

Regional Growth Causalities, Dependency and Integration among the Provinces of Pakistan

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Abstract

The paper addresses an empirical question whether the provinces of Pakistan are growing equitably and or integrating over time. Regional growth inequalities and deprivation among provinces of Pakistan is one of the hot issues. It is a general perception that small provinces are neglected in the development process, while focus of development policies was on large provinces. Therefore, this study has investigated growth dependency of provinces among each other. The study applied Engle Granger co-integration and Granger causality test to find the long run and short run relationships and growth causalities among provinces. The empirical evidences indicated that there exist long run and short run relationships between large provinces. However, the growth of small provinces (KPK and Baluchistan) depends on the growth of large provinces, Punjab and Sindh. Punjab effects growth of Sindh; both in short and long run but Sindh effects economic growth of Punjab, only in the long run. Such a strong relationship hardly exists for small provinces; i.e. KPK and Baluchistan. The trickled down effect is not evident for small provinces. The small provinces are less beneficial from this relationship. Besides, the growth of small provinces is dependent upon the performance of large provinces, such dependent nature of growth of small province may have created a sense of deprivation in small provinces. Thus, there is a need to integrate small provinces in to the main stream of economic growth by allowing economic policies to be directed towards deprived region (provinces) of Pakistan. It will help to improve equitable growth and integration of the small provinces in to the main stream of national development.

Keywords: Economic Growth, Regional Growth Rate Differences, Provincial Integration, Granger Causality

JEL Classification: I30, O15

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1. Introduction

The pace of economic growth, as well as, regional development is widely analyzed phenomena. One of the most desirable outcomes of economic growth is that citizens of a nation equitable benefit from the fruits of economic growth; the desired goal of treacle down effect need to be ensured, otherwise, economic growth without such unequitable distribution may lead to deprivation for some regions, which may create political unrest. Therefore, a balanced growth, which brings all regions (provinces) of a country towards equitable distribution of the fruits of progress and welfare of any nation. Thus, it is one of the very reasons that target of economic policies need to be focused to bring the deprived regions in to the main stream of economic development. Before the 18th amendment in the constitution of Pakistan, the resources mobilization and their disposal were in the hands of federal government. Thus, fiscal and monetary policies were the driving force for economic growth in Pakistan. If the public policies are not equitably focused among provinces, it will create regional inequalities and deprivations. It is generally claimed that major portion of public investment was concentrated in the large provinces and large urban cities (Chaudhary, 1989). It appears that all provinces of Pakistan may have not been benefitted equitably, from the national development Plans and policies². As a result, some provinces are left behind in the development process. Particularly, the small provinces like Baluchistan are a victim of such regional unbalanced economic growth. (Chaudhary, 1989-a; Chaudhary and Saeed, 1990). The people of these provinces feel deprived and this deprivation is growing over time. In other words, the fruits of economic growth may have not been equitably distributed among the provinces of Pakistan³. Different theories have been focused to explain and understand sources of economic growth, as well as, their impacts on different regions of Pakistan. The growth theories set a path to economic and development i.e. Balanced and Unbalanced Economic Growth theories, as well as, trickled down effect theory are some of those rationales which

² For the allocation of resources and development, see different development plans (Chaudhry, 1989). The agricultural growth in Baluchistan was more than double that of other provinces in the 1960s and 1970s. However, there is hardly any financial integration and much industrial activities in this province. It is the most deprived province and, at national level, hardly any effort was made to integrate its economy in to the main framework. Major chunk of agricultural development, in terms of Green revolution was concentrated in Indus Basin i.e. in the large provinces. The province also suffers from deep rooted poverty in the province. In the 6th Five-year plan, a chapter was added to integrate such regions; in to the main framework, but in practice, hardly any action was taken to implement the plan (for more details see Chaudhry, 1989).

³ For details see, Chaudhary, et.al (1990). Chaudhary, (2019). For recent development in agriculture in Baluchistan see; Safi, G. M., Gadiwala, M. S., Burke, F., Azam, M., & Baqa, M. F. (2014).

focused on equitable development. Similarly, one of the major goals of regional development is equitable economic development, across regions and sectors. There is hardly any comprehensive study which may have been focused on the above cited issue; one of the very reasons was unavailability of regional data. Given the above background, this study is focused to analyze the growth linkages and economic performance at Province (regional) level and their integration over time i.e. provincial economic integration and dependency among provinces; the very reason that this study is undertaken.

Gross Domestic Products (GDP) is a comprehensive measure of economic activity at aggregate level. It could provide level of development in a region. An important question to be analyze is the growth differential within a country and across countries. A considerable body of economic literature suggests the importance of equitable growth among different sectors and regions which is important for over all welfare of a society or country. Wider income inequalities are hardly ever desirable; rather discouraged. Such outcomes may create political and economic unrest in the country. Regional (provincial) accounts provide important indicators for assessing the economic diversity and sectoral growth of regional (provincial) economies. It can also be used to understand regional disparities and distribution of income amongst the various units of an economy. The major economic territory of Pakistan can be subdivided into the four provinces; Punjab, Sindh, Khyber Pakhtunkhwa (KPK) and Baluchistan⁴. These provinces are governed by separate provincial governments and have their own development authorities. However, they depend upon National Finance Award, for their major financial needs. Moreover, mega projects are undertaken by the federal government, which have major impacts on the economy. So, the national and regional economic growth depends on the economic policies adopted by the central government.

