

THE IMPACT OF FDI ON ENVIRONMENTAL RESOURCES IN SELECTED COUNTRIES (NON- OECD)

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ABSTRACT

Recently, concerns on the role of Foreign Direct Investment (FDI) in environmental pollution besides other factors and resources of investment have been greatly considered by lots investigators. Existence of foreign direct investment or multi-national enterprises may show positive marginal spillover effects on technologic characteristics of national enterprises. The national enterprises may tend to enjoy from technologic activities of multi-national enterprises or their technical knowledge for coping environmental problems as well. As long as products of these technologies replace with product of traditional resources, it can be expected that residual loading will also reduce. Therefore, foreign direct investment will probably leave important positive effects on decrease of residual loading and environmental pollution. The main purpose of this research is to find the relationship between FDI and the quality of environments. To do so, firstly some countries are selected from Non-OECD countries, then by using panel data method for period 1996-2007 the relationship between FDI and chemical pollution of water was investigated. The results show that increasing inflow of FDI in Non-OECD countries, increasing FDI causes the amount of water pollution. In other words, Foreign Direct Investment causes environmental disturbances in Non-OECD countries. (selected countries). This study shows that among these countries the ratio of water chemical pollution to gross domestic income (WCP/GNI) in Latvia is 0.0015 which is smaller than other countries.

Key words: *Foreign Direct Investment, Chemical pollution of water, GNI Per Capita, Non-OECD countries, The Ratio of Water Chemical Pollution to GNI.*

1. INTRODUCTION

In twenties century, foreign investment mostly flowed in the form of indirect investments from Industrial Countries to the developing countries. Such capital as flowed to under developed countries in 1920s the form of direct investments went mainly into production for export. Very little of it went to manufacturing for home market. But since the Second World War, over half the private investment has been directed. Direct private investment has been concentrated mainly in the extraction of raw materials like iron, crude oil, manganese, bauxite, copper, electric energy, etc. Foreign investment has advantages and disadvantages [4]. FI provides finance, managerial, administrative and technical assistance to developing countries. FI has also encouraged local enterprise to invest more itself in ancillary industries or collaboration with foreign enterprise. But FI has some disadvantages recipient countries may be required to provide basic facilities, land, power and other public utilities. FDI also affects income distribution when it competes with home investment. During recent decades we have witnessed an increasing in Foreign Direct Investment, in underdeveloped countries. FDI increases economic growth and expansion process but, on the other hand it may effect on environmental resources. For instance during past twenty five years, China has been witnessed an extraordinary economic expansion and FDI compared to other developing countries [7]. But China has suffered more air pollution in urban areas. This research follows evaluation of the impact of FDI on environmental issues. A number of studies have reported on the beneficial aspects of more open trade regimes, noting, for instance, that export expansion raises the rate of economic growth by way of its impact on total factor productivity [3],[8]. Other studies link greater openness to deteriorating social and environmental conditions, such as increased income inequality or greater emissions of greenhouse gases [2], [6]. In developing countries, the entry of foreign direct investment facilitates the strengthening of environmental regulations. This is achieved in two ways: Direct effect through a direct influence on capital accumulation and increased ability to reduce pollution in the host country and indirect effect through the impact on income growth, which they in turn benefit from better environment increases[10].The fact is that in most of economic literature, the relation between foreign direct investment and environment has not been examined so far. In the present paper, thus, it is assumed that along with globalization, easier environmental regulations are executing in the developing countries. Indeed, such regulations in

this condition change to be a relative privilege for pollution-intensive foreign investment. Since, this capital seeks a safe place for its pollution in order to avoid heavy costs of abiding environmental pollution rules inside the country. Luckily, most of new papers have taken into consideration the relation between direct foreign investment and quality of the environment, these studies have picked rate of carbon dioxide (CO₂) emission as an index for pollution and examined the air pollution as a result. Generally speaking, pollution comprises of air pollution, water pollution, noise pollution and solid waste pollution [1].

