

Measurement of Structural Change in the Pakistan Economy: A Review of the National Income Estimates

1949/50 to 1963/64

by

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I. INCOME ESTIMATES FOR PRE-PARTITION INDIA

A number of national income estimates are available for pre-Partition India. Many of these estimates, especially those pertaining to the last quarter of the 19th and the early 20th centuries, had their origin in political controversy. The estimators were mainly concerned with proving or refuting the idea that the per capita income was very low and that the government had failed to improve the economic conditions of the masses[6]. The earlier estimates were based on scanty data but as time passed, the basic statistics as well as the methods of income estimation improved. The studies of national income of British India, undertaken by Dr. V.K.R.V. Rao, were exhaustive and comprehensive and still serve as a useful reference for all those who are interested in the history of national income estimation in India [14]. Because of the general lack of economic data in India, Dr. Rao conducted a number of ad hoc enquiries in different parts of India to fill in the existing gaps in data.

The various estimates of per capita income in India before Partition are shown in Appendix Table A-I. These estimates are at current prices. Because of differences in concepts and methodology, these estimates are not entirely comparable and are to be regarded as rough approximations of per capita net national product at factor cost.

Estimates for Pakistan

When Pakistan came into being on August 14, 1947, hardly any data were available for the provinces which comprised the new state. The inadequacy of

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data was further accentuated by the division of Punjab and Bengal and the large-scale movement of refugees both in and out of Pakistan. To take stock of the economic position, one of the first tasks to which the statisticians addressed themselves was to compile national income estimates for 1948/49, the first complete year after the establishment of Pakistan. The estimates for 1948/49 (April-March) were prepared by the Office of Economic Advisor, Ministry of Economic Affairs, under severe handicaps imposed by the paucity of data. In order to cover the gaps in statistical data, a number of expedients and assumptions were used¹.

When the Central Statistical Office (CSO) was set up in 1950, it established a separate division to prepare national income estimates which were urgently required for the preparation of economic development plans in Pakistan. This division revised the national income estimates for 1948/49 and has since then been issuing income estimates on a yearly basis. Up to 1953/54, these estimates were prepared both at constant and current prices but due to the lack of regular price data, the current price series was discontinued, and until 1963 only the constant price series were published. These series were presented in a single table showing national product by industrial origin at factor costs of 1949/50 to 1952/53. The average prices of these four years were used to eliminate the wide fluctuations in prices which were witnessed during the Korean boom and the recession which followed in its wake.

In 1961, the Central Statistical Office appointed a committee of economists and statisticians to review the progress of national income estimation in Pakistan and to assist in developing a programme for the improvement of national accounting. The committee submitted its report in July 1962. Its main recommendations were that national accounts should contain separate estimates for each province and that estimates should be presented in both current and constant prices. It emphasized the need for an integrated set of national accounts in accordance with the United Nations' recommendations [15]. Accordingly, the Central Statistical Office undertook a preliminary revision of its national income estimates for Pakistan, following as far as possible the concepts and sector classification recommended by the United Nations Statistical Office.

With the quickening pace of economic development in Pakistan, a great need was felt for preparing the estimates of per capita income for each province and for areas within the provinces so that measures could be taken to stimulate and sustain economic growth in all parts of the country on an equitable basis². There

¹ For a detailed description of methodology of these estimates, see "Problems of National Income Estimation in Pakistan", *Statistical Bulletin* (Central Statistical Office), May 1952.

² The Constitution of Pakistan contains clauses which make it obligatory for the State to make efforts for the removal of economic disparity between East and West Pakistan and also between the different regions in each province.

was also a need for examining the available data and to chalk out a more detailed programme for future work. In April 1963, the President appointed a National Income Commission with the following terms of reference:

i) To examine the available data and the requirements for compilation of national income accounts.

ii) To recommend ways and means of collection of accurate and fuller data required for preparation of national income statistics.

iii) To report on suitable classifications under which national income statistics should be prepared, keeping in view particularly the need for separate statistics for the two provinces and for areas in different stages of development within the provinces so as to assist the National Economic Council in fulfilling the obligations placed on it under Article 145 (4) of the Constitution.

iv) To recommend lines of guidance to the Central Statistical Organization for setting up national accounts procedures.

v) To make recommendations regarding promotion of research in the field of national income statistics.

The Commission submitted an Interim Report in September 1964 [10], which contains an evaluation of the basic data used by the Central Statistical Office in its national income estimates. The Commission also provided guidance to the Central Statistical Office for preparing revised estimates of national and provincial income for the years 1959/60 to 1963/64. While the Commission was able to improve the previous estimates in various important respects, it still had to use a number of assumptions and expedients to fill in the gaps in statistical information. Thus, one of the most important results of the Commission's work was to point out the deficiencies in the available data and the need for improvements.

In order to get comparable estimates for previous years, the Central Statistical Office has now also revised its estimates of Pakistan's national income for the years 1949/50 to 1958/59. On the basis of the data available in that office, we have estimated provincial products for East and West Pakistan for the years 1949/50 to 1958/59. These estimates for the provinces and for the country are shown in Tables 2, 3 and 4 of Appendix A. A few differences in the estimates prepared by us and the official estimates may be noted. In the official estimates, value added arising in banking and insurance, central government, Pakistan International Airlines (PIA) and net factor income from abroad has not been allocated to the provinces. This unallocated part constitutes about 3 per cent of gross national product. A number of difficulties have been faced in allocating the product of these sectors between the two provinces. The headquarters of the Central Government, most

of the banks and insurance companies as well as that of PIA are located in West Pakistan but their field of operation covers the entire country. A regional or provincial breakdown of their activities is not available. Under the circumstances, we have arbitrarily allocated the value added in these sectors in a ratio of fifty-fifty to the provinces. We are aware that objections can be raised against this arbitrary division of value added in the specified sectors. But we believe that for the results of our analysis, it does not make any appreciable difference if the ratio used throughout the period was slightly biased in favour of one or the other province.

Apart from the allocation mentioned above and a few other minor corrections, the figures in our tables are in accord with those published by the Central Statistical Office [7] and the National Income Commission [10]. The provincial tables for 1949/50 to 1958/59 are being presented here for the first time.

II. THE CONCEPTUAL FRAMEWORK

The basic concepts used in preparing the national product estimates are in accord with those recommended by the United Nations [17]. In the following paragraphs we have confined our discussion of the conceptual framework to those aspects which we think necessary for the understanding and interpretation of Pakistan's national income estimates.

1. *Gross Domestic Product (GDP)* has been defined as gross domestic output during a year less all secondary inputs, i.e., inputs of intermediate goods and services used up in the same year. These inputs are supplied from domestic stocks in existence at the beginning of the year, from imports during the year and from domestic production in the same year.

Due to the various kinds and degrees of integration of production processes, gross output for the country as a whole is not an unambiguous concept, unless we introduce specific criteria for inclusion and exclusion of inter- and intra-sectoral flows of goods and services. GDP is, however, conceptually unambiguous, because of the implicit assumption that exactly the same inter and intra-sectoral flows which are included in gross output are supposed to be included in the input flows that are deducted to get GDP.

2. *Value Coefficients*: All elements in the gross output flow, as well as in the flows of secondary inputs, can be identified as goods and services in physical terms. We could describe and quantify these flows by listing the goods and services they contain and attaching a quantity figure to each item. However, in order to make meaningful aggregates we need a set of value coefficients, one for each item in the flows of goods and services. Logically, we have complete freedom with regard to the choice of value coefficients. It cannot be said that one set is wrong

and another is right. But one set might be more relevant than another set for some specific purpose. One possible set is current market prices. A second one is market prices for some past or succeeding period. Other possibilities are factor cost (current, past, *etc.*), defined as market prices less indirect taxes net of subsidies. Finally, we can think of a variety of "shadow prices" reflecting national, social or other preference functions. Once a specific set has been chosen, it must be used consistently.

3. *Gross Value Added*: As GDP equals the difference between gross output and secondary inputs, it can also be regarded as that part of the gross output which has been created by the primary inputs, *i.e.*, by labour and capital employed in the country. It is the gross value which has been added by labour and capital, measured at market price, factor cost or other prices.

4. *Gross Factor Income*: The GDP estimates for Pakistan are at *factor cost*. GDP, or the gross value added by the primary factors—labour and capital, is thus identical with their gross incomes, and it is, therefore, also called gross factor income.

5. *Gross National Product*: Part of GDP is created by primary factor services rendered by foreign suppliers, and a corresponding part of the factor income accrues to them. On the other hand, because of a flow of factor services also in the opposite direction, Pakistan gets factor income from abroad. By adjusting GDP for these external flows of factor income by subtracting the outward flow and adding the inward flow, we get gross national product (GNP).

6. *Net Domestic and National Product*: If *depreciation* of fixed assets during the year is deducted from GDP and from GNP, we are left with the flows known as net domestic product (NDP) and net national product (NNP).

7. *(Net) National Income*: GNP/NNP at factor cost is the gross/net reward to the labour and capital belonging to the country. Gross means inclusive and net means exclusive of depreciation. NNP is identical with the net national income of the country.

8. *Factor Cost vs. Market Price*: The factor cost concepts require clear criteria for the distinction between indirect and direct taxes, as well as between subsidies and direct government grants, since GDP, GNP, *etc.*, at factor cost exclude indirect but not direct taxes. The market price concepts do not call for any such criteria, as they include indirect as well as direct taxes and exclude subsidies as well as other government grants.

9. *Sector Accounts*: The various definitions stated in the preceding paragraphs can be applied, not only to the country as a whole, but to any sector of the

economy, no matter whether the criteria for the sector specifications are regions, industries, social groups or any thing else. In the case of sector accounts/product everything outside the sector will be the rest of the world in relation to that sector. All transactions with other sectors as well as with foreign countries will be external in relation to the sector under consideration. Thus, we can study each sector separately, leaving out in turn all the other sectors of the economy.

The gross and net domestic product estimates for Pakistan for 1949/50 to 1963/64 are worked out by sectors of origin for each of the two provinces. The industrial sector specification is also in accordance with the UN standard classification.

10. *Methods for Measuring the Flows:* It follows from the conceptual framework that various methods can be used for measuring GDP, GNP and other related flows. In national accounts we are concerned with the measurement of the circular flow of product, income, and expenditures. A circular flow can be measured at any point. The three methods used for measuring these flows are the i) production, ii) income, and iii) expenditure approach. Because of the paucity of reliable data, it has not been possible to use one and the same method for estimating value added in different sectors of Pakistan's economy. It was also not possible to prepare alternative estimates by the use of these methods for cross-checking the accuracy of results.

III. THE RELIABILITY OF ESTIMATES

The measurement of national or sectoral income presupposes the availability of adequate and reasonably accurate empirical data. It is true that even in the most advanced countries, all the required data may not be collected according to the specifications and needs of the national income estimator and some parts of the accounts may have to be based on indirect evidence. But in the case of Pakistan, the paucity of basic data imposes serious limitations on the accuracy of national income estimates. Relatively, few economic data are collected and these too become available only after a considerable lapse of time. The accuracy of data varies from one province to the other and also from year to year. Under the circumstances, the methods of income estimation have been necessarily governed by the availability of economic data. While the general lack of data may continue for some time to come because of the fact that the collection of statistics is a time-consuming process, it is heartening to note that efforts are already underway to widen the coverage of statistics both in content and in space. The National Income Commission deserves full credit for pointedly drawing attention to the existing gaps in the presently available data. A few of the major weaknesses of the available data are briefly discussed below.

Estimates of Population

Reliable statistics of human population and its occupational distribution are one of the major requirements for preparing reasonably accurate national accounts. Besides using them as denominator for computing per capita income, the growth rate of population has been used in some sectors for estimating their contribution to national income. For example, in East Pakistan estimates of production of fish are derived from estimated per capita consumption multiplied by the total population and adjusted for imports and exports. Unfortunately, the accuracy of the existing estimates of population based on the Census of 1961 is controversial. According to this census, the total population of the country stood at 93.72 million in 1961, of which 50.84 million were enumerated in East and 42.88 in West Pakistan. The average rate of annual increase was estimated at 2.15 per cent for Pakistan, 2.36 per cent for West and 1.91 per cent for East Pakistan. The Planning Commission [5] has, however, adjusted these figures upward by 8.25 per cent for underenumeration in 1961 Census. According to these figures, the total population of the country stood at 101.45 million in 1960/61, of which 55.25 million were in East and 46.20 million in West Pakistan. The rates of population growth in East and West Pakistan have been revised upward to 2.6 per cent per year. There were reasons to believe that the rate of population growth may have been much lower in the earlier years of the preceding decade than in the latter years. This hypothesis was supported by the evidence collected by the Pakistan Institute of Development Economics and the Central Statistical Office for their project on the estimation of population growth.

