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CAPITAL FORMATION IN NATIONAL ACCOUNTING WITH PARTICULAR REFERENCE TO PAKISTAN

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THE last few decades have witnessed considerable interest in the study of capital formation. Various approaches have been adopted to discuss the problems which cover a very wide range with reference to their method and content. One could, for instance, differentiate among the purely theoretical approach of Harrod,[2] Domar[3] and Joan Robinson;[4] econometric approach of Douglas;[5] structural flows approach of Leontief[6] and statistical work of Clark,[7] Kuznets[8] and the studies prepared at the National Bureau of Economic Research.[9]

The reason for these various approaches consists in the fact that capital has many facets out of which at least the following may be clearly distinguished:

(*a*) Capacity creating effect – creation of productive capacity being the immediate effect of capital investment.

(*b*) Output creating effect – effective utilization of capacity leads to increase in output; (*a*) is only a potential whereas (*b*) is realized or actual.

(*c*) Employment creating effect – capital operates in co-operation with labour and therefore creates employment; capital intensity of a process of production determines the capital/labour ratio and thus the employment potential of a given level of investment.

(*d*) Income creating effect – the 'output' can also be looked at from the point of view of income flows.

[1] Department of Economics, University of Punjab.

[2] R. F. Harrod, *Towards a Dynamic Economics* (London: Macmillan, 1948).

[3] E. D. Domar, 'Capital Expansion, Rate of Growth and Employment', *Econometrica*, April 1946.

[4] J. Robinson, *The Accumulation of Capital* (London: Macmillan, 1956).

[5] P. H. Douglas, *Theory of Wages* (New York: Macmillan, 1934).

[6] W. Leontief and others, *Studies in the Structure of the American Economy* (New York: Oxford, 1953).

[7] C. Clark, *Conditions of Economic Progress* (London: Macmillan, 1957).

[8] S. Kuznets, *Income and Wealth of the United States. Trends and Structure* (London: Bowes & Bowes, 1952).

[9] National Bureau of Economic Research, *Capital Formation and Economic Growth* (Princeton: University Press, 1955). *Capital in Transportation, Communications and Public Utilities* (Princeton: University Press, 1957).

The basic problems which a national income accounting analyst has to face with reference to capital formation consist of the following:

(i) Coverage, i.e. what should be included in capital formation?
(ii) Valuation, i.e. what system of pricing should be followed?
(iii) Disaggregation, i.e. what system of break-down of total capital would be most useful? and
(iv) Depreciation, i.e. what method of depreciating the capital assets should be followed in order to arrive at the net capital formation figure as the gross figures have been found unsatisfactory for many purposes.

These apparently modest questions are not easy to answer particularly because the discipline of national income accounting calls for precise, consistent and unambiguous answers and definitions which have an operational significance.

(i) *Coverage*

Capital formation, being a measurement of stock, has a different time dimension from income, which is a flow. It is the well-known difference between point-in-time and period-of-time. The distinctive characteristic of a stock is its exhaustibility contrasted with the continuity of income.

Capital formation is the money value of:

(*a*) the fixed productive assets that yield continuous services, such as plant, machinery, vehicles, buildings and land,
(*b*) the assets which can be used only once such as inventories of raw materials, fuels and finished products as well as work in progress.

It is useful to make a clear distinction between capital and wealth. The latter is a very comprehensive term and includes land, mines, forests and, in fact, all natural factors. It is sometimes used to include even human resources and their qualities such as health, dexterity, technical knowledge and enterprise. Quite obviously such a concept is neither measurable nor very useful from the standpoint of national accounting. Capital for the purposes of national accounting should be defined as reproducible wealth used for further production.

