International Journal of Social Science and Economic Research

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

DETERMINANTS OF FOREIGN DIRECT INVESTMENT INFLOW TO ODISHA: AN EMPIRICAL ANALYSIS

Anima Tirkey

Assistant Professor of Economics, Government Women's College, Balangir, Odisha, India.

DOI: 10.46609/IJSSER.2020.v05i07.012 URL: https://doi.org/10.46609/IJSSER.2020.v05i07.012

ABSTRACT

This paper attempts to examine the important factors that determine Foreign Direct Investment (FDI) inflow to Odisha in India. Augmented Dickey Fuller (ADF) test is applied for stationarity test of variables for time series analysis to avoid spurious regression result. The study is based on secondary sources of data from Department of Industrial Policy and Promotion Govt. of India, Directorate of Industries Govt of Odisha, Economic Survey of Odisha and Annual Survey of Industries Govt. of Odisha. Augmented Dickey Fuller (ADF) test is applied for stationarity test of variables for time series analysis to avoid spurious regression result. Simple Ordinary Least Square (OLS) method is applied to analyse the determinants of FDI inflow to Odisha and found that huge availability of mineral reserve in the state has statistically significant impact on FDI inflow to Odisha whereas market size measured by Gross State Domestic Product (GSDP), availability of power, domestic investment measured by Gross capital formation and capital expenditure, and installed capacity of power have insignificant impact on FDI inflow to Odisha during the study period from 1994-95 to 2014-15.

Keywords: Mineral Reserve, FDI, ADF, OLS, Odisha.

1. INTRODUCTION

Odisha has emerged as a preferred investment destination for mineral based industries in India after economic reform 1991. Odisha is consistently ranked amongst the top three states in terms of live manufacturing investments in India (Economic survey of Odisha, 2018-19). Odisha has attracted large proportion of total FDI inflow in the industrial sector. Vedanta in Kalahandi and Jharsuguda is the leading investing foreign company which invested to produce Aluminium. So the study attempts to examine what may be the factors in Odisha that plays an important role in attracting a large volume of FDI in Odisha.

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

2. REVIEW OF LITERATURE

After economic reform many empirical studies have been carried on issues relating determinants of FDI inflow to India. The following table shows the brief review of literature in the context of India and many other countries.

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

Table 1: Summary of the Review of literature on the Determinants of FDI

Author (s)	Country	Period of study	Methodology	Determinants	Findings
Borensztein.et.al. (1998)	69 developing countries	1970-1989	Panel data, Regression & SUR	Quality labour force and infrastructure	Significant
Nagraj (2003)	India	1991-2000	Analytical Discussion	Liberal policy regime, industrial labour market reforms and infrastructure investment	Significant
Banga (2003)	India	1980-2000	Random Effect Model	Large market size, low labour cost, high productivity of labour, financial health of the economy and higher availability of electricity	Significant
Nonnemberg & Cardoso de Mendonca (2004)	38 developing countries	1975-2000	Panel data analysis	Level of schooling, degree of openness of the economy, inflation and average rate of economic growth.	Significant
Alfaro, Chanda, Ozcan & Sayek (2004)	78 countries (India)	1975-1995	Cross section data Correlation, regression & Descriptive statistics	Financial market	Significant
Rao & Murty (2006)	India	1991-2004	Regression	Fuels (Power & Oil Refining), Metallurgical industries, Transportation Industry, Hotel & Tourism, and service sector	Significant
Balasubramanyam and Sapsford (2007)	India & China	1980-2005	Discussion Method	Factor endowment	Significant
Singh (2009)	Indian states	1991-2008	Descriptive	Liberal FDI Policies	Significant

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

Narayanamurthy & Rao (2010)	BRICS countries	1975-2007	Panel data analysis	Market size, Labour cost, Infrastructure, Currency value and Gross Capital formation	Significant
Muhammad Azam, Ling Lukman (2010)	India, Indonesia & Pakistan	1970-2005	Log linear regression model, OLS	Market size, external debt, domestic investment, trade openness, and physical infrastructure	Significant
Singh (2010)	India	1980-2010	Descriptive	Liberal FDI Policies	Significant
Sidhu & Dhingra (2011)	India	1990-2010	Exploratory Factor Analysis Technique, Principal Component Analysis (PCA),	High Human development index, high literacy rate, high per capita income, freedom from corruption, physical infrastructure and the size of the market	Significant
Hussaini (2011)	India	1991-2009	Karl Pearson's Coefficient of Correlation (r)	GDP & Openness of trade	Significant
Hooda (2011)	India	1991-2009	OLS	Trade GDP, Research and Development GDP, Financial position, exchange rate, Reserves GDP	Significant
Ranjan & Agrawal (2011)	BRIC countries	1975-2009	Random effect model, Panel data	Market size, trade openness, labour cost, infrastructure facilities, macroeconomic stability and growth prospects	Significant
Bhavan,Changsheng and Chunpung (2011)	South Asian Countries	1995-2008	Panel data and Arellano-Bond dynamic panel system method	Pulling pushing cyclical factors Economic growth rates	Significant
Mukherjee (2011)	31 states including Odisha	2001-2011	Regression, Panel data	Market size, agglomeration effects and size of manufacturing and services base	Significant
Sahni (2012)	India	1992-2009	OLS	GDP, inflation and Trade Openness	Significant
Jadhav (2012)	BRICS	2000-2009	Panel unit-root test and	Market Size measured by real GDP, Trade	Significant

