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Does Environmental Policy Stringency impact the flow of FDI? A study in Indian Manufacturing sector in relation with OECD countries

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Abstract

The pollution haven hypothesis postulates how industrial nations seek to set up factories in countries with cheapest resources and lowest environmental regulation cost. FDI in polluting industries flows from countries with stringent environmental regulations to those with slack regulations. With this background this paper tries to assess the validity of the pollution haven hypothesis employing graphical and panel data analysis. Assuming that manufacturing sector is the most polluting sector we examine the relationship between environmental policy stringency and percentage share of manufacturing FDI in India for the period 2003 to 2015 and also of five OECD countries (United States, United Kingdom, South Korea, Japan and Germany) where environmental policies are highly stringent. Study found that in Germany, Japan and South Korea a growing strictness in environmental policy is followed by a falling share in manufacturing FDI inflow. In our next effort, to assess the relationship between the policy stringency differences across countries and flow of polluting FDI, by using panel data analysis we find significant econometrical evidence that changing differences in environmental policy stringency has been influencing the inflow of polluting FDI in India.

1.0 Introduction

100 years ago Ricardo showed how comparative advantage can shape business decision making. At that time it was thought that relative factor abundance was the only source of comparative advantage. Now a day in the era of globalization it is known to all that comparative cost advantage is not only the foundation of international trade but also the most important basis of international investment flow. Again, we find that the comparative advantage is enriched by a newly origin component –the environmental regulation cost.

FDI has risen equal to \$1.757trillion in 2016 representing 2.67% percent of world GDP. Foreign direct investment (FDI) has become a key factor of growing integration among countries. FDI is also very closely linked to GDP and its growth prospects (the FDI Report 2017). In India FDI has become an important part of the economy after the adoption of the New Economic Policy. In first half of the 2015, India attracted investment of \$31 billion compared to \$28 billion and \$27 billion of China and the US respectively becoming the top destination for foreign direct investment.

There has been an interesting association of FDI and natural environment. It is argued that the global trend towards trade and investment liberalization deepen environmental pressures because countries compete for an increased share of foreign investment by taking the strategy of ‘race to the bottom’ on environmental regulations. It is because the

adoption of more stringent environmental standards could reduce a country's competitive advantage. Environmental regulations add to the production cost and international investors choose their destination where the cost is the minimum.

Opposite to this opinion some policymakers have also argued that a more stringent environmental regulation instead of discouraging attracts the flow of FDI with the argument that it reduces the risks of environmental liabilities and encourage exploiting the competitive advancement based on technological innovation.

The idea of preserving the environmental quality has been increasingly receiving a comprehensive importance in recent decades. The concern for the environmental impacts of cross-border trade and investment flow is growing internationally which is reflected by increasing number of international treaties for environmental regulation. The WTO is also committed to the goal of sustainable development.

In poor countries environmental quality is considered to be a luxury where a faster development is more important. In those countries international investment is encouraged by reduction in national environmental standard. As the economy grows, people's preference moves toward a cleaner environment. Higher economic growth is associated with improved environmental quality (Phukan, 2017). Like other criterion the environmental quality also becomes one of the determinants of the value of a site. In those countries environmental aspects are highly regulated.

In their research document presented to the OECD Conference on FDI and the Environment (The Hague, 28-29 January 1999), Muthukumara Mani and David Wheeler ranked the polluting industries. In their list of top ten polluting industries a total of eight industries hailed from the manufacturing sector. These industries were Iron and Steel, Non-Ferrous Metals, Non-Metallic Products, Pulp and Paper, Leather Products, Industrial Chemicals, Metal Products and Rubber Products. On the above background this paper tries to assess the relationship between the environmental policy stringency and direction of the flow of FDI in polluting sectors.

1.1 Environmental Regulations in India

A good environment is a constitutional right to the citizens of India. It has also been a fundamental duty of Indian citizens to protect natural environment and wildlife. The Directive Principle of State Policy of the Constitution states that it is a duty of the government to 'protect and improve the environment and to safeguard the forests and wildlife of the country'. The Ministry of Environment and Forests (MoEF) is the highest administrative body for regulating and ensuring environmental protection and for the formulation of environmental policy framework.

