Standard Error	t-statistics	Prob.
C	1100.959	1505.226	0.731424	0.4719
PDRB	0.057447	0.011342	5.065090	0.0000***
GvI	-1.027886	0.270517	-3.799716	0.0009***
R	-237.1807	49.68717	-4.773479	0.0001***
ExR	0.449956	0.083532	5.386645	0.0000***
CrI	0.113540	0.022806	4.978516	0.0000***
INF	-178.0482	41.54899	-4.285259	0.0003***
LIBOR	-18.06276	78.88605	-0.228973	0.8209
CRS	-1364.662	511.4329	-2.668311	0.0137**
R^2 = 0,826008				
Adjusted R^2 = 0,765490				
F-statistic = 13,64878				
Prob (F-statistic) = 0,000000				
Independent Variable : PrI				

Note: **** Significant at 1 persent; ** Significant at 5 persent; *Significant at 10 persent*

Based on Table 5, it can be seen that the long-term economic growth (GDP) has a significant and positive effect on the level of 1% to the growth of private investment in North Sumatera. The coefficient of the GDP is 0.0574, which means that the economic growth of 1% is able to spur the private investors to increase its investment by 0.0574%, thus the hypothesis ($\beta 2 > 0$) is accepted. The results reflect that this province can be considered as an investment destination by private investors, both domestic and foreign investors. These results are supported by empirical researches by Valila & Mehrotra (2005), Acosta & Roza (2005), Lesotlho (2006), Khan & Khan (2007), Imtiaz & Qayyum (2008) which stated that the GDP positively affects the private investment.

Morever, the government investment variable (GvI) has a significant negative effect on the level of 1% of the private investment. Government investment (GvI) is equal to -1.027886 and this indicates that the increase in government investment results in a decrease in the private investment (PrI) or the crowding - out between government investment with private investment, thus the hypothesis ($\beta 2 > 0$) is not accepted. This indicates that an increase in government investment through the availability of facilities and infrastructure hasnot been able to encourage the increase in the private investment in North Sumatra. The fact shows that the availability of the infrastructure, particularly roads and electricity in North Sumatra is very

limited and quite alarming that it does not act as an incentive for investors to invest. In addition, many production activities that should be conducted privately are done by the government, so that the government investment has shiftedthe opportunity of private investment. Previous researches support this result, namely by Lesotlho (2006), Jongwanich and Kohpaiboon (2006), Imtiaz & Qayyum (2008), Majeed & Khan (2008), whofound that the long-term government investment which negatively affects private investment is acceptable.

This study also proves that the interest rate (R) has a significant and negative effect on the level of 1% of the private investment. The coefficient of the interest rate (R) is -237.1807 which indicates that the rise in the interest rates causes a decline in private investment, thus the hypothesis ($\beta 3 < 0$) is accepted. The results of this study are inaccordance with the theory that statedthat the interest rate is negatively related to investment. Moreover, this result is consistent with past studies done by Chhiber & Winjbergen (1988), Carruth et al. (1998), Dehn (2000), Seruvatu and Jayaraman (2001), Agrawal (2001), Suwarsih (2004), Valila & Mehrotra (2005), Lesotlho (2006), Khan & Khan (2007), Setyari et al. (2008), Tantiasi (2008) and Majeed & Khan (2008), where they statedthat the interest rate has a negative effect on private investment. Meanwhile, according to Pohan (2008) the high interest rates benefit the depositors because they areable to increase people's desire to gain greater benefits from savings. However, on the other hand, high interest rates will increase the costs to be incurred in the businesses, especially for those businesses that receive the financial credits from banks, resulting in a decrease in the production and investment activities.