Regional income inequalities have serious implications for economic development. It is the very reason that Inclusive growth has been focused to improve the welfare of the entire society (Aribah, Aslam et.al. 2016 and Kalsoom, et. al. 2017). In order to identify the level of regional income inequalities, regional income accounts (RIA) are a very helpful tool. The table 1, below indicates province wise GDP growth rate from 1973 to 2017. There are two important economic outcomes; first, over time, there is a significant variation in the growth rate of provinces and second, during the high growth periods, the regional growth

⁴ There are other small entities like FATA, Gilgit and Swat too. FATA is being merged with KPK.

differences are more as compare to low growth periods, which could be driving force for regional income inequalities⁵.

Table 1: Province/Regional GDP Growth Rate from 1973 to 2013, (% age)

Year	Punjab	Sindh	NWFP	Baluchistan	Pakistan
1973-78	3.88 (2 nd)	3.04(3 rd)	2.76 (4 th)	3.90(1 st)	3.48
1978-89	5.84(3 rd)	6.89(1 st)	6.36 (2 nd)	4.55 (4 th)	6.16
1989-00	4.92(1 st)	3.69(4 th)	4.38(2 nd)	4.13 (3 rd)	4.43
2000-08	4.87 (3 rd)	6.21(1 st)	5.63(2 nd)	3.34(4 th)	5.23
2008-13	3.02(2 nd)	2.08(3 rd)	4.97(1 st)	1.88(4 th)	2.86
1973-2013	4.75(3 rd)	4.76(2 nd)	5.01(1 st)	3.75 (4 th)	4.71
2014-17	4.91	4.82	4.94	3.81	4.56

Source: SPDC (2005) and IPR (2015) and compiled by the authors. Values in parentheses are the ranking based on growth rate.

The composition of relative sectoral share towards GDP i.e. of agriculture, manufacturing and services sector is given in the following Table 2. It is evident from the Table 2 that the agriculture contribution in GDP is declining and the share of services is rising, which is as per expectations, indicating that growth, as well as structural change is taking place. However, it is important to note that the structure of each province is different, and it has not changed much over time, for example industrial activities are not wide spread in Baluchistan. Agriculture is still the mainstay of population there. Besides, structural change has not much taken place in this province. However, relatively, more structural change was evident in the large provinces. It indicates that economic policies followed in the past were not focused to equitably develop and to integrate the provinces in to the main stream of development. The province of Baluchistan remained at the top in its dependence for growth on other provinces. It still largely depends upon agriculture and not much structural change took place in this province. The KPK province has attracted some industrial activities but still its quantum was very small, as compared to large provinces.

⁵ For regional development activities, also see Chaudhary, et. al. (1989) & (1990) and in the inequalities in regional income per capita are also very large, as indicated by the differences in growth rates for regional development activities.

Table 2: Composition of Sectoral Contribution in Provincial GDP, (%)

Province / Sector	1990	2000	2015	2017
Punjab				
Agriculture	27.9	31.6	23.8	22.6
Industry	24.2	13.3	15.4	16.31
Services	47.9	55.1	60.8	61.2
Sindh				
Agriculture	21.3	22.48	15.7	15.8
Industry	29.9	24.48	28.6	29.2
Services	48.8	53.04	55.8	56.3
KPK				
Agriculture	26.3	22.5	15.7	15.8
Industry	20.7	24.5	28.6	29.1
Services	52.9	53.0	55.8	56.4
Baluchistan				
Agriculture	33.0	27.8	27.6	27.3
Industry	22.2	26.3	25.1	25.4
Services	44.8	45.9	47.4	48.6

Source: SDPI (2005), IPS, (Report, annual) (2015) and compiled by the authors.

To test relative contribution of the sector's growth towards GDP growth rate, relevant evidences are provided in Table 3, below. The table indicates the frequency and number of years for relative growth of each sector, towards national GDP. It is interesting to note that in the last 45 years, there were only 12 years in which agriculture growth rate was greater than GDP growth rate. The growth rate of industry and services were greater than GDP growth for 29 and 31 years, respectively.

Table 3: Frequency of Sectoral Growth Rates (Greater than GDP Growth)

Sectors	Frequency	Total No. of Years
Agricultural Growth	12	45
Industrial Growth	29	45
Services Growth	31	45

Source: Handbook of Pakistan economy, SBP.

There were total 18 years, out of 45 years, when industry and services growth rate was more than GDP growth rate. This indicates that there exists high sectoral frequency of growth differences; in terms of their contribution towards

GDP growth, which may be one of sources of significant growth differentials. The growth of one sector is specific to a province, which leads to growth differences among provinces. Major agriculture investment was done during Green Revolution in the 1960s, which was mainly concentrated in the Indus Basin i.e. Punjab and Sindh (Chaudhary M. Aslam 1989). Thus, there is a need to explore GDP growth linkages of provinces; within provinces and across provinces; the focus of the present study is to explore dependent growth of provinces in Pakistan.

Given the above background, this study analyzes the relationship between the Provincial (regional) growth patterns in Pakistan; while identifying their integration with the national stream of development. Besides, the objective of the study is to find out causalities and long run growth relationship between the regions of Pakistan. More specific objectives are given below.

