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Inter-Temporal Analysis of Employment Elasticity in India

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Abstract:

The study analyses the impact of real GDP growth rates on employability in India for the period 1950-2020. The GDP growth rate is adjusted for price changes to ensure that the economy is growing without any distorting effect of inflation. The CAGR (Compound Annual Growth Rate) approach and regression approach are used for the calculation of employment elasticities. It is found in the analysis that there is acceleration in GDP growth rate in India i.e. 5.08 per cent average for the mentioned period. Further slight improvement is noticed in the growth rate of employment of India around 1.7 per cent. It is also perceived that Indian economy is showing considerable growth but employment has not grown alongside. The empirical results show that India has 0.39 per cent ability to create employment opportunities for its population in the process of its growth and development.

1. Introduction

Employability is vital to a nation's labour force and society's wellbeing. Employment has significantly remained as a vital component of the growth and development process of an economy. It acts as a link between economic growth and reduction of poverty and other socio-economic problems. Employment serves as a significant variable in the attainment of inclusive, substantial and sustainable growth. In the developing countries, the objective is to provide increasing employment opportunities not only to meet the backlog of the unemployed but also the new additions to the labour force. Expansion and creation of employment opportunities has always remained in focus as one of the main socio-economic objectives in the planning period in India. In the era of globalisation, the adoption of liberalised economic policies expected to have resulted in higher output growth and generation of vast employment opportunities but the performance of Indian economy on employment front has been rather miserable. India has been registering a fairly

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high rate of GDP growth, but employment has failed to keep pace with it. High growth of output, coupled with low growth in employment have raised doubts about the desirability of such a growth process, on one hand, and the linkage between economic growth and expansion of employment opportunities, on the other (Bhaduri, 2008). Therefore, with increasing GDP growth rates the stability of the economy demands low unemployment rate and safe and secure work place. Moreover, employment is considered as one of the most important means of obtaining adequate economic resources which is indispensable for material wellbeing and full participation in the society.

One widely used labour market indicator for analysing an economy's labour market is the employment intensity of growth or the employment elasticity with respect to output. However, the employment elasticity indicator is far less researched than other key labour market indicators like percentage of unemployment or employment to population ratio. Nevertheless, it is a commonly used tool by policy makers since it provides valuable insights into the labour market and overall macroeconomic performance of an economy. The employment elasticity measures the percentage change in employment associated with a 1 % increase in GDP (Kapsos, 2005). The employment intensity of economic growth can be analysed by the size of output elasticity of employment. It specifies the capability of an economy to create employment opportunities for its population as per cent of its growth process. The employment elasticity in a particular sector of the economy helps in comprehending the extent of labour absorption capacity of that sector in the Economy. Employment Elasticity estimates the percentage change in employment associated with one percentage point change in economic growth. It indicates the proportion of an economy's growth process that creates jobs for its population. When the employment elasticity is 1, it shows that employment increases at the same pace as the economy. A value of 0 for elasticity indicates that employment does not increase at all regardless of economic expansion. On the other hand, the contraction of employment with the expansion of the economy is referred to as negative employment elasticity. It goes in consensus with Okun’s Law (1962).

Employment elasticity is considered as a concise method of summarising the intensity of the increase in employment to output growth. Against this backdrop, the present paper aims to calculate and analyse employment elasticity for the Indian economy over past seven decades ranging from 1950 to 2020. The study of the concept of employment elasticity becomes important since it's a prevalent misconception that employment will expand with just economic development.