The responsibility for prevention and control of industrial pollution is primarily accomplished by a central level statutory authority -the Central Pollution Control Board (CPCB) which is attached to MoEF. In state level also there are State Pollution Control Boards in all states.

Central Government has enacted several laws for Environmental Protection. Among these laws The Environment (Protection) Act, 1986, is the umbrella legislation which authorizes the Central Government to protect and improve environmental quality, control and reduce pollution from all sources, and prohibit or restrict the setting and /or operation of any industrial facility on environmental grounds.

The Central Pollution Control Board (CPCB) has developed National Standards for Effluents and Emission under the statutory powers of the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981. These standards have been approved and notified by the Government of India, Ministry of Environment & Forests, under Section 25 of the Environmental (Protection) Act, 1986. Besides, standards for ambient air quality, ambient noise, automobile and fuels quality specifications for petrol and diesel are also there. Guidelines have also been developed separately for hospital waste management.

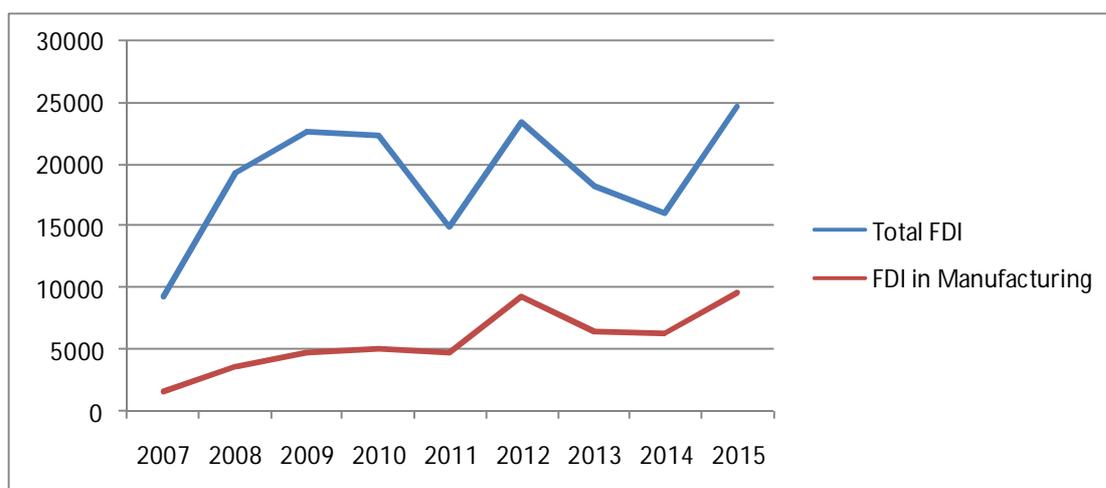
1.2 Flow of FDI in Manufacturing Sector of India (in \$million)

Manufacturing has emerged as one of the highest growing sectors in India. India has become one of the most attractive destinations for investments in the manufacturing sector. The Gross Value Added (GVA) at basic constant (2011-12) prices from the manufacturing sector in India grew 7.9 per cent year-on-year in 2016-17, as per the 2nd provisional estimate of annual national income published by the Government of India. Foreign Direct Investment (FDI) inflows in India’s manufacturing sector grew by 82 per year-on-year to US\$ 16.13 billion during April-November 2016.

Table-1 shows the flow of manufacturing FDI in India and also total FDI inflow during the period 2007-2015

Table-1: Flow of FDI in Indian Manufacturing Sector (in \$ million)

Year	Total FDI inflow	FDI in Manufacturing
2007	9307	1642
2008	19425	3726
2009	22697	4777
2010	22461	5143
2011	14939	4793
2012	23473	9337
2013	18286	6528
2014	16054	6381
2015	24748	9613



1.3 Review of Literature

Variations in environmental stringency have resulted anxieties among the researchers about the impact of environmental regulation on international investment flows. Several empirical works have been done to test the pollution haven hypothesis. However the literature has failed so far to produce conclusive evidence confirming that differences in environmental regulations across countries are a significant determinant of trade and investment flows (**Smarzynska and Wei**, 2001). It is critical to understand the environmental effects of private investment and identify appropriate responses (**Mabey and McNall**, 1999). Economic growth has generated countervailing effects through increases in regulation, technical expertise, and investment in cleaner production (**Mani and Wheeler**, 1997). Environmental regulations have greatly improved air and water quality, especially in areas that were dirtiest before regulation (**Wayne B. Gray**, 1999).