While the total population has been adjusted upward, a corresponding adjustment has not been made in the occupational distribution of the population because it is hard to believe that all occupations have been evenly underenumerated. As a result the rates of growth of persons employed in different occupations have become suspect. The rates of growth depicted by different occupations worked out from the censuses of 1951 and 1961 show a good deal of divergence from those obtained from the manpower surveys carried out by the Ministry of Labour[9].

Agricultural Sector

In its estimation of agricultural income, CSO has used official data of crop production and prices. The Ministry of Agriculture issues regular estimates of crop production for 14 major and 9 minor crops³. The method of crop

³ The distinction between major and minor crops is based on their respective economic importance, more important ones are called major crops and the other minor crops. The major crops are:

1) rice, 2) wheat, 3) barley, 4) bajra, 5) jawar, 6) maize, 7) gram, 8) sugarcane, 9) jute, 10) cotton, 11) tea, 12) rape and mustard, 13) sesamum, and 14) tobacco. This distinction is already outdated as some of the crops at present classified as minor, like, potatoes, fruits and vegetables *etc.*, have become more important in monetary value than some of the major crops like barley or bajra.

estimation is based, more or less, on personal appraisal of the crop by the revenue and agricultural officials. The total production of a crop is worked out according to the following formula:

$$\text{Production} = \text{crop area} \times \text{normal yield} \times \text{seasonal condition factor}$$

Of the above factors, the data on crop area are collected quite accurately. The "normal" yield represents the average yield in a five-year period as determined by official crop-cutting experiments conducted on fields of average fertility. The "average field" is selected purposively. The normal yield estimates are based on only a few experiments and their reliability is not known. The normal yield term is, therefore, subject to a large and unknown error.

The seasonal condition factor is an index which relates the yield in the current year to the historical average for the area. It is subjectively estimated by the revenue and agricultural officers who rely on their own impressions and their talks with the farmers.

In West Pakistan, Dr. D.M. Qureshi has carried out a number of crop-cutting experiments based on probability sampling for wheat and cotton [13]. A comparison of these results with the official estimates shows that the latter have generally underestimated the yields by 10 to 15 per cent. Another significant fact emerging from this comparison is that the official estimates generally overstate production in a poor crop-year and understate the same in a very favourable year [2].

Value Added in Livestock Subsector

The available data on livestock and livestock products suffer from a number of shortcomings. These data are primarily based on the livestock censuses of 1945 and 1955. Though the census of 1945 was held in the provinces now comprising Pakistan, the movement of livestock between India and Pakistan during 1947 was not recorded. As such the data based on this census may not be wholly correct. The first post-Partition livestock census in Pakistan was due in 1950 but was not conducted until 1955. The 1955 Census was confined to West Pakistan omitting Karachi. The next livestock census was due in 1960 but was not carried out as a separate census in that year as it coincided with the programme of the 1960 Census of Agriculture wherein the requisite information was proposed to be collected. The Agricultural Census of 1960 was carried out on a sample basis. After preliminary tabulation of the sample results, it was found that a substantial underenumeration had occurred in the case of livestock. To correct this, correction factors called "ratio estimates" based on the relationship of total acreage to enumerated acreage in each district were applied to obtain the desired coverage. Since the relationship between the acreage and livestock is not necessarily invariant, the application of ratio estimates has probably led to an overestimation of livestock [3;4].

The official estimates of livestock products also show wide variations from year to year both in East and West Pakistan. In some cases like the output of meat and hides and skins, the annual rates of growth do not show any reasonable relationship. Similarly, the production of milk has been estimated by applying very high yield rates and long lactation periods⁴.

Another limitation of the estimates of value added in this subsector should be noted. The Central Statistical Office has made no adjustment for the increase in the livestock population as reliable data on the rate of their growth is not available. Since there are reasons to believe that livestock products have been overestimated, this omission may bring the figures of value added in this subsector closer to reality.

Fishing and Forestry

The value added in this subsector has been worked out by the use of production method for West Pakistan and consumption approach for East Pakistan. The available estimates of per capita consumption in East Pakistan show wide divergence. According to the *Fish and Meat Consumption Survey, 1961/62*, it was 12.5 seers (one seer is approximately 2.2 lbs) in rural areas. The National Sample Survey of 1961 yields a figure of 14.4 seers and the Nutrition Survey of 1962 gives a figure of 17.2 seers. The CSO has accepted the results of the Nutrition Survey as the quantities consumed by the sample households were actually weighed by the staff in this survey.

The value and output of forest products are compiled by official agencies. These data pertain to the production of "forest areas" only. To account for production in "non-forest" areas, suitable adjustments were made.

Mining and Quarrying

The estimates for value added in mining are fairly reliable. At present, there appears to be a serious underestimation in the case of value added in quarrying because of the lack of data on removal of sand and stone from private quarries. The total value added in this sector constitutes only a very small percentage of the national income and as such even a serious omission may not affect the total income in any appreciable manner.

Manufacturing Sector

This sector is subdivided into large-scale and small-scale manufacturing. Large-scale industry covers all factories registered under Section 2 (j) of the Factories Act 1934. All manufacturing establishments employing twenty or more

⁴ In West Pakistan, the daily yield of cow and buffalo milk has been taken at 3.64 seers while in East Pakistan these have been taken to be 0.94 seers and 1.81 seers. The lactation period in West Pakistan is taken at 300 days for cow and 330 days for buffaloes. The corresponding periods for East Pakistan are 210 and 240 days.

workers on any day during the twelve months preceding the census of manufacturing industries and using power in manufacturing process are registered under this section. Small-scale industry includes all manufacturing establishments not covered by Section 2 (j) of the above Act. Since the definition of large-scale industry leaves out an important section of manufacturing establishments from the census of manufacturing, attempts have been made to extend the census to cover medium-scale industries which come under the jurisdiction of Section 5(i) of the Factories Act 1934, *i.e.*, factories employing ten or more workers with or without power [8].

The above distinction between various types of industry is based mainly on labour considerations. In recent years, the scope of small-scale industry has been redefined by the provincial governments. According to the East Pakistan Small Industries Corporation Act of 1957, a small industry means an industrial establishment or unit which is run mainly by hired labour and not using mechanical motive power for any operation, or an industrial establishment or unit using mechanical motive power but not normally employing more than 50 workmen and whose land, building and machinery do not exceed Rs. 250,000 in value [1]. In West Pakistan according to a recent amendment in the Provincial Industrial Development Corporation Act, small industry has been defined as an industry engaged in the handicraft or the manufacture of consumer or producer goods wherein *a*) motive power is not used, or *b*) motive power is used but the value of land, buildings and machinery does not exceed Rs. 200,000. The definitions of small-scale industry in the two provinces are not similar and also overlap with Section 2 (j) of the Factories Act. As a result, the coverage of manufacturing firms in the recent provincial surveys is not comparable.

The estimates of value added in large-scale industry are based on the periodic Censuses of Manufacturing Industry (CMI). The results of these censuses are vitiated by underreporting and non-response. A recent study by the CSO showed that the total value added in large-scale industry in the Census of Manufacturing Industry of 1959/60 was understated to the extent of 9.5 per cent in East Pakistan and 5.8 per cent in West Pakistan. In a survey of industrial units in 1960 and 1961, Papanek found a tendency on the part of respondents to overstate total capital costs and understate output presumably because of the tax considerations [12].

Many of the products of large-scale industry are subject to excise taxation. As such the Central Board of Revenue (CBR) also maintains production statistics of these products. A comparison of the CBR's data with those of CMI showed that the latter grossly underreported production of sugar, tea, tobacco products and cotton textiles among others in East Pakistan in 1959/60 and 1962/63. When Tims applied these corrections he found that value added in large-scale industry

in East Pakistan was underestimated by about 24 per cent in 1959/60 and by 7 per cent in 1962/63 [16].

Construction

Because of the paucity of data, estimates of value added in this sector are admittedly weak. A few studies of the cost of construction in urban areas showed that cement input constituted 10 per cent of the total cost and the value added came to 40 per cent of the total cost of construction. For rural housing, the ratio of value added to total costs was taken to be 20 per cent in East and 50 per cent in West Pakistan. The number of new houses built each year was based on the rate of growth witnessed during the 1950 and 1960 housing censuses and may well be an underestimate like the population censuses. This method ignores all types of construction except the Rural Works Programme, wherein cement is either not used or used to a negligible extent.

Electricity, Gas, Water and Sanitary Services

These services are supplied by public-owned companies, Water and Power Development Authorities and local bodies. Their budgets are available and the estimates of value added in this sector are based on reliable data.

Banking, Insurance and Public Administration Sectors

The NIC faced a few minor problems in estimating value added in these sectors. For example, recent data were lacking in respect of local bodies and cooperative societies and previous wage-income ratios had to be used for estimating total wage payments for some years. This, however, constituted an insignificant part of the total. On the whole, the estimates are highly reliable.

Transportation and Communication

The estimates of value added in transport and communication services provided by the public sector such as port trusts, railways, post and telegraph, airways and public-owned bus companies are based on their budgets and are reliable. The estimates for international and coastal shipping, privately owned bus and steamer companies are also based on, more or less, adequate data. The weakest link are the estimates for non-mechanised transport including country boats which abound in East Pakistan, animal-drawn vehicles, rickshaws and other like means of transport. Of these, estimates for value added in country boats are based on a sample survey carried out by the Inland Water Transport Authority of East Pakistan. The importance of country boats as a means of transport in East Pakistan is evident from the fact that of the total value added in this sector in that province, almost half is contributed by these boats.

Wholesale and Retail Trade

The value added in distributive trade is measured by the trade margins earned by traders on the quantum of goods entering into trade channels. In the NIC estimates, the former was based on a special survey carried out to determine these margins and checked against existing information on the subject. The quantum of goods entering into trade was ascertained from various marketing reports and surveys. In the case of import trade on private account, it was assumed that capital goods and industrial raw materials are imported directly by the users and only the consumer goods are imported through trade channels. This assumption does not appear to be valid and is not in conformity with existing practices. It is doubtful whether a survey is a suitable method for collecting information on trade margins which is generally treated as a closely guarded trade secret in a market characterised by a scarcity of imported goods.

Ownership of Dwellings

The benchmark data for occupied houses in urban and rural areas are based on Housing Censuses of 1950 and 1960. The gross rentals per household are obtained from the National Sample Surveys on Family Expenditures. The reliability of these estimates is closely linked with the degree of accuracy of the benchmark data. It is generally believed that the census of housing has a similar downward bias as the census of population. The rates of depreciation adopted for working out net value added are more or less arbitrary.

Services

The estimates of value added in this sector are based on income and in a few cases on expenditure approach. The number of persons engaged in different occupations were obtained from the population census of 1961. The intercensal rate of increase of the labour force engaged in this sector worked out to be 3 per cent for East and 4 per cent for West Pakistan. This rate was used for extrapolating the total value added for post-census years.

The rate of growth used in the estimates is obviously on the low side. In the case of medical and health workers, the data maintained by the Ministry of Health shows an annual rate of growth of 11 per cent in East and 11.5 per cent in West Pakistan. The available evidence from other independent sources also shows that the rate of growth of teachers, legal practitioners, auditors and accountants *etc.*, has been much higher than the one worked out from the population censuses.

The composition of services sector is likely to undergo considerable change during the process of economic growth. Because of the enhanced opportunities of employment and increased rate of literacy, inter- and intra-occupational mobility becomes easier. The census of 1961 shows a decrease in the number of domestic

servants compared with 1951 which indicates a vertical movement in some of the occupations included in this sector.

In summary, the largest part of GDP has been derived from data on gross output and intermediate goods and services. The production approach, sometimes called an input-output approach, has been used for agriculture, mining, large-scale manufacturing and for parts of the electricity-producing sector. For the subsistence part of agricultural sector, value has been imputed on the same basis as the marketed part. In cases where actual data on inputs were not available, input coefficients based on various pieces of information or borrowed from other countries have been applied. The income approach was used for banking and insurance, public administration and defence and substantial parts of transport and services sectors. The expenditure approach was utilised in the fisheries sub-sector in East Pakistan where output estimates were based on consumption and exports of fish. The consumers' expenditure also served as the basis for estimating gross rentals arising in the sector ownership of dwellings. Finally, this method was used for a smaller part of the services sector.

