International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

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 referred to as LPG (Liberalization, Privatization, and Globalization), were implemented with the objective of transforming the Indian economy into a globally competitive one. The economic growth of India has generated a business environment that is facilitating rapid economic expansion, despite occasional fluctuations. There have been studies on the structural transformation of Indian Economy pre and post-liberalization in the past research. Few researchers have also emphasized the causes and consequences, pros and cons and impact of these changes on the growth of Indian Economy. However, studies on the correlation between population growth and the growth of economic sectors of Indian economy have found very scarce space in academic research. Hence the researcher in this paper has provided a Spearman correlation approach to analyze the interrelations between population and economic sectors of the Indian Economy. The researcher has found a very strong negative correlation between Agriculture, forestry, fishing, value added (% of GDP), and 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. The researcher has also found a strong positive correlation between Services, value added (% of GDP), and the population of India from 1961-2022.

Keywords: Population, agriculture, industry, services, Indian Economy

Introduction

Bhattacharjee, A. (2014) opined that India has undergone significant transformations since 1991, when the government of India adopted economic liberalization as its guiding principle. In response to increasing inflation as well as 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 privatized economy across nearly all industrial sectors of the nation. The new economic reforms, commonly referred to as LPG (Liberalization, Privatization, and Globalization), were implemented with the objective of transforming the Indian economy into a globally competitive one. The economic growth of India has generated a business environment that is facilitating rapid economic expansion, despite occasional fluctuations. Furthermore, there is a consistent and gradual increase in both international trade and investment.

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 adoption of technology. This forced labour in the agrarian sector stuck to utilisation of traditional agricultural technology which thereby resulted in less generation of income for workers in agricultural farms. These impediments have shaped the pattern and growth of agriculture in our country post-1947. But the initiation of 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 to agricultural sector. The protection given to the agricultural sector from predatory imported items was lifted which resulted in a decline in the price of agricultural items. As part of reforms in the fiscal sector, many input subsidies were removed in relation to the size of the agrarian economy. Not only did the formation of public capital in agriculture continue to decline but also the increase of public expenditure on extension as well as research declined. The growth of rural credit suffered thereby reopening the doors for the unorganized 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 which has been followed by the secondary sector and then lowest from 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 there exists "bi-directional causality" between sectoral contribution and economic development and vice-versa. It has also been pointed out by the researcher that the most important activity to be monitored in Indian economic growth by the policymakers would be the pattern of sectoral contribution.

Tripathi, A., & Prasad, A. R. (2010) evaluated the progress, performance, and growth of agriculture in the Indian economy from the time of Independence. The researcher used a decomposition test to find out the agriculture growth sources and approach of the production function to know the agriculture production determinants. The researchers found out that the workforce became laborers from being cultivators, there was an increase in the number of holdings which were uneconomic, 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, due to the shift towards neo-liberal policies, the state has ceased to provide essential services. 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 and potentially exacerbates their limited expenditure on food and nutrition. They hypothesized that the strain manifests in the reduction of the disparity between the wealthy and those in need regarding the proportion of spending on services in the overall monthly household expe-

nses.

Research Gap

There have been studies on the structural transformation of the Indian Economy pre and post-liberalization in the past research. Few researchers have also emphasized 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 analyze the interrelations between population and economic sectors of the Indian Economy.

Objectives

1. To find out correlation between Agriculture, forestry, and fishing, value added (% of GDP) and Population of India from 1961-2022.
2. To find out correlation between Industry (including construction), value added (% of GDP) and Population of India from 1961-2022.
3. To find out 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 (percent of GDP) along with the population of India from 1961 -2022; 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				
			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 has been performed to assess the association among 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 has been performed to assess the relationship among 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 very strong 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 organized retailing in India can be attributed to the steady increase of Foreign Direct Investment (FDI) during the post-globalized era. The implementation of the new economic policy created a conducive environment for Foreign Direct Investment (FDI) in the India's sector of the retail sector. This, in turn, enhanced the investment climate in the industrial sector of India and had significant implications for 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 the security of

food, soil quality degradation, water scarcity, inadequate infrastructure for food storage, and degradation of land. 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 emphasized 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 specialized services that require personal interaction.

Conclusion

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

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