Mani, Pargal and Huq (1996) studying determinants of the location of new manufacturing plants in India found that the plants' locational choice wasn't adversely affected by the stringency of environmental enforcement. **Kirkpatrick and Shimamoto**(2008) assessing the impact of environmental regulation in host countries on Japanese foreign direct investment (FDI) decision -making to test the pollution haven hypothesis using data on national environmental regulation standards and Japanese inward FDI in five dirty industries did not find evidence in support of the pollution heaven hypothesis. Instead they found that inward Japanese FDI appears to be attracted to countries which have committed themselves to a transparent and stable environment regulatory environment. Similar finding was established by **LiseTole and Gary Koop** (2008) empirically analyzing the location decisions of the world's major gold mining with conclusion that the investment appears to be attracted to countries that have a clean environment. The impact of regulations may vary from country to country. **Kostakis and Lolos** (2016) found that FDI inflows have led to environmental degradation in Brazil but not in Singapore. **Jha and Rabindran** (2002) found that in India exports and FDI grew in the more polluting sectors relative to the less polluting sectors in the post-liberalization period. **Frank S. Arnold** (2000) found no evidence that U.S. environmental regulation causes large-scale plant closures and job losses, that it impairs our international competitiveness, or that it encourages companies to flee to nations with more lax environmental protection requirements.

2.0 Objectives

1. To see the relationship between environmental regulation stringency and direction of the flow of FDI.
2. To examine the difference of environmental regulations across the countries.
3. To test the proposition that loose environmental policy stringency is attractive polluting FDI to India.

2.1 Research Questions

Does environmental policy stringency have influence over the determination of the direction of Foreign Direct Investment of polluting industries?

2.2 Methodology

Data

Firstly, the total inflow of FDI in six countries viz. India, United States, United Kingdom, Japan, South Korea and Germany are collected from the sources Reserve Bank of India and OECD. Then the percentage share of manufacturing FDI is computed.

Secondly we are computing the percentage share of United States, United Kingdom, Japan, South Korea and Germany in Indian manufacturing FDI for the period 2003-2015 taking data from RBI.

To measure the strictness of environmental policies we are using the Environmental Policy Stringency Index (ESI) constructed by OECD. The OECD Environmental Policy Stringency Index (EPS) is a country-specific and internationally-comparable measure of the stringency of environmental policy. Stringency is defined as the degree to which environmental policies put an explicit or implicit price on polluting or environmentally harmful behaviour. The index ranges from 0 (not stringent) to 6 (highest degree of stringency). The index covers 28 OECD and 6 BRIICS countries for the period 1990-2012. The index is based on the degree of stringency of 14 environmental policy instruments, primarily related to climate and air pollution.

Methods

Graphical methodology has been put in use to see the relationship between environmental policy stringency and percentage flow of manufacturing FDI for the six countries in separate graph.

To examine whether the difference in environmental policy stringency influences the direction of the flow of FDI in polluting sector we are considering the inflow of FDI in Indian manufacturing sector from five countries where environmental regulations are highly stringent. Firstly we are calculating the differences of Environmental Stringency Index of these countries with that of India and have taken it as independent variable. Next, we are calculating the percentage contribution of these countries to Indian manufacturing FDI which is taken as the dependent variable in our statistical analysis.

3.0 Environmental regulation and flow of FDI in manufacturing sector

The following figures show the relationship between environmental regulation (measured by Environmental Policy Stringency Index formulated by OECD) and percentage share of manufacturing FDI in six countries viz. India, United States, United Kingdom, Germany, Japan and South Korea during the period 2007-2015.

