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Sources of Pakistan's Economic Growth

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INTRODUCTION

Economic growth is one of the most important objectives of development policy in almost every country. It depends on the historical accumulation of primary factors of production, e.g. labour and capital, and on technological progress and a combination of socio-political and institutional factors. Owing to interactions among these different factors, it is difficult to delineate the role of each factor in economic growth. It is precisely because of this that a systematic and quantitative study of the sources of growth is indispensable. The growth-accounting framework, introduced by Solow [15] to measure productivity change and subsequently extended by Jorgenson and Griliches [5], Christensen and Jorgenson [1], Hulten [4] and Denison [2], provides an important method with which to study the growth experience of a country.

In developed countries a proportionately higher percentage of GDP growth is attributable to productivity change. In less developed countries (LDCs), however, increased use of factor inputs is the dominant source of economic growth.[1] In LDCs, typically, two-thirds of the factor input contribution in GDP growth is due to capital. The estimates obtained, using the growth-accounting framework, can thus be taken as crude indicators of the level of development.

The main purpose of this paper is to apply the growth-accounting approach in order to analyse the sources of growth in Pakistan from 1959-60 to 1984-85. Following McCarthy, Hanson and Kwon [10], growth during the period under study will be analysed over different subperiods. The GDP growth over each subperiod will be decomposed according to: (i) factors of production, viz. labour and capital; (ii) components, e.g. consumption, investment, etc.; and (iii) sectors, e.g. agriculture, manufacturing, etc. The factor decomposition of GDP growth gives an estimate of the overall productivity change in the economy. The component- and sector-wise decomposition, on the other hand, shows the contribution of each component and sector in the overall GDP growth.

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[1] See, for example, [2], [3] and [10].

The remainder of this paper is organized as follows: Section II explains the analytical framework. Section III discusses methodology and data sources. In Section IV, we discuss our estimates of the sources of growth in Pakistan. Finally, Section V summarizes the results.

II. THE ANALYTICAL FRAMEWORK

The measurement of technological change, as defined by Solow [15], depends critically on the existence of an aggregate production function for the economy and homogeneous factor inputs. Therefore, an explicit consideration of a well-behaved constant-returns-to-scale (CRS) production function forms the basis of the analysis. Let Y represent net real output produced. If one makes the rather heroic assumption that capital (K) and labour (L) are the only factors of production, and, additionally, that both factors are homogeneous,[2] then the aggregate production function can be written as

$$Y = F(K, L, t) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

where t allows F to change over time. Assuming CRS and Hicks-neutral technological change, we can write the aggregate production function as

$$Y = A(t) f(K, L) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

Where $A(t)$ represents the Hicksian efficiency parameter.[3] Differentiating Equation (2) with respect to t, we get

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + \left[\theta_k \frac{\dot{K}}{K} + \theta_L \frac{\dot{L}}{L}\right] \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

where the dot over the variable indicates its derivative with respect to time. Equation (3) shows that the growth in real output is the sum of growth in the Hicksian efficiency parameter and the weighted sum of growth in capital and labour. The weights θ_k and θ_L are the output elasticities of capital and labour, respectively. The term $\dot{A}/A$ represents shifts in the production function and the expression within the brackets of Equation (3) indicates a movement along the function. Thus, the growth in the aggregate output of the economy, i.e. $\dot{Y}/Y$, is the sum of the shift in, as well as the movement along, the production function.

Under the assumption that the economy is in a competitive equilibrium, output elasticities in Equation (3) become equivalent to the income shares of the respective factors of production in total output. Equation (3) can then be rewritten as

$$\frac{\dot{A}}{A} = \frac{\dot{Y}}{Y} - \left[\alpha \frac{\dot{K}}{K} + \beta \frac{\dot{L}}{L}\right] \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

where $\alpha = \frac{cK}{pY}$, and $\beta = \frac{wL}{pY}$, are shares of capital and labour in total output, respectively. The prices of output, capital and labour are denoted by p, c and w, respectively. Equation (4) indicates that the growth in the Hicksian efficiency parameter (or technological change) can be measured as the difference between the growth in aggregate output and the growth in total factor inputs (which is the weighted sum of growth in all productive inputs).