The exchange rate variable (ExR) has a significant and positive effect on the level of 1% of the private investment in North Sumatra with the coefficient of the exchange rate (ExR) of 0.4499, thus the hypothesis ($\beta 4 < 0$) is not accepted. This result means that the increase in the exchange rate causes an increase in the private investment. Related empirical researches are done by Agrawal (2001), Seruvatu and Jayaraman (2001), Lesotlho (2006), Jongwanich & Kohpaiboon (2006), Parenta (2008), Suhendra (2009), and Frimpong & Marbuah (2010) stating that the increase in the exchange rate has positive effect on private investment. This positive influence has several meanings, namely to foreign investors on the depreciation of the exchange rate of dollar againts Rupiah. For foreign investors whose input is derived from the domestic market, they will get it at low prices, thus the cost of production becomes cheaper, thereby this would encourage more foreign investment. Meanwhile, for domestic investors, they would receive the inputs from domestic's raw material but producing for export market. From the trading point of view, the lower exchange rate may lead to an increase in export products, so that the revenue of investors from overseas markets will be increased. However, for investors who obtained the imported raw materials and capital goods, this would be a burden. According to Krugman and Obstfeld (2001), depreciation tends to affect the terms of trade, whereby the exchange rate depreciation stimulates exports' products and import substitution.

The investment credits (CrI) havea significant and positive effect on the level of 1% of private investment. The coefficient of investment credit is 0.1135, meaningthat the availability of the investment financing in the form of investment loans has a positive effect in encouraging private investment, thus the hypothesis ($\beta 5 > 0$) is accepted. The results of this study are supported by past researches done by Chhiber and Wijbergen (1988), Dehn (2000), Seruvatu

and Jayaraman (2001), Ribeiro and Teixeira (2001), Ouattara (2004), Acosta and Roza (2005), Lesotlho (2006), Jongwanich & Kohpaiboon (2006), Khan and Khan (2007), Majeed & Khan (2008), and Suhendra (2009) where they concluded that the investment credit has a positive effect on private investment. Ouattara (2004) stated that private investment in a country will increase if there is availability of adequate funding and that role is performed by the banking sector with the provision of credit investment facilities for the investors.

The inflation (INF) has a negative and significant effect on private investment. The coefficient for the inflation variable is -178.0482, implyingthat higher inflation would reduce investment, thus the hypothesis $\beta 6 < 0$ is accepted. This finding is consistent with the results of empirical studies by Seruvatu and Jayaraman (2001), Ribeiro and Teixeia (2001), Roberts (2003), Acosta & Roza (2005), Lesotlho (2006), Jogwanich & Kopaiboon (2006), Setyari et. al. (2008), and Suhendra (2009) whereby the inflation has adverse effects on the development of private investment. Many economists argue that high inflation tends to negatively affect the investment. Additionally, as noted by Lesotlho (2006) inflation causes the decreased real income of the population who hasfixed income, where the consumption will decrease and the stock of goods which isnot sold is increased, which in turn encourages manufacturers to reduce the production by reducing the production capacity.

The international interest rate variable (LIBOR) has a negative and insignificant effect to private investment, thus the hypothesis ($\beta 7 < 0$) is not accepted. This study is in line with the researches done by Afrizal (2010) and Dewata & Swara (2013), Kholis (2002) and Sunike (2006) where they mentioned that the interest rates negatively affect the private investment. The international interest rates are unsupported on private investment because the investors prefer to select other interest rates that can be used as guidelines in conducting the investment activities. Meanwhile, the economic crisis (CRS) has a negative effect on private investment, thus the hypothesis $\beta 1 < 0$ is accepted. It has occured and hit the Indonesianeconomy including North Sumatra province in the period of 1997 - 2003 which madethe political situation unstable. This situation resulted in a decrease in confidence among domestic and foreign investors to invest in this province. Previous researches done by Heliati (2007) found that the economic crisis negatively affects the private investment in 7 districts in West Java.

4.5. Short-term Relationship

The results of the regression analysis of the short-term relationship is to estimate the factors that influence the private investment (domestic and foreign) in the North Sumatra province in the period of 1980 to 2011.

