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Exchange rate Uncertainty and Investment In Some of Middle East and North African Countries

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This paper examines the relationship between uncertainty of exchange rate and domestic investment by using the fixed effect approach of panel data model. The results of the theoretical part show that there is a nonlinear relationship between these two variables (uncertainty of exchange rate and investment). By using GARCH(1,1) approach, we obtained the uncertainty of exchange rate for every six countries. The results of the estimation show that there is a negative relation between uncertainty of exchange rate and domestic investment and the investments of these countries suffer from lag of uncertainty of exchange rate too.

JEL Codes: G1, G3, O16, O55

1. Introduction

The most of key macroeconomic variables such as inflation, interest rate, exchange rate and return rate in stock market are faced on changes over times. Some of these changes are unpredictable in which they are called uncertainty. Uncertainty of exchange rate is one of the many factors can influence on macroeconomic variables and makes an uncertain environment for financial markets. This can make adverse conditions for countries which have undeveloped financial systems. Some of these countries are developing countries that are in the different income groups. Investment is a very important factor whereby can be really effective in every country's income. Because of the importance of investment, many research have been done to identify the factors which can effect on investment and how, in the recent decades, especially in developing countries. Exchange rate uncertainty can impact on investment through different channels. Amadou (2007) classified the common results of the research which have been concentrated on internal adjustment costs in three groups. First, exchange rate can affect investment through the price of goods in which are sold in domestic or export markets. Depreciation of the currency is caused to decrease the price of domestic goods and they will be cheaper than imported goods. So the demand of these goods will increase. On the other hand, exports increase and make profits for investors. Thus, investor respond to this demand by increasing the capital and consequently, labor. Second, depreciation of the currency is caused to decrease the marginal profitability by increasing the total costs of production, but it depends on the share of imported inputs into production. So this factor is important for countries which rely heavily on imports. Third, the results in which show that exchange rate can influence on investment through the price of imported investment via adjustment cost whereby depreciation of the currency causes an increase of investment price, so adjustment costs increase and investment will decrease.

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The most of the research which have been done in the field of investment have relied on the conventional investment theory that was established by Jorgenson (1963) and Tobin (1969). Jorgenson (1963) established the cost of capital view in which suggests that the desired stock of capital is found by equating the marginal product and the user cost. Tobin (1969) suggested the q ratio in which focuses on the value of the marginal unit of capital relative to its replacement cost.

Hartman (1972) and Abel (1983) developed the traditional investment theory by including the impact of uncertainty on investment. they had some assumptions such as investors are risk neutral, to be constant returns relative to scale, marginal profitability is a convex function of output prices and finally, output price is the factor of uncertainty. They suggest that based on Jensen's inequality, any increase in price uncertainty raises the expected profitability of capital, so increases the desired capital stock and thus investment.

On the one hand, the empirical failure of these traditional views of investment and on the other hand, the lack of realism in some of their foundations, especially in the assumption of convex adjustment costs, have led to emerge of new view of investment in which was established by Dixit and Pindyck (1994). They emphasized that there are three important features in this view. First, irreversibility is an unavoidable factor for a part or complete form of most fixed capital investments. Second, investors have to face uncertainty about their future income. Third, there is a possible for timing in investment decisions for investors to get more information about future. They found that these features make investment adjustment cost asymmetric whereby the adjustment is larger for downward than for its upward. Under such conditions, the profitability threshold increases with the extent of uncertainty. If this effect is more than expected profitability stemming from the convexity of the profit function is led to reduce investment.

Demir (2009) states that uncertainty of financial factors have remained in developing world, as caused to increase sensitivity of domestic variables to change in the international markets. Demir (2009) suggests that despite the existence of many theoretical research about the effect of uncertainty on investment, but there is no agreement about the channels which can influence on this relationship.