We know from the national income identity that the total value of output produced in an economy, in a particular year, is either consumed, saved (invested), or exported, i.e.

$$Y_t = C_t + I_t + (X_t - M_t) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

where Y_t, C_t, X_t, and M_t are, respectively, total value of output produced, total consumption, total investment, exports, and imports, in year t. Taking first-order difference and dividing both sides of the equation by Y_{t-1}, we get

$$\frac{\Delta Y}{Y_{t-1}} = \gamma_1 \frac{\Delta C}{C_{t-1}} + \gamma_2 \frac{\Delta I}{I_{t-1}} + \gamma_3 \frac{\Delta X}{X_{t-1}} - \gamma_4 \frac{\Delta M}{M_{t-1}} \quad \ldots \quad \ldots \quad (6)$$

where Δ represents the first-order difference of the variable with which it appears and γ_1, γ_2, γ_3, and γ_4 are shares of consumption, investment, exports and imports, respectively, in total GDP in period $t-1$. Equation (6) indicates that growth in GDP over a period is the weighted sum of growth in its components. The weights are the shares of each component.

The total value of output produced in an economy, i.e. GDP in period t, is also the sum of value added in each sector, e.g. agriculture, manufacturing, etc. Thus, the growth in GDP over a period can also be expressed as the weighted sum of growth in each sector. The weights, in this case, are the shares of each sector in total GDP in period $t-1$.

[2] Homogeneous labour and capital are aggregates of heterogeneous elements. Capital equipment varies in type, life span, productive quality, etc., while labourers differ in skill, education, age, sex, etc. Since the aggregation problems are elaborated elsewhere in the literature, they are not discussed in this paper.

[3] Productivity change can also be labour-saving or capital-saving. There are three definitions of productivity (or technical) change: (i) Hicksian, which measures bias along constant capital-labour ratio; (ii) Harrodian, which measures bias along constant capital-output ratio; and (iii) Solow's, which measures bias along constant labour-output ratio. See Nadiri [11] for detailed discussion.

III. DATA SOURCES AND METHODOLOGY

Except those for capital stock and factor shares, all the data are obtained from the *Pakistan Economic Survey, 1985-86* [14] and are at constant prices of 1959-60. There is no official capital-stock series available for Pakistan. However, an official investment series is available. These data were used to generate a capital-stock series using the first-order difference equation

$$K_t = (1-d)K_{t-1} + I_t$$

where

K_t is capital stock in year t;

K_{t-1} is capital stock in year $t-1$;

I_t is gross investment in year t; and

d is the depreciation rate.

Capital stock for the starting year, viz. 1959-60, was estimated with the Harrod-Domar formula. This further required knowledge about the overall capital-output ratio. Estimates of both the capital-output ratio and the depreciation rate were obtained from Khilji [8], who, by using coefficients from Khan and MacEwan [7], generated capital-stock series for different sectors and the overall economy of Pakistan from 1956 to 1978. The estimates of the capital-output ratio for 1959-60 and the depreciation rate derived from Khilji's aggregate capital-stock series are 2.75 percent and 4 percent, respectively.

There are no official data on factor shares in GDP for the overall economy. However, the distribution of household monthly income by source, e.g. wages and salaries, self-employment, property, etc., is given in *Household Income and Expenditure Surveys (HIES)* [13] for different years. This information was used to estimate factor shares in GDP. As the income of the self-employed also includes wages, the share of wages and salaries given in the *HIESs* are underestimated. Thus labour's share in GDP was obtained by adjusting the share of wages and salaries, assuming that 40 percent of the income of the self-employed is wages and the remaining 60 percent is return on their capital. The share of capital in GDP is simply one minus the share of labour. The resulting estimated shares are presented in Table 1.[4]

[4] The Household Income and Expenditure Surveys (HIES) available do not necessarily correspond with all the years given in the Table. For the years for which HIESs are not available, the factor shares were interpolated, using average annual growth rates.