Depreciation of fixed assets was estimated for each sector as a percentage of gross value added. As there is no real basis for estimating depreciation rates, the estimates of net domestic product or net value added are more arbitrary than the gross estimates.

Benchmark Growth Rates: For some of the sectors the estimates have been worked out independently for each year along the lines described in the preceding paragraphs. This is the case for major crops and minor crops, forestry, mining, electricity *etc.*, and for parts of some other sectors. But in other cases independent estimates have been prepared only for a few years, for some sectors for only one year. The estimates for that particular year have been used as benchmarks and estimates for other years obtained by applying production indices, population growth rates, trends based on two or more benchmark years *etc.* Therefore, the growth rates that can be derived from the estimates depend heavily on the reliability as well as on the relevance of those indices.

IV. TRENDS AND FLUCTUATIONS

The following analysis is confined to gross national, provincial and sector products at constant (1959/60) factor cost⁵. Some of the main characteristics of the time series are:

i) Heavy fluctuations in the product of agricultural sector, particularly in East Pakistan. As agriculture has a relatively higher weight in provincial product,

⁵ See, Appendix Tables A-2, A-3 and A-4.

of East than in West Pakistan, the fluctuations in the GPP are also much more pronounced in East Pakistan.

ii) For the period 1949/50 to 1963/64 as a whole all sector products show an upward trend. This is also the case for any five-year period, no matter from which year we start. The only exception is the agricultural sector in East Pakistan for which five-year periods of stagnation or even decline can be pointed out.

iii) The upward trends became much steeper after 1959/60, or rather after 1958/59 in East Pakistan. We prefer to use 1959/60 as a base year because it is commonly used for this purpose for the Second Five Year Plan, 1960-65. The agricultural output in East Pakistan in 1958/59 was exceptionally low and the use of this year as a base would distort the subsequent growth rates.

iv) A clear structural change in favour of non-agricultural sectors. Though structural changes have taken place also within agricultural sector, these are more pronounced in the case of non-agricultural sectors such as large-scale manufacturing.

Growth Patterns

In the foregoing paragraph the term trend was used in a rather loose way. It needs some clarification and formalization before it can be expressed in quantitative or graphic terms.

A trend is a normalized time series constructed by smoothing out the actual series so that it fits into one or another simplified growth pattern or model. The first step in the construction of a trend is, therefore, to decide about the growth pattern and thereby to choose the formulas to be used for the trend computations. Each formula (or set of formulas) corresponds to only one specific growth pattern, which is reflected in the shape of the trend.

The following types of trends may have more or less relevance to the gross domestic and sector product estimates for Pakistan:

a) *A Constant Growth per Year in Absolute Terms*: The trend value grows by the same absolute amount each year which gives a simple *linear trend*. This pattern is described by a linear equation (see, Appendix C).

b) *A Constant Annual Compound Growth Rate*: The trend value grows by the same percentage from one year to the next throughout the period. We get a certain type of exponential trend, the pattern can be expressed by an exponential equation. As explained in Appendix C it can, however, be transformed to a linear trend in the logarithmic form. For the sake of convenience we will call it a *semi-logarithmic trend*.

c) An Accelerating Growth, or an Increasing Annual Compound Growth Rate:

The acceleration, *i.e.*, relative increase in the growth rate may be constant, increasing or declining, but the growth rate itself would be continuously increasing if the acceleration is positive. If the acceleration is declining, we gradually approach a trend characterized by a constant rate (type *b*), which is in fact a special case of type *c* where the acceleration is zero. The acceleration may be negative, which means a retarding growth due to a declining annual compound growth rate. Type *a*, the linear trend, represents a special case of retarding growth. When the yearly growth is constant in absolute terms, the growth rate is declining but the retardation—the relative decrease in the growth rate—becomes smaller year by year.

If we work out sector-wise trends and aggregate them, the growth pattern of the aggregate may or may not follow any of the patterns of its component. It may even not represent any of the types of trends listed above. The following case is of special interest for our trend computations:

In the case of semilogarithmic sectoral trends, if the sectors grow at a constant and equal rate, the aggregate growth rate will be identical with the sectoral growth rate. However, constant but unequal sectoral growth rates will lead to acceleration in the aggregate growth rate. The obvious reason for the acceleration of the growth in the aggregate is that the sectors with higher growth rates (higher than the weighted average growth rates for all sectors) increase their relative weights year by year. This will be so regardless of which set of weights we start with. If we continue the trends infinitely, we approach a growth rate for the aggregate equal to the constant growth rate of the fastest growing sector. The acceleration will eventually come down to zero. But it does not necessarily decline continuously. It may even increase over longer periods, depending on the sectoral growth rates and the relative weights⁶.

If we assume constant growth rates for each sector, then the rate of acceleration of the growth in the aggregate would depend on the degree of disaggregation of sectors. If we, on the other hand, lump all sectors together and assume a constant growth rate for the aggregate (a semilog trend), then the implicit assumption is that the specified sectors on the average grow at more or less declining rates. It is an important point that a semilog trend for the aggregate is incompatible with a semilog trend for the sectors that make up the aggregate, if the sectors grow at different constant rates.

We should be clear however that no similar implication exists in the case of linear trends. The linear trend for the aggregate is just the aggregate of the linear trends for the components.

⁶ A mathematical exposition of aggregate growth and acceleration in the two-sector case is given in Appendix C.

Trends 1949/50—1959/60

Not only the growth rates, but to some extent also the growth patterns, seem to have changed around 1959/60. We have, therefore, worked out separate trends for the periods before and after 1959/60.

For the first period, 1949/50—1959/60, the "actuals" in agriculture do not give any clear indication about the growth pattern, so the choice has to be arbitrary. In a case like that semilogarithmic trends might be as relevant, or irrelevant, as simple linear trends. The average growth rates in agriculture over the ten-year period were so small that the difference between linear trends and semilogarithmic trends would be negligible. For the non-agriculture sector, as a whole, simple linear trends seem to fit the actual time series 1949/50 — 1959/60 fairly well, in East as well as in West Pakistan.

It should be noted, however, that if we break down our two broad sectors into subsectors, according to the sector specification in Appendix Table B-1, we find marked differences with regard to growth patterns. For some sectors the "actuals" themselves are in fact extrapolations or interpolations made on different assumptions about the relevant growth patterns, *e.g.*, semilog trends for small-scale manufacturing and for the main parts of services. But when we lump them together into one non-agricultural sector, a simple linear trend seems to be a workable approximation for both provinces.

Since in each province the trends for the two specified sectors, *viz.*, agriculture and non-agriculture, are linear, the aggregate trend for the provinces as well as for the country as a whole will also be linear. The appended Figures 1, 2 and 3 show the linear trends 1949/50 — 1959/60 together with actual estimates.

As a supplement to these figures, a few crucial trend values are shown in Tables I, II and III⁷.

TABLE I

EAST PAKISTAN: GROSS PROVINCIAL PRODUCT AT 1959/60 FACTOR COST

	Trend values (<i>in crore of rupees</i>)			Average annual compound rate of growth (<i>per cent</i>)
	1949/50	1959/60	Constant annual increase	
Agriculture: gross value added	835.8	879.6	4.4	0.5
Non-agriculture: gross value added	440.3	584.1	14.4	2.8
Net factor income	—1.5	—1.5	—	—
Gross provincial product	1274.6	1462.2	18.8	1.4
Population (<i>lakhs</i>)	422.5	538.5	—	2.4
GPP per capita (<i>Rs.</i>)	302	272	—3.0	—1.0

⁷ As our trends are linear, the average compound rates may differ slightly from the constant growth rates which semilog trends would have shown, but the differences would in this case be negligible.

TABLE II
WEST PAKISTAN: GROSS PROVINCIAL PRODUCT AT 1959/60 FACTOR COST

	Trend values (in crore of rupees)			Average annual compound rate of growth (per cent)
	1949/50	1959/60	Constant annual increase	
Agriculture: gross value added	628.7	767.3	13.9	2.0
Non-agriculture: gross value added	544.6	884.9	34.0	5.0
Net factor income	-1.5	-1.5	—	—
Gross provincial product	1171.8	1650.7	47.9	3.5
Population (lakhs)	353.1	450.3	—	2.4
GPP per capita (Rs.)	332	368	3.6	1.1

TABLE III
PAKISTAN: GROSS NATIONAL PRODUCT AT 1959/60 FACTOR COST

	Trend values (in crore of rupees)			Average annual compound rate of growth (per cent)
	1949/50	1959/60	Constant annual increase	
Agriculture: gross value added	1464.5	1646.9	18.3	1.2
Non-agriculture: gross value added	985.2	1469.4	48.4	4.1
Net factor income	-3.0	-3.0	—	—
Gross national product	2446.7	3113.3	66.7	2.4
Population (lakhs)	775.6	988.8	—	2.4
GNP per capita (Rs.)	315	315	0	0

NB: One crore equals ten million. One lakh equals one hundred thousand.

As far as our figures go, they tell the story about a decade of stagnation for the Pakistan economy as a whole. Gross national product per capita stayed at

the same low level throughout the period. In East Pakistan it even declined. Neither in East Pakistan nor in West Pakistan did the output in agriculture keep pace with the population growth.

Trends during 1959/60—1963/64

Our trends for this five-year period are based on the "actuals" 1959/60—1963/64 only. Looking at the sectoral time series, each of which is based on five observations, *agriculture* is again a questionable sector with regard to growth pattern. No doubt, any type of trend we might choose, would give higher average annual growth rates for this period than for the period 1949/50—1959/60. But the growth pattern is still not clear. However, simple linear trends do not seem to be the most relevant trends for this period, the more so if we look at the 1959/60—1963/64 series as a continuation of the 1949/50—1959/60 series. As the growth rates in agriculture changed substantially upwards at the end of the first 10-year period, it seems unlikely that the growth pattern for the succeeding years should be one with retarding growth rates, which is the implication of a simple linear trend. Recent studies of the basic growth factors in agriculture indicate increasing growth rates for the coming years. Partly as a consequence of such studies the Third Five Year Plan is based on much higher expected annual growth rates in agriculture than the average annual growth rates realised during the Second Five Year Plan period [11]. In order not to overstate the acceleration over the four years 1959/60—1963/64, we have split up agriculture, separately for East and West Pakistan, in only two subsectors, and have chosen semilogarithmic trends for each of them. Major and minor crops have been treated as one subsector and livestock, fishing and forestry as the other.

With regard to "non-agriculture", the 1959/60—1963/64 figures indicate a development pattern completely different from that found for 1949/50—1959/60. An examination of specified sectors separately shows that the actual time series of sectors are just semilogarithmic trends, with constant annual compound growth rates of 18.8 per cent for large-scale manufacturing in East Pakistan, 10.7 per cent for large-scale manufacturing in West Pakistan and 2.6 per cent for small-scale manufacturing in both provinces. This is so because the "actuals" were estimated exactly according to this growth pattern. For large-scale manufacturing there were actual observations only for the two years 1959/60 and 1962/63, and the other three years were extrapolated by assuming that the annual compound growth rate remained constant for the whole period. As far as the small-scale manufacturing is concerned, an estimate was made for one year, from which the other years were calculated by extrapolation, assuming a constant annual compound rate equal to the assumed population growth rate of 2.6 per cent. Consequently in both provinces we get trends with accelerating

growth rates for the aggregate manufacturing,—large and small-scale together, as the large-scale manufacturing with its higher growth rate increases its relative weight year by year at the expense of small scale.

The series for most of the *other non-agriculture* sectors indicate that linear trends are out of question. Semilog trends may be a good approximation for some of these sectors, but accelerating growth seems to be more relevant for most of them. For the sake of simplicity, and also in order not to overstate the aggregate growth rates, we have chosen semilog trends for each of the specified non-agriculture sectors, separately for East and West Pakistan.

As a consequence of our sectoral semilog trends we necessarily end up with an accelerating growth pattern for each of the two provincial products as well as for the national product.

