

THE SIZE AND GROWTH OF GOVERNMENT EXPENDITURES;
A TIME-SERIES AND CROSS-SECTION ANALYSIS.

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by

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ABSTRACT.

The purpose of this study is to provide some understanding of the actual behaviour of government expenditures. Firstly, on the basis of a cross-section analysis, an attempt is made not only to further test the income hypothesis, suggested by the recent cross-section studies, that government expenditure as a share of national output and real per capita income are correlated, but also to examine whether the rate of change of this share is constant over all the different ranges of income or whether it is an increasing and/or diminishing function of income. The analysis suggests the income hypothesis that government expenditure as a share of G.N.P. increases at a diminishing rate with the increasing level of economic development. It is also evident from this analysis that geographical location could also be an important factor influencing the level of public expenditure.

Secondly, on the basis of a time-series analysis, which is primarily concerned with studying the time pattern of expenditure growth, the Peacock-Wiseman "displacement effect" hypothesis is tested for a number of countries, not only with regard to the World Wars but also with regard to the Great Depression. An attempt is made to make some quantitative

(ii)

measurement and test of significance of the "displacement effect". Furthermore, it is examined whether an upheaval is associated with a change in the rate of growth of government expenditure with relation to economic growth. The analysis suggests a significant shift in the level of government expenditure with relation to economic growth (or the "displacement effect") associated with the World Wars in the case of each country included, except Sweden which did not directly participate in the War. A significant shift is also observed to be associated with the Great Depression in the United States and Canada which were most affected by that upheaval. Furthermore, a significant change in the rate of growth of government expenditure with relation to economic growth is observed to be associated with a major upheaval. No generalisation, however, can be made about the direction of such change.

Finally, some plausible explanations of the two sets of statistical observations and hypotheses are provided; the questions concerning the compatibility of the statistical findings and techniques used in the two different approaches are discussed; and the possibilities of further research concerning the actual behaviour of public expenditure are explored.

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CHAPTER IINTRODUCTION

The primary aims of this study are: first, to determine the relationship, if any, between public expenditure and the level of economic development on the basis of a cross-section sample of countries chosen at different stages of economic development; second, to study the time pattern of public expenditure in relation to economic growth, on the basis of a time-series approach, for a number of countries. An attempt is also made to provide plausible explanations for the statistical observations and hypotheses suggested by both approaches. It is hoped that such a study may provide a greater understanding of the actual behaviour of government expenditure.

Research in the field of public expenditure has been comparatively neglected. For example, with regard to consumers' behaviour, many hypotheses have been developed and rigorously tested against empirical data. But there are very few hypotheses which have been put forth and tested concerning the actual behaviour of government expenditure. Although there has been tremendous growth of public expenditure in many countries in recent years, the interest of economists or specialists in public finance was confined, from after the Great Depression until recently, almost exclusively to the analysis of the probable short-run effect of taxes, public debt and public expenditures upon levels of employment, incomes and prices, with an almost complete disregard

for the analysis of the determinants of the size and structure of public expenditure. Interest in the main was centred on the analysis of the economic effects of budgetary policies, principally because of the problems brought to notice by the Great Depression and the stimulus provided by the General Theory of Keynes. Lack of interest in analysing the actual behaviour of government expenditure was probably due to the innate difficulties, conceptual and statistical, in explaining the highly complex behaviour of government expenditure. Nevertheless, some analysis and explanation of the behaviour of government expenditure, which in some countries comprises more than one third of the national output, is of great importance, "if", as is pointed out by Peacock and Wiseman, "progress in other fields is not to be nullified by our inadequacy in this one."¹

Whatever the research carried out in the field of public expenditure, it has been directed largely toward the development of normative theories. Such normative theories of public expenditure, based on old or new welfare economics (the difference between old and new welfare economics being less than is frequently

1 Alan T. Peacock and Jack Wiseman, The Growth of Public Expenditure in the United Kingdom, N.B.E.R., Princeton University Press, Princeton, 1961, page 12.

supposed¹), seek to provide the rule of maximisation of social welfare and/or the preservation of the 'ideal' conditions of individual choice. Such welfare theories attempt to provide criteria which should determine the revenue and expenditure policies of a government rather than explain how the revenue and expenditure policies are in fact determined.

Some of these theories, more or less similar, are based on old welfare economics and have as their basis "The Ability-to-pay Theory" and the corollary "The Sacrifice Theories". They attempt to provide the rule of "maximisation of welfare". The State is considered by theorists as an organic entity whose revenue and expenditure policies are then prescribed by marginal criteria, similar to those usually applied for individual consumer's equilibrium on the basis of maximisation of utility. Leaving aside the fundamental weaknesses of such theories (due to the assumption of cardinal measurement and inter-personal comparison of utility and the political philosophy behind their organismic theory of state, with which one may not agree), what is more important from our point of view is that the ability

1 See E. J. Mishan, "A Survey of Welfare Economics", 1939-59, Economic Journal, June 1960, for the different criteria or tests developed by different welfare theorists (Kaldor-Hicks, Scitovsky, Samuelson, Little) to solve the income distribution problem and how such criteria involve logical flaws. Dr. Mishan has pointed out in his survey article, "without some expressed partiality for one distribution of welfare over all others there is no case in welfare economics for prescribing a movement from a non-optimal position to any optimal position". Thus one can hardly avoid inter-personal comparison of utility. Also see Dr. Mishan's article "A Re-appraisal of the Principles of Resource Allocation", Economica,

of such welfare theories to explain the actual behaviour of government expenditure is insignificant, because there is no reason to believe that the men who run the government will follow the rule of "maximisation of social welfare", even assuming that an unambiguous and logical definition of it is possible.

Then there are the so-called ethically neutral theories of public expenditure, based on new welfare economics. These are as follows: an extended version of the traditional benefit theory, i.e. the Voluntary-exchange Theory of Lindahl and others; a modified version of the same approach in general equilibrium terms by Samuelson; and through incorporating voting mechanism into the 'polar' case model by Musgrave, keeping in mind the Wicksellian point that otherwise the individual will contribute nothing towards the satisfaction of public wants.¹ We do not intend to describe these theories or discuss their internal weaknesses (e.g. because of the difficulties encountered in making consumers reveal their preferences, choosing the single best optimum; and because of the problem of merit wants, and the

1 See R. A. Musgrave and Alan T. Peacock, eds. Classics in the Theory of Public Finance, London, International Economic Association, Macmillan & Co. Ltd., 1958, Introduction, R. A. Musgrave, The Theory of Public Finance, McGraw-Hill Company, Inc., 1959, Chapter 4 and 6; P. A. Samuelson, "The Pure Theory of Public Expenditure", Review of Economics and Statistics, Vol. XXXVI, No. 4, November 1954; "A Digramatic Exposition of the Theory of Public Expenditure", same Review, Vol. XXXVII, No. 4, November, 1955; "Aspects of Public Expenditure Theories", same Review, Vol. XL, No. 4, November 1958; Julius Margolis, "A Comment on the Pure Theory of Public Expenditure", same Review, Vol. XXXVII, No. 4, November 1955; G. Colm, "Comments on Samuelson's Theory of Public Expenditure", same Review, Vol. XXVIII, No. 4, November 1956; James M. Buchanan, "Fiscal Institutions and Efficiency in Collective Outlay", American Economic Review, May 1964.

well known weaknesses of the welfare economics on which they stand, such as the second best arguments, logical flaws involved in different compensation tests developed by different economists to solve the income distribution problem, etc. which severely limit the applicability of welfare economics to policy problems). But what is more important from our point of view is that such an approach, by making individual choices the sole criterion for a theory of budget determination, involves highly unrealistic assumptions about the behaviour of a government. The men who run a government, while formulating its budgetary policies, do not formulate solely with reference to the criterion of the preservation of the individual choice prescribed by such a theory. Thus, due to the considerable gulf between the aims of policy makers and those prescribed by such welfare theorists, the ability of such theories to provide an explanation for the actual behaviour of government expenditure seems insignificant.

Recently, Buchanan and Tullock in their book "The Calculus of Consent" have made another attempt to construct a normative "theory of collective choice"¹ analogous to the theory of markets. It is assumed that individual citizens seek to maximise utilities or to minimise the interdependence costs, i.e., external costs plus decision making costs, when they participate in the collective

1 J.M. Buchanan and G. Tullock, The Calculus of Consent, Logical Foundations of Constitutional Democracy, Ann Arbor: The University of Michigan Press, 1962.

choice, as they do in the market. On the basis of such an assumption they demonstrate the calculus through which "ideal" constitutional decisions, i.e. those which will maximise efficiency or utility for all individuals, can be made. As regards the constitutional decisions, they are mainly concerned with two types of decision, viz., whether an activity should be left within the public sector, and, if so, what voting rules should be decided upon for that activity. From the calculus of a single individual, it is concluded that in principle it should be possible to achieve "ideal" constitutional decisions by unanimous consent, because of the assumption of "equal uncertainty" for every individual. Thus the level and structure of public expenditure generated by such a constitution can also be considered "ideal".

Their model also suffers from several logical weaknesses which reduce its applicability in a policy context. For example, leaving aside the second best arguments, the "equal uncertainty" assumption does not necessarily mean that the subjective evaluation of the expected costs if the activity is left to the private sector, the expected decision making costs and the external costs of collective activity, and the rate of discount for conversion of the expected costs into their present values, would be the same for every individual. Such costs even under the assumption of "equal uncertainty" for every individual may be

different for different individuals because of the differences in political ideologies, differences in attitudes to risk, and also because of the varying degrees of information, because of which different individuals would decide for different rules. Thus, "efficiency", the criterion for which is assumed to be unanimous consent is not possible even at the constitutional level of decisions. Buchanan and Tullock in their attempt to save their model from the criticisms levelled against the compensation tests, or, in other words, to make it ethically neutral, accepted too readily that unanimous consent should always be possible at the level of constitutional decisions.

And, once the assumption of "equal uncertainty" for every individual is discarded, their model for constitutional decision making falls into pieces. Of course every individual is uncertain about his precise role in any one of the whole chain of collective choices that will actually have to be made in future, but the degree of uncertainty is likely to be different for different individuals. For example a very poor man with average intelligence assumes that the probability of his becoming a millionaire is very low. And for a millionaire the probability of his becoming a poor man is likely to be very low. For a physician, the probability of becoming a street-cleaner is very low and vice versa. Therefore, the preferences for separate

issues, while choosing a decision making rule, are not randomly distributed as thought by Buchanan and Tullock. An individual can predict with some degree of certainty whether he is likely to be in a winning or losing coalition on any specific issue. Therefore the assumption of "equal uncertainty" does not seem to be a realistic one and once this assumption is discarded it seems rather impossible that unanimous consent could ever be reached.

Their so often mentioned analogy with the economic exchange in the market is not a correct one. In a market, nobody is coerced to enter a bargain, and all parties involved in a bargain benefit. But in a political-choice process, coercion is a part of that process. Some participants or citizens might expect a net loss from some constitutional rules, but although they disagree may not be able to stop the enactment of such rules. They may still have to accept the membership of that state because the cost of moving to some other state may be more than the losses from those constitutional rules, and also because of the family ties, difficulties of obtaining citizenship in other state, etc. Therefore, the constitutional-choice process cannot be rightly compared with the market-choice process. Similar sorts of arguments can be put forth to falsify their game analogy.

What is crucial from our point of view is that their model does not depict any real existing constitution. No constitution is framed by unanimous consent. The amendment of a constitution

is similarly never done by such consent. The existing set of constitutional rules in any country also does not usually reflect the consensus of opinion. It is highly unrealistic to assume that every citizen agrees with the constitutional rules which were framed several decades or centuries before his birth, and, therefore, without reference to his consent. Thus, because of the unrealistic nature of the model, their theory of collective choice cannot provide any explanation of the actual behaviour of public expenditure.

It may also be pointed out that the foregoing normative theories of public expenditure are concerned only with the static level of analysis. Welfare economics, upon which these theories are based, has been developed mostly in relation to static analysis and hardly any formal dynamic welfare analysis exists. Therefore, in a dynamic setting, that is, in conditions of continuing changes in industrial and socio-political structure, people's fiscal attitudes, etc., in a growing economy, the inadequacies of such static theories and their welfare 'calculus' to provide an explanation of the actual behaviour of public expenditures become even more apparent.

In contrast to the above mentioned normative theories, recently Anthony Downs has attempted to construct a theory of democratic government decision-making, on the basis of some behaviouristic assumptions about government. It is assumed

on the basis of the self-interest axiom that every government tries to maximise its length of life, because by doing so its members can further their private ends, which are the income, power, or prestige which come from holding office. From this Downs derives his hypothesis that a democratic government tries to maximise votes. And a voter, for whom the objective is assumed to be the maximisation of utility from government's policies, votes for the party in power if the policies pursued by the government correspond more nearly to his preferences than the policies assumed to be pursued by the opposition party. Because of the mutual interdependence of the self interest of the voters and the men who run the government, it is said that the government policies would usually correspond to the preferences of the voters.

The assumption that a government tries to maximise its length of life could be considered a reasonable one if the self-interest axiom be accepted. However, the vote-maximisation hypothesis and the corollary hypothesis that the government policies, including expenditure policies, would usually correspond to the preferences of the majority of voters cannot always be accepted due to several difficulties. Some of these difficulties are recognised by Anthony Downs himself, when he discusses both the possibility of a "coalition-of-minorities" strategy by the opposition party by uniting the "passionate" minorities on some issues and when the government encounters the "Arrow Problem"

for some issues, which leads to the paradoxes of cyclical majority.¹ Besides, in an uncertain world with imperfect knowledge and where information involves costs, there are other factors which cause deviations from the majority principle. Many voters are not well informed about the facts necessary for their voting decisions, and could be influenced by persuasion. A government, therefore, would give more favour to the voters who provide money or services to influence the voters' opinion. The preferences of the interest groups also receive greater weight because they may mould public opinion through persuasion. Thus deviations from the majority principle could take place because the politicians attach different weights to the different voters' preferences.

Furthermore, Downs discusses the nature and consequences of political rationality under a supersimplified model of democracy. In his model of direct democracy, a party (or coalition of parties if there are more than two parties) must be elected by the support of a majority of those voting in the election. Such a model of democracy is highly unrealistic. No governmental system in any "democracy" resembles such a supersimplified model of democracy.

¹ Anthony Downs, An Economic Theory of Democracy, Harper and Brothers, New York 1957 (Chapter IV, for the difficulties mentioned above). Also his articles, "An Economic Theory of Political Action in a Democracy", Journal of Political Economy, LXV 1957 and "Why the Government Budget is Too Small in a Democracy", World Politics, July 1960.

In a representative democracy which is the usual form of democracy, it can be shown that as the number of voters and the number of constituencies increase, as limit, a party can win with the support of $\frac{1}{4}$ of all the voters. It is, of course, necessary that such a group of $\frac{1}{4}$ of the voters must be fairly evenly distributed among a simple majority of the constituencies and must be absent in other constituencies. This fact makes it difficult for a party to win elections with a support of just about $\frac{1}{4}$ of the voters. However, the fact that a party in a two-party system under a representative democracy, could win even with the votes of about $\frac{1}{4}$ of the voters makes it clear that once a government is assured of the votes of such a group of voters, it is not necessary for the government to maximise votes. Thus, failure to maximise votes may be compatible with the achievement of its objective, i.e. to continue in power.

Furthermore, a voter while casting his vote for a party votes for a bundle of policies supposed to be pursued in future if that party comes into power. He is interested in the total effect of government policies as a whole. The expenditure policies are only a fraction of the total policies pursued by a government. The deviation of the expenditure policies from his preferences could be tolerated to a great extent if he can be compensated by favourable policies in other spheres.

Therefore, although his assumption that a government tries to maximise its length of life could be considered a reasonable

one, his vote-maximisation hypothesis and the correlary hypothesis that a government's policies would correspond to the preferences of the majority of voters are dubious. It is only for those expenditure policies where we find some reason to believe that citizens or voters are likely to have strong preferences so that major deviations of expenditure policies cannot be easily compensated by other compensatory policies, and where the problems mentioned above either do not exist or their existence does not create significant deviations from majority preferences, that voters' preferences may provide some explanation for expenditure policies.

Recently, however, because of the considerable broadening of the impact of the public sector upon the economy, and the growing interest in the problems of economic growth which has conferred considerable significance on this impact, some interest has been directed towards studying the behaviour of government expenditure on the basis of empirical data and historical facts, with a view to discovering if there are generalizations which could be made about the behaviour of public expenditure, or whether public expenditures are solely a function of the specific political and social policies pursued in any country.

Such a study is of great importance for a study of the economic growth process itself. In the economic growth models developed so far by the growth theorists, government expenditure

is either ignored completely or some assumptions about the relationship between public expenditure and other variables are made which have little relevance to the actual behaviour of governments, because of which such models are not suitable for the purposes of economic policies. Such a model, to be of any use for policy purposes, should incorporate some explanation of the behaviour of public expenditure in the general explanation of the process of economic growth. Hence, recently, interest has been directed towards empirical investigations concerning the behaviour of government expenditure with relation to the level of economic development and the time pattern of growth of government expenditure with relation to economic growth; and certain inductive hypotheses have been deduced from such empirical observations. We are specifically interested in those hypotheses because our study is also concerned with the empirical observation of the behaviour of public expenditure in different countries and at different times, which we consider a fruitful approach is understanding the actual behaviour of public expenditure.

In chapter II, therefore, we conduct a review of the recent empirical studies and the inductive hypotheses suggested by these studies. Recently, several economists, on the basis of a cross-section approach, have attempted to examine the relationship

between government expenditure as a share of national output and the degree of economic development. Their statistical findings suggest an income hypothesis, namely that there is a positive correlation between the two. A summary of the statistical findings of the recent cross-section studies and our criticisms, general and specific of each study, are given in that chapter. Certain inductive hypotheses are also deduced from the historical time-series approach. After a very brief review of Wagner's 'Law' of increasing state activity, which is concerned exclusively with the secular growth of public expenditure with relation to national output, we comment on the Peacock and Wisemans' "displacement effect" hypothesis, which is concerned with the time pattern of expenditure growth. We also discuss the limitations and significance of the concept of the "tolerable burden" of taxation offered as an explanatory tool in justification of the "displacement effect" hypothesis.

In chapter III, on the basis of a cross-section approach, an attempt is made not only to further test the income hypothesis, suggested by the recent cross-section studies, that government expenditure as a share of national output and real per capita income are correlated, but also to examine whether the rate of change of such share is constant over all the different ranges

of income or whether it is an increasing and/or diminishing function of income, (the important problem which was overlooked by the earlier studies) with the help of a double logarithmic polynomial regression function. In addition to the description of the statistical procedure and measures adopted, it provides also a discussion of some of the related conceptual and statistical problems, the reasons for the choice of particular measures and also their limitations. The statistical procedure and measures adopted in our cross-section study attempt to avoid as far as possible the limitations of the earlier studies. The tables and the sources of data used in the cross-section study, and also the major divergences, if any, from the concepts adopted for this study are given in Appendix A.

In chapter IV, we pursue our analysis on the basis of a time-series approach, in which we are primarily concerned in studying the time pattern of expenditure growth with relation to economic growth. Peacock's and Wiseman's "displacement effect" hypothesis is tested for a number of countries, not only with regard to World Wars but also with regard to the Great Depression, which may also be considered to be a major social upheaval in the case of some countries. An attempt is made to form some quantitative measurement and test of significance of the "displacement effect". We furthermore consider whether this "effect" is associated with a change in the rate of growth of government expenditure in relation to economic growth. The statistical procedure, measures and techniques used in the

case of time-series studies, the related conceptual and statistical problems, and the limitations of our findings are also discussed in that chapter. The tables and sources of data used in the time-series analyses are given in Appendix B.

In the last chapter, an attempt is made to provide some plausible explanations for the two sets of statistical observations and hypotheses from two independent approaches. Although wherever possible some justification on empirical grounds has been provided, the explanations offered are, by and large, speculative. We discuss also plausible reasons for the differences in statistical findings for different countries included in the time-series approach, the inter-relationship between the different explanations offered for our findings, and the comparability of the statistical findings of, and technique employed by one approach with those of the other. Finally, some comments upon the possibilities of further research concerning the actual behaviour of public expenditure are given, in view of the limitations and usefulness of our approach.

CHAPTER TWORECENT EMPIRICAL STUDIES AND THE INDUCTIVE HYPOTHESES

Certain inductive hypotheses concerning the behaviour of public expenditure have been inferred from empirical observations. They are of special interest to us because our study is also concerned with the empirical observations of public expenditure. In section I of this chapter we make a review of the recent empirical studies, based on a cross-section approach, which suggest an income hypothesis, i.e. the relationship between government expenditure as a share of national output and the degree of economic development. In section II, we review the inductive hypotheses deduced from a historical time-series approach. Wagner's "Law", which has been well reviewed in the recent literature is considered first very briefly. The major part of this section is devoted to reviewing Peacock's and Wiseman's displacement effect hypothesis, deduced from their statistical observations of the time-pattern of the growth of British public expenditure; and their explanatory hypothesis based basically on the concept of 'tolerable burden' of taxation.

I. Cross-section studies and the hypothesis concerning the relationship between government expenditure as a share of national output and the degree of Economic Development.

Recently several cross-section studies undertaken by Martin and Lewis, Oshima, and Williamson and Mesmer, have tried to examine the relationship between the levels of public expenditure, (or public revenue only in the study by Oshima) and levels of economic

development.¹ Their statistical findings suggest the hypothesis that there is a positive correlation between government expenditure as a share of national output and the degree of economic development.

Our criticisms of the above mentioned studies are confined mainly to the statistical procedure and technique adopted by these studies. The criticisms specific to each study are offered below. The general comment, however, is that the important problem which has been overlooked in these cross-section analyses involves the determination of the rate of change of government expenditure as a share of national output with relation to that of economic growth (or real per capita income). That is, no attempt has been made to determine, if there is a correlation, whether the rate of change of government expenditure as a share of some national income aggregate with relation to that of economic growth is a constant or decreasing or increasing function of income over all the different ranges of income or whether it is an increasing function for some ranges but a decreasing function for other ranges of income.

The main criticisms of the article by Martin and Lewis are the following. First, the sample of countries chosen by them is small. The total number of countries selected by them is 16. Besides, one might think, as pointed out by Williamson in his study, that the results obtained from their sample are heavily biased towards

1 A. M. Martin and W. A. Lewis, "Patterns of Public Revenue and Expenditure", The Manchester School of Economic and Social Studies, Sept. 1956; H. T. Oshima "Share of Government in Gross National Product in various countries", American Economic Review, June 1957; Jeffery G. Williamson, "Public Expenditure and Revenue: An International Comparison", The Manchester School of Economic and Social Studies, January 1961; T. D. Mesmer, Government Expenditure and Economic Growth - An International Comparative Study, an unpublished Ph.D. thesis, Wisconsin University, 1961.

welfare nations.

Second, the time-period chosen for their cross-section study was one year, i.e. 1953 or 1954 (except in the case of Columbia, for which the figures are for 1947, because of the non-availability of data.) Although a cross-section analysis refers to a point of time, the main criterion for the choice of time, is that the 'time' chosen should be 'normal'. One particular year cannot be considered sufficiently normal for all the countries to be a good basis of comparison. An average of several years, apparently not abnormal years, is a better choice; so that abnormality, if any, in any particular year may be lessened. Again the choice of 1953, which was a boom year for most countries, is likely to show government expenditure as a percentage of G.N.P. lower for most countries and the share may be relatively lower for those countries which are more vulnerable to business cycles and also are better equipped to use anticyclical monetary and fiscal policies.

Third, in their study, no rigorous statistical technique is used to study the relationship. For example a "rough relationship between public expenditure and G.N.P. per head"¹ is assumed to exist by just showing how the mean current expenditure as a percentage of G.N.P. is different for four different groups of countries. No test of the significance of the difference between such means for different groups of countries was made. The test would have shown that they do not differ significantly. The "rough relationship" shown between total public expenditure and G.N.P. per head is too rough to reject the null hypothesis about such relationship.

¹ Martin and Lewis, op. cit., page 205.