Figure-1: ESI and inflow of FDI in manufacturing: INDIA

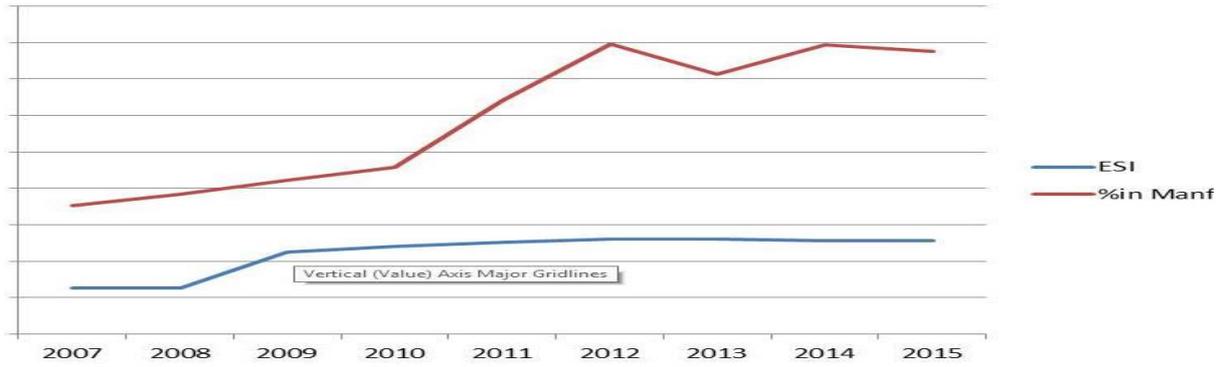


Figure-2: ESI and inflow of FDI in manufacturing: UNITED STATES

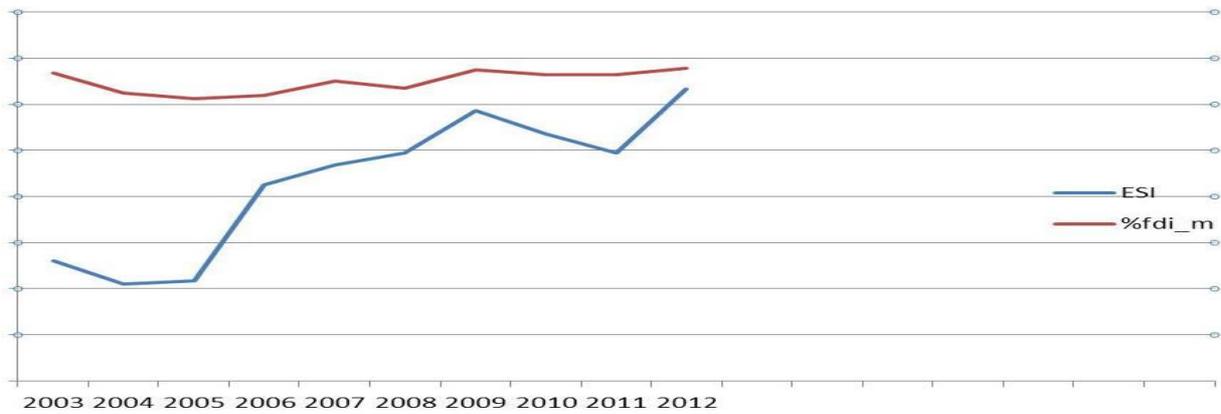


Figure-3: ESI and inflow of FDI in manufacturing: UNITED KINGDOM

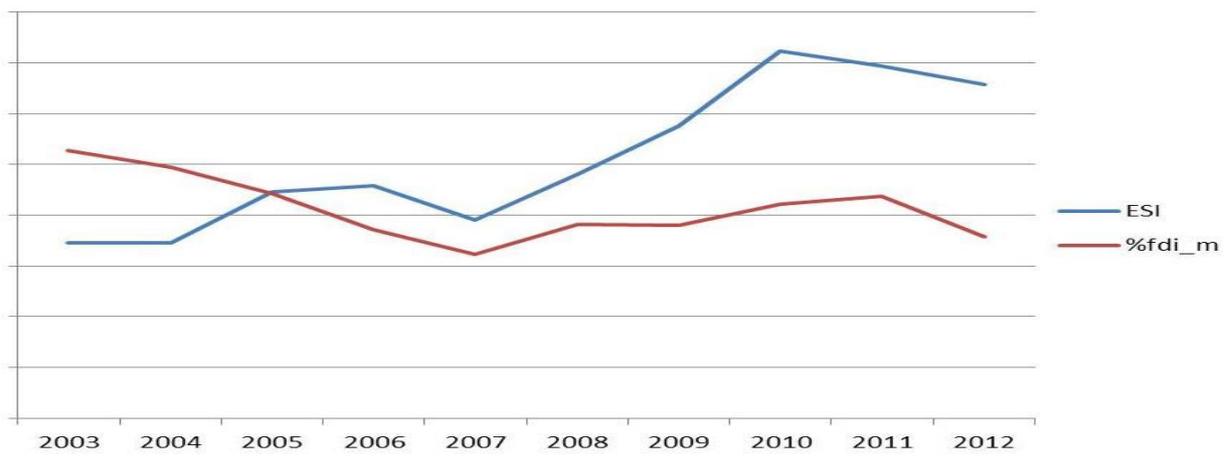


Figure-4: ESI and inflow of FDI in manufacturing: GERMANY

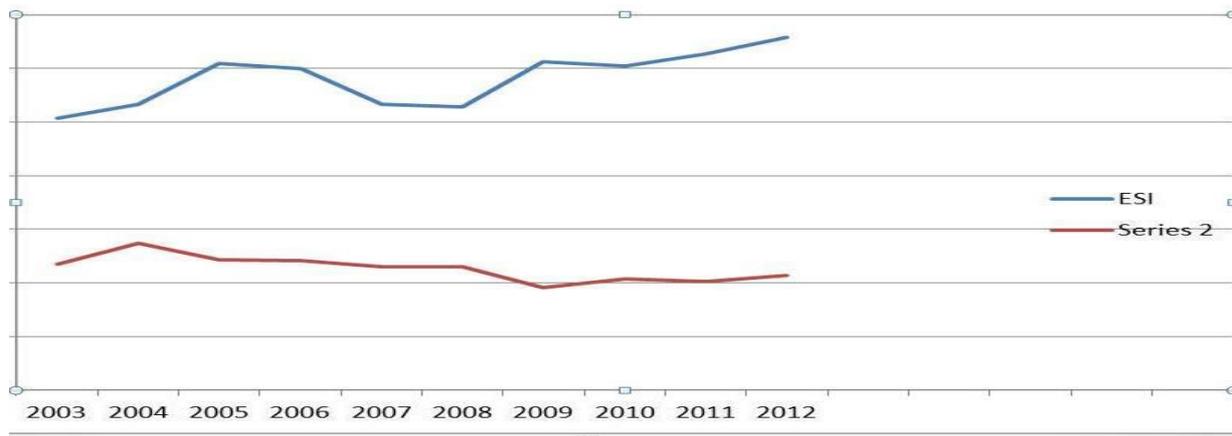


Figure-5: ESI and inflow of FDI in manufacturing: JAPAN

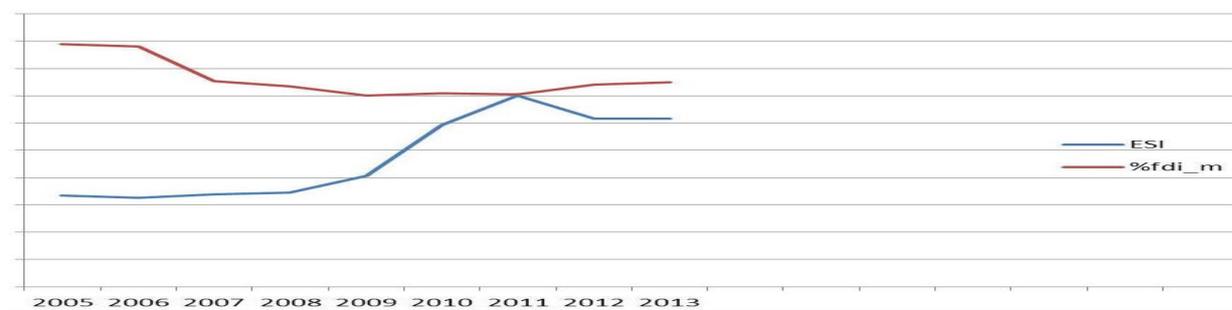
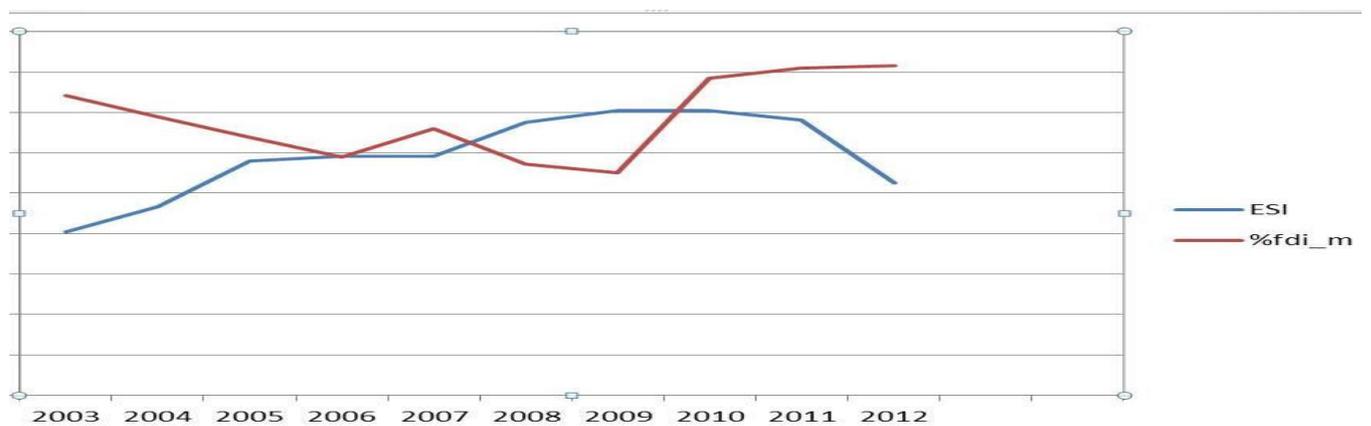


Figure-6: ESI and inflow of FDI in manufacturing: SOUTH KOREA



Findings

It was expected that the progression of environmental policy stringency would reduce the inflow of polluting FDI. Graphical analysis reveals the following results.