This definition of capital has sometimes been criticized as too narrow. Kuznets, for instance, observes:

> 'If we view capital as all tools for increased productivity for economic growth, this definition is too narrow; it should also include all goods held by consumers and all resources (e.g. education and training), making for a more efficient labour force – a society more capable of grasping the potentialities of technical progress. If, however, we view capital as the tools of economic enterprize more narrowly defined we should have to exclude residential construction and all stocks in the hands of the government proper.
> 'For studying economic growth, the broader definition of capital is desired – one including much of what is usually measured under consumer expenditure.'[1]

These observations by Kuznets raise some fundamental issues. The question whether the term capital should be confined merely to physical assets or should be extended to cover expenditure on education, research and a host of other activities which are included under the term 'Development Expenditure' in some of the underdeveloped countries is an important one.

The root cause of this problem lies in the development in growth theory since the late 40s. The role of capital formation in economic development has remained a highly controversial issue. The balance, though heavily in favour of capital, in the early stages has now tilted against it. It is maintained that capital is not the only factor and not even a strategic factor in economic development. Hirschman[2] argues that the scarce factor in development is the ability to make decisions. Maclelland in his *Achieving Society* maintains that the development of entrepreneurship depends primarily on the psychological variable, the need for achievement.

The role of education and technological progress has also been increasingly emphasized. Historical cases, particularly of Denmark and Japan, are often cited in support of the view that compulsory universal education has been a prime mover of economic growth. Taking aggregate non-farm production of the

[1] Kuznets, *Capital Formation and Economic Growth* (Princeton: University Press, 1955).
[2] A. O. Hirshman, *The Strategy of Economic Development* (New Haven: Yale University Press, 1958).

U.S.A. between 1900 and 1960, Prof. Solow[1] has estimated that only 10 per cent of the growth could be attributed to capital, leaving the remaining 90 per cent due to residual factors falling under the general heading of technological progress. Dr. Massel[2] has published an independent estimate for United States manufacturing industry and has arrived at a similar conclusion. Studies made by Prof. Aukrust[3] and Prof. Reddaway[4] also support the abovementioned conclusions. A recent statistical study made by the Secretariat of the U.N. Economic Commission for Europe arrived at the conclusion that in the postwar growth of western European countries, 'inputs of labour and capital account for only a part – and often a relatively small part – of growth, and that more intangible factors, whether they are labelled "technique" or "organization" of the "human factor" play a very important role'.[5]

The only general conclusion which one could draw from these controversies is the most obvious and commonplace statement that economic growth is a very complex process and depends on a set of interrelated factors. Any explanation that reduces growth to a function of this or that variable has its origin in the failure to distinguish between necessary and sufficient conditions of economic growth.

It is the contention of the present paper that the traditional definition of capital as given in the U.N. Standard Tables should be accepted for the following reasons:

(*a*) By equating capital to 'physical capital' only, national accounting techniques do not support or rebut any development theory; these are mere statements of facts.

(*b*) Break-down of development expenditure into physical capital formation and other development expenditure would not present much difficulty, as most of the 'other development expenditure' would be in the public sector.

(*c*) A wider definition of capital creates more anomalies than

[1] R. Solow, 'Technical Change and the Aggregate Production Function', *Review of Economics and Statistics*, August 1957.

[2] B. Massel, 'Capital Formation and Technological Change in United States Manufacturing', *Review of Economics and Statistics*, May 1960.

[3] O. Aukrust, *European Productivity Review*, February 1959.

[4] W. B. Reddaway and A. D. Smith, 'Progress in British Manufacturing Industries in the Period 1948–1954', *Economic Journal*, March 1960.

[5] United Nations, Economic Commission for Europe, 'A Study of Developments of Growth in Europe during the Nineteen-Fifties' (mimeographed), ECON. ADVISERS/CONF/13 dt. March 2, 1961.

it solves, e.g. residential housing or even certain types of education may be cases in point.

(*d*) If the effect on production of certain types of expenditures is accepted as the guiding principle, even the distinction between 'consumption' and 'capital formation' may appear untenable as in the context of the prevailing extremely low level of consumption, increased consumption may lead to increases in production.