1.1. Objectives of the Study

The major objectives of the study are as follows:

- (i) Identify pattern or integration of provincial growth in Pakistan.
- (ii) Point out sectoral linkages, among provinces and among sectors.
- (iii) Find out sources of provincial inequalities.
- (iv) Propose policy guidelines to integrate provincial and sectoral economies, with national economic growth.

It is an attempt to answer two important questions, first, do there exists a long run relationship between GDP growth rates of provinces and second, do GDP growth of a province complements the GDP growth of another province or not? In either case, could it be a source of provincial inequalities? Hereafter, the study is organized as under. Part 2 provides literature review. Part 3 consists upon Data and methodology and techniques to draw empirical evidences. Part 4 discusses the empirical evidences and their implications. Part 5 consists upon Conclusions and policy recommendations.

2. Literature Review

The early development theories contributed towards economic growth process and pointed out that the main source of growth was a result of capital accumulation [Hahn and Matthew (1964)]. The rationale behind it was save more and invest more, which was considered driving force for growth. Thus, capital accumulation was considered major force for accelerated economic growth. The availability of capital helps to have access to improved machinery and other inputs,

which raises productivity of workers; the integrated process leads to accelerate economic growth of a country. So, to promote investment, capital will be supplied by higher rates of saving. Harrod (1939) and Domar (1947a) developed model as assumed constant rate of saving and capital output ratio in deriving a simple formula for economic growth. In their model, the rate of growth of output was related to the rate of saving and capital output ratio. However, [Solow, (1956) and Swan, (1956), Ramsey (1928), Cass (1965), and Koopmans (1965) and Diamond (1965)] further developed their models to analyze the cross-country economic growth differences. They assumed that capital, labor, and knowledge are inputs, and these are combined to produce output. There is an ample body of literature which focused on factors' contribution and the role of technical change in determining economic growth rate. It also assumed that labor and knowledge grow at a constant rate and savings are exogenous; although others considered that savings are constrained to income. The models showed that saving rate has a level effect on output but not growth effect. The underlying assumption of above models is that all factors of production and saving rate is same for all areas in a country, which may not be true.

Capello (2011) argues that space influences the way an economic system works. It is a source of economic advantages (or disadvantages) such as high (or low) endowments of production factors. It also generates geographical advantages, like integrated regions (area), and a high (or low) endowment or availability of raw materials (inputs). Two large groups of theorists have developed; i) location theory, it deals with the economic mechanisms that distribute activities by location. Location theory involves investigation into the location choices of firms and households. It applied the concepts of externalities and agglomeration economies to highlight the issues of disparities and distribution of the fruits of the economy. ii) Regional growth (and development) theories focused on spatial aspects of economic growth and the territorial distribution of income. It remained to be seen that which one of these theories explain regional development in Pakistan, which has hardly been a part of literature pertaining to the subject matter.

Hussain (1993) discussed that during 1960s, the disparities between East and West Pakistan was very high, which led to the separation of East Pakistan; as Bangladesh in 1971. As a result, in 1970s and 1980s, the issue of regional disparity has gained a high priority for the government. Over time, there has been a lot of changes in the income of provinces but at the same time the inequality has also been increased both at interprovincial and intra-provincial level. The author further discussed that, this inequality has led to the increase in poverty within regions and across regions. Such an outcome leads to deprivation and neglect of specific

segment of the society as well as regions, which are undesirable in terms of equitable economic growth. The regions which have relatively, better infrastructure is likely to attain higher level of growth, as compared to other regions. In 1959-60, Karachi accounted for 39 percent of the industrial output value added, followed by Lahore and Faisalabad. Hence the total value added in industry in these three districts accounts for more than 60 percent of the total industrial activities in Pakistan. On the other hand, industrial sector in Baluchistan was almost neglected, which hardly contributed much towards overall industrial output in Pakistan. There is hardly any large industry in the province. It is on the face that the province is rich in minerals, gas and mines. But with the passage of time, in addition to above cited developed districts, the surrounding districts also enjoyed agglomeration economies in these cities and these cities attracted further industrial activities i.e. in Faisalabad, Sialkot, Gujranwala, Sheikupura and Gujrat etc., in Punjab (Chaudhary M. Aslam, 1989-a). Karachi still accounts for 35 percent of the value added in industrial output. Furthermore, the he central Punjab that includes Sheikupura and northern Punjab that includes Jhelum accounts for 19 percent of the industries in Pakistan. However, in interior Sindh only growth has been taken place in Dadu and Hyderabad. The provinces of Baluchistan and KPK were not able to benefit much from such growing industrial activities in Pakistan.

Jamal (2015) estimated spatial disparities in socio economic development of Pakistan and found that the in urban areas, the per capita income of urban Sindh was highest and urban Baluchistan was the lowest among provinces. But with rural per capita income, the case is little different, as the rural per capita income of KPK and Baluchistan was slightly higher than Sindh; mainly due to agricultural dominated activities and lack of industrialization.

