Investigating the Relationship between Investment Risk and Private Investment in Iran’s Industry Sector

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Abstract: The stability of macroeconomic is the basis for sustainable economic growth because it increases national saving and private investment, and improves balance of payments through enhancing export competitiveness. Sustainable economic growth requires an economically safe environment so as to encourage investment by the private sector. In this regard, the stability of macroeconomy can play a very influential role. The main purpose of this paper is to investigate the effect of the risk arising from economic instability on the private investment in Iran’s industry sector during 1980-2009. To do this, Autoregressive Distributed Lag (ARDL) was used. The results indicate that the risk associated with the short and long term macroeconomic instability has a negative and significant effect on private investment in the industry sector.

Key words:

INTRODUCTION

Risk is the probability of disparity between the actual rate of Return On Investment (ROI) and the expected rate of ROI. Investors are constantly faced with the risk that their ROI rate might be lower than their desired rate of ROI. In other words, risk is defined as the deviance from the expected return rate. In terms of statistics, risk is the standard deviation from the expected return. Simply put, risk is the loss due to investment (Ismihan, 2002).

In defining and describing a macroeconomic environment, five indicators are emphasized, namely, inflation rate, disparity between the official and unofficial exchange rates, interest rate, government’s financial status, and the status of balance of payments (World Bank, Fischer and Michael, 1996). If budget deficits (as a fraction of GDP) are at a reasonable level, and if inflation rate is also a small and predictable value, the actual foreign exchange rate is competitive and close to equilibrium, and the status of interest rate and balance of payments is apt to growth and development, the macroeconomic environment will experience stability – this is the picture observed in most developed countries. On the other hand, developing countries are often faced with high and changing inflation rates, increasing and unsteady budget deficits, intense fluctuations in the actual exchange rate, and chronic deficits in balance of payments.

Based on the results of studies by Fischer, Gowara, and some other researchers, countries with less inflation rate and budget deficit and more rapid convergence of the foreign exchange effective rate towards the balanced rate have experienced higher growth rates. During the recent years, economic security has been the center of attention. A safe economic environment serves as an important factor in promoting private investment and economic growth in developing countries (Poirsen and Fabrischtz, 1998).

In experimental research, economic security consists of a set of key elements and attributes associated with the political, economic, and financial environment. In some studies, a few number of such variables, and in some others, all of these variables are used as indicators of economic security.

In order to illustrate macroeconomic instability, many economic scholars rely on five indicators. They introduce economic instability as the risk arising from instability. The indicators of macroeconomic instability are inflation rate, official/unofficial foreign exchange rate, foreign debts, balance of payments, and budget deficits, all introduced by World Bank (1993) and Hoda Michael et al. (1994). Belini (1996) assumes instability a result of inflation rate, budget deficit to GDP ratio, and current debts to GDP ratio. These studies show that instability has a significant effect on capital formation and economic growth.

Ismihan (2002) defines macroeconomic instability index based on the simple average of four sub-indices, including inflation rate, budget deficits to GNP ratio, foreign debts to GNP ratio, and the gap between the official and unofficial foreign exchange rate. In this paper, we subscribe to Ismihan’s view, who introduces this index as the risk arising from instability.

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2. The Link between Risk and Investment:

Research during the recent years about the relation between the security of investment environment and the level of private investment and economic growth rate has proved the tie between “security” and “investment and growth” predominantly by relying on the concept of institutes. The amount of investments in any nation is a function of a set of variables, among the most important of which is “investment security”. Studying the security level of an economy and the mix of factors endangering the security of its investment environment is realized through two methods.

In the first method, which necessitates an objective approach to the quantity of security, the strength or weakness of security institutions of a nation is considered. In the second method, which requires a subjective approach to the amount of security, the amount of the nation’s security and the factors endangering security along with their effects on the security of business environment are enquired from the actual applicants of security, i.e. (potential or actual) investors. The logic behind the latter is that a “feeling of security” by those who wish to make investments makes sense when investing in a specific country or industry. Currently, this method is applied worldwide, constantly and with high reliability. Some studies are wholly subjective. In the respective literature, the data related to such investigations are known as “survey data” and are documented as perceived by evaluators’ subjectivity. Research by Bronti, Kisanko, and Voodr (1997) is of this type.

Another line of research to measure investment security is based on economic objective observations such as GDP growth rate, inflation rate, unemployment rate, balance of payments, foreign debts, the difference between official and unofficial foreign exchange rate, etc. The data associated with this type of research are known as “hard data” and are principally independent of the subjective perceptions of scholars or investors. The present study belongs to this latter line of research.