(ii) *Valuation*

One of the methods of arriving at estimates of capital is that of capitalizing assets at the prevailing rate of interest. This is of course the least satisfactory method and therefore not of much interest to us. We are interested in preparing an inventory of capital once we have resolved the problem as to how wide or narrow a concept of capital we are going to use. This raises the problem of valuation. The well-known methods are:

(*a*) *Market value* determined by the price the asset is expected to fetch if sold. This may be measured in terms of stock exchange quotations for shares and bonds.

(*b*) *Replacement value* determined by the cost of the asset if replaced.

(*c*) *Book value* determined by the purchase price of the asset and depreciation. This is also termed 'depreciated value', 'conventional value' or 'legal value'. Here the value of the asset is taken as given in the company balance sheet. This is the most widely used approach.

A new approach to this problem was adopted by Tibor Barna in his *Measurement of Growth of Industrial Capital*. He asked the firms to give a realistic value of their fixed assets which the firms considered as important for policy decisions or for assessing performance. The value which was given was one most commonly used for the purpose of fire insurance and was generally based on replacement cost.

Production v. Expenditure Approach

For a considerable time the measurement of capital was made by resorting to production-supply method. This method took into account construction and equipment from the figures relating to production, imports and exports. The statistics on

capital formation are now generally derived from capital expenditure data, i.e. data relating to capital expenditure by the principal users of fixed assets and the accountancy valuation of changes in stocks. The sources of these data come from the census of manufacturing, published accounts and other records of capital expenditure.

The expenditure data are consistent in the sense that they are given in conjunction with other data which give them a precise definition. They also permit a break-down of capital formation according to principal users of capital which the production data cannot.

The main drawback of the accounting data, however, is that they do not provide more than a summary break-down of the types of assets. Not only that, there is a wide margin within which the items are charged to operating account or capital account. Some firms do not include those items which do not last for several years or those which are not costly or even when costly are used for a particular purpose and for a short duration.

Furthermore, there is the problem of a clear-cut distinction between 'fixed assets' and 'stocks'. This is particularly true of those fields of operation such as shipbuilding or construction where the period of production is long 'work in progress' may cause a certain amount of double counting in such cases.

(iii) *Disaggregation of Capital*

The U.N. Report, *A System of National Accounts and Supporting Tables*, has suggested the disaggregation of capital in the following forms:

(*a*) by type of capital goods;
(*b*) by industrial use,
(*c*) by type of purchaser.

By type of capital goods

This is merely a detailed break-down of the two main categories, i.e. construction and equipment. Construction is sub-divided into dwellings, non-residential and other construction, and machinery and equipment into transport equipment and machinery and other equipment.

By industrial use

When capital is disaggregated according to its distribution over different sectors and industries, it throws light on some

important aspects of the economy and may be helpful in solving some of the complex problems of economic policy. But to infer that *ex post facto* figures of some successful experiments of economic development would provide some insight into priorities, is perhaps expecting too much.

By type of purchaser

The dichotomy of private and public investment or the further breakdown in terms of:

(*a*) private enterprises,
(*b*) public corporations,
(*c*) Government enterprises, and
(*d*) general government

is in fact less helpful than the break-down with reference to the type of investment. The information as to which agency has undertaken investment is much less useful than the industrial use of investment. For instance, substantial private investments are made in housing. In many countries the bulk of investments by local authorities are again in housing projects. Similarly in countries where public investments are the main plank in Government's industrial policy, the real picture will be blurred by an institutional classification.

The relative scope of public versus private enterprises is largely determined by political, historical, institutional and even accidental factors. Depending on the situation one may argue that rapid growth would result if a smaller share was given to public investment because of its inefficiency or if less was left to the private sector because of its reticence or lack of entrepreneurial spirit. In the underdeveloped countries, however, the distinction between public and private investment may have much significance from the point of view of the development policy.

It is, therefore, suggested that the most useful method would be that of recording the composition of capital by industrial use with break-down for public and private sector.

