

FULL EMPLOYMENT GROWTH PROJECTIONS FOR PAKISTAN

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Abstract. Economic growth and employment creation are both interlinked. A growing economy creates more employment opportunities due to expanding business. The demographic characteristics of Pakistan indicate that the working-age population will constitute the largest cohort in the future. The study is based on the idea that if Pakistan wants to reap this demographic dividend by effectively employing the available labor force in the economy then how much economic growth is needed? To measure the required full employment growth rates, we used information on the output-employment elasticity and required employment growth rate. Based on the projected population data, our calculations show that Pakistan needs a sustained growth rate of around 7.11 percent over a prolonged period. Considering the welfare and per capita income aspects, the required growth is much higher than the 7.11 percent threshold. However, the average economic growth rate during the last decade was merely 3.8 percent, and the economy's potential growth is estimated to be around 6 percent. To achieve a growth rate nearer to full employment growth rates, Pakistan needs to take much-needed structural reforms to promote business activities and transactions in the economy.

Keywords: Full employment, growth projections, labor elasticity

JEL Classification: J21, J23

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I. INTRODUCTION

According to the UN's World Population Prospects Report (2019), the world population will be around 9.7 billion in 2050, which shows an increase of 2 billion individuals during the next 30 years. Pakistan stands third among the top nine countries that comprise more than half of the projected population by 2050. As illustrated by Nayab (2008), Pakistan is experiencing a bulge in the working-age population and a decline in the dependency ratio, which has been called a "demographic dividend" in the literature. However, Pakistan can only realize the economic benefits of the available demographic dividend by productively employing this bulge of the working-age population (Population Council Report, 2013). The question arises that if Pakistan wants to productively employ all the available and forecasted working-age population cohort, then how much increase in employment is required? Since both economic growth and employment creation are interlinked and crucial aspects of inclusive development. A growing economy creates more employment opportunities due to the expansion of business activities to meet the rising demand for goods and services. Therefore, another pertinent question is how much economic growth or increase in GDP would be needed to create that required increase in employment. These are the central questions that this study intends to address.

POPULATION TRENDS IN PAKISTAN

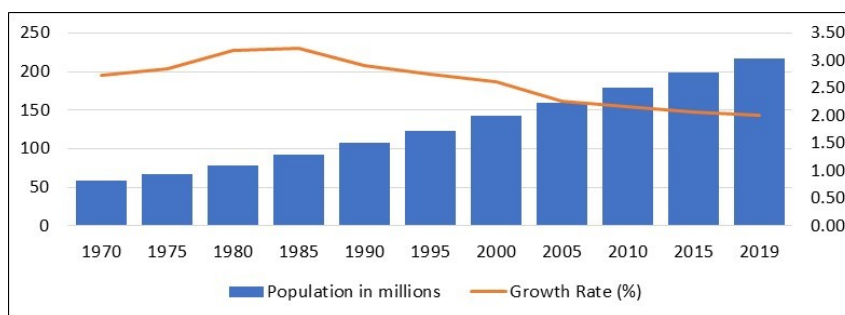
Historic Trends: In absolute terms, the total population of Pakistan was 58.14 million in 1970, which can be further divided into 30.75 million males (53 percent of the total population) and 27.38 million females (47 percent of the total population).¹ While in 2019, it increased to 216.56 million persons with 111.44 males (51 percent of the total population) and 105.11 million females (49 percent of the total population). This represents an average population growth of 2.72 percent during this era, and the female population grows at an annual rate of 2.78 percent

¹ All the population Data, both historical as well as in case of projections that is used in the analysis has been collected from the United Nation, Department of Economics and Social Affairs, World Population Prospects 2019. In case of projection, we use data with median variant. The data can be retrieved at; <https://population.un.org/wpp/>, and methodological notes are available at; <https://population.un.org/wpp/DataSources/586>.

compared to the male population growth rate of 2.66 percent. As Figure 1 indicates, Pakistan observed the highest population growth during 1978-1988 with an average growth rate of around 3.2 percent. After this growth peak, the population growth slowed down, and the average growth rate remained around 2.06 percent during the last decade.