Figure 4 shows the semilog trends for the specified sectors of each of the two provinces. The numbers attached to the trends are trend values 1964/65 in per cent of trend values 1959/60. Tables IV, V and VI below give the trend values in absolute terms for 1959/60 to 1964/65. Appendix B gives the regression coefficients of our semilog trends and the corresponding growth factors. Finally, in Figures 5, 6, and 7 we have drawn the aggregate trends, together with the "actuals" of the same aggregates. The results for 1959/60—1964/65 as they appear on these figures, are directly comparable with the results for 1949/50—1959/60 in Figures 1, 2, and 3.

The trends during the period 1959/60 to 1964/65 give a much more encouraging picture than the trends during the previous decade. The average compound rate of growth in GNP and per capita income works out to 5.3 and 2.7 per cent per year respectively. This higher growth rate is reflected in value added in agricultural as well as non-agricultural sectors. The rate of growth in GNP was 5 per cent in 1960/61 when compared with the previous year. It gradually rose to 5.7 per cent in 1964/65. The average rate of growth of GPP in East Pakistan was about the same as in West Pakistan but this rate showed a higher acceleration in East than in West Pakistan.

There are pronounced differences between the growth rates of agriculture and non-agriculture sectors. The latter grew at a rate which was twice as high as that of agriculture and as such gained in relative weight year by year. Within these two broad categories, particularly within non-agricultural sectors, rates of growth showed a wide variation indicating a structural change in the composition of GNP.

TABLE IV
EAST PAKISTAN: TREND VALUES OF GROSS VALUE ADDED AT 1959/60 FACTOR COST

Sector	Trend values (in crore of rupees)						Constant annual growth rate (per cent)
	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	
I. Agriculture							
Crops	914.8	945.6	977.0	1009.3	1042.8	1077.4	3.3*
Other agriculture	715.3 199.5	740.0 205.6	765.7 211.3	792.1 217.2	819.6 223.2	848.0 229.4	3.5 2.8
II. Non-agriculture							
Manufacturing, large scale	588.0	628.9	675.2	728.8	791.0	864.3	8.0*
Manufacturing, small scale	40.6	48.2	57.3	68.1	80.9	96.1	18.8
Mining	50.6	51.9	53.3	54.7	56.1	57.5	2.6
Construction	18.5	24.9	33.3	44.8	60.1	80.6	—
Electricity, gas	1.6	2.3	3.5	5.1	7.6	11.3	34.2
Transport, communication	89.0	94.3	99.9	105.8	112.1	118.8	47.9
Trade	157.2	168.5	180.4	193.2	207.0	221.8	5.9
Ownership of dwellings	93.2	95.5	97.8	100.3	102.7	105.4	7.1
Services	70.0	72.1	74.2	76.4	78.7	81.0	2.5
Banking, insurance	11.2	12.3	13.5	14.8	16.3	17.9	3.0
Public administration, local	19.0	21.5	24.2	27.4	30.9	34.9	9.8
Central government and net factor income from abroad	37.1	37.4	37.8	38.2	38.6	39.0	12.9
Gross provincial product (GPP) as an aggregate of the sectors	1502.8	1574.5	1652.2	1738.1	1833.8	1941.7	0.9
GPP index	100.0	104.8	109.9	115.7	122.0	129.2	5.3*
Percentage growth in GPP from preceding year		4.8	4.9	5.2	5.5	5.9	—
Agriculture index	100.0	103.4	106.8	110.3	114.0	117.7	—
Non-agriculture index	100.0	107.0	114.8	123.9	134.5	147.0	—
Population (lakhs)	538.5	552.5	556.9	581.6	596.9	612.2	2.6
Per capita GPP (Rs.)	279	285	291	299	307	317	2.6*

* Average annual compound growth rate.

TABLE VI
PAKISTAN: TREND OF GROSS NATIONAL PRODUCT AS AN AGGREGATE OF PROVINCIAL,
SECTORAL SEMILOGARITHMIC TRENDS

	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	Average annual compound growth rate (per cent)
Agriculture (<i>in crore of rupees</i>)	1674.8	1733.7	1794.1	1857.1	1922.0	1989.8	3.5
Non-agriculture (<i>in crore of rupees</i>)	1460.8	1558.9	1667.2	1788.4	1923.8	2076.7	7.3
Gross national product (GNP) (<i>in crore of rupees</i>)	3135.6	3292.6	3461.3	3645.5	3845.8	4066.5	5.3
GNP index	100.0	105.0	110.4	116.3	122.6	129.6	—
Percentage growth in GNP from preceding year		5.0	5.1	5.3	5.5	5.7	—
Agriculture index	100.0	103.5	107.1	110.9	114.8	118.8	—
Non-agriculture index	100.0	106.7	114.1	122.4	131.7	142.2	—
Population (<i>laks</i>)	988.8	1014.5	1040.9	1067.9	1095.6	1124.1	2.6
Per capita GNP (<i>Rs.</i>)	317	325	333	341	351	362	2.7

Future Trends

The trend coefficients in the above discussion are based on only five observations, *i.e.*, on the data for 1949/50 to 1963/64. The actual estimates are subject to considerable margin of error and the trends derived from them must be regarded as rough approximations. In spite of these limitations, we have computed trend values for 1964/65. The assumption that the growth pattern and factors which characterize a past period will continue into the future becomes unrealistic if we move too far ahead in time. This is all the more true in a planned developing economy like Pakistan where any forecast based on an extrapolation of past trends may be wide off the mark.

Nonetheless, we have not been able to resist the temptation to compute the growth in GNP during the Third Five Year Plan (1965/70). This exercise is based on the assumption that the trends during 1959/60 to 1964/65 will remain unchanged. An extrapolation of GNP over the five years 1964/65 to 1969/70 shows a total growth of about 39 per cent which corresponds to an average annual compound rate of 6.8 per cent. Similar extrapolation of East Pakistan's GPP shows 45 per cent growth over the Third Plan period which is equivalent to an average annual compound rate of 7.7 per cent. For West Pakistan, the corresponding figures are 34 per cent for Plan period and 6 per cent per year.

The Third Plan's targets for growth in Pakistan's GNP is 6.5 per cent per year which is quite close to our figures. Similarly, the Plan's target for West Pakistan's GPP are almost the same as the figures we got by extrapolation of trend. In the case of East Pakistan, the Plan target of 40 per cent growth in GPP is lower than the extrapolated trend (7 per cent per year) figure of 45 per cent.

However, when we look at the two broad sectors, *viz.*, agriculture and non-agriculture separately, we get a different picture. The Third Plan targets for growth in agriculture are 4.5 per cent in East and 5.5 per cent in West Pakistan giving an aggregate rate of 5 per cent per year for the country as a whole. Against these planned rates of growth, the trend values were 3.3 per cent in East and 3.7 per cent in West Pakistan. If we combine the Third Plan targets for agriculture with our trend rates for non-agriculture, we get a much higher growth rate for GNP and GPP of East and West Pakistan than envisaged in the Third Plan. The purpose of this comparison was to point out the Third Plan's implicit assumption that the annual growth rates in a number of non-agricultural sectors are going to decline substantially during the next five years.

V. STRUCTURAL CHANGE IN THE ECONOMY

A relative sectoral distribution of the trend values of gross provincial and national products is shown in Table VII below. The two major sectors in which

these values have been divided are agriculture and non-agriculture. The latter has been subdivided into commodity-producing and service-producing sub-sectors.

The distribution of relative figures shown in the table depends on the price structure in the base year 1959/60. If a base year was chosen wherein the prices of agricultural products were relatively higher, the share of agriculture would have been higher. However, the structural change in the gross provincial and national products is so pronounced that it would have appeared regardless of the year which we chose as base for prices.

TABLE VII

RELATIVE SECTORAL DISTRIBUTION OF THE TREND VALUES OF GNP AND GPP¹

	Agriculture	Non-agriculture			GNP/GPP
		Total	Commodity producing sectors ¹	Service producing sectors ²	
East Pakistan					
1949/50	65.6	34.4			100
1954/55	62.7	37.3			100
1959/60 ³	60.2	39.8			100
1959/60 ⁴	60.9	39.1	(7.4)	(31.7)	100
1964/65	55.5	44.5	(12.6)	(31.9)	100
West Pakistan					
1949/50	53.6	46.4			100
1954/55	49.5	50.5			100
1959/60 ³	46.5	53.5			100
1959/60 ⁴	46.5	53.5	(16.2)	(37.3)	100
1964/65	42.9	57.1	(19.5)	(37.6)	100
Pakistan					
1949/50	59.9	40.1			100
1954/55	56.0	44.0			100
1959/60 ³	52.9	47.1			100
1959/60 ⁴	53.4	46.6	(12.0)	(34.6)	100
1964/65	48.9	51.1	(16.2)	(34.9)	100

¹ Includes manufacturing, mining, construction, electricity, gas and water.

² Includes transport, trade, dwellings, services, banking and insurance, public administration, Central Government.

³ Derived from trend exhibited during 1949/50 to 1959/60.

⁴ Derived from trend during 1959/60 to 1964/65. As the two trends were calculated separately, they do not necessarily give the same result for the common year 1959/60.

During the past 15 years agriculture's contribution to GNP has gradually decreased from 60 to 49 per cent. A similar pattern is evident in the provinces. In East Pakistan, agriculture's share decreased from 66 to 56 per cent and in West Pakistan from 54 to 43 per cent.

Another interesting aspect of the change in structure is that the commodity-producing sectors in non-agriculture category have increased their share by almost the same percentage points as the decrease in agriculture's share during the Second Five Year Plan period. In other words, the service-producing sectors have been able to keep their share unchanged during this period. East and West Pakistan have these characteristics in common which underlie the fact that non-agricultural commodity-producing sectors have played a leading role in the economic development of both provinces.

Comparison of Per Capita Income in East and West Pakistan

We have already referred to the constitutional requirement of the removal of disparity in per capita income between the provinces and different regions within each province. To fulfil this requirement it is necessary to compare the behaviour of regional products and per capita income over the past years. For several reasons, a comparison of this kind between East and West Pakistan is particularly difficult.

The structures of the two provincial economies is distinctly different. The data on which these estimates are based differ in their reliability from sector to sector, province to province and from year to year. Moreover, the rupee may have a different purchasing power in the two provinces. A detailed discussion of these problems is beyond the scope of this paper. These have been dealt with briefly in the *Interim Report* of the National Income Commission [10]. Suffice it to say here that too firm conclusions should not be drawn on the basis of Table VIII below which compares the per capita income of the two provinces.

TABLE VIII

TREND VALUES OF PER CAPITA GPP AT 1959/60 FACTOR COST

	1949/50	1954/55	1959/60 ¹	1959/60 ²	1964/65
East Pakistan as % of West Pakistan's per capita GPP	90.9	81.0	73.8	76.9	76.4
West Pakistan as % of East Pakistan's per capita GPP	110.0	123.4	135.5	130.1	130.9

¹ Derived from 1949/50—1959/60 trend.

² Derived from 1959/60—1964/65 trend.

For 1959/60, two sets of figures have been shown in the above table. These are based on two different trends. For studying the change in disparity over time, the first figure for 1959/60 should be used when comparing with preceding years and the second set when comparing with succeeding years. The table shows that the disparity between the two provinces increased during the decade 1949/50 to 1959/60 but has remained almost constant over the last five years. The figures can be interpreted to indicate that by the end of Second Plan East Pakistan lagged ten years behind West Pakistan. With a growth rate of 2.7 per cent per year in GPP, it would take East Pakistan ten more years to reach the 1964/65 level of per capita GPP of West Pakistan. This calculation has nothing to do with the question when the disparity will be removed. That is a problem of future growth rates in East and West Pakistan.

Before we leave Table VIII, it should be mentioned that the way in which we have measured the disparity implies that the level of disparity as well as the change over time depends on the base-year prices. The composition of East Pakistan's GPP is different from that of West Pakistan and the prices of the various components do not move proportionately. Sometimes they even move in opposite directions. Again, the price movements for the same goods are not always the same in the two provinces, because most of their products are not sold in the same markets. It is an open question whether GPP at constant prices or at current prices is the most relevant concept for measuring the provincial disparity in income. If we could postulate that a rupee in East at any time had the same purchasing power as a rupee in West Pakistan, it could be argued that GPP at current prices would be a more relevant concept for this purpose. However, regardless of which of the conceivable set of prices we choose for our comparison, the outcome is likely to confirm the extent of disparity between the provinces.