A reference may here be made to the distinction which is often made between 'induced' and 'autonomous' investment. This distinction has played a leading part in current business cycle theory.[1] By 'induced investment' is meant the investment

[1] J. R. Hicks, *A Contribution to the Theory of Trade Cycle* (Oxford: University Press, 1950).

directly related to changes in demand or income. 'Autonomous investment' on the contrary is related to the long-term growth of the economy. This distinction is, however, not of much significance from the national accounting point of view as it depends on the motive or the purpose of investment on which the available figures would not throw much light.

CAPITAL FORMATION IN PAKISTAN

Estimates of capital formation in Pakistan are still in an embryonic stage. This is true both of overall capital formation and capital formation in particular sectors or industries.

The outstanding effort in this respect is the Census of Manufacturing Industries (C.M.I.) which is the main source of data on capital formation in the industrial sector and in particular industries. The data on capital formation are collected in the following form:

Fixed Assets

(*a*) Book value of land at establishment location:	Includes all land owned by the establishment. Plantation or tea garden connected with the establishment excluded.
(*b*) Book value of buildings:	Includes all buildings directly or indirectly connected with the manufacturing processes. Warehouses, storage sheds, canteens, etc., included.
(*c*) Book value of machinery and other equipment:	Includes all machinery, tools and other mechanical equipment used in the manufacturing operation; transportation equipment for the movement of materials or products within the plant are also included.
(*d*) Book value of other fixed assets (e.g. furniture and fixtures, durable spare-parts, trade marks, etc.).	Includes all other fixed assets, such as trucks, buses, furniture, office equipment, etc.

Inventories

Inventories valued at cost or market price whichever is lower:

1. Stocks of raw materials to be used in manufacturing.
2. Stocks of fuels.
3. Stocks of spare parts.
4. Stocks of finished products.
5. Stocks of semi-finished goods (work in process).

Much of this very useful data has not been used for economic analysis which alone would point out the deficiencies and the lacunae in the data. Two obvious limitations of C.M.I. consist of its limited coverage and the non-reporting units. The census covers only industrial establishments employing twenty or more workers and using power; a fairly large percentage of even these units remains unreported. Only very recently efforts have been made to use C.M.I. data for making an input-output table for the industrial sector. A study by John Fei has already appeared in the *Pakistan Development Review*; another by Mr. Norby is in its final stages.

Information on capital structure from balance sheets is also available for some public corporations set up by the Government, such as the Pakistan Industrial Development Corporation (now bifurcated in West Pakistan Development Corporation and East Pakistan Development Corporation) and Pakistan International Airlines Corporation. Similar information on railways in the two wings of the country is available.

Finally mention may be made of two other efforts with which the author of this paper was associated and which aimed *inter-alia* at collection of data on capital structure. The Textile Enquiry Commission, appointed by the Government of Pakistan in 1959, made a study of the capital structure of the textile industry in Pakistan by undertaking a complete costing of nine textile units and using balance sheets for the rest of the mills. This very useful data has not, however, been released by the Government. Similarly Harvard University undertook a survey of about 250 units in Pakistan. This study covered units in both the provinces, of all types and all sizes. A preliminary report on this study has already appeared.[1] The rapid growth of industrial assets in Pakistan can be gauged from the following table:

[1] G. F. Papanek, 'The Development of Entrepreneurship', *The American Economic Review*, May 1962.

TABLE I

Growth in Industrial Assets[1]

Year	Rs. million	Index
1947	580	17
1949	820	23
1951	1,280	36
1953	2,030	57
1955	3,510	100
1957	4,360	124
1959	5,020	143

As far as the collection of information on capital structure of public limited companies is concerned, the Registrar of Joint Stock Companies could be a good and centralized source of data but unfortunately the statutory obligation of furnishing the balance sheet is not honoured and the information lying with this office is discontinuous and incomplete.