FIGURE 1

Population Growth Rate (1970-2019)



Now if we consider the composition of the population based on different age cohorts. During 1970, the age group 15-64 constituted the highest share 54 percent with 24.61 million individuals, then followed by the 0-14 age group (42 percent share) and 65+ age group (4 percent share). However, the growth rate of the 65+ age group exceeds the growth rates of other groups with an average of 2.96 percent annually during 1970-2019. Figure 2 contains an illustration of the growth trends among different age cohorts along with the population.

Projected Trends: The projected data of the Population Division, UN, indicates Pakistan’s population will grow at an average annual rate of 1.44 percent during the next 30 years. However, the downward trends of the growth rate will continue as shown in Figure 3. It is expected that the average population growth rate during 2020-2030 will be around 1.78 percent. During 2031-2040 will reduce to 1.40 percent, and further fall to 1.13 percent during 2041-2050. The total population of Pakistan has projected around 338.01 million individuals, which represents an increase of 121 million individuals in the coming 30 years.

FIGURE 2
Age Groups and Growth Rate (1970-2019)

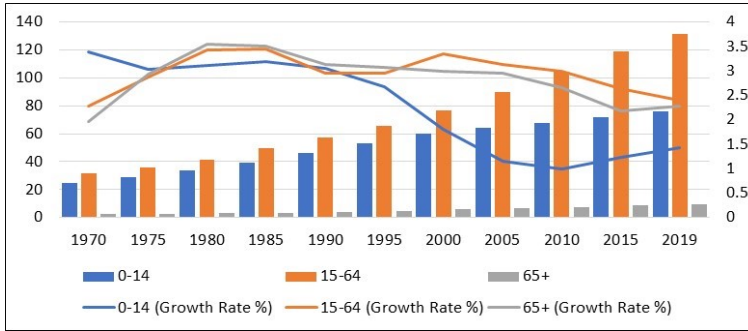


FIGURE 3
Projected Population and Growth Rates (2020-2050)

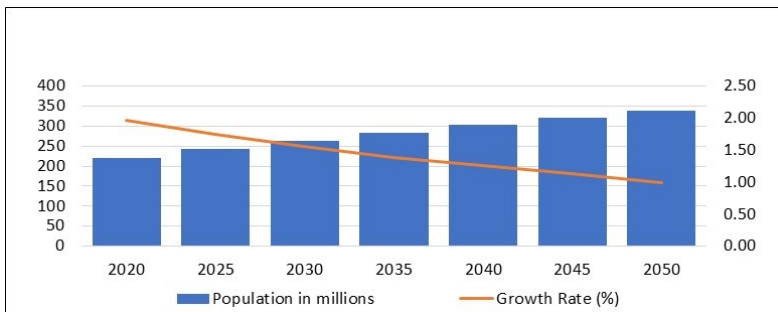
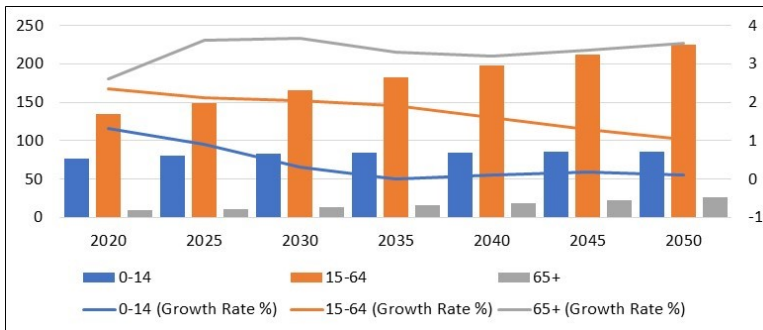


FIGURE 4
Projected Age Groups and Growth Rate (2020-2050)