REFERENCES

1. East Pakistan Small Industries Corporation, *Survey of Small Industries in East Pakistan*. (Dacca: East Pakistan Small Industries Corporation, 1964).
2. Falcon, Walter P., "The Reliability of Punjab Agricultural Data" in *Acreage, Production and Prices of Major Agricultural Crops of West Pakistan*. (Karachi: Pakistan Institute of Development Economics, June 1961).
3. ———, and Carl Gotsch, *Recent Growth of the Livestock Sector in West Pakistan and Provisional Benchmarks for the Third Five Year Plan*. Mimeographed, 1965.
4. Gotsch, Carl H., and Walter Falcon, *Growth of Livestock Products in East Pakistan During the Second Plan and Suggested Benchmarks for the Third Plan*. Mimeographed, 1965.
5. Haq, M., *Population Projections for Pakistan*. Mimeographed, 1964.
6. Khandkar, R.H., *A Study in the Concept and Measurement of National Product and its Distribution with Special Referenceto Pakistan*. Unpublished doctoral dissertation submitted to the London School of Economics, 1954.
7. Pakistan, Central Statistical Office, *Statistical Bulletin*, December 1965. (Karachi: Manager of Publications).
8. ———, Central Statistical Office, *Census of Manufacturing Industries*, 1954, 1957 and 1959/60. (Karachi: Manager of Publications).
9. ———, Ministry of Labour, *Manpower Survey Reports*, 1955 and 1959. (Karachi: Department of Manpower and Employment).
10. ———, National Income Commission, *Interim Report*. (Karachi: Reproduction Unit, Central Statistical Office, 1964).
11. Pakistan, Planning Commission, *The Third Five Year Plan, 1965-70*. (Karachi: Planning Commission, March 1965).
12. Papanek, Gustav F., "Industrial Production and Investment in Pakistan", *Pakistan Development Review*, Autumn 1964, pp. 462-81.
13. Qureshi, D.M., "Crop Estimation Surveys in the Punjab", *Pakistan Statistical Association Proceedings*, 1965.

14. Rao, V.K.R.V., *The National Income of British India, 1931-32*. (London: Macmillan and Company).
15. Committee of Experts on the National Accounts, *Report of—*. (Karachi: Pakistan Institute of Development Economics, 1962).
16. Tims, Wouter, *Industrial Production in East Pakistan; 1959/60—1962/63*. Mimeographed, 1966.
17. United Nations, *A System of National Accounts and Supporting Tables*. (New York: Statistical Office of the United Nations, 1960).

