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The effect of interest rate and inflation on the net inflow of foreign direct investment in Iran and China

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ABSTRACT

The purpose of this study is to investigate the effect of interest rate on rate of foreign direct investment (FDI) as well as the effect of inflation rate on variable of net inflow of FDI in Iran and China. After presenting relevant theoretical literature to investment, foreign direct investment and foreign investment trend of both studied countries as well as studying relevant domestic and foreign studies, the econometric model of study was processed based on the fixed effects approach for both countries in accordance with extracted panel data from World Bank for time interval of 2006-2013. According to the results obtained from estimated model, the mentioned variables can significantly effect on dependent variable of study. Hence, the negative and positive effects of independent variables of study on net rate of FDI in Iran and China were confirmed as well as hypotheses of study.

1. Introduction

Investment has been always considered as an important economic issue and capital formation has been essential for economic growth and development in every country especially in developing countries. In international community, those countries will remain if they have high technical and production ability so that a considerable amount of capital is required for this purpose. Hence, it would be vital to use foreign financial sources as to supplement domestic resources. Finance through FDI is an appropriate tool to access modern technology and to use equipment and machineries with new technology in addition to solve the issue of capital shortage. It should be also considered that attraction of FDI is related to identification of effective factors on FDI and creation of appropriate changes in these factors. In this case, access to a sustainable and positive economic growth is one of the aspects of economic development and FDI is one of the effective factors in process of economic growth. In addition to project financing, FDI has other positive effects on macroeconomic indicators such as increase in quality of domestic products, reduction in unemployment, reduction in investment risk (because of creation diversity in assets and creation of spatial diversity), reduction in prices level, reduction in marginal cost of capital, increase in production, economic growth, education, capital efficiency and exports as well as promotion of technology.

Accordingly, FDI is a process in which, guest country will gain ownership of assets of host country in long term with the aim of controlling production, distribution and other relevant activities. The difference between FDI and Portfolio is that contrary to FDI, portfolio investment occurs in short term and includes economic activities such as holding securities including bonds, foreign stocks and financial assets, not including management activities, acts of votes in decision-making or control of the issuer of foreign investors.

2. A review of research literature and background

2.1. The concept of FDI and its relevant theories

Foreign direct investment (FDI) is related to the constant relationship between investor and investee and an opportunity for investor to influence in actions of host country. In FDI, investor is looking for some interests through participating in decision-making process while these interests are not obtainable within investment in foreign portfolio. According to the theory of International Monetary Fund in 2008, FDI is an international investment reflecting goals of a resident institution in an economy that obtains sustainable interests within a

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resident institution of another economy. Sustainable interests point to a long-term relationship between direct investor, institution and a considerable level of capital effect on management of institution. Direct investment not only includes initial trade obtained from the relationship between investor and institution but also considers all future transactions and relationships between them.

2.2. Research background

Najarzadeh et al. (2005) have assessed effective factors in attraction of FDI based on theoretical and experimental studies within an econometric pattern using combined data of cross section-time series (panel data) in 31 Islamic countries during 1995-2000. The obtained results of this study indicated that some factors could positively effect on FDI of Islamic countries, these factors are as follows: expansion of market size, implementation of appropriate business policies including reducing in tariffs, liberalization of foreign trade, reducing economic instability and unsustainability through reducing inflation rate, and reducing the budget deficit and foreign debt of government.

Komijani and Ghavidel (2006) have investigated one of the important consequences of globalization of economy in their study under the title of the effect of FDI entrance on employment in service sub-sectors in Iran. For this purpose, the effect of efficiency gap between of labor force of service sector in Iran and developed countries has been indicated based on the ratio of skilled labor force to unskilled labor force at the time of entrance of multi-national companies using Data Integration Model (compilation of time-series and cross-sectional data) during 1997-2004. According to the obtained results of this study, active serving entities in service sectors can employ higher numbers of skilled labor force at the time of entrance of multi-national companies in order to increase efficiency of their labor force and compete with foreign entities.

Shahabadi (2007) have stated that in addition to the effect of FDI and international trade of goods and services on promotion of efficiency of a country, investment is also affected by domestic factors. The experimental evidences indicate that international trade and FDI would cause to foreign technology transfer to countries. The objective of this study was to assess the role of capital aggregation in field of foreign R&D, aggregation of domestic R&D, domestic development, human capital and other effective factors in total efficiency of factors. The obtained results indicated that aggregation of domestic R&D, capital of foreign R&D and development, and human capital can effect on total efficiency of factors.

