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MACROECONOMIC DIFFERENCES IN CHINA AND PAKISTAN: AN HISTORICAL ANALYSIS

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ABSTRACT

Pakistan performed better than China in terms of GDP per capita before 1993, but after that, China experienced 2.39 to 13.63 % annual growth rate compared to -1.45 to 6.68 % for Pakistan. High growth in GDP accompanied by low population growth rate in China compared to Pakistan resulted in GDP per capita of US $ 8123.18 for China and US $ 1468.19 for Pakistan. The percentage contribution of agriculture in the GDP showed a decreasing trend while the agricultural value addition indicated an increasing trend for both China and Pakistan. Yields of major crops, values of human development index and its various components, and saving rate were substantially higher in China compared to Pakistan. China experienced 0.5-0.6 percent population growth rate compared to 2.1 for Pakistan for the period 2000-2015. Regression results showed that human development index and saving rate have positive significant influence, while population growth rate showed negative effect on GDP.

KEYWORDS: Macroeconomic; analysis; development; GDP; China; Pakistan

INTRODUCTION

Currently Pakistan is lagging to China under almost all key economic indicators. Pakistan and China had almost homogenous economic characteristics at the time of independence but over time significant differences developed in these characteristics. Historically proven friendship of China and Pakistan has resulted in strong economic coordination between them and China - Pakistan Economic Corridor (CPEC) is a recent example of this coordination. The CPEC provides an excellent opportunity to Pakistan and its neighboring countries to improve this economic and security situation. CPEC projects amounting to US $ 46 billion can help Pakistan in tackling some of the main economic development barriers like food insecurity, energy shortage, poor connectivity and limited attraction for foreign investors (Ashraf *et al.,* 2013) As Pakistan got a lot of investment from China under CPEC to boost its economy, therefore, it is important to have an understanding about macroeconomic differences in these countries. This study will examine key macroeconomic variables like gross domestic product, agricultural value addition, human development, saving rate and population growth rates of both economies historically and quantify the difference in macroeconomic variables of China and Pakistan. Further, present study will find out the time periods in which Pakistan's economy is lagging to China under different economic indicators.

Agriculture

Agriculture is among one of the major sectors of Pakistan and China. Its contribution play an important role in the economic growth of these countries. Agricultural value addition is comprised of forestry, fishing, crops and livestock sub-sectors of the economy (GoP, 2019). The value added trend of both countries showed an increasing trend is depicted in Fig. 1. The agricultural value added showed a growth rate of 2.8 and 3.9 percent for Pakistan and China, respectively from 1990 to 2015.

In absolute terms, value addition from agricultural sector increase both in China and Pakistan. However the percentage contribution of agricultural value addition to GDP showed a decreasing trend for China and Pakistan but in China the percentage share of agriculture in GDP decrease more than Pakistan (Fig. 2).

The agricultural crop land shows the capital accumulation in the agriculture. The agricultural crop land shows an increasing trend in both China and Pakistan (Fig. 3).

In Pakistan, major crops are wheat, rice, cotton and sugarcane; and production of these crops have a significant impact on the growth of agricultural sector and the economy. Agriculture sector contributed about 18.5 percent to the gross domestic product of Pakistan (GoP, 2019). Growth rate of crop sector depends on the harvesting of major crops, availability of agricultural

credit, water and usage of fertilizers. “Kharif” and “Rabi” are two major cropping seasons in Pakistan (Shahid *et al.,* 2016). Rice, cotton and sugarcane are major kharif crops while wheat is dominant “Rabi” crop. Yield of these crops in China and Pakistan indicates that historically China performed better than Pakistan and the gap between the yields of crop is significant between these economies.