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

	Countries		multiple regressions	openness and natural resources are economic determinants whereas Macroeconomic Stability, Inflation Rate, Political stability, Government Effectiveness, Regulatory Quality, Control of corruption, Voice and accountability, Rule of Law	
Lokesha & Leelavathy (2012)	India	1990-2010	Descriptive	Policy framework, market size, economic stability and political factors	Significant
Lautier & Moreaub (2012)	68 developing countries	1984-2004	Regression, Descriptive statistics	Domestic investment	Significant
Chatterjee, Mishra and Chatterjee (2013)	India	2000-2010	Panel data analysis	Level and variability in profitability	Significant
Sisili & Elango (2013)	India	1973-1995	Correlation	Size of Market & Growth of Market	Significant
Sharmiladevi & Saifilali (2013)	India	2000-2012	time series data and ordinary Least Square (OLS) method	Growth rate, inflation, Index of Industrial Production, exports	Significant
Asiedu (2013)	99 developing countries	1984-2011	Panel data	Natural resources and institution	Positive effect of good institution on FDI
Hassan, Aslam & Sameer (2013)	Malaysia	1980-2010	Time series, OLS	Human Capital	Significant
Roy (2014)	India	2000-2005	Descriptive statistics and Correlation	Human capital and financial assistance	Significant

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

Parashar (2015)	India & China	1980-2013	Linear regression analysis, the time series data, OLS, partial least squares analysis	Lower wage rates (China) Policy reform (India)	Significant
Jena & Hegde (2015)	India	1991-2012	Linear regression method and factor analysis technique	Gross Domestic Product, Wholesale Price Index, Foreign Institutional Investment, Foreign Exchange Reserve, Export, Import, Trade Balance, open and Populations growth	Significant
Pradhan & Rastogi (2015)	Indian states	2006-2012	Panel data, Regression	Mineral resources, large market size, Transport facilities, port facilities	Significant
Randelovic, Milic & Kostadinovic (2017)	6 countries of Western	2007-2015	Multiple regression analysis	Market size, the impact of market growth and population size	Significant
Ali and Nishat, 2010	Pakistan	1973-2008	Ordinary least Squares and ARDL, Panel data	Poverty, FDI inflows, Education expenditure, Exchange rate, Infant mortality rate and Female enrolment and Gross domestic product	Insignificant

Source: Various Journal Articles

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

From the review of literature, it is found large literatures on determinants of FDI inflow to India. But no literature is found in the context of determinants of FDI inflow to Odisha. Thus, the present study attempts to examine the determinants of FDI inflow in the context of Odisha.

3. OBJECTIVES OF THE STUDY

- To examine the trend of FDI inflow to Odisha
- To examine the determinants of FDI inflow to Odisha

4. HYPOTHESIS OF THE STUDY

- There is no statistically significant impact of Mineral reserves in FDI inflow to Odisha.

5. DATA SOURCES AND METHODOLOGY

The study is based on secondary sources of data. The data is collected from Department of Industrial Policy and Promotion Govt. of India, Directorate of Industries Govt of Odisha, Economic Survey of Odisha and Annual Survey of Industries Govt. of Odisha. Augmented Dickey Fuller (ADF) test is applied for stationarity test of variables for time series analysis to avoid spurious regression result. Simple Ordinary Least Square (OLS) method is applied to analyse the determinants of FDI inflow to Odisha.

6. FDI INFLOW TO ODISHA

Odisha plays an important role in attracting large FDI in the state. The following table shows the FDI inflow to India in general and Odisha in particular from 1991-92 to 2017-18 and FDI inflow to Odisha as a percentage of India. It shows the continuous FDI inflow to Odisha from 1991-92 to 20017-18. FDI inflow to Odisha as a percentage of India is more in the year 1993-94, 1995-96, 1996-97, 1997-98, 2003-04, 2006-07 and 2007-08. It has declined after 2007-08 which may be due to the severe effect of Global financial crisis on FDI.

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

Table 2: FDI inflow to Odisha as a percentage of India from 1991-92 to 2017-18

(In Rs. Million)

Year	Amount of FDI Inflow to Odisha (Rs. Million)	Annual Growth Rate of FDI inflow to Odisha (%)	Amount of FDI inflow to India (Rs. Million)	FDI inflow to Odisha as a percentage of India
1991-92	65.00	-	5202.25	1.24
1992-93	115.17	77.18	9530.63	1.21
1993-94	7796.91	6669.91	21623.53	36.06
1994-95	270.75	-96.53	41719.75	0.65
1995-96	13688.54	4955.79	77123.23	17.75
1996-97	23529.92	71.90	118982.33	19.78
1997-98	30396.07	29.18	156539.58	19.42
1998-99	1828.7	-93.98	142218.28	1.29
1999-00	2176.39	19.01	174862.78	1.24
2000-01	2382.46	9.47	193225.8	1.23
2001-02	40.14	-98.32	197703.18	0.02
2002-03	2.10	-94.77	188687.71	0.001
2003-04	40001.00	1904709.52	130295.08	30.7
2004-05	1.5	-99.99	91414.03	0.001
2005-06	3157.3	210386.67	270636.37	1.17
2006-07	400493.8	12584.69	541416.98	73.97
2007-08	84302.63	-78.95	840526.09	10.03
2008-09	420	-99.50	1375390.69	0.03
2009-10	7020	1571.43	1222386.30	0.57
2010-11	680	-90.31	1119949.51	0.06
2011-12	1250	83.82	1503490.50	0.08
2012-13	2850	128	1235642.01	0.23
2013-14	2880	1.05	1409401.97	0.20
2014-15	560	-80.56	1946253.76	0.03
2015-16	360	-35.71	1905811.80	0.02
2016-17	830	130.56	45695.84	1.82
2017-18	4150	400	647668.80	0.64
Total	**631248.38**		**15613398.78**	