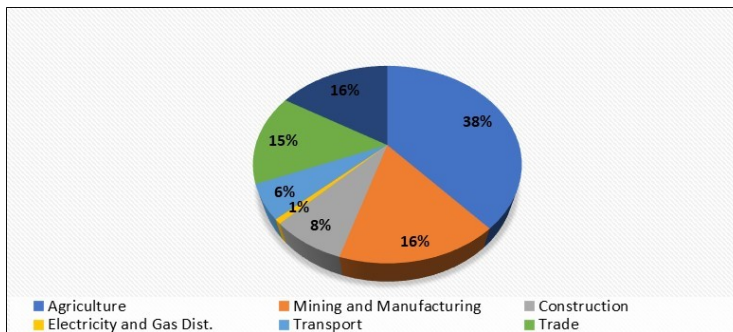
Now if we consider the projected population based on age cohorts. Then the working age group, i.e., the 15-64 age group is projected to be 67 percent of the total population. While the age group 0-14 shares 26 percent and the 65+ group shares 8 percent of the total population. This again reminds us of the importance of employment creation to productively engage that 67 percent working-age population. Figure 4 describes the projected growth rates of different age groups. The average growth rates projected are 0.41 percent for the 0-14 age group, 1.75 percent for the 15-64 age group, and 3.42 percent for the 65+ age group.

EMPLOYMENT TRENDS IN PAKISTAN

Historic Trends: The total labor force has increased from 40.38 million to 65.50 million from 2000 to 2019. This indicates on average annually 1.25 million new entrants joined the labor force during the last two decades. While the total employed labor force during 2019 in absolute terms stands at around 61.71 million. The unemployment rate was 5.79 percent in 2019, which fell from 7.83 percent in 2000.

FIGURE 5

Projected Age Groups and Growth Rate (2020-2050)



The sectoral distribution (see Figure 5) indicates that agriculture still constitutes the largest sector concerning employment and employs around 23.76 million individuals. The agriculture sector is followed by the mining and manufacturing sector. This sector provides employment opportunities to 10.05 million workers. On the other hand, the employment share of the agriculture sector is declining over time as shown in Table 1.

TABLE 1
Average Growth Rates of Sectoral Employment (percent)

Period	Agriculture	Mining and Manufacturing	Construction	Electricity and Gas Dist.	Transport	Trade	Others
2015-2019	-2.39	2.89	0.74	11.38	0.87	0.48	2.35
2010-2019	-1.50	2.25	1.52	3.49	0.92	-0.88	1.98
2000-2019	-1.15	1.92	1.49	2.01	0.73	0.58	0.57

This declining trend in the employment share of the agriculture sector along with an increasing trend in the manufacturing and services sector (which falls under the “others” category here) indicate that Pakistan is going through the transition phase. Therefore, to have a successful transition from an agriculture-based economy toward a manufacturing and services-based economy, we have to create comparative employment opportunities in sectors other than agriculture.

Projected Trends: Now based on sectoral employment growth rates, we can project the employment trends in these sectors. Before discussing the projected employment, a clear description of the underlying assumptions involved in these projections is necessary. First, our basic goal is to measure the increase in employment opportunities required to employ all the available labor force till 2050. Therefore, we assume labor supply is equivalent to the working age group (15-64 age group). Second, we assume that all sectors bear the same unemployment rate. This assumption helps us to simplify the calculation of the available pool of labor force, the point will be made clear in the next section.

By utilizing our first assumption, the available labor force in 2050 is projected to be 225.03 million workers, which is almost equivalent to the current total population of Pakistan. Now to compute the projected labor distribution across sectors, we develop three possible scenarios based on average sectoral employment growth rates.

Scenario-1: The projected employment follows the average employment growth trends of the last two decades. In this scenario, employment in the agriculture sector grows at a rate of -1.15 percent annually as shown in Table 1. While the growth rate in mining and manufacturing is assumed to be 1.92 percent, and so on.

Scenario-2: The second scenario assumes that the employment projection is based on the average employment trends of the period

(2010-2019). In this case, the decrease in employment in the agriculture sector is -1.50 percent annually. However, the mining and manufacturing sector is creating employment opportunities at a rate of 2.25 percent annually. The second last row of Table 1 can define the employment growth rates of other sectors.