2. RESEARCH METHOD

In this research, first we have applied data and information from World Development Indicators, (WDI) and UNCTAD from 1996 to 2007. as below: [9]

Table 1: Selected Countries in Non-OECD

(Non-OECD)	Syrian Arab Republic-Tajikistan-Iran- Jordan - Kazakhstan-Romania- Lithuania-Latvia- Oman
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After the implemented reviews and using from the related tests for choosing the proper model, fixed effects model was confirmed. In the following model by the fixed effects methods the impacts of independent variables on dependent variable is estimated. The model which we have applied is as follows:

$$LBOD_{it} = \alpha + \beta_1 LGNI_{it} + \beta_2 LFDI_{it} + \beta_3 LMV_{it} + \beta_4 LEU_{it} + u_{it}$$

Where LBOD shows the logarithm of water chemical pollution as dependent variable; LGNI indicates the logarithm of per capita national income; LFDI is the logarithm of FDI; LMV shows the logarithm of value added of industries and LEU is the logarithm of energy consumption. [5]

3. A COMPARATIVE STUDY AMONG OECD AND NON-OECD COUNTRIES (SELECTED COUNTRIES)

The present subsection intends to show a comparative study on the Gross Domestic Income Per Capita and Water pollution in Non-OECD countries. In order to compare them, we have applied some environmental and economic indicators from World Bank Data Base such as GNI and water chemical pollution from 1996 to 2007. Where GNI indicates Gross Domestic Income; WCP shows water chemical pollution and WCP/GNI shows the ratio of water chemical pollution to gross domestic income. In table 2 we have shown GNI, WCP and WCP/GNI. As table 2 shows among these countries the ratio of water chemical pollution to gross domestic income (WCP/GNI) in Tajikistan is 0.0299 in which is greater than other countries. The minimum ratio belongs to Latvia which is 0.0015.

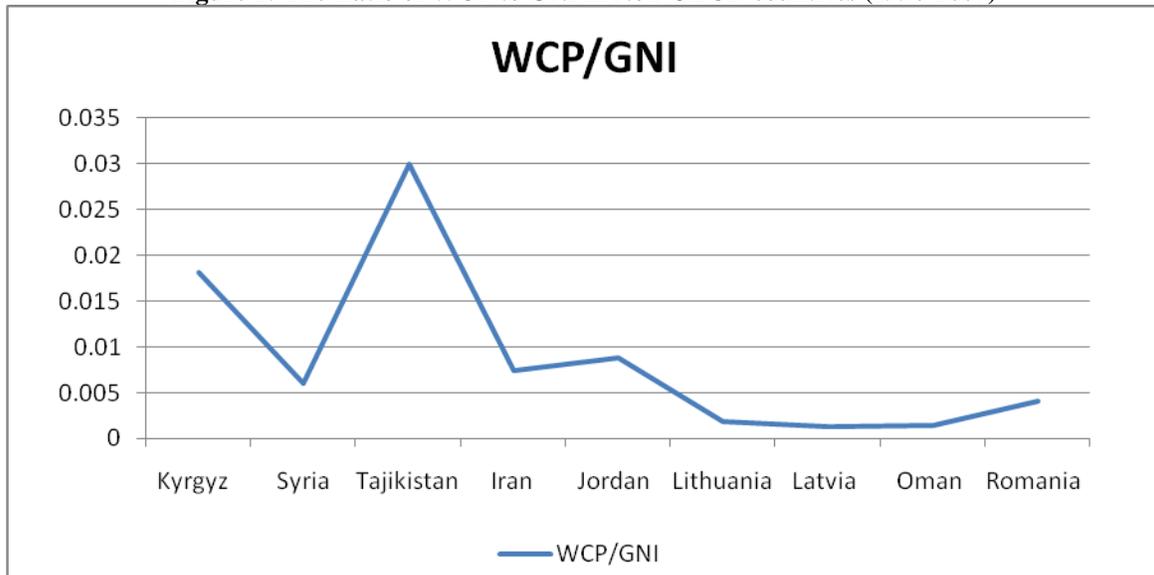
Table 2: Average of GNI per Capita, WCP in Non-OECD countries (1996-2007)

	Kyrgyz	Syria	Tajikistan	Iran	Jordan	Lithuania	Latvia	Oman	Romania
GNI	269.50	1203.28	160.07	1719.94	1948.69	3883.19	3993.49	8558.58	1953.32
WCP	4.8628	7.2532	4.7840	12.7443	17.1799	6.9709	5.0531	12.4139	7.8576
WCP/GNI*	0.0180	0.0060	0.0299	0.0074	0.0088	0.0018	0.0013	0.0015	0.0040

Source: World Bank, World Development Indicators; *Calculated by Authors

Mean= 0.00875 and STD= 0.0095 for WCP/GNI.