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2. Review of Literature

Okun (1962) examined the functional relationship between output growth and the change in the rate of unemployment and postulated a law, according to which a 3 percent increase in output corresponds to a 1 percent decline in rate of unemployment. The law involved the overwhelming attention from the literature to explore the relation between output growth and employment growth. **Padalino and Vivarelli (1997)** studied the employment intensity in G7 economies and explored 'structural difference' between North America, Europe and Japan with regard to employment elasticities, with North America factually characterized by more employment-intensive growth. **Walterskirchen (1999)** found a direct association between GDP growth and change in employment from 1968 to 1988 and also observed an indirect association between change in employment and unemployment for EU countries. **Islam and Nazara (2000)** analysed employment elasticity for Indonesia over the period from 1977 to 1996, using arc elasticity of employment and OLS regression method. It was found that the highest employment elasticity was noticed in agriculture sector, followed by trade, services and industry sector respectively. **Bhattacharya and Sakthivel (2003)** observed a significant decline in employment elasticity at All-India level, as well as across the states, and also noticed delinking of growth and employment during post-reforms period. **Mazumdar and Sandip (2007)** reviewed the Indian experience in formal manufacturing sector from 1976-2002. They revealed the enormous fluctuation in employment elasticity from period to period. Starting with the period of 'benign' growth in the last half of the '70s, when employment elasticity was nearly unity, employment growth turned somewhat negative in the period of 'jobless growth in the '80s. It picked up to a reasonable, but not unduly high, value of 0.33 during the reform period, when output growth was also high. But it slumped badly to a substantial negative figure in the latest post-reform years of 1996-2001 when output growth also stumbled. Rangarajan, **Padma Iyer and Seema (2007)** analysed employment elasticity and their implication for economic growth in India. They found a continuous and drastic decline in aggregate employment elasticity from 0.53 during 1977-78 to 1983 to 0.41 from 1983 to 1993-94 and to 0.15 from 1993- 94 to 1999-00. However, this trend reversed in the period 1999-00 to 2004-05. During 1999-00 to 2004-05, aggregate employment elasticity came out to be 0.48. **Papola and Sahu (2012)** estimated the employment elasticity in India to be 0.20 for the period 1999-00 to 2009-10. They further noticed a continuous decline in employment elasticity from the 1970s to 1990s and it declined to almost zero during 2004-05 to 2009-10. In addition, there are various studies that have attempted to calculate

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employment elasticity for organised manufacturing based on ASI data (Goldar, 2000, Nagaraj, 2000, Kannan and Ravindran, 2009). Many other researchers, such as Yam et al., (2002), Gereffi and Sturgeon (2004), Perugini and Signorelli (2005), Choi (2007), Rangarajan et al., (2007), Sen and Kirkpatrick (2009), Garrett and Rhine (2011), etc., have also studied different aspects of economic growth and employment in India as well as other countries.

However, a scant literature is available to analyse employment intensity at all India level for such a long period covering almost seven decades from 1950-2020. Thus, in order to fill the void in the existing literature, an attempt has been made to analyse the employment elasticity and economic growth vis-à-vis Indian economy.

3. Objectives of the Study

i) To analyse the growth pattern of employment and real Gross Domestic product for seven decades (1950-2020) in India.

ii) To examine the output employment elasticity in India from 1950-2020.

4. Data Source and Methodology

The focus of the study is to examine the impact of real GDP growth rates on employability in India for the period 1950-2020. To analyse this objective, the data on number of persons engaged and real GDP at constant 2017 prices (US$) for Indian economy has been taken from Penn World Table. To calculate the growth rates, real GDP i.e., GDP adjusted for price changes is taken to ensure that the economy is growing without any of the distorting effects of inflation.

There are many comprehensive data sets which provide accessibility in doing economic research, amongst these exhaustive data sources well utilised source in this study is Penn World Table 10.0 (PWT 10.0).

In the empirical literature, there are two methodologies that are generally used for calculation of employment elasticities. These are based on compound annual growth rate (CAGR) approach that gives the 'arc' elasticity and regression approaches that provide point elasticity. The formula for calculation of 'arc' elasticity of employment is:

$$\varepsilon = \frac{(E_1 - E_0) / E_0}{(Y_1 - Y_0) / Y_0}$$

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Where ε denotes the employment elasticity of growth, E is the employment expressed in number of persons engaged (in millions) in the country, Y is the GDP at constant 2017 prices and the 1 and 0 denotes different time periods.

To calculate employment elasticity called the OLS method that utilizes an ordinary least squares regression to compute the point elasticity, the regression equation used is:

$$lnE_t = \beta_0 + \beta_1 \, ln(Yt) + U_t$$

Where E_t is the employment expressed in number of persons engaged for time t, β_0 is a constant, β_1 is the elasticity of employment with respect to GDP, Y_t is the GDP expressed in constant local currency for time t, and U_t is the error term.

The paper is divided into various sections. Section 2 of the paper provides a brief on the existing estimates on employment elasticity in India. Section 3 outlines the objectives of the study followed by data and methodology in Section 4. Thereafter section 5 presents the empirical analysis on employment and real GDP growth rates and estimates on employment elasticity in India. Conclusion is mentioned in Section 6.