Table 1

Estimated Factor Shares

Years	Labour	Capital
1959-60	0.400	0.600
1964-65	0.446	0.554
1969-70	0.454	0.546
1974-75	0.463	0.537
1979-80	0.486	0.514

Source: Author's estimates.

IV. SOURCES OF GROWTH

Factor Decomposition

A change due to a factor of production is composed of two parts: the gross component, which reflects change in the quantity of the factor, and the quality component, which, say for labour, takes account of change in education, sex composition, age composition, etc., of the labour force. Because of data constraints, it was not possible to adjust our estimates of the factor contribution in GDP growth for the qualitative changes. As a result, our estimates of the residual, or productivity, are biased upwards.

The decomposition of GDP growth by the contribution of factor inputs, viz. labour and capital, over each sub-period, is given in Table 2. Overall, the performance of GDP growth has been reasonable during the period under study. It grew at an average rate of well over 6 percent during the Sixties and Eighties. In the Seventies, however, the growth was slower but was well over 4 percent. Although this, as noted by Naqvi and Sarmad [12], is a fairly healthy rate compared with that of the Sixties and Eighties, the performance is relatively weak. This can partly be attributed to exogenous shocks, e.g. secession of East Pakistan and the sharp rise in oil price during the period.

Both in absolute terms and as a percentage of GDP growth, the contribution of labour increased consistently during the Sixties and Seventies but declined during the Eighties. During the 1975–80 period, one-third of the growth in GDP was due to labour. The increase in the contribution of capital had not been smooth. However, as a percentage of GDP growth, it had been close to 40 percent in all but one sub-period. The residual, which also represents aggregate productivity, accounted for over 55 percent of the growth in GDP during the Sixties. Its share dropped to only 23 percent during the 1975–80 period. However, there has been a significant improvement since then.[5]

[5] See Kemal [6] for a detailed analysis of the productivity change in the manufacturing sector of Pakistan.

Table 2

Factor Decomposition of GDP Growth

(Percentage)

	1960–65	1965–70	1970–75	1975–80	1980–85
GDP Growth (Factor Cost)					
5 years	38.83	38.43	23.48	29.79	37.73
Average Annual Growth Rate	6.78	6.72	4.31	5.35	6.61
Factor Inputs	17.66	16.09	15.60	22.87	21.34
Labour	3.08	3.91	6.34	9.94	6.84
Capital	14.58	12.18	9.26	12.93	14.50
Residual	21.17	22.34	7.88	6.92	16.39
Percentage Distribution of GDP Growth					
Factor Inputs	45.48	41.87	66.44	76.77	56.56
Labour	7.93	10.18	27.00	33.37	18.13
Capital	37.55	31.69	39.44	43.40	38.43
Residual	54.52	58.13	33.56	23.23	43.44
	100.00	100.00	100.00	100.00	100.00

Source: Author's estimates.

The analysis of productivity will be considered in more detail later. Firstly, for comparison across countries, in Table 3 we reproduce estimates of factor inputs and productivity contribution in GDP growth for some Latin American countries and Malaysia, obtained by Elias [3] and McCarthy and Burney [9], respectively. It is evident from the estimates that, as compared with other countries, most of which are better endowed in terms of resources, Pakistan has done reasonably well.

Our estimates in Table 2 indicate that during the Sixties, productivity was the main source of growth in GDP, whereas during the Seventies and Eighties, factor inputs were the major contributors. In order to explore what might have gone wrong, we examine average labour productivity (ALP) in different sectors. ALP is taken as value added per worker. Growth in ALP depends on the rate of technical change and the growth rate of the capital-labour ratio. In Table 4, we give estimates of aggregate ALP, and ALP in different sectors. It is important to note that throughout the period, ALP is the lowest in agriculture. During 1965–70 and 1980–85

Table 3

Factor Decomposition of GDP Growth in Various Countries
Percentage Distribution of GDP Growth