There are some questions in which are tried to answer in this paper. First, can volatility especially based on exchange rate, decrease domestic investment in the Middle East and North African countries in which have many sources of oil? Second, are their income changes an effective factor on the relation between exchange rate uncertainty and investment? The remaining of this paper includes some sections. Theoretical part and literature review in which based on Amadou (2007) is in the next section. Methodology and explanation about the variables used in the model is shown in third section. This section is divided in some sub sections in which includes how the exchange rate uncertainty is calculated, the kinds of unit root tests and explains about the estimation method. Empirical results and finally interpretation relative to empirical results and conclusion are in the fourth and fifth section, respectively. As like as the other research, the positive or negative impact or even to be ineffective exchange rate uncertainty on investment will be tested but some extra control variables are in the model of this study which can be useful to find the relationship between exchange rate uncertainty and investment, indeed this is the different aspect of this study compared with the others. The selected countries are Algeria, Egypt, Iran, Morocco, Syrian Arab Republic and Tunisia which are classified in the lower middle income group by WDI (World Development Indicators).

2. Theoretical Frame and Literature Review

As we noted before, this section is based on Amadou (2007) which is started with neoclassical functional form that the production technology is a function of capital goods. It is considered that the investors maximize their present value of future profit by choosing their investment level. In this function Y is the production function and K is the capital goods index.

$$Y = F(K) \tag{2.1}$$

Capital goods are homogenous but can be produced domestically or imported from abroad. The change in the firm's capital stock is given by

$$\dot{K} = I - \delta K \tag{2.2}$$

Where δ is the rate of depreciation of capital goods. The cost of each unit of investment is 1 plus an adjustment cost.

$$C(I) = I(1 + \emptyset\left(\frac{I}{K}\right)) \tag{2.3}$$

The price of each unit of capital goods, in real term is $(r+\delta)^{\theta}(\epsilon\frac{p_{mk}}{p^{\cdot}})^{1-\theta}$. Where r is the real interest rate, ϵ the real exchange rate, p_{mk} the nominal price of imported capital goods, $p^{\cdot}$ the foreign price index and θ a weighting factor. As $0 < \theta < 1$, the price of capital is a geometric mean of domestic price of capitals, $r + \delta$, and foreign price of capital expressed in real terms, $\epsilon\frac{p_{mk}}{p^{\cdot}}$. Similarly, the price of one unit of output, in real terms is $(\epsilon\frac{p_{xf}}{p^{\cdot}})^{1-\rho}$. In this expression p_{xf} is the nominal price of exported output and ρ a weighting factor which that is $0 < \rho < 1$.

So the profits in real terms are:

$$\pi = (\epsilon\frac{p_{xf}}{p^{\cdot}})^{1-\rho}F(K) - (r+\delta)^{\theta}(\epsilon\frac{p_{mk}}{p^{\cdot}})^{1-\theta}K - C(I) \tag{2.4}$$

The firms should maximize net present value of profits, that we can show it in continuously time as below:

$$V(0) = \int_0^{\infty} e^{-rt}\{\pi\}dt \tag{2.5}$$

It should be noted that equation (2.5) is maximized subject to $K(0) = K_0 > 0$ and equation (2.2). The Hamiltonian of this dynamic optimization problem, in current value is:

$$\widehat{H} = \pi + q(I - \delta K) \qquad (2.6)$$

The expression of q in (2.6) is the current value shadow price of installed capital in unit of contemporaneous output. We can get the maximum condition by derivative of Hamiltonian with respect to investment I, that is called control variable, because the firm can change it to maximize net present value of profits.

$$\widehat{H}_I = -1 - \frac{\beta I}{K} + q = 0 \qquad (2.7)$$

It should be noted that we substitute $\beta/2$ instead of ∅ in (2.3). See Amadou (2007) for more details. Equation of motion for K can be calculated as:

$$\dot{K} = \frac{\partial \widehat{H}}{\partial q} \qquad (2.8)$$

By derivative of the Hamiltonian with respect to q we can get (2.2), that is $\dot{K} = I - \delta K$. The equation of motion for q equals to derivative of Hamiltonians with respect to K:

$$\dot{q} = -\frac{\partial \widehat{H}}{\partial K} + rq$$
$$\dot{q} = -\frac{\beta I^2}{2K^2} + q(r+\delta) + (r+\delta)^{\theta}\left(\frac{\epsilon p_{mk}}{p\cdot}\right)^{1-\theta} - \left(\frac{\epsilon p_{xf}}{p\cdot}\right)^{1-\rho} F'(K) \qquad (2.9)$$

