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Minerals and Industrial Development in India (1980-2012)

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Abstract

The mining industry acts as a catalyst for the growth of other core industries. This paper shows how India's mineral production helps our Industrial development and by inference the overall economic development. To elucidate the importance of mineral production on industrial development, regression analysis was made. From the analysis, the researcher got the result of all mineral production explains about 99% variation in Industrial production.

Keywords: Economic development, Mineral production, Industrial production, Minerals, Industrial development, Coal

Introduction

The mining sector is a propeller to economic growth. The mining industry acts as a catalyst for the growth of other core industries. The mining industry is a major force in the world economy, occupying a primary position at the start of the resource supply chain. Every one percent increment in the growth rate of mining and quarrying results in a 1.2-1.4% increment in the growth rate of industrial production (FICCI Report, 2013). The mining industries drive growth in other sectors of economies, including communication, electricity and transportation infrastructure, and commercial services. Some countries used their mineral wealth to promote economic development. Wright and Czelusta (2004) supported this view. Historically, Britain, the United States, and Germany are often cited as successful examples. In recent times, it is generally accepted that mineral resources have promoted economic development in Australia, Botswana, Canada, Chile, Malaysia, Peru, the Netherlands, and Norway.

This paper shows how India's mineral production helps our Industrial development and by inference the overall economic development. Here industrial development considered a proxy for economic development. In the same way, James P. Dorian (1989) observed that the contribution of India's mining industry to GDP had remained relatively stable between 1970 to 1989. Economic reforms stimulated the industrial expansion in India.

There is a rationale behind the choice of the period of study. While the period commencing from the 1990s, marks the phase of reforms, the preceding decades of the 1980s to have been included in the analysis. This is in view of the fact that there were some policy initiatives in the direction of liberalizing trade during this period . This anticipated the various measures adopted since1991, such as new trade regime moving towards eliminations of various restrictions imports and exports and allowing private participation in the export of major agricultural and mineral products.

Industrial development has a necessary and ultimately a large role to play in almost any sound development programme. The industrialization has come to be regarded as synonymous with economic development, and if an under-developed country wants to raise its economic development, then it must initiate programs of industrialization. Industrialization paves the way for economic development, which uses a substantial major part of natural resources towards developing a technically up-to-date and diversified national industry (Ranjana Seth, 2010). This should, in turn, be capable of a high rate of growth for the economy as a whole and of overcoming economic and social backwardness. In the same way, Robert L.Curry, Jr (1989) explains in his study; there is a general lesson to be derived from Zambia's overdependence upon copper as a source of national growth and development.

Further, the essential criteria applied to distinguish a developed economy from an under-developed economy usually comprise the proportion of work force engaged in industrial activity and the proportion of national output originating, in the industrial sector. Broadly, industrialization has deemed a precursor to economic development and social change. Christa N.Brunnschweiler (2008) explains that an abundance of natural resources may, in fact, generally be much less of a curse and more of a boon for economic performance than often believed.

Methodology

Specifically, this article analyses the relationship between mineral production and industrial development, establishing the positive impact of the former on industrial development in India during 1980-2012.

It brings out the influence of all and chosen minerals production on industrial production employing a regression analysis, both studies in value terms. Five minerals have been chosen for analysis, which records high production among minerals. They are Coal, Petrol, Iron Ore, Manganese Ore, and Lime Stone, denoted as C, P, I, M, and L in the analysis.

Scope

The scope of the article is to discuss the relationship between mineral production and industrial development . The most important question is to look into the impact of mineral production on industrial development in India during 1980-2012.

The Objective of the Study

To examine the contribution of minerals to Industrial development in India.

To help pursue the analysis, the hypothesis is presented as follows:

Hypothesis

The production value of minerals exerts their influence on industrial production.

Table 1 All Minerals Production and Industrial Production Data from 1980-81 to 2011-12

Year	Industrial production (Rs. in billion)	All Minerals (Rs.in billion)
1980-81	267.47	23.02
1981-82	328.4	37.36
1982-83	366.87	53.36
1983-84	431.47	68.15
1984-85	487.95	81.13
1985-86	542.88	90.91
1986-87	606.05	101.31
1987-88	680.39	125.39
1988-89	811.77	137.01
1989-90	966.9	178
1990-91	1112.39	184.28
1991-92	1225.09	190.04
1992-93	1433.17	230.12
1993-94	1665.48	270.4
1994-95	2039.94	307.45
1995-96	2497.24	330.2
1996-97	2816.13	380.7
1997-98	3020.23	414.27
1998-99	3344.96	454.08
1999-00	3595.05	517.77
2000-01	4002.93	587.65
2001-02	4162.43	608.32
2002-03	4685.08	668.78
2003-04	5145.74	713.82

2004-05	6009.28	816.08
2005-06	6852.38	903.32
2006-07	8177.68	1045.25
2007-08	9413.62	1540.32
2008-09	10492.2	1788.99
2009-10	11953.38	1980.93
2010-11	14078.5	2320.21
2011-12	15479.79	2556.77

Source: Reserve bank of India hand book 2013-14; Indian Minerals Year Book, 1980-2012; Compiled by the researcher.

