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STEEL PRODUCTION AND MACROECONOMIC PERFORMANCE IN PAKISTAN: WHAT DOES LONG-RUN DATA SHOW?

Farzana Siddique[1], Bilal Mehmood[2] and Saddam Ilyas[3]
[1,2,3]Department of Economics, GC University, Lahore, Pakistan
[2]farzanasiddique786@yahoo.com
[2]dr.bilalmehmood@gcu.edu.pk
[3]economist1208@gmail.com

ABSTRACT: *The study is intended to scrutinize steel production and economic growth in Pakistan. The data is collected from World Steel Association. It is an annual data for Pakistan covering time period of 1980 - 2012. This time spans allow us 42 observations for our time series analysis. We apply Stationarity tests namely Augmented Dickey Fuller (ADF) and Phillip Peron (PP) test to check long run association between steel and GDP Growth we apply the test of Johansen cointegration. Empirical results show the presence of long run between steel production and economic growth. There is long run association between steel production and economic growth. Recommendations are made on the basis of empirical results*.

Key Words: Steel Production, Economic Growth, Johansen cointegration, Bai-Perron Breaks point tests.

1. INTRODUCTION

Steel industry provides necessary inputs for industrial economic growth and industrial development of country and its congruence with economic development affects GDP Positively. The role of steel in other sectors as in transport, construction and energy cannot also be undermined. Initial steel industry was developed by heavily industrialized countries of Europe and USA. In the late 20thcentury, when the Asian countries needed to increase their steel production. At that time Asian economies having lower input factor costs, moved in and captured steel production market share that enhance the utilized resources, reduced reliance on imports and increased their industrial capability. This growth, in turn, positively affected GDP Growth. Steel consist of two key components of iron ore and recyclable steel that is most abundant component on earth. Steel is 100% recyclable and have infinite life without losing quality additionally with durability, versatility and affordability makes it unique.

The iron and steel, requires long factory construction and requires low cost iron ore, energy and labor. Steel industry is very factor intensive. These entire features make it difficult for all new investors to enter in the industry, due to high cost and low return. The UK was the first industrialized country; its production was 28 million tons in 1970 that cut back to 11.6 million tons in 2002. In 2003 many of steel making units were closed due to high cost and low return. The profitability measured in longer term, this tends to industry, increase barrier to entry in the market and leads towards monopolistic behavior. There is an example of china's steel industry. Now in the world China is on top producer of steel. The industry of China's steel set up cost was very high due to high cost of steel making plant, at that time when European and North American steel industries were underway. China purchase superfluous steel plants at low cost. Many Modern plants were constructed as mini steel mills at lower setup cost. China's comparative advantage in low energy cost, cheap labor and higher feedstock. In short run producer increased efficiency of production. Due to low cost of set up industry, cheap labor and cheap other factors of production, increase demand of steel that increase the cost of steel, will impact the country's economic development. In the long run currency appreciated in value, which make exports expensive and cheaper imports.

Pakistan steel industry is presently performing below its capacity. At the time of partitions, country was poorest in the word. Pakistan had extreme backwardness in industrial sector, no significant industry, no industrial raw material, and no significant commercial groups. It was difficult for country to grow up with the growth level of population. At that time, Economy recognizes the areas which were urgent contemplation. According to country's domestic demand of steel, steel idea was presented in first five-year plan (1955, 1960), Manufacturing process, raw material, plant site, supply sources, manufactured goods, and ownership technique far-off at that time having no investment. In 1968, Government of Pakistan considered a steel mill established in the country. At this time Government decided to sponsor Karachi steel mill in public sector. It was a separate cooperation according to the act of 1913. In 1969, a feasibility report of establishment was prepared for steel industry. USSR signs a letter in January 1971, to provide technology and financial assessment for the steel mill construction. In 1973, Prime Minister of Pakistan Mr. Zulfiqar Ali Bhutto laid foundation stone for the project of Pakistan steel industry. The construction work of the integrated steel industry was started that supervise by Soviet export. There were more than twenty component of steel mill, and each component consists of a large unit commissioned its own right. All work was completed in April 1981 to August 1985. In august 1981, commissioned of Blast and furnace marked entry of Pakistan into the club of steel and iron producing economies. The capital cost of this project was 24700 million. In 15th January 1985, steel mill was officially started by president of Pakistan General Zia-ul-Haq. Now Steel industry is big complex production unit having production capacity of 1.1 Million tons of steel. It is located 40 km south. East of Karachi in locality of port Muhammad Bin Qasim. Pakistan steel is the main industrial complex having greater than 20 units. It plays a fundamental role to provide improved quality of steel also having least cost.