Mahdaviadeli et al. (2009) have studied the role of foreign investment in non-oil exports using self-explanatory model with distributive lags and annual data during time interval of 1963-2005. The obtained results indicated that FDI had a similar positive effect on non-oil exports during long term and short term. Additionally, an increase in real rate of currency and decrease in domestic demand index would lead to increase in non-oil exports.

Afshari et al. (2010) have investigated the relationship between inflow of FDI and capital flight using panel data in 9 selected countries of Middle East and north of Africa during 1991-2006. For this purpose, the capital flight has been calculated through methods of World Bank and Morgan. According to the results obtained from convergence tests, there is a long-term equilibrium relation between FDI and capital flight without considering estimation method. In addition, the obtained results indicated a positive significant relationship between capital flight and inflow of FDI during the studied period in selected countries.

Ahmadi et al. (2011) analyzed the economic growth and flow of foreign investment for three income groups of 112 developing countries during 1980-2006. For this purpose, the relevant techniques to panel data including panel unit root, panel co-integration and model of Panel Vector Error Correction have been applied. The obtained results indicate that there is appositive significant relation between economic growth and flow of FDI in three groups of countries.

Googerdchian et al. (2010) assessed the effect of FDI on non-oil exports in free trade areas of Iran during 1996-2008. They conducted this study using panel data and STATA software to evaluate the obtained result. According to the findings of this study, attraction of FDI, infrastructural investments and economic capacities in Provinces of Hormozgan and Sistan-Baluchistan are effective factors in development of non-oil exports of free trade areas.

Amini et al. (2010) have studies the effective factors in total efficiency with emphasize on FDI of Iran and 23 selected countries during 1996-2006. They have identified total efficiency through measurement method and recognized the effective factors using panel data technique. The effective factors on total efficiency of estimated model include aggregation of FDI, aggregation of R&D costs, the rate of Gross enrollment in university courses, openness degree of economy and capacity utilization rate. On the other hand, the obtained results indicate the positive significant effect of all the mentioned factors on total efficiency of factors. Therefore, technical progress through different methods (R&D costs, domestic development, foreign trade and foreign investment) can effect of efficiency promotion. Among the mentioned factors, capacity utilization rate has had the most effect and aggregation of FDI has had the lowest effect on promotion of total efficiency.

Agheli (2010) has assessed in his study the effective factors on FDI using combination of time-series and cross-sectional data in selected Islamic countries during 1993-2002. According to the estimations of this study, the actions of Islamic governments should decrease foreign debt volume and increase domestic investment within infrastructures to attract FDI and open the economy toward international trade. Islamic countries need

foreign sources for their finance in addition to taxes and domestic savings like other developing countries. FDI is one of the important methods to access to capital and technology required for economic growth of these countries. Although the FDI have been considerably increasing from 1980 at international level, but the share of Islamic countries has not been important within this process.

Mahdavi and Mahdavi (2011) have pointed that FDI is one of the important economic factors that can effect on economic growth because of its features while FDI has no positive effect on economic growth in some countries in accordance with the obtained results of other studies. The mentioned studies consider the domestic conditions for positive attraction of FDI as a reason for lack of the positive effect of this factor on economic growth of such countries. One of the required conditions for positive effect of FDI on economic growth is related to presence of a developed financial market. Accordingly, this paper was about to test the effect of financial market and FDI on economic growth in Iran. Time-series data during 1967-2008 have been applied this matter. The obtained results indicated that development of financial market o Iran is not able to prepare filed in which, FDI can positively effect on Gross Domestic Production (GDP).

Shahabadi and Ebad (2011) have assessed the effective factors in attraction of FDI in Iran during 1959-2003. According to this study, FDI is affected by some factors including rate of return on investment, economic openness, infrastructures, economic growth, domestic investment, natural resources, human capital, inflation, exchange rate, foreign debt, and financial situation of government, taxation, market size, Political Rights and the ratio of government expenses to GDP. The obtained results of this study indicate that A- Natural resources, human capital and infrastructures have a direct and significant effect on attraction of FDI in Iran. B- Variable of political rights and dummy variable of Islamic Republic have a reverse and significant effect on attraction of FDI in Iran. C- Factor of economic openness has a positive insignificant; ratio of government expenses to GDP has a negative insignificant effect on attraction of FDI in Iran.