Similarly, their coefficient of rank correlation of only .46 between "basic" expenditure (i.e. excluding public expenditure on defence, public debt, social insurance scheme and food or agricultural subsidies) as a percentage of G.N.P. and per capita G.N.P. is also too small to be significant for a sample size of 16. Their 'slight correlation' could in fact be no correlation. Their conclusions, therefore, are based on very inadequate and improper statistical analysis. As Williamson points out, "in the analysis only classification and casual empiricism result".¹

H. T. Oshima's study, however, is based on a larger sample (N = 32) and he has used post-war averages (1948 - 1954) for the share of government in gross domestic product, instead of taking the figures of a single year. His broad generalisations are based on the comparison of the percentage of government total receipts (the sum of all taxes, income from government property, profits of government enterprises, and non-tax receipts of all levels of government less subsidies) to gross domestic product at current prices for "more developed" countries and "less developed" countries.

The expenditure of government, with which our interest lies, are not taken into account. The sample of countries (N = 32) is divided into two broad groups - namely "more developed" and "less developed" countries; each group of countries is listed in order of their post-war averages of share of government total receipts in G.D.P. at current prices. No attempt is made to compare the

¹ Williamson, op. cit., page 43.

figures of per capita income of different countries or even to compare their ranks as regards per capita income with such averages; and the reader lacking information about the degree of economic development of different countries is left to guess 'the underlying pattern' which he thinks " is that of a direct variation between the percentage share of government in gross domestic product and the degree of development of the economy".¹ His broad division of countries between 'more developed' and 'less developed' countries also would not be acceptable to everybody. For example, is Chile "more developed" than Puerto Rico or even Malaya? Rosenstein-Rodan's figures of per capita G.N.P. however, suggest the opposite. The per capita G.N.P. figures at money and real exchange rate for Chile are \$348.4 and \$452.9 respectively, whereas for Puerto Rico and Malaya they are \$643.0 and \$771.6; \$368.3 and \$552.4 respectively for 1961.² H. T. Oshima's generalisations, as those of Martin and Lewis, are also based on extremely inadequate statistical findings.

Jefferey G. Williamson's paper in the Manchester School attempts "a more rigorous statistical test of the relationship"³ suggested by Martin and Lewis. His study is based on a larger sample (N = 32). An average of government expenditure and G.N.P. data over a period of several years (usually 1951 - 1957) is used. Nevertheless, it

1 H. T. Oshima, op. cit., page 384.

2 P. N. Rosenstein-Rodan, "International Aid for Underdeveloped Countries", The Review of Economics and Statistics, Vol. XLIII, May 1961.

3 J. G. Williamson, op. cit., page 43.

may be pointed out that the period of years chosen by him (1951 - 1957) may not be considered a period of "not-abnormal" years. The period chosen by him (and also that by Oshima) includes the period of the Korean War and the ensuing period of boom, which are likely to create abnormal distortions in the averages of government expenditure and income, and at varying amounts for different countries.

Our main criticisms to his study however, are the following:

First, his definition of government expenditure includes only current expenditure. Capital expenditures or expenditures on capital account of a government are excluded from his definition of government expenditure. No reason for such exclusion is given by Williamson; nor do we see any reason for such exclusion. It is not possible to have a clear cut distinction between current and capital expenditure, but to exclude one or the other is highly arbitrary. The effects of financing and spending on the economy of one is in no way less important than the other. Both types of expenditures are equally important for policy decisions and are determined fundamentally by the same political process. In the study of the relationship between government expenditure and the level of economic development, it is not reasonable to assume that capital expenditures are exogeneously determined and the relationship, if any, exists only between current expenditure and level of per capita income. The exclusion of capital expenditure from total expenditure gives a distorted view of government expenditure as a share of G.N.P. Furthermore the distortion is likely to be

proportionately more for developing countries than for the developed ones, because capital expenditure as a share of total public expenditure (or even of G.N.P.) is likely to be higher for the developing countries than for the developed ones. We will discuss in detail in Chapter V the importance of capital expenditure as an explanation for the relationship between government expenditure and level of economic development observed in our cross-section study in Chapter III.

Second, the statistical technique employed by Williamson is an application of an univariate regression function. He is "primarily concerned with the evidence of a positive correlation between per capita income and the government share",¹ and he uses a linear double logarithmic function as a basis for either accepting or rejecting the hypothesis. This relationship, however, gives him "a measure of elasticity as well". The rate of change of current government expenditure as a share of G.N.P. with relation to the rate of change of per capita income is assumed to be constant and greater than unity. His statistical analysis was not pursued further in order to verify whether that rate of change is constant over all the different ranges of per capita income, as assumed by him, or whether that rate of change is an increasing and/or diminishing function of income.

Dr. Mesmer in his study "Government Expenditure and Economic Growth - An International Comparative Study", which was "designed to

1 J. G. Williamson, op. cit., fn. 2, page 48.

explore the relationship between government expenditure and economic growth",¹ provides some interesting and useful results. He has, however, used the share of the male labour force in primary and tertiary industries and the share of population living in cities of 20,000 or more as his measures of economic growth and complexity.

Several reasons are given by him for the use of such measures instead of the usually accepted measure of economic growth, i.e. real per capita income. Dr. Mesmer states "measures of real income per capita, in addition to being somewhat abstract, have other defects that handicap their use, especially in international comparative studies"; "the defects of these measures relate 1) doubts about the applicability of national income concepts to underdeveloped countries; and 2) the problems of conversion of national income estimates."² "Economic growth (rising real per capita income) is associated with a decreasing share of the labour force in primary industries (agriculture, forestry, fishery) and an increasing share in tertiary industries (commerce, transport, storage, communication, services). Such changes in the occupational and industrial composition of the labour force are typically accompanied by a shift in the residence from rural to urban areas."³ Hence the three measures of economic growth that are used in his study are: the share of the male labour force in primary and its share in tertiary industries, and finally the share of population

1 T. D. Mesmer, op. cit., preface.

2 Ibid, pages 22 - 23.

3 Ibid, pages 21 - 22.

living in cities of 20,000 or more.

We do not disagree with him as regards the conceptual and statistical difficulties involved in the measurement of real per capita income, which are discussed in some detail in the next chapter. But, are his measures free from such difficulties? Can his measures be substituted for the usually accepted measure of economic growth, (i.e. real per capita income) without distorting 'the relationship between government expenditure and economic growth,' which his study is "designed to explore"?

His measures also involve several conceptual and statistical problems and as a result are unlikely to be more reliable or less abstract than measures of real per capita income. Some of such problems are noted by Dr. Mesmer himself. As regards the occupational distinction, one has severe doubts about the applicability of such distinctions especially in under-developed countries where many persons are employed in agriculture, fishing, cottage industries, and trading simultaneously because 'specialisation' in any particular work does not exist for such people. Besides, in those countries, either labour statistics do not exist or they are very unreliable. With regard to a measure of urbanisation, the nature of urbanisation is different for countries at different levels of economic development; and the definition of 'urban area' is bound to be arbitrary.

The use of the percentage of economically active male population in primary and tertiary industries as measures of economic growth according to Dr. Mesmer, is based on the validity of "firmly

established generalisation that a high average level of real income per head is always associated with a low proportion of the working population engaged in primary production and a high proportion of the working population engaged in tertiary production." But how can such generalisations be established without first making some estimate of real per capita income? If measures of real per capita income are discarded as defective, should not the generalisation based on such measures be discarded too?

Although we think that there is likely to be a high correlation between his measures and the usually accepted measure of economic development, i.e. real per capita income,¹ such a correlation would be far from being a perfect one, and because of this we shall stick to the commonly accepted measure of real per capita income.

However, Dr. Mesmer's methodology and simple linear correlation exercise which shows a highly significant positive correlation between government expenditure (as a percentage of G.N.P. at market prices)

1 Clark-Fisher thesis (see Colin Clark, Conditions of Economic Progress, 2nd edition, MacMillan & Co. Ltd., London, 1951; Allen G. B. Fisher, "A note on Tertiary Production", Economic Journal, December 1952) that a high level of real per capita income is always associated with a low percentage of population employed in primary industries and a high proportion of population engaged in tertiary industries, is questioned by several economists (e.g. P. T. Bauer and B. S. Yamey in "Economic Progress and Occupational Distribution", Economic Journal, December 1951; Simon Rottenberg, "Note on Economic Progress and Occupational Distribution", Review of Economics and Statistics May 1953) on the grounds of conceptual and statistical difficulties, already mentioned, for measurement of industrial distribution of labour force and because of the assumption on, regarding income-elasticity of demand for different products behind such generalisation. A U-shaped curve for employment in tertiary production with relation to level of economic development could also be a possibility. There is also a strong presumption that urbanisation is a diminishing function of real per capita income.

and the degree of urbanisation (and a significant correlation between such shares of government expenditures in G.N.P. and the occupational distribution of male labour force), are useful; and some of his results are used in this study, for example the relationship between the degree of urbanisation and government expenditure as a share of G.N.P. is used as one of the explanations in chapter V for our statistical observations.

In the next chapter an attempt is made not only to test further the hypothesis, suggested by the above-mentioned cross-section analyses, that government expenditure as a share of national product and level of economic development (or real per capita income) are correlated, but also to examine whether the rate of change of such a share with relation to that of real per capita income is constant over all the different ranges of income or whether it is an increasing and/or diminishing function income. The possible tests of significance of our statistical findings from a cross-section approach will be made. The statistical procedure and technique, to be adopted for our cross-section analysis in chapter III, avoid as far as possible the aboved mentioned criticisms.

II. Historical Time-series Approach - The displacement effect hypothesis and the concept of tolerable burden of taxation.

Following the historical time-series approach for the study of the behaviour of public expenditure, towards the end of the last century Adolph Wagner tried to establish generalizations about government expenditure by direct inference from historical evidence. On the basis of his empirical observation in a number of countries

he deduced his "Law" of increasing state activity, according to which government expenditure must increase at a rate faster than that of national output. In order to provide explanations and "justification" of his "Law" he distinguishes between several types of state activities and shows why the rate of growth for each type of government expenditure should be faster than that of national output. His explanations and justifications are based on his particular social and political philosophy. The 'proof' of his law depends on the validity of the organic theory of state in which the state, including all individuals within it, is considered as an organic entity.¹ Therefore, as pointed out by Peacock and Wiseman, although his "Law" is based upon historical evidence, "its acceptance as anything more than a statistical observation requires acceptance also of Wagner's own very special view of the nature of the state as a political entity".²

1 For a discussion and criticisms of the organismic theory, see James M. Buchanan, "The Pure Theory of Government Finance", Journal of Political Economy, December, 1949; also reprinted in his Fiscal Theory and Political Economy, Selected Essay, 1960.

2 Alan T. Peacock and Jack Wiseman, The Growth of Public Expenditure in the United Kingdom, op. cit., page 18. For a full discussion of Wagner's Law and the criticisms, see ibid., chapter 2, and Dr. J. Veverka and Mrs. Andic, "The Growth of Public Expenditure in Germany since Unification", Finanzarchiv, January 1964. For an English translation of the most relevant extracts from Wagner's study (Finanzwissenschaft, Leipzig 1890, 3rd edition), see Adolph Wagner, Three Extracts on Public Finance, in R. A. Musgrave and A. T. Peacock (Eds.), Classics in The Theory of Public Finance, op. cit.

While rejecting Wagner's conclusions, however, they adopt his historical approach and study the behaviour of British public expenditure by looking at the relevant time-series statistical data and the historical facts. Moreover, Wagner did not pay any attention to the time pattern of expenditure growth; he was interested only in the secular growth of public expenditure with relation to national output. On the other hand, Peacock and Wiseman are concerned primarily with the time pattern of expenditure growth; and, on the basis of their time-series study of British public expenditure, have tried "to evolve hypotheses that may explain the evolution of government expenditure in other countries and at other times".¹ We consider below their displacement effect hypothesis and the explanation, based on the concept of 'tolerable burden' of taxation, put forth in justification of that hypothesis.

Their statistical findings, as depicted by the charts, showing the growth of British Public expenditure and G.N.P. reveal a pattern of expenditure growth which is characterised by peaks of increasing heights separated by plateaus. The major expenditure peaks occur during the periods of the two world wars. Obviously one would expect the government expenditure as a share of G.N.P. to rise during the war years because of the extraordinary war expenditures. But the important finding of Professors Peacock and Wiseman was that "the divergence in the time-pattern of the two series" (p.25) namely that of G.N.P. and government expenditure cannot be attributed simply

1 Alan T. Peacock and Jack Wiseman, op. cit., page 3.

to the abnormal government expenditures during the war years.

"Although British government expenditure declines after the wars, it does not return to the prewar level, in Britain the plateaus of expenditure establish themselves at successively higher levels, and the share of government expenditure in national product remains much greater after the war than it was immediately before them".¹

This upward shift in the level of government expenditure with relation to national output is called by them the "displacement effect". It was shown that the "displacement" exists independently of the effects of permanent influences such as population and price changes.²

The effects of unemployment on government expenditure in Britain were found to be temporary, i.e. there was no lasting upward displacement effect. Moreover, the displacement effect of either world war does not disappear by removing the "war-related" expenditures from the total government expenditure series. The curve of residual government expenditure still shows the displacement effect.³

Although, as pointed out by Peacock and Wiseman "the precise explanation of displacement in particular cannot be free from speculation",⁴ their plausible explanation of the displacement

1 Ibid., pages 25 - 26.

2 For a discussion of the specific reasons and the statistical procedure for the elimination of the price and population effects, see chapter IV, section III (ii).

3 For a discussion of the specific reasons for the exclusion of war-related expenditures, see Peacock and Wiseman, op. cit., chapter 4 and also chapter IV, Section III (iii) of this study.

4 Peacock and Wiseman, op. cit., page 70.

hypothesis is based basically on the concept of "tolerable burden of taxation". According, to them, people's ideas about a tolerable burden can be separated from their notions of a desirable level of public expenditure because the choices made through the political process are inherently different from those made through markets. Also, it was pointed out that there is likely to be a gap between the two sorts of ideas, because of the tendency to the underestimation of the 'burden' and overestimation of the 'desirable' level of public expenditure on the part of an individual. But, it is their ideas about a tolerable burden of taxation which determine largely what the level of public expenditure would be.¹ It is said that during normal periods ideas about a tolerable burden of taxation tend to be fairly stable. This does not mean that during such periods public expenditures would not grow at all. If people's ideas are related to the tax rates rather than the total payments, then, if on the whole the tax-rates are progressive, government expenditure as a share of G.N.P. may increase with increasing G.N.P. But in times of social upheaval like war people accept tax levels formerly thought intolerable. The acceptance of new tax levels continue even after the upheaval has disappeared because people get accustomed to new burdens of taxation. As they say, "it is harder to get the saddle on the horse than to keep it there".² Thus it is possible for a government to undertake those public expenditures which it may have

1 Peacock and Wiseman also recognise the importance of other factors such as changes in the attitude towards public expenditure, widening of tax opportunities etc., because of the "inspection effect of war; but the concept of tolerable burden of taxation is assigned a special role in the explanation of the 'displacement effect'.

2 Peacock and Wiseman, op. cit., page XXIV.

considered desirable before the social disturbance but which were not undertaken because the accepted ideas of tolerable burden of taxation before the disturbance was too low to permit the financing of those expenditures. Thus a shift in people's ideas about the tolerable burden due to a social upheaval may give rise to a shift in the level of public expenditure, with relation to national output, which is described as a "displacement effect".

In what follows, the significance and limitations of the concept of the tolerable burden of taxation as an explanatory tool are discussed first; our comment on the 'displacement effect' hypothesis are given next.

As far as the concept of the tolerable burden of taxation is concerned, it provides some explanation of the time pattern of public expenditure, if the shifts in the level of public expenditure as a share of G.N.P. are associated with some social upheaval like war during which people get accustomed to a higher burden of taxation, which continues even after the upheaval is over. But, suppose such a shift if any, is found to be associated with a severe depression, as is shown in chapter IV in the case of the U.S.A. and Canada where such a shift is associated with the Great Depression, during which taxes are rather cut down, then we cannot say that such a shift occurred because people got accustomed to higher burden of taxation. If the taxes are cut down during such a prolonged depression, the concept of the tolerable burden of taxation would rather suggest a shift in the downward direction. We have to look at some other relevant factors which could provide some plausible

explanation for such a shift after depression, e.g. change in the attitude towards public expenditure.¹ If some "new" expenditures are thought to be highly desirable because of the "inspection effect" of a severe depression, financing of such expenditures could be tolerated. Such a shift in the level of public expenditure may occur not because people got accustomed to the high level of taxation during depression, but because of the change in the attitude towards public expenditure during that upheaval, which may permit the acceptance of new taxes after the upheaval is over to finance these "new" expenditures considered not so highly desirable before such an upheaval.

If some public expenditures are financed by public debt or new money creation during a severe depression, the "burden" or the opportunity costs of financing such expenditures may be considered almost zero during that period. The "burden" or opportunity costs of public debt or money creation is not always zero (e.g. under conditions of full employment) and even during depression, after a certain limit is reached, the opportunity costs of financing by public debt or new money creation may be more than that of taxes.² Therefore, though the concept of the tolerable burden of taxation cannot explain such a growth of public expenditure during a depression, yet we can say that the tolerable burden of financing the government

1 This factor of course is frequently mentioned by Peacock and Wiseman, but in their analysis of the growth of public expenditure in the U.K. significance is mainly attached to the concept of tolerable burden of taxation because the Great Depression did not give rise to any 'shift' in the level of public expenditure in the U.K.

2 J. M. Buchanan, Public Principles of Public Debt, Homewood, Illinois, Richard D. Irwin, Inc., 1958. J. Wiseman, "The Logic of National Debt Policy", Westminster Bank Review, Aug., 1961.

expenditure (i.e. through public debt, money creation, and taxation) determines largely the level up to which the changed ideas about desirable level of public expenditure could be implemented. The ideas about the desirable level of public expenditure may change during a depression, but the implementation of such ideas is possible because of the possibility of incurring higher expenditures without increasing (or even lowering) the total burden of financing such public expenditures. Thus it can be maintained that public expenditures are determined largely by the burden of financing such expenditures.

Our analysis of the growth of government expenditure during depression explains how the concept of a tolerable burden of taxation cannot provide an explanation for the growth of expenditures during such periods. Besides, even during normal periods public expenditures are financed to some extent in varying degrees in different countries by deficit financing. Therefore, it seems that if we expand the concept of the tolerable burden so as to include not only that of taxes but also that of other methods of financing government expenditures, which may be called the "tolerable burden of financing government expenditures", such an expanded concept of "tolerable" could provide a better explanation of the growth of public expenditure.

However, the major portion of the government expenditures has usually been financed by taxes during normal periods, in most countries. This is so, firstly because of the prevalent favourable

attitude towards balanced budgets,¹ secondly because, in case of full-employment or near full employment, deficit financing is not costless. The opportunity costs of deficit financing may be more than that of tax financing after a point. If most of the government expenditure is financed by taxes, we can say that in normal periods, by and large, it is the tolerable burden of taxation which determines largely the level of public expenditure.

Again, a conceptual separation of the ideas about desirable level of public expenditure and ideas of the tolerable burden cannot always be made. In some cases there is an inter-dependence between the two sorts of ideas. For example, assume that specific taxes are levied for the financing of old age pensions and such taxes are directly proportional to the benefits to be received during old age; or, that the tax payments for old age pensions are equivalent to the insurance premiums which an individual would pay to a private insurance company if he wished to receive the same amount of benefits during his old age. The question is: are his ideas about "burden" of such taxes determined independently of the corresponding public expenditure? Such taxes would have zero "burden" for those individuals who would have insured themselves with a private insurance company if the government had not introduced an old age pension scheme. It will of course involve some "burden" for those who would not have insured themselves, because of the compulsive

1 In the recent empirical study of fiscal attitudes of American people, Eva Mueller's study shows that, although "there is no evidence that the existing federal debt causes great concern or uneasiness"; "predominantly negative attitudes toward deficits were expressed, however, when the advisability of additional deficits came under discussion", page 217, "Public Attitude toward Fiscal Programs", The Quarterly Journal of Economics, May 1963.

nature of taxes. In this case too, "burden" is felt to the extent that he feels his restriction of choice. To take another example, suppose a specific tax is used to give foreign aid, and the individual thinks, rightly or wrongly, that no benefit could accrue to himself, it will entail a burden equal to the utilities thought to be foregone by such tax payments. Thus ideas about "tolerable burden" are not independent of public expenditures.

These are a few extreme examples which simply show how the two sorts of ideas cannot be separated completely. However, one may say that such payments which provide direct benefits proportional to the payments cannot be considered taxes, because of the direct quid pro quo. Others may hold a different view because of the compulsive nature of such payments, which distinguish them from prices and fees. However, the main question is should we consider such expenditures as public expenditures? If we are to consider them as public expenditures as we do, no matter whether we call them taxes or not, the ideas of tolerable burden of financing such expenditures cannot be completely separated from the notions of desirable public expenditure; they influence each other. This also has been verified recently by Eva Mueller's empirical study concerning people's attitudes towards government expenditure and taxes. Her findings clearly show that people are sometimes willing to accept tax increases for the increase in government expenditures which they consider highly desirable.¹

¹ See Eva Mueller, "Public Attitudes Toward Fiscal Programs", op. cit. We will discuss in detail her empirical findings concerning people's attitudes towards government expenditure and taxes in chapter V, section II in connection with the plausible explanations of our statistical findings.

Although we argued above that a conceptual separation between the two sorts of ideas cannot always be made; nevertheless, since in almost all countries most of the taxes (in varying degrees) are not only compulsory but also do not have any direct quid pro quo, because of the indivisible nature of the benefits provided by public expenditures and also because of redistributive consideration, it could thus at the same time be thought reasonable that, to a large extent, the people's ideas about the tolerable burden are determined independently of their ideas of desirable public expenditure. When an individual knows that his benefits from public expenditures do not depend on the amount of taxes paid by him, why would his ideas about desirable level of public expenditure depend solely on his ideas about the tolerable burden? Thus, as pointed out by Peacock and Wiseman, there is likely to be a gap between the two sorts of ideas. Eva Mueller's empirical findings (see chapter V, section II), while providing support for our view that a conceptual separation between the two sorts of ideas cannot always be made, also clearly indicate the existence of a gap between them.

It may, however, be pointed out that although it is not possible to give any objective measurement of such a subjective tolerable burden or to describe by any mathematical terms the relationship of such a burden with that of the economic, political and social factors, e.g. level of G.N.P., distribution of income, social and industrial structure, political ideologies, etc., which seem to influence such a burden, still the concept is useful because it focuses our attention on some of the relevant factors which could

influence the growth and time pattern of public expenditure.

Our comments on the displacement effect hypothesis are the following:

Firstly, the displacement effect hypothesis was deduced from Peacock's and Wiseman's statistical observations of time pattern of growth of public expenditure in the United Kingdom only. Before one can make any generalisation, this needs to be tested for a number of countries. Secondly, even in the case of the United Kingdom, although the existence of such effect was depicted with the help of charts and the corresponding tables, no quantitative measurement and test of significance of that effect was attempted. That is, the level of confidence which can be put on the displacement effect hypothesis as against the corresponding null hypothesis was not ascertained. Thirdly, the displacement effect refers only to the shift in the level of government expenditure with relation to national output. No attempt was made to investigate the effect of a social upheaval, if any, on the rate of growth of government expenditure.

In view of the above mentioned comments, an attempt is made in chapter IV to test the "displacement effect" hypothesis for different countries not only with regard to the World Wars but also with regard to the Great Depression which could also be considered a major social upheaval for some countries. Some quantitative measurement and test of significance of that 'effect' will be made. We will also examine whether such a 'shift' in the level of government expenditure is associated with a change in the rate of growth of government expenditure with relation to economic growth.