Nazir, M. and Yasin, H. M. (2011) analyzed economic growth and regional convergence in Pakistan. The authors found that in Pakistan, the regional disparities are not only due to difference in culture or demography but much of the regional disparities lies in the diversities of social and economic development among regions. The authors used the data set from 1979 to 2005; in a panel data form to find out the absolute and conditional convergence among regions. The results indicated only the period of 1979-1988 which showed convergence. It was due to the fact that economic performance was better during the period, as growth rate was high, and inflation was low in this period. Besides, an increase in worker's remittances increased the living standards of the people, across provinces, which led to convergence among regions. It was further pointed out that rural and urban disparities are not likely to converge, due to their independent growth path; the

reason is as per capita growth may not be the only variable that explains the complex growth process of convergence.

The growth of provinces and their regional differences was discussed by Pasha (2015). The author argued that during Musharraf period, the economic growth of Sindh was highest as around 6 percent, which was more than the growth of national economy. Thereafter, the growth rate of Sindh has declined significantly; as it was 2 percent from 2008-09 to 2012-13. Recently, again some improvement in the same was seen in Sindh. In Punjab, during Musharraf period, economic growth was lower than the national economy⁶. Surprisingly, the KPK province has maintained its growth rate around 5 percent in last fifteen years. However, Baluchistan seems to be struggling, as its growth rate did not exceed 3 percent in the last fifteen years. As a result, the people of Baluchistan are now suffering from deprivation and exclusion from the national economic development. Hardly, any focused policy was there to integrate the deprived provinces.

The intra-provincial inequality results show that in Punjab, the intra provincial inequality is highest, as compared to other provinces. After Punjab, comes Sindh, as intra provincial inequality is also higher in Sindh. Whereas in KPK, the inequality is less among households. However, it is not only that Baluchistan's economic growth was low, but poverty was also high in this province.

Total factor productivity is not similar across provinces; Chaudhary, (2019) found that the total factor productivity in Baluchistan is higher than all other provinces. It is on the face that hardly any significant invest or mega project was undertaken there by the public sector. A similar development was witnessed in the agriculture sector in the 1960s and 1970s (Chaudhary M. Aslam, 1989). The total factor productivity in Punjab, Sindh and KPK remained same as one percent per annum. The combined results of crop and livestock, total factor productivity in KPK is 1.27 percent per annum, whereas the total factor productivity of Baluchistan is 4.01 percent per annum within two time periods; the TFP was higher in 1980-81 than that of in 1994-95, in all provinces; with Baluchistan as exceptionally higher 7.25 percent per annum. In 1995-96 to 2009-10 the TFP decreased to -2.67 percent, average annually. Further, during the same time period, KPK showed a decrease in TFP by -0.25 percent per annum. The combined total factor productivity of Punjab has significantly decreased from 0.87 percent to 0.41 percent; in these two time periods. However, in Sindh, the TFP has increased from 0.64 percent to 0.94 percent annually. The authors concluded that irrigation turned out to be the strong

⁶ For human development see; Sabir and Aftab (2006).

variable for enhancing productivity; as in Punjab, effective irrigation, road infrastructure and pesticides befitted Punjab more, as compared to other provinces.

Pasha and Pasha, (1996) examined the difference in the social development of each province and districts (Pahsa, 2018). The empirical evidences confirm that there exists a strong correlation between levels of social and economic development. Urbanization, provincial administrative development and geographical and economic significance appear to be the sources of regional variation in development. Baluchistan appeared to have the lowest level of social development followed by Sindh, KPK and Punjab. Siddiqui et. al. (2017) pointed regional integration and convergence. The variations in the indicators across the provinces are an indicative of regional disparities in quality of life. Pasha and Hassan (1982) showed that almost 15 per cent of the population of Punjab and 27 per cent of Sindh's population lives in the underdeveloped area. The same numbers are much higher for other provinces. Jamal and Salman (1988) also indicated that there is a significant difference in the level of development at intra and inter provincial level in Pakistan. Both studies have indicated that, significant differences in demographic, institutional, social sectors and economic base of each province is the main reason for inter-provincial disparities. The above studies clearly indicate that, the level of development varies across provinces. Second, the source of regional disparities is due to different economic, social and geographical base. The small provinces are major victim of deprivation and they lag behind in the process of development.

All the above cited studies incorporated certain variables on which data was available and tried to explain regional performances and disparities. But hardly any study was focused on growth causality among regions (provinces); the integration of provinces and the convergence of growth patterns among provinces, which are rarely discussed in literature on Pakistan's economy. This present study will be the first to look at the regional differences in terms of growth and try to highlight the flow of growth causality among provinces, as well as, their patterns of convergence.

3. Data and Methodology

In Pakistan, province wise data is hardly available. What so ever the data is there, it is compiled from aggregate national data base, therefore, no such data is available which may have good quality and based upon field survey. Now some data for provinces pertaining to regional GDP is available, which is used for

macroeconomic empirical analysis⁷. It is compiled from the national data for different variables. Bangalli (1995) made an attempt to decompose the national GDP into province wise GDP. His study provided province wise GDP data from 1973 to 1990; at 1980-81 prices. Bangalli (2005) updated the estimate of province wise GDP from 1973 to 2000⁸. The IPR (2015) provides recent estimates of the province wise GDP; from 2000 to 2015; at base year of 2005-06. The first task is to construct a consistent series of province wise GDP from 1973 to 2017. The standard rebasing method has been applied for construction of a consistent data series, as shown by equation-1.

$$Y_{i,j,t,06} = SF_{i,j} * Y_{i,j,t,81} \dots \dots \dots (1)$$

$Y_{i,j,t,06}$ = Value added of sector j, in province i, at time t; at base of 2005-06.