Source: Compiled from DIPP, SIA News letter, Govt. of India

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

7. DETERMINANTS OF FDI INFLOW TO ODISHA

(a) Market Size

Gross State Domestic Product (GSDP) at factor cost is taken as the proxy variable of market size in Odisha. The literatures suggest that market size has significant impact on FDI inflow. If the market size of an economy is large then it will attract higher FDI inflow and vice versa i.e. an economy with large GSDP at factor cost will attract more FDI inflow.

Table 3: Trend of GSDP in Odisha from 1993-94 to 2016-17

Year	GSDP at factor Cost (In Rs. Million)
1993-94	782664
1994-95	824686
1995-96	867194
1996-97	826121
1997-98	934639
1998-99	957513
1999-00	1005762
2000-01	989070
2001-02	1049330
2002-03	1044482
2003-04	1202706
2004-05	1361308
2005-06	1438634
2006-07	1622971
2007-08	1801178
2008-09	1940693
2009-10	2028949
2010-11	2198015
2011-12	2278723
2012-13	2383696
2013-14	2591793
2014-15	2747208
2015-16	2912269
2016-17	3143638

Source: Handbook of Statistics on Indian States, Reserve Bank of India

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

(b) Large availability of Mineral reserves

Odisha has an important place in the mineral map of India. Key minerals available in state are Iron ore, Bauxite, Chromite, Manganese ore, Coal, Limestone, Dolomite, Nickel ore and Graphite. State contributes about 34.3% of total mineral production to India followed by Rajasthan, Chhattisgarh, Karnataka, Madhya Pradesh and Jharkhand. Odisha exports about 67.5% of iron ore, 31.8% manganese, 21.7% limestone and 26% coal to other states of the country (Economic survey of Odisha, 2018-19). Hence, Odisha has been an attractive destination for mineral-based industries. Odisha occupies more than 55 percent of India's total bauxite reserves which makes Odisha an ideal location for setting up aluminium based companies. Odisha occupies first position in the country in terms of both production capacity and actual output of aluminium (IBEF report).

Table 4: Share of Major Mineral Reserve of Odisha in India in 2017-18

Mineral Deposits	% share of total deposit of Odisha in India
Chromite	96
Nickel Ore	92
Graphite	77
Bauxite	53
Manganese	45
Iron Ore	35
Coal	25

Source: Odisha Economic Survey, 2018-19

Table- 4 shows the share of major mineral deposits of Odisha in India. The mineral reserves of Chromite, Nickel Ore, Graphite, Bauxite, Iron Ore, Manganese and Coal are 96 percent, 92 percent, 77 percent, 53 percent, 45 percent, 35 percent and 25 percent respectively of the total mineral deposits in India. Odisha has 75895.67 million tonnes of coal, 300.83 million tonnes of chromite, 7168.16 million tonnes of iron ore, 2047.72 million tonnes of bauxite and 1764.45 million tonnes of lime stones reserves by end of the year 2016-17 (Economic Survey of Odisha, 2017-18). The following table shows the district-wise major mineral reserve in Odisha.

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

Table 5: District-wise Major Mineral reserve in Odisha

Mineral Deposits	Districts
Bauxite	Bargarh, Balangir, Kandhamal, Keonjhar, Koraput, Kalahandi, Malkangiri, Rayagada and Sundargarh
Chromite	Balasore, Cuttack, Dhenkanal, Jajpur and Keonjhar
Coal	Angul, Dhenkanal, Jharsuguda, Sundargarh and Sambalpur
Nickel Ore	Cuttack, Keonjhar and Mayurbhanj
Graphite	Bargarh, Boudh, Balangir, Kalahandi, Koraput, Nuapada and Rayagada
Dolomite	Bargarh, Koraput, Keonjhar, Sambalpur and Sundargarh
Lime stone	Bargarh, Koraput, Malkangiri, Nuapada, Sambalpur and Sundargarh
Iron Ore	Dhenkanal, Jajpur, Keonjhar, Koraput, Mayurbhanj, Sambalpur, Sundargarh
Manganese Ore	Balangir, Keonjhar, Koraput, Rayagada, Sambalpur and Sundargarh
Mineral Sand	Puri & Ganjam