The only estimates so far available on overall capital formation in Pakistan have been prepared by the Planning Commission. These are given below:

TABLE II

Gross Capital Formation in Pakistan (Rs. million)

	1951–2	52–53	53–54	54–55	55–56	56–57	57–58	58–59
1. Public development expenditures	40	58	57	74	78	97	130	150
2. Private investment	57	74	35	61	66	67	71	67
Gross investment	97	132	92	135	144	164	201	217
Total gross national product					1,820	2,260	2,220	2,450
Gross investment as a percentage of G.N.P.					8	7	9	9

In its estimation of gross capital formation, the Planning Commission has included all development expenditures in the public sector. These development expenditures include all expenditures which are designed to (i) keep intact, enlarge and improve the physical resources of the country; (ii) improve the

[1] Ibid., p. 51.

knowledge, skill and productivity of the people; and (iii) encourage the efficiency with which available resources are used. The estimates of investment in the private sector are based on the figures of production, imports and exports of capital goods. The figures have been adjusted for import duties, sales tax, transportation and costs of installation, wherever appropriate.

Investment under the Second Five-Year Plan

The total envisaged investment under the Second Five-Year Plan, 1960–5 (S.F.Y.P.) comes to Rs.23,000 million, Rs.14,620 million in the public sector and Rs.8,380 million in the private sector. The investment undertaken in the First Five-Year Plan (F.F.Y.P.) was Rs.11,150 million: Rs.7,180 million in the public sector and Rs.4,000 million in the private sector. The sectoral break-down of the investment to be made in S.F.Y.P. is given below:

TABLE III

Investment Under Second Five-Year Plan

	Government	Private	Total	Percentage
Agriculture and village aid	2,415	905	3,320	14·4
Water and power	4,140	250	4,390	19·1
Industry	1,460	3,660	5,120	22·3
Fuel and minerals	450	550	1,000	4·3
Transport and communication	2,725	1,085	4,000	17·6
Housing and settlement	1,985	1,525	3,510	15·3
Social services	1,445	165	1,610	7·0
Total in million rupees	14,620	8,380	23,000	100·0

During the period 1950–5 gross investment amounted to 8·3 per cent of G.N.P. Under the F.F.Y.P. the investment rate was pushed to 9·5 per cent of G.N.P. The S.F.Y.P. proposes gross investments of Rs.23,000 million which would amount to about 12 per cent of G.N.P. It is worth noting that the increase in the total gross investment from 8·3 per cent of G.N.P. in 1950 to about 12 per cent of G.N.P. has been achieved without much change in the average rate of gross domestic saving. Foreign aid and loans have played a strategic role raising the coefficient of investment from 8·3 to 12 per cent of G.N.P.

No direct estimates of savings are available for Pakistan. The

figures for gross domestic savings are arrived at as residuals by taking actual investment and deducting the part financed by foreign aid, loans and private investment and use of foreign exchange reserves. On this basis during the F.F.Y.P. gross domestic investment fluctuated on a yearly basis within the range of 4·5 to 7·9 per cent of G.N.P. and averaged during the plan period around 6 per cent. It would be interesting to compare this with the rate of gross domestic savings prevailing during the pre-plan period. Gross investment during the period 1961–5 is estimated at Rs.5,960 million: aid, loans and foreign investments accounted for Rs.418 million during the same period. With the G.N.P. at Rs.71,803 million this gives a rate of gross domestic savings of 7·7 per cent. It has been estimated that during 1960–1, the first year of the Second Plan Period, the gross domestic savings stood in the neighbourhood of 7 per cent. During the S.F.Y.P. the saving rate is expected to rise steadily from 7 to 8·5 per cent.

We can look at the picture from another angle. Out of the total investment of Rs.10,780 million under the F.F.Y.P. the domestic resources amounted to Rs. 7,228 million or about 67 per cent. In the S.F.Y.P. out of the total investment of Rs.28,730 million only Rs.15,835 million will be financed from domestic resources, i.e. the ratio of domestic resources to foreign resources will be 55 per cent as against the 67 per cent under the F.F.Y.P. In fact, in view of the increased cost of the Indus Basin replacement work to be financed by foreign resources, domestic resources may contribute only 45 per cent of the total gross capital formation.