$SF_{i,j}$ = Splicing factor between 1980-81 and 2005-06 of province i for sector j.

$Y_{i,j,t,81}$ = Value added of sector j, in ith. Province, at time t on the 1980-81 base.

The following equation two is applied to calculate $SF_{i,j}$.

$$SF_{i,j} = \frac{Y_{i,j,2000,81}}{Y_{i,j,2000,06}} \dots \dots \dots (2)$$

$Y_{i,j,2000,81}$ = Value added of sector j, in province i, at base of 1980-81, in year 1999-00.

$Y_{i,j,2000,06}$ = Value added of sector j, in province i, at base of 2005-06, in year 1999-00.

After obtaining relevant data, econometrics techniques have been applied to draw empirical evidences.

3.1. Co-integration Test

A time series is said to be integrated of order one, if it generates stationary series. The technique developed by Granger (1969) and elaborated by the Engle and Granger (1987) implies that if two non-stationary series generate a stationary series then these are said to be co-integrated. The co-integration will provide long term relationship of variables. Engle & Granger explained a two-step procedure to test the co-integration. Pair-wise co-integration equations is estimated, which enabled to find the relationship between any two provinces for specific variables.

⁷ Where ever value is missing, such value has been compiled on the basis of previous pattern. Besides, standard rebasing method has also been applied.

⁸ Also see; Belton, Haizheng and Min-Qiang (2010)

First step is to run a regression between two non-stationary series and test the unit root in residual. If residual series is stationary at level, then we say that both series are co-integrated, and the parameter of regression will give us the long run relationship between variables.

$$GDP_{i,t} = a + \beta_1 GDP_{j,t} + u_t$$

Step 2 is to estimate the short run relationship and error correction term, to find out the short run adjustment between variables, as given below.

$$\Delta GDP_{i,t} = \gamma + \sum \theta_l \Delta GDP_{i,t-z} + \sum \delta_l \Delta GDP_{j,t-z} + \alpha \mu_{t-1} + \varepsilon_t$$

Furthermore, causality analysis is carried out, as given below.

3.2. Causality Analysis

To test the causality between provinces; for specific sector for are co-integrated variables, Granger causality test could be applied on the following Vector Error Correction Models (VECMs);

$$GDP_{i,k,t} = a + \beta_1 GDP_{j,k,t-1} + \beta_2 GDP_{j,k,t-2} + \gamma_1 GDP_{i,k,t-1} + \gamma_2 GDP_{i,k,t-2} + \mu_i$$

The simple model, which tests the causal relationship between growths of province i and its impact on the growth of province j, presented by Granger (1969), is as follows:

$$X_{it} = \sum_{n=1}^{m1} a_q X_{it-n} + \sum_{n=1}^{m2} a_q Y_{it-n} + \varepsilon_t \quad (3)$$

$$X_{it} = \sum_{n=1}^{m3} c_q X_{it-n} + \sum_{n=1}^{m4} d_q Y_{it-n} + \eta_t \quad (4)$$

Here the error terms, ε_t and η_t are not correlated and the mean of $E[\varepsilon_t, \eta_t]=0$; the “m” shows the lag lengths. In the above equations, the direction of causality runs from Y to X, if bq is not equal to zero. Similarly, the direction of causality runs from X to Y, if cq is not equal to zero. Further, there is presence of bi-directional causality if both bq and cq are not equal to zero. However, there is no causality between X and Y if both bq and cq are equal to zero.

In the present study $X_{i,t}$ shows growth of province i at time period t and it is denoted by $Y_{i,t}$ in the study and $Y_{j,t}$ shows growth of province j at time period t. The empirical results obtained pertaining to provinces are discussed in the following section.

4. Empirical Evidences and Implications

To explore the long run and short run relationships between GDP growth rates of provinces, Engle Granger cointegration test has been applied to test the co-integration. First unit root test is applied, and its results are provided in table 4 below. The results indicate that the variables have unit root and order of integration is I(1). Since all the variables are integrated at I(1), therefore, cointegration test may be applied to find the long run relationship between variables.

Table 4: Unit Root Test Results

Province	Level	First Difference
Punjab GDP	-1.54 (0.54)	-4.86* (0.00)
Sindh GDP	-0.90 (0.77)	-5.72* (0.00)
KP GDP	-0.07 (0.95)	-4.87* (0.00)
Baluchistan GDP	-1.04 (0.72)	-7.1* (0.00)

Note: Values in parentheses are p-values and * show significant at 1% level.

The following Table 5, shows that the long run and short run dynamics of GDP growth across provinces. The error correction terms illustrate the speed of adjustment in short run, as if there is a disequilibrium between two or more series in short run; at what rate the series will restore equilibrium or at what rate the previous year's disequilibrium will be restored. It is interesting to note that Punjab is only co-integrated with Sindh, while, Sindh is co-integrated with Punjab and KPK. However, KPK is co-integrated with Punjab and Sindh. Baluchistan is the only province that is co-integrated with all three provinces.