		1960–65	1965–70	1970–75	1975–80	1980–83
Argentina	Factor Inputs	51.91	119.0	78.3	–	–
	Labour	7.43	38.0	27.64	–	–
	Capital	44.48	81.0	50.66	–	–
	Residual	48.09	–19.0	21.7	–	–
Brazil	Factor Inputs	87.44	56.25	70.00	–	–
	Labour	53.4	22.66	16.13	–	–
	Capital	34.04	33.59	53.87	–	–
	Residual	12.56	43.75	30.00	–	–
Chile	Factor Inputs	68.60	64.90	90.89	–	–
	Labour	18.06	15.77	32.32	–	–
	Capital	50.54	49.13	58.57	–	–
	Residual	31.40	35.10	9.11	–	–
Colombia	Factor Inputs	65.10	63.51	57.01	–	–
	Labour	23.50	21.93	12.92	–	–
	Capital	41.70	41.58	44.09	–	–
	Residual	34.90	36.49	42.99	–	–
Malaysia	Factor Inputs	60.6	105.0	72.0	86.3	121.1
	Labour	19.6	32.7	13.6	11.7	13.4
	Capital	41.0	72.3	58.4	74.6	107.7
	Residual	39.4	–5.0	28.0	13.7	–21.1
Mexico	Factor Inputs	77.05	76.45	98.14	–	–
	Labour	16.44	12.11	20.51	–	–
	Capital	60.61	64.34	77.63	–	–
	Residual	22.95	23.55	1.86	–	–
Peru	Factor Inputs	62.34	77.35	–	–	–
	Labour	18.48	27.95	–	–	–
	Capital	43.86	49.40	–	–	–
	Residual	37.66	22.65	–	–	–
Venezuela	Factor Inputs	38.36	118.86	128.57	–	–
	Labour	23.29	44.29	31.43	–	–
	Capital	15.07	74.57	97.14	–	–
	Residual	61.64	–18.85	–28.57	–	–

Source: [3], [9].

Table 4

Capital-output Ratio, Capital Labour Ratio, and Average Labour Productivity

Years	Output-employment Ratio								Capital-Labour Ratio	Capital-Output Ratio
	Agriculture	Manufacturing Mining	Construction	Electricity and Gas	Transport	Trade	Other	Aggregate		
1964	897.45	1497.29	3900.00	2366.67	3563.64	2386.18	1737.87	1638.41	3116.16	2.37
1965	946.53	1580.87	3548.28	2866.67	3970.00	2380.45	1962.01	1769.20	3278.94	2.31
1966	952.76	1645.42	3082.86	3283.33	3516.67	2405.59	2490.87	1876.46	3402.45	2.26
1967	1008.1	1659.36	2416.28	3450.00	3036.21	2336.13	2575.12	1831.76	3514.83	2.30
1968	1128.67	1695.79	1956.60	3733.33	2651.43	2247.90	2877.01	1865.72	3581.18	2.22
1969	1182.08	1764.71	2057.81	4183.33	2339.29	2233.33	3470.99	1999.41	3631.74	2.15
1970	1241.26	1936.23	1938.57	9128.57	2411.90	2532.39	3960.00	2291.94	3711.53	2.04
1971	1151.98	2027.50	2106.06	14820.00	2201.11	2283.00	4455.40	2499.89	3720.65	2.09
1972	1186.36	2395.42	1846.03	11142.86	2254.44	2549.73	3108.61	2276.12	3795.61	2.10
1973	1180.57	2456.30	1922.86	11287.50	2536.56	2491.41	3351.40	2391.52	3764.35	2.03
1974	1215.38	2497.74	1935.06	11866.67	2571.88	2663.98	3589.86	2541.04	3777.64	1.94
1975	1175.72	2385.36	2063.53	9490.00	2604.04	2575.11	4156.16	2589.32	3795.93	1.93
1976	1193.97	2292.54	2276.09	8954.55	2556.86	2518.80	4011.30	2520.60	3818.17	1.95
1977	1190.82	2222.83	2076.00	8792.31	2526.67	2417.70	4023.55	2511.42	3860.32	1.99
1978	1190.98	2324.09	2081.48	8293.33	2804.63	2563.49	4229.64	2629.49	3885.24	1.93
1979	1194.29	2383.24	2043.96	8035.29	2924.11	2625.95	4254.72	2669.38	3892.84	1.91
1980	1244.18	2628.24	2240.68	7655.00	3092.92	2710.26	4341.54	2767.76	3958.84	1.84
1981	1260.95	2908.05	2290.83	7382.61	3283.48	2786.27	4486.02	2891.45	4022.86	1.80
1982	1275.68	3300.29	2324.59	6834.62	3454.70	2961.15	4604.21	3027.19	4134.44	1.77
1983	1293.98	3528.86	2560.48	6606.90	3660.50	3018.12	4835.74	3172.47	4262.67	1.75
1984	1178.59	3768.08	2934.65	6815.15	3984.30	2987.65	5089.97	3378.51	4355.72	1.77
1985	1200.00	4051.40	2949.23	6171.05	4114.52	3149.56	5306.51	3496.47	4460.64	1.72