Scenario-3: In this last case, we assume that the projected employment follows the employment growth trends that have been observed during 2015-2019. Hence the first row of Table 1 contains the annual employment growth rates.

Table 2 illustrates the projected sector-wise employment shares for the year 2050. In the case of scenario 1, the projected agriculture share will be 26.85 percent of the total labor force. While scenario 3 indicates this share will stand at 18.15 percent. This glaring difference among relative shares shows that the projection values are very sensitive toward the underlying assumptions, and the interpretation of these projections requires careful treatment.

TABLE 2
Sectoral Distribution of Employment in 2050 (percent)

	Agriculture	Mining and Manufacturing	Construction	Electricity and Gas Dist.	Transport	Trade	Others
Scenario-1	26.85	29.44	12.06	1.35	7.11	17.88	19.44
Scenario-2	24.10	32.50	12.17	2.12	7.54	11.33	29.96
Scenario-3	18.15	39.47	9.59	2.63	7.42	17.34	33.50

Based on the above sectoral employment share, we can easily identify the employment opportunities at the sector level. Table 3 carries the sector-wise number of workers (in millions) that will be employed by 2050. In scenarios, one fact that emerges unreservedly is that the mining and manufacturing sector will surpass the agriculture sector and provide employment to workers that range from 66.26 million to 88.83 million workers. This super dense by mining and manufacturing will happen in 2048 in the case of scenario 1. While scenario 2 and 3 project that it will happen in 2043 and 2036, respectively.

TABLE 3
Sector-wise Employment in 2050 (in million)

	Agriculture	Mining and Manufacturing	Construction	Electricity and Gas Dist.	Transport	Trade	Others
Scenario-1	60.43	66.26	27.13	3.05	15.99	40.23	43.74
Scenario-2	54.23	73.13	27.38	4.77	16.97	25.49	67.41
Scenario-3	40.85	88.83	21.57	5.12	16.70	39.03	75.39

GROWTH TRENDS IN PAKISTAN

The economic performance of Pakistan remains dismal over the last two decades. GDP annually grew at 4.25 percent on average during 2001-2019. While the growth rate is downward trending as shown in Figure 6. Furthermore, from 2001 to 2019, the average sector-wise growth rates are; the agriculture sector at 2.33 percent, mining and manufacturing at 5.22 percent, construction at 4.63 percent, electricity, and gas distribution at 2.89 percent, trade at 4.95 percent, transport at 4.14 percent, and others at 5.24 percent.

FIGURE 6
GDP Growth Rate

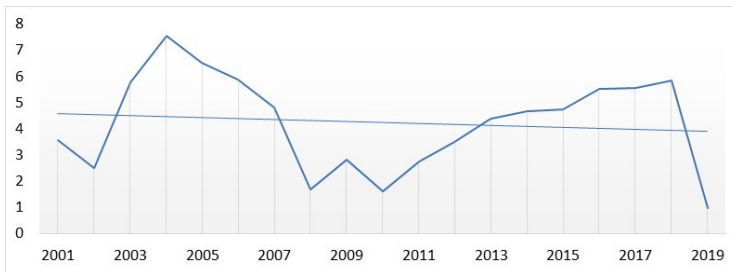
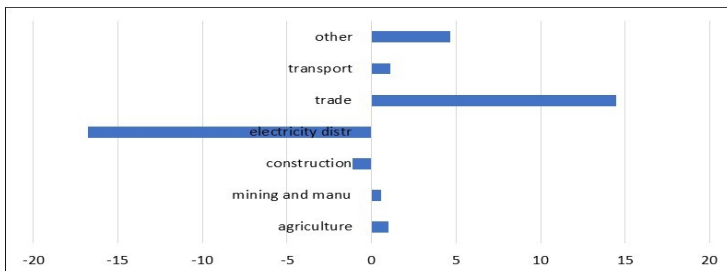
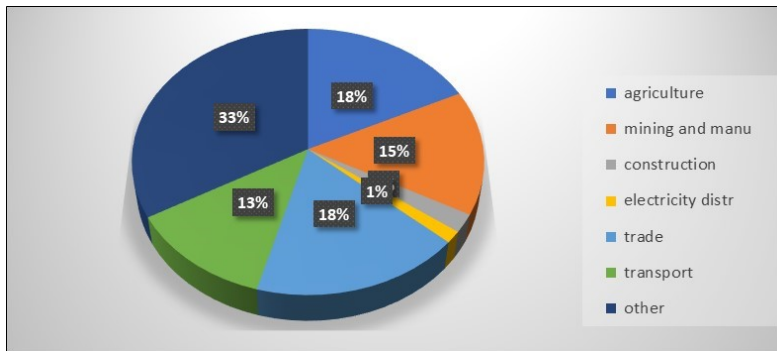