The GDP growth of Punjab significantly affects GDP growth of Sindh in the long run and short run. The error correction term in below table (5) shows that 24 per cent deviation from equilibrium in GDP growth of Sindh will be adjusted by GDP growth of Punjab, in the short run. The GDP growth of Punjab affects KPK significantly in both short run and long run. The 25 percent disequilibrium in GDP growth of KPK is adjusted by GDP growth of Punjab, in short run. The GDP growth of Punjab also affects Baluchistan significantly in short run and long run. About 22 percent short run disequilibrium in GDP growth of Baluchistan is adjusted by GDP growth of Punjab.

The results of table 5 above shows that GDP growth of Sindh significantly affects the GDP growth of Punjab in long run and in short run; as parameters are significant. Moreover, the GDP growth of Sindh affects KPK significantly in long run and short run. The 35 percent disequilibrium in short run in GDP growth of KPK is adjusted by GDP growth of Sindh. The GDP growth of Sindh affect

Baluchistan significantly in long run and short run. About 21 percent disequilibrium in GDP growth of Baluchistan, in short run, is corrected by GDP growth of Sindh.

In short run the GDP growth of KPK affects significantly to the GDP growth of Baluchistan. The long run parameter is insignificant, however, there exists co-integration between both series. The long run and short run parameters of GDP growth of KPK and Sindh are insignificant but both series are integrated. There seems weak relationship between these two provinces. The case of Baluchistan shows that the GDP growth of Baluchistan does not significantly affect the GDP growth of any province in long run and short run. The reason being a small province, its economy does not have impact on the economy of other provinces. However, its economy is dependent upon the growth of other provinces, particularly, large provinces.

Table 5: Long Run and Short Run Results for the Provinces

Equation	Dependent	Independent	Long Run Parameters	ECM Results
Equation 1	GDP growth of Punjab	GDP growth of Sindh	0.229 (0.0006)*	-0.1613 (0.024)**
Equation 2	GDP growth of Sindh	GDP growth of Punjab	0.33 (0.01)*	-0.24 (0.04)**
Equation 3	GDP growth of Sindh	GDP growth of KPK	0.043 (0.66)	-0.04 (0.69)
Equation 4	GDP growth of KPK	GDP growth of Punjab	0.31 (0.003)*	-0.25 (0.03)**
Equation 5	GDP growth of KPK	GDP growth of Sindh	0.31 (0.002)*	-0.35 (0.0009)*
Equation 6	GDP growth of Baluchistan	GDP growth of Punjab	0.17 (0.04)**	-0.22 (0.03)**
Equation 7	GDP growth of Baluchistan	GDP growth of Sindh	0.148 (0.03)**	-0.21 (0.02)**
Equation 8	GDP growth of Baluchistan	GDP growth of KPK	0.085 (0.15)	-0.135 (0.09)***

Note: Only those results are reported, for which co-integration exist. *, ** and *** indicate Significant level at 1%, 5% and 10%, respectively.

The parameters further highlight the fact that GDP growth of Punjab affects more significantly to GDP growth of Sindh; both in long run and short run. The major reason is the integration of both the provinces in manufacturing and services

sectors. Thus, the two large provinces i.e. Punjab and Sindh, complement the GDP growth of each other. Moreover, their economies affect the GDP growth of Small provinces too; i.e. KPK and Baluchistan. However, it may be noted that both the large provinces benefit more from each other's development.

The error correction term highlights the fact that between two large provinces, Punjab and Sindh, the speed of adjustment towards any disequilibrium, from the previous value is fast. The speed of adjustment to any deviation is also fast. However, between small provinces, KPK and Baluchistan, no such significant relationship is present. Moreover, from small to large provinces, no significant relationship is present. In other words, large provincial economies are integrated, while the small province's economies are dependent upon large provinces. The above analysis reveals that in Pakistan, the development of small provinces (Baluchistan and KPK) is highly dependent upon the development of large provinces (Punjab and Sindh)⁹.

The above analysis indicated the fact that the growth of large provinces complements each other, and spillover effect contributes to the economies of small provinces; as the developmental process takes place. Thus, the development pattern benefits large provinces more than that of small provinces. Moreover, the analysis pertaining to the presence of cause & effect and development patterns between GDP growths of provinces is summarized below. The empirical evidences are reported in Table (6). Results show that there exists bidirectional causality between Sindh, KPK and Baluchistan. Bidirectional causality also exists in the case of Punjab and Balochistan. But a unidirectional causality exists from Punjab to Sindh and KPK only, (also see appendix I).

Table 6: Granger Causality Test Results

From:	➤	To			
		Punjab	Sindh	KPK	Baluchistan
Punjab	-		Yes	Yes	Yes
Sindh	No			Yes	Yes
KPK	No		Yes		Yes
Baluchistan	Yes		Yes	Yes	

Note: Compiled by the authors.

⁹ It may be noted that mega projects, as well as, Green revolution was introduced in the large provinces. There was hardly any mega project was implemented in the small province. Recently, first major mega project of Gawader Port has been initiated in Baluchistan. In other words, federal investment was mainly concentrated in the large provinces. See Federal Development Budgets. It may have added to regional income inequities and deprivation.