Table 6. Estimation Results of Short-Term Relationship

Variable	Regression Coefficient	Standard Error	t-statistics	Prob.
C	-83.55709	151.5314	-0.551418	0.5872
D(PDRB)	0.080643	0.015900	5.071963	0.0001***
D(GvI)	-1.115451	0.328904	-3.391416	0.0028***
D(R)	-245.3831	39.07880	-6.279187	0.0000***
D(ExR)	0.410646	0.056205	7.306232	0.0000***
D(CrI)	0.103136	0.019443	5.304679	0.0000***
D(INF)	-148.3759	25.73529	-5.765464	0.0000***
D(LIBOR)	-121.5956	89.79660	-1.354122	0.1901
D(CRS)	-1729.661	625.4908	-2.765287	0.0116**
ECt-1	-1.075874	0.229844	-4.680895	0.0001***
R^2 = 0,928300				
Adjusted R^2 = 0,897572				
F-statistic = 30,20978				
Prob (F-statistic) = 0,000000				
Independent Variable: D(PrI)				

Note: **** Significant at 1 persent; ** Significant at 5 persent; *Significant at 10 persent*

The empirical results for the short-term relationships showthat the error coefficient term (ECTt-1) is negative and significant statistically at $\alpha = 0.00$. The research indicates that the validity ofthe balance of the relationship between the cointegrated variables in the equation is valid. In the short-term, the economic growth has a significant and positive effect on private investment in North Sumatra with a regression coefficient of 0.080643. The results indicate that the increase in the GDP will increase the private investment, and viceversa. Meanwhile, the government investment (GvI) has a negative and significant effect on the private investment with a regression coefficient of -1.115451. It indicates that an increase in the government investment on infrastructure has unsupported the growth of private investment, thus the government investment negatively affects the private investment in North Sumatra.

Moreover, the interest rate (R) has a negative and significant effect on the private investment with the regression coefficient of -245.3831. It means that if the interest rate increases, then the private investment will decrease. This finding is aligned with the investment theory by Keynes where the increase in the interest rates would lead to the decrease in the investment spending because of the desire to invest is reduced, and viceversa. Meanwhile, the exchange rate has a positive and significant effect on private investment with the regression coefficient of 0.410646. The positive direction of the influence implies that an increase in the exchange rate (depreciation) can lead to an increase in the private investment, and viceversa.

Furthermore, the investment credit has a significant and positive effect on private investment with the regression coefficient of 0.103136. According to Dehn (2000), there is a relationship between the availability of credit financing for investment with the growth of investment and economic growth. Empirical results by Seruvatu & Jayaraman (2001) explained that the increase in the credit financing of investment has encouraged the investors to invest.

Meanwhile, the inflation variable has a negative and significant effect on private investment with a regression coefficient of -148.3759. This means that the rise in prices leads to the increase of the costs greater than the increase in revenue, thus the company will reduce its investment. In this case, a reduction in businesses' profit margins hasoccured, hence the production and investment will be cut.

The international interest rates have a negative and significant effect on private investment with regression coefficient of -121.5956. This means that the increase in LIBOR will reduce the amount of capital inflows. Meanwhile, the economic crisis has a negative and significant effect on private investment with a regression coefficient of - 1729.661. This means that during the economic crisis, the unpredictive changes in North Sumatra's economy have occured and made the situation worse than before the crisis. In addition, the economic crisis had caused a decline in investors' confidence to invest. Finally, the ECT_{t-1} value of -1.075874 means that the model in short term is under the long-term equilibrium, thus the process of equilibrium adjustment in short-term moves towards the long-term equilibrium into the top.

5. Conclusion and Recommendation

Based on the above analysis, a few conclusions have been derived as follows:

1. Long-Term Relationship

a. The variable of economic growth affects the private investment in North Sumatera positively and significantly . It means that if economic growth increases, the private investment will increase, and vice versa.

b. The variable of Government investment affects the private investment significantly, but it has a negative relationship. It means that if the government investment increases, the private investment will decrease, and vice versa.

c. The variable of interest rates affectstheprivate investment significantly, but it has a negative relationship. This means that if the interest rate increases, the private investment will decrease, and vice versa.

d. The variable of exchange rate has a positive direction towards private investment in North Sumatra. This means that if the exchange rate increases, the private investment will increase, and vice versa.

e. The variable of the investment credit has a significant and positive effect on private investment. This means that if the investment credit increases, the private investment will increase, and vice versa.

f. The variable of inflation has a negative influence on private investment. This means that if inflation increases, the private investment will decrease, and vice versa.

g. The variable of international interest rate has no effect on private investment in North Sumatra. This means that the presence or absence of the international fixed interest rate will not affect the development of private investment.

h. The variable of economic crisis has negative effect on private investment in North Sumatra. This means that the economic crisis is occured, the private investment will decrease, and vice versa.