FIGURE 7
Sectoral Growth Rates in 2019



Although the relative performance of the mining and manufacturing sector is satisfactory, it contributes an average of 15 percent to GDP. Yet, the main contributing sector is agriculture (with an average share of 21 percent for 2001-2019), followed by trade (an average share of 17 percent).

FIGURE 8
Sectoral GDP share in 2019



II. LITERATURE REVIEW

Different strands of literature have explored different dynamics of labor employment in literature. However, the role of economic growth in employment creation or vice versa has been explored by Thomson (1999), Tadjoeeddin and Chowdhry (2012), Sweezy and Owens (1974), Ramsaran (1992), Rahman et al. (2006), Goldar (2000), Domer (1946), Maundu et al. (2022), Kapsos (2005), among others.

Patnaik (2008) argues that the newly independent countries of the mid-20th century inherited high a level of unemployment. Therefore, the development model by these economies such as India, Pakistan, and China, focuses on employment creation through industrialization. However, the economic policies observed a major shift after the 1990s liberalization movement and employment creation is no longer an objective. This shift in the economic policy has been assessed by Jain (2015) by looking at the industrial structural change due to the liberalization policies of the 1990s and its impact on employment generation in the case of India. The findings suggest that reform in the

manufacturing sector, though able to achieve higher output but was unable to generate more employment opportunities.

Iyoha (1978) argues that the industrial sector in less developed countries has been unable to generate employment and unemployment has become a perennial issue. Conventionally it is stated that the production process has shifted toward capital-intensive technology. However, the author argues that capital-intensive manufacturing in less-developed countries also results from the misspecification of the objective function which is based on employment growth. Any significant increase in the per capita income in the short run will be associated with less employment growth. However, the high income and employment targets can only be achieved in the long run.

Ghose (2006) tries to answer the question of why economic growth often fails to improve employment conditions. He segregated economic growth into traditional and modern sectors and found that growth in the modern sector, as experienced by developing countries, does not automatically lead to growth in employment. Unni and Raveendran (2007) compared the employment growth from 1993 to 2004 and observed that economic growth is not inclusive in the case of India since low-paid jobs observe more growth. Goldar (2000) explores the potential reasons for stagnant employment growth in the industrial sector of India during the 1980s. The findings suggest that the underlying structural shift towards small and medium industries causes the slow growth in real wages and employment.

In the case of developed countries, Sweezy and Owens (1974) assess the notion that full employment is desirable since prosperous businesses must have a growing number of consumers in the case of an economy where population growth is slow. They argue that population growth will not benefit businesses since the opportunities to increase the capital per worker are less and might lead to a fall in profit. Therefore, the capitalists may hold money rather than acquire real capital goods, and full employment in the economy may not be achieved. Thomson (1999) and Horrigan (2004) discuss the Bureau of Labor Statistics (BLS) sector-wise projections of employment and GDP growth in the case of the USA. The projections indicate that the service sector will be the leading driver of employment and GDP growth. However, the goods-producing sector is

projected to observe nominal employment growth even with strong output growth. Stober (1968) observes a structural shift in employment from agriculture to non-agriculture in the 10 States of Southeast USA since World War II. The employment expansion in the non-agriculture sector was lower than the population's growth rate and increased labor due to a structural shift, which led to migration.