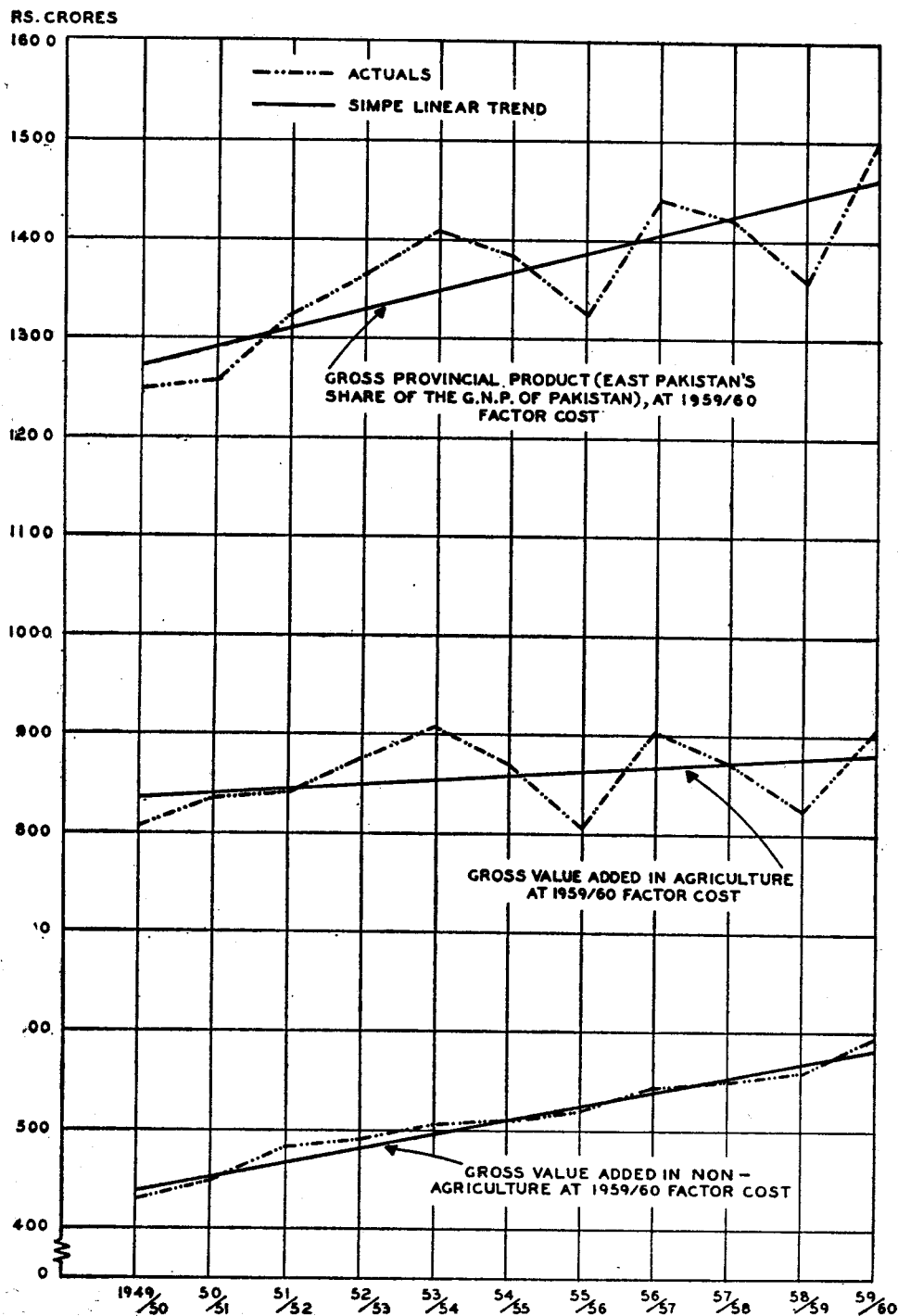


Figure 1. Gross Provincial Product of East Pakistan at 1959/60 Factor Cost

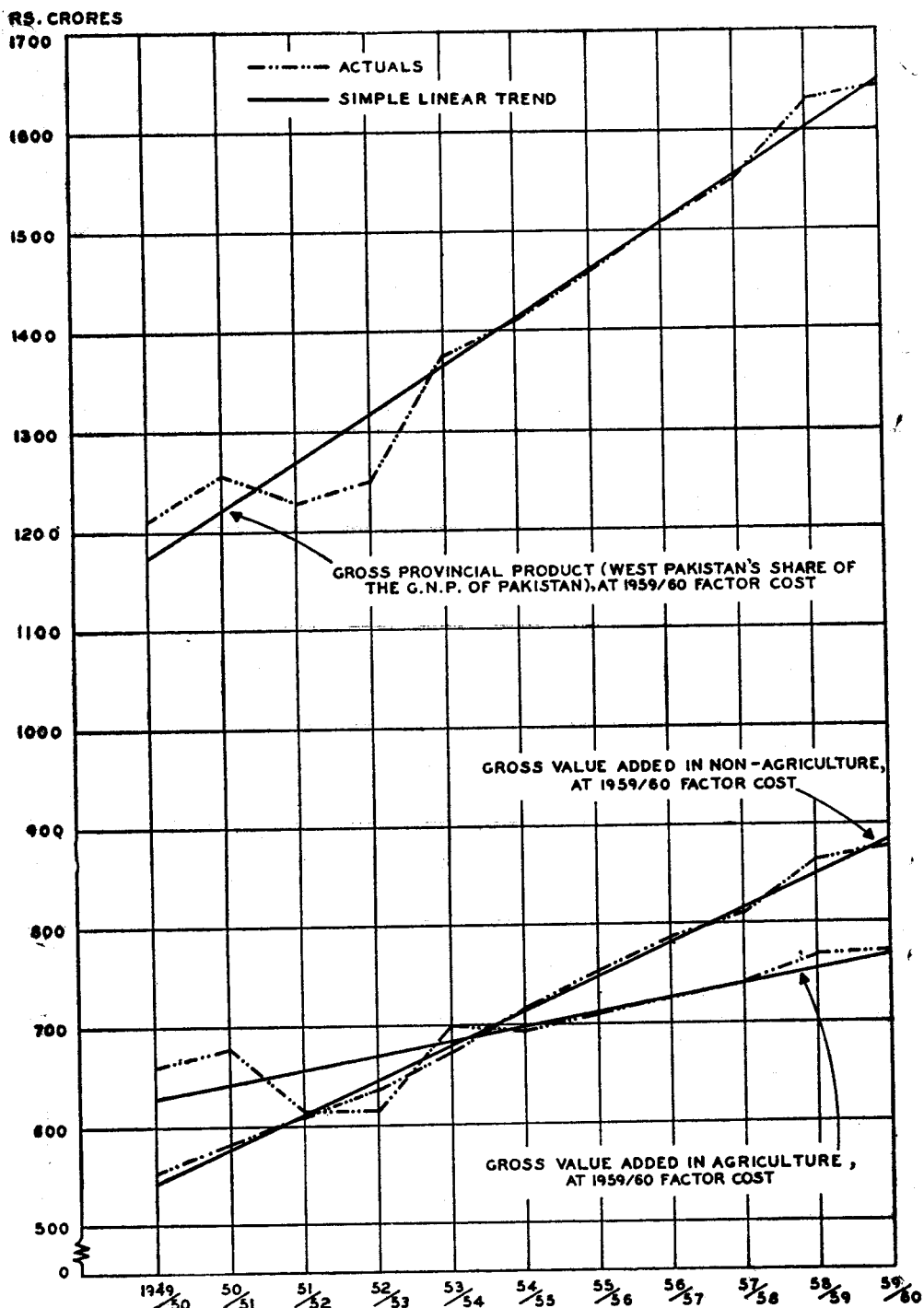


Figure 2. Gross Provincial Product of West Pakistan at 1959/60 Factor Cost

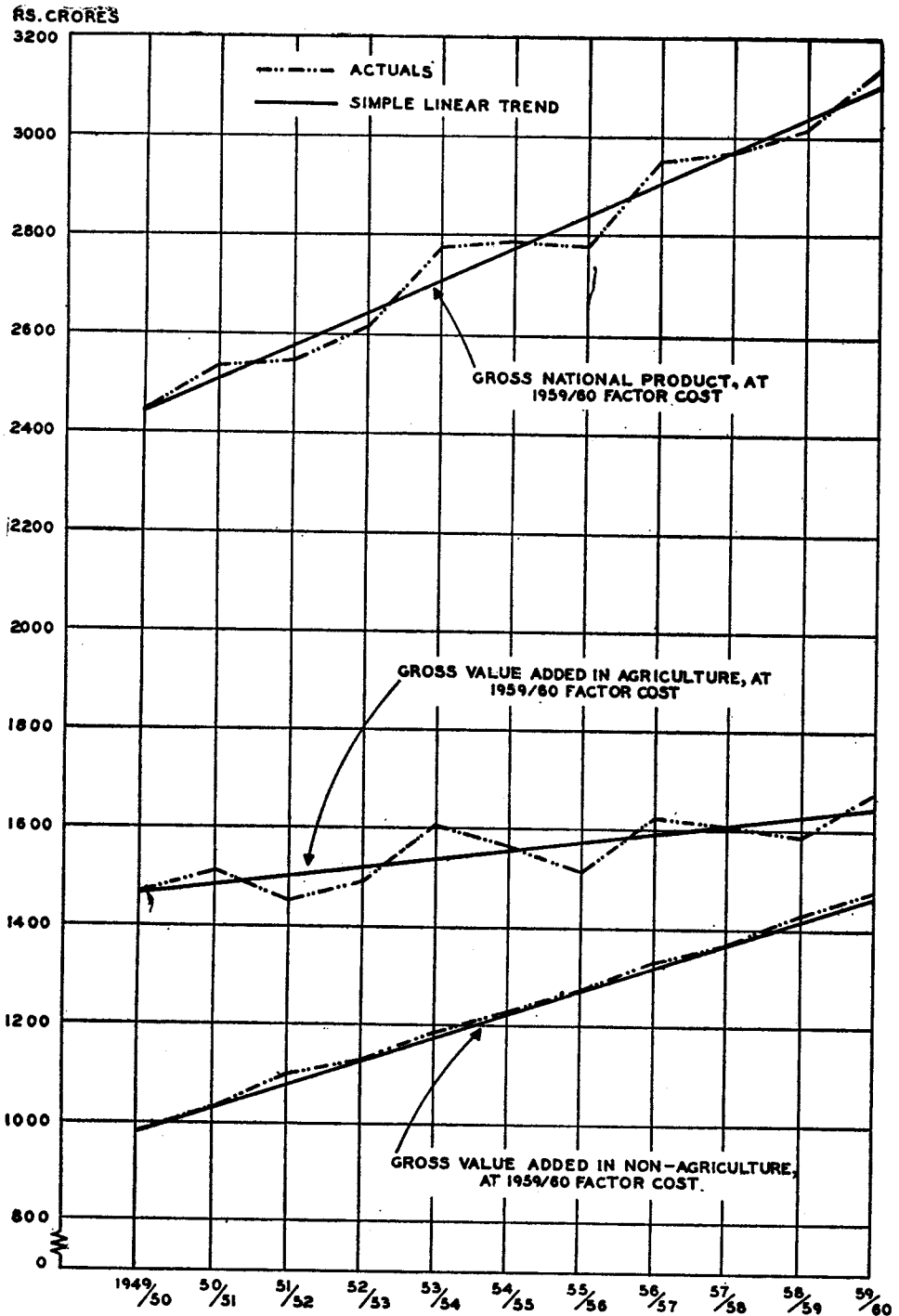


Figure 3. Gross National Product of Pakistan at 1959/60 Factor Cost

TREND VALUE 1959/60 = 100. NUMBERS IN BRACKETS ARE
TREND VALUES 1964/65, IN PERCENTAGE OF TREND VALUES 1959/60

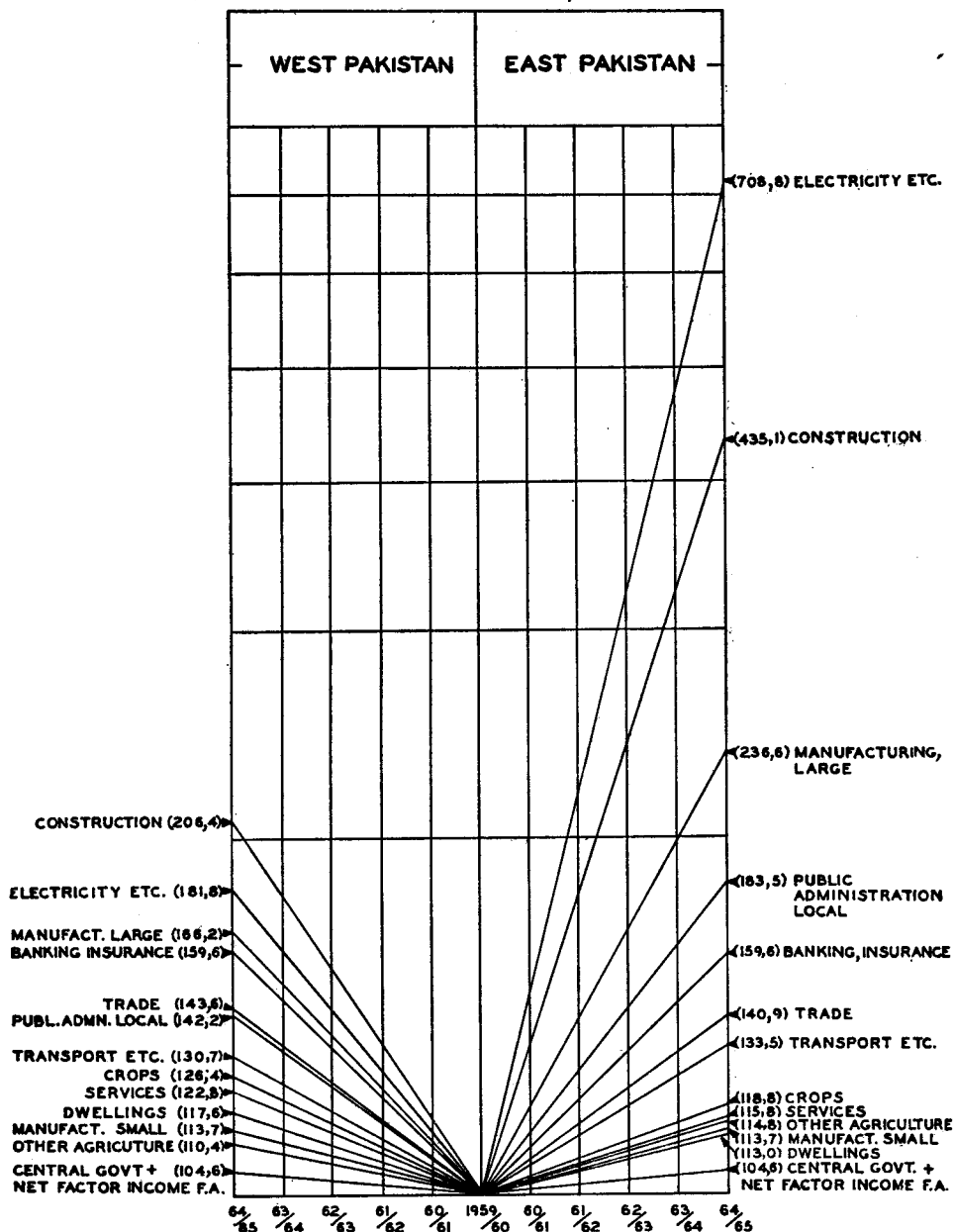


Figure 4. Sectoral Semilogarithmic Trends

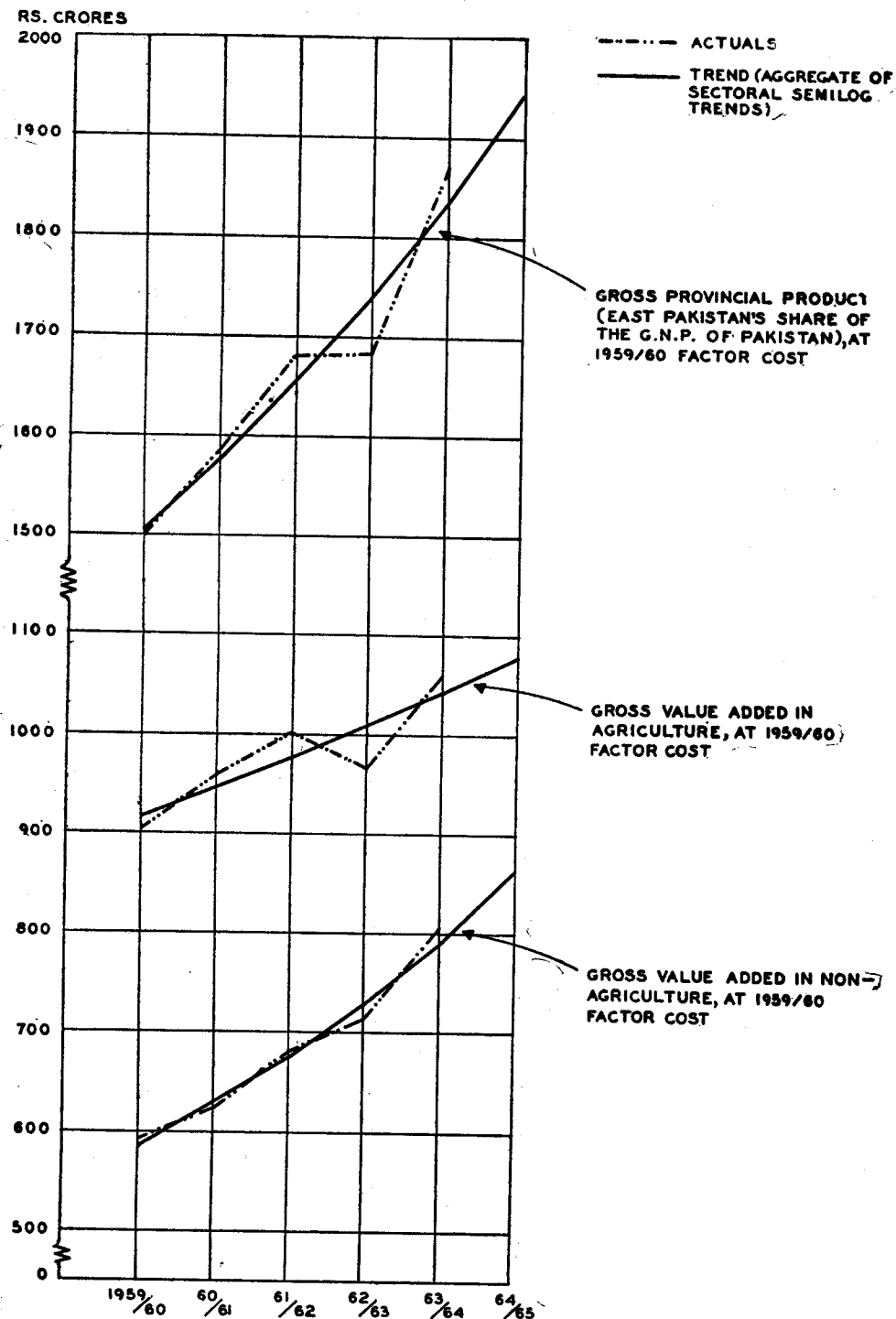


Figure 5. Gross Provincial Product of East Pakistan (Semilog Trends)

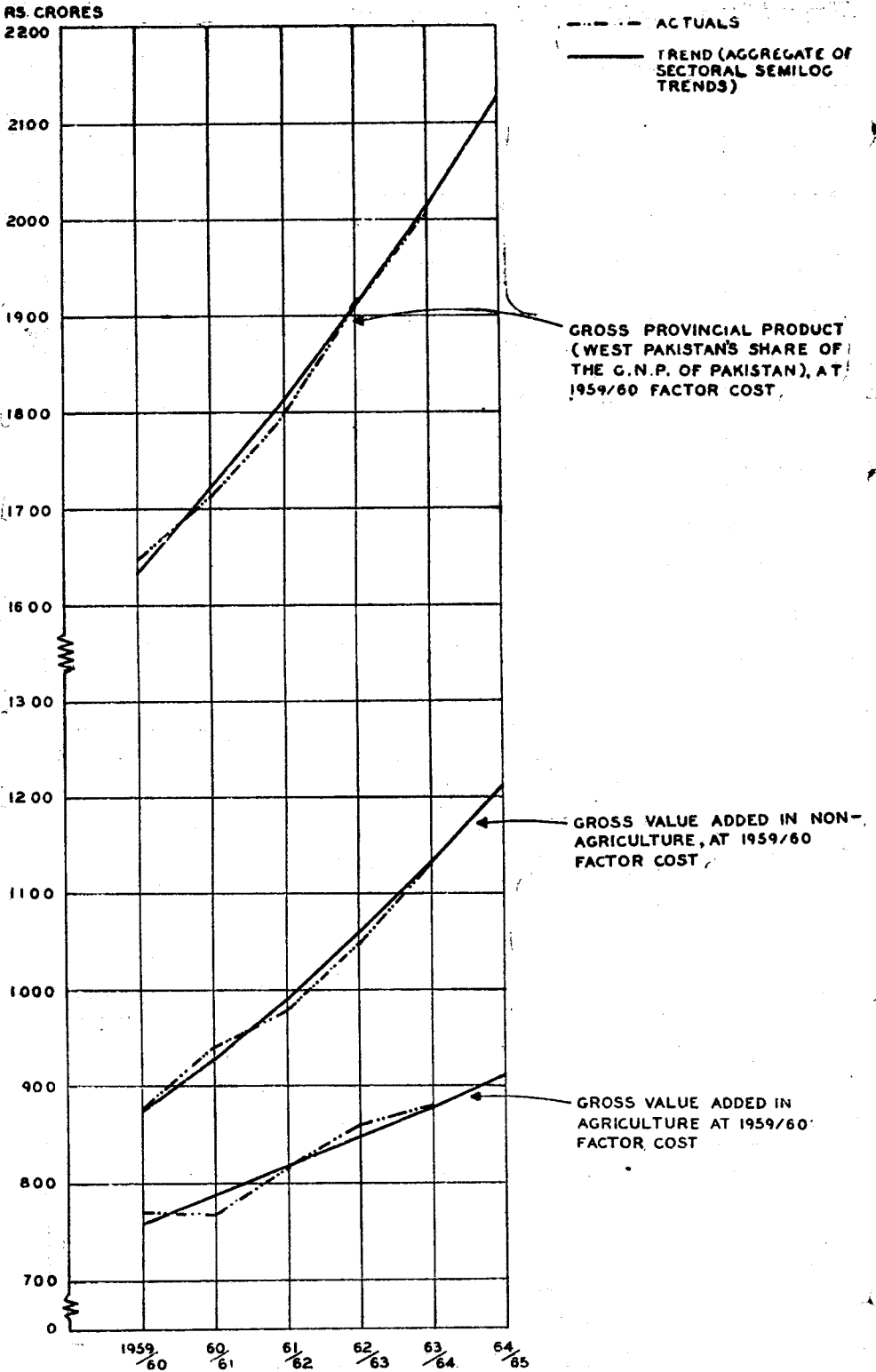


Figure 6. Gross Provincial Product of West Pakistan (Semilog Trends)