CHAPTER THREEPUBLIC EXPENDITURE AND ECONOMIC DEVELOPMENT - A CROSS-SECTION APPROACH.I. Introduction

In this chapter, an attempt is made to examine the relationship between public expenditure and economic development from a cross-section sample of countries chosen from different stages of economic development. We shall verify the hypothesis suggested by recent cross-section studies (which we reviewed in chapter II) that government expenditure as a share of national output and the level of economic development (real per capita income) are correlated. At the same time we shall investigate whether the rate of change of such a share with relation to that of real per capita income is constant over all the different ranges of income or whether it is an increasing and/or diminishing function of income.

Section II of this chapter states the objectives in the form of specific questions which we are interested in answering. Section III is concerned with the statistical procedure and measures (viz. measurement of public expenditure as a share of G.N.P. and real per capita income of different countries, the time-period involved, and the choice of sample of countries) adopted for this study. We discuss some of the different measures suggested or adopted by different economists, the related conceptual and statistical difficulties, the arguments in justification of the measures adopted in the study and also the limitations of our measures in that section. The statistical

tables, the sources and the major divergences, if any, from the concepts adopted in this study in the case of each country included in our sample are given in the Appendix A. Section IV is concerned with the statistical technique used in the study. Finally, Section V provides the answers to the specific questions asked in Section II and describes the hypotheses supported by our statistical observations.

II. Objectives

The main objective of our cross-section analysis is to study the relationship between public expenditure and the level of economic development on the basis of a sample comprising a large number of countries selected from different stages of economic development.

Specific questions, which we are interested in answering with a view to studying this relationship are :-

- (1) Is there a correlation between government expenditure as a share of G.N.P. and real per capita income?
- (2) If there is a correlation, is the rate of change of government expenditure expressed as a proportion of G.N.P. with relation to the rate of change of real per capita income constant over all the different ranges of per capita income? Or, is it a diminishing function of income? Or, is it an increasing function of income? Or, is it an increasing function for some ranges of income, but a decreasing function for other levels of income?

III. Statistical Procedure and Measures

(i) Measurement of public expenditure as a share of G.N.P.

There are various different measures of the government sector suggested and/or adopted by different economists, depending upon the objectives of a study and also on the availability of data. To mention a few, for example, Abramovitz and Eliasberg, in order to study the growth of public employment in the U.K. and to compare trends of public employment in the U.K. with those in the U.S.A., used the ratio of public employment to the total labour force.¹ "Measurement of the scope and trend of government activity" by Fabricant and Lipsey is "approached through the drafts it makes upon the productive resources of the nation".² In order to measure the 'resources absorbed' in government activity, in addition to data on government employees in relation to total employment, they used data on government's share in nation's stock of capital goods and government purchases from private industry. Their "measure of input" includes (1) payrolls (and pension payments), (2) purchases of goods and services from private industry, (3) an imputed rental on government owned capital goods. Since their objective is to measure government's absorption of real resources, their "measure of input" is not intended to provide "the usual estimate of expenditure".

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1. Moses Abramovitz and Vera Eliasberg, The Growth of Public Employment in Great Britain, Princeton, Princeton University Press 1957.
 2. Solomon Fabricant, assisted by Robert E. Lipsey, The Trend of Government Activity in the United States since 1900, N.B.E.R., New York 1952, Chapter 2, page 10.

However, as our main objective is to study the relationship between government expenditure and the level of economic development, a ratio of government expenditure to some national income aggregate is a more appropriate measure. Besides, in an international comparative study, the statistical measures that one chooses depend upon the availability of data. The large variety of data used by Fabricant and Lipsey in order to measure the trend of government's absorption of resources in the U.S.A. is not available for many of the countries. The budgetary and national accounts data for many countries, however, are collected and made available regularly and with continuous improvement. The choice of a measure which depends on such data, therefore, would enable further testing of our hypothesis with reference to some future time-period.

Economists, however, disagree as regards the inclusion or exclusion of certain items in government expenditure and also about the selection of particular national income aggregates. (G.N.P. at factor cost or at market prices, or national income). The ratio of government expenditure to national income aggregates would depend upon the concepts of government expenditure and national income used. The problems connected with the different concepts have been debated in the literature of recent years and we do not intend to go into details of the controversy. Nevertheless, the main elements of controversy and the reasons for our choice of particular concepts are given below.

As regards the government expenditure, the numerator in such a ratio, the main controversy arises about the inclusion or exclusion of transfer payments. It is being argued that, since transfer payments are excluded from national income aggregates, they should also be excluded from 'government expenditure.' Because, if we are using the ratio of government expenditure to some national income aggregates, the numerator should be fully included in the denominator, otherwise a comparison of government expenditure with national income may be "seriously misleading".¹ If the transfer payments and subsidies are included in government expenditure, the ratio results in a false structure quotient in the sense given to that term by Ohlsson.² The exclusion of transfer payments is also favoured by those who think that the government can be regarded either as a final consumer of the services of public servants and of the goods and services purchased and used by the government,³ or as an enterprise selling public goods and services at prices equivalent

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1. Alan Sweezy, "Comparison of Government Expenditure with National Income", The American Economic Review, December, 1952.
 2. See Ingvar Ohlsson, On National Accounting, National Institute of Economic Research, Stockholm, 1961, pages 230-235, for his discussion of false and genuine structure quotients. Ohlsson defines genuine structure quotients as being those in which the numerator forms a part of the denominator, homogeneous items are included in the numerators and denominators. Or, if the numerator is subtracted from the denominator, the residual is of the same type as the numerator and represents the remaining part of that total which is the denominator.
 3. See for instance, Francis Bator, The Questions of Government Spending, (Harper Bros., New York, 1960).

to taxes. We agree that on technical grounds the exclusion of transfer payments from the concept of government expenditure, when they are excluded from national income aggregates, would be justified. But the exclusion of transfer payments on the basis of the construction of a government either as a final consumer or as an enterprise cannot be justified. As Gerald Colm pointed out, "both these constructions fail to recognise the true role of government in the economic system - the performance of such functions as cannot be adequately performed by the market system, or which the community does not wish to have performed by enterprise in response to a market demand".¹ If one is concerned with gauging the portion of total demand determined by political process, then the concept of public expenditure should include transfer payments, because the incomes and the consequent demand due to transfer payments are created not by the market but by government. The purchase of goods and services and transfer payments are both determined by the political decisions made through the political process and are often the policy alternatives to achieve a specific end. In this study, therefore, we preferred to include transfer payments in the concept of government expenditure.

1. Gerald Colm "The Government Sector: A Re-examination of Controversial Issues", Studies in Income and Wealth, Vol. XX., Princeton, Princeton University Press, pages 113 and 114.

As regards the choice of a measure of national income aggregate, we have selected G.N.P. at market prices. Since government purchases are made at market prices, the national income aggregate selected should be at market prices rather than at factor cost in order to maintain logical consistency. The deduction of indirect taxes from G.N.P. in order to compute G.N.P. at factor cost is based on the doubtful assumption about the shiftability of such taxes. It has been shown by several economists that some direct taxes, e.g. the corporation profit tax, are shifted on to the consumers to an even greater extent than some of the indirect taxes.¹ Besides, as argued by Colm, the deduction of indirect taxes from G.N.P. means "that the price excluding taxes, corresponds to the rewards of factors of production, namely, labour, management and capital. This concept makes sense only if government is interpreted solely as a 'consumer'". We have already rejected this. Moreover, R. Frisch, has also said, as quoted by Colm, "one cannot claim factor cost to be a relevant national income concept except by considering government as a nuisance, a non-productive class."²

1. R. A. Musgrave and Marian Kryyniak, The Shifting of Corporation Income Tax, 1963, The John Hopkin Press, Baltimore, 1963.

2. Gerald Colm, op. cit. page 121.

We preferred gross national product to net national product mainly on practical statistical grounds, since capital depreciation cannot be measured directly. Besides, since the available government expenditure data are usually gross of depreciation of the public capital stock, it is appropriate to choose a measure of national product which is also gross of capital depreciation for the sake of logical consistency.

The concept of government expenditure should include expenditure of all the different levels of government (i.e. of central and local governments, in the case of a unitary state, and also of governments of regions, i.e. state, or canton or province, in the case of a federal state) and of closely related bodies such as social security funds. It was not possible to adopt this concept and our concept of government expenditure excludes that fraction of local government expenditure, which is financed by revenue raised by local governments themselves because of the non-availability of the necessary data for many countries and also because of the wide differences in the nature of local authorities in different countries. Our concept of government expenditure in the cross-section approach, therefore, includes purchases of goods and services (current and capital), transfer payments (e.g. interest payments, social security payments, etc.) loans and advances granted by central government, and, in the case of a federal state, by regional governments also,

and by closely related bodies such as national insurance funds. The total expenditure is taken net of transactions between the central government, regional governments, and associated bodies, and of transactions between the different departments of the same governments. The government expenditure also includes transfers and loans to the local governments either by central governments and/or regional governments. As government expenditure includes such transfers and loans to local authorities, it excludes only that portion of local government expenditure which is financed by their own revenue.

The exclusion of such expenditure is undoubtedly one of the limitations of our study. It was, however, shown by Dr. Mesmer that the linear correlation coefficient between total central government expenditure (including transfers to local governments) as a percentage of G.N.P. and total central, regional and local government expenditure as a percentage of G.N.P. was $+0.91$ (for fifty countries.)¹ Such a correlation coefficient would be even higher than 0.91 when regional governments' expenditure are added to that of central government. Dr. Mesmer's estimates of total central, regional and local government expenditure were "necessarily crude". Nevertheless, such an extremely high correlation coefficient suggests that the limitation due to the exclusion of some expenditures of local authorities is not likely to change our conclusions.

1. T. D. Mesmer, Government Expenditure and Economic Growth, op. cit.

A variety of sources were used for the government expenditure data. But as the budgetary systems and accounting practices vary from country to country, only reasonable approximations to the concept of government expenditure set forth above could be achieved, although an attempt is being made to ensure comparability, consistency and accuracy as far as possible.¹ The major divergences from the definition adopted in this study, in case of particular countries, however, are noted, together with the sources utilised for each country, in Appendix A.

Similarly, complete accuracy, comparability and consistency cannot be achieved for G.N.P. at market prices, because of the differences in concept, scope and coverage of G.N.P.; and the fact that the reliability of G.N.P. estimates is undoubtedly different for different countries. Estimates are likely to be less reliable for low-income countries because of their less developed accounting techniques, and also because of the existence of a large non-monetised sector, the imputation of income or output of which cannot avoid arbitrariness.

1. For a detailed discussion of the main difficulties in international comparisons of government expenditures see "General Note to Public Finance statistics" published in United Nations Statistical Year Book.

(ii) Measurement of real per capita income.

This sub-section is not intended to provide a detailed discussion of the conceptual and statistical problems involved in international comparison of national product or per capita income, the discussion of which, and controversies as regards the methods, can be found in the recent writings of several economists and statisticians.¹ After a very brief note of some of the problems involved in such comparisons, we shall devote the rest of this sub-section to showing why Rosenstein-Rodan's measures are chosen in preference to some other available measures.²

In short, the problems of international comparisons of income are no different from the problems of comparisons of income over time. One of the main problems in such comparisons either between one country and another or between one time and another is the choice of weights or prices in terms of which

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1. See for instance, John W. Kendrick, "Introduction: Problems in the International Comparison of the Account", Studies in Income and Wealth Vol. XX, Princeton, Princeton University Press 1957; Hans Stachle, "International Comparison of Real National Income", Studies in Income and Wealth, Vol. II, Conference on Research in Income and Wealth, N.B.E.B. 1949; Irving B. Kravis, "The Scope of Economic Activity in International Income Comparisons", Studies in Income and Wealth, Vol. XX; Dorothy S. Brady and Abner Hurwitz, "Measuring Comparative Purchasing Power", Studies in Income and Wealth, Vol. XX; Everett E. Hagen, "Some Facts about Income Levels and Economic Growth", Review of Economics & Statistics, Feb., 1960; H. C. Edey and A.T. Peacock, National Income & Social Accounting, Hutchinson & Co. Ltd., London, 1959, Chapter VI.
 2. P. N. Rosenstein-Rodan, "International Aid for Underdeveloped Countries", Review of Economics and Statistics, May 1961, Vol. XLIII, No. 2.

output of different countries or at different dates is to be measured. But the different prices or weights may give different results. In the case of a comparison between one time and another, for example, Laspeyer's index at the base year's weights may differ from Paasche's index calculated at current year weights; similarly in case of international comparisons of G.N.P., differences in the level of G.N.P. of different countries at U.S. prices would be different from those given by using prices of some other country as weights. The weights or relative prices between different goods and services differ between countries and also between one time and another; because of which, comparisons of the level of income either over time or between countries cannot produce unambiguous results. There are many other problems and difficulties in such comparisons. Because of the differences in taste, need, and technology, the goods produced and used in different countries differ in quality; some goods produced and used in one country may not be available in another country whose prices might have been taken as weights. Some may think that an international comparison of the level of income is meaningless because of such conceptual and statistical difficulties and because of the divergencies in concept, scope and methodology (which are mentioned in the previous sub-section) of the national

income estimates of different countries. Of course, an international comparison of the level of income cannot be completely relied upon. But it is no more improper to make such comparisons than to compare levels of income over a considerable period of time within one country, because the problems are the same in both cases.

Several comparisons of the level of per capita income between different countries have been made recently by several people and organisations. Why did we choose Rosenstein-Rodan's measure in preference to other available measures?

The conventional method of comparison is to convert the national income estimates of different countries expressed in each country's own currency into estimates expressed in a single currency by the use of exchange rates. In the Yearbook of National Accounts Statistics published by United Nations, estimates of total and per capita gross domestic product expressed in U.S. dollars have been prepared by using that conventional method. For countries with a single fixed exchange rate, the conversion rate selected is usually the par value of the currency. For countries with a single fluctuating rate, the conversion rate is usually the annual average of import and export rates. And for countries with multiple exchange rates, the conversion rate chosen is usually an average of the implicit rates obtained by comparing the values of exports and imports in dollars and national currency units.

For the purpose of comparing the level of real income or the relative amount of goods and services produced and consumed per annum, the method of conversion of national incomes to a common unit by use of foreign exchange rates is grossly arbitrary. As Jacob Viner points out "this method of course, involves conscious or unconscious acceptance of the purchasing-power-parity theory of the foreign exchange, in its crudest, least qualified and most indefensible form..... Given the present instability of exchange rates, the prevalence of exchange controls, and the existence of multiple exchange rates, this is a peculiarly inappropriate time for following a method which under the best of circumstances is unsusceptible of a logical defence, regardless of the purpose of comparison."¹

Everett E. Hagen also objects to the use of exchange rates because it tends to understate the level of income of low-income countries relative to that of high-income countries. This is so because the goods and services produced and consumed domestically in low-income countries are much cheaper, relative to the same goods and services in high-income countries, than those which are exported. The goods and services in which a

1. Jacob Viner, "Comment on Irving B. Kravis' paper", op. cit. page 397.

low-income country has the greatest advantage are not exported because many of such goods and services are non-transportable. Foreign exchange rates may only reflect the relative prices of goods and services which enter into foreign trade, which are not typical of relative prices within low-income and high-income countries.¹ The recent study by Gilbert and associates has also demonstrated that when the output of eight countries of Western Europe in 1955 was priced in dollars by direct comparison of prices, the value of output was about 50 per cent greater than that obtained by use of an exchange rate.² As was suggested by Kuznets some years ago, if the per capita income of low-income countries were as low as exchange rate conversions indicated, a majority of people in those countries would literally have died of starvation.

In the United Nations' Yearbook of National Accounts, 1963, a second set of dollar estimates of total and per capita G.D.P. based on the calculated parity rates of exchange rather than par values was presented for the first time. The parity rates

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1. Everett E. Hagen, "Some Facts about Income Levels and Economic Growth", op. cit., and comment on Kravis' paper op. cit.
 2. Milton Gilbert and associates, Comparative National Products and Price Levels, O.E.C.D., Paris 1958.

for several years were estimated by adjusting the official or free market exchange rates in 1938 for each country by the relative change in the level of prices from 1938 to the year in question, between the United States and the country concerned. In some instances the starting point for the calculations was the official rate of exchange in 1929. Such parity conversion does not solve the problems mentioned above with regard to exchange rate conversions. The exchange rates prevailing in 1938 (in some cases 1929) are utilised as a starting point for calculating the parity rates. On what basis can the official or free rates of exchange in 1938 (or 1929) be considered as reflecting the real purchasing power of different currencies?

Thus, the use of direct price comparisons as well as adjustments for greater comparability of national income aggregates gives more plausible real income measures than those obtained by the use of exchange rates. We have chosen Rosenstein-Rodan's figures of real per capita G.N.P. in 1961 for our cross-section study in the absence of any better alternative recent figures. His real G.N.P. per head indicates the purchasing power of G.N.P. compared to United States prices. The details of the calculation of such figures are given in Explanatory Notes for Table 1-A and 2-B, and 2-A-1 included in the Appendix of his study.¹

1. P.N. Rosenstein-Rodan, op. cit.

(iii) Time-period

A cross-section analysis which compares government expenditure as a share of G.N.P. with the level of economic development refers to a point of time. The criteria which we need to follow as regards the choice of 'time' are:-

(a) Time chosen should be 'normal', i.e. it should not be time of war or great depression or boom; because otherwise government expenditure as a share of G.N.P. may be higher or lower than what it would be under normal circumstances and may also introduce bias in favour of or against some countries. For example, if we choose a depression year, government expenditure as a share of G.N.P. is likely to be higher for most countries and may be relatively higher for developed countries since these countries are more vulnerable to business cycles and also are better equipped to use anti-cyclical monetary and fiscal weapons.

(b) It should be a recent point of time, if only one cross-section comparison is intended. This criterion is based mainly on practical grounds of increased availability and reliability of national income and government expenditure

data in recent years, because of the increased work and research put into the compilation of such data by individual countries and by international organisations towards some standardisation of National Accounts necessary for such international comparisons. Besides, an analysis which refers to a recent time is likely to be of more use, if any, for policy purposes, than such an analysis based on a year like 1880.

One recent year, however, cannot be considered sufficiently "normal" for all the countries, to be a good basis of comparison. An average of several years, apparently not abnormal years, is a better choice, so that abnormality (if any) in any particular year for a country, may be lessened.

In this study, therefore, an average of government expenditure and G.N.P. data for the most recent five years (i.e. 1958-1962, with some exceptions because of non-availability of data) is used. The period of 1958-1962 is a period of "relative peace" and without severe depression or boom. Any abnormal distortion in any particular year in case of a country being averaged over five years, is considerably lessened.

In the case of ratios of government expenditure to G.N.P. both the numerator and denominator (measured in domestic currency) are averaged over the period chosen, i.e. the ratio of government expenditure to G.N.P. is calculated by dividing the arithmetic average of government expenditure by the arithmetic average of G.N.P. for five years. But unfortunately we could not follow the same procedure as regards the real per capita G.N.P. of different countries because such data for several years are not readily available. Rosenstein-Rodan's data for real per capita G.N.P. used in this study refer to 1961 alone. The spread of real per capita G.N.P. in the cross-section, however, being extremely large, the cardinal ratings of per capita income is not likely to be significantly affected; for this reason the additional extra effort required to calculate real per capita G.N.P. for several years did not seem worthwhile.

(iv) The Choice of Sample of Countries

A set of countries are excluded from the cross-section because of various reasons given below.

The "Communist" countries are excluded from the study for the obvious reason of non-comparability of concepts used. It is an extremely difficult task to deduce the "non-Marxist" measures from the "Marxist" measures of government expenditure and national product. The net material product estimates which are available for some communist countries cannot easily be reconciled with G.N.P. estimates used for other countries. The Marxist concept of "material" production excludes many services, e.g. public administration, defence, banking and insurance, education, health etc., which are included in G.N.P. estimates. Besides different methods are used by different communist countries to estimate net material product. Again, even if net material product is somehow adjusted for those services and variations in the methods adopted by different countries, the comparison of G.N.P. between the "Marxist" and "non-Marxist" countries is meaningless because "prices" or factor costs, in the former are largely administered (ones) whereas in the latter they are largely determined by market mechanism.

Differences in political ideologies between these two different groups of countries are so great that the government expenditures of one cannot be rightly compared with another. To include both categories of countries in our sample would make it heterogeneous to such a degree as to make the test of

any hypothesis highly unreliable. We should therefore consider the "communist" and "non-communist" countries as two different "universes" or "populations". Our sample is drawn from the latter.

The other countries excluded fall into one or more of the following categories:-

- (a) Non-self governing countries or colonies.
- (b) Countries which are to a great extent fiscally dependent.
- (c) Small countries as regards the size of population.
- (d) Countries for which necessary data (i.e. government expenditure, G.N.P. and real per capita G.N.P.) were not readily available.

Arguments in favour of excluding these countries are given in detail by Dr. Mesmer in Chapter 2 of his unpublished thesis; some of his arguments for such exclusion, however, could be questioned. Briefly, it is argued that "one of the fundamental requirements of state-hood, a government free from external control, is absent" in case of (a) and experience in case of India and Indonesia seems to suggest that transition from colonial status to independent status produces changes in the amount and pattern of public expenditures, because of which non-self government areas are to be excluded. But the important questions which need to be answered before we decide in favour of, or against, the exclusion of such areas are:-

- (1) Is freedom from 'external control' the most important decisive factor?
- (2) Does a de jure external control produce results differing significantly from those of a de facto external control by larger states?

We do not know the answers. Dr. Mesmer assumes the answer is 'yes' for the above mentioned questions and therefore thinks that the non-self governing areas must be excluded. But the answers in 'no' are also not very unlikely. It is possible that the level (and possibly also the pattern, except for defence and foreign relations) of government expenditure may not change simply because of transition from colonial status to independent status. The financial support from the metropolitan country during colonial status is usually substituted by foreign aid after independence. It is not necessary that experience of India should be repeated by other colonies after independence, with different political, social and economic environment, and also, to say that the changed level and pattern of expenditure in India is due to independence, is only a speculation because the other circumstances are no longer the same. Besides, de facto external control may have almost the same effect on government expenditure that de jure control produced. Then where would one draw the dividing line? There is thus no clear cut case

for an exclusion of non-self governing areas. It would of course be highly interesting to compare the results obtained by inclusion of such areas with the results obtained after exclusion, which may provide some answers about the effects of de jure external control. However, the available data and time did not permit us to do separate statistical exercises. Mainly on practical grounds, (i.e. the non-availability of the necessary data for non-self governing areas), they are excluded from our study.¹

Fiscally dependent states, e.g. Laos, Jordan, South Korea, China/Taiwan, South Vietnam, where foreign public aid constitutes a large proportion of public expenditure, are excluded, because such aid obviously influences the level and pattern of public expenditure. Small countries, e.g. the Vatican, Monaco, Luxembourg, Kuwait, etc., are excluded because of their small size.

1. There is only one exception, i.e. British Guiana is included in our study. But its inclusion would not affect the result because as can be noticed from the chart the point 30 representing British Guiana's government expenditure as a share of G.N.P. with relation to real per capita income lies almost on the regression curve.

The exclusion of the above-mentioned countries has the advantage of making the units chosen in the sample to some extent homogeneous, because the sample now includes countries which are largely politically and fiscally independent and are above a minimum size as regards their population. This homogeneity aspect is very important for the validity of testing the significance of a hypothesis.

Even after such exclusions, either because of non-comparability of concepts or non-availability of data, the number of countries chosen for cross-section study is quite large. The sample of countries chosen is large in terms of country and population coverage. The total number of countries included in our sample is 53. It includes a fair number of countries from each continent, and countries at different levels of economic development.

IV. The Statistical Technique

For the study of the relationship between government expenditure as a share of G.N.P. and real per capita income, a polynomial regression function of the third degree, i.e. $y = a + bx + cx^2 + dx^3$ is used where x and y denote the logs. of real per capita income and government expenditure as a share of G.N.P. respectively. The log. values are used in our regression analysis mainly because of our interest in

studying the rate of change of government expenditure as a share of G.N.P. with relation to the rate of change of real per capita income.