Source: Directorate of Mines, Odisha & Indian Bureau of Mines, Govt. of India

Table- 5 shows the minerals deposit in different districts of Odisha from 1991-92 to 2017-18. Bauxite is deposited in Bargarh, Balangir, Kandhamal, Kalahandi, Keonjhar, Koraput, Malkangiri, Rayagada and Sundargarh districts; chromite in Balasore, Cuttack, Dhenkanal, Jajpur and Keonjhar districts; Coal is deposited in Angul, Dhenkanal, Jharsuguda, Sundargarh and Sambalpur districts; Nickel Ore is deposited in Cuttack, Keonjhar and Mayurbhanj district; Graphite in Bargarh, Balangir, Boudh, Kalahandi, Koraput, Nuapada and Rayagada districts; Lime stone is deposited in Bargarh, Koraput, Malkangiri, Nuapada, Sambalpur and Sundargarh district; Iron ore is deposited in Dhenkanal, Jajpur, Keonjhar, Koraput, Mayurbhanj, Sambalpur and Sundargarh districts; Manganese ore in Bolangir, Keonjhar, Koraput, Rayagada, Sambalpur and Sundargarh districts and Mineral sand is deposited in Puri and Ganjam districts (Indian Minerals Yearbook, 2012).

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

Table 6: Trend of Major Mineral Reserves in Odisha (In Million Tonnes) from 1991-92 to 2017-18

Year	Bauxite	Chromite	Coal	Graphite	Iron Ore	Lime stone	Manganese	Mineral Sand	Total Mineral Reserve
1991-92	1626	183	44304	2	3120	1017	50	82	50384
1992-93	1641	183	44304	2	3489	1017	50	82	50753
1993-94	1656	183	45753	2	3645	1025	50	82	52396
1994-95	1695	183	45753	2	3645	1025	50	82	52396
1995-96	1733	183	47889	2	3767	1032	50	82	54738
1996-97	1708	183	47889	2	3767	1032	50	82	54738
1997-98	1683	183	48917	2	3567	1032	50	82	55566
1998-99	1658	183	48917	2	3567	1032	50	82	55566
1999-00	1634	183	49406	2	4200	1609	50	82	57265
2000-01	1610	183	49406	2	4200	1609	119	82	57334
2001-02	1586	183	51571	2	3567	1032	50	82	58220
2002-03	1563	183	51571	2	3567	1032	50	82	58220
2003-04	1530	111	51571	4.6	4177	2224	116	86	59820
2004-05	1808	202.96	61999	4.6	4761	1738	153	86	69232
2005-06	1743	183.6	61999	4.6	5371	1015.61	115	86	70518
2006-07	1802	180	65353	4.5	5305	1013	121	82	73861
2007-08	1801.8	179.88	65353	4.53	5305	1013.09	121.47	81.76	73861
2008-09	1811	174	65227	4.4	5153	1007	120	81.76	73861
2009-10	1806	170	65121	4.4	5073.63	1004	119	226	73332
2010-11	1800.9	166.1	65010.3	4.4	5008.3	1000.7	118.6	222.3	73332
2011-12	1806.6	159.4	71337.7	4.3	5008.3	993.7	120.1	221.8	79652
2012-13	1806.6	159.4	71337.7	4.3	4958.3	993.7	120.1	221.8	79602

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

2013-14	1808	203	73786.3	5.4	4760.2	1738	153	254.7	82709
2014-15	1808	203	73786.3	5.4	4760.2	1738	153	254.7	82709
2015-16	2047.7	300.8	75895.7	18.9	7168.2	1764.5	211.9	266.4	87674
2016-17	2047.7	300.8	75895.7	18.9	7168.2	1764.5	211.9	266.4	87674
2017-18	2039.2	319.8	77284.8	19.2	7874.6	2163.8	217.8	363.9	90283

Source: Department of Steel and Mines, Economic Survey 2018-19, Directorate of Mines and Directorate of Geology Govt. of Odisha

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

(c) Physical Infrastructure

Odisha is well known for its physical infrastructure. The state's infrastructure includes well-connected road and rail networks, airports, ports, power, Dam, hotel, banking, transportation and telecommunication. It is the first state in India to have undertaken reform and restructuring initiatives in the power sector. As of 2019, the state had a total installed power generation capacity of 7,653.58 megawatt (Economic survey of Odisha, 2018-19). There are two airport Biju Pattnaik international airport at Bhubaneswar and Veer Surendra Sai airport at Jharsuguda. This Airport is located 5 kilometers north-east of Jharsuguda at Durlaga, approximately 8.5 km from the Jharsuguda Junction railway station. Jharsuguda is the well connected place by road, rail as well as air. Railway routes pass through 22 districts of the state excluding 8 districts namely, Boudh, Deogarh, Kandhamal, Kendrapada, Malkangiri, Nabarangpur, Nayagarh and Sonepur (Odisha Economic Survey, 2009-10). All mining districts are well connected with railway to transport mineral resources easily to other districts of the Odisha and different states of India.

Power is an essential infrastructure for development of industrial sector. Power more commonly meant as electric power. Electric power has become the life blood of modern industrialisation. States that have more power generation capacity attract more FDI. There has been a growing demand for power in the state due to increasing industrialisation, urbanisation and rural electrification. There are various sources of generation available to the state are the Hydro Generating Station owned by Odisha Hydro Power Corporation, the Thermal generating station owned by Talcher Thermal Power Station and Odisha Power Generation Corporation. Some major industries like NALCO, Rourkela Steel Plant (RSP) and INDAL having their own captive power plants also supply power to Grid Corporation of Odisha. There are two airports in Odisha in Bhubaneswar and Jharsuguda. It also plays a positive role in attracting foreign investors in the state. Industrial sector consumes large proportion of total consumption by different sectors.