Mahdavi Aadeli et al. (2013) have studies the effect of FDI on export of Iran using Co-integration method during time interval of 1973-2008. The results indicated a positive and short-term relation between FDI and non-oil export while the relation between FDI, total export, and non-oil export was negative. In long term, the relationship between FDI, total export and non-oil export was negative while the relationship between FDI and oil exports was positive.

Farzin et al. (2012) have applied dynamic and econometric methods to identify the effect of FDI on economic growth and assess the effective economic factors in attraction of FDI and economic growth. Or this purpose, a model was designed and simulated in which, effective factor on economic growth was identified and simulated with a specific approach toward foreign investment in accordance with effective factors on it including exchange rate and domestic investment. The applied data were annual time-series data of Iran in 2007 predicted for 2025 based on the studied model. The obtained results of this study indicated positive significant effect of FDI on economic growth.

Jalili (2014) has assessed the relationship between non-oil exports, FDI and economic growth using GMM and panel data during 2000-2010. According to the obtained results of study, non-oil exports and FDI have positive significant effect on economic growth of studied countries. Therefore, it would be required to remove obstacles of foreign investment attraction in order to prepare the conditions for attraction of such capitals and increase domestic production capacity.

Etemadi and Saeedi (2013) have studied the effect of investment growth of capital assets on the relation between stock value and accounting variables using multiple regression models of listed companies in Tehran Stock Exchange during 2000-2010. The obtained results of their study indicate that investment growth can increase the intensity of relationship between present stock value and profit of companies with high profitability while this variable would decreases intensity of this relationship within companies with low profitability. On the other hand, intense relationship between present value and book value of stock will increase in companies with low profitability while the density of this relationship will decreases for companies with high profitability. The book value of stock will decreases if the present value increases in accordance with the effect of investment growth. In accordance with profitability, present value and book value of stock equally increases. In other words, the mentioned relationship is positive and investment growth increases intensity of this relationship.

Banga (2003) has studied the effect of conducted FDI by United States and Japan on exports of India based on panel data during 1994-2000. The obtained results indicate conducted investments by American companies directly has increased the exports of India through increase in export diversity and indirectly has increased exports of domestic companies in non-traditional sector. However, the investments of Japan had not any significant effect on exports of India.

Zhang and Felmingham (2001) have assessed the relationship between entrance of FDI and exports using co-integration and error correction (ECM) methods based on statistical monthly data of China during 1986-1999. According to the obtained results of this study, there is a mutual relationship between FDI and exports. The researchers of this study also evaluated the relationship between mentioned factors using panel data of different cities and areas. The obtained results indicate that there is a causal mutual relation between FDI and export in areas with high inflow of foreign investment (coastal areas) and low inflow of foreign investment

(western areas) while there is not such relationship in other regions.

Le (1987) have assessed this question whether the purpose of investment contracts is expansion of FDI or not then he studied the effect of investment method on expansion process of FDI and facilitation the investment decisions. This issue has been directly considered in this study through evaluation of model along with non-traditional mechanisms of dispute settlement and in accordance with the effect level of FDI. This paper also considers the indirect role of investment in promotion of law sovereignty. The obtained results of this study indicate that the effect of investment contracts on FDI is not clear. However, this effect can be considered as an important factor of investment.

3. Research hypotheses

According to the obtained results of research background, the hypotheses of present study are as follows:

- Hypothesis 1: there is an effective and significant relationship between interest rate of Iran and net flow of FDI.
- Hypothesis 2: there is an effective and significant relationship between interest rate of China and net flow of FDI.
- Hypothesis 3: there is an effective and significant relationship between inflation rate of Iran and net flow of FDI.
- Hypothesis 4: there is an effective and significant relationship between inflation rate of China and net flow of FDI.

4. Research methodology

Relevant statistical data to dependent and independent variables is related to tome interval of 2006-2013. The relevant concepts and tests to panel data of econometric model relevant calculations to fitness of models and statistical and econometric analyses have been obtained using EVIEWS 9 Software and econometric books. Data collection tools of this study includes observation tools, statistical tests, note-taking in library methods, database of World Bank and statistical software of EVIEWS 9 in order to use within econometric analyses. Significant test of specified coefficients using t value and Durbin-Watson value to assess hypotheses and to evaluate correlation of following model:

$$NOFDIR_{it} = \alpha + \beta_1 (i^*)_{it} + \beta_2 inf_{it} + \varepsilon_{it}$$

In which,

$NOFDIR_{it}$: net flow of FDI for section i in year t

α: intercept

inf_{it}: inflation rate for section i in year t

$(i^*)_{it}$: interest rate for section i in year t

ε_{it}: error sentence for section i in year t

In this study, concepts, estimation methods and analysis method are related to econometrics and combined data (panel data) are the main analysis tool. It should be mentioned that selected model would be analyzed after implementation of F-Limer test and Hausman through EVIEWS 9 software.