The transversality condition for the current value problem can be writing as:
$\lim_{t\to\infty}[qKe^{-rt}] = 0$

This condition is hold if q and K tend asymptotically towards constants and $r > 0$. So $\dot{K}$ and $\dot{q}$ should be zero. Form equation (2.2) and equation (2.7), we have:

$$\dot{K} = -\frac{K(1+\beta\delta - q)}{\beta}$$

For $\dot{K} = 0$, then we have:

$$q = 1 + \beta\delta \qquad (2.10)$$

For $\dot{q} = 0$ and (2.9), we can get the final relation:

$$F'(K) = \frac{\frac{2p_{mk}(r+\delta)^{\theta}\epsilon + p\cdot(2r(1+\beta\delta) + \delta(2+\beta\delta))\left(\frac{\epsilon p_{mk}}{p\cdot}\right)^{\theta}}{2p\cdot}}{\left(\frac{\epsilon p_{mk}}{p\cdot}\right)^{\theta}\left(\frac{\epsilon p_{xf}}{p\cdot}\right)^{1-\rho}} \qquad (2.11)$$

From the condition $\dot{q} = 0$ and implicit function theorem, the slop of the implicit function, $q(K)$, is:

$$\frac{dq}{dK} = \frac{\beta(\frac{\epsilon p_{xf}}{p^{\cdot}})^{1-\rho} F''(K)}{1+\beta(r+\delta)-q} \tag{2.12}$$

By the properties of the neoclassical production function, the numerator of this expression is negative. The denominator is positive if the parameters r, β and δ are real, which we suppose and $q < 1 + \beta(r + \delta)$. This last condition must hold at steady state value q, because $r > 0$. Consequently the implicit function, $q(K)$, is downward sloping. See Amadou (2007) for more details.

For the role of volatility as Campa and Goldberg (1995) following Abel and Blanchard (1992) argued that in the presence of uncertainty, investment is a function of expected per period profits and the cost of capital. In their studies exchange rate is log normally distributed with mean μ and σ^2 as the variance, the distribution of the exchange rate is exogenous to the firm. As the study of Amadou (2007), we have:

$$I = \psi\left(E\left(\pi(\mu, \sigma^2)\right)\right) = \psi(Z(\mu, \sigma^2)) \tag{2.13}$$

This relation shows that investment is function of μ and σ^2, in which they are mean and variance, respectively. We can differentiate from (2.13), which we have:

$$dI = \frac{\partial E(\pi(.))}{\partial \mu} \psi' d\mu + \frac{\partial E(\pi(.))}{\partial \sigma^2} \psi' d\sigma^2 \tag{2.14}$$

In (2.14) $Z(.)$ has been substituted by $E(\pi(.))$. Consider the production function is a Cabb Douglas function:

$$Q = F(K) = K^{\alpha} \tag{2.15}$$

So the per period profits are then:

$$\pi = (\epsilon \frac{p_{xf}}{p^{\cdot}})^{1-\rho} Q - (r + \delta)^{\theta} (\epsilon \frac{p_{mk}}{p^{\cdot}})^{1-\theta} Q^{\frac{1}{\alpha}} \tag{2.16}$$

The right hand side of the (2.16) equals the revenue minus cost. The cost function has been resulted from production function, that is:

$$C(.) = (r + \delta)^{\theta} (\epsilon \frac{p_{mk}}{p^{\cdot}})^{1-\theta} Q^{\frac{1}{\alpha}}$$

By taking expectation of profit function, we have:

$$E(\pi) = (\frac{p_{xf}}{p^{\cdot}})^{1-\rho} exp\{(1-\rho)\mu + 1/2(1-\rho)^2\sigma^2\}Q - (r+\delta)^{\theta} exp\{(1-\theta)\mu + 1/2(1-\theta)^2\sigma^2\}(\frac{p_{mk}}{p^{\cdot}})^{1-\theta} Q^{\frac{1}{\alpha}}$$