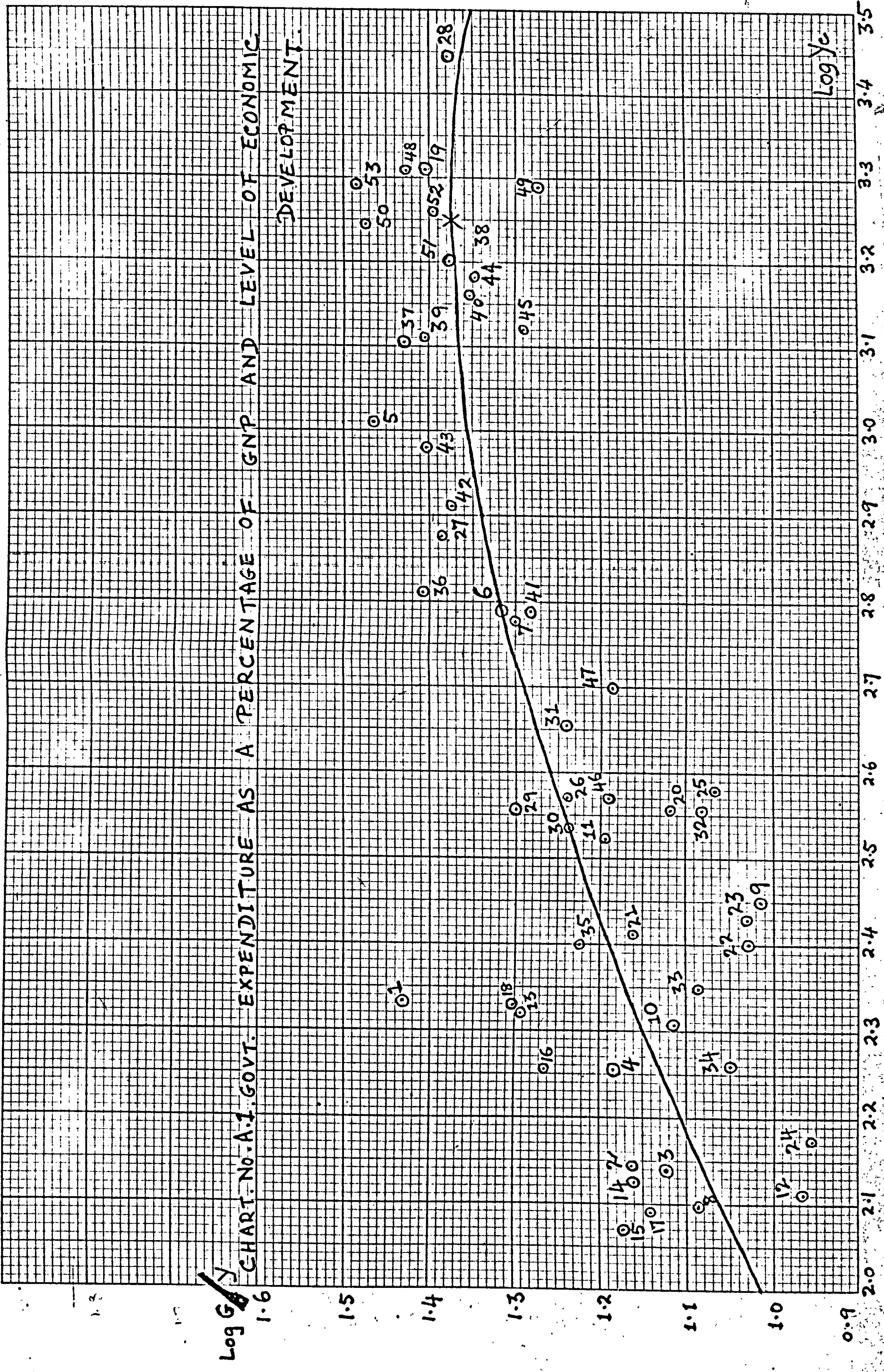
Why is a polynomial regression function of third degree used instead of a linear function or any other function? There are various reasons for using such a function. First, such a function is suitable for providing some answer to all the questions asked in Section II, especially to the questions: is the rate of change of G/Y (G and Y denotes government expenditure and G.N.P. respectively) with relation to the rate of change in real per capita income a constant/decreasing/increasing function over all the different ranges of income? Or is it an increasing function for some ranges of income, but a decreasing function for other levels of income? If a straight line is the appropriate function, which on a double logarithmic scale shows a constant rate of change, in our polynomial function b will be positive and c and d would become zero. If a second degree curve showing either the diminishing or increasing rate of change is the appropriate one, d in our regression function would become zero. But if the rate of change is an increasing function for some ranges of income but a decreasing function for other levels of income, none of the constants, viz., b , c , d , will become zero.

Second, as is shown in the next section, it is not only the total variance explained by our fitted third degree curve, which is highly significant; but the additional variance explained by such a function is also highly significant, thus providing justification for its use. Third, the regression curve fitted with such a polynomial function not only provides a better fit, it is also acceptable on the analytical grounds given in Chapter V. Fourth, although our function is quite a complicated one, yet it is not too complex for analytical purposes; it is quite a familiar function used by economists for depicting various economic phenomena e.g. the diminishing return phenomena is usually shown by such a function.

V. Statistical Observations and Hypotheses

In the chart No. 1 we measure the x variable, i.e. the logarithms of real per capita G.N.P. (or $\text{Log. } Y_c$), on the horizontal axis and the y variable, i.e. the logarithm of government expenditure as a share of G.N.P. (or $\text{Log. } G/Y$), on the vertical axis and we plot a point for each pair of x and y values. For each country included in our sample we have a pair of values of the variables x and y (i.e. $\text{log. } G/y$ and $\text{log. } Y_c$) which is represented by plotting a point on the scatter diagram. As our sample includes 53 countries, there are 53 such points on the scatter diagram, the numbering of

Log G_Y CHART. No. A.1. GOVT. EXPENDITURE AS A PERCENTAGE OF GNP AND LEVEL OF ECONOMIC DEVELOPMENT.



such points corresponding to the respective numbers given to different countries included in our sample. Such numbers and the data of G/y and Y_c for countries included in our sample are to be found in the table A.1 in Appendix A.

The scatter diagram in the chart suggests some relationship between G/y and Y_c . A further inspection of the scatter diagram would suggest a curvilinear relationship (i.e. a curve concave downwards); our regression analysis with a polynomial regression function ($y = a + bx + cx^2 + dx^3$) provides further support to the relationship suggested by the scatter diagram.

Our regression equation is :-

$$y = 0.2267 + 0.065x + 0.286x^2 - 0.061x^3$$

and the curve in the chart represents computed values from that equation.

The computed correlation coefficient or index of correlation is 0.783; the coefficient of determination is 0.614, i.e. 61.4 per cent of variability of G/y is explained by our regression equation.

By an application of the analysis of variance technique we tried to ascertain (1) whether the non-linear coefficient of determination is significantly larger than a coefficient based upon a curve of lower order and (2) whether the non-linear coefficient is significantly greater than zero.

The F test (or the equivalent t test) showed that the use of the additional constants explained a significantly larger amount of variation (at 5% level of significance). The use of our polynomial regression function, as shown in chapter V, is also supported on analytical grounds. The use of the F test also showed that the non-linear coefficient significantly exceeds zero, the probability of its being zero being much less than 0.001.¹

It may be pointed out that the point at which the diminishing rate of increase starts is the point of inflection in the curve, i.e. where the change in slope is zero.

By setting $\frac{d^2Y}{dX^2} = 0$, we have $X = 1.57$,

Anti-log. of 1.57 = 37.1 (dollars)

On the basis of our regression function, an increasing rate of increase of G/Y with relation to the rate of increase of real per capita GNP is likely for countries with extremely low level of income.

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1. The formulae for such tests of significance can be found in any standard text book on applied statistics, which discusses polynomial regression. See, e.g. Frederick E. Croxton and Dudley J. Cowden, Applied General Statistics, second edition, Sir Isaac Pitman & Sons Ltd., London, 1962, pages 726-730. The tests of significance are, however, based on the usual assumptions in a regression analysis, i.e.,
 - (a) The universe, from which, the sample is chosen is very large.
 - (b) The sample includes homogeneous units.
 - (c) For given X's the Y's are normally distributed about the regression function with a standard deviation which is the same for all X's, i.e. the deviation or error is normally distributed about a zero mean with given standard deviation.

Similarly by setting

$$\frac{dY}{dX} = 0, \text{ we have } X = 3.243 \text{ (disregarding negative value of } X)$$

Anti-log. of $X = 1750$.

The Chart indicates that a maximum for G/Y is reached when $X = 1750$ dollars, beyond which G/Y diminishes.

Moreover, from the scatter diagram, it is also apparent that the geographical location of a country could be an important factor in influencing the level of public expenditure. It can be noticed that the Latin-American countries are usually below the regression curve, whereas the African and Asian countries are usually above that curve. The explanation for the importance of geographical location will also be given in chapter V.

The regression equation and the fitted curve show a diminishing rate of increase of G/y with relation to the rate of increase of real per capita income for the range of actually observed real per capita income. The equation would show an increasing rate of increase of G/y for a very low level of income (i.e. below \$37). But as the countries with such low levels of income either do not exist now or are extremely few, the fitted curve relevant for analytical purposes is a curve showing a diminishing rate of increase of G/y with increasing level of per capita income. Any other

curve fitted to such data, we think, would show a similar tendency; because the flattening out of a curve, especially for the high-income countries, is pretty obvious from the scatter diagram.

Thus, the answer to the specific questions asked in Section II, as provided by our statistical observations are:-

- (1) There is a highly significant correlation between government expenditure as a share of G.N.P. and the real per capita income.
- (2) The average relationship is that of a diminishing rate of increase of G/y with relation to the rate of increase of real per capita income (increasing rate of increase of G/y may occur only for countries with extremely low level of income.)

Our main hypothesis, supported by statistical observations, therefore, is that government expenditure as a share of G.N.P. increases at a diminishing rate with an increasing level of economic development, the analytical reasons for which will be discussed in Chapter V.

CHAPTER FOURPUBLIC EXPENDITURE AND ECONOMIC GROWTH -A TIME-SERIES APPROACHI Introduction

In this chapter, a statistical analysis of the growth and time-pattern of public expenditure with relation to economic growth is attempted for different countries. Our primary concern, however, is to study the time-pattern of such a growth of public expenditure; or, specifically, to examine whether social upheavals, such as war, affect the level and/or rate of growth of public expenditure with relation to that of per capita income. Professors Peacock and Wiseman's "displacement effect" hypothesis in this area, deduced from their statistical observations of the behaviour of British public expenditure (which was discussed in chapter II), will be tested for a number of countries, not only with regard to the World Wars but also with regard to the Great Depression which could be considered a major social upheaval in the case of some countries. We have attempted to make some quantitative measurement of that 'effect'. In addition to the verification of their 'displacement effect' hypothesis, which refers only to the shift in the level of government expenditure with relation to economic growth, we investigate also the effect, if any, of a social upheaval on the rate of growth of government expenditure with relation to economic growth. Some statistical tests of significance of such shifts and/or changes in the rate of growth of government expenditure are made with a view to examining whether they are statistically significant so as to associate

them with the respective social upheaval.

In section II of this chapter the objectives of our time-series approach are stated in the form of specific questions which we are interested in answering. Section III is concerned with the statistical procedure and measures (viz., definition of government expenditure, elimination of the "price and population effects", exclusion of the war-related expenditures, per capita income at constant prices, choice of countries); and some of the related conceptual and statistical difficulties are also discussed in that section. The statistical tables and the sources of those tables used in our time-series analysis are given in Appendix B. Section IV describes the statistical techniques (i.e. the division of the time-period into sub-periods, choice of regression function, measurement and tests of significance of the shift in the level and change in the rate of growth of government expenditure with relation to economic growth) used in the study. Section V provides the answers to the specific questions asked in section II in the case of each country included in our time-series approach (viz., U.K., Germany, U.S.A., Canada, Sweden), with regard to the effect of social upheaval on the level and rate of growth of government expenditure with relation to economic growth. The necessary adjustments to the available statistical data in order to ensure comparability over time and between countries, the divergencies, if any, from our definitions in the case of each country, and the similarities or dissimilarities observed between different countries are also noted in this section. Finally, a summary of the statistical

observations and the hypotheses suggested is provided in the last section of this chapter.

II Objectives

The main objective of our time-series studies, as stated above, is to examine whether social upheavals such as war affect the level and/or rate of growth of government expenditure with relation to economic growth.

Specific questions which we are interested in answering, are the following:

- (1) Is a major social upheaval (such as a world war, and also The Great Depression in the case of some countries) associated with a shift in the level of government expenditure with relation to economic growth? To put that question in a different form, is a social upheaval associated with a shift in the regression function of G_c (i.e. per capita total government expenditure other than for war-related government expenditure at constant prices) on Y_c (i.e. per capita G.N.P. at constant prices)?¹
- (2) If such a shift is observed, is that shift statistically significant so as to associate it with the respective social upheaval?
- (3) Is a social upheaval associated with a change in the rate of growth of government expenditure with relation to that of per capita income? In other words, is an upheaval associated with a change in the slope of the regression curve of G_c on Y_c ?

¹ We discuss in the next section of this chapter why G_c and Y_c are chosen for the sake of our analysis, instead of total government expenditure and G.N.P. at current prices.

- (4) If a change in such a rate of growth of public expenditure is observed, is that change statistically significant so as to associate it with the respective social upheaval?

In our time-series studies in section V, in addition to providing some answers to the above mentioned questions, we will also point out the similarities (or dissimilarities) observed between different countries as regards the growth and time-pattern of public expenditure with relation to economic growth.

III Statistical Procedure and Measures

(i) Definition of government expenditure

There is no single definition of the government sector or expenditure which can claim universal acceptance. As pointed out in chapter III, various different statistical measures are suggested and/or adopted by different economists, depending upon the objective of a study and also on the availability of data. We do not intend to describe those various measures or to discuss the conceptual problems connected with different concepts, which have been debated in the literature of recent years. Some of such measures and the main elements of controversy (e.g. about the inclusion or exclusion of transfer payments) are, however, discussed briefly in chapter III.

The concept of total government expenditure for our time-series studies is that of the British study by Professors Peacock and Wiseman, which conforms basically with that used by Central Statistical Office of the United Kingdom, as found in the National Income and Expenditure Blue Books. The concept used in the National Accounts of the different countries, in most cases, is also very similar to their definition.

The conceptual problems connected with the definition of government expenditure adopted in our study are discussed in detail in the study by Professors Peacock and Wiseman. In general terms, however, government expenditure should include expenditure of all levels of government, i.e. of central and local governments in the case of a unitary state and also of governments of regions (i.e. state or province) in the case of a federal state. It should also include the expenditures of closely associated agencies, such as social insurance schemes financed by compulsory contributions from employees and/or employers, which may not be amenable to the same budgetary control as other expenditures and whose transactions may be recorded in the extra-budgetary accounts. The essential characteristic of such agencies is that their services, like other services included in the budget, are not sold in the market and are financed mainly by compulsory contributions which are similar to taxes. It is, therefore, considered necessary that their expenditure should also be included for the measurement of total government expenditure. The total expenditure, however, should be taken net of internal transactions between the different levels of government and the associated agencies, and of transactions between the different departments of the same government, so that no duplication of expenditures or double-counting occurs. Again, when specific fees are paid for certain non-commercial government services (such as school fees and fees paid for health service), they should be deducted from the corresponding government expenditure. The total government expenditure is, therefore, defined as net of such specific fees.

The fees which are paid for services which the government alone can provide, e.g., passport fees and all kinds of legal fees are, however, treated as taxes, and are, therefore, not deducted. The social insurance contributions also, as mentioned before, could be treated as taxes; and are, therefore, not deducted. In the case of some countries, as shown later in section V, it has not been possible to exclude the above-mentioned specific receipts because of the lack of necessary statistical information. Besides, the government purchases of goods and services are usually recorded at market prices and thus include taxes on expenditure which the government pays to itself. It has also not been possible to exclude this tax element from the expenditure series computed for different countries included in our time-series study.

The definition of government expenditure adopted for our time-series studies includes not only the purchases of goods and services but also the transfers and subsidies, such inclusion being constant^{is} with the definition adopted in our cross-section approach. The controversy as regards their inclusion or exclusion and the particular reasons for our choice of inclusion are already given in chapter III, section II. To repeat, transfers and subsidies, like the purchase of goods and services, are normally financed by taxes. Both sorts of expenditures are determined not by the market but by political decisions made through the political process and are often policy alternatives to achieve a specific end. Therefore, we choose to include transfers and subsidies also for our measure of total government expenditure.

Following the social accounting conventions, the expenditure of public corporations such as railways are not included. The essential characteristic of public undertakings is that their services or products are sold in the market; and, therefore, are likely to be much more affected by market criteria than by the categories of public expenditure mentioned above. From an economic point of view, their activities are basically of the same nature as those of private enterprises; both being usually guided to a large extent by commercial considerations. The most satisfactory procedure, therefore, would be to exclude 'production expenditures' completely from our measurement of total government expenditure. It is, however, not possible in practice to exclude all forms of trading activities of the different levels of government. Usually, certain trading services, such as Post Office, which are financially dependent on government, are included in the government accounts; whereas other public enterprises, which are not so dependent but otherwise little different in economic character, are excluded from the government sector. The compromise made for such trading activities, following the social accounting conventions, is that current expenditures of those trading services are considered as self-liquidating and thus are not included, but capital expenditures are included. For public corporations and other public enterprises whose transactions are not included in government accounts, both current and capital expenditures are excluded for our measurement of total government expenditure.

For the sake of comparability over time and between different countries, computation of government expenditure for different countries

Text cut off in original

procedure for their elimination.

In order to eliminate price changes or to obtain the series of 'real' government expenditure (and also real G.N.P.), estimates at current prices need to be deflated by an appropriate price index. Several problems, conceptual and statistical, arise in this connection. First, there are general problems of index numbers, which will not be discussed here. Some of these general problems (e.g. the choice of weights, difficulties due to change of quality or introduction of new commodities because of change in taste, and need or technology over time) are pointed out in our cross-section approach while discussing the problems of international comparisons of income which, at least as far as the conceptual ones are concerned, were shown to be no different from the problems involved in comparison over time. Another set of problems arises because of the lack of market valuations for goods and services provided by a government. Usually such goods and services (almost all the goods and services, and expenditures ~~on~~ which are included in our definition of government expenditure) are not sold in the market either because the "exclusion principle"¹ does not apply to them or because of the socio-political considerations such as redistributive considerations. We consider in the next paragraph the various methods considered by different economists and statisticians for the deflation of current estimates of government purchases of goods and services.

1 See R. A. Musgrave, The Theory of Public Finance, Chapter I, op. cit.

One possibility is to regard government as a unitary being in the Pigovian sense, with tastes and preferences like other beings; and thus the prices paid by government in purchasing goods and services may be considered to represent its marginal utilities. An index of prices paid for such goods and services by the government could then be used to obtain the 'real' output consumed by government. But many would not accept an organic conception of state and even if one accepts this view of government, crude assumptions have to be made as regards the quality changes of the goods and services consumed by the unitary being. The second possibility is to regard government as a producer, so that the purchases of such goods and services can be considered as inputs used to produce government output. But then, how can one translate the current estimates of government inputs into the real government output values? The problems arise not only with regard to the construction of price index of government inputs, which is usually not available in a country, but also because one has to make some crude assumptions about the change in productivity of such inputs over time (because it is impossible to measure such productivity change), if the purpose is to derive the "real" government output series. The third method suggested is to measure the real government output by the volume of services rendered. In this method, the obvious difficulties are in defining the unit in terms of which the volume of each service is to be measured and also in allowing for quality changes. Another possibility is to value government services with the valuation placed on "comparable" services by the private

sector. As Professors Peacock and Wiseman point out in their study, "this would call for some arbitrary assumptions (e.g. about what constitutes a "comparable" service), and would also entail enough statistical labour and discussion for another treatise".¹

The method adopted for each time-series study, in order to eliminate the effects of price changes, is, however, chosen on the grounds of statistical expediency. Wherever possible, different components of government expenditure were deflated separately by appropriate price indexes and then the deflated components were added to obtain the total at constant prices. For example, as discussed later, in the case of Canada and the United Kingdom, current and capital expenditures of government were deflated by separate price indexes for current goods and services and for capital goods respectively. The transfer payments and subsidies were deflated by an index of prices of consumers' goods and services. The use of separate indexes obviates, to some extent, the difficulties associated with the change in composition of government expenditure compared with that of national product. Even this refinement was not possible in the case of all countries and a single index (i.e. whole-sale price index or an index implied in the current and constant price estimates of national product) was used due to the lack of statistical information.²

1 Peacock and Wiseman, op. cit., page 11.

2 As pointed out by Peacock and Wiseman, "the construction of any separate price index for government expenditure presents difficult statistical problems, and the computation and the use of more than one such index, would in our judgement have added more to complexity than to enlightenment", *ibid.* page 8.

The statistical method used for computation of real estimates has its obvious limitations. The deflation of current estimates of government expenditure by an index of prices of private output assumes almost identical productivity changes in both the private and public sector. The difference in productivity changes in the public and private sector, so far as it is due to the change over time in composition of government output compared with that of national output, could be taken into account in the calculation of real estimates for both, if the appropriate separate price indexes for different components of government expenditure and national product could be computed in sufficient detail. Although, as mentioned above, separate price indexes were used for different components in the case of some countries, they cannot be considered sufficiently detailed as regards the number of main components and the sub components into which the main components were divided for deflation; and therefore the differences in the productivity changes in the public and private sectors, even due to the factor mentioned above, is hardly taken into account. It has been pointed out by several economists that productivity in the government sector is rising at a slower rate than in the private sector. This is so because the public sector is characterised mostly by the service industries where the rate of increase of productivity is usually less than that of manufacturing or even of agriculture. It is impossible to establish any numerical value for this productivity lag in the government sector. Therefore no adjustment will be made for such a productivity discrepancy in our calculation of "real" estimates.

The importance of 'productivity lag' for our statistical observation and hypothesis is, however, discussed later in chapter V.

The elimination of the effects of population change also raises complex problems. The relationship between population changes and government expenditure is highly complex and uncertain. Population changes usually comprise not only of changes in total numbers but also of changes in the composition of population (such as old age pensioners or children as a percentage of total population), both of which are likely to affect government expenditure. Many kinds of government expenditures are likely to be affected by the number of persons in particular groups, whose needs such expenditures are designed to meet. However, the influences of population change, so far as it is due to change in total numbers, could be eliminated by computing our series on an average per capita basis. Although the per capita estimates do not eliminate the effects of changes in the composition of population, a quantitative measurement of which has not been possible, our analysis will be based on per capita estimates, which assumes in the absence of any better alternative that either the composition of population has not changed or that such changes (if any) have not affected significantly per capita estimates.

(iii) Exclusion of War-related Expenditures

For the testing of the displacement effect hypothesis it is also necessary that the expenditures that resulted directly from the Wars should be eliminated. The expenditures which can be considered as the direct consequences of war, continuing in peace-time are:

national debt interest, war pensions, war damage compensations, reparation payments, and so on. The possibility that the displacement effect is solely due to such 'accidental' expenditures generated by war can be eliminated by studying the behaviour of government expenditure other than for war-related expenditure. If our study of the residual government expenditure still shows a "displacement effect", it then could be considered the result of the influence of the social upheaval on government behaviour.¹

Following the same analytical procedure, the Great Depression-related expenditure should also be excluded for a country (e.g. the United States and Canada) for which the Depression is considered as a major social upheaval which influenced the time-pattern of public expenditure in that country. The high expenditure during the Depression was financed to a large extent by deficit financing. By excluding interest payments on national debt, considered as war-related expenditure, we are, however, excluding also the Great Depression-related debt commitments which continued after the recovery.

1 Following Peacock-Wiseman we have not included peace-time defence expenditure in the category of war-related expenditure. The defence expenditure is not eliminated because, to quote Peacock and Wiseman, "peace-time defence expenditure clearly does not lie as completely outside the influences that affect expenditures of other types as do war-time military expenditure and other war-related expenditures. like all other expenditure, defence spending requires the raising of revenues, and the governments of many countries (including Britain) are answerable to the electorate for defence spending. peace-time expenditure on defence constitutes a part of the total tax burden that the community is called on to bear. From this point of view defence expenditure is no different from any other expenditure, it is the total that is of prime importance to a government. it is probable, therefore, that in eliminating all defence expenditures we are eliminating altogether too much if we want the residual to reflect what government expenditure "would have been" in the absence of such spending", Ibid., p. 60-61.