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1.1 Objectives

The main objective of this study is identifying the cointegration analysis of steel production and economic growth of Pakistan for the time duration of (1980-2012).

2. LITERATURE REVIEW

Limited literature exists on importance of steel industry in economic growth. For instance, [16] analyzed the major implications of China steel industry in, trade, consumption and production. [4] analyzed the consumption of Japanese steel and its upcoming trends using model to forecast crude steel consumption in Japan from 1997-2005.[5] examines the Indian economic growth and its steel consumption. This study scrutinizes the steel consumption and economic growth by using cointegration and Granger causality in India for time span of (1951, 2004) there was no cointegration found in economic growth to steel consumption. [1] investigate Nigeria's industrialization and its steel and iron and industry that exploring cooperation with Japan. His focused on importance of this industry and its linkage to industrialization.[15] studied in trends and development in the intensity of steel used in China and India. The main analysis of this paper is consumption of steel demand of steel and its impact on economic growth. [4] analyzed stationarity between steel consumption and economic of UK and use cointegration technique that made possible to determined steel consumption and economic goings-on that follow stochastic trend.[6] analyzed short and long term causal relationships between steel consumption and economic growth in Korea from (1975-2008) by using vector auto regression and vector error correction models. [3] analyzed the correlation between crude steel production and the economic growth in the period of 1991-2011.

To the best of our knowledge, this paper is the first effort to investigate long run relationship between steel production and economic growth.

3. DATA AND METHODOLOGICAL ISSUES

3.1 Data

Annual data is collected from World Steel Association data for Pakistan covering the time period of 1980-2012. The time span allows us 42 observations for our time series analysis. Data on GDP and crude steel production and Blast furnace iron production it is used as a proxy for steel production. Steel production and GDP are used after logarithm transformation.

3.2Stationarity Tests

A stationary having constant variance, constant mean and constant auto-covariance for all given lag. In non-stationary series mean and variance will depend on time, which causes misleading results. In non-stationary series no long run mean, variance depends on time that goes to infinity. Stationary series follow theoretical correlogram that will eliminate by increasing lag length. In non-stationary series t-value will not follow t- distribution and F-statistics will not follow F-distribution. First is to make series stationary to avoid this problem. We apply stationarity test named as Augmented Dickey Fuller (ADF) and Phillip Peron (PP) test with the assumption that GDP and Steel in logarithmic, form divulge intercept and trend. Both variables have unit root at level and series will be integrated as a same order after using ADF and PP test. GDP and ST are stationary at first difference these results show in Table 1. The result indicates that series have unit root at level and became stationary after taking first difference.

Table 1: Unit root test results of GDP and Steel

Variable	ADF test		PP test	
	Level	1st diff.	Level	1st diff.
GDP	-2.9571 (0.998)	-2.960 (0.000)	-2.9571 (0.999)	-2.9604 (0.000)
ST	-2.9862 (0.054)	-2.9640 (0.001)	-2.9571 (0.914)	-2.9604 (0.001)

Source: Authors' estimates

Table 1 shows ADF and PPtests. ADF and PP results indicate that series of GDP and ST for Pakistan are found to be non-stationary but after taking first difference becomestationarity.

3.3Structural Breaks

Structural dummies are included in the model to show the structural breaks. Three structural breaks are found, by using Bai-Perron test,at1990, 2004 and 2008.Structural dummies are used to incorporate the structural breaks. In Table 2, Johansen cointegration with structural breaks are tabulated.

Table 2: Johansen Cointegration with Structural Breaks

Hypothesized no. of cointegration equations	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.7077	79.0632	69.8189	0.008
At most 1	0.4270	40.9304	47.8561	0.191
At most 2	0.3399	23.6674	29.7971	0.215

Source: Authors' estimates
Trace test indicates 1 cointegrating equation at the 0.05 level.

Presence of 1 cointegrating equation shows long run relationship between steel production and economic growth in Pakistan.Error Correction Term (ECT) is also estimated to find short run dynamics. Here, ECT = -0.0511with standard error of 0.0198 and t-statistic of -2.5787. Since ECT < 1, and negative as well, it is safe to accept that short-run adjustment to re-establishes long-run equilibrium.

3.4Robustness Test

For finding the robustness of long run slopes, we apply two versions of OLS, i.e. fully modified OLS (FMOLS) and dynamic OLS (DOLS). It has become quite conventional in empirical literature, see for instance; [9], [10], [11], [12], [13]and [14].Results in Table 3 show that long run slope parameters are quite robust and remain positive and statistically significant.