By deriving of the expectation function with respect to μ and σ^2, we have:

$$\frac{\partial E(\pi)}{\partial \mu} = (1-\rho)\exp(\Phi)(\frac{p_{xf}}{p^{\cdot}})^{1-\rho} Q - (1-\theta)\exp(\Phi^{'})(r+\delta)^{\theta}(\frac{p_{mk}}{p^{\cdot}})^{1-\theta} Q^{\frac{1}{\alpha}} \tag{2.17}$$

$$\frac{\partial E(\pi)}{\partial \sigma^2} = \frac{1}{2}(1-\rho)^2\exp(\Phi)(\frac{p_{xf}}{p^{\cdot}})^{1-\rho} Q - \frac{1}{2}(1-\theta)^2\exp(\Phi^{'})(r+\delta)^{\theta}(\frac{p_{mk}}{p^{\cdot}})^{1-\theta} Q^{\frac{1}{\alpha}} \tag{2.18}$$

The expression Φ in (2.17) and (2.18) is $(1-\rho)\mu + \frac{1}{2}(1-\rho)^2\sigma^2$ and $\Phi^{'}$ is $(1-\theta)\mu + \frac{1}{2}(1-\theta)^2\sigma^2$. In (2.18), the effects of exchange rate uncertainty on investment are ambiguous. See Amadou (2007, p5-9) for more details.

Zeira (1990) suggests that the investors who are risk averse suffer from the impact of uncertainty on their investment decisions. Overall, it makes a negative impact of uncertainty on investment. Some of researchers such as Lee and Shin (2000) have noted to a positive impact of uncertainty on investment by emphasizing the role of variable inputs and their share of output in which may be caused to increase the convexity effect and thus the investment is more likely to increase with uncertainty. Sarkar (2000) realized that there is a threshold effect in the link of investment and uncertainty in which there would be a positive relationship when the quantity of uncertainty is a little but it makes a negative relationship beyond some critical value. Goldberg (1993) and Darby (1999) by examining the impact of exchange rate uncertainty on aggregate investment in some industrialized countries found that the exchange rate uncertainty has negative impact on aggregate investment. Serven (1996) entered the factor of irreversibility of investment in the research and then found evidences in which suggest there is a negative association between investment performance and instability in some of African countries in the recent decades. Serven (2002) examined the relationship between real exchange rate volatility and investment in developing countries and found real exchange rate volatility has a strong negative impact on investment and this negative impact is significantly larger in economies that are highly open and with less developed financial systems. Campa and Goldberg (1995) realized that the exchange rate uncertainty has an ambiguous impact on profits. Campa and Goldberg (1999), Lafrance and Tessier (2001) and Harchaoui et al. (2005) fond that exchange rate and its changes are an ineffective factor to change the investment in Canada whereas more examinations by Hachaoui et al. (2005) show that there are nonlinear effects of exchange rate on investment in Canada whereby, the investment has different reactions against exchange rate volatility. Darby et al (1999) searched something that was different from others. they expanded the impact of exchange rate uncertainty on the level of investment. they stated that there are threshold effects which can be used to identify the situation of increase or decrease of investment by rising the volatility and also to identify which types of industries would gain and which would suffer from a moved to fixed exchange rates. Serven (1996) entered the factor of irreversibility of investment in the research and then found evidences in which suggest there is a negative association between investment performance and instability in some of African countries in the recent decades. Atella et al (2003) by employing a large panel of Italian firms and using a model of signal extraction found that exchange rate volatility reduces investment, with decreasing sensitivity the greater the firm market power. So any economic system can benefit from the stable exchange rate. Byrne and Davis (2005) examined the short run and long run impact of exchange rate uncertainty on investment by using the panel of some industrial countries. Amadou (2007) examined the link between real exchange rate volatility and investment by using the method of panel data cointegration and the result illustrated that there is a negative relation between real exchange rate volatility and investment in which the volatility based on real exchange rate has strong negative impact on investment in some of developing countries.

Demir (2009) analyzed the relationship between macroeconomic volatility and private investment in Argentina, Mexico and Turkey and realized that increasing macroeconomic volatility hurts fixed investment in these countries. Serven (2002) by examination of the link between real exchange rate volatility and investment in developing countries and using a large cross country time series data set has found that there is some evidence of threshold effects. The negative impact of real exchange rate uncertainty on investment is significantly larger in economies that are highly open and in those with less developed financial systems.