5. Empirical Analysis

5.1. Trend Analysis of Gross Domestic Product and Employment Growth Rates:

A country's gross domestic product is the monetary measure of the total goods and services produced within an economy over a specific period. Further the GDP growth rate shows how much a country's economy has expanded or shrunk relative to the previous period. Therefore, it is the primary measure of how well or poorly an economy is performing. In the present study the GDP annual growth rate is calculated using the "real" GDP i.e. the GDP has been adjusted for inflation. This adjustment is made to ensure the effects of inflation do not result in a false sense of economic progression.

Graph 1 represents the trend in the growth rate of GDP for around seventy years from 1950 to 2020 at 2017 constant prices. It is observed that on an average there exists acceleration in GDP growth rate in India. It is averaged at 5.08 percent for the overall study period. Even though a fluctuating trend in GDP growth rate has been observed in the graph yet the Indian economy is progressing in terms GDP growth.

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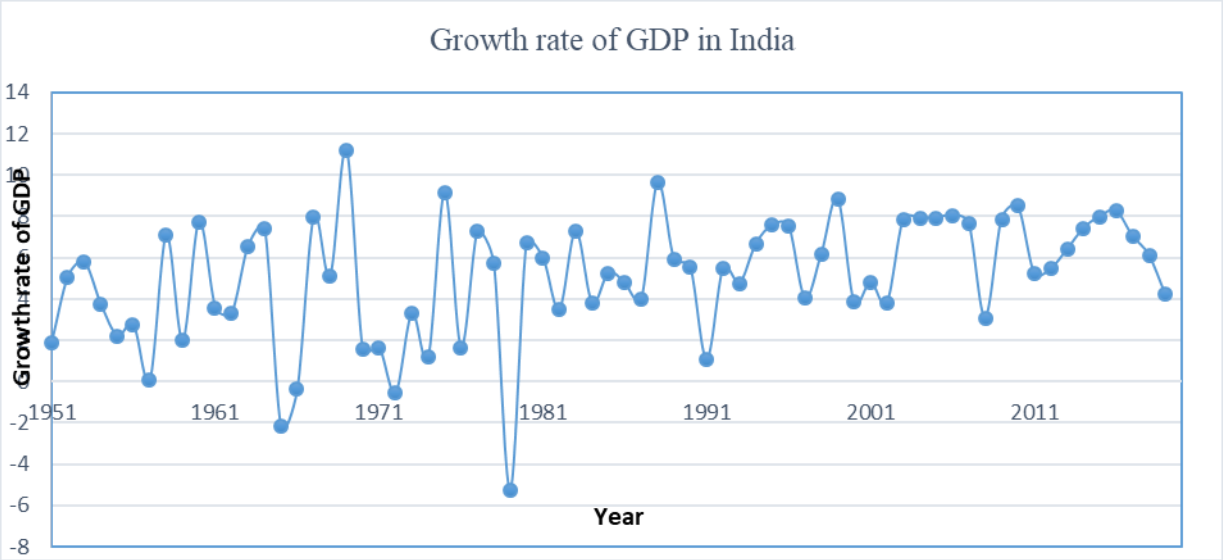
Graph 1: Growth of Real GDP: 1950-2020



Graph 2: Growth of Employment: 1950-2020

Graph 2 depicts the trend in the growth rate of number of persons engaged (in millions) for around seven decades from 1950 to 2020 in India. The estimates indicate that there was an improvement in the employability during 1970s. However, this was accompanied by a decline in the workforce after the reform period which is later seen recovered in the year 2013. For the overall period there is little improvement averaged at 1.7 percent.

5.2. Estimation of Employment Elasticity:

This section attempts to compute the employment elasticities (both 'arc' and 'point' elasticities) based on the compound annual growth rate (CAGR) approach and the regression approach and taking into account the PWT 10.0 data on real GDP and employment from 1950-2020.

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Year wise employment elasticity calculated from growth rates of real GDP and number of persons engaged is shown in graph 3. As evident from the graph, employment elasticity was more than 20 percent during late 1950s. This could be due to a strong and positive relationship between employment opportunities and growth in gross domestic product in India during periods of planned development. A major shock in the employability can be seen during 1972 but it recovered thereafter and registered a positive growth. However, the employment elasticity is below 1 percent for most of the study period that highlights a growing disconnect between economic growth, skilling, education and jobs in India.

Graph 3: Employment Elasticity in India: 1950-2020

5.2.1. CAGR Approach:

The CAGR approach is the most widely used approach in India to estimate employment elasticities (GoI, 2012; Papola et al (2012), Rangarajan et al (2007)).