Finally, a major part of research on investment security employs both hard and survey data and could be called as “combined research”.

Increase in investments and achieving higher rate of economic growth are the primary objectives of all economic systems and the desired end of all efforts extended to adjust economic affairs of societies. In other words, it has been several years that economists have tried to discover the factors that influence investments and growth.

Iran is a country that has suffered from lack of investment and production during the past two centuries and achieving an acceptable economic growth rate, as an inevitable part of development, has always been at the top of the goals of developmental plans of the nation. Increase in production and investment is the prerequisite of economic growth. Therefore, investigating the elements that slow down growth and investment, such as the risk associated with economic instability gains much importance.

3. Research Background:

Norman Olkahoma (2009) investigated macroeconomic and private investment instability or uncertainty in Argentina, Mexico, and Turkey during 1990-2003. The results showed that increased macroeconomic instability, which is actually a nation’s risk, harms investment costs in real institutes. Moreover, a decline in capital-to-production rate boosts investment, and increased risk or uncertainty in macroeconomics (e.g. exchange rate and inflation in production cost) as well as the growth in the relative prices of capital goods have significant and negative effects on investments. The results also showed a direct relation between the development of financial sector and private investment. Moreover, measure should be taken in order to remain safe from industrial development and to reorganize the financial system of developing countries to establish a stable micro- and macroeconomy through avoiding extreme fluctuations in financial markets aiming at reducing risk and uncertainty associated with macro prices.

Imobaigh (2006) analyzed private investment and macroeconomic instability in Nigeria’s economy during 1970-2002. As observed in the results, the coefficient of correlation between Foreign Direct Investment (FDI) and the indicators of macroeconomic instability (e.g. inflation rate, exchange rate, and foreign debts) was a negative value. In addition, unemployment in the economy had a significant and negative impact on FDI. In Imobaigh’s paper, there are recommendations such as adopting a managerial strategy with respect to interest rate, exchange rate, and foreign debts. The results of the study indicated that procurement of the facilities required for necessary infrastructures and policies that enhance investments is a mandatory and Nigeria should avoid unsteady policies which may be implemented by any government coming into office.

Mostafalsmihan (2002) investigated macroeconomic instability, capital accumulation and growth in Turkey for 1936-1999. The function showed that there is a negative relation between private investment, as the dependent variable, and state investment and macroeconomic instability, as the representative of risk. Moreover, the intense and the increasing macroeconomic instability in Turkey affect economic growth severely. Growth in macroeconomic unsteadiness is a serious barrier for governmental investment, particularly with respect to its infrastructures, and private sector investment. These results were in line with the theory and descriptive analysis concerning Turkey’s economy and the study could be generalized to developing countries suffering from macroeconomic instability experienced by Turkey.
In a study by Mehrara and Poor-rahim (2010), the researchers examined the role of oil funds in controlling the macroeconomic instability of oil-rich nations. Their results indicated the effectiveness of those funds in reducing the macroeconomic instability of the nations employing the funds. This finding is shown by the oil fund ambiguity differential.

Boroomand (2008) investigated economic security in Iran and some chosen countries for the period of 1998-2007. The research was conducted using the data published by international centers for measuring investment risk. The investigations showed that to realize a stable macroeconomic in the society, the areas that their exposure to any threat may result in loss of stability and security in the whole society should be identified.

In his MA thesis, Saki (2007) investigated the impact of macroeconomy instability on private sector’s investment in Iran’s industry sector during 1963-2003. Based on the results obtained using Angel Granger method, all the coefficients of the model were statistically significant at 95% confidence interval. The results also showed that 81% of variance in private investment in industry sector is explained by the explanatory variables of the model, which is indicative of a favorable explanatory power.

In their research, Ahangari and Saadat-mehr (2007) examined the link between risk and private investment in Iran. In order to calculate the investment risk, a combined risk indicator (which contained political, economic, and financial risks) as well as the statistics published by IBC institute were used. The independent variables of the research included combined risk indicator, fixed government investment, real GDP, and the amount of banking facilities, and the dependent variable of the research was fixed private investment.