Analysis of the Relationship between Mineral Production and Industrial Production

Table 2(a) All minerals production on industrial development

Model		Coefficients		t	Sig.
		B	Std. Error		
1	(Constant)	272.458	113.222	2.406	.022
	Production of all minerals	6.088	.123	49.354	.000

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.494E8	1	5.494E8	2.436E3	.000[a]
	Residual	6766461.407	30	225548.714		
	Total	**5.562E8**	**31**			

Table 2 (a) depicts that the regression of production of all minerals on industrial development is,

Industrial production = 272.5 + 6.08 (production value of all minerals)

R^2 =0.988**

Since R^2 is very high and statistically highly significant. So the above hypothesis is validated. The minerals production (all) explains about 99% variation in industrial production. The coefficient table indicates that an increase in the production of all minerals increases the industrial production of our country. It is statistically significant.

Next, to have a still close probe, the data subjected to the logarithmic regression method. The Results provided in table 2 (b) to the previous result conformed.

Table 2 (b) Logarithmic Regression of all Minerals Production on Industrial Development

Model		Coefficients		t	Sig.
		B	Std. Error		
1	(Constant)	2.072	.128	16.213	.000
	Ln (production of all_mineral)	.971	.022	44.906	.000

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	44.612	1	44.612	2.017E3	.000[a]
	Residual	.664	30	.022		
	Total	**45.275**	**31**			

Table 2 (b) depicts that the regression of natural logarithm (ln) of production of all minerals on natural logarithm (ln) of industrial output is,

industrial production =2.07+0.97 (production of all mineral), R2= 0.985**

A 100% increase in the production of all minerals increases India's industrial production by 97.1%.

Table 3(a) presents the regression results of the production of the chosen minerals on industrial production.

Table 3 (a) Effect of Production of chosen Minerals on Industrial Development

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.547E8	5	1.109E8	1.992E3	.000[a]
	Residual	1448098.109	26	55696.081		
	Total	5.562E8	31			

Table 3(a) depicts that the regression of production of chosen minerals on industrial production is,

Industrial output = -57.708+9.1c-1.2p+11.4I -50.96m+168.2L, $R^2 = 0.997$**

Since R^2 is very high and statistically highly significant, so the above hypothesis is validated. The chosen mineral production explains about 99% variation in industrial production. However, the individual performance of each mineral does not register positive performance consistently with all minerals. The coefficient table indicates that an increase in coal, iron ore, and limestone increases industrial output, while an increase in petrol and manganese ore decreases industrial output. However, it is found that the coefficients relating to petrol and manganese ore are not statistically significant. This may be due to the multicollinearity found among the chosen minerals, which might have overestimated the standard errors of the relevant coefficients.

The logarithmic regression method was used to have a closer probe. Results are provided in table 3 (b).

Table 3 (b) Logarithmic regression of chosen minerals on industrial production

Model		Coefficients		t	Sig.
		B	Std. Error		
1	(Constant)	4.068	.555	7.334	.000
	lnC	.619	.198	3.125	.004
	lnP	-.063	.034	-1.855	.075
	lnI	.184	.067	2.751	.011
	lnMn	-.010	.079	-.131	·897
	lnL	.240	.188	1.274	.214

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	45.169	5	9.034	2.216E3	.000[a]
	Residual	.106	26	.004		
	Total	**45.275**	**31**			

Table 3 (b) depicts that the regression of natural logarithm (ln) of production of the chosen minerals on natural logarithm (ln) of industrial production output is,

Ln (Industrial output)

= 4.068 + 0.61 lnc – 0.06 lnp +0.18 lnI – 0.01 lnMn + 0.2 lnL

$R^2 = 0.998$**

A 100% increase in production of coal increases industrial output by 61.9%

- A 100% increase in the production of petrol decreases industrial output by 6.3%
- A 100% increase in the production of iron increases industrial output by 18.4%
- A 100% increase in production of Manganese decreases industrial output by 1%
- A 100% increase in the production of limestone increases industrial output by 24%

Conclusion

This research is centered around the impact of minerals on industrial development. The analysis period is between 1980-2012. Regression is used to find the impact. It was found that the production value of all and chosen minerals explain about 99% variation in industrial development.

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