3. Methodology, Model and Variables

This section is divided to four sub sections. First part, includes the method of calculation of exchange rate uncertainty, second part, explains the unit root tests for panel data, briefly. Panel data models are in third part and finally, we will define the variables in the model in fourth part.

3.1 Exchange Rate Uncertainty

There are many methods for obtaining exchange rate uncertainty but more popular of them, are ARCH (Auto Regressive Conditional Heteroskedasticity) and GARCH (Generalized Auto Regressive Conditional Heteroskedasticity). In this study, we used GARCH(1,1) to obtain the uncertainty of exchange rate. The GARCH(1,1) includes two equations:

$$Y_t = X_t'\theta + \epsilon_t \qquad (3.1)$$

$$\sigma_t^2 = \omega + \alpha\epsilon_{t-1}^2 + \beta\sigma_{t-1}^2 \qquad (3.2)$$

In which first equation is called mean equation and second, is called variance equation. Actually, the second equation is variance of remained disturbances from mean equation in which depends on its lag and the lag of disturbances. See Engle (2001) for more details. It should be noted that, we used $\mathrm{Dln}(\mathrm{ex}_t)$ as dependent variable, Y_t, to get the disturbances, so we have:

$$Dln(ex_t) = \beta_0 + \epsilon_t$$

$$\sigma_t^2 = \omega + \alpha\epsilon_{t-1}^2 + \beta\sigma_{t-1}^2$$

3.2 Unit Root Tests in Panel Data

Recent literature suggests that panel based unit root tests have higher power than unit root tests based on individual time series. There are five types of panel unit root tests in which EViews will compute:

1. Levin, Lin and Chu (2002)
2. Breitung (2000)
3. Im, Pesaran and Shin (2003)
4. Fisher type test using ADF and PP tests (Maddala and Wu (1999) and Choi (2001))
5. Hadri (2000)

Consider a following AR(1) process for panel data:

$$y_{it} = \rho_i y_{it-1} + X_{it}\delta_i + \epsilon_{it} \quad (3.3)$$

$$i = 1,2, \dots, N \qquad t = 1,2, \dots, T$$

The X_{it} represent the exogenous variable in the model, including any fixed effects or individual trend, ρ_i are the auto regressive coefficients and the errors ϵ_{it} are assumed to be mutually independent idiosyncratic disturbance. If $|\rho_i| < 1$, y_i is said to be weakly (trend) stationary. On the other hand, if $|\rho_i| = 1$ then y_i contains a unit root. The following table summarizes the basic characteristics of the panel unit root tests available in EViews:

Table 3.1: Summary of Panel Unit Root Tests

Test	***Null***	***Alternative***	***Possible Deterministic Component***	***Auto Correlation Correction Method***
Levin, Lin and Chu	*Unit root*	*No Unit Root*	*None, F, T*	*Lags*
Breitung	*Unit root*	*No Unit Root*	*None, F, T*	*Lags*
Im, Pesaran and Shin	*Unit Root*	*Some cross section with or without UR*	*F, T*	*Lags*
Fisher (ADF)	*Unit Root*	*Some cross section with or without UR*	*None, F, T*	*Lags*
Fisher (PP)	*Unit Root*	*Some cross section with or without UR*	*None, F, T*	*Kernel*
Hadri	*No Unit Root*	*Unit Root*	*F, T*	*Kernel*

Source: user guide of EViews
Note: the expressions of None, F and T indicate no exogenous, fixed effect and individual effect and individual trend, respectively.