The causality analysis indicates that growth of a province affects the growth of other provinces; in case of Pakistan. However, it also indicates that small provinces are dependent upon large provinces. The cause and effect to some extent, highlights the same fact; as GDP growth of Punjab effects GDP growth of Sindh, i.e. again Punjab is large province which is imparting growth in other provinces. In nutshell, the development pattern favored large provinces, and then their impact is on other provinces. The small province are unable to benefit much from the economic growth pattern in Pakistan. In other words, the national plans and polices may have not much benefited small provinces. There is a need to pay special attention to bring small provinces into the main framework of economic growth in Pakistan.

5. Conclusions and Policy Recommendations

The main purpose of this study was to analyze and point out linkages of growth among the provinces and their economic integration in to the main stream of economic growth in Pakistan. For this purpose, co-integration analysis, short and long run relationships was analyzed; i.e. cause and affect relationships were estimated and analyzed. The results show that there exists a long run relationship between GDP growths of the large provinces in Pakistan. Engle Granger causality test results show that there exists bidirectional causality between large provinces. However, the same is not true for small provinces. The growth of small provinces is dependent upon large provinces i.e. long run and short run parameters reveals the fact that the growth of large province affects the growth of small provinces. But the growth of small provinces hardly effects growth of large provinces. In the long run, the large province of Punjab affects the growth of Sindh; both in short and long run. But Sindh only effects Punjab's growth, in the long run only. The GDP growth of Sindh affects significantly, in short run and long run, to the GDP growth of KPK and Baluchistan. There is rapid convergence to previous value. Based upon the above findings, it is important to chalk out economic policy to integrate small provinces in to the main stream of economic growth i.e. to develop bi-directional relationships, which may be done with equitable public investment in all the provinces. There is a need to initiate mega projects, by the federal government, in the small provinces too i.e. like building dams for agriculture and encouragement of mining industry in Baluchistan. Presently, heavy investment is being made for Gawader port and highways in Baluchistan, which is likely to have some positive impact on the deprivation in Baluchistan. Moreover, further research pertaining to sectoral relationships, among provinces can also provide more solid policy interferences. To curtail regional inequalities, it is important to identify products in which a province has comparative advantage and based upon such rationale policy framework need to be introduced to resolve regional economic inequality issues.

Thus, fiscal and monetary policies may be designed in such a way that these policies lead to equitable sector specific linkages within provinces and benefit all provinces equitably too. At present the strongly integrated large provinces benefit more from each other, whereas the small provinces are left behind in the development process. The role of large provinces i.e. Punjab and Sindh is pivotal in this regard. A special package and development plan is needed to integrate the small province in to the mainstream of economic growth in Pakistan.

References

- Aghion, P., & Howitt, P. (1992). A Model of Growth through Creative Destruction. *Econometrica*, 60(2), 323-351.
- Asteriou, D., & Agiomirgianakis, G. M. (2001). Human Capital and Economic Growth: Time Series Evidence from Greece. *Journal of Policy Modeling*, 23(5), 481-489.
- Aslam, A., & Zulfiqar, K. (2016). Policy Framework for Inclusive Growth: A Case Study of Selected Asian Countries. *Forman Journal of Economic Studies*, 12 (January–December).
- Azam, M. & Khattak (2009). Empirical Analysis of the Determinants of Economic Growth in Pakistan, 1971-2005. *Sarhad J. Agriculture*. 25(2).
- Belton, F., Haizheng, L., & Min Qiang Zhao (2010), Human capital, economic growth, and regional inequality in China. *Journal of Development Economics*, 92(2), 215-231.
- Bengali, K. & Sadaqat, M. (2005). Regional Accounts of Pakistan: Methodology and Estimates 1973-2000 (Working Paper No.5). Retrieved from Social Policy and Development Centre
- Bengali, K. (1995). Temporal and Regional Decomposition of National Accounts of Pakistan. PhD Thesis, University of Karachi, Pakistan.
- Baer, W. (1964). Regional Inequality and Economic Growth in Brazil. *Economic Development and Cultural Change*, 12(3), 268-285.
Retrieved from <http://www.jstor.org/stable/1152261>.
- Belton, F., Haizheng, L., & Min Qiang Zhao (2010), Human capital, economic growth, and regional inequality in China. *Journal of Development Economics*, 92(2), 215-231.
- Capello, R. (2011). Location, regional growth and local development theories. *Aestimum* (58), 1.
- Cass, D. (1965). Optimum Growth in an Aggregative Model of Capital Accumulation. *Review of Economic Studies*. 32 (July): 233–240.
- Chaudhary, M. A. (1989). Agricultural Development and Public Policies in Pakistan, Izhar Sons, Lahore.