Source: Author's estimates.

periods, aggregate ALP grew at an average rate of 5.3 percent and 4.8 percent, respectively. The capital-labour ratio in the corresponding periods grew at an average rate of 2.5 percent. During 1970–75 and 1975–80 periods, however, when aggregate ALP grew at an average rate of 2.5 percent and 1.3 percent, the growth in the capital-labour ratio was not more than 0.8 percent. This indicates that one possible reason for slower productivity change during the Seventies was the slow growth in capital per capita. This is further supported by the fact that during the 1960–85 period, the capital-output ratio dropped from 2.75 to 1.72. This reasoning can also be true for agriculture where, during the 1970–75 period, the average growth rate of ALP was negative and has subsequently been less than one percent.

Demand Decomposition

The GDP growth for each sub period is decomposed into principal aggregates of consumption, investment and trade.[6] Consumption and investment are further divided into private and public components. The estimates of the contribution by each component are given in Table 5. Consumption provided the main source of growth in all subperiods. Excluding the first subperiod, it accounted for more than 85 percent of GDP growth. More than 80 percent of this has been from the private sectors. Since the mid-Sixties, however, the contribution of public consumption has been rising gradually. Except for the first sub period, i.e. 1960–65, the contribution of investment in GDP growth has never been more than 18 percent of GDP growth. Both private and public sectors have contributed more or less equally. Some of the contribution made by consumption and investment had been offset by the negative effect of trade. The contribution of trade, however, was never more than 20 percent and has declined significantly since 1970–75. Within trade, the contribution of both exports and imports does not show any consistent pattern.

Sectoral Decomposition

Estimates for the sectoral contribution in the GDP growth are given in Table 6. First, note that the role of different sectors in GDP growth has more or less remained the same during the period under study. This is despite the fact that in GDP the shares of different sectors have changed sharply over time [12]. Except for the 1970–75 subperiod, when public administration and defence contributed 25 percent of growth in GDP, the commodity-producing sectors, viz. agriculture plus manufacturing, had contributed more than 40 percent to the growth. Agriculture faced major problems in the early Seventies. Its performance in the Eighties is also not all that impressive, especially if we take into account the fact that investment in

[6] Kamal [6] decomposed growth in manufacturing into domestic demand, export expansion, and import substitution. The evidence presented shows that during the Sixties, Pakistan was not heavily dependent on import substitution for its growth.

Table 5

Demand Decomposition of GDP Growth

(Percentage)

	1960–65	1965–70	1970–75	1975–80	1980–85
GDP Growth (Market Prices) –5 Years	36.37	65.56	19.35	33.81	36.78
Average Annual Growth Rate	6.40	10.61	3.60	6.00	6.46
Consumption	24.14	58.86	22.48	34.45	31.09
Private	19.05	54.57	21.16	29.12	24.61
Public	5.09	4.29	1.32	5.33	6.48
Investment	19.03	–0.93	0.50	4.57	6.60
Private	12.23	–1.52	–2.47	2.33	2.77
Public	8.22	–0.46	2.53	2.86	2.50
Change in Stock	–1.42	1.05	0.44	–0.62	1.33
Trade	–6.80	7.63	–3.63	–5.21	–0.91
Exports	3.50	8.26	–1.38	2.63	2.14
Imports	10.30	0.63	2.25	7.84	3.05
Percentage Distribution of GDP Growth					
Consumption	66.37	89.78	116.18	101.89	84.53
Private	52.37	83.24	109.35	86.13	66.91
Public	14.00	6.54	6.83	15.76	17.62