- **In India** both ESI and Manufacturing FDI are raising.
- **In United States** both ESI and Manufacturing FDI are raising but **ESI is rising more sharply**.
- **In United Kingdom** both ESI and Manufacturing FDI are following **the same direction**.

- In **Germany** ESI and Manufacturing FDI are **following opposite direction**.
- In **Japan** ESI and Manufacturing FDI are **following opposite direction**, as expected.
- In **South Korea** ESI and Manufacturing FDI are **following opposite trend**.

4.0 Does difference in Environmental Policy Stringency directs the Flow of FDI in manufacturing sector?

To examine whether the difference in environmental policy stringency influences the direction of the flow of FDI in polluting sector we are considering the inflow of FDI in Indian manufacturing sector from five countries where environmental regulations are highly stringent. Firstly we are calculating the differences of Environmental Stringency Index of these countries with that of India and have taken it as the independent variable. Next, we are calculating the percentage contribution of these countries to Indian manufacturing FDI which is taken as the dependent variable in our statistical analysis.

The model for panel data analysis is

$$Y_{it} = \alpha + \beta X_{it} + \epsilon_i$$

Here,

‘Y’ is the dependent variable –percentage flow of FDI in manufacturing sector

‘i’ denotes countries United States, United Kingdom, Germany, South Korea and Japan

‘t’ denotes time period from 2003 to 2015

‘X’ is the independent variable: difference in Environmental Policy Stringency of the specified countries with that of India.