Table 7: Trend of availability of Power from all sources and Trend of Installed capacity of Power in Odisha (In MW)

Year	Availability of power from all sources	Installed capacity of Power
1991-92	835	1612
1992-93	857	1742
1993-94	936	1742
1994-95	997	1952
1995-96	1123	2152

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

1996-97	1195	4052
1997-98	1182	3905
1998-99	1253	4146
1999-00	1278	4275
2000-01	1387	4469
2001-02	1423	4580
2002-03	1371	4695
2003-04	1826	4815
2004-05	2025	4845
2005-06	1862	5073
2006-07	2120	5179
2007-08	2381	6068
2008-09	2268	6746
2009-10	2415	7990
2010-11	2838	9457
2011-12	2599	10114
2012-13	2776	8859
2013-14	2900	5054
2014-15	3019	5532
2015-16	2901	5594
2016-17	2962	5509
2017-18	3012	5359

Source: Odisha Economic Survey 1998-99, 2016-17 and 2018-19

(d) Domestic investment

Domestic investment is the crucial factor affects FDI in the state. Gross capital formation and capital expenditure are taken as the proxy variables of domestic investment. Foreign investors prefer to invest in that sector in which profit expectation is more and where domestic state is less. Profit of the domestic investors gets affected negatively by FDI inflow.

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

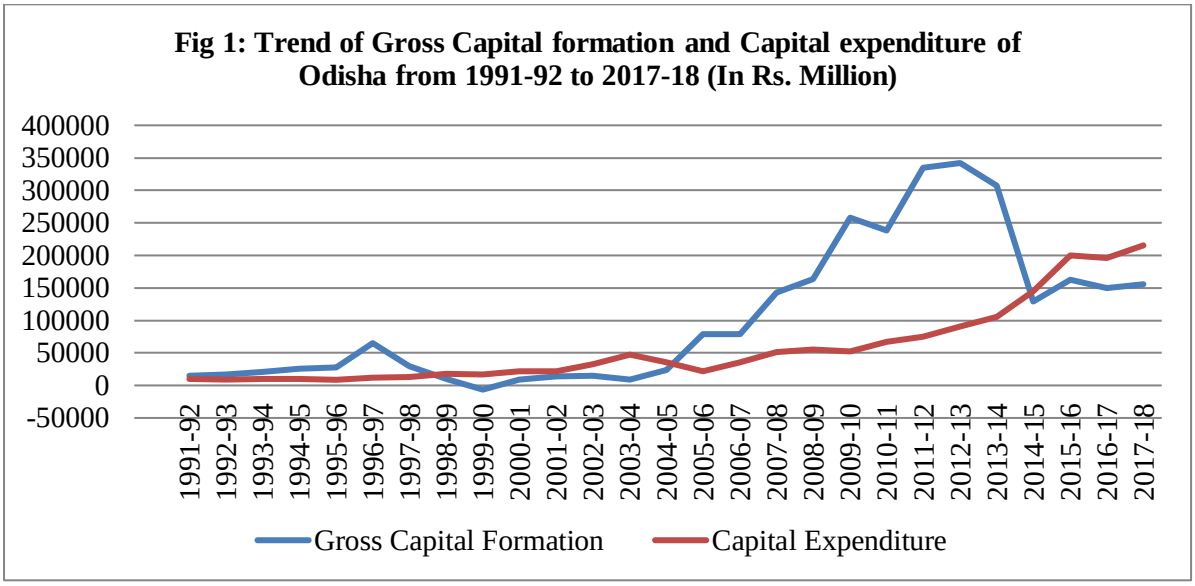
Table 8: Trend of Gross Capital Formation and Capital Expenditure in Odisha from 1991-92 to 2017-18 (In Rs. Million)

Year	Gross Capital Formation	Capital Expenditure
1991-92	14794.0	10050
1992-93	16425.2	8660
1993-94	20772.7	9730
1994-95	25242.0	9470
1995-96	27321.0	8650
1996-97	65163.5	11930
1997-98	29985.0	13180
1998-99	9683.7	18230
1999-00	6456.8	16610
2000-01	9035.4	22190
2001-02	13884.7	21870
2002-03	14859.7	32520
2003-04	9375.8	47040
2004-05	23990.4	35130
2005-06	79312.2	21430
2006-07	79220.8	35740
2007-08	142512.9	51210
2008-09	163062.4	54830
2009-10	257616.9	52490
2010-11	238208.2	66830
2011-12	334829.9	74450
2012-13	342031.2	90180
2013-14	306719.4	105130
2014-15	128979.4	144620
2015-16	162679.5	199540
2016-17	149779.6	196090
2017-18	155643.8	215360

Source: Annual Survey of Industries (ASI) and Ministry of Statistics and Programme Implementation, Government of India.