Continued –

Table 5–(*Continued*)

Investment	52.33	–1.42	2.58	13.52	17.94
Private	33.63	–2.32	–12.76	6.89	7.53
Public	22.60	–0.70	13.07	8.46	6.80
Change in Stock	–3.90	1.60	2.27	–1.83	3.61
Trade	–18.70	11.64	–18.76	–15.41	–2.47
Exports	9.62	12.60	–7.13	7.78	5.82
Imports	–28.32	–0.96	–11.63	–23.19	–8.29
	100.0	100.0	100.0	100.0	100.0

Source: Author's estimates.

Table 6

Sectoral Decomposition of GDP Growth

(Percentage)

	1960–65	1965–70	1970–75	1975–80	1980–85
GDP Growth (Factor Cost) 5 Years	38.83	38.43	23.48	29.79	37.73
Average Annual Growth Rate	6.78	6.72	4.31	5.35	6.61
Agriculture	9.30	14.11	1.55	6.88	5.27
Major Crops	5.96	11.39	–0.30	4.14	2.36
Minor Crops	1.41	0.99	0.97	1.02	0.56
Livestock	1.69	1.37	1.11	1.53	2.22
Fishing & Forestry	0.24	0.36	–0.23	0.19	0.13
Mining & Quarrying	0.30	0.15	0.08	0.19	0.25
Manufacturing	8.90	7.16	4.04	5.95	10.14
Large-scale	8.12	6.51	2.56	3.87	7.48
Small-scale	0.78	0.65	1.48	2.08	2.67
Construction	3.52	1.40	1.23	2.23	2.30
Electricity & Gas	0.49	1.90	0.97	1.47	1.60
Transport & Communication	3.81	1.88	1.72	2.31	3.08
Wholesale & Retail Trade	6.30	5.56	4.14	4.02	6.46
Banking & Insurance	1.00	1.14	1.33	0.73	1.70
Ownership of Dwellings	0.83	0.60	0.64	0.64	0.58
Public Administration & Defence	2.47	2.65	5.82	3.11	4.04
Services	1.91	1.88	1.96	2.26	2.31

Continued –

Table 6–(*Continued*)

Percentage Distribution of GDP Growth

Agriculture	23.95	36.72	6.60	23.09	13.97
Major Crops	15.35	29.64	–1.28	13.90	6.25
Minor Crops	3.63	2.58	4.13	3.42	1.48
Livestock	4.35	3.56	4.73	5.14	5.88
Fishing & Forestry	0.62	0.94	–0.98	0.63	0.34
Mining & Quarrying	0.77	0.39	0.34	0.64	0.66
Manufacturing	22.92	18.63	17.21	19.97	26.88
Large-scale	20.91	16.94	10.90	12.99	19.83
Small-scale	2.01	1.69	6.31	6.98	7.08
Construction	9.07	3.64	5.24	7.49	6.10
Electricity & Gas	1.26	4.94	4.13	4.93	4.24
Transport & Communication	9.81	4.89	7.33	7.75	8.16
Wholesale & Retail Trade	16.22	14.47	17.63	13.49	17.12
Banking & Insurance	2.58	2.97	5.66	2.45	4.51
Ownership of Dwellings	2.14	1.56	2.73	2.15	1.54
Public Administration & Defence	6.36	6.90	24.79	10.44	10.71
Services	4.92	4.89	8.34	7.60	6.11
	100.0	100.0	100.0	100.0	100.0

Source: Author's estimates.

this sector, in nominal terms, increased by 54 percent during the period. It is evident from the estimates that the difference in the performance of agriculture during different sub periods is mainly due to the strong or weak performance of the major crops. Manufacturing contributed 23 percent of growth in GDP during the early Sixties. Its share dropped gradually to 17 percent during the 1970–75 subperiod, but since then has increased significantly. This increase is largely due to the role of large-scale manufacturing.