(iv) Per Capita Income at Constant Prices

For the measurement of real per capita income, which is usually accepted as a measure of economic growth (and was accepted also in the cross-section approach), the first problem arises with regard to the choice of a measure of national income aggregate. Second, the 'population and price effects', as in the case of government expenditure, have somehow to be eliminated.

As regards the choice of a measure of national income aggregate, we would prefer gross national product at market prices for the sake of consistency with our cross-section approach, where such a measure was chosen; and also because of the specific reasons for our choice of that measure, given in chapter III. The gross national product is preferred to net national product mainly on practical grounds, since capital depreciation cannot be measured directly. Besides, since government expenditure is computed gross of depreciation of the public capital stock, it would also be appropriate to choose gross national product for the sake of logical consistency. Again, since government purchases of goods and services are computed at market prices, the national income aggregate selected should also be at market prices rather than at factor cost in order to maintain logical consistency. If the indirect tax content could be excluded from the public expenditure; then, the gross national product at factor cost could be regarded an equally good measure from the point of view of logical consistency. But, as already noted in sub-section (i), since it has not been possible to exclude taxes on such expenditure which the government pays to itself, the gross national product

at market prices is to be preferred.¹

Our choice of a measure of national income aggregate for individual countries included in the time-series study is, however, based on the grounds of statistical expediency. For two countries, namely the United States and Canada, we could select the series of G.N.P. at market prices. The series of G.N.P. at factor cost is selected for the United Kingdom and Germany and the G.D.P. at market prices is chosen for Sweden in the absence of any other better alternative series.

From these series, as for that of government expenditure, the 'population and price effects' have to be eliminated in order to obtain the series of real per capita income. We have already discussed some of the problems connected with the deflation of government purchases of goods and services, which equally apply for the computation of G.N.P. series at constant prices because government purchase is one of the main components of national product. The general problems of index numbers arise for deflation of private output. However, as is shown in section V, the series at constant prices, for all countries except Sweden, are obtained from official or other publications, which had been computed by deflating different components by separate price indexes. In the case of Sweden, a single index, i.e. the general wholesale price index was used for the deflation of G.D.P. series at the current market price. The adjustment for 'population effect' is to be made, as in the case of government expenditure series, by computing such series on an average per

¹ For other reasons in favour of a choice of G.N.P. at market prices, see chapter III, Section III.

capita basis.

(v) Choice of Countries

The analysis based on time-series studies necessarily limited us to a small number of countries for which historical data on a comparable basis is readily available. The number of countries included is U.K., Germany, U.S.A., Canada and Sweden. In the case of the first two countries, world wars are considered to be the major social upheaval. As discussed in section V, in the case of Canada and the United States, in addition to the wars, the Great Depression was also a major social upheaval. Sweden is an isolated case among our studies, which neither took a direct part in war nor was affected severely by the Great Depression. Thus, although our sample as regards the number of countries is a small one, still it enables us to examine not only the effects of wars but also the effect of the Great Depression in the case of some countries. War and Depression are two different types of social upheaval and their 'displacement effects', as is shown in Chapter V, would require a different interpretation. The inclusion of Sweden in our time-series study helps us to examine the effects of war, if any, on the time-pattern of public expenditure for a country which did not participate in war. However, because of the small number of countries included in our time-series analysis, even if we notice some general or common factors influencing the growth and time-pattern of public expenditure, extreme caution is needed as regards any generalisation of their applicability to other countries because of political and social differences and differences in economic development.

IV Statistical Technique

(i) Division of the Time-period into sub-periods.

After the necessary statistical series, namely the series of per capita total government expenditure at constant prices (excluding war-related expenditure) and that of per capita G.N.P. at constant prices had been obtained for as many years as possible, we found it necessary to divide the whole time-period for each country, into different sub-periods depending on the occurrence of major social upheaval in the case of each country during the whole time-period. For example, in the case of the United Kingdom, as shown later in section V (i), the whole time-period, i.e. 1890-1962, is divided into three sub-periods, viz., (1) the First War period (2) inter-war period (3) post Second War period, because the world wars are considered the only major social upheaval during that time-period. In the case of the United States (and also Canada), the inter-war period, i.e. 1923-1939 is divided further into two sub-periods, viz., 1923-1929 and 1931-1939, because the Great Depression is considered as a major social upheaval. The reasons for this are given in the next section. Such a division of the whole period into sub-periods was found necessary for the following reasons:

- (1) It facilitates our analysis of the effects, if any, of the corresponding social upheaval on the level and/or rate of growth of government expenditure with relation to economic growth. As is shown below, a separate regression function for government expenditure is fitted for each sub-period; and the difference between such regression functions fitted

for different periods and the statistical tests of such differences provide some answers to the questions stated in section II.

- (2) It is not possible to find any simple mathematical function to which the data for the whole period would conform because of the irregularities in the secular growth of public expenditure through time. In each of these different periods, public expenditures have behaved with more regularities than for the period as a whole.

(ii) Choice of Regression Function.

The next problem is the choice of a simple mathematical function so as to obtain the regression curve of G_c on Y_c . G_c and Y_c denote per capita total government expenditure (excluding war-related expenditure) at constant prices, and per capita G.N.P. at constant prices, respectively. We need a regression function which not only provides a "good" fit for the data, but also helps us provide some answers to the questions asked in section II. Besides, on the grounds of simplicity, it should be as uncomplicated as possible so as to facilitate the statistical computations and analysis.

On the above mentioned grounds, we chose a double logarithmic function of the form:

$$\text{Log } G_c = \text{Log } a + b \text{ Log } Y_c,$$

which is fitted for the different sub-periods into which the whole-time period for each individual country is divided.

Such a double logarithmic function seemed to fit better than a simple linear function. Besides it provides us with a measure of

the rate of growth of government expenditure with relation to that of Y_c . The constant b provides that measure. As is discussed below, by examining the differences between such regression functions fitted for different periods, we are able to provide some measure of the shift in the level (or the displacement effect of Peacock and Wiseman) and the change in the rate of growth of government expenditure with relation to economic growth, if any, associated with a social upheaval.

(iii) Measurement and Tests of the significance of the shift in the level and change in the rate of growth of government expenditure with relation to economic growth

As stated in the preceding section, a double logarithmic regression function is fitted for each sub-period (the whole time-period being divided into different sub-periods depending on the occurrence of major social upheavals), so that a regression equation of G_c on Y_c is obtained for each sub-period. Then, for a measurement of the increase in government expenditure due to a shift, if any, in the regression line of G_c on Y_c associated with a social upheaval, the following statistical method is used. The level of government expenditure in the year immediately after the shift is calculated with reference to the regression equation for the sub-period prior to the social upheaval. This is then subtracted from the level of expenditure calculated with reference to the regression equation for the sub-period in which that year lies. For example, in order to measure the increase in government expenditure due to such a shift after the second war in the case of the U.K., the level of expenditure in 1947 is calculated with reference to the regression

equation for the inter-war period, which is subtracted from the level of expenditure calculated with reference to the regression equation for the post second war period. The anti-log of the difference provides a measurement of the percentage increase in government expenditure after such a shift took place. For a measurement of the change in the rate of growth of G_c with relation to Y_c , the difference in the slopes of the regression functions for the two sub-periods (corresponding to the periods before and after the 'shift') is measured.

Now the important question is: could such shifts and changes in the slopes of the regression function of G_c on Y_c arise simply because of sampling error? Or, are they significant enough to be associated with the respective social upheaval?

In order to answer this question, we will test the two null hypotheses:

- (1) a social upheaval is not associated with such positive shifts;
- (2) a change in the rate of growth of G_c with relation to that of Y_c is not associated with the social upheaval;

for each major social upheaval, during the time-period under study in the case of each country included in our time-series analysis.¹

To test the significance of a shift or to test our null hypothesis No. 1, we used the following formula,

¹ I am indebted to Mr. R. A. Cooper for suggesting the formulae for tests of significance of such shifts and change in slope of the regression line of G_c on Y_c , and also for many other suggestions and comments.

$$|t| = \frac{\text{shift}}{s^1}, \quad \text{with } v = N_1 - 2 \text{ degrees of freedom,}$$

where

$$s^1 = \sqrt{s^2 \left[1 + \frac{1}{N_1} + \frac{(x_{N+1} - \bar{x})^2}{\Sigma(x_i - \bar{x}_i)^2} \right]}$$

And, as regards the test of significance of a change in the rate of growth of G_c with relation to that of Y_c , or to test our null hypothesis No. 2, we used the formula:

$$|t| = \frac{b_1 - b_2}{\sqrt{\frac{1}{\Sigma(x_i - \bar{x}_i)^2} + \frac{1}{\Sigma(x_k - \bar{x}_k)^2}}} \cdot \frac{\sqrt{N_1 + N_2 - 4}}{\sqrt{\Sigma(y_i - y_i^1)^2 + \Sigma(y_k - y_k^1)^2}}$$

The other symbols denote:

$$s^2 = \frac{(y_i - y_i^1)^2}{N_1 - 2}$$

y_i = an observed value of $\log G_c$ during a particular period, e.g., in the pre-first world war period, if we are testing the null hypothesis for the first war.

y_i^1 = a value of $\log G_c$ as calculated from the regression equation of G_c on Y_c for that period.

y_k = an observed value of $\log G_c$ after the shift (i.e. during the inter-war period when there is no further sub-division of that period).

y_k^1 = a value of $\log G_c$ as calculated from the regression equation for the sub-period after the shift (i.e. inter-war period).

N_1 = number of observations for the sub-period prior to the social upheaval (i.e. pre first war period).

N_2 = number of observations for the period after the shift (during the inter-war period in this case).

x_i = an observed value of $\text{Log } Y_c$ during that period (i.e. pre first war period).

x_k = an observed value of $\text{Log } Y_c$ after the shift (i.e. in the inter-war period in this case).

x_{N+1} = the observed value of $\text{Log } Y_c$ immediately after the shift.

$$\bar{x}_i = \frac{\sum x_i}{N_1}$$

$$\bar{x}_k = \frac{\sum x_k}{N_2}$$

b_1 = the rate of growth of G_c with relation to that of Y_c before the war.

b_2 = the rate of growth of G_c with relation to Y_c after the war.

By referring to the t table with $N_1 - 2$ degrees of freedom for the No. 1 hypothesis and $N_1 + N_2 - 4$ degrees of freedom for the second hypothesis we ascertain the probability of getting a value as great as or greater than the calculated value. If P is less than 0.05 for each calculated value, we regard the shift and change in slope as significant. If P is less than 0.01, they are highly significant. In these cases our null hypothesis are very unlikely and we reject them. The observed shift and/or change in the slope of regression function of G_c on Y_c are then considered significant enough to suggest that such a shift and/or change in the rate of

growth of G_c with relation to Y_c is associated with the social upheaval.

The important limitation of our statistical tests is that they are based on the assumption of an independent normal distribution of 'residual'. The assumption is highly doubtful in the case of a time-series analysis. The statistical tests of significance applied in our cross-section analysis in chapter III, are also based on such an assumption. Although it is conventional to accept that assumption as a necessary part of analytical procedure in a cross-section approach, it is a doubtful assumption for cross-section analysis too. For example, in our cross-section analysis in chapter III we tested certain income hypotheses. But, besides income, there are several factors, namely social, political, geographical location, etc., which may influence systematically public expenditure. The systematic influence of geographical location, however, was apparent from the scatter diagram given in chapter III. Thus, the assumption of independent normal distribution of 'residuals' is doubtful also in the cross-section approach. The difference as regards the validity, or rather invalidity, of such an assumption in a cross-section and a time-series lies only in degree. Some care, however, has been taken in our time-series analysis in this respect, an attempt being made to eliminate the influences of two important trend factors - namely population and price changes - on our variables.

It may, however, be pointed out that recently some complicated and sophisticated tests have been devised for testing the independence

of 'residuals' in time-series regression models; and if such tests show that the 'residuals' are not independent, instead of applying simple least-squares method, alternative complicated estimating procedures are to be adopted.¹

The small size of our sample (i.e. the number of pairs of observations of G_c and Y_c for each time-period being small, equal to five or four for the pre-first world war period and also for the inter-war periods for some countries), and the inadequacies of our data prohibited us from applying further sophisticated and complicated statistical techniques.² The consequences of applying the least squares formulae are that although we obtained unbiased estimators, their sampling variances are likely to be underestimated. Our statistical technique in this respect is imperfect. However,

1 See for example, J. Johnston, Econometric Methods, chapter VII, McGraw-Hill Book Company, 1963, for a summary of Durbin-Watson d test, and also some alternative tests devised by other econometricians for testing the independence of 'residuals' in time-series regressions, and also for the estimation methods when such residuals are not independent.

2 The number of degrees of freedom with reference to which the t tests described above can be made is related to the size of the samples. For the test of significance of a shift it is $N - 2$, and for that of a change in slope it is $N_1 + N_2 - 4$. Thus when the size of the sample or number of pairs of observations of G_c and Y_c is equal to five for each of the two consecutive periods, the number of degrees of freedom for the test of significance of a shift is equal to 3 and for that of a change in slope of regression function it is 6. The suggested sophisticated technique, with reference to which a new set of transformed variables are to be computed each time until a random set of residuals results, reduces further the number of pairs of observations and also, therefore, the number of degrees of freedom, by the number of times the estimating procedure is carried out until the 'residuals' are independent. The reduced number of degrees of freedom would either be too small for any possible tests or even if a test is possible, that test would not lead to a positive conclusion.

our observation, as shown later in section V, of a shift in the level and change in the rate of growth of G_c with relation to Y_c , associated with each major social upheaval in the case of each country included in our time-series analysis (which are also found to be highly significant although on the basis of our imperfect testing procedure), leads to a strong presumption that such shifts and changes in slopes are associated with major social upheavals.

V Government Expenditure and Economic Growth - Time-series Studies

(i) The United Kingdom

For an analysis of the growth of public expenditure with relation to economic growth in the case of the United Kingdom, the necessary statistical series for the period 1890-1955 are taken from the study of "The Growth of Public Expenditure in the United Kingdom" by Professors Peacock and Wiseman.¹ We have, however, extended the time-period up to the year 1962, on the basis of the same concepts and statistical procedure.

The conceptual and statistical difficulties and also the computational procedure involved in the computation of those series are discussed in great detail in Chapter I and the Appendix of their study, a discussion of which, therefore, is not intended here. In general terms, however, total public expenditure figures include the expenditures of the central government, the national insurance fund,

¹ Alan T. Peacock and Jack Wiseman, *The Growth of Public Expenditure in the United Kingdom*, op. cit.

and the local authorities of the U.K. All intra-governmental transactions are excluded, so that no duplication of expenditures occurs. The expenditures of the public corporations such as the Airways Corporations, and the Electricity Authorities are not included; but the capital expenditures of certain trading services of the central and local governments, such as the Post Office in the case of the former, and the electricity and gas services before nationalization in the case of the latter, which are financially dependent on government, are included. The current expenditure of those services is considered as self-liquidating and, therefore, is not included. From such total expenditure figures the war-related expenditures, viz., interest on national debt, war pensions, war damage compensation, release leave pay and war gratuities are excluded for the sake of our analysis of the effects of war on the time-pattern of public expenditure.

Further adjustment to total expenditure figures consists of the elimination of the 'population and price effects'. The price effect is eliminated by deflating the different components of total public expenditure by separate appropriate price indexes. Government current expenditure on goods and services, transfers and subsidies, and the very small change in stock, were deflated by an index of prices of consumers' goods and services. A separate price index was used for the deflation of gross fixed capital formation by government. The deflated total public expenditure figures at 1900 prices are divided by the corresponding population figures, so as

to eliminate the "population effect".

The "price and population effects" are also eliminated from the series of G.N.P. at factor cost by taking the per capita G.N.P. at 1900 prices for the whole period, i.e. 1890-1962.

Although the time-period for our analysis of the growth of public expenditure in the case of the United Kingdom refers to the period 1890-1962, some years from that period are excluded either because of the non-availability of data or for analytical reasons. For the years 1890-1913, the data were only collected at five yearly intervals up to 1910 (i.e. for 1890, 1895, 1900, 1905, 1910) and for 1913. The missing years in between them are, therefore, excluded. The war years are excluded because such years could be regarded as abnormal from the view point of the growth of public expenditure. These years are also excluded in the study by Professors Peacock and Wiseman. If the exclusion of the war years is justified because those were the years of social upheaval for which growth of public expenditure cannot be considered normal, the years before and after the wars also may not be considered normal years in the case of the United Kingdom. It is, of course, a matter of judgement to decide which years are abnormal years. Looking at the size of our sample, i.e. the number of years for which data is collected, it is not possible to exclude many years because otherwise the sample would become too small for any statistical analysis. Therefore, we excluded only the years immediately before the wars, i.e. 1913 and 1938, and after the wars, i.e. 1920-1922 and 1946. Several years after the First World War are excluded because

the data for 1918-1920 was not collected and also the G.N.P. data for the years 1920-1923 were only crude backward estimates gained by the simple device of interpolation.¹ We chose 1923 onwards because the data is more reliable and also because the public expenditure seemed to behave with more regularity than in the previous years.

Thus, for the pre-First World War Period, our data refers to the period 1890-19¹/₀, collected at five yearly intervals. For the inter-war period, we chose the years 1923-1937.² The post Second World War Period refers to 1947-1962. For the regression analysis of government expenditure with relation to economic growth, a double logarithmic function of the form $\text{Log } G_c = \text{Log } a + b \text{ Log } Y_c$ is fitted for each different period. As is shown in chart number B.1, the logarithms of per capita total government expenditure less war-related expenditure at 1900 prices (i.e. $\text{Log } G_c$) are measured on the Y axis and the logarithms of per capita G.N.P. at 1900 prices (i.e. $\text{Log } Y_c$) are measured on the X axis on a natural scale. Each dot in the chart shows the combination of $\text{Log } G_c$ and $\text{Log } Y_c$ with respect to one of the years 1890-1962.³

-
- 1 For 1914-1923, "We have compiled very rough estimates by interpolation using as our guide the changes in national income at constant prices These estimate figures are not very reliable, and we show them for the relevant peacetime years in Table A-2 only, for the purposes of broad comparison". Quoted from Peacock and Wisemans' study, op. cit., Appendix, page 154.
 - 2 From the inter-war period, we have excluded the years 1931 and 1932 also, the reasons for which are given in the next paragraph.
 - 3 For the necessary data, see our tables No. B.1 and B.2 in the Appendix.

Chart No. B.1. The Growth of Per Capita Govt. Expenditure with relation to Economic Growth at 1900 prices in the United Kingdom.

Log G_c

1.5

1.4

1.3

1.2

1.1

1.0

0.9

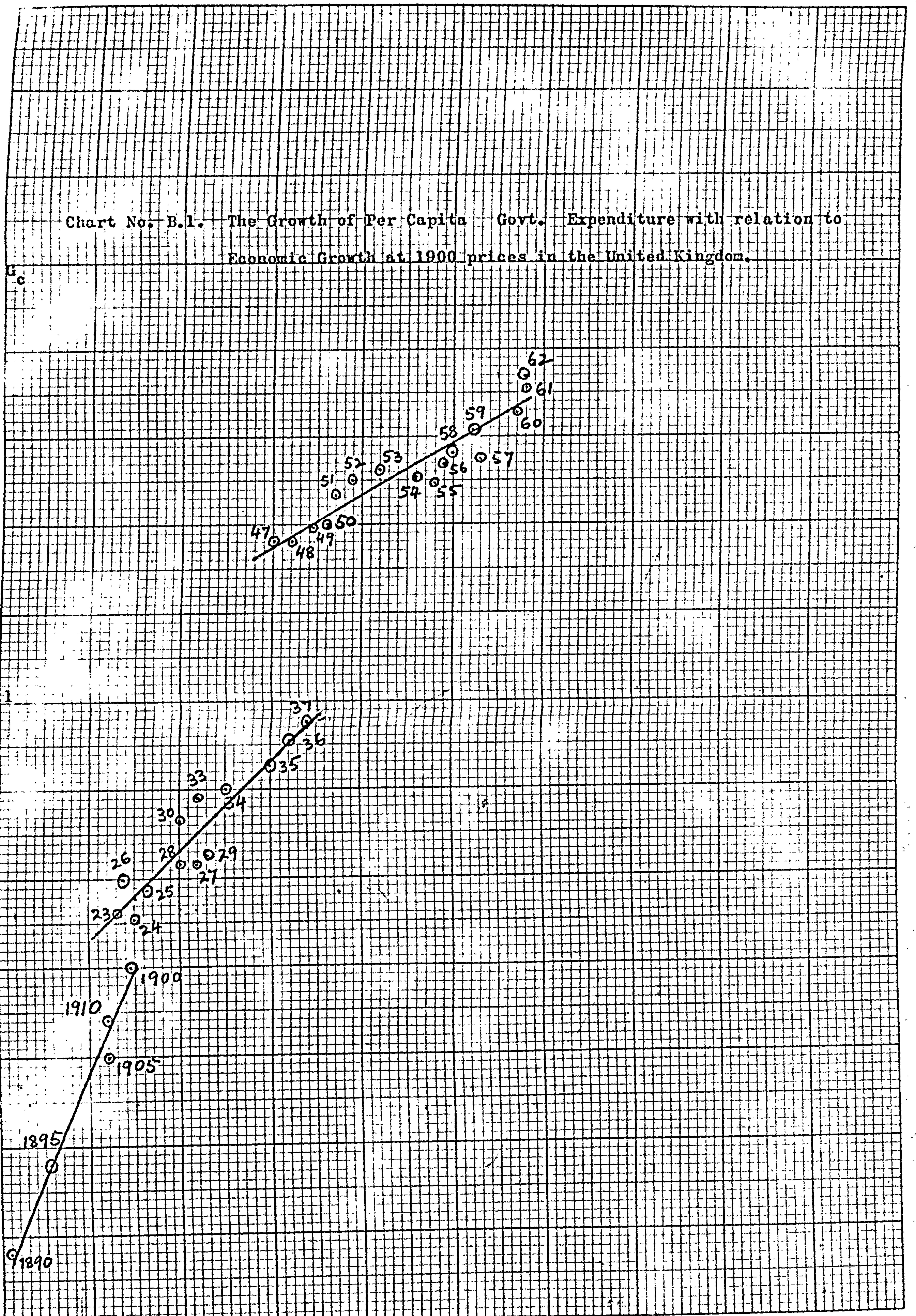
0.8

0.7

0.6

0.5

0.4



1.6

1.65

1.7

1.75

1.8

1.85

1.9

Log Y_c

to Y_c to be associated with the Great Depression. However, as was pointed out above, the two years 1931 and 1932 were the years in which percentage decline in real per capita income and also the percentage of people unemployed were the highest.¹ The total government expenditure during those years was also relatively high because of the enormous expenditures for unemployment benefit and the provision of poor relief. Those years, therefore, relative to the other years during our inter-war period, cannot be considered normal years. We have excluded, therefore, the years 1931 and 1932 from our regression analysis because their inclusion would otherwise distort seriously the regression function, based on the simple least-square fit.

For the different periods, we found three different regression equations of G on Y , viz.,

$$\text{Log } G_c = -6.856 + 4.568 \text{ Log } Y_c \quad (1)$$

$$\text{Log } G_c = -2.617 + 2.087 \text{ Log } Y_c \quad (2)$$

$$\text{Log } G_c = -0.795 + 1.182 \text{ Log } Y_c \quad (3)$$

for the pre First War, inter-war and post Second War periods respectively.

They differ from each other not only with respect to the intercepts but also with regard to the slope (regression coefficient of G_c on Y_c) which denotes the rate of change of G_c with relation to that of Y_c .

¹ See Peacock and Wiseman, op. cit., Table A-4 page 158 for percentages of unemployment in different years.