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"



8. EMPIRICAL ANALYSIS

The following equation is used as the basic model to examine the determinants of FDI inflow to Odisha.

$$\log FDI = f\{\log GSDP, \log MR, \log AP, \log GCF, \log CE, \log ICP\}$$

Here, FDI is taken as the dependent variable and other variables are considered as independent variables. The following model is specified to examine the determinants of FDI inflow to Odisha. Ordinary Least Squares (OLS) technique is applied to measure the impact of all independent variables on FDI inflow to Odisha.

$$\log FDI_t = \alpha + \beta 1 \log GSDP_t + \beta 2 \log MR_t + \beta 3 \log AP_t + \beta 4 \log GCF_t + \beta 5 \log CE_t + \beta 6 \log ICP_t + U_t$$

Here,

$\log FDI_t$= Log value of FDI during the time period t

$\log GSDP_t$= Log value of GSDP (Market Size) during the time period t

$\log MR_t$= Log value of Mineral reserve during the time period t

$\log GCF_t$= Log value of Gross Capital Formation (proxy for Domestic investment) during the time period t

$\log AP_t$= Log value of availability of Power during the time period t

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

$logCE_t$= Log value of Capital expenditure (proxy for Domestic investment) during the time period t

$logICP_t$= Log value of Installed Capacity of Power during the time period t

Ut= Error term

t= Time period

After the model specification, the OLS technique is applied for the empirical analysis taking the time series data of 21 years from 1994-95 to 2014-15. So the first step is to test whether the time series data is stationary or not because the non-stationary data will generate spurious regression results which have no practical relevance (Gujarati, 2004). Unit root test is a pre-requisite testing of long run relationship between two or more time series data. The study needs to test stationarity of the variables using unit root tests, namely Augmented-Dickey Fuller (ADF) test to avoid the spurious regression results. After getting the time series data in the stationary form, we calculate the descriptive statistics and regression results. The result of the unit root test (using ADF test) has been shown in the following table.

Table 9: Result of ADF Unit Root Test

Null Hypothesis: log(FDI) has a unit root	Exogenous: Constant, Linear Trend	Lag Length: 0 (Automatic-based on SIC, Maxlag=4)	NA	NA
	t- Statistics (level)	Prob.	NA	NA
Augmented Dickey-Fuller test statistics	-4.399308	0.0026	NA	NA
Null Hypothesis: log(GSDP) has a unit root	Exogenous: Constant, Linear Trend	Lag Length: 0 (Automatic-based on SIC, Maxlag=4)	Null Hypothesis: D(logGSDP) has a unit root Exogenous: Constant, Linear Trend	Lag Length: 0 (Automatic-based on SIC, Maxlag=4
	t- Statistics (level)	Prob.	t- Statistics (1^{st} difference)	Prob.

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

Augmented Dickey-Fuller test statistics	-0.748417	0.9903	-4.742702	0.0014
Null Hypothesis: log(Mineralreserve) has a unit root	Exogenous: Constant, Linear Trend	Lag Length: 0 (Automatic-based on SIC, Maxlag=4)	Null Hypothesis: D(logMineralreserve) has a unit root Exogenous: Constant, Linear Trend	Lag Length: 0 (Automatic-based on SIC, Maxlag=4)
	t- Statistics (level)	Prob.	t- Statistics (1st difference)	Prob.
Augmented Dickey-Fuller test statistics	-0.282835	0.9122	-4.756915	0.0013
Null Hypothesis: log(AvailabilityofPower) has a unit root	Exogenous: Constant, Linear Trend	Lag Length: 2 (Automatic-based on SIC, Maxlag=4)	Null Hypothesis: D(logAvailabilityofPower) has a unit root Exogenous: Constant, Linear Trend	Lag Length: 1 (Automatic-based on SIC, Maxlag=4)
	t- Statistics (level)	Prob.	t- Statistics (1st difference)	Prob.
Augmented Dickey-Fuller test statistics	-0.626111	0.8425	-6.769876	0.0000
Null Hypothesis: log(GCF) has a unit root	Exogenous: Constant, Linear Trend	Lag Length: 1 (Automatic-based on SIC, Maxlag=4)	Null Hypothesis: D(logGCF) has a unit root Exogenous: Constant, Linear Trend	Lag Length: 0 (Automatic-based on SIC, Maxlag=4)
	t- Statistics (level)	Prob.	t- Statistics (1st difference)	Prob.
Augmented Dickey-Fuller test statistics	-1.278932	0.6181	-3.101566	0.0427
Null Hypothesis: log(Capitalexpenditure) has	Exogenous: Constant,	Lag Length: 0	Null Hypothesis: D(logcapitalexpenditure) has	Lag Length: 2

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

a unit root	Linear Trend	(Automatic-based on SIC, Maxlag=4)	a unit root Exogenous: Constant, Linear Trend	(Automatic-based on SIC, Maxlag=4)
	t- Statistics (level)	Prob.	t- Statistics (1st difference)	Prob.
Augmented Dickey-Fuller test statistics	-0.108126	0.9364	-4.491206	0.0028
Null Hypothesis: log(Installedcapacitypower) has a unit root	Exogenous: Constant, Linear Trend	Lag Length: 0 (Automatic-based on SIC, Maxlag=4)	Null Hypothesis: D(logInstalledcapacitypower) has a unit root Exogenous: Constant, Linear Trend	Lag Length: 0 (Automatic-based on SIC, Maxlag=4)
	t- Statistics (level)	Prob.	t- Statistics (1st difference)	Prob.
Augmented Dickey-Fuller test statistics	-2.459931	0.1388	-3.793810	0.0103

Source: Author's Calculation by using E-views Software

The ADF test result presented in Table-9 shows that log(FDI) is stationary at level and all other variables i.e. log(GSDP), log(Mineralreserve), log(AvailabilityofPower), log(GCF), log(Capitalexpenditure) and log(Installedcapacityofpower) are stationary at their first difference i.e. integrated of order 1 indicates that null hypothesis of the variables are rejected in their first differences. The simple OLS test is applied to find out the determinants of FDI inflow to Odisha during the study period where logFDI is the dependent variable.