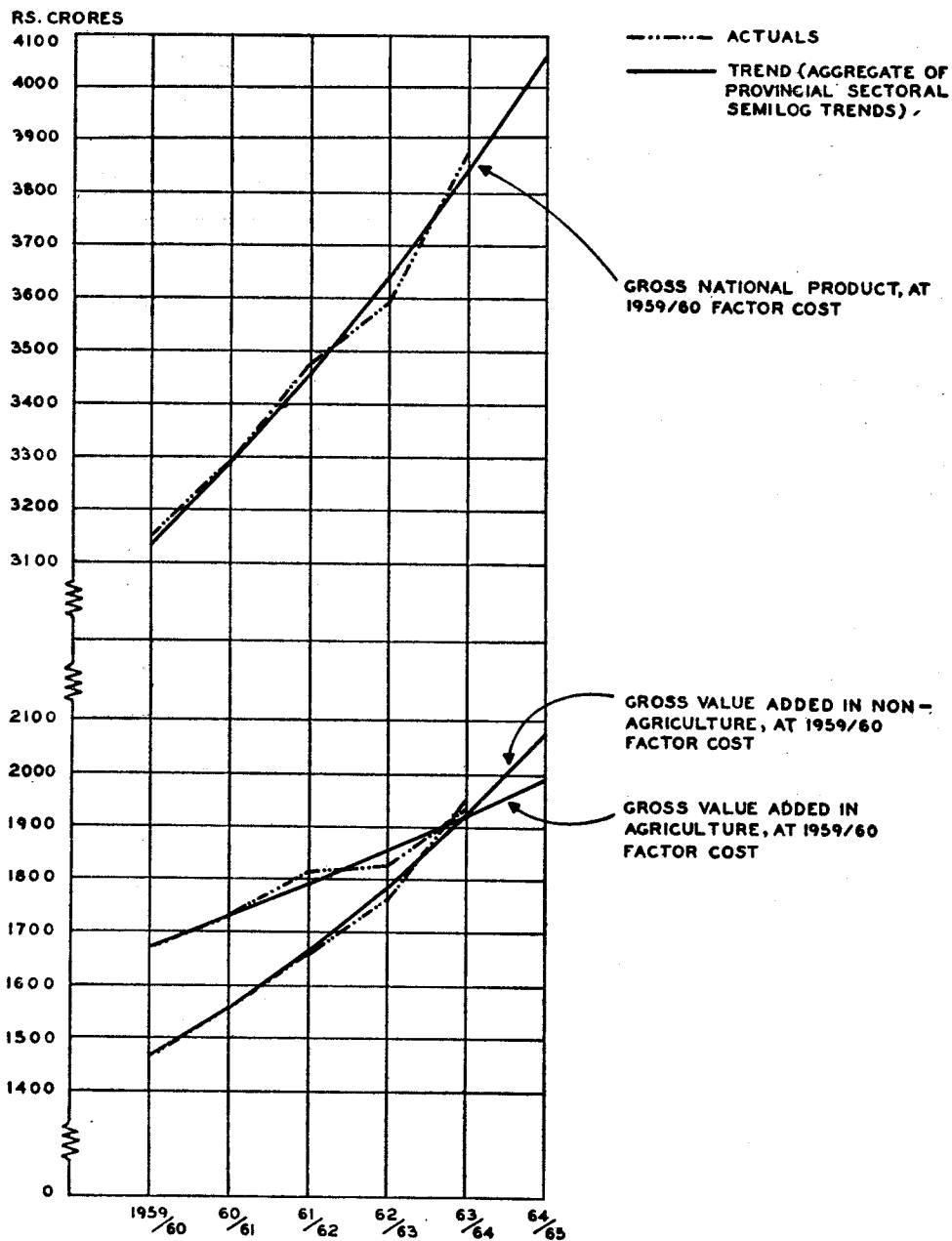


Figure 7. Gross National Product of Pakistan (Semilog Trends)

Appendix A

TABLE A-1
PER CAPITA INCOME IN BRITISH INDIA

Author	Year of estimate	Year for which estimate is made	Per capita income (rupees)
Dadabhai Naoraji	1876	1867	20.0
Baring and Barbour	1882	1881	27.0
Lord Curzon	1901	1897	30.0
William Digby	1902	1899	18.0
F.G. Atkinson	1902	1875	27.3
F.G. Atkinson	1902	1895	35.2
B.N. Sarma	1921	1911	50.0
Findlay Shirras	1924	1911	49.0
-do-	1924	1921	107.0
-do-	1924	1922	116.0
Shah and Khambhata	1924	1921	74.0
Wadia and Joshi	1925	1913	44.3
Vakil and Muranjan	1926	1910	58.5
Simon Commission	1926	—	116.0
Central Banking Enquiry Committee	1931	1928	42.0
Findlay Shirras	1932	1931	63.0
James Grigg	1938	1937-38	56.0
V.K.R.V. Rao	1939	1925-29	77.9
-do-	1940	1931-32	65.0
"Eastern Economist"	1949	1945-46	137.0

Source: [6, p.45]

TABLE A-2

EAST PAKISTAN: GROSS PROVINCIAL PRODUCT AT 1959/60 FACTOR COST

Sector	(in crore of rupees)							
	1949/50	1950/51	1951/52	1952/53	1953/54	1954/55	1955/56	1956/57
Agriculture	807.4	834.4	839.4	875.1	904.8	870.4	804.3	901.2
Crops : major and minor	650.7	673.4	673.4	706.4	730.4	691.5	621.7	714.1
Other agriculture <i>n.e.s.</i>	156.7	161.0	166.0	168.7	174.4	178.9	182.6	187.1
Non-Agriculture	430.0	446.8	482.6	486.6	502.9	511.2	519.1	539.5
Mining quarrying	—	—	—	—	—	—	—	—
Manufacturing	47.2	49.7	52.2	55.7	60.3	65.1	71.2	75.9
a) Large scale	(6.9)	(8.5)	(10.1)	(12.6)	(16.2)	(20.0)	(25.1)	(28.7)
b) Small scale	(40.3)	(41.2)	(42.1)	(43.1)	(44.1)	(45.1)	(46.1)	(47.2)
Construction	5.8	5.1	9.4	10.2	15.6	12.6	13.5	19.3
Electricity, gas, water	0.6	0.7	0.8	0.8	0.9	1.0	1.1	1.2
Transport and communication	63.1	63.7	68.4	70.6	71.3	77.9	79.0	80.2
Trade	137.9	145.3	153.5	152.5	154.8	147.8	143.3	151.6
Banking and insurance	3.8	4.2	4.6	4.9	5.4	5.5	6.7	8.3
Ownership of dwellings	75.5	77.1	78.8	79.9	81.7	83.5	85.3	87.2
Services	52.5	54.2	55.8	57.5	59.3	61.1	63.0	64.8
Public administration, local	11.4	13.4	17.1	16.9	18.4	15.1	16.2	18.8
Central Government and defence	34.0	35.1	43.0	39.8	37.8	41.5	41.7	33.8
Net factor income from abroad	—1.8	—1.7	—1.0	—1.2	—2.6	—0.2	—1.9	—1.6
Gross provincial product	1237.4	1281.2	1322.0	1362.7	1407.7	1381.6	1323.4	1440.7
Population (lakhs)	422.5	432.9	443.5	454.4	465.6	477.0	488.6	500.6
GPP per capita (Rs.)	293	296	298	300	302	290	271	288

TABLE A-3

WEST PAKISTAN: GROSS PROVINCIAL PRODUCT AT 1959/60 FACTOR COST

(in crore of rupees)

Sector	1949/50	1950/51	1951/52	1952/53	1953/54	1954/55	1955/56	1956/57
Agriculture	659.5	676.8	615.5	616.6	700.5	694.8	709.3	725.4
Crops: major and minor	425.0	436.8	369.7	365.3	443.2	432.0	440.5	450.2
Other agriculture	234.5	240.0	245.8	251.3	257.3	262.8	268.7	275.2
Non-agriculture	549.6	579.5	612.0	634.7	672.2	715.8	750.1	784.4
Mining and quarrying	2.7	3.7	4.1	4.2	4.5	4.5	5.0	5.5
Manufacturing	96.1	104.2	112.3	123.5	139.6	156.9	172.7	182.1
a) Large scale	(27.7)	(34.2)	(40.6)	(50.2)	(64.6)	(80.2)	(94.2)	(101.8)
b) Small scale	(68.4)	(70.0)	(71.7)	(73.3)	(57.0)	(76.7)	(78.5)	(80.3)
Construction	17.9	18.7	24.7	26.2	28.3	28.9	32.3	33.7
Electricity, gas, water	2.7	2.9	3.1	3.0	3.5	3.7	4.3	5.7
Transport and Communication	60.8	64.5	65.8	71.2	75.4	81.0	83.2	86.6
Trade	147.7	156.7	157.5	158.5	168.5	177.7	181.8	187.6
Banking and insurance	3.9	4.2	4.6	5.0	5.4	5.6	6.8	8.3
Ownership of Dwellings	63.2	64.9	67.0	68.6	70.4	72.5	74.5	76.9
Services	95.5	99.3	103.3	107.4	111.7	116.2	120.8	125.6
Public adm., local	26.9	27.1	27.5	28.5	29.7	27.6	28.9	40.2
Central Government and defence	34.0	35.1	43.1	39.9	37.9	41.6	41.8	33.9
Net factor income from abroad	-1.8	-1.8	-1.1	-1.3	-2.7	-0.4	-2.0	-1.7
Gross provincial product	1209.1	1256.3	1227.5	1251.3	1372.7	1410.6	1459.4	1509.8
Population (lakhs)	353.1	361.8	370.7	379.8	389.1	398.7	408.6	418.7
GPP per capita (Rs.)	342	347	331	329	353	354	357	361

TABLE 3-A (contd.)