Professors Peacock and Wiseman, in their study, explain the time-pattern of the growth of public expenditure with reference to the "displacement effect" of war, only in terms of the shift of such a function for different periods. We found that such shifts occurred; but also that after each war the slope of the regression line of G_c on Y_c diminished; or in other words the rate of change of government expenditure with relation to economic growth diminished.

A shift in the regression function of G_c on Y_c occurred after both World Wars, but such a shift was greater after the Second World War than it was after the First War. After the Second War the shift accounts for about a 72.8% rise in government expenditure, but only a 27.0% rise after the First War. But after each war, the rate of growth of government expenditure with relation to per capita income diminished relative to that of the pre war rate. It diminished from the pre-First War rate of 4.568 to 2.087 after the First World War. Nevertheless, it was still much higher than unity so that government expenditures as a percentage of G.N.P. went on increasing during the inter war period. But after the Second World War it diminished from the rate of 2.087 to 1.182. Government expenditure as a percentage of G.N.P., therefore, had been almost constant during the post-Second War period.

Now the question is: are these shifts and changes in the rate of growth of G_c with relation to Y_c significant enough to be associated with the world wars? Or, could they not arise simply because of sampling errors?

We proceed to test the two null hypotheses, viz., that

- (1) either the First War or the Second War is not associated with such positive shifts.
- (2) A change in the rate of growth of government expenditure with relation to economic growth is not associated with either of these wars.

By the statistical tests of significance, described in the section IV (iii) of this chapter, both these hypotheses are found to be very unlikely, and we reject them. Hypothesis No. 1 is rejected at much less than 1 per cent level of significance for both the First and Second World Wars. The positive shifts are highly significant in suggesting that the shifts in the regression function of G_c on Y_c occurred after each war. The second null hypothesis is also rejected at much less than 1 per cent level of significance. The negative change in the rate of growth of government expenditure with relation to economic growth after each war is highly significant in suggesting that this change occurred after each war in the case of the U.K.

(ii) Germany

The statistical data necessary for our analysis of the growth of public expenditure with relation to economic growth in the case of Germany is taken from the study of "The Growth of Public Expenditure in Germany since the Unification" by Mrs. Suphan Andic and Dr. Jindrich Veverka.¹ Because of the territorial changes after

1 Mrs. Andic and Dr. Jindrich Veverka, The Growth of Public Expenditure in Germany since the Unification. Finanzarchiv, January 1964.

the First and Second World Wars in the case of Germany, the statistical estimates refer to different geographical areas during different time-periods. The estimates until the First World War refer to the old German Reich, and the inter-war estimates refer to the reduced territory which existed after that war. The post Second War estimates cover only the German Federal Republic, excluding Berlin and the Saar because of the lack of statistical sources.

The definitions and the general statistical procedure adopted for the estimation of the necessary statistical data are basically those of the study by Professors Peacock and Wiseman. The conceptual and statistical difficulties arising out of the particular circumstances specific to Germany, and also the computational procedures and the sources of the estimates are discussed in some detail in the main text and the statistical appendix of their paper. The major specific difficulties, and the adjustments made, which relate particularly to the statistical series used in our study are, however, mentioned very briefly below.

For the computation of the total public expenditure series for the period 1881-1958, the expenditures of all the levels of government, i.e. the government of the Reich (Bund), those of the States (Länder) and the local authorities (Gemeinden and Gemeinderesleände), are included. The transfers between different public authorities and between the different accounts of the same public authorities are excluded so as to avoid double counting. The estimates until 1913, however, include some double counting because although the non-specific transfers between the central and state governments have

been excluded, the adjustment was not carried out for the "small amounts" of specific grants. Second, the estimates prior to 1913 also include a "considerable amount" of current expenditure on trading services, which according to our definition of government expenditure should have been excluded. As pointed out by Mrs. Andic and Dr. Veverka, "the items could be removed with great effort, if at all". Prior to 1913, the accounts of the public enterprises, such as railways and postal services, were not separated from the budgets of the public authorities. Such enterprises became autonomous after the First World War and their accounts no longer appeared in the budgets of the public authorities. The authors of the German study, however, made some estimates of the capital expenditures of these trading enterprises for the period prior to 1913 and their 'adjusted' estimates of government expenditures for that time-period exclude the capital expenditures by such enterprises. Such 'adjusted' estimates seem to "reflect better the long-term trend" and therefore were adopted by them. In the absence of any other better available alternative series, we have decided to use the 'adjusted' one for the period prior to 1913.¹ Third, during the Nazi government, many of its functions were carried out through several non-governmental

1 The estimates of government expenditure exclude the capital expenditures of the trading services which remained under the direct responsibility of the public authorities, because only the net balance of expenditure and revenue on both current and capital accounts is included in the Financial Statistics. The post Second War estimates include the net balance of current and total expenditures of the trading services.

organisations such as Arbeitsfront, Winterhilfe and others. They are not included in the estimate of total public expenditure, "the only group of non-governmental character included in the semi-public bodies administering the German social insurance".¹ Therefore, the size of the public sector is underestimated for the Hitler regime. Such underestimation also arises because of the exclusion of the trading enterprises which were dominated by non-commercial considerations such as defence requirements, especially during the Nazi Government. Lastly, the comparability over time is affected due to the territorial changes after the First and Second World Wars. After the First War, Germany lost about 13% of its territory and consequently about 11% of its population and 8% of its G.N.P. The losses after the Second War were even more severe, amounting to 52% of the territory and the consequent loss of about 44% of the population and 41% of the G.N.P. Such changes are most likely to affect the level and composition of government expenditure. In the absence of any other better alternative, it is assumed that per capita estimates of government expenditure were not affected by such territorial and accompanying changes. Such an assumption has its obvious limitations. The lower average per capita income and population density, the greater dependence on agriculture in the lost territory and also other differences between the lost and the

1 Ibid., page 228, "Otto Nathan estimated the revenue of these non-governmental organisations in 1938 at no less than 10% of total government revenue", Ibid., footnote 2, page 173. See Otto Nathan, Nazi War Finance and Banking N.B.E.R., New York, 1944.

remaining territories of Germany can hardly leave the average per capita estimates unaffected. But, because of the cost-element, and the absence of the necessary data to analyse the effects of such changes on the per capita estimates, it was assumed that the territorial changes have not affected the per capita estimates. Our analysis is based on such per capita estimates computed by Mrs. Andic and Dr. Veverka; and, therefore, suffers from all the above mentioned limitations.

Further adjustments to such per capita estimates of government expenditure are made in order to eliminate the "price effect". In addition to the general conceptual difficulties encountered in the deflation of current estimates of government expenditure so as to obtain the real amounts (due to the absence of a market valuation of government services and the general problems of index numbers), the statistical difficulties were due to the lack of appropriate indices by which different components of government expenditure could be deflated. Therefore, instead of using separate indices for different components, as was done in the case of the United Kingdom, a single index was used for such deflation. For the period prior to 1925, the index used is an unweighted geometric average of the index of wholesale prices and an index of retail prices (both for limited number of commodities, with foodstuffs predominating); and after that date the index used is that implicit in the official estimates of national product at current and constant prices. The deflation of current estimates of government expenditure by such

indices assumes almost identical productivity changes in both the private and public sector.¹ The war-related expenditure such as interest on national debt, war-related social assistance, and war damage compensation including reparation are also excluded before obtaining our final estimates of real per capita total government expenditure.

The other important series necessary for our analysis is that of real per capita G.N.P., which is also taken from Mrs. Andic's and Dr. Veverka's study. For the computation of their series, the official estimates of G.N.P. were taken for the period after 1925; but for the period prior to that date, in the absence of official estimates, the series given by Hoffman and Müller was taken,² after some adjustments for capital depreciation being made to their net national product estimates.

Our analysis is restricted by the availability of government expenditure and G.N.P. data. For the pre-First War period, such data is available only for five years, with major gaps in between these years. We have data only for the years 1881, 1891, 1901, 1907 and 1913. Such a small sample reduces "reliability" or increases "sampling error" to such an extent that in some cases, as shown below, no positive conclusion seems possible.

1 For a discussion of the "productivity lag" in the public sector and its probable effect on the secular growth of public expenditure in Germany see Mrs. Andic and Dr. Veverka, op. cit., page 177-179.

2 W. G. Hoffman and J. H. Müller, Das deutsche volkseinkommen 1851-1957, Tübingen, 1959. For the adjustments made to their series of net national product see Mrs. Andic and Dr. Veverka, op. cit., Appendix page 226.

For the post-Second War period data is available for 1950-1958. The data is not available for 1946-1950 and therefore such years are excluded.¹ It may however, be pointed out that the immediate post war years were characterised by low per capita income and monetary instability, which one may consider as an indirect consequence of the war. But by 1950, although the per capita income was about 88% of the pre-war level, the recovery had already started with monetary reform in June 1948.

The great difficulties, however, arise as regards the analysis of public expenditure during the inter-war period, which was a period of almost continuous disturbances. As was pointed out by Mrs. Andic and Dr. Veverka in their study, 'the period of unrest was not limited to the actual war years but continued throughout from the outbreak of the First World War until the close of the Second World War. Gutar Stolper described those years as the "period of disasters", conveying clearly its unifying tendency to slip nearer and nearer to a total collapse. It would be interesting to separate the effects of Nazi ideology from other growth factors present in the 1930's. Even if this were conceptually possible, the available statistical material would not permit such an analysis'.²

The immediate post-First War years, like the years immediately after the Second War, were years of monetary instability and very low

1 We have not extended the series to later years. This is so because although the statistical Appendix of Mrs. Andic's and Dr. Veverka's study provides some description of the computation procedures and the sources of estimates, as pointed out by them, "it is not exhaustive, and the reader could not reconstruct the estimates for himself.", page 223. Besides it seems highly unlikely that the extension of the series to two or three years would change our statistical findings significant.

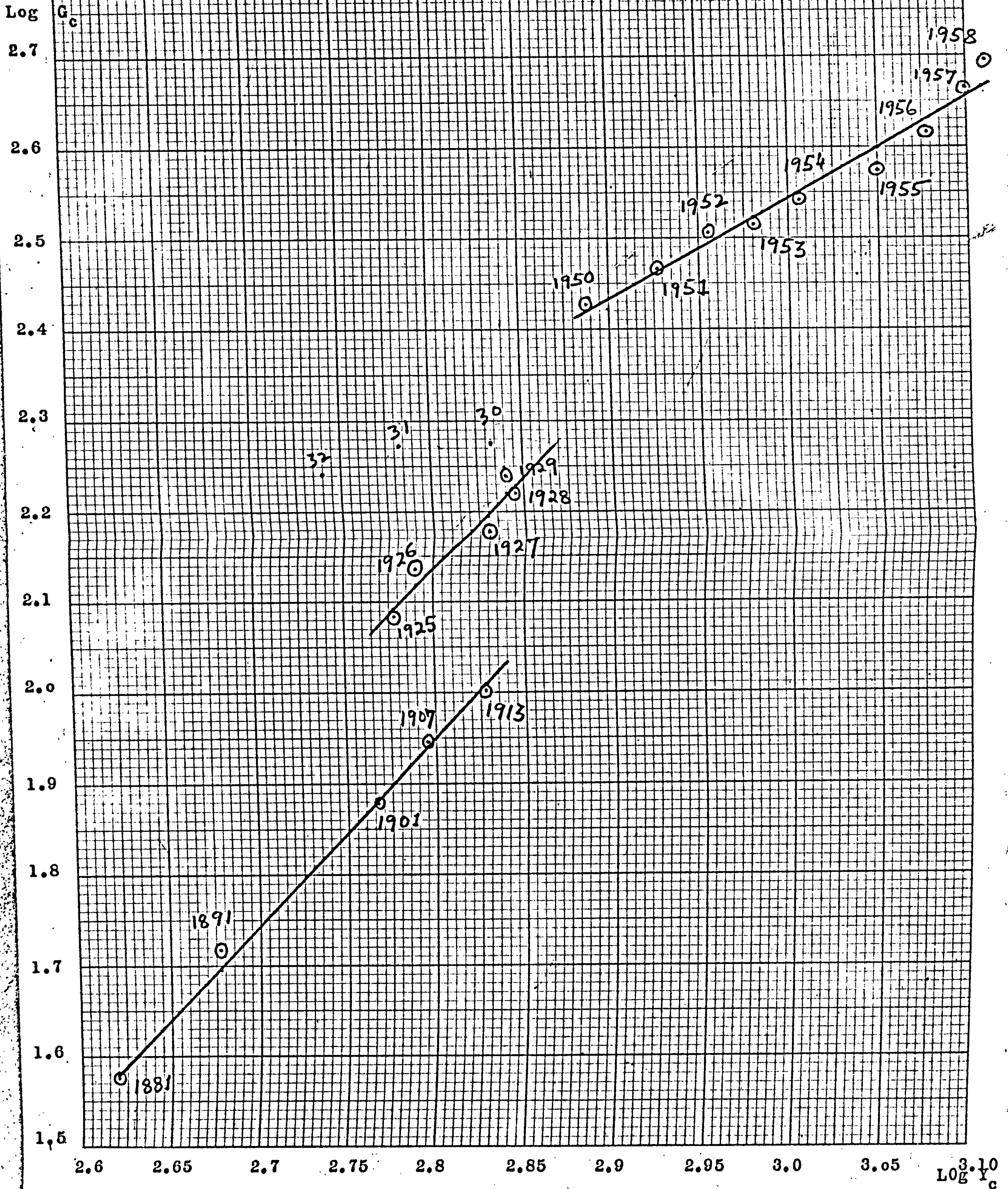
2 Mrs. Andic and Dr. Veverka, op. cit., p. 190.

per capita income, and could be regarded as the indirect consequences of the war. The estimates of government expenditures prior to 1925, however, are not available, and, therefore, such years are to be excluded from our analysis. The first estimate of government expenditure after the First War is that of 1925. By 1925, although the per capita income was still about one sixth under the 1913 level, the economy was well ahead on its way to recovery "in response to the monetary stability and the agreement upon the reparation payments of 1924".¹ The per capita income was rising during the period 1925-1928. In 1929 also it was only marginally lower than in 1928, and government expenditure also continued to rise during the period 1925-1929. Such a rise in per capita income was checked by the Great Depression; rather, it declined by about 22 per cent between the years 1928 and 1932. Rapid recovery, however, started from 1933 and by 1938 the real per capita income reached a level never experienced before. The adverse effects of the Great Depression, though not to be considered as severe as those suffered by the American or Canadian economy, where the real per capita income never reached the level of 1929 in any of the years during the thirties, were more serious than those suffered by the British Economy, where the decline of such incomes was almost 7% in 1932 in comparison to the level reached in 1929 and the recovery to that level was also much quicker than in the case of Germany. As one may guess from our scatter diagram given in chart No. 2, possibly a shift in the

1 Ibid., page 191.

regression function of G_c on Y_c is associated with the Great Depression in the case of Germany. However, this is unlikely to be as great as that, shown later, in the case of the United States or Canada. Unfortunately it has not been possible to examine the effects of the Great Depression on the time pattern of public expenditure because of the reasons given below. Although rough estimates of total public expenditures during the Hitler regime since 1933 are available in the study by Mrs. Andic and Dr. Veverka, such estimates are seriously underestimated because, as already stated, many of the functions of the Nazi government were carried out through non-governmental organisations which were not included for the purpose of their estimation. The exclusion of trading enterprises which were dominated by non-commercial considerations especially during the Nazi government also gives rise to under-estimation. Besides, even such rough estimates could not be adjusted for the war-related expenditures because data for such expenditures is not available for the years since 1933. Such expenditures, we think, were of great importance during the Hitler regime. Therefore, for the sake of comparability with different time periods within the same country and with other countries we had to exclude the period 1933-1938. For the three years of the Great Depression before the Hitler regime, i.e. 1930-1932, a separate regression analysis was not considered worth attempting, the number of pairs of observations of government expenditure and per capita income being too small. Thus, for the inter-war period, we are left with public expenditure and G.N.P. data for only five years, i.e.

Chart No. B2. The Growth of Per Capita Govt. Expenditure with relation to Economic Growth at 1900 prices in Germany.



1925-1929 and our analysis is restricted to this limited number of years for the inter-war period.

After such necessary data being obtained, for the three different periods considered by us (see Tables B.8-9 in the Appendix), we fitted a double logarithmic function for each different period of the same form, i.e. $\text{Log } G_c = \text{Log } a + b \text{ Log } Y_c$. As shown in Chart 2, the logarithms of per capita government expenditure less war-related expenditure at 1900 prices, i.e. $\text{Log } G_c$, are measured on the X axis on a natural scale.

For the three different periods, we found three different regression equations of G_c on Y_c , viz.,

$$1881-1913: \text{Log } G_c = -3.885 + 2.084 \text{ Log } Y_c \quad (1)$$

$$1925-1929: \text{Log } G_c = -3.530 + 2.025 \text{ Log } Y_c \quad (2)$$

$$1950-1958: \text{Log } G_c = -0.854 + 1.132 \text{ Log } Y_c \quad (3)$$

They differ from each other not only with respect to the intercepts but also with regard to the slope which denotes the rate of change of G_c with relation to Y_c .

The difference between the 1st and 2nd regression equations could be attributed to the consequences of the First World War, which was the major social upheaval in between those two different periods. We cannot, however, say that the difference between the 2nd and 3rd regression equations was due to the Second War. In between those periods to which 2nd and 3rd regression equations relate, the Great Depression, the Hitler regime, and the Second World War all consecutively exerted their influence as major social upheavals; and

it is not possible to isolate the effects of one from those of the others. All we can say is that the difference in the 2nd and 3rd regression equations may be due to the combined effect of the Great Depression, the Hitler regime, and the 2nd World War, i.e. the social upheavals of the thirties and the Second World War.

As shown in chart No. 2, we find that the shifts in the regression function of G_c on Y_c occurred after the social upheavals in the case of Germany as well. The shift after the First War increased government expenditures with relation to economic growth by about 54.7%. The second shift which occurred after the social upheavals of the thirties and the Second World War increased government expenditure further by about 24.3%. Thus we notice, both in the U.K. and Germany, and also in other countries, as will be shown later, shifts in government expenditures with relation to economic growth after the major social upheavals.

Again, as it happened in the U.K., we find that after the social upheavals the rate of growth of G_c with relation to Y_c also diminished in the case of Germany. It diminished after the First War from 2.08 to 2.02 and after the social upheavals of the thirties and the Second World War it diminished from 2.02 to 1.13. It is interesting to observe almost the same rate of growth of G_c with relation to Y_c in both countries during the inter-war period and also the post Second War period considered by us. For the U.K. the rate was 2.087 for the inter-war period and was 1.182 during the post-Second War period; in the case of Germany too our statistical findings show almost the same rates for the above mentioned periods.

For Germany also, we attempted the same sort of tests of significance for the positive shifts and the negative changes in slopes which occurred after the major social upheavals. The problem which we faced for such tests was the small size of the samples with which we are left for the inter-war period and the pre First War period, for each of which the number of pairs of observations of G_c and Y_c was only five.

However, even with such small samples, our first null hypothesis that the positive shifts did not occur after the major social upheavals was rejected at a level of significance of 1% and 5% for the first and second social upheavals respectively. The shifts are large enough for the positive hypothesis, that social upheavals exert upward pressure on Government expenditure, not to be refuted. To this extent we may have a degree of confidence in the hypothesis.

As regards the second null hypothesis that a change in the rate of growth of G_c with relation to Y_c is not associated with such upheavals, the hypothesis is again rejected at a level of significance of 1% so far as the social upheaval of the thirties and the Second World War is concerned, the rate of growth of government expenditure being diminished by about half after these upheavals. But, because the change after the First War is quite small, i.e. from 2.08 to 2.02, and the samples are so small that the number of degrees of freedom (i.e. $N_1 + N_2 - 4 = 6$), with reference to which such a test can be made, is very small, we cannot reach any significant conclusion. This however, cannot be construed as an acceptance of the null hypothesis.

The main difficulty, as already pointed out, is due to the small size of the sample for the inter-war period. If the inter-war period is excluded altogether, as a period of political and economic instability and major upheavals, and a comparison is made between the pre-First War and the post-Second War periods, we find that the positive shifts and the negative change in the slope in the regression function of G_c on Y_c are both significant at the 1% level of significance.

(iii) The United States

The first step in our analysis of the growth of public expenditure in the case of the United States is the computation of continuous total government expenditure series for as many years as possible. This may seem an easy task in view of the recent publication of several studies concerned mainly with some aspects of the secular growth of the public sector in the United States.¹ But the real problem arises because of the requirement of not only comparability over time but also between different countries. The Government expenditure, as defined in any of those studies, does not agree completely with our definition outlined in section III, and, therefore, the purpose of comparability between different countries cannot be achieved if our analysis is to be pursued on the basis of expenditure series given in any of those studies, unless several

¹ See, for example, Solomon Fabricant and Robert E. Lipsey, The Trend of Government Activity in the United States since 1900, N.B.E.R., New York 1952; M. Slade Kendrick, A Century and a Half of Federal Expenditures, N.B.E.R. 1955 John M. Firestone, Federal Receipts and Expenditures During Business Cycles, 1879-1958, N.B.E.R. 1960; Morris A. Copeland, Trends in Government Financing N.B.E.R. 1961.

The methodology adopted for the computation of total government expenditure is first to estimate expenditure of federal government (including that of trust accounts) and that of state and local governments separately and then to combine them together to obtain the estimation of total government expenditure. Several adjustments are, however, made to the census data so as to obtain a series of government expenditure which is conceptually, as far as possible, similar to our definition, so that the purpose of comparability within the countries is achieved to the highest possible degree.

In the case of the federal government, expenditure data (including that of Trust Accounts), is taken from the Census publication for the years 1932-1962; adjustments made, the reasons for which are given below.

First, the item 'intergovernmental expenditure' which represents Federal Grants-in-aid to State and Local Governments is subtracted from the Federal Government total expenditure given in the Census publication, so as to avoid duplication of expenditures. The expenditures financed by such Federal Grants-in-aid are, however, included in the State and Local Governments' expenditures.

Second, we have also subtracted 50 per cent of the expenditures under the items "Non-Highway Transportation" and "Other and Unallocable direct general expenditures", on the grounds that this represents a rough estimation of the expenditures of public corporations and the current expenditures of certain trading services, which are included in the government expenditure as defined by the Bureau of the Census. To quote "Historical Summary of Governmental finances

in the United States", 1957, Census of Governments, "The Federal government has several business enterprises in the field of non-highway transportation. These include the Panama Canal Company, The Alaska Railroad, and the St. Lawrence Seaway Development Corporation. In addition, large Federal Expenditures are made for facilitating air transportation, subsidizing ship construction and merchant marine operations, improving navigation facilities, and such aids to water transportation as the Coast Guard and Coast and Geodetic Survey", (page 7). "Other commercial type operations of governments port facilities, airports, housing projects, toll highways and the like as well as all Federal Government agencies and activities, including its corporations and the U.S. Postal service, are treated as part of the general government sector." (page 2). In our definition of government expenditure, expenditures of public corporations are not included. The current expenditures of trading services are regarded as self-liquidating and, therefore, are also not included. But without any detailed information of such expenditures, which are included in government expenditure according to the definition of the Bureau of the Census, an estimate of 50 per cent of "Non-Highway Transportation" plus "Other and Unallocable direct expenditure" is only a rough approximation and is deducted from the Federal Government total expenditure given in the census publication for the purpose of comparability between different countries.

The other adjustments consist of the conversion to calendar year estimates of fiscal year data and interpolation between biennial

estimates. The calendar year estimates are obtained by taking the arithmetic mean of the expenditures of two consecutive corresponding fiscal years (ending 30th June). The expenditures of the missing years until 1949 are obtained similarly by taking the arithmetic mean of the two consecutive biennial estimates.