Chow test or limited F (F Limer): according to the results obtained from this test (Table 1), Prob. < 0.05; hence it can be found that the estimation approach is not based on the combined method of common effects and fixed effects method is chosen here.

Table 1: F-Limer test and choosing fixed effects method

Description	Value	Prob.	df
Model of study	3.1	0.02	10.1

Source: research findings

Hausman test: According to the obtained results from Hausman test (Table 2) and prob <0.05, estimation approach is not based on random effects method.

Table 2: Hausman test and choosing fixed effects method

Description	Value	Prob.	df.
Model of study	2.3	0.12	1

Source: research findings

Relevant tests to assumptions of linear regression model (choosing selected estimation model of FE): It would be essential to assess and test the following assumptions in order to have the best linear unbiased estimators (BLUE) as the estimators of Ordinary least squares of regression coefficients within linear regression model:

Assumption of normal residuals (Jarque-Bera test): Judgment method: if the prob. value of test is more than 0.05, H_0 (normal distribution of considered variable at confidence level of 95%) will be accepted. Since the prob. of this test is obtained to 0.88 (>0.05), the normality of residuals has been accepted (Table 3).

Table 3: Jarque-Bera test and normal residuals

Description	Prob.
Model of study	0.88

Source: research findings

Assumption of independent residuals (Durbin-Watson test): Judgment method: if the Durbin-Watson value is between 1.5 and 2.5, the hypothesis of independent residual will be accepted. According

to obtained DW of this study (1.76), the residuals are independent (Table 4).

Table 4: Durbin-Watson test and independent residuals

Description	DW
Model of study	1.776

Source: research findings

Assumption of lack of heteroskedactisity between residuals: In this case, H_0 will be rejected and heteroskedactisity between sectional units will be accepted if the calculated value is above the critical amount of table at the confidence level of 95% so that the problem should be resolved using some methods. If the calculated value is lower than critical value of table at confidence level of 95%, H_0 will be accepted and heteroskedactisity between sectional units will be rejected with 95% assurance. On the other hand, estimated model of study (Table 5) it is observed that weighted and non-weighted estimation indicate different coefficients of determination (0.84 and 0.96) showing heteroskedactisity. Hence, model estimation is based on fixed effects method using WLS or weighted OLS as EGLS through software in order to access to higher coefficient of determination (R^2) and to remove heteroskedactisity.

Table 5: Lack of heteroskedactisity between residuals

Determination coefficient of difference	
Determination coefficient in weighted mode	Determination coefficient in non-weighted mode
0.96	0.84

Source: research findings

Test of significant coefficients: Since the calculated t of this study is above the obtained value (2) of table (Table 6) and relevant prob. (probability of hypothesis rejection) to significant coefficients is obtained to zero, the effect of coefficients on dependent variable is 100% significant.

Table 6: Test of significant coefficients

Value	Prob.
>2	0

Source: research findings

Test of significant model: According to table 6 and obtained Prob. (approximately zero), the significance of the whole regression has been accepted for calculated F obtained to 52.29.

Estimation of final model and test of hypotheses: The summary of estimation of selected model based on fixed effects method has been indicated in Tables 7 and 8 in which, the effect of independent variables of econometric model of study on dependent variable has been assessed to test hypotheses.

Table 7: Summary of estimation of selected model based on fixed effects method

Country	Coefficient of variables/t value/Prob.	Estimation results
Iran	$INP_1=(i^*)_{it}$ (t) (prob.)	-4/85 (3/91) (0/000)
	inf_{it} (t) (prob.)	-1/37 (2/16) (0/000)
	Adjusted coefficient of determination	0/96
	DW	1/76
	Prob. for F-Limer	<0/05
	Result of F-Limer test (Choosing the method of model estimation)	Fixed effects (FE)

Source: research findings

Table 8: Summary of estimation of selected model based on fixed effects method

Country	Coefficient of variables/t value/Prob.	Estimation results
China	$INP_2=(i^*)_{it}$ (t) (prob.)	2/90 9/2) (0/000)
	inf_{it} (t) (prob.)	3/42 (2/27) (0/000)
	Adjusted coefficient of determination	0/96
	DW	1/76
	Prob. for F-Limer	<0/05
	Result of F-Limer test (Choosing the method of model estimation)	Fixed effects (FE)

Source: research findings

5. Conclusion

According to the obtained results hypotheses testing and analysis of econometric model of this study for studied countries (Iran and China), the results of hypothesis 1 indicate the negative and significant effect of coefficient of variable paid interest rate for section i in year t (inp1) on net flow of FDI of Iran at confidence level of 100%.