- Chaudhary, M. A. (1989-a). Modeling Industrial Growth and Agglomeration Economies in the Manufacturing Sector of Pakistan. *The Pakistan Development Review*, 28(4), 981-991.
- (1990). Economic Growth and Regional Disparity in Production Activities in Pakistan. *Pakistan Economic and Social Review*, 28(2), 105-120.
- (2019). Economic Management and Emerging Issues in Pakistan, forthcoming, HEC, GOP, Islamabad.
- Chaudhary, M., A. & Saeed, A. (1990). Economic Growth and Regional Disparity in Production Activities in Pakistan. *Pakistan Economic and Social Review*.
- Diamond, P., A. (1965). National Debt in a Neoclassical Growth Model. *American Economic Review*, 55(5), 1126–1150.
- Domar, E. (1947). Expansion and Employment. *The American Economic Review*, 37(1), 34-55. Retrieved from <http://www.jstor.org/stable/1802857>
- Ellahi, H. M. (2013). Overtime Growth in Crop and Livestock Productivity in Pakistan's Provincial Context. *Global Journal of Science Frontier Research*, 13(10).
- Engle & Granger (1987). Co-integration And Error-Correction: Representation, Estimation and Testing. *Econometrica*, 55(2), 251-276.
- Granger, C. W. J. (1969). Investigating Causal Relations by Econometric Models and Cross-Spectral Methods. *Econometrica*, 37, 424-438.
- Grossman, G., M. & Helpman, E. (1991a). *Innovation and Growth in the Global Economy*. Cambridge, MA: MIT Press.
- Hahn, F. H., & Matthews, R. C. (1964). The Theory of Economic Growth: A Survey. *The Economic Journal*, 74(296), 779-902.
- Harrod, R. (1939). An Essay in Dynamic Theory. *The Economic Journal*, 49(193), 14-33. doi:10.2307/2225181
- Hussain, A. (1993). Regional Economic Disparity in Pakistan and a framework for Regional Policy. Paper presented at the Wilton Park Conference at Wiston House, Sussex, England.
- Iqbal, Z., & Malik, N. (1993). Institutional Variations in Saving Behavior in Pakistan. *The Pakistan Development Review*, 32(4), 1293-1311.

- Iqbal, Z., & Zahid, G. (1998). Macroeconomic Determinants of Economic Growth in Pakistan. *The Pakistan Development Review*, 37(2), 125-148.
- IPS (2015). Annual Report, Institute of Policy Studies, Becon House University, Lahore.
- Jenkins, H. (1995). Education and Production in the United Kingdom, Oxford: Nuffield College, (Economics discussion paper, No 101).
- Khan, J. (2012). *The Role of Human Capital in Economic Growth of Pakistan (1971-2008)*. PhD. Thesis, University of Peshawar, Peshawar.
- Koopmans, T., C. (1965). On the Concept of Optimal Economic Growth. In the *Economic Approach to Development Planning*. Amsterdam: Elsevier.
- Pasha, A., G., Pasha, H., A. & Asma, Z. (2010), Fiscal Equalization Among Provinces in the NFC Awards. *The Pakistan Development Review*, 49(4), 563-576.
- Pasha, H. A., & Hasan, T. (1982), Development Ranking of Districts of Pakistan. *Journal of Applied Economics*, 1(2), 157-192.
- Pasha, H. A. (2015). Growth of the Provincial Economies. Institute of Policy Reforms, Lahore.
- Romer, P., M. (1990). Endogenous Technological Change. *Journal of Political Economy*, 98(5), 71-102.
- Shabbir, T. & Mahmood, A. (1992). The Effects of Foreign Private Investment on Economic Growth in Pakistan. *The Pakistan Development Review*, 31(4), 831-841.
- Siddiqui, Z. & Zaheer, R. (2017). Regional Integration and Economic Growth: A Convergence Analysis for Pakistan. *Journal of Global Economics*, 5(3). doi:10.4172/2375-4389.1000255
- Solow, R., M. (1956). A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics*, 70(1), 65-94.
- Safi, G. M., Gadiwala, M. S., Burke, F., Azam, M., & Baqa, M. F. (2014). Agricultural Productivity in Balochistan Province of Pakistan A Geographical Analysis. *Journal of Basic and Applied Sciences*, 10, 292.
- Swan, T. W. (1956). Economic Growth and Capital Accumulation. *Economic Record*, 32(2), 334-361.

- Sandilah, M. N., & Yasin, H. M. (2011). Economic Growth and Regional Convergence: the case of Pakistan. *The Pakistan Development Review*, 333-353.
- Sabir, M., & Aftab, Z. (2006). Province-wise growth patterns in human capital accumulation. *The Pakistan Development Review*, 873-890.
- State Bank of Pakistan. Different annual reports, Karachi.
- SDPI, (2005). Sustainable Development and Policy Institute, annual Report, Islamabad.
- Ullah, S., Khan, S. & Ullah, F. (2014). Assessment of Key Determinants for Economic Growth in Pakistan. *Journal of Theoretical and Applied Economics*, XXI(9), 103-114.

Appendix: I

Pairwise Granger Causality Tests			
Null Hypothesis:	Obs	F-Statistic	Prob.
SIN01 does not Granger Cause PUN	42	0.53843	0.4675
PUN does not Granger Cause SIN01		23.6545	2.E-05
KP does not Granger Cause PUN	42	1.44953	0.2359
PUN does not Granger Cause KP		34.3040	8.E-07
BAL does not Granger Cause PUN	42	7.23150	0.0105
PUN does not Granger Cause BAL		11.0637	0.0019
KP does not Granger Cause SIN01	42	4.20815	0.0470
SIN01 does not Granger Cause KP		35.3593	6.E-07
BAL does not Granger Cause SIN01	42	2.85356	0.0992
SIN01 does not Granger Cause BAL		9.35121	0.0040
BAL does not Granger Cause KP	42	30.5284	2.E-06
KP does not Granger Cause BAL		7.10054	0.0111