Besides agriculture and manufacturing, the contribution of wholesale and retail trade had been significant. It was around 15 percent of GDP growth in all sub-periods. Other important sectors, in order of their significance, are public administration plus defence, transport plus communication, and construction. In view of sharp increases in investment in this sector during different sub periods, one might have expected an even bigger contribution from the construction sector but it seems that much of the gains were not captured by the domestic sector.

V. CONCLUSIONS

In this paper we have analysed the sources of economic growth in Pakistan during the period from 1959-60 to 1984-85. The GDP growth is decomposed according to the contributions made by factors of production, components and sectors. The main finding is that during the Sixties productivity was the main source of GDP growth. During the Seventies and Eighties, however, factor inputs were the major contributors. This shift is partly due to a slower increase in capital per capita and decline in capital-output ratio. This is further supported by the evidence that the contribution of investment in GDP growth is small. On the demand side, consumption has been the major source of growth in GDP. The sectoral decomposition of GDP growth indicates that the commodity-producing sector has accounted for more than 40 percent of the growth in GDP. The major crops are the main source of the varying contribution of agriculture. In the case of manufacturing, large-scale sector's output accounts for more than 60 percent of the contribution.

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Comments on "Sources of Pakistan's Economic Growth"

Any empirical work, undertaken to identify the sources of economic growth for Pakistan's economy, is hampered by an acute paucity of reliable statistical data. Dr Burney's paper should, therefore, be examined in this perspective.

I would have no serious reservations about the theoretical underpinnings: It is a standard formulation for an aggregate production function with two factors of production – capital and labour. A time variable allows the function to shift parametrically over time, which signifies a constant-returns-to-scale production function with neutral (*a la* Hicks) technological change. Equation (3), thus, measures the growth of "real output" as the sum of growth of the "Hicksian efficiency parameter $\dot{A}/A$" plus the weighted sum of growth in output elasticities of capital and labour".

In the case of Pakistan, one would seriously question the assumption of "competitive equilibrium" and consequently the equality between the output elasticities of Equation (3) and their corresponding income shares as stipulated in Equation (4). For the period in question, any observer of the economic scene in Pakistan would rather point to the monopolistic/quasi monopolistic market conditions of the economy. Viewed thus, the estimation of α's and β's is clearly suspect and does not follow the marginal productivity criteria for the determination of factor shares. Furthermore, there is still a very large "residual" left to be explained.

It is not quite clear whether the author is trying to measure total factor productivity, multifactor productivity or technological change (as measured by changing techniques of production). For example, it is not clear whether the author is determining gross output prices, net output prices, or prices of particular capital goods. It is also confusing to ascertain whether the total wage rate of the economy has been measured or not.

I think there is an error in the formulation when it is said that the total value of output equals the GDP. The latter is the difference between the total gross outputs and the total intermediate inputs.

The following specific comments are offered with a view to overcoming some of the shortcomings of the paper:

Capital Stock Series: Since there exist no such data, they have to be estimated. The author uses some depreciation rates but he does not discuss what depreciation procedures have been employed – i.e. whether the straightline depreciation rate or the Perpetual Inventory Method is used.

Gross Investment: Is it total investment or does it refer to both private and public investments separately? Each component has its own peculiarities and the rates at which each would be depreciated would certainly differ.

Inter-country Comparison: Comparison of the results obtained for Pakistan's economy with corresponding results for other countries is unwarranted unless the countries in question follow the same path of economic growth or, at least, depict similar characteristics. No such explanation about the countries compared has been provided.

Table 4: Some explanation as to what is the source of employment data, with all its sectoral disaggregation, is required.

Given the lack of statistical information, I would suggest that the sources of structural change for Pakistan's economy be best studied within an input-output framework. Two such tables are available for Pakistan's economy. A given level of final demand can be assumed to be produced by two (given) technologies and the sources of change in the gross output levels be quite easily decomposed.

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