4. Research Method:

The data for this research are gathered using desk research method. Moreover, in order to answer the research questions and to test the hypotheses, econometrics methods were used. In other words, after identifying the proper model (through resorting to the available statistics), the coefficients were estimated in the form of elasticity using econometric methods and Microfit4 software. Then, using the coefficients and taking into account the magnitude of their effects on the investment in the target function, and also through analysis of the obtained results, efforts were given to present appropriate strategies.

In order to investigate the short- and long-term relations between the dependent variable and other explanatory variables of the model, Autoregressive Distributed Lag (ARDL) was used after ensuring an accumulative vector. Since estimates provided by ARDL method avoid problems such as autocorrelation and endogeneity, they are unbiased and efficient (Seddiki, 2000).

ARDL method includes two steps. In the first step, the presence (or absence) of a long-term relationship among the considered variables is tested. The maximum frequency of lags is incorporated based on the number of observations, and because of the inclination of Schwarz Bayesian Criterion (SBC) towards shorter specification, the criterion delivers better results in observations less than 100 (Tashkini, 2005).

Immediately after estimating the dynamic (short-term) equation, the test of the presence (or absence) of long-term relation should be performed. In order to test whether the long-term relation obtained from this method is false or not, the following is undertaken and tests the concerned hypothesis.

\[ H_0 = \sum_{i=1}^{p} \phi_i - 1 \geq 0 \]

\[ H_1 = \sum_{i=1}^{p} \phi_i - 1 < 0 \]

The null hypothesis indicates the absence of a long-term relation, because the convergence of the short-run dynamic relation towards the long-term relation requires the sum of coefficients to be less than one. The \( t \) value to be used in the test is calculated by subtracting one (1) from the sum of the coefficients of dependent variable lags and dividing the obtained value by the sum of the standard deviation of coefficients.

\[ t = \frac{\sum_{i=1}^{p} \hat{\phi}_i - 1}{\sum_{i=1}^{p} S\phi_i} \]

In this equation, \( s \) represents the standard deviation of lagged coefficients of the dependent variable. If the absolute value of \( t \) is larger than the absolute value of the critical quantities provided by Banerjee, Dolado and Master, the null hypothesis is rejected and the presence of a long-term relation is accepted. Once the existence of the long-term relation among the variables is established, Error Correction Model (ECM) can be used.

The second step of this analysis includes the use of ARDL options for estimating the long-term relations and the statistical inference with respect to their values. It should be noted that the use of this step is appropriate only when it is ensured that the falseness of the relation among the variables is rejected.
5. Experimental Results of the Research:
5.1. Model Identification and Explanation:
In this section, the function for investigating the relation between the risk and investment is introduced and estimated.

The basic regression equation of the study is as follows:
\[ LIP = (LIG, LBI, Ly, LN, XIRT, NS) \]

- \( LIP \): the logarithm of private investment in Iran’s industry sector based on the fixed prices of 1997 (Billion Rials)
- \( LIG \): the logarithm of government investment in Iran’s industry sector based on the fixed prices of 1997 (Billion Rials)
- \( LBI \): the logarithm of investment risk arising from economic instability
- \( Ly \): the logarithm of value added by the industry sector based on the fixed prices of 1997 (Billion Rials)
- \( LN \): the logarithm of the official exchange rate (Rials)
- \( XIRT \): the ratio of industrial exports to the total exports
- \( NS \): the interest rate of facilities awarded by governmental banks

5.2. Stationarity of Variables Test:
The use of econometric methods in experimental tasks is based on the fact that the employed time series variables are stationary. A time series variable is stationary when its variance average and autocorrelation coefficients remain unchanged over the time. Therefore, it is necessary to ensure the stationarity/non-stationarity of the variables before using them. Unit root test is used in this research to test the stationarity of variables.

Based on the results of unit root test, all variables were non-stationary. In order to determine the stationary order of variables, the differential of non-stationary variables is calculated. The results with respect to all non-stationary variables after one differential performance were stationarity of the variables.

5.3. Estimation of the Short-Term Equation:
Based on the study by Pesaran et al. (2001), who used ARDL and considered proper lags, it is possible to obtain the long-term coefficients of consistency among the considered variables in a model. In Johansen Method, one single lag value is allocated to all variables, whereas in ARDL method, optimized lags are assigned to each of the variables using Schwarz Bayesian, Akaike, and Hannan and Queen information criteria.