Fusfeld (1968) argues that increasing population is the underlying cause of the growth of employment in the service industries instead of an increase in income, as commonly perceived by contemporary economists. Akbari et al. (1993) analyze the employment profiles of Punjab and Sindh for the period 1980-87. They find that employment growth in the manufacturing sector of selected provinces in Pakistan follows the regional differences in the industrial structure.

Maundu et al. (2022) measure the employment elasticity of growth in the case of Kenya for the period 1997 to 2019. Their findings suggest a positive relationship between employment creation and economic growth in the short run while negative in the long run. Kapsos (2005) estimates the employment intensity of economic growth for 160 countries over the period 1991 to 2003. The employment portfolio across demographic characteristics is also explored. The estimates are suggesting a decline in the elasticity, with the highest elasticities in Africa and the Middle East.

On the determinants of employment creation, Tadjoeeddin and Chowdhury (2012) find that growth is the main determinant instead of real wages in the case of Indonesia. Therefore, reducing unemployment through lowering the wage rate as perceived by the government is not a desirable policy and increases the incidence of vulnerability. Rahman et al. (2006) explore the contributing factors to GDP and employment growth in the case of Bangladesh. Their results indicate that FDI, exports, and remittances are growth drivers in the short run. Nelson (1966) developed a model with a growing labor force and technical advancement and assessed the influence of monetary and fiscal policy responses to maintain aggregate demand in line with potential output. He argues that a higher tax rate is ideal in the event of rapid technological changes.

Ramsaran (1992) argues that the desire to create more jobs by the government to achieve full employment in Caribbean countries has

created a balance of payment and debt issues. To overcome these challenges, countries embarked on different structural adjustment programs, and these programs themselves created unemployment. Therefore, pursuing a full employment target without prioritizing growth is not desirable in the long run. Domer (1946) argues that the analysis of growth requirements to keep the available labor force fully employed shortfalls on theoretical grounds since it misses the demand side analysis.

EMPLOYMENT GROWTH ELASTICITY

To measure the relationship between economic growth and employment creation, the most used approach is employment elasticity concerning economic growth. However, the relationship between economic growth and employment is much more complex than measuring through simple elasticity. Nonetheless, employment-output elasticity is the best available way that indicates the employment absorptive capacity of the economy (Ahmed, and Samad, 2019). Since employment elasticity measures the percentage change in employment due to the percentage change in output, i.e., GDP. The simple formula for employment elasticity is

$$\varepsilon = \frac{\text{percentage change employment}}{\text{percentage change GDP}} = \frac{\Delta EM/EM}{\Delta GDP/GDP}$$

To measure the employment elasticity, we utilize the double-log linear version, which is

$$\ln EM = \beta_0 + \beta_1 \ln GDP$$

The coefficient β_1 in the equation gives the employment elasticity concerning output.

Data Sources: To measure equation 1, we collect data on employment and GDP from various issues of the Pakistan Economic Survey.

The results of linear estimations from this equation are presented in Table 4.

TABLE 4
Employment-Output Elasticities

	2000-2019	2010-2019	2015-2019
Total Employment	0.6	0.3	0.4
Agriculture	0.5	(0.9)	(0.1)
Mining and Manufacturing	0.9	0.8	0.6
Construction	1.0	0.5	0.5
Electricity and gas	0.5	1.2	0.5
Transport	0.6	0.6	0.6
Trade	0.7	0.2	0.4
Others	0.6	0.9	1.2

Table 4 shows the overall employment absorptive capacity of Pakistan is reducing over time. If we compare the sector-wise absorptive capacity for the period 2000-2019, the construction sector emerges as the top employment-creating sector, followed by mining and manufacturing, and trade. Therefore, if the objective is to increase employment opportunities for the masses, then sectors with higher employment growth elasticities should be given more attention. The agriculture sector has an employment elasticity of 0.5 during 2000-2019. However, during 2010-2019, the agriculture sector's employment elasticity took a negative value; the same is true for 2015-2019. This shows that with the increase in GDP, the employment growth in the agriculture sector is negative.