The same sort of adjustments are also made to Census Bureau estimates of State and Local government expenditures for the years 1932-1962. In their case also we have subtracted 50 per cent of the items "Non-Highway Transportation", which at the state and local level includes "such services as canals, port and terminal facilities, airports, and off-street parking facilities",¹ and "other and unallocable direct general expenditure" for the reasons already given above. We also considered it necessary for the purpose of comparability between different countries to exclude "utility and liquor stores expenditure" which "comprises all spending involved in provision and conduct of such undertakings, including acquisition of facilities, current operation and the purchase of goods and services for resale, and interest on utility debt".² The other adjustments, as in the case of federal government expenditure, consist of conversion of fiscal year estimates to calendar year estimates

1 Historical Summary of Governmental Finances in the United States, 1957 Census of Governments, vol. IV, No. 3, U.S. Department of Commerce, Bureaus of the Census, page 7.

2 Ibid., page 2. "For census reporting of government statistics, the term "utilities" relates only to water supply, electric power, gas supply, and transit system owned and operated by local governments. The term "liquor stores" relates to such stores operated by 16 state governments and by local governments in a few states", page 2, *ibid.*

and interpolation between biennial estimates in order to obtain some estimate of expenditure for the missing years until 1949.

Serious difficulties, however, are encountered with the extension before 1932 of such expenditure series. Before 1932 only four estimates of total public expenditure, namely those of the years 1902, 1913, 1922, and 1927, are available in the census publications; and, as mentioned above, the secondary sources can be used for the missing years only if the quantitative importance of conceptual differences is found to be negligible. In the case of expenditure of state and local governments, the only series of annual estimates, which goes back to 1910, is that of Professor Copeland. But in view of the roughness of the basic data, the estimates until 1928 are given as three-year moving averages. Besides, comparing the two series post-1932, we find that Copeland's concept is much wider than ours, his objective being to study total Government Financing. In view of the above-mentioned facts, instead of relying on his series for the years 1929, 1930 and 1931, we have used the National Income concept data for the state and local governments expenditures, for which the quantitative importance of conceptual difference did not seem significant. For the years 1922 and 1927, the adjusted census data of state and local governments expenditure are taken. For the missing years (namely 1923, 1924, 1925, 1926 and 1928), we have decided to rely on straight line interpolations, on a semi-log graph, between the available adjusted census benchmarks, the assumption being that the rate of growth of state and local expenditures between those benchmark years has been constant. Although such an assumption

does not seem highly unrealistic for a short-period of four years, the reliability of estimates based on such assumption diminishes as the time-period lengthens. Therefore, it was not considered proper to obtain estimates for the missing 10 years before the First War, i.e. 1902-1913 on the basis of straight line interpolation between the only two available estimates for that time-period. Our expenditure series for state and local governments, therefore, is restricted to the time-period 1922-1962.

In the case of federal government expenditure, however, several expenditure series for the years before 1932, computed by several economists and statisticians, namely Fabricant and Lipsey, Kendrick, Firestone, Copeland, are available in the recent N.B.E.R. publications. A comparison of the available series with our adjusted census series for the years for which the census data is available shows that those of Fabricant and Lipsey, and Kendrick are the closest to the adjusted census estimates.¹ And it is very difficult to choose the one which is closer. For some years, Kendrick estimates are the closest, whereas for other years the Fabricant and Lipsey series is the closest, to the adjusted census estimates. Therefore, although the decision as regards the choice of any one of these two series is an arbitrary one, yet because for the eight years from 1932, the Fabricant and Lipsey series is the closest of the two, the series of Federal Expenditures given by Fabricant and

¹ Such comparison was made by Mr. Claude Germain with the help of several charts and our observation is based on those charts and the typescript paper prepared by him, which provides a description of the charts. Such comparison led Mr. Germain to choose the series of Federal Expenditures given by Fabricant and Lipsey for the years before 1932.

Lipsey was chosen for the years before 1932, i.e. for 1922-1932, as our expenditure series for state and local governments goes back only to 1922. For our purpose, the important omissions from their series are expenditures on Trust Accounts and interest payments on Federal debts. But the omission of expenditures on Trust Accounts becomes quantitatively important only after the Second World War, especially since 1952; and, therefore, this omission is not likely to impair comparability over time and or between different countries. The interest payments on federal debts, however, are excluded even for other years in our final analysis, because we consider such expenditure as "war-related".¹

For the purpose of our analysis the series of total expenditure, obtained by combining the expenditures of Federal, and State and Local governments, is to be adjusted further for 'war-related' expenditures which comprise of interest payments on federal debt and other war-related expenditure, such as war pensions and war damage compensations. In the case of the United States, the interest payments on the federal debt (after being adjusted for calendar year estimates) are subtracted from our total expenditure figures; but it was not possible to make any such adjustment for other war-related expenditures such as war pensions as was made for U.K., and Germany (and also for Canada as will appear later), because of the lack of readily available data for such expenditures. However, it is the

¹ In the case of United States a substantial amount of interest payments may also be regarded as 'Great Depression-related', because of the financing of high expenditure during the Great Depression by Federal Loans. As is discussed later, the Great Depression can also be regarded as a major social upheaval, which influenced the time-pattern of public expenditure in the case of the U.S., and, therefore, 'Great Depression-related' expenditure should also be excluded for the proper analysis of its influence on American public expenditure.

interest payment on the national debt, which has been found to be the quantitatively important item relative to other items in the 'war-related' expenditure category in the case of other countries; and therefore, the effect of the omission of other war-related expenditures, in the case of U.S.A., on our comparative analysis is likely to be negligible.

Such current estimates of total public expenditure are also adjusted in order to eliminate the 'population and price effects'. The 'population effect' is eliminated, as before, by obtaining the respective per capita estimates. With regard to the elimination of the "price effect" or the deflation of the current estimates of government expenditures so as to obtain the estimates at constant prices, the statistical difficulties specific to the United States arise due to the lack of appropriate price indexes by which the different components of government expenditures should be deflated. Therefore, as in the case of Germany, a single index was used for deflation. For the whole period, the index used is that implicit in the estimates of the national product at current and constant 1929 prices, computed by dividing the current price series of G.N.P. by the constant prices. Such deflation, therefore, assumes almost the same productivity increases in both the private and public sector.

With regard to the G.N.P. series, the other important series necessary for our analysis, we have chosen the series based on Department of Commerce concept, which is basically no different from that used for obtaining such a series for other countries included in this study. Gross national product according to that concept,

as for other countries, "comprises the purchase of goods and services by consumers and government, gross private domestic investment (including the change in business inventories) and net foreign investment."¹

For the years 1929-1961, the current dollar estimates are the official estimates prepared by the Department of Commerce. For the years prior to 1929, the underlying estimates are those of Simon Kuznets, but they have been adjusted to the Department of Commerce concept by John Kendrick.² The difference between Kuznets' series and the Department of Commerce series arises mainly because of the conceptual differences. In Kuznets' series, those government expenditures which are considered by him not to take the form of services to consumers or capital formation, and the imputed value of unpaid services of financial intermediaries, are omitted as components of gross national product, because such expenditures are treated as yielding intermediate services. We do not intend to go into the controversy of whether such services constitute the final product or should be treated as intermediate services. Our choice of the Department of Commerce estimates, in preference to those of Simon Kuznets, is based on the grounds of comparability between different countries. Because the Department of Commerce concept is the conventional one, and our G.N.P. series for other countries are based basically on the same concept, we have chosen the estimates prepared

1 Historical Statistics of the United States, Colonial Times to 1957, U.S. Department of Commerce, Bureau of the Census, 1961, p. 132.

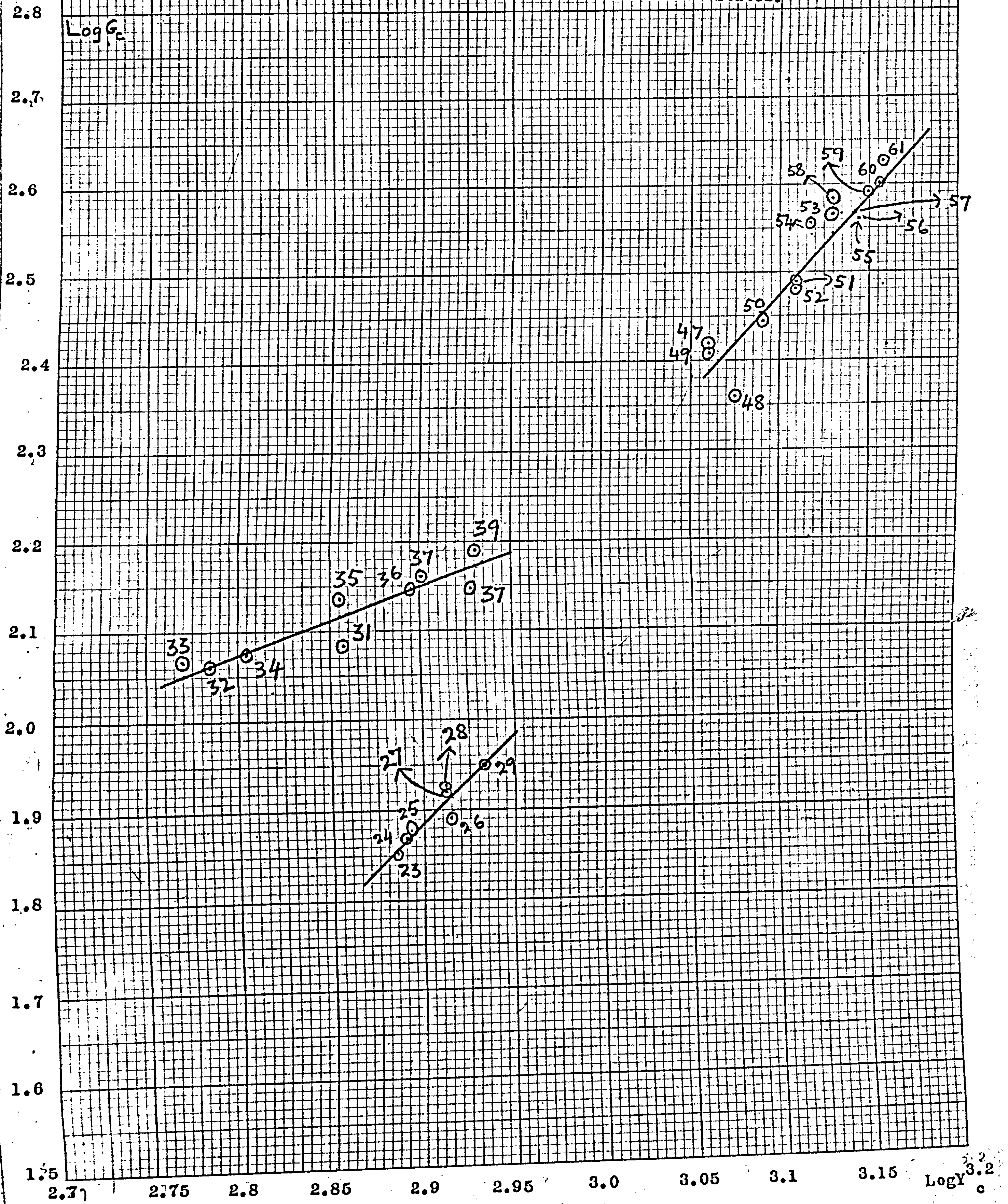
2 See Simon Kuznets, Capital in the American Economy: Its Formation and Financing, N.B.E.R. New York, for his estimates of G.N.P. and John W. Kendrick, Productivity Trends in the United States, N.B.E.R. New York, 1961, for the adjustments of those estimates to the same conceptual basis as the commerce figures.

by the Department of Commerce and, for the years prior to 1929, the estimates that have been adjusted to the same conceptual basis as the commerce figures.

The current price series of G.N.P. is, however, adjusted for the "population and price effects". Such effects are eliminated, as before, by obtaining the per capita constant dollar estimates. Our constant dollar estimates at 1929 prices for the period prior to 1955 are those prepared by Kendrick, after adjusting those of Simon Kuznets to the Department of Commerce concept. The estimates for the period 1956-1961 at 1929 dollars are prepared by us from the G.N.P. series at 1954 dollars for that period, after the necessary adjustments by splicing the index implicit in the latter series to that implicit in series prior to 1955 at 1929 dollars.

After the series necessary for analysis being obtained (see Tables B.12-17), the whole time-period, i.e. 1923-1961, is divided into three periods, viz., (a) 1923-1929, (b) 1931-1939 and (c) 1947-1961. And the double logarithmic regression function, i.e. $\text{Log } G_c = \text{Log } a + b \text{ Log } Y_c$ is fitted for each different period with a view to examining the effects of major social upheavals (which are considered to be the Great Depression, for the reasons given below, and the second World War during our time-period in the case of U.S.A.) on the time-pattern of public expenditures. Our analysis, in other words, is intended to show whether a shift in the level and/or a change in the rate of growth of G_c with relation to Y_c is associated with each of the two major social upheavals, Y_c being the per capita

Chart No. B. 3. The Growth of Per Capita Govt. Expenditure with relation to Economic Growth at 1929 prices in the United States.



G.N.P. at constant market prices and G_c being the per capita total government expenditure. In Chart No. 3, the $\text{Log } G_c$ and $\text{Log } Y_c$ are measured on the Y and X axes respectively on a natural scale, and each dot in the chart shows the combination of $\text{Log } G_c$ and $\text{Log } Y_c$ with respect to some one of the years 1923-1961.

In the case of the United States also, as for U.K. and Germany, the Second World War was a major social upheaval, during which government expenditure increased enormously because of the expenditures on the war in which the United States actively participated. Besides the Second World War, the Great Depression is also usually considered to be a major social upheaval in American economic history during our time-period. As is apparent from Chart No. 3, and the corresponding Tables No. B13 given in the appendix, the real per capita income started falling from 1929, and within two years it declined to a level which was even lower than that of 1923, the first years of our time-period. It declined further during the next two years, and, in 1933, the real per capita income was lower than that reached more than twenty-five years ago. The real per capita income of 1933, i.e. \$590, was smaller than that of 1906, i.e. \$625.¹ Although the recovery started from 1934, yet the real per capita income never reached the level of 1929 in any of the years

¹ Such a decline in real per capita income during the thirties, when the productivity of labour was much higher than that during the pre-First War period, implies mass unemployment. As is shown by several American economic historians, the scale of unemployment experienced by American economy during the thirties, especially in 1932-1934, has never, before or afterwards, been experienced.

prior to the Second World War. Because of the reasons stated above, the Great Depression is considered to be a major social upheaval in the case of U.S.A., and the inter-war period is divided into two sub-periods, viz., 1923-1929, and 1931-1939 and a separate regression function is fitted for each period so that the effect of the Great Depression on the time-pattern of public expenditure can be studied. Chart No. 3, with its scattered points for different years also suggests an upward shift in the level and a decrease in the rate of growth of G_c with relation to Y_c associated with the Great Depression, which is examined further by our regression analysis and statistical tests.

Thus the whole time-period (1923-1961), as already stated, is divided into three periods, viz., 1923-1929, 1931-1939, 1947-1961; and when a separate double logarithmic regression function ($\log G_c = \log a + b \log Y_c$) is fitted for each period, the following regression equations of G_c on Y_c are obtained:¹

1 It may be mentioned that the conversion to calendar years estimates of government expenditures for the fiscal years 1922-1962 reduces the series by one year from each end, so that our series of public expenditure for calendar years is for the time-period 1923-1961. The other series necessary for our analysis, therefore, are also taken for the time-period 1923-1961. The war years and the years immediately after the war, i.e. 1940-1946 are excluded from our analysis for the same reasons as in the case of the United Kingdom. For the analysis of Great Depression, we have excluded only the year 1930, because, as is apparent from the chart, although the Depression started in 1930, it took some time before the attitude towards public expenditure could change, which enabled G_c with relation to Y_c to reach a new and higher plateau (see our analytical explanation of a shift after Great Depression in Chapter V). Contrary to the usual view that the New Deal was the major step towards increased government spending, our chart and Table No. B.17 show that public expenditure had reached a new and higher plateau long before the New Deal, that is in 1931.

$$(1) \quad 1923 - 1929: \quad \text{Log } G_c = -3.7164 + 1.9322 \text{ Log } Y_c$$

$$(2) \quad 1931 - 1939: \quad \text{Log } G_c = -0.0502 + 0.7426 \text{ Log } Y_c$$

$$(3) \quad 1947 - 1961: \quad \text{Log } G_c = -4.5608 + 2.2704 \text{ Log } Y_c$$

They are different from each other not only with regard to the intercepts but also with regard to the slope which shows the rate of change of G_c with relation to Y_c .

Thus, as in the case of other countries which took an active part in the Second War, a shift in the regression function of G_c on Y_c occurred after the Second War in the case of United States. Such a shift increased the per capita total government expenditure with relation to per capita real income by about 31.6%. The shift, however, was smaller than that in the case of U.K., where the shift accounts for about a 72.8% increase in G_c with relation to Y_c , after the war. The shift, which is of greater importance for the time-pattern of American public expenditure, is associated with the Great Depression, which accounts for about 136% to 70% increase in G_c with relation to Y_c .¹ And, when the test of significance, described in Section IV (iii), is applied to the positive shifts associated with the two major social upheavals, namely the Great

1 Measurement of the per cent increase in G_c with relation to Y_c on account of the shift associated with the Great Depression varies with the year chosen from the period 1931-1939. If such increase is measured with reference to 1931, the year in which public expenditures had already reached a new and higher plateau, the shift accounts for about a 104.7% increase. But, if the increase is measured with reference to the year 1934, the first year in which real per capita income showed an increase over the preceding year during the thirties (the real per capita income in 1934, however, was smaller than that of 1931), the shift accounts for about 136.3% increase. For 1937, the year in which the real per capita income reached a level only marginally lower than that of 1929 but higher than that of any other year during the twenties, the shift accounts for a 69.2% increase. Such variation arises because our regression functions differ also with regard to the slope.

Depression and the Second World War, the null hypothesis that either of these upheavals did not give rise to any upward shifts was rejected at less than 1% level of significance. The positive shifts are highly significant to suggest:

- (i) A shift in the level of G_c with relation to Y_c occurred after the Second World War.
- (ii) Such a shift is also associated with the Great Depression in the case of the United States, which, as already shown, was severely affected by that upheaval.

Again, we find that the rate of growth of G_c with relation to that of Y_c changed after such shifts associated with the Great Depression and the Second World War. It diminished from the rate of 1.93 to 0.74 after the shift associated with the Great Depression. It became less than unity and therefore government expenditure as a percentage of G.N.P. had been decreasing during the thirties. It may be mentioned here that Adolph Wagner's "Law" of Increasing State Activity, according to which government expenditure must increase at a faster rate than that of national output, does not hold good in this case.¹ But such rate of growth of government expenditure, in contrast to that observed in the U.K., increased from the rate of 0.74 to 2.27 after the Second World War in the case of the United States, so that the government expenditure as a percentage of G.N.P. have been increasing during the post Second War period. Although it is tempting to provide the plausible explanations for this contrasting

1 For a discussion of Wagner's Law, see Professors Peacock and Wiseman, The Growth of Public Expenditure in the United Kingdom, op. cit., page 16-20, and Mrs. S. Andic and Dr. J. Veverka's op. cit., Section V.

feature of the British and American public expenditure, this chapter being mainly concerned with statistical observations, we had to postpone our explanations for this and also for other observations for the next chapter with a view of keeping them separate.

The statistical test for significance of the observed changes in the rate of growth of G_c with relation to that of Y_c associated with the Great Depression and the Second World War, however, was applied and the null hypothesis that no change in such rate of growth of government expenditure is associated with either of those social upheavals is rejected at 2% level of significance and at much less than 1 per cent level of significance for the Great Depression and Second World War respectively. The observed changes in the rate of growth of G_c with relation to that of Y_c are, therefore, significant enough to suggest:

- (1) the rate of growth of G_c with relation to that Y_c diminished after the shift associated with the Great Depression.
- (2) the rate of growth of government expenditure increased after the shift associated with the second World War in the case of the United States.

(iv) Canada

The statistical series necessary for our analysis of the growth of public expenditure in the case of Canada are taken from 'Historical Statistics of Canada', 1965.¹ The sources for the government

¹ Historical Statistics of Canada, edited by M. C. Urquhart and K. A. H. Buckley, The Macmillan Company of Canada Ltd., Toronto, 1965.

expenditure series taken from that publication were the "National Accounts: Income and Expenditure" for various years published by the Dominion Bureau of Statistics. The concept of government expenditure used by D.B.S. is basically the same as that outlined in the Section III(i). The total public expenditure figures include the expenditures of all governments namely federal, provincial and municipal. Intra-governmental transfer payments and subsidies are excluded from them. The expenditures of government commercial enterprises are, in general, also not included. The Post Office, however, is considered to be a "trading activity" and therefore the capital outlays on post office buildings, facilities and equipment are included. The current expenditures of the Post Office, which may be regarded as self-liquidating are not included. Similarly, in the case of government-owned buildings, the cost of construction of such building is also included. The expenditures of extra-budgetary funds and agencies which are not set up on a commercial basis such as Unemployment Insurance Commission, the old aid security fund and the workmen's compensation boards are included. However, when specific fees are paid for certain government non-commercial services such as fees paid to federal and provincial hospital, they are deducted from the corresponding government expenditure.¹ Such

1 For a detailed account of the different items included or excluded from the concept of government expenditure adopted by D.B.S. see Historical Statistics of Canada, page 120-121 and 124 and also D.B.S. National Accounts, 1926-1956, 1962.

public expenditure data, however, is not available for the years prior to 1926, which are therefore excluded from our study.

The war-related expenditure, viz., interest payments on federal debt, world war pensions and war veterans' allowance are excluded for the sake of our analysis of the effects of the social upheavals on the time-pattern of public expenditure.¹

Further adjustments to such expenditure figures are made in order to eliminate the "price and population effects". For the purpose of deflation of current estimates, different components of government expenditure were deflated, separately and then the deflated components were added to obtain the total constant dollar estimates. The total government expenditure is divided into two main components namely

- (1) expenditure on goods and services (current and capital)
- (2) Transfer payments plus subsidies.

For the first main component, the deflated estimates in constant 1949 dollars are taken from the "Historical Statistics of Canada". To quote from that publication, "the individual subcomponents of the expenditure categories were deflated in rather fine detail by, for the most part, Laspeyres-type price indexes government capital formation were deflated in considerable but somewhat less

¹ In the case of Canada too, a substantial part of interest payment can be regarded as 'Great Depression-related' because high expenditures during the Great Depression were financed to a great extent by deficit financing. The Great Depression, as in the case of the United States, is regarded as a major social upheaval for the reasons given later; and, therefore, Depression-related expenditure, i.e. the interest payments on federal debt incurred during the Depression, should also be excluded; which, however, are eliminated by excluding interest payment on federal debt for the whole period, i.e. 1926-1960.

detail."¹ The deflated subcomponents in each group were then added to obtain the constant dollar estimate for the first main component, i.e. for government expenditure on goods and services.² For the second main component, i.e. the transfer payments and subsidies after the exclusion of the above-mentioned war-related expenditures, a single index, i.e. the consumer Price Index, 1926 to 1960 (1949 = 100) was used for the deflation.³ The constant dollar estimate for total government expenditure for each year, obtained by adding such estimates of its main components, is divided by the population figure for the corresponding year in order to obtain the real per capita government expenditure.

The other important series necessary for our analysis, viz., the series of G.N.P. (= Gross National Expenditure) in constant dollars, for the time-period 1926-1960, is also taken from the Historical Statistics of Canada.⁴ The per capita estimates are

1 Ibid., page 122.

2 For a detailed discussion of the deflation procedure see, Historical Statistics of Canada, op. cit., page 122.

3 Such expenditures in the case of the U.K. were also deflated by Consumer Price Index. See Professors Peacock and Wiseman, op. cit., Appendix, page 158. The Consumer Price Index, 1926 and 1960, (1949 = 100) for Canada is given in Table B.22 in the Appendix B.

4 For a description of the concepts and methods of calculation followed for computing the G.N.P. series at current and at constant prices see Historical Statistics of Canada, op. cit. Chapter F., National Income and Wealth, pages 131-138.

then computed by dividing the above-mentioned series by the population series for that time-period.