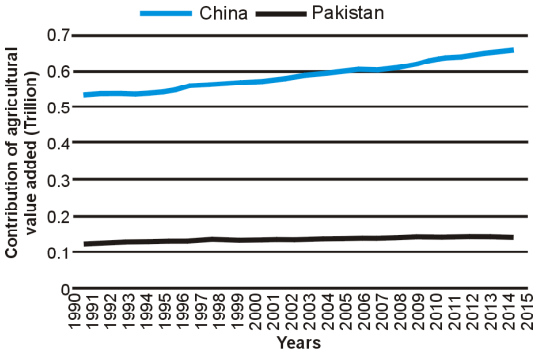

Fig. 1. Analysis of agricultural value added contribution differences between China and Pakistan
Source: World Bank (2019)

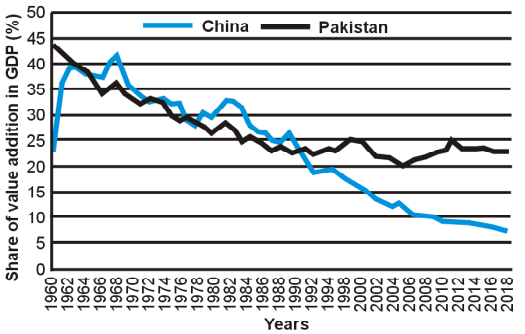

Fig. 2. Analysis of percentage share of agricultural value addition in GDP between China and Pakistan
Source: World Bank (2019)

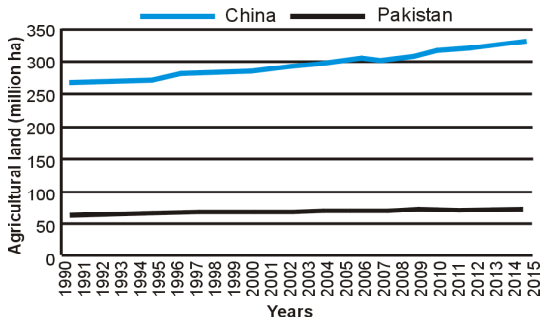

Fig. 3. Agricultural land differences between China and Pakistan
Source: World Bank (2019)

There are many countries in Asia which are among the top nations for producing cotton in the world. Historical data of cotton yield in China and Pakistan is depicted in Fig. 4. It indicates that cotton yield in China and Pakistan is very close to each other in 1990 but over time this yield gap has been widened.

Rice crop has immense popularity in the South Asian region. It is a staple food crop for quite a number of economies in the region. It dominates the South Asian region among all cereal crops. Pakistan also produces a significant amount of the rice crop. It is considered a superior substitute for wheat in the country. A comparison of rice yield in Pakistan with reference to China is depicted in Fig. 5.

The sugarcane crop is a valuable cash crop in Pakistan. Pakistan is among top ten countries in the world according to sugarcane production. Fig. 6 indicates that the yield of sugarcane in Pakistan is always less than China.

Yield of wheat in China has shown consistency in its supremacy in the production of wheat with respect to Pakistan. Fig. 7 depicts the yield of wheat in Pakistan and China since 1990, and it indicates an increase in wheat yield gap of two neighboring economies.

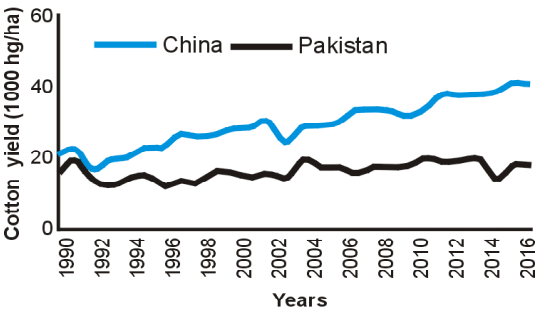

Fig. 4. Cotton yield differences between China and Pakistan
Source: FAOSTAT (2019)