Figure 1: The Ratio of WCP to GNI in Non-OECD countries (1996-2007)



In Figure 1 we have drawn the ratio of WCP/GNI for selected countries. It has also shown that the maximum ratio happened in Tajikistan.

Table 3: Average of GNI per Capita, WCP in OECD countries (1996-2007)

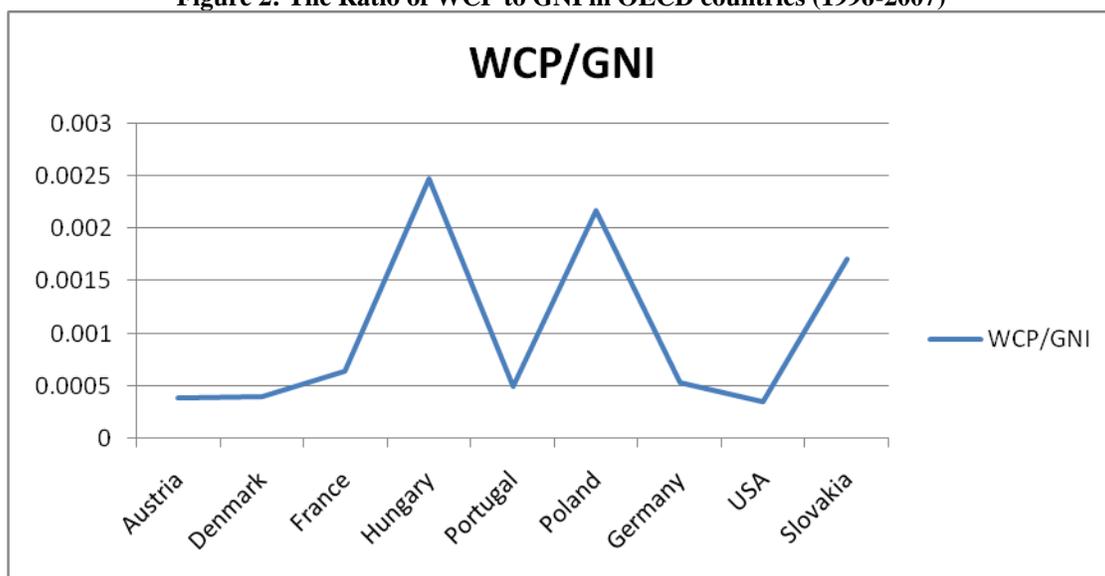
	Austria	Denmark	France	Hungary	Portugal	Poland	Germany	USA	Slovakia
GNI	23302	28669	22102	4583	10779	4595	25128	35688	5888
WCP	8.8589	11.4705	14.2549	11.3650	5.2741	10.0118	13.2662	12.3832	10.0766
WCP/GNI*	0.0004	0.0004	0.0006	0.0025	0.0005	0.0022	0.0005	0.0003	0.0017

Source: World Bank, World Development Indicators; *Calculated by Authors

Mean= 0.00102 and STD= 0.00086 for **WCP/GNI**.

Table 3 has shown that among OECD countries the ratio of water chemical pollution to gross domestic income (WCP/GNI) in USA is 0.0003 in which is less than other countries. The maximum ratio belongs to Hungary which is 0.0025.

Figure 2: The Ratio of WCP to GNI in OECD countries (1996-2007)



In Figure 2 we have shown the ratio of WCP/GNI for selected countries in OECD countries. It has also shown that the maximum ratio happened in Hungary. In terms of WCP/GNI Ratio among OECD and Non-OECD countries, t-test shows that there are significant differences between these two regions. The calculate t is obtained 2.5679. Since the calculated value of t is greater than tabulated t (T0.025 for 16 df =2.306) hence null hypothesis is rejected at 5% level of significance and we conclude that the proportion of water chemical pollution to gross domestic income in Non-OECD areas is greater than in OECD areas.

4. THE ESTIMATION OF MODEL AND RESULTS

In developing countries with high income, rapid economic growth and increase of demand for being benefitted from better environment is accompanied with the intension of environmental regulations. The existence of intense environmental regulations and preserving environmental standards in these countries has been resulted the entrance of foreign direct investment in these countries which have been accompanied with technologies that at the side of more efficiency, creates less contamination. In other words, the activity of multinational enterprises in these countries as a host country has considerable share in increasing efficiency and has removed the obstacles and bottlenecks of supply and by entering new technologies for the production or support from the environment and training the workers and directors, has broken down the existing monopolies and has encouraged the efficiency and competition. This matter depends on the power and amount of reaction of the local enterprises. In reality the operations of multinational enterprises in these countries are in a way that it is possible they transfer the specified technologies for the management of the contamination of the environment or controlling the quality and its operations. They may claim the supply of cleaner goods from local enterprises in these countries and encourage the local enterprises in these countries to increase the related management effects or some marketing techniques used by multinational enterprises in the level of local markets or in the international level. In other words the entrance of foreign direct investment to these countries has spillover positive effects on the technological specialties of local enterprises.