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

Table 10: Simple OLS Results

Dependent Variable: Log(FDI)			
Method: Least Squares			
Time Period: 1994-95 to 2014-15			
Variable	Coefficient	t-Statistic	Prob.
C	-331.0864	-2.197385	0.0453
log(GSDP)	-7.722561	-0.642594	0.5309
log(MR)	47.98663	2.237766	0.0420
log(AP)	-11.73828	-1.078948	0.2988
log(GCF)	0.943028	0.908149	0.3792
log(CE)	-2.787791	-0.871244	0.3983
log(ICP)	2.595930	0.983225	0.3422
R-squared=0.52, Adjusted R-squared=0.31, Durbin Watson stat=2.65, Akaike Info Criterion (AIC)=4.99, Schwarz Info Criterion (SIC)=5.34, Prob. (F-statistics)=0.07			

The regression results presented in Table-10 are considered appropriate for the analysis of the fitted model. The value of R^2 (0.52) is greater than the adjusted R^2 value 0.31. The value of R^2 is also known as coefficient of determination and used to know the goodness of the fitted model. The value of R^2 (0.52) indicates that 52 percent variation in the dependent variable i.e. logFDI is explained by the explanatory variables. The other 48 percent variations are explained by the exogenous variables included in the error term.

$$\log FDI_t = \alpha + \beta 1\ \log GSDP_t + \beta 2\ \log MR_t + \beta 3\ \log AP_t + \beta 4\ \log GCF_t + \beta 5\ \log CE_t + \beta 6\ \log ICP_t + U_t$$

$$\log FDI_t = -331.086 + (-7.722)\ \log GSDP_t + 47.986\ \log MR_t + (-11.738)\ \log AP_t + 0.943\ \log GCF_t + (-2.787)\ \log CE_t + 2.595\ \log ICP_t + U_t$$

t- Statistics (-0.64) (2.23*) (-1.07) (0.90) (-0.87) (0.98)

From the above regression results it is found that the estimated coefficient of log(MR) has significant positive impact on FDI inflow to Odisha during the study period. The estimated coefficients of log(GSDP), log(AP), log(GCF), log(CE) and log(ICP) have shown insignificant impact on log(FDI) that means no exact inference can be drawn about their impact on FDI inflow to Odisha particularly in the study period. The regression result shows that 1 percent increase in the mineral reserve for log(MR) leads to 4798.6 percent increase in FDI inflow to Odisha. The

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

whole analysis of OLS test result of determinants of FDI inflow to Odisha can be concluded that GSDP at factor cost, availability of power, installed capacity of power, domestic investment measured by Gross capital formation and Capital expenditure have insignificant impact whereas huge availability of mineral resources in the state has statistically significant impact on FDI inflow to Odisha.

9. CONCLUSION

The analysis of OLS test result of determinants of FDI inflow to Odisha is concluded that market size measured by GSDP at factor cost, availability of power, installed capacity of power, domestic investment measured by Gross capital formation and Capital expenditure have insignificant impact whereas huge availability of mineral reserves in the state has statistically significant impact on FDI inflow to Odisha. Therefore, the study suggests that Govt. of Odisha should allow more FDI for the exploration of mineral resources for the progress of the state.

REFERENCES

Alfaro, L., Chandab, A., Ozcanc, S.K. & Sayekd, S. (2004). FDI and economic growth: the role of local financial markets. *Journal of International Economics*, Vol. 64, pp. 89-112.

Ali, M., Nishat, M. & Anwar, T. (2010).Do foreign inflows benefit Pakistan poor? *The Pakistan Development Review*, Vol. 48, No.4, pp. 715-738.

Annual Survey of Industries, Govt of Odisha.

Asiedu, E. (2013). Foreign Direct Investment, Natural Resources and Institutions. International growth centre, *working paper*, International Growth Centre, Department of Economics University of Kansas.

Azam, M., & Lukman, L. (2010). Determinants of Foreign Direct Investment in India, Indonesia and Pakistan: A Quantitative Approach. *Journal of Managerial Sciences*, Vol. 4, Issue. 1, pp. 31-44.

Balasubramanyam, V. N., & Sapsford, D. (2007c). Does India Need a lot more FDI. *Economic and Political Weekly*, Vol. 42, Issue No. 17, 28 Apr, 2007, pp. 1549-1555.

Banga, R. (2003). Impact of Government Policies and Investment Agreements on FDI Inflows. Working Paper No.16, ICRIER, New Delhi.

Borensztein, E., De Gregorio, J., & Lee, J.W. (1998). How Does Foreign Direct Investment Affect Economic Growth? *Journal of International Economics*, Vol. 45, pp.115-135.

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

ChalapatiRao, K.S. & Murty, M. R. (2006). Towards Understanding the State-wise Distribution of Foreign Direct Investments in the Post-Liberalisation Period, *Working Paper* No: 01, ISID.