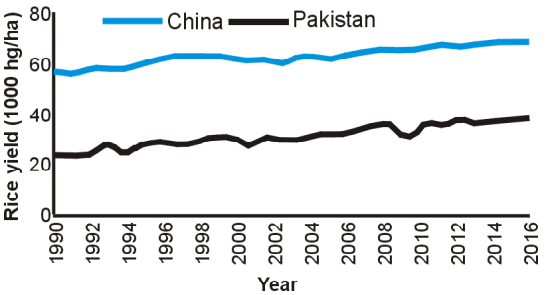

Fig. 5. Rice yield differences between China and Pakistan
Source: FAOSTAT (2019)

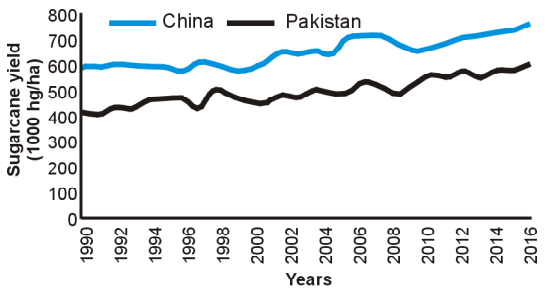

Fig. 6. Sugarcane yield differences between China and Pakistan
Source: FAOSTAT (2019)

Human Development

Development theorists recognize human development and economic development as development indicators. In order to measure the human development, human development index (HDI) was developed by UNDP in 1990 from the available indicators. Development of HDI is considered to be one of the best attempt to analyze the inter-country and inter-temporal socio economic development across countries (Doessel and Grounder, 1994). Human Development Index for the year 2015 of China and Pakistan is reported in Table 1. It shows that human development index of China was higher by 34.18 % compared to Pakistan. Life expectancy, expected schooling years, average schooling years and GNI per capita of China was higher by 14.46, 66.67, 49.1 and 165.26 % respectively compared to Pakistan (UNDP, 2016).

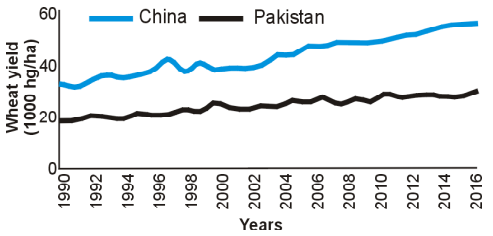

Fig. 7. Wheat yield differences between China and Pakistan
Source: FAOSTAT (2019)

Human development index (Table 2) shows that over the period 1990-2015, there have been consistent achievements in terms of HDI for both China and Pakistan. Both countries experienced an improvement in HDI, with faster growth in China and low growth rate in Pakistan. The difference in HDI between China and Pakistan was 0.095 in 1990 which increased to 0.181 in 2015. Average annual HDI growth rate was substantially higher in China compared to Pakistan. Overall annual growth rate was 1.57% in China compared to 1.24% in Pakistan (UNDP, 2016). Continued economic development in China can be linked to improved human development.

The human development index combines three dimensions of human development i.e. life expectancy at birth, average schooling years and expected schooling years and GNI per capita (UNDP, 2005). Life expectancy shows the ability to lead a long and healthy life. Schooling years reflect the ability to acquire knowledge. A decent standard of living is depicted by per capita income.

Saving rate

Saving and investment are two important macro indicators which play significant role in economic growth. Saving is considered as engine of economic growth as it is directly related with investment. High saving rate results in high investment level. Further, saving plays an important role in the accumulation of capital which in turn helps to achieve sustainable economic growth and development (Chow, 1993).

