



A Spearman Correlation Approach To Interrelations Between Population And Economic Sectors Of The Indian Economy

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Abstract

The new economic reforms, commonly called LPG (Liberalization, Privatization, and Globalization), were implemented to transform the Indian economy into a globally competitive one. Despite occasional fluctuations, India's economic growth has generated a business environment facilitating rapid economic expansion. There have been studies on the structural transformation of the Indian economy pre- and post-liberalisation. Few researchers have also emphasised the causes and consequences, pros and cons and impact of these changes on the growth of the Indian Economy. However, studies on the correlation between population growth and the growth of economic sectors of the Indian economy have found very scarce space in academic research. Hence, the researcher in this paper has provided a Spearman correlation approach to analyse the interrelations between population and economic sectors of the Indian Economy. The researcher has found a robust negative correlation between Agriculture, forestry, fishing, value added (% of GDP), and the population of India from 1961 -2022. However, there is a moderate positive correlation between the industry (involving construction), value added (% of GDP), and the population of India from 1961 to 2011. The researcher has also found a strong positive correlation between Services, value added (% of GDP), and the population of India from 1961-2022.

Introduction

Bhattacharjee, A. (2014) opined that India has undergone significant transformations since 1991, when the government adopted economic liberalisation as its guiding principle. In response to increasing inflation and a balance of payment crisis in the middle of 1991, the government implemented a market reform policy that transformed the sluggish planned economy into a thriving privatised economy across nearly all industrial sectors of the nation. The new economic reforms, commonly referred to as LPG (Liberalization, Privatization, and Globalization), were implemented to transform the Indian economy into a globally competitive one. Despite occasional fluctuations, India's economic growth has generated a business environment facilitating rapid economic expansion. Furthermore, there is a consistent and gradual increase in international trade and investment.

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Literature Review

Ramakumar, R. (2009) stated that the development of agriculture after the independence of India was witnessed by a significant failure of the government to solve the agrarian problems related to ownership of land and prevention of factors that led to disincentive in investment in agriculture as well as the adoption of technology. This forced labour in the agrarian sector stuck to the utilisation of traditional agricultural technology, resulting in less income generation for workers in agricultural farms. These impediments have shaped the pattern and growth of agriculture in our country post-1947. However, initiating economic “reforms” post-1991 gave a novel dimension to these impediments of the post-independent era. Post 1991, there was a significant weakening of institutional support structure in the agricultural sector. The protection given to the agricultural sector from predatory imported items was lifted, resulting in a decline in the price of agricultural items. As part of reforms in the fiscal sector, many input subsidies were removed concerning the size of the agrarian economy. Public capital formation in agriculture continued to decline, and the increase of public expenditure on extension and research also declined. Rural credit growth suffered, thereby reopening the doors for the unorganised sector in the Indian economy. Food crops received less attention and more prominence was given to high-value export-oriented crops. Markets regulated by the government were seen as impediments to efficient marketing.

Solanki, S., Inumula, K. M., & Chitnis, A. (2020) found that there was an uneven pattern of sectoral growth in India since independence because the Indian economy saw various policy regimes which governed the transformation of the structure of the Indian economy. After gaining independence, the state made efforts to boost agricultural production through various innovative strategies under the umbrella of green revolution. Thereafter, the liberalisation era showed slow growth in structural change from agriculture to industrial sector. Contemporarily India is gaining most of its contribution to economic growth from the service sector, followed by the secondary sector and then lowest from the primary sector. The researcher found out that economic development increases by 3.42% and the primary sector contribution increases by 1.12% if there is a 1% change in industrial sector contribution in the long run. The researcher showed that “bi-directional causality” exists between sectoral contribution and economic development and vice versa. The researcher has also pointed out that the most important activity to be monitored in Indian economic growth by policymakers is the pattern of sectoral contribution.

Tripathi, A., & Prasad, A. R. (2010) evaluated agriculture’s progress, performance, and growth in the Indian economy from the time of independence. The researcher used a decomposition test to determine the agricultural growth sources and approach of the production function to determine the agricultural production determinants. The researchers found out that the workforce became labourers from being cultivators, there was an increase in the number of uneconomic holdings, there was an increase in the area under non-food crops as compared to food crops, there was a fall in instability in the



yield as well as production of approximately all the crops during the period after reforms but the instability in terms of the area increased.

Basu, D., & Das, D. (2017) observed that in many areas of India, the state has ceased to provide essential services due to the shift towards neo-liberal policies. As a result, the poor are compelled to replace public services with private alternatives. Although there is room for discussion regarding whether this transition enhances the quality of services accessed by the impoverished, it undeniably amplifies the financial burden on their households. It potentially exacerbates their limited expenditure on food and nutrition. They hypothesised that the strain manifests in reducing the disparity between the wealthy and those in need regarding the proportion of spending on services in the overall monthly household expenses.