The employment elasticity numbers based on the CAGR approach during 1950 to 2020 divided into class intervals of 10 years are reported in Table 1. As evident from the table, there has been a continuous decline in employment elasticity from the 1980s to 1990s to 2000s till date. During 1960-61 to 1969-70 employment elasticity recorded a decline to as low as 0.18 percent from 0.42 percent during the previous decade. For the period as a whole (1950-2020), employment elasticity was placed at 0.34 which implies that with every 1 percentage point growth in GDP, employment increased by 34 basis points. However, the employment elasticity of only 0.11 percent in current decade unfolds the misconception that economic growth alone will increase employment. So, when we examine the data, we see that despite India's impressive economic growth, employment has not grown alongside.

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Table 1: Employment Elasticity in India: CAGR approach

Year	CAGR GDP	CAGR EMP	EMP ELASTICITY
1950-51 to 1959-60	0.03	0.01	0.42
1960-61 to 1969-70	0.04	0.01	0.18
1970-71 to 1979-80	0.02	0.03	1.19
1980-81 to 1989-90	0.05	0.02	0.49
1990-91 to 1999-2000	0.05	0.01	0.29
2000-01 to 2009-2010	0.06	0.01	0.21
2010-11 to 2019-2020	0.06	0.01	0.11
Overall	**0ᵘ05**	**0ᵘ02**	**0ᵘ34**

Source: Authors' calculations

5.2.2. Regression Approach

An alternative way to compute the elasticity is to estimate a log linear regression equation between employment and GDP that generates the point elasticity of employment.

The output of regression analysis is in consonance with the CAGR approach as discussed in the previous section.

$$\ln Emp = 0.15 + 0.39 \ln rGDP$$

Table 2: Employment Elasticity in India: CAGR approach

Log employment on	Equation 1
Constant	0.15
Log Output	0.391**
R^2	0.947
adj. R^2	0.946
p value	0.000

Note: ** and * indicate significance of coefficient at 1 per cent and 5 per cent levels, respectivelyᵘ

Source: Authors' calculations.

The employment elasticity through regression approach is recorded at 0.39 percent. The results of this approach also validate our findings from previous analysis that GDP growth has positive impact on employment growth during the study period. The coefficient of employment elasticity is statistically significant at 1percent level of significance. In another words, the positive employment elasticity (0.39) indicates the ability of an economy to generate employment opportunities for its population as per cent of its growth and development process.

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6. Conclusion

The Indian economy has been one of great promise with abundant growth opportunities. Its growth potential has always attracted western economies to expand their economic footprint. It is however a globally accepted fact that growth comes with job creation, which is something not pleasing in India and it sorely needs to be looked at considering sizeable unemployment rate in 2022. A constant rise in unemployment is not a good indicator for any economy. With the creation of job opportunities, unemployment drops and more people willing to work join the workforce. Availability of workforce leads to more production of goods and services, thus more demand for goods and services can be met. From a macroeconomic perspective, lack of employment opportunities contributes to both frictional and structural unemployment and affects the productivity of the labour force. This further impacts a country's standard of living, as measured by GDP per capita and its potential for economic growth as measured by aggregate demand and GDP. The result of the present study based on time series data from 1950 to 2020 indicates the positive magnitude of the employment elasticity with respect to real GDP. The objective of providing employment opportunities not only for the additions to the labour force but also to reduce the backlog of unemployment accumulated from the past is not attained in the Indian economy. The empirical analysis of real GDP growth rates and employment growth shows that the aggregate employment elasticity estimates for India vary from 0.34 (arc elasticity) to 0.39 (point elasticity) during last seventy years (1950-2020). This implies that for every 10 per cent change in real GDP, there is about 3.4 to 3.9 per cent change in employment. Also, this employment elasticity marks a noteworthy decline since 1980s. Falling employment elasticity could be partly the result of substitution of labour-intensive techniques with automation and capital-intensive techniques. It is however a well-accepted fact that human capital is now the fastest growing component of India's wealth but to reap the benefits of this to ever increasing demographic dividend, there is an urgent requirement to create sufficient job opportunities. This fact also cannot be ignored that it is the lack of potential of Indian economy to create jobs rather than labelling it as 'jobless growth'. Therefore, the emphasis should be on creating more job opportunities along with GDP growth rates.

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