Changsheng, X., Chunping Z., & Bhavan, T. (2011). Determinants and Growth Effect of FDI in South Asian Economies: Evidence from a Panel Data Analysis. *International Business Research*, Vol. 4, No. 1, ISSN: 1913-9004, pp. 43-50.

Department of Industrial policy and promotion, Govt. of India.

Dhingra, N. & Siddhu, H.S. (2011). Determinants of Foreign Direct Investment Inflows to India. European Journal of Social Sciences, Vol. 25, Issue.1, pp. 21-31.

Directorate of Industries, Govt. of Odisha.

Directorate of Mines, Govt. of Odisha.

Directorate of Mines, Odisha & Indian Bureau of Mines, Govt. of India

Economic Survey of Odisha, 1998-99, 2009-10, 2016-17 and 2018-19.

Gujarati, D. N. (2004). *Basic Econometrics.* (4th ed.). McGraw Hill Companies, Singapore.

Handbook of Statistics on Indian States, Reserve Bank of India.

Hooda, S. (2011). A Study of FDI and Indian Economy. A Ph.D Thesis, NIT Kurukhetra, Haryana-136119

Hussaini, N. (2011). Economic factors and Foreign Direct Investment in India: A correlation Study. Asian Journal of Management Research, Vol. 2, Issue 1, ISSN: 2229-3795, pp 348-358.

Indian Minerals Yearbook, 2012.

Jadhav, P. (2012). Determinants of foreign direct investment in BRICS economies: Analysis of economic, institutional and political factor. *Social and Behavioural Sciences* Vol.37, pp. 5-14.

Jena, P. K. & Hegde, D.S. (2015). Determinants of Foreign Direct Investment Inflows into India after Globalisation: An Empirical Investigation. *The Asian Economic Review*, Vol. 57, Issue.1, ISSN: 0004-4555, pp. 2-18.

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

Lautier, M & Moreaub, F (2012). Domestic Investment and FDI in Developing Countries: The Missing Link. *Journal of Economic Development*, Vol. 37, No. 3, pp. 1-23.

Lokesha, B.K., & Leelavathy, D.S. (2012). Determinants of Foreign Direct Investment: A Macro Prospective. *The Indian Journal of Industrial Relations*, Vol. 47, Issue. 3, pp. 459-469.

Ministry of Statistics and Programme implementation, Govt. of India

Mukherjee, A. (2011). Regional Inequality in Foreign Direct Investment Flows to India: The Problem and the Prospects. *Reserve Bank of India Occasional Papers*, Vol. 32, Issue. 2.

Nagraj, R. (2003). Foreign Direct Investment in India in the 1990s: Trend and Issue. *Economic and Political Weekly*, Vol. 38, No. 17, pp. 1701-1712.

Narayanamurthy, V. K., Sridharan, P., & Rao, K.C.S. (2010). Determinants of FDI in BRICS Countries: A panel analysis. *International Journal of Business Science and Applied Management*, Vol. 5, Issue. 3, pp. 1-13.

Nonnemberg, M.B., Rio de Janeiro & Cardoso de Mendonca, M.J. (2004).The determinants of Foreign direct investment in developing countries. Research Paper.

Parashar, S. (2015). Factors affecting FDI inflow in China and India. *University of Alberta Research Experience.*

Pradhan, B.K. & Rastogi, R. (2015). Mineral Resource Endowments and Investment Destinations: A Panel Data Analysis of Indian States. IEG Working Paper No. 354.

Randelovic, M.P., Jankov, V & Kostadinovic, I. (2017). Market Size as a determinant of the foreign direct investment inflows in the western Balkans Countries. *Economics & Organisation*, Vol.14, pp 93-104.

Ranjan, V. & Agrawal, G. (2011). FDI Inflow Determinants in BRIC countries: A Panel Data Analysis. *International Business Research,* Vol. 4, No. 4, pp. 255-263.

Roy, S. (2014). Foreign Direct Investment and Performance of Indian States. *International Journal of Sciences: Basic and Applied Research*, Vol. 12, Issue. 1, ISSN: 2307-4531, pp. 229-239.

Sahni, P. (2012). Trends and Determinants of FDI in India, An Empirical Investigation. *Journal of marketing and Technology*, Vol.2, Issue.8, ISSN: 2249-1058, pp. 144-161.

ISSN: 2455-8834

Volume: 05, Issue: 07 "July 2020"

Sharmiladevi, J.C. & Saifilali, M.I. (2013). An Empirical Examination of the Determinants of Foreign Direct Investment in India. *The International Journal of Economics and Business Studies,* Vol. 2 No. 12, ISSN: 2251- 1555, pp.42-48.

Singh, J. (2010). Economic Reforms and Foreign Direct Investment: Policy, Trends and Pattern. *The IUP Journal of Financial Economics*, Vol.8, Issue. 4, pp. 59-69.

Singh, S. (2009). Foreign Direct Investment (FDI) and Growth of States of India. *Research Paper, ICFAI 4th International Conference (IBSICON'09),* New Delhi, 2009.

Sisili, T. & Elango, D. (2013). FDI and its Determinants of India. International Journal of Scientific & Engineering Research, Vol. 4, Issue. 1, ISSN: 2229-5518, pp. 1-12.

www.ibef.org