Table 1. Human Development Index of China and Pakistan in year 2015

Country	Human development index (HDI)	Life expectancy at birth (year)	Expected years of schooling (year)	Mean years of schooling (year)	Gross National Income/Capita (2011 PPP $)
China	0.738	76.0	13.5	7.6	13345
Pakistan	0.55	66.4	8.1	5.1	5031
Percent increase in China over Pakistan	34.18	14.46	66.67	49.1	165.26

Source: UNDP (2016)

Table 2. Human Development Index in China and Pakistan over the period 1990-2015

Country	HDI Value						Average annual HDI growth (%)			
	1990	2010	2012	2013	2014	2015	1990-2000	2000-2010	2010-2015	1990-2015
China	0.499	0.70	0.713	0.723	0.734	0.738	1.72	1.70	1.05	1.57
Pakistan	0.404	0.525	0.538	0.542	0.548	0.557	1.09	1.55	0.95	1.24

Source: UNDP (2016)

Table 3. Descriptive statistics

Variables		Both Countries		China		Pakistan	
	Definition of variables	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
GDP	Gross domestic product (current US $) (billion)	1716.05	2903.43	3314.87	3445.99	117.24	72.45
HDI	Human development index (%)[a]	54.82	9.65	62.06	7.58	47.59	4.86
Gsav	Gross saving (% of GDP)	33.32	12.13	44.58	5.33	22.07	2.87
Popgth	Population growth rate (annual %)	1.53	0.81	0.78	0.31	2.28	0.27
Agvalue	Agricultural value added (% of GDP)	18.72	5.77	14.38	5.21	23.05	1.29

[a] obtained by multiplying the figures reported in HDR with 100.

Gross saving as percent of gross national income (GNI) ranged from 34.42 to 51.85 % in China, while it varied from 16.56 to 27.46 in Pakistan over the period 1982-2015. Thus, China had saving rate consistently higher than Pakistan. In year 2015, the saving rate in China was 48.46 % of GNI. This is above the world average of 26.21 % while in Pakistan people saved 21.95 % of GNI (Fig. 8).

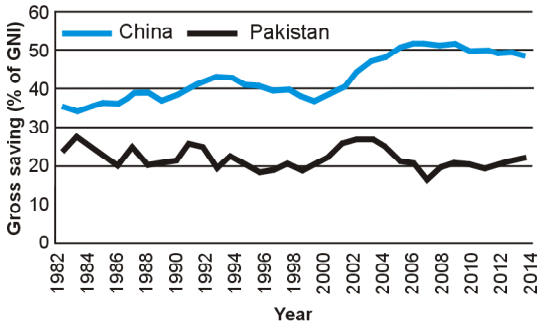

Fig. 8. Comparison of gross saving between China and Pakistan
Source: World Bank (2019)

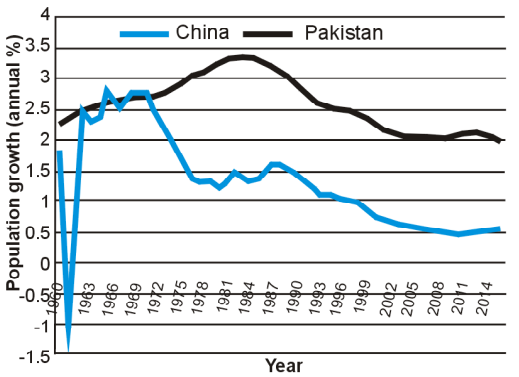

Fig. 9. Annual population growth differences between China and Pakistan
Source: World Bank (2019)

Table 4. Estimates of the regression model

Variables	Coefficients
Constant	-1.072 (0.955)
HDI	0.122* (0.010)
Gsav	0.027* (0.007)
Popgth	-0.434* (0.126)
Agvalue	0.012 (0.011)

Standard error of the Coefficient is given in the prentices
*represents statistical significance at 1 % level of significance

Higher saving and investment rates in China helped in boosting GDP. This might be one the reason that China's economy is growing faster than in Pakistan. According to Harrod (1939) and Domar (1946), in order to achieve economic growth, the government should encourage saving which leads to innovation and progress. Using data from a large set of countries, Mankiv *et al. (*1992) indicated that saving and population growth affect income. They concluded that a higher saving rate leads to higher level of human capital which results in raising total factor productivity. A number of studies support that increase in saving leads to increase in growth of the nation's economy. For example, Najarzadeh *et al.* (2014) concluded that saving has positive significant impact on total and non-oil economic growth. Verma and Wilson (2005) reported that saving and investment affect GDP in the long run. Verma (2007) reported that investment is the driver of economic growth in India. Mohan (2006) found that the causality runs from savings and investment to economic growth and not from economic growth to saving and investment.