REQUIRED CHANGE IN EMPLOYMENT

Now, given the projected population growth rates (as described in Figures 5 and 6) and employment output elasticities, we can address questions posed in the introduction section, i.e., how much change in employment is needed to employ all available labor force by the year 2050? More importantly, what would be the required annual employment growth rate to achieve the objective of full employment?

To answer these questions, we followed the methodology that has been developed by the International Monetary Fund (IMF) to analyze the

labor market.² To apply that methodology we use information about these variables.

- Total labor force at the starting year, which is 2019.
- Unemployment rate at the starting year
- Total labor force at the ending year, which is 2050.

To compute the required change of employment, first, we calculate the aggregate pool of new entrants till 2050 and unemployed workers during 2019. Then dividing this pool of new entrants and unemployed by total employed workers at the starting date gives the required employment change. While the required employment growth is calculated through the following relationship.

$$\text{Employment growth rate} = (1 + \text{Change in Employment})^{1/(2050-2019)}$$

Results and Discussion: Table 5 contains the data that has been used to compute the pool of new entrants and unemployed workers. Again, the projected sector-wise distribution of employment depends upon the underlying employment growth rates. Therefore, to make our analysis more inclusive, the labor force description in the case of the three scenarios discussed before is also reported in Table 5.

TABLE 5
A Description of Underlying Data (in Million)

		Labor Force 2019	Unemployed 2019	Labor Force 2050	Pool (new entrants and unemployed)
	Aggregate	65.5	3.78	225.03	164
Scenario 1	Agriculture	25.21	1.45	60.4	37
	Mining and Manu.	10.66	0.61	66.25	56
	Construction	4.988	0.28	27.13	22
	Electricity and Gas Dist.	0.47	0.02	3.04	3
	Transport	3.71	0.21	15.99	12
	Trade	9.77	0.56	40.23	31
	Others	10.66	0.61	43.74	34
Scenario 2	Agriculture	25.21	1.45	54.32	30
	Mining and Manu.	10.66	0.61	73.13	63
	Construction	4.988	0.28	27.78	23
	Electricity and Gas Dist.	0.47	0.02	4.7	4
	Transport	3.71	0.21	16.96	13

²For more details visit, <https://www.imf.org/en/News/Articles/2015/09/28/04/53/sores092412a>.

		Labor Force 2019	Unemployed 2019	Labor Force 2050	Pool (new entrants and unemployed)
	Trade	9.77	0.56	25.48	16
	Others	10.66	0.61	67.14	57
Scenario 3	Agriculture	25.21	1.45	40.35	17
	Mining and Manu.	10.66	0.61	88.87	79
	Construction	4.988	0.28	21.56	17
	Electricity and Gas Dist.	0.47	0.02	4.41	4
	Transport	3.71	0.21	16.7	13
	Trade	9.77	0.56	39.02	30
	Others	10.66	0.61	75.39	65

As indicated in Table 6, employment change that is required to productively employ all the available labor force in 2050 is around 265 percent. This translates into a 4 percent required growth rate of employment for the next 30 years. However, as shown in Figure 9, the employment growth rate is merely 1.16 percent during 2018-19. This enormous employment growth gap needs to be addressed, otherwise, the labor market will face pressing unemployment challenges which will constrain economic gains. Table 6 also elaborates on the required employment change and employment growth sector-wise and case-wise as well. The fact that emerges vividly in all scenarios is that the gap between required employment growth rates and actual employment growth is massive. Therefore, irrespective of the underlying assumption, the need of the hour is to create employment opportunities in every sector of the economy.