2. Short-Term Relationship

a. The variable of the GDP has a positive and significant effect on the growth of private investment in North Sumatra. This means that if the GDP increases, the private investment will also increase, and vice versa.

b. The variable of Government investment has a significant and negative effect on private investment. This means that if the government investment increases, the private investment will decrease, and vice versa.

c. The variable of interest rates has a significant and negative effect on private investment. This means that if the interest rate increases, the private investment will decrease, and vice versa.

d. The variable of exchange rate has a positive direction towards private investment in North Sumatra. This means that if the exchange rate increases, the private investment will increase, and vice versa.

e. The variable of investment credit has a significant and positive effect on private investment. This means that if the investment credit increases, the private investment will increase, and vice versa.

f. The variable of inflation has a negative influence on private investment. This means that if inflation increases, the private investment will decrease, and vice versa.

g. The variable of international interest rate has a negative effect on private investment in North Sumatra. This means that if the international interest rate increases, the private investment will decrease, and vice versa.

h. The variable economic crisis has a negative effect on private investment in North Sumatra. This means that when the economic crisis happens, then private investment will decrease, and vice versa.

Referring to the results of this study, some of the recommended policy strategies need to be considered in order to boost private investment in North Sumatra such as; (i) the North Sumatra government should initiate a real effort to empower as well as encourage private investors in dealing with the economic sector efficiently and professionally, which also reduces government's role in the production activities. Therefore, the government needs to create policies and regulations maturely which will make the investors more passionate, while the legislative bodies are able to control the implementation; (ii) through expansive fiscal policy, the government of North Sumatra should allocate development funds for infrastructure especially roads, electricity and other public facilities that act as an incentive for private investors to invest in North Sumatra; and (iii) through the government's monetary policy, it is

expected to maintain price stability and adequate interest rate so as to encourage the investors to invest.

References

Acosta, P., & Loza, A. (2005). Short and Long Run Determinants of Private Investment in Argentina. *Journal of Applied Economics, 2*(8), 389-406.

Adugna H. (2013). Determinants of Private Investment In Ethiopia. *Journal of Economics and Sustainable Development*, *4*(20).

Afrizal. (2010). Analisis Investasi di Indonesia Suatu Pendekatan Model Dinamik. *Jurnal Ekonomi, Bisnis dan Kewirausahaan*, *1*(1).

Agrawal, P. (2001). Interest Rates and Investment Levels: An Empirical Evaluation of McKinnon, Stiglitz, and Neo-Structaralist Hypotheses. *Journal of Economic, 1*(10), 1-29.

Alkhatib, H.B., Altaleb, G.S., & Alokor, S.M. (2011). Economical Determinants of Domestic Investment, *European Scientific Journal*, *8*(7).

Bakare, A.S. (2011). The Determinants of Private Domestic Investment In Nigeria. *Far East Journal of Psychology and Business*, *4*(2).

Carruth, A., Andrew D., & Andrew, H. (1997). Econometric Modelling of UK Aggregate Investment: The Role of Profits and Uncertainty. *NBER Working Papers Series Number 6950.*

Chhibber, A., & Wijnbergen, S.V. (1988). Public Policy and Private Investment in Turkey. *PPR Working Papers 120, 1-29.*

Dehn, J. (2000). Private Investment in Developing Countries: The Effects of Commodity Shocks and Uncertainty. *WPS/2000.*

Dewata, B.K. & Swara, W.Y. (2013). Pengaruh Total Ekspor, LIBOR dan Upah Tenaga kerja Terhadap Investasi Asing Langsung di Indonesia. E-Jurnal Ekonomi Pembangunan Universitas Udayana, *2*(8).

Frimpong, J.M.G., & Marbuah. (2010). The Determinants of Private Sector Investment in Ghana: An ARDL Approach. *European Journal of Social Science*, *15*(2).

Heliati, R. (2007). Determinants of Foreign Direct Investment and Its Effect on Economic Growth in 7 (Seven) District of West Java During 1993-2004. Disertasi, Program Pasca Sarjana Universitas Padjadjaran, Bandung.