Research Gap

There have been studies on the structural transformation of the Indian Economy pre and post-liberalisation in the past research. Few researchers have also emphasised the causes and consequences, pros and cons, and impact of these changes on the growth of the Indian Economy. However, studies on the correlation between population growth and the growth of economic sectors of the Indian economy have found very scarce space in academic research. Hence, the researcher in this paper has provided a Spearman correlation approach to analyse the interrelations between population and economic sectors of the Indian Economy.

Objectives

1. To find out the correlation between Agriculture, forestry, and fishing, value added (% of GDP) and Population of India from 1961-2022.
2. To find out the correlation between industry (including construction), value added (% of GDP) and Population of India from 1961-2022.
3. To find the correlation between Services, value added (% of GDP) and Population of India from 1961-2022.

Data Analysis

The researcher analyses secondary data to determine the correlation among “Agriculture, forestry, and fishing, value added (per cent of GDP) along with the population of India from 1961 -2022; a correlation between Industry (involving construction), value added (GDP %) and population of India from 1961-2022 and correlation between Services, value added (% of GDP) and population of” India from 1961-2022.

Correlations: Agriculture, forestry, and fishing, value added (% of GDP) & population
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			Agriculture, forestry, and fishing, value added (% of GDP)	Population
Spearman's rho	Agriculture	Correlation Coefficient	1.000	-.969**
		Sig. (2- tailed)	.	.000
		N	62	62
	Population	Correlation Coefficient	-.969**	1.000
		Sig. (2- tailed)	.000	.
		N	62	62
**. Correlation is significant at the 0.01 level (2-tailed).				

A Spearman's correlation analysis assessed the association between the percentage of GDP contributed by forestry, agriculture, fishing, value-added, and the population. There was a significant negative association among forestry, Agriculture, and fishing, value added (GDP%), and Population, r_s ([60]) = [-.969], $p = [< .001]$.

Correlations: Industry (including construction), value added (% of GDP) & population				
			Industry (including construction), value added (% of GDP)	Population
Spearman's rho	Industry	Correlation Coefficient	1.000	.691**
		Sig. (2-tailed)	.	.000
		N	62	62
	Population	Correlation Coefficient	.691**	1.000
		Sig. (2-tailed)	.000	.
		N	62	62
**. Correlation is significant at the 0.01 level (2-tailed).				

A Spearman's correlation analysis was performed to calculate the association between the industry sector (including construction), the percentage of value added to the GDP, and the population. There was a significant positive relationship between industry



(including construction), value added (GDP%), and Population, r_s ([60]) = [.691], $p = [<.001]$.

Correlations: Services, value added (% of GDP) & population				
			Services, value added (% of GDP)	Population
Spearman's rho	Services	Correlation Coefficient	1.000	.844**
		Sig. (2-tailed)	.	.000
		N	62	62
	Population	Correlation Coefficient	.844**	1.000
		Sig. (2-tailed)	.000	.
		N	62	62
**. Correlation is significant at the 0.01 level (2-tailed).				

A Spearman's correlation was performed to assess the relationship between services, value added (% of GDP), and population. There was a significant positive association among Services, value added (GDP%), and Population, r_s ([60]) = [.844], $p = [<.001]$.

Findings & Discussions

The researcher has found a robust negative correlation between Agriculture, forestry, fishing, value added (% of GDP), and the population of India from 1961 -2022. However there is a moderate positive correlation between the industry (involving construction), value added (% of GDP), and population of India from 1961-2011. **Panigrahi, R., & Anjani, S. (2014)** correctly identified that the growth of organised retailing in India can be attributed to the steady increase of Foreign Direct Investment (FDI) during the post-globalised era. The implementation of the new economic policy created a conducive environment for Foreign Direct Investment (FDI) in India's sector of the retail sector. This, in turn, enhanced the investment climate in India's industrial sector and significantly impacted the economic growth of a densely populated country such as India.

Nevertheless, **Selvan, S. S. (2021)** has correctly linked the slow expansion of the agricultural sector, amidst a growing population, to a range of obstacles that impact the economy of India. These challenges include concerns related to food security, soil quality degradation, water scarcity, inadequate infrastructure for food storage, and land degradation. The researcher has also found a strong positive correlation between Services, value added (% of GDP), and the population of India from 1961-2022. **Hutton, T. A. (2003)** has aptly emphasised this finding by stating that the importance



of the service sector is increasing as more and more population advances towards cities. The service sector plays a dominant role in providing employment and increasing the productivity and output of urban areas. Service industries that cater to the final demand, such as education, retail, and most government services, are closely connected to larger consumer markets in metropolitan areas. On the other hand, intermediate services are even more concentrated in specific locations, which is influenced by the economies of urban areas and the clustering of specialised services that require personal interaction.

Conclusion

The researcher has brought to light a strong negative correlation between agricultural value added to GDP, whereas, on the other hand, the researcher has shown a positive correlation between industry and service sector and the growing population of India. Thus, the above discussion will open up new avenues for contemporary academicians and researchers in sectoral growth along with structural change of the Indian Economy concerning its relation to the growing population.

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ISSN (Print Version) 0975-3931
ISSN (On-Line Version) 2278-1277

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