3.3 Fixed Effects Approach

First differencing is just one of many ways to eliminate the fixed effect. An alternative method, which works better under certain assumptions, is called fixed effects transformation. Consider a model with a single explanatory variable, for each i:

$$y_{it} = \beta_1 x_{it} + a_i + u_{it} \tag{3.4}$$

$t = 1,2, \dots, T$

a_i is the fixed effect. For each i, average this equation over time. We get:

$$\bar{y}_i = \beta_1 \bar{x}_i + a_i + \bar{u}_i \tag{3.5}$$

If we subtract (3.5) from (3.4) for each t, we wind up with

$$y_{it} - \bar{y}_i = \beta_1 (x_{it} - \bar{x}_i) + u_{it} - \bar{u}_i \tag{3.6}$$

$t = 1,2, \dots, T$

Or

$$\ddot{y}_{it} = \beta_1 \ddot{x}_{it} + \ddot{u}_{it} \tag{3.7}$$

$t = 1,2, \dots, T$

$\ddot{y}_{it} = y_{it} - \bar{y}_i$ is the time demeaned data on y and similarly for $\ddot{x}_{it}$ and $\ddot{u}_{it}$. The fixed effects transformation is also called the within transformation. The important thing about (3.7) is that the unobserved effect, a_i, has disappeared. This suggests that we estimate (3.7) by pooled OLS. A pooled OLS estimator that is based on the time demeaned variables is called the fixed effects estimator or the within estimator (Gujarati 2004).

3.4 Variables

We applied the panel data and fixed effect model to estimate a model of the form:

$$I_{it} = \gamma ue_{it} + \beta' X_{it} + \alpha_i + \delta_i t + \epsilon_{it} \qquad (3.8)$$

In this form, $\mathrm{I_{it}}$ is investment and it is calculated from $\mathrm{GCF_{it}/GDP_{it}}$, so we can call it domestic investment. $\mathrm{ue_{it}}$ is uncertainty of exchange rate, that is obtained from GARCH(1,1) model of real effective exchange rate for every country and $\mathrm{X_{it}}$ is the other exogenous variables that includes price of the capital goods, $\mathrm{pinv_{it}}$, the changes of GDP, $\mathrm{gdp_{it}}$, net exports, $\mathrm{exp_{it}}$. It should be noted all variables except exchange rate uncertainty are used as proportional of GDP.

4. Empirical Results

This study examines the relation between investment and exchange rate uncertainty by using availability of the annual data for Algeria, Egypt, Iran, Morocco, Syrian Arab Republic and Tunisia from 1975 until 2006 for every variable. It should be noted that these data based on availability have been gathered from WDI. At first, the exchange rate uncertainty is obtained from $GARCH(1,1)$. Then the stationary of the variables will be tested by panel unit root tests and finally, it is estimated the model and the hypotheses will be tested by looking at the coefficient of exchange uncertainty and the other coefficients. The interpretation of the results has come in next section.

4.1 Panel Unit Root Tests

We tested the existence of unit root for every used variable in the model. The results show that all variables are stationary in level. The results of the unit root test have been shown in table (4.1), briefly.

Table 4.1: Unit Root Tests

Variables	***Method of Test***	***Test Statistic***	***P Value***
I_{it}	***Levin, Lin & Chu***	-2.55279	0.0053
	Im, Pesaran and Sihn	-2.59641	0.0047
	Fisher Chi square (ADF)	30.7717	0.0021
	Fisher Chi square (PP)	11.6561	0.4737
ue_{it}	***Levin, Lin & Chu***	-4.93107	0.0000
	Im, Pesaran and Sihn	-5.36006	0.0000
	Fisher Chi square (ADF)	49.1392	0.0000
	Fisher Chi square (PP)	68.7417	0.0000
ue_{it-1}	***Levin, Lin & Chu***	-6.44058	0.0000
	Im, Pesaran and Sihn	-6.72837	0.0000
	Fisher Chi square (ADF)	59.7412	0.0000
	Fisher Chi square (PP)	67.6127	0.0000
$pinv_{it}$	***Levin, Lin & Chu***	-2.38544	0.0085
	Im, Pesaran and Sihn	-2.06958	0.0192
	Fisher Chi square (ADF)	21.4526	0.0441
	Fisher Chi square (PP)	13.9437	0.3043
gdp_{it}	***Levin, Lin & Chu***	-10.2640	0.0000
	Im, Pesaran and Sihn	-10.8931	0.0000
	Fisher Chi square (ADF)	108.351	0.0000
	Fisher Chi square (PP)	102.762	0.0000
gdp_{it-1}	***Levin, Lin & Chu***	-10.1106	0.0000
	Im, Pesaran and Sihn	-10.6349	0.0000
	Fisher Chi square (ADF)	105.539	0.0000
	Fisher Chi square (PP)	99.5921	0.0000
exp_{it}	***Levin, Lin & Chu***	-0.58115	0.2806
	Im, Pesaran and Sihn	-1.98218	0.0237
	Fisher Chi square (ADF)	26.4667	0.0092
	Fisher Chi square (PP)	8.17250	0.7715