Imtias, A., & Qayyum, A. (2008). Effect of Government Spending and Macro-Economic Uncertainty on Private Investment in Services Sector: Evidence from Pakistan. *European Journal of Economics, Finance and Administrative Sciences*, *11*.

Jayaraman, T.K., & Singh, B. (2007). Foreign Direct Investment and Employment Creation in Pacific Island Countries: An empirical study of Fiji. *Working Paper Series.* No. 35, 33-65.

Jongwanich, J., & Kohpaiboon, A. (2006). Private Investment: Trends and Determinants in Thailand. *Journal of Economics*, *9*(70), 1- 29.

Khan, S., & Khan, M.A. (2007). What Determines Private Investment? The Case of-Pakistan. *PIDE Working Papers, 36*.

Kholis, M. (2002). Aliran Investasi Asing Langsung (FDI) ke Indonesia. Thesis, Program Pasca Sarjana Universitas Diponegoro, Semarang.

Krugman, P.R., & Obsfeld, M. (2001). The International Economic, Theory and Policy. Addison-Wesley Publishing Company.

Lesotlho, P. (2006). An Investigation of the Determinants of Private Investment: The Case of Botswana. *Policy Research Working Paper No. 2123.*

Majeed, M.T., & Khan, S. (2008). The Determinants of Private Investment and Relationship between Public and Private Investment in Pakistan, Minich Personal RePEc Archive (MPRA), Quaid-i-Azam Univercity, *MPRA Paper No.49301, 17:18 UTC.*

Naa-Idar Ayentimi, F.D.T., & Frimpong, J.M. (2012). A Time Series Analysis of Determinants of Private Investment in Ghana. *Journal of Economics and Sustainable Development,* 3(13).

Ouattara, B. (2004). Modelling the Long Run Determinants of Private Investment in Senegal. *CREDIT Research Paper No. 04/05.*

Parenta, T. (2008). Pengaruh pengeluaran konsumsi Pemerintah dan Variabel Lainnya Terhadap pengeluaran Investasi Swasta di Indonesia, Analisis, *5*(2), 129 -138.

Pohan A. (2008). Potret Kebijakan Moneter Indonesia. Jakarta: PT Raja Grafindo Persada.

Ribeiro, M. B., & Teixeira, J.R. (2001). An Econometric Analysis of Private Sector Investment in Brazil. *CEPAL Review, 74.*

Roberts, M. J. (2003). Modeling Aggregate Investment: A Fundamentalist Approach. *Journal of Economic,* 9(22).

Record, R., & Davies, S. (2007). Determinants and Impact of Private Sector Investment in Malawi: Evidence from the 2006 Investment Climate Survey. March 2007. *Papers of Centre for the Study of African Economies (CSAE) Conference on Economic Development in Africa at St. Catherine 's College. Oxford: UK: 1920*.

Seruvatu, E., & Jayaraman, T.K. (2001). Determinants of Private Investment in Fiji. *Working Paper 2001/02*.

Setyari, N. P. W., Purwanti, M., & Widata. (2008). Determinan Investasi di Indonesia. *Buletin Studi Ekonomi*. Jurusan Ilmu Ekonomi. Fakultas Ekonomi. Universitas Udayana. Denpasar. *13*(2), 159-171.

Suhendra, I. (2009). Faktor Penentu Investasi Swasta dan Pengaruhnya Terhadap Pertumbuhan Ekonomi, Kesempatan Kerja dan Distribusi Pendapatan di Indonesia, Disertasi. Fakultas Ekonomi Universitas Padjadjaran, Bandung.

Sunike, S. (2006). Determinan Perilaku Investasi Swasta di Propinsi Jawa Tengah. Tesis, Program Pasca Sarjana Universitas Diponegoro, Semarang.

Suwarsih, S. (2004). Faktor-faktor yang Mempengaruhi Investasi Swasta di Indonesia. *Jurnal Ekonomi Pembangunan, 10*(2).

Tantiasti, D. (2008). Analisis Faktor-faktor yang mempengaruhi Investasi Swasta di Indonesia. *Buletin Studi Ekonomi Indonesi, 45*(3).

Valila, T., & Mehrotra, A. (2005). Evolution and Determinants of Public Investment in Europe. *Economic and Financial Report 2005/01*.