According to the obtained results of hypothesis 2, the coefficient of variable of paid interest rate for sections i and year t (inp1) had a positive and significant effect on net flow of FDI of China.

The obtained results of hypothesis 3 indicated that coefficient of inflation rate of Iran had negative and significant sign; hence, hypothesis 3 was accepted. In other words, it can be accepted that variable of inflation rate had a significant effect on net flow of FDI of Iran.

The obtained results of hypothesis 4 indicated that coefficient of inflation rate of China had positive and significant sign; hence, hypothesis 4 was accepted. In other words, it can be accepted that variable of inflation rate had a significant effect on net flow of FDI of China.

6. Recommendations

It is recommended to pay attention toward policies leading to promotion of interest rate of domestic investments as well as effective factors in promotion of return on investments in studied countries with an emphasize on Iran. Liquidity control with the aim of controlling inflation rate in studied countries is highly recommended in order to reduce budget deficit, reduce reliance on Central Bank reserves and printing money considering production-oriented economy.

References

Afshari Z, Yazdanpanah A and Rahmatzadeh A (2010). Relationship between FDI and Capital Flight. Journal of Monetary and Banking Researches, 2(2): 79-102.

Agheli L (2010). Estimates of the foreign direct investment in selected countries. Economic Research, (17): 189-207.

Ahmadi AM, Dehnavi J and Haghnejad A (2011). Economic growth and foreign direct investment in developing countries: an analysis based on panel data. Journal of Economic, (41): 159-180.

Amini A, Rysmanchy H and Farhadikia A (2010). Analysis of the role of foreign direct investment (FDI) in improving total factor productivity (TFP); a Cross-country panel data analysis. Economic Research Journal, (43): 57-60.

Banga R (2003). The differential impact of Japanese and U.S. foreign direct investments on exports of Indian Manufacturing. Indian Council for Research on International Economic Relations, New Delhi (http://econpapers. repec. org/RAS/pba255. htm).

Etemadi H and Saeedi M (2013). The relationship between the current stock value and growth investment accounting information. Journal of Financial Knowledge, (20): 45-61.

Farzin M, Ashrafi Y and Fahimifar F (2012). The effect of FDI on economic growth: Incorporation of dynamic systems and the econometric. Journal of Research and Economic Policy, (61): 29-62.

Googerdchian A, Tayebi SK and Amini F (2010). Effect of foreign direct investment inflow on non-oil exports of the Iran's free trade zones. Journal of Economic Policy, (3): 21-44.

Jalili Z (2014). Investigation the relationship between non-oil exports, foreign investment and economic growth in the MENA region. Economic Growth and Development Research, 4(13): 29-42.

Komijani A and Ghavidel S (2006). The spillover effect of FDI on employment of skilled and unskilled service sector. Economic Research Journal, 76: 29-50.

Le CD (1987). The role of R&D in high-technology trade: an empirical analysis. Atlantic Economic Journal, 15(4): 32-38.

Mahdavi AMH, Kazemi A and Feiz MS (2013). Examining the effect of FDI on export in Iran. Monetary and Financial Economics, 19(3):151-157.

Mahdavi R and Mahdavi R (2011). Impact of foreign direct investment and financial market development on economic growth in Iran. Journal of New Economy and Commerce, (14): 129-147.

Mahdaviadeli MH, Nowrouzi R and Motahari Mo (2009). Role of foreign investment in non-oil exports in Iran. Journal of Finance, 11: 22-45.

Najarzadeh R, Sabbagh KM and Shaghaghi SV (2005). Estimate the supply of foreign direct investment (FDI) in the member states of the organization of the Islamic conference (IC), (35): 177-212.

Shahabadi A (2007). The role of FDI, international trade and human capital on total factor productivity in economics of Iran. Journal of Economic Literature, 7: 99-134

Shahabadi A and Ebad M (2011). Determinants of foreign direct investment in Iran. Journal of Economic Literature, (5): 89-126.

Zhang Q and Felmingham B (2001). The relationship between inward direct foreign investment and China's provincial export trade. China Economic Review, 12(1):82-99.