The statistical series, necessary for our analysis, being computed, the whole time-period, i.e. 1926-1960, is divided into three periods, viz., (a) 1926-1929, (b) 1931-1939 and (c) 1947-1960; and a double logarithmic function ($\text{Log } G_c = \text{Log } a + b \text{ Log } Y_c$) is fitted for each different period with a view to examining the effects of major social upheavals on the time-pattern of public expenditure in Canada. The major social upheavals, as in the case of the United States, are considered to be the Great Depression, for the reasons given below, and the Second World War during our time-period.

The Second World War (as for the United Kingdom, Germany, and the United States) was also a major social upheaval in the case of Canada during which there was an enormous increase in total public expenditure because of the expenditures of the war in which Canada also actively participated. Besides the Second World War, the Great Depression, as in the case of the United States, was a major social upheaval for the Canadian economy. As can be noticed from Chart No. 4 and the corresponding Table No. B.19 given in the Appendix^B, the decline in real per capita income started since 1928. In 1929, however, it was only marginally lower than in 1928, i.e. \$903.5 as against \$918.9. By 1931 it declined to a level which was lower than that of 1926, the first year for which such data is available. The decline continued and in 1933 the real per capita income was about 35% lower than in 1928. Although we do not possess the unemployment data to illustrate its effect on employment, such

Chart No. B.4. The Growth of Per Capita Govt. Expenditure with relation to Economic Growth at 1949 prices in Canada.

Log G_c

2.8

2.7

2.6

2.5

2.4

2.3

2.2

2.1

2.0

2.7

2.75

2.8

2.85

2.9

2.95

3.0

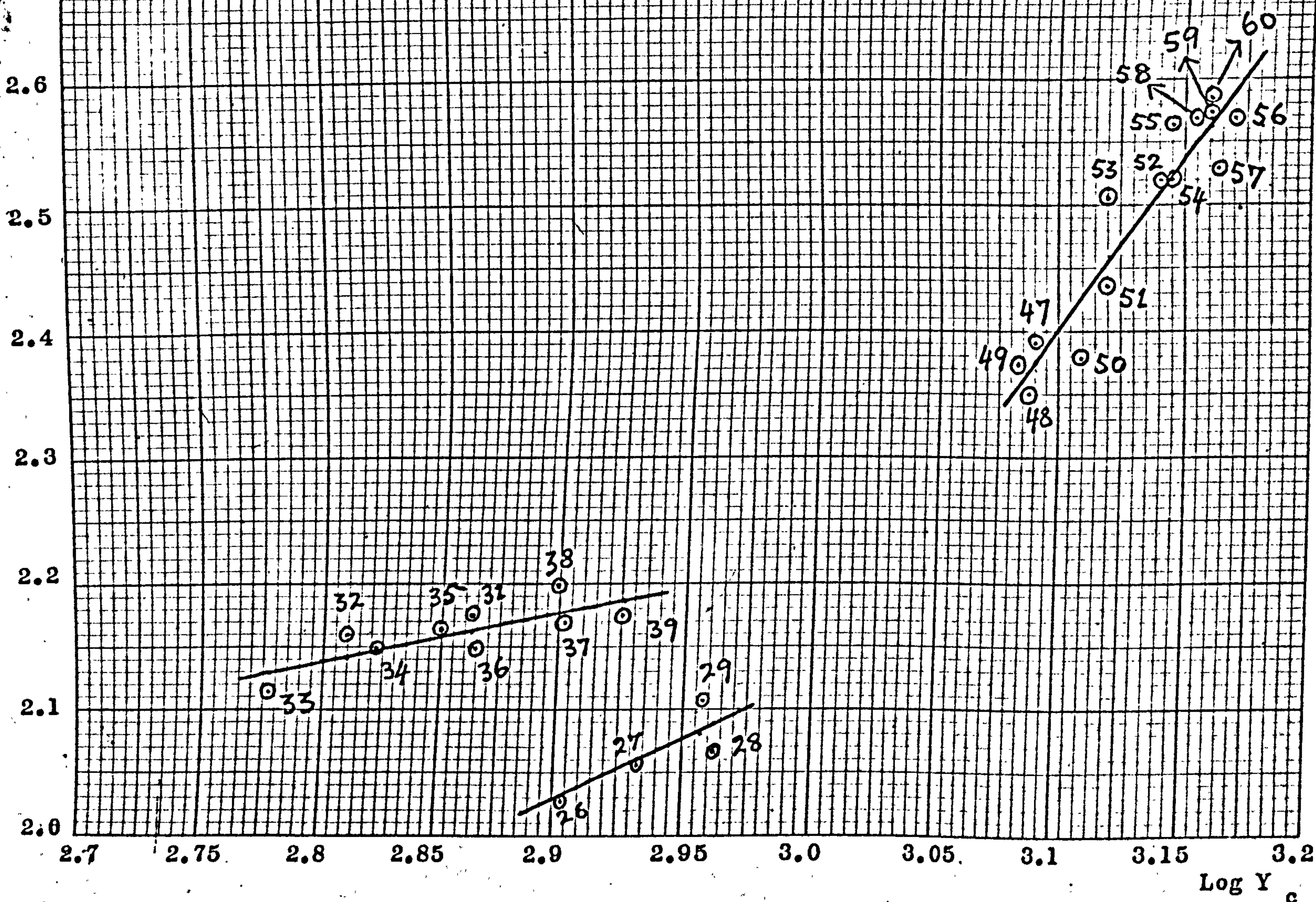
3.05

3.1

3.15

3.2

Log Y_c



declines in real per capita income during the thirties, when the productivity of labour can reasonably be assumed to be higher than in the earlier period because of the technological innovations and the increase in capital investment per unit of labour, imply mass unemployment. The recovery, however, started from 1934, though the real per capita income did not reach the level of 1929 (or 1928) in any of the years during the thirties. In the above-mentioned respects, there is a close parallel between Canada and the United States. (Several other similarities between the two countries will be apparent from our later discussion). And thus we have considered the Great Depression as a major social upheaval in the case of Canada too. The inter-war period, therefore, is divided into two sub-periods, viz., 1926-1929, and 1931-1939 and a separate regression function is fitted for each period in order to analyse the effects of the Great Depression on the time-pattern of public expenditure.

Our whole time is thus divided into three periods, viz., 1926-1929, 1931-1939, 1947-1960 and the following regression equations of G_c on Y_c are obtained.¹

$$(1) \quad 1926 - 1929: \quad \text{Log } G_c = - .953 + 1.027 \text{ Log } Y_c$$

$$(2) \quad 1931 - 1939: \quad \text{Log } G_c = 1.070 + 0.382 \text{ Log } Y_c$$

$$(3) \quad 1947 - 1960: \quad \text{Log } G_c = - 5.824 + 2.654 \text{ Log } Y_c$$

1 The war-years and the years immediately after the war, i.e. 1940-1946, as in the case of other countries, are excluded. For an analysis of the effects of the Great Depression, we have excluded, as in the case of the United States, the year 1930. For the reasons of such exclusion, see footnote, No. 1, page 126.

They differ from each other not only with regard to the intercept but also with regard to the slope which denotes the rate of change of G_c with relation to Y_c .

Thus, a shift in the regression function of G_c on Y_c occurred after the Second War in the case of Canada as well, and this accounts for about a 33.9% increase in Government expenditure with relation to economic growth. The shift is not significantly different from that which occurred in the United States after the Second War, where such a shift accounts for about 31.6% increase in G_c with relation to Y_c . The shift which is of greater importance, as in the case of the United States, we find to be associated with the Great Depression, which accounts for about 60% to 42% increase in G_c with relation to Y_c .¹

In the case of Canada also, we attempted the same sort of test of significance for the positive shift associated with the Second World War and the Great Depression. Even with a very small number of pairs of observations of G_c and Y_c for the period prior to the Great Depression, ($N = 4$), the null hypothesis that either of these upheavals did not give rise to any upward shifts was

1 Such % increase on account of the shift associated with the Great Depression, as in the case of the United States, varies with the year chosen from the period 1931-1939, because the regression functions differ also with regard to the slope. With reference to the year 1931, the year in which a new and higher plateau was already reached by government expenditure, the shift accounts for about 50.5% increase. For the year 1934, the first year in which real per capita income increased over the preceding year during the thirties (although the real income was smaller than that of 1931), the shift accounts for about 60% increase. For 1937, the year in which real per capita income was higher than that of 1926, the first year of our time-period, but was still lower than that of 1928, the shift accounts for about 42% increase in G_c with relation to Y_c .

rejected at a much less than 1% level of significance. The positive shifts are, therefore, highly significant in that they suggest that (1) a shift in the level of G_c with relation to Y_c occurred after the Second War, and (2) such a shift is also associated with the Great Depression in the case of Canada.

Again, as it happened in the United States, we find that the rate of growth G_c with relation to Y_c diminished after the shift associated with the Great Depression. It diminished from the rate of 1.03 to 0.38. It became less than unity in the case of Canada as well and therefore government expenditure as a percentage of G.N.P. had been decreasing during the thirties. This is another instance which provides evidence against Wagner's "Law" of increasing State Activity.

The similarities between the two countries (the United States and Canada) can also be noticed as regards the observed rate of growth of G_c with relation to Y_c after the Second World War. In the case of Canada, too, the rate increased from the rate of 0.38 to 2.65. In both countries it was greater than two in the post-Second War period. Are the above mentioned similarities purely accidental? What other explanations could be offered otherwise? We do not think that the similarities are due to the "change" factor. We will give what we hope are plausible explanations for this in the next chapter.

The statistical test for significance of the observed changes in the rate of growth of government expenditure, described in the section IV (iii) was made. The null hypothesis that no change in

such rate of growth of government expenditure occurred after the Second War is rejected at much less than 1% level of significance. The observed increase in such rate is, therefore, highly significant, suggesting that such a rate increased after the shift associated with Second War. For the decrease in such rate associated with the Great Depression, the corresponding null hypothesis, however, could be rejected only at about 7½% level of significance. The increased sampling error and, therefore, the increased level of significance is mainly because of the very small number of the pairs of observations of G_c and Y_c for the period prior to the Great Depression ($N = 4$). It seems, however, highly unlikely that the rate of growth of government expenditure could be as small as 0.38, which implies a continuous decline in government expenditure as a percentage of G.N.P., for the period prior to the Great Depression and after the First War. In spite of the limitations due to the very small size of our sample for the time-period prior to the Great Depression, the level of significance for the rejection of the null hypothesis is observed to be less than 10 per cent. The plausible conclusion, therefore, seems to be that the rate of growth of G_c with relation to that of Y_c diminished after the shift associated with the Great Depression in the case of Canada as well.

(v) Sweden

The public expenditure data is taken from the "Den Offentliga Sektorns expansions" (The expansion of the public sector) by

Erik Hook.¹ The expenditure figures include expenditures of the central government and also those of the local authorities, the basic data being taken from the government's budget reports and the reports of municipal finances. Such figures exclude all intra-governmental payments, so that no duplication of expenditures occur. The expenditures on public utilities such as state railways, telegraph administration, municipal gas works, ports, etc., are not included in the total public expenditure figures.

In order to ensure comparability over time, a few adjustments in the expenditure data were made by Dr. Hook.² Such adjustments in the expenditure figures given in the budgetary reports were considered necessary mainly because of the changes in accounting techniques over time. For example, in the earlier years, receipts for certain services were deducted from the corresponding expenditure item and the expenditure figures given in the budgetary reports were net of receipts for those services. But in the later years, because of the "growing use of gross values", gross expenditure was taken up on the expenditure side, while receipts were accounted for on the income side.² For the purpose of comparability over time, the expenditure figures given in the budgetary reports were adjusted so as to represent gross expenditure. Secondly, in the earlier years, expenditure on road maintenance were financed by special local funds; and, therefore, were not

1 Erik Hook, Den Offentliga Sektorns expansion, En studie av de offentliga civila utgifternas utveckling åren 1913-1958. Almqvist and Wiksell, Stockholm, 1962.

2 Ibid. p. 594. For a discussion of statistical difficulties and particular adjustments made for specific expenditures, see Erik Hook's book.

included in either the central government or municipal accounts. The adjusted figures include such expenditures financed by special funds. Some other minor adjustments were made, e.g., because of the 'successive transformation of the pension system', 'stopping of the practise of payment in kind and better cost accounting for the utilization of public buildings', etc.¹

For the purpose of comparability over time, our analysis of the growth and time-pattern of public expenditure in Sweden is based on such "adjusted" expenditure figures. The purpose of comparability with other countries is also served better by the adjusted figures. This is so mainly because of the inclusion of the expenditures for road maintenance financed by special local funds in the adjusted series. As Dr. Höök points out, "of strong importance are the adjustments made in expenditure on roads." For example, "for the pre-war year of 1938, adjustments caused a raising of 9.0 per cent, with road expenditures accounting for 6.6 per cent of this and the remaining adjustments only 2.4 per cent."² The expenditure financed by special funds, such as national insurance fund, in the case of U.K., as mentioned earlier, should be included in the definition of public expenditure. The exclusion of expenditure financed by special local funds which are "numerically impressive" in the case of Sweden, and the inclusion of expenditure financed by special funds in case of other countries, would impair comparability with other countries. Although we would prefer the

1 Ibid. page 549.

2 Ibid. page 551.

expenditure series net of "specific" receipts to the series of gross expenditures, the specific receipts seem to be quantitatively unimportant, and therefore could be neglected due to the statistical difficulties of obtaining the necessary data for such specific receipts.

The total public expenditure figures in the case of Sweden suffer also from another minor drawback. In the case of the municipal governments, the fiscal and calendar year coincided during the whole period included in our study. In the case of the central government also the fiscal and calendar year coincided until 1922; but since 1923, the fiscal years runs from the 1st July till 30th June. For this inconsistency due to the difference in calendar and fiscal year in the case of the central government since 1923, no adjustment was possible because the figures taken from Dr. Höök's study are only biennial estimates. But as he points out, "even if the expenditure-stream for the particular year is not, thereby, treated with the highest order of accuracy, the long-run-development picture is not disturbed to any great extent."¹

Such expenditure figures are only available since 1913 as biennial estimates until 1958 in his study. As the data is not readily available for the pre-First War period (except for 1913), and the expenditures in war years are completely disregarded in the case of the other countries because such years are regarded as "abnormal" years, our analysis is restricted to the inter-war period,

1 Ibid., page 549.

i.e. 1920-1938, and the post-Second War period, i.e. 1946-1958.¹ Even though Sweden did not take part directly in the world wars, one can hardly think that such wars did not affect the Swedish economy.

As regards the choice of a measure of national income aggregate, the gross Domestic Product at market prices is selected in the case of Sweden. Although we would prefer the G.N.P. series to that of G.D.P. for the purpose of comparability within countries, the G.N.P. data is not readily available for the earlier years. The difference between G.D.P. (which does not include net factor income from abroad) and G.N.P., however, is very small in the case of Sweden in the post-war period. For example, in 1948 and 1958, the difference amounts to .025% and .008% of G.D.P. respectively. On the basis of last fifteen years' estimates, one would presume that the net factor income from abroad was also quantitatively unimportant in the inter-war period.

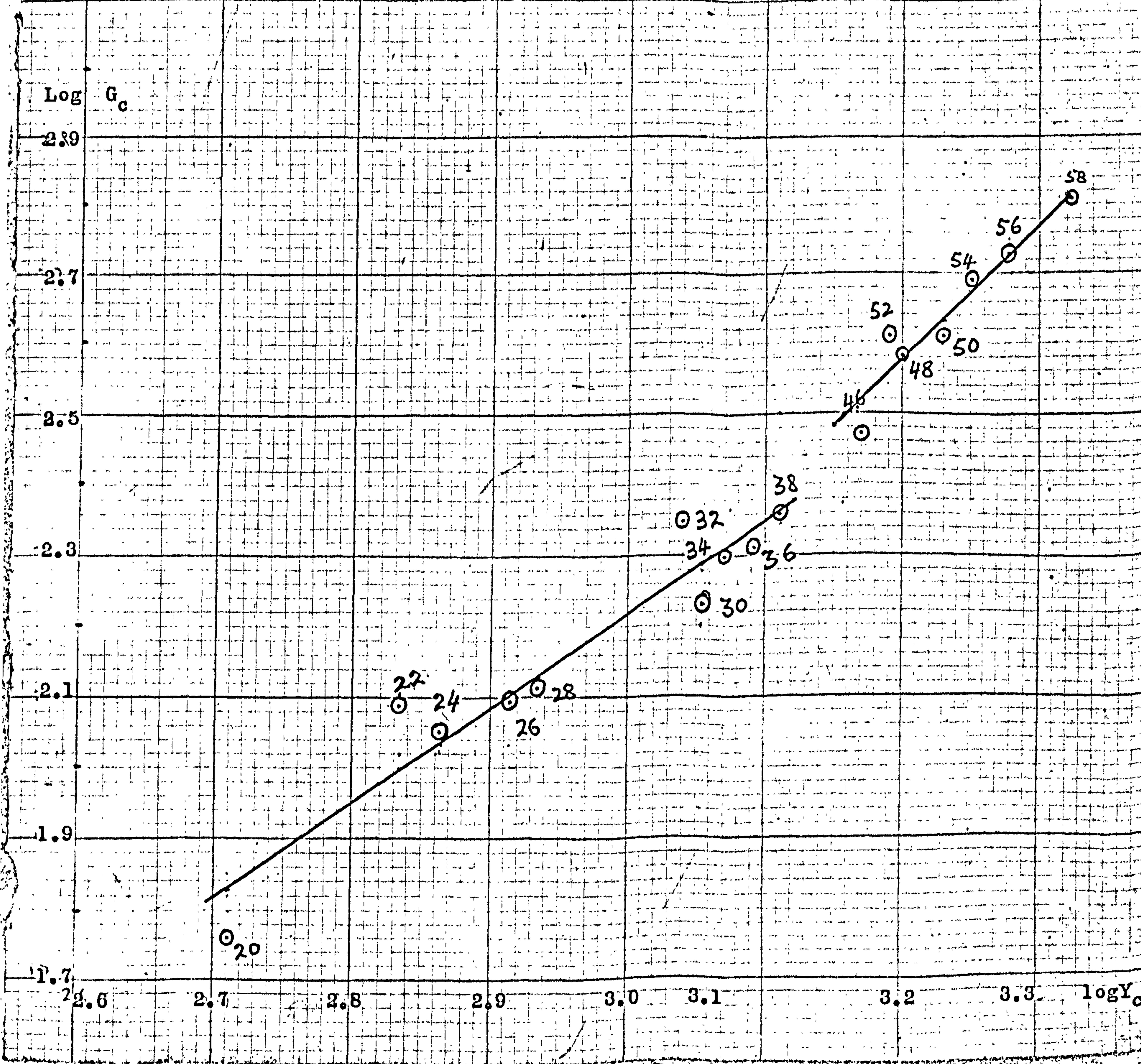
From the series of total government expenditure and of Gross Domestic Product, the "price effect" is to be eliminated by the deflation of the different components of each series by the separate appropriate price indexes. The statistical difficulties

¹ As in the case of West Germany, we did not attempt to extend the expenditure series to later years. Such extension would require not only search into several budget reports of the central government and the reports of municipal finances but also enormous other information so as to derive the 'adjusted' expenditure estimates, the cost element of which did not make it worthwhile. It does not seem at all likely that the extension of series to two or three later years would change our statistical findings significantly.

encountered in this respect were due to the lack of appropriate indices; and, therefore, a single index was used for the deflation of each series. The index used in the general wholesale price index, which covers a large variety of goods such as consumer goods, industrial and agricultural raw materials, machines and transport equipment. Because of its wide coverage, the deflated estimates obtained by multiplying our money series by this index would show better the "real" change in our series than if some other available single index, e.g., consumer price index, had been used. The deflation of both the government expenditure and G.D.P. series by a common index, however, assumes that the composition of government expenditure and that of G.D.P. are the same, which is not likely. In the absence of any better alternative, our analysis is based on such "real" estimates for each series, after adjustment being made also for the "population effect" by computing each series on average per capita basis.

The whole period, i.e. 1920-1958, is divided into two periods, viz., (a) Inter-war period, i.e. 1920-1938 and (b) Post Second War period, i.e. 1946-1958, and a double logarithmic function of the same form, i.e. $\text{Log } G_c = \text{Log } a + b \text{ Log } Y_c$ is fitted for each different period in order to examine whether a shift in the level and/or a change in the rate of growth of G_c with relation to Y_c occurred after Second World War in the case of Sweden. As before, Y_c is per capita income (G.D.P. at market price) at constant prices and, G_c is per capita total government expenditure at constant prices. As shown in the chart No. 5, the logarithms of G_c are

Chart No. B.5 The Growth of per capita Govt. Expenditure with relation to Economic Growth. At 1881-1885 prices in Sweden.



measured on the Y axis and the logarithms of Y_c are measured on the X axis on a natural scale. Each dot in the chart shows the combination of $\text{Log } G_c$ and $\text{Log } Y_c$ with respect to some one of the years 1920-1958.

In the case of Sweden, by looking at the per capita income data, the Great Depression does not appear to be a major social upheaval. The real per capita income for each year during the thirties was higher than that of any year during the twenties. The rate of increase of real per capita income during the thirties was almost the same as that during the period 1922-1928. The real per capita biennial estimate of income for each year during the thirties is higher than the estimate of this for any previous year, except the year 1932, for which such estimates are only marginally (3.4%) lower than that of 1930. (See Table B.26 and chart No. 5). Our scatter diagram also as is shown in chart No. 5, does not suggest any change in the level and/or rate of growth of G_c with relation to Y_c to be associated with Great Depression, which does not appear to be a major social upheaval in the case of Sweden so far as its effects on per capita income is concerned. Because of the above-mentioned reasons, no further division of our period and no separate regression analysis for the thirties, as was done in the case of Canada and U.S.A., where the Great Depression appeared as a major social upheaval, was considered necessary. Although Sweden did not take direct part in the war, it could not completely isolate herself from the effects of war, when war was fought so near to her territory. The government expenditure, though,

did not rise to the extent that it did in those countries which were directly involved in the war (e.g. U.K., U.S.A., W. Germany and Canada among our case studies), it was higher during the war-years than the level reached in any previous year, (see chart 5), and we consider below whether a shift in the level and/or change in the rate of growth of G_c with relation to Y_c occurred after the Second World War in the case of Sweden.

The whole period, i.e. 1920-1958, as already mentioned, is divided into two periods, viz., inter-war period, i.e. 1920-1938 and post Second War period, i.e. 1946-1958 and a separate double logarithmic regression function is fitted for each period. We get the following two regression equations of G_c on Y_c :

$$(1) \quad 1920 - 1938: \quad \text{Log } G_c = - 1.778 + 1.331 \text{ Log } Y_c$$

$$(2) \quad 1946 - 1958: \quad \text{Log } G_c = - 4.028 + 2.063 \text{ Log } Y_c$$

They, as in the case of other countries included in our sample, differ from each other not only with regard to the intercept but also with regard to the slope, which shows the rate of change of G_c with respect to Y_c .

A shift in the regression line of G_c on Y_c occurred after the Second World War in the case of Sweden as well. But the shift in the case of Sweden which did not take direct part in the war was much smaller than in the case of other countries, e.g., U.K., U.S.A., Germany and Canada, which were directly involved in the war. The shift after the Second War in the case of Sweden increased government expenditure with relation to economic growth by about 7.6%, whereas in the case of U.K., Canada and U.S.A. this shift accounts

for about a 72.8%, 33.9% and 31.6% increase respectively. And, when the same sort of test of significance is applied for the positive shift after the Second War in the case of Sweden, it cannot be considered statistically significant, even at a level of significance of 10%. Therefore, the only plausible conclusion we can reach is, that either no such shift occurred after the Second War in the case of Sweden (the observed shift being too small to reject the null hypothesis) or the shift, if any, was too small to exert any significant impact on the time-pattern of government expenditure in the case of Sweden.

But, as it happened in the United States and Canada, we find that after the Second War the rate of growth of per capita total government expenditure in relation to that of per capita income increased significantly in the case of Sweden. It increased from the inter-war rate of 1.33 to 2.06 after the Second War (i.e., the increase in such rate was about 55%). By the statistical test of significance, described in the section IV (iii), the null hypothesis that the Second War did not change the rate of growth of government expenditure with relation to economic