WEST PAKISTAN: GROSS PROVINCIAL PRODUCT AT 1959/60 FACTOR COST

	(in crore of rupees)						
	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64
Agriculture	739.3	768.9	771.1	769.5	817.1	859.7	875.6
Crops: major and minor	457.8	482.2	477.5	470.9	512.7	548.6	558.7
Other agriculture, <i>n.e.s.</i>	281.5	286.7	293.6	298.6	304.4	311.1	316.9
Non-agriculture	812.2	863.4	875.6	941.5	977.6	1050.7	1133.4
Mining and quarrying	5.9	6.4	7.0	8.1	8.6	9.6	10.4
Manufacturing	188.9	196.8	201.8	216.5	232.5	250.2	269.4
a) Large scale	(106.8)	(112.8)	(115.9)	(128.3)	(142.0)	(157.3)	(174.1)
b) Small scale	(82.1)	(84.0)	(85.9)	(88.2)	(90.5)	(92.9)	(95.3)
Construction	38.6	45.9	42.7	61.2	59.6	70.0	83.7
Electricity, gas, water	6.3	6.6	8.7	9.9	9.9	12.2	14.2
Transport and communication	87.7	105.1	92.1	102.3	98.7	108.6	111.8
Trade	193.9	198.8	210.5	219.8	230.1	249.3	274.6
Banking and insurance	8.1	9.2	11.2	12.4	13.4	15.0	16.3
Ownership of dwellings	79.2	81.5	83.7	85.8	88.8	91.6	95.2
Services	130.7	135.9	141.1	147.8	153.7	160.1	166.5
Public adm., local	41.2	40.3	39.7	39.8	44.3	47.2	51.8
Central Government and defence	32.1	37.9	38.8	39.4	39.8	40.7	44.2
Net factor income from abroad	-0.4	-1.0	-1.7	-1.5	-1.8	-3.8	-4.7
Gross provincial product	1551.5	1632.3	1646.7	1711.0	1794.7	1910.4	2009.0
Population (lakhs)	429.0	439.5	450.3	462.0	474.0	486.3	498.9
GPP per capita (Rs.)	362	371	366	370	379	393	403

TABLE A-4

PAKISTAN: GROSS NATIONAL PRODUCT AT CONSTANT FACTOR COST OF 1959/60
FOR THE YEARS 1949/50 TO 1963/64

Sector	1949/50	1950/51	1951/52	1952/53	1953/54	1954/55	1955/56	1956/57
<i>(in crore of rupees)</i>								
Agriculture	1466.9	1511.2	1454.9	1491.7	1605.3	1565.4	1513.5	1626.6
Major and minor crops	1075.7	1110.2	1045.1	1071.7	1173.6	1123.4	1062.2	1167.3
Other agriculture	391.2	401.0	411.8	420.0	431.7	442.0	451.3	462.3
Non-agriculture	980.4	1026.8	1094.6	1122.9	1176.2	1226.6	1270.2	1324.4
Mining and quarrying	2.7	3.7	4.1	4.2	4.5	4.5	5.0	5.5
Manufacturing	143.3	153.9	164.5	179.2	199.9	222.0	243.9	258.0
a) Large scale	(34.6)	(42.7)	(50.7)	(62.8)	(80.8)	(100.2)	(119.3)	(130.5)
b) Small scale	(108.7)	(111.2)	(113.8)	(116.4)	(119.1)	(121.8)	(124.6)	(127.5)
Construction	23.8	23.8	34.0	36.4	43.9	41.5	45.8	52.9
Electricity, gas, water and sanitary services	3.3	3.6	3.9	3.8	4.4	4.7	5.4	6.9
Transportation, storage and communications	123.9	128.2	135.2	141.7	146.6	158.8	162.2	167.4
Wholesale and retail trade	285.6	302.0	311.0	311.0	323.3	325.5	325.1	339.2
Banking and insurance	7.7	8.4	9.2	9.9	10.8	11.1	13.5	16.6
Ownership of dwellings	138.7	141.8	145.8	148.5	152.6	155.9	160.5	164.1
Services	148.0	153.5	159.1	164.9	171.0	177.3	183.8	190.4
Public administration, local	38.3	40.5	44.7	45.5	48.2	41.3	45.2	59.9
Central Government and defence	68.0	70.2	86.0	79.6	75.6	83.0	83.4	67.6
Net factor income from rest of the world	(-)-3.6	(-)-3.5	(-)-2.1	(-)-2.5	(-)-5.3	(-)-0.8	(-)-3.9	(-)-3.4
Gross national product	2447.3	2538.0	2549.5	2614.6	2781.5	2792.0	2783.7	2951.0
Population (<i>lakhs</i>)	775.6	794.7	814.2	834.2	854.7	875.7	897.2	919.3
Per capita GNP (<i>Rs.</i>)	316	319	313	313	325	319	310	321

(continued)

TABLE A-4 (contd.)
PAKISTAN: GROSS NATIONAL PRODUCT AT CONSTANT FACTOR COST OF 1959/60,
FOR THE YEARS 1949/50 to 1963/64

Sector	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64*
(in crore of rupees)							
Agriculture	1608.9	1592.3	1675.3	1728.5	1818.3	1827.2	1935.5
Major and minor crops	1136.8	1109.2	1181.4	1224.4	1303.1	1298.7	1395.3
Other agriculture	472.1	483.1	493.4	504.1	515.2	528.5	540.2
Non-agriculture	1364.1	1425.0	1468.6	1566.1	1656.1	1765.7	1940.7
Mining and quarrying	5.9	6.4	7.0	8.2	8.8	10.0	11.0
Manufacturing	269.1	281.8	293.0	316.7	343.2	373.1	406.5
a) Large scale	(138.7)	(148.4)	(156.5)	(176.5)	(199.3)	(225.4)	(255.0)
b) Small scale	(130.4)	(133.4)	(136.5)	(140.2)	(143.9)	(147.7)	(151.5)
Construction	55.8	60.2	65.1	79.6	98.2	108.6	151.0
Electricity, gas, water and sanitary services	7.8	8.0	10.7	12.0	12.5	17.3	23.3
Transportation, storage and communications	172.3	191.0	185.7	200.8	200.4	221.9	230.9
Wholesale and retail trade	348.6	348.4	366.5	389.3	414.0	347.6	483.3
Banking and insurance	16.2	18.4	22.4	24.7	26.8	29.9	32.5
Ownership of dwellings	168.5	172.4	177.2	181.4	186.0	191.7	198.5
Services	196.7	203.9	211.2	219.8	227.9	236.5	245.3
Public administration, local	58.3	57.7	55.6	57.8	62.4	65.4	79.4
Central Government and defence	64.0	75.8	77.5	78.9	79.5	81.3	88.3
Net factor income from rest of the world	(-0.7)	(-1.9)	(-3.3)	(-3.1)	(-3.6)	(-7.6)	(-9.3)
Gross national product	2973.0	3017.3	3143.9	3294.6	3474.4	3592.9	3876.2
Population (<i>lakh</i>)	941.9	965.1	988.8	1014.5	1040.9	1067.9	1095.6
Per capita GNP (<i>Rs.</i>)	316	312	318	325	334	336	354

*Provisional

Appendix B

TABLE B-1

REGRESSION COEFFICIENT b TO THE SEMILOG TRENDS, AND CORRESPONDING
CONSTANT ANNUAL GROWTH FACTOR $(1 + r) = \text{ANTILOG } b$

Sector	East Pakistan		West Pakistan		East and West Pakistan	
	b	$(1 + r)$	b	$(1 + r)$	b	$(1 + r)$
Crops	.0148	1.035	.0203	1.048		
Other agriculture	.0119	1.028	.0084	1.020		
Manufacturing, large scale	.0749	1.188	.0440	1.107		
Manufacturing, small scale	.0111	1.026	.0111	1.026		
Mining and quarrying	—	—	.0410	1.099		
Construction	.1277	1.342	.0631	1.156		
Electricity, gas, water	.1701	1.479	.0516	1.127		
Transportation, etc.	.0251	1.059	.0236	1.055		
Trade	.0298	1.071	.0316	1.075		
Dwellings	.0107	1.025	.0140	1.033		
Services	.0127	1.030	.0179	1.042		
Public administration, local	.0528	1.129	.0305	1.073		
Central Government and net factor Income from abroad					.0042	1.009
Banking and insurance					.0406	1.098

This table contains all the regression coefficients used for our semilog trend computations (1959/60—1963/64).

Appendix C

I. TREND FORMULAS

A. Linear Trend, i.e., the trend value grows by a constant absolute amount each year.

The structural relationship between trend value and time can in this case be expressed by the linear equation:

$$Y_t^* = Y_0^* + bX_t \dots\dots\dots(1)$$

where X is time, Y^* is trend value ("expected" value) Y_0^* is a constant which also can be regarded as the trend value in year 0, the last year before our time series start, and b is the yearly increase in Y^* .

X and Y^* are variables, X the independent and Y^* the dependent variable, whereas Y_0^* and b are parameters derived from the actual time series. These two parameters are determined by minimizing the sum of squared deviations of the actual observations from the corresponding trend values:

$$Y_0^* = \bar{Y} - b\bar{X} \dots\dots\dots(2)$$

and

$$b = \frac{\sum_1^N XY - \frac{\sum_1^N X \sum_1^N Y}{N}}{\sum(X - \bar{X})^2} \dots\dots\dots(3)$$

where N is the number of observations, $\bar{Y}$ is the average of the Y values, and $\bar{X}$ the average of the X values.

B. Exponential Trend with Constant Annual Compound Growth Rate, i.e., the trend value grows by the same percentage from one year to the next throughout the period.

The functional relationship between trend value and time can in this case be expressed by the exponential equation:

$$Y_t^* = Y_0^*(1 + r)^{X_t} \dots\dots\dots(4)$$

where r is the yearly growth rate. Equation (4) can be transformed to the linear semilogarithmic equation:

$$\text{Log } Y_t^* = \text{Log } Y_0^* + X_t \cdot \text{Log } (1 + r) \dots\dots\dots(4a)$$

The term semilogarithmic trend refers to this equation, where the dependent variable is in logarithmic terms but the independent variable is still in absolute terms.

For convenience we use the symbol b for $\text{Log}(1 + r)$ and y for $\text{Log } Y$:

$$y_t^* = y_0^* + bX_t \dots\dots\dots(4b)$$

The variables are now y_t^* ($= \text{Log } Y_t^*$) and X_t , whereas y_0^* ($= \text{Log } Y_0^*$) and $b = \text{Log}(1 + r)$. The parameters are determined by applying the formulas (2) and (3) above.

The regression coefficient b is here the annual constant increase in y^* , i.e. in $\text{Log } Y^*$, whereas the growth rate of Y^* is r . As $b = \text{log}(1 + r)$, we find the growth rate r by:

$$r = \text{Antilog } b - 1. \dots\dots\dots(5)$$

Similarly the trend value Y^* is

$$Y^* = \text{Antilog } y \dots\dots\dots(6)$$

II. AGGREGATE GROWTH RATES AND ACCELERATION

In the simple case of two sectors with constant per annum growth factors a and b (the growth rates being $a - 1$ and $b - 1$), the aggregate growth factor "of year n " is:

$$g_n = \frac{aX_{n-1} + bY_{n-1}}{X_{n-1} + Y_{n-1}} \dots\dots\dots(1)$$

where X and Y are the trend values of the sectors. The acceleration "of year n ", defined as

$$g'_n = \frac{g_n - g_{n-1}}{g_{n-1}}, \text{ can be derived from (1)}$$

$$g'_n = \frac{(a - b)^2 X_{n-2} Y_{n-2}}{(X_{n-1} + Y_{n-1})^2} \dots\dots\dots(2)$$

As both a and b are supposed to be positive (and constant) and also X and Y are positive (though varying from year to year), g'_n must be positive if $a \neq b$. Only in the special case of $a = b$ we get $g'_n = 0$, and g'_n can never be negative.

If we have more than two sectors, with constant growth factors $a, b, c, d, \dots$, we get $g'_n = 0$ only when $a = b = c = d, \dots$. If one (or more) sectoral growth rate differs from that of the other sectors, the acceleration as measured by g'_n must be greater than zero.

In the two sector case, the relative increase in the acceleration itself,

defined as $g'_n = \frac{g_n - g_{n-1}}{g'_{n-1}}$, can be derived from (2) and the result can be written:

$$g''_n = \frac{(a - b)(b \cdot Y_{n-2}^2 - a \cdot X_{n-2}^2)}{(X_{n-1} + Y_{n-1})^2} \dots\dots\dots (3)$$

Since a, b, X , are positive, we get

$$g''_n > 0 \text{ if}$$

$$a > b > a \cdot \frac{(X_{n-2})^2}{(Y_{n-2})^2}$$

$$\text{Or } b > a > b \cdot \frac{(Y_{n-2})^2}{(X_{n-2})^2}$$

As $X_{n-1} = a \cdot X_{n-2}$ and $Y_{n-1} = b \cdot Y_{n-2}$ the conditions for getting $g''_n > 0$ can also be written:

$$a > b \quad \text{and} \quad Y_{n-1} \cdot Y_{n-2} > X_{n-1} \cdot X_{n-2}$$

which says that the acceleration is increasing as long as the fastest growing sector's share of the aggregate is less than one half¹.

¹ The relative increase in the acceleration, g'' as defined above, will still be positive for the year in which the fastest growing sector's share exceeds one half; it may be positive, zero or negative the next year; but it must be negative for the following years. These timelags are due only to our use of definite time periods. If we introduce infinitesimal time period, g'' will pass zero downwards at the moment the fastest growing sector's share of the aggregate passes one half upwards.