Running Panel Regression we find the following results

Model 1: Fixed-effects, using 45 observations				
Included 5 cross-sectional units				
Time-series length = 9				
Dependent variable: fFDI				
	coefficient	std. error	t-ratio	p-value
const	-0.00684389	1.71885	-0.003982	0.9968
difESI	2.17260	0.941323	2.308	0.0264 **

** Statistically significant at 5%

Finding: Difference in environmental policy stringency has a positive relationship with the flow of FDI in manufacturing sector.

Conclusion

International investors choose location for their investment where cost of production is the lowest. Environmental regulation imposes a heavy cost in countries where environmental policies are highly stringent. Therefore it is expected that flow of FDI in polluting industries will move to locations with slack environmental standards. Our analysis concludes that difference in environmental policy stringency has influenced the inflow of FDI in manufacturing sector of India.

References

1. Adam, J. (1997), "Environmental Policy and Competitiveness in a Globalization Economy: Conceptual Issues and a Review of the Empirical Evidence, in OECD", Globalization and Environment: Preliminary Perspectives, Paris, OECD.
2. Arnold, F., Forrest, A. and Dujack, R: (1999) "Environmental Protection: Is it Bad for the Economy?," Applied Microeconomics Incorporated.
3. Brunel, C. and A. Levinson (2013), "Measuring Environmental Regulatory Stringency", OECD Trade and Environment Working Papers, 2013/05, OECD Publishing, Paris. <http://dx.doi.org/10.1787/5k41t69f6f6d-en>
4. Dechezlepretre, A. and Sato, M., (2014): "The impacts of environmental regulations on competitiveness" Policy brief November 2014
5. Eskeland GS and Harrison AE (2003) 'Moving to Greener Pastures? Multinationals and the Pollution Haven' Journal of Development Economics , vol70,pp1 -23
6. Friedman, J., D. A. Gerloeski and J. Silberman (1992), "What Attracts Foreign Multinational Corporations? Evidence from Branch Plant Location in the United State," Journal of Regional Science , Vol. 32, No.4, pp. 403 -418.
7. Joshi, S., Krishnan, R. and Lave, L. (2002), "Estimating the Hidden Costs of Environmental Regulation" CES 02-10 May, 2002
8. Mani, M. and D. Wheeler (1999), "In Search of Pollution Havens?: Dirty Industry in the World Economy 1960 -1995, in Fredriksson, P. G. (ed.) Trade, Global Policy and the Environment ," World Bank Discussion Paper, No. 402, Washington, D. C., World Bank.
9. Mani, M., Pargal, S. and Huq, M. (1996): "Does Environmental Regulation Matter? Determination of the Location of New Manufacturing Plants in India in 1994," The World Bank
10. Murty, M., Kumar, S. and Paul, M., (2001): "Environmental Regulation, Productive Efficiency and Cost of Pollution Abatement: A Case Study of Sugar Industry in India", Institute of Economic Growth Delhi University, Enclave Delhi-110007
11. OECD (1997), "Foreign Direct Investment and the Environment: An Overview of the Literature ," <http://www.oecd.org/daf/cmisis/fdi/fdienv.htm>
12. Phukan, K.(2017): "Environmental Kuznets Curve Hypothesis: A Cross Sectional Study.", South Asian Journal of Multidisciplinary Studies. Volume- 4, Issue- 4, pp233-247.
13. Rastogi, R. and Sawhney, A. (2013): "What Attracts FDI in Indian Manufacturing Industries?," Discussion Paper 13-02, Centre for International Trade and Development, School of International Studies. Jawaharlal Nehru University
14. Tole, L. and Koop, G. (2008): "Do Environmental Regulations Act the Location Decisions of Multinational Gold Mining Firms?" Department of Economics, University of Strathclyde.

Internet Sources

- a. Country-wise and Industry-wise flow of Foreign Direct Investment in India www.rbi.org.in (accessed on 23rd July 2017, 4.30 pm)
- b. Environmental Policy Stringency Index –OECD, www.oecd.org (Accessed on 22nd July 2017, 9.15 pm)