Population

Population growth has several effects on the performance of a country. China with 1376 million people and Pakistan with 189 million people enjoy the same factor endowment i.e. large labor force. In China, average annual population growth rate was 0.6 percent over the period of 2000-2005 and 0.5 percent during 2010-2015, while Pakistan experienced the population growth rate of 2.1 percent over these periods (Figure 9). Substantial rise in per capita income over the period 1993-2015, led unprecedented rise in the standard of living of Chinese people compared to Pakistan. Technological progress in China has helped the people to increase their per capita income.

Higher population growth not only puts pressure on the limited resources of a country, but increases dependency ratio of people, thus limiting the growth of country. Dependency ratio of young people (0-14 years) to 100 people ages (15-64) was 23.5 in China compared to 57.9 in Pakistan. Thus the non-productive young population shared the major part of total population in Pakistan. A number of studies reported the effect of population growth on economic growth. For example, Mushtaq (2006) stated that population growth does not influence per capita income in long run. Afzal (2009) estimated the association between economic growth and population growth in Pakistan. He found inverse relationship between economic growth and population growth in Pakistan. Ahmed and Ahmad (2016) concluded that population creates negative impacts on economic growth of Pakistan however, population growth and economic growth has direct relationship in Nigeria (Tartiyus *et al.,* 2015). Similarly, Chang *et al.* (2014) reported that population growth has inverse relationship with economic growth.

Gross domestic product

China and Pakistan are two dynamic economies. China ranks as the 2nd largest economy after United States with gross domestic product of 74.413 trillion US $ in 2016. Pakistan GDP was 29.59 trillion US $. Both the economies experienced an increase in GDP from 1990-2016. Since 1985 GDP of China increased substantially as compared to Pakistan. GDP of China increased from 147.01 billion US $ in 1960 to 74.413 trillion US $ in 2015. GDP of Pakistan increased from 17.653 billion dollars to 29.58 trillion dollars over the same period. China shared 14.81 % of the world GDP, while Pakistan contributed only 3.75 % to it at current US $ in 2016. GDP annual growth rate shows that it has been fluctuating over time. Since 1991 China has consistently higher GDP growth rate compared to Pakistan. In China GDP growth rate ranged from 6.7-14.231 %, while in Pakistan it varied from 1.014 to 7.667 over 1991-2015. Thus China experienced much higher GDP growth rate compared to Pakistan.

Comparison of per capita GDP overtime between China and Pakistan is very interesting. Starting from 1961 to 1993, surprisingly per capita GDP of Pakistan was higher than China. For example, in 1961, per capita GDP of Pakistan was higher by USD 121.36 compared to China. Up to 1993 generally speaking both the countries experienced an increase in per capita GDP and it was higher in Pakistan compared to China. After 1993, the per capita GDP of China was higher compared to Pakistan. Higher growth in GDP accompanied by low population growth rate in China as compared to Pakistan resulted in continuous rise in GDP per capita over time. Consequently, in 2016 per capita GDP of China was US $ 8123.18 and that of Pakistan US $ 1468.19 and the difference was US $ 6654.88 (Fig. 10).