Table 4: Results of the Estimation for Non-OECD Selected Countries

Variables	Coefficient	Std Error	t -Statistics
C	-0.59	0.12	-4.79
LGNI	0.26	0.03	8.57
LFDI	0.01	0.00	6.33
LMV	0.17	0.03	5.59
LEU	0.15	0.02	5.57

R-squared= 0.9964

Adjusted R-squared= 0.9959

F-statistic= 2192

Table 4 shows the estimated coefficients for elected countries in Non-OECD region. A positive relationship between independents variables and water's chemical contamination variable is revealed. Considering all other affecting elements constant, if gross national income per capita raises about 10% pollution will raise about 2.6%. LFDI coefficient is estimated to be 0.01, assuming other influencing elements if direct international investment raises 10%, water's chemical pollution will raise 0.1%. Existence of a positive relation between levels of water contamination as an environmental quality indicator and foreign direct investment represents the fact that most of the polluting industries comes from foreign countries via direct investment. In other words, the positivity of this coefficient shows that in Non-OECD countries there is a direct relationship between water pollution which demonstrates the quality of environment and foreign direct investment. This result shows that Non-OECD countries import polluting industries. This is due to the fact that polluting industries manufacturers in OECD countries face limitations because of severe environmental pollution. Therefore they tend to move these products to countries with lower environmental standards and this is done by foreign direct investment. Hence in Non-OECD countries the relationship between water pollution and direct foreign investment is positive. [5] According to acquired coefficients from the model, LMV has been evaluated 0.17 which means that if the added value of a factory increases 10%, chemical water pollution increases 1.7%. Assuming all other influencing factors is constant. The existence of a direct relationship between levels of water pollution, as an environmental quality indicator, and LMV shows that these countries are in era of industrialization and cause harm to their environment by importing polluting industrial facilities. It can also be concluded that in these countries due to incompatibility of environmental laws, the composition of industries is so that mainly includes polluting industries.

LEU has been estimated to be 0.15 which reports a positive relation between this variable and water chemical variable. This means that if all other elements stay constant, a 10% increase in energy consumption variable,

increases the dispersed water pollution by 1.5%. The discussed countries in this group which mainly are developing countries, mostly are in era of industrialization and mostly do not pay enough attention to natural fuels.

5. CONCLUSION

The main purpose of this study was an evaluation of water pollution in Non-OECD and selected countries, by using panel data model for the period of 1996-2007. This study has revealed, there is significant relationship between FDI and water pollution in Non-OECD selected countries. In fact foreign direct investment will increase the water pollution in Non-OECD selected countries. In this study we assume that the conditions of globalization, environmental regulations easier to come into force in developing countries. In fact, such regulation went into an advantage in this situation is causing pollution attractive to foreign capital. Because investors seek a haven for their pollution control rules to avoid paying heavy environmental pollution in the country. As the results have shown, the relationship between GDP per capita and water pollution in Non-OECD selected countries is positive.

This study has shown that among these countries the ratio of water chemical pollution to gross domestic income (WCP/GNI) in Latvia is 0.0015 which is smaller than other countries. It has also shown that the maximum ratio happened in Tajikistan. In terms of WCP/GNI Ratio among OECD and Non-OECD countries, t-test shows that there are significant differences between these two regions. The calculate t is obtained 2.5679. Since the calculated value of t is greater than tabulated t ($T_{0.025}$ for 16 df =2.306) hence null hypothesis is rejected at 5% level of significance and we conclude that the proportion of water chemical pollution to gross domestic income in Non-OECD areas is greater than in OECD areas.

6. SUGGESTIONS AND RECOMMENDATIONS

According to gained results from presented research, it seems; the scope of research can be increased so we have to expand and improve Data base. For example we can focus on the other types of pollutants and observe FDI effects on different kinds of pollutants and compare them. We can also observe FDI environmental effects on Iran and other developing countries.

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