TABLE 6

Required Rates of Employment Change and Employment Growth

		Required Employment Change	Required Employment Growth Rate
Aggregate		265 percent	4 percent
Scenario 1	Agriculture	154 percent	3 percent
	Mining and Manu.	559 percent	6 percent
	Construction	447 percent	6 percent
	Electricity and Gas Dist.	576 percent	6 percent
	Transport	357 percent	5 percent
	Trade	337 percent	5 percent
	Others	335 percent	5 percent
Scenario 2	Agriculture	128 percent	3 percent
	Mining and Manu.	628 percent	7 percent
	Construction	483 percent	6 percent
	Electricity and Gas Dist.	944 percent	8 percent

		Required Employment Change	Required Employment Growth Rate
	Transport	385 percent	5 percent
	Trade	177 percent	3 percent
	Others	568 percent	6 percent
Scenario 3	Agriculture	70 percent	2 percent
	Mining and Manu.	784 percent	7 percent
	Construction	359 percent	5 percent
	Electricity and Gas Dist.	880 percent	8 percent
	Transport	377 percent	5 percent
	Trade	324 percent	5 percent
	Others	650 percent	7 percent

REQUIRED GDP GROWTH

After perceiving the employment growth required for full employment in the future, naturally, the question arises of how much growth in the output or GDP will yield the required employment opportunities. By using employment elasticity and the required growth rate, we can address this question. Thus, the GDP growth required to yield full employment can be computed as:

$$\text{Full Employment Required GDP Growth rate} = \frac{\text{Required Employment Growth Rate}}{\text{Employment Elasticity}}$$

Results and Discussion: Using the employment elasticity for the period 2000-2019, the above relationship produces Table 7.

TABLE 7

Full Employment Required Growth Rate

		Required GDP Growth Rate
Scenario 1	Aggregate	7.11 percent
	Agriculture	6.11 percent
	Mining and Manu.	6.39 percent
	Construction	5.59 percent
	Electricity and Gas Dist.	10.95 percent
	Transport	7.61 percent
	Trade	6.67 percent
	Others	8.09 percent
Scenario 2	Agriculture	5.39 percent
	Mining and Manu.	6.74 percent
	Construction	5.62 percent
	Electricity and Gas Dist.	13.55 percent
	Transport	7.91 percent
	Trade	4.57 percent
Others	10.53 percent	

		Required GDP Growth Rate
Scenario 3	Agriculture	3.44 percent
	Mining and Manu.	7.19 percent
	Construction	4.84 percent
	Electricity and Gas Dist.	13.71 percent
	Transport	7.83 percent
	Trade	6.53 percent
	Others	11.19 percent

The results indicate that Pakistan needs an economic growth rate of around 7.11 percent persistently over the period of 30 years to engage the available labor force productively. The table above also dissects the required growth rates from different sectors of the economy to meet the 7.11 percent minimum threshold growth level.

III. CONCLUSION

Pakistan is experiencing a bulge in the working-age population, and it is expected that 67 percent of the total population will be in the working-age group by 2050. Pakistan can only realize the economic benefits of the available demographic dividend by productively employing this bulge of the working-age population. Our calculation based on the projected population data shows that Pakistan needs a sustained growth rate of around 7.11 percent over a prolonged period to create enough jobs for the available labor force. However, the average economic growth rate during the last decade was merely 3.8 percent, and the economy's potential growth is estimated to be around 6 percent. To achieve a growth rate nearer to full employment growth rates, Pakistan needs to take much-needed structural reforms that promote business activities. Since employment growth and economic growth have both way causality. Therefore, removing the bottlenecks faced by the business in the economy will lead to higher growth in employment creation, which ultimately translates into higher economic growth. The key policy implication that can be drawn from this study is that the government should focus on increasing the growth potential of the economy by facilitating business and transactions in the economy. To create such a business-enabling environment, the government must embark on deep structural reform initiatives that ensure policy consistency, remove unnecessary regulations, promote of free market and competition, and liberalization of trade policy.

One must keep in mind that the estimated 7.11 percent level of output growth is the minimum required growth rate to achieve full employment of the labor force. However, if one also considers the welfare and per capita income aspects, the required growth rate is much higher than the 7.11 percent threshold.

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