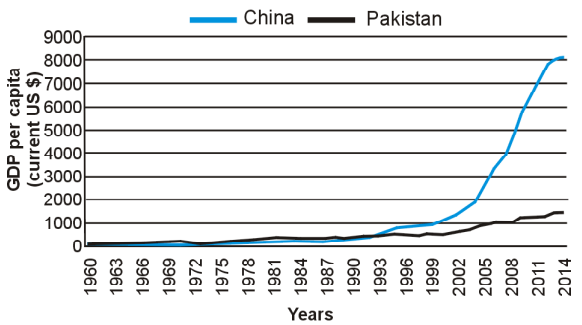

Fig. 10. Per capita GDP differences between China and Pakistan
Source: World Bank (2019)

A look at the GDP per capita growth rate shows that since 1977 China experienced much higher growth rate than Pakistan. China annual GDP per capita growth rate generally remained higher than six percent and ranged between 2.39 to 13.63 %, while in Pakistan annual GDP per capita growth rate was around 2 % and ranged from -1.45 to 6.68 %. From this it can be concluded that despite the fact that China GDP per capita was relatively low in initial years but in later years GDP per capita of China was substantially higher than Pakistan.

Results of regression model

Following model was used to estimate the effect of various explanatory variables:

$GDP_{it} = f(HDI_{it}, gsav_{it}, popgth_{it}, Agvalue_{it})$

Where GDP_{it} = is gross domestic product of country i (i = 1, 2) in period t

HDI_{it} = human development index of country i in period t

$gsav_{it}$ = gross saving as percent of GDP of country i in period t

$popgth_{it}$ = population growth rate of country i in period t

$Agvalue_{it}$ = agricultural value added as percent of GDP of country i in period t

HDI captures the effect of the quality of labor while population growth shows the changes in the quantity of the labor. Investment/capital formation is approximated through increase in saving rate. The study used data of China and Pakistan from 1990 to 2015. Data about the human development index were obtained from Human Development Reports, while data about GDP, gross saving, population growth and agricultural value added as percent of GDP were taken from World Bank indicators database. Basic statistics of the variables used in the model are reported in Table 3.

The average value of Gross Domestic Product (current US $) was 1716.05 billion, and it was substantially higher in China (3314.87 billion) as compared to Pakistan (117.24 billion). Gross saving as % of GDP was double in China compared to Pakistan. However, the population growth rate was about three times higher in Pakistan as compared to China. The agricultural value added as percent of GDP is more in Pakistan than China and indicated that this sector contributed relatively greater in GDP of Pakistan than China.

For estimation of relationship among considered macroeconomic variables of China and Pakistan, log linear was used.

The coefficient of human development index Table 4 shows that one percent increase in the human development index increases GDP by 0.122 percent. The coefficient of gross saving as percent of GDP is positive and significant. The results show that an increase in the gross saving will improve GDP by 0.027 percent. It was observed that the relationship

between population growth rate and GDP is negative and highly significant. It shows that if the population growth increases by one percent, it will decrease GDP by -0.434 percent. The coefficient of agricultural value added as percentage of GDP is insignificant in the estimated model.

Summary

Historically China and Pakistan experienced fluctuating annual growth rate in GDP. Comparison of per capita GDP over time shows that Pakistan had higher per capita income compared to China up to 1993 but after that GDP per capita of China remained substantially higher than Pakistan. Annual GDP per capita growth rate ranged from 2.39 to 13.63 percent for China and -1.45 to 6.68 percent for Pakistan since 1977. Values of human development index were substantially higher for China as compared to Pakistan. Saving which play an important role in the accumulation of capital varied from 34.42 to 51.85 percent and 16.56 to 27.46 percent for China and Pakistan, respectively. However, population growth rate was lower in China than Pakistan. Results of estimated model indicates that an improvement in human development index and saving rate significantly increased GDP, population growth rate significantly decreased GDP while agricultural value addition has insignificant positive effect on GDP. The findings of the study suggest that Pakistan needs to improve HDI substantially by increasing expenditure on education and health care. Further, Pakistan needs to improve saving by increasing profit on saving schemes and through other initiatives in order to create capital formation which leads to technical innovation and economic growth.

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1.	Tanvir Ahmed	Prepared manuscript	
2.	Waseem Ahmad	Analyzed the data	
3.	Abdul Naveed	Reviewed the literature