Table 3: Long Run Slopes using FMOLS and DOLS

	Coefficient	t-statistic	Std. Error	p-value
FMOLS	0.3993	3.3167	0.1204	0.002
DOLS	0.4139	2.5866	0.1600	0.016

Source: Authors' estimates

3.5 Causality Analysis

Table 4: Granger Causality Results

Direction	F-statistic	p-value	Remarks
GDP → ST	0.1176	0.028	Uni-causality
ST → GDP	0.3642	0.698	

Source: Authors' estimates

As per Granger causality results, increase in GDP triggers demand for steel. Causality from steel production to GDP remains absent. It could be attributed to unsatisfactory

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performance of steel industry in Pakistan. Such inefficient industry is expected not to be a significant contributor to economic growth of the country.

4. CONCLUSION

This study finds the long run relationship between steel production and economic growth in Pakistan. Pakistan steel industry faces a lot of problem there is no doubt about profitability, some poor policies of Pakistan Government and mismanagement of industry that cause to decline the production capacity. The economy of Pakistan is facing challenges of energy shortage, rain, flood, poor law and order situations, many other factors and natural disasters that held back investment and economic growth.

The economy of Pakistan is suffering the problem of political instability. It also has a negative impact on its production and profitability. Pakistan government took some steps for Pakistan steel industry like privatization at lower market price that ignored profitability. This step reduced the production capacity. Industry is also bearing a high labor cost of idle labor force that also has adverse effect on industry's production. Causality results have shown absence of forward linkages of steel industry with economy. There is a need to improve the performance of steel industry. In this respect, efficiency analysis of steel firms should be done so as to find the grey areas. This can have the effect of improving the efficiency of steel industry.

REFERENCES

1. Agbu, O. The iron and steel industry and Nigeria's industrialization: Exploring cooperation with Japan. *Institute of Developing Economies, Japan External Trade Organization* (2007).
2. Cropton, P. Forecasting steel consumption in South-East Asia, *Resources Policy*, **25:** 111-123 (1999).
3. Dobrotă, G., & Căruntu, C. The analysis of the correlation between the economic growth and crude steel production in the period 1991-2011. *Metalurgija*, **52**(3): 425-428 (2013).
4. Evans, M. Steel consumption and economic activity in the UK: The integration and cointegration debate, *Resources Policy*, **36**: 97-106 (2011).
5. Ghosh, S. Steel consumption and economic growth: Evidence from India. *Resources Policy*, **31**: 7-11 (2006).
6. Huh, K. S. Steel consumption and economic growth in Korea: Long-term and short-term evidence, *Resources Policy* **36**: 107–113 (2011).
7. Johansen, S. Estimation and hypothesis testing of cointegrating vectors in Gaussian vector autoregressive models. *Econometrics*, **59**(6): 1551–1580 (1991).
8. Johansen, S. Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control*, **12**: (2/3), 231–254 (1988).
9. Mehmood, B., & Shahid, A. Aviation demand and economic growth in Czech Republic: Cointegration estimation and causality analysis. *Statistika*, **94**(1): (2014) 54-63.
10. Mehmood, B., & Kiani, K. An inquiry into nexus between demand for aviation and economic growth in Pakistan. *Academicia*, **3**(10): 200-211 (2013).
11. Mehmood, B., Feliceo, A. & Shahid, A. What causes what? Aviation demand and economic growth in Romania: Cointegration estimation and causality analysis. *Romanian Economic Business Review*, **9**(1): (2014) 21-33.
12. Mehmood, B., Shahid, A. & Ilyas, S. Co-integration analysis of aviation demand and economic growth in Philippines. *International Journal of Economics and Empirical Research*, **3**(6): (2015) 271-279.
13. Mehmood, B., Shahid, A., & Younas, Z. I. Aviation demand as covariate of economic growth in Bangladesh: Cointegration estimation and causality analysis. *International Journal of Economics and Empirical Research*,**2**(8): (2014) 301-307.
14. Mehmood, B., Shahid, A., & Younas, Z. I. Interdependencies between aviation demand and economic growth in India: Cointegration Equation Estimation, *Economic Affairs*, **58**(4): (2013) 335-345.
15. Warell, L., & Olsson, A. Trends and developments in the intensity of steel use: an econometric analysis (2009). Retrieved from: http://pure.ltu.se/portal/files/3157773/Paper.pdf
16. Wu, Y. The Chinese steel industry: Recent developments and prospects, *Resources Policy*, **26**: 171–178 (2000).