Based on the estimated results, the problems of autocorrelation or heterogeneity of variance, normality and consequential form were not present in this model and the explanatory power of the model was acceptable. In ARDL, the existence of a long-term cointegration relation is verified when the absolute value of statistic \( t \) is larger than the absolute value of its critical value (to perform this test, the sum of lagged coefficients of the dependent variable should be subtracted from one (1) and be divided by its standard deviation). Comparing the calculated statistic (-4.52) with the absolute value of the critical value of this test at 95% confidence interval (-4.43), which is proposed by Banerjee et al. (1992), the hypothesis claiming the presence of a long-term relation (co integration) among the model’s variables is verified. Therefore, the long-term model is estimated.

5.4. Estimation of the Long-Term Equation:
After estimating the dynamic (short-term) model and proving the existence of the long-term relation, the equation related to the long-term relation is estimated. The results pertinent to the long-term estimate are summarized in table 1.

Since the mentioned model is logarithmic, the coefficients of the independent variables indicate the sensitivity and elasticity of the dependent variable.

<p>| Table 1: Estimated Long Run Coefficient Using the ARDL Approach |</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>T- Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ly</td>
<td>0.98387</td>
<td>7.1208 (0.000)</td>
</tr>
<tr>
<td>LBI</td>
<td>0.19723</td>
<td>-2.5150 (0.023)</td>
</tr>
<tr>
<td>XIRT</td>
<td>8.6868</td>
<td>3.6791 (0.002)</td>
</tr>
<tr>
<td>NS</td>
<td>0.085076</td>
<td>-2.7477 (0.014)</td>
</tr>
<tr>
<td>LIG</td>
<td>0.63367</td>
<td>4.3495 (0.000)</td>
</tr>
<tr>
<td>LN</td>
<td>-0.21065</td>
<td>-3.0867 (0.007)</td>
</tr>
<tr>
<td>C</td>
<td>-4.0468</td>
<td>-3.2521 (0.005)</td>
</tr>
</tbody>
</table>

Datum: Computing Research

As it is observed, all the coefficients are significant at 95% confidence interval. Based on the obtained results and investment risk coefficient, private sector’s investment has a negative relation with investment risk. As a result, one per cent increase in investment risk in long-term, private investment in industry sector decreases by 0.19%.
One-per-cent increase in industrial production (added value in industry sector) leads to an increase of 0.98% in private investment in industry sector.

One-per-cent increase in government investment in industry sector leads to an increase of 0.63% in private investment in industry sector.

One-per-cent increase in official exchange rate leads to a decrease of 0.21% in private investment in industry sector.

One-per-cent increase in the interest rate associated with banking facilities leads to a decrease of 0.08% in private investment in industry sector.

One-unit-increase in the ratio of industrial exports to total exports leads to an increase of 8.68% in private investment in industry sector.

Examining the coefficients of the model over long-term indicates substantiation of theoretical expectations and the negative effect of investment risk on private sector’s investment in Iran’s industry sector.

5.6. The Results of Structural Stability Test:

The stability of coefficients is tested using CUSUM test, the result of which shows that the coefficients of the estimated model over the studied period are stable.

As it is shown by the results of the estimation and cumulative residuals and square graphs, the confidence interval of 5% is not crossed by the graphs, and therefore, the null hypothesis claiming the presence of structural stability is accepted and the void claim is rejected.

6. Conclusion and Recommendations:

As it was observed, macroeconomic stability helps economic growth by prompting private investment and capital accumulation. If government’s construction investments take place in an unstable macroeconomic environment (which is the case in the majority of developing countries) economic performance will most likely be unfavorable. By creating uncertain and risky atmosphere, macroeconomic instability makes gathering the actual data about relative prices very difficult and causes inefficient resource allocation.

The statistical findings clearly indicate that the inhibitory effect of macroeconomic instability on the actual growth rate is significant. Therefore, to achieve sustainable economic growth, establishing and sustaining a stable macroeconomic environment is a basic must and sustainable growth requires policies that do not lead to accelerating inflation, budget deficit, and the deficits with respect to non-financeable account and dramatic fluctuations in exchange rate.

Poor management of macroeconomy through adopting reckless policies and reacting passively to shocks increases volatility. The economy is always subject to internal and external shocks. Admittedly, the effective
zone of some of these shocks is such expansive that they severely challenge the management of the macroeconomic, no matter how powerful the practice is.

Appropriate reacting to shocks, especially in the case of our country (Iran) which is facing severe shocks, is highly important.

The most important measure to create and maintain macroeconomic stability is to replace financial instability with financial discipline in government’s budget, and this requires fundamental changes in the financial and economic structures of the government.

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