Source: Author’s findings

The results of the table (4.1) show that we can use from the variables in their levels.

4.2 Model Specification

In this section we estimate the model by using the fixed effect model and obtain the coefficients of variables and their impacts on the dependent variable. The results of the estimation have been shown in table (4.2).

Table 4.2: results of the panel estimation

Variable	C	ue_{it}	ue_{it-1}	$pinv_{it}$	gdp_{it}	gdp_{it-1}	exp_{it}	$F\ Statistic$	DW
Coefficient	-0.004 (0.84)	-0.21 (0.01)	-0.29 (0.00)	0.01 (0.41)	0.11 (0.04)	0.09 (0.09)	0.01 (0.02)	2.03 (0.02)	1.94

Note: P Value is in ()
Source: Author's findings

As the results of the table (4.2) illustrate, investment in which is dependent variable reacts to exchange rate uncertainty. This reaction would not be restricted to current period of exchange rate uncertainty but, exchange rate uncertainty in previous period can impact on investment of current. The coefficient of GDP is completely significant whereas its coefficient is really small. Indeed, the impact of GDP and its lag on domestic investment are significant; the difference between them is really small and can be ignored. Exports or actually, net exports are unavoidable factor to impact on investment. Its coefficient is completely significant and has the expected sign. Other statistics show that all of these coefficients have been estimated correctly and there is not any serial correlation and auto regressive among the variables. It should be noted that because of the limitation of number of countries, the method of fixed effect has been used to estimate the coefficients. So there is no need to choose between random and fixed effect approach. The estimated model has been selected by model selection criteria such as AIC (Akaike information criterion) and SC (Schwarz criterion) and general to specific method. The coefficient of price of capital goods is insignificant so it does not have any impact on investment. The price of capital goods is an important factor to impact on investment but why does not have any impact on investment in here? It will explain in section of interpretation.

It should be noted that investment has been affected not only by uncertainty of exchange rate in current period but, it has been affected by the lag of exchange rate uncertainty.

5. Interpretation of the Results

In this section we conclude from the obtained results of estimation of the model. The results of the table (4.2) show that the exchange rate uncertainty and its lag impact on the investment, effectively. Uncertainty is a factor in which will be revealed in long run, so the investors who need to long run to invest should be careful because this uncertainty really suffers the investment in these countries. One of the solutions to offset the adverse effect of exchange rate uncertainty is to make investments with short period. Because these countries are really depended on imports of capital goods and the uncertainty of exchange rate impacts on the price of these goods. So, on the one hand, these countries are affected by the impacts of exchange rate uncertainty through their imports, on the other hand, these countries have to import these capital goods to develop their economies. So government in these countries may want to protect from their investors through adjustment the price of capital goods. Because of that the coefficient of price of capital goods is insignificant. The short run investments can be a very important factor to increase the investment as a whole. So the extension of SME's can be one of the best solutions for this problem, it means to increase investment.

The investment has a small share of GDP in these countries. It seems that these countries spend too share of their GDP and its growth for the other factors, such as imports, government spending, long term debts and so on. Uncertainty of exchange rate can affect on investment through imports and exports, so the economies in which rely heavily on imports, suffer from uncertainty of exchange rate. For example, if exchange rate increases then these countries should spend a large share of GDP to import the capital goods from abroad, but the exports of the goods in which these countries are good in them can help to provide the financial sources for imports and then these countries can improve their domestic investments through GDP. So this kind of countries can decrease the effects of uncertainty of exchange rate by increasing the exports of goods or services in which are in the large production. The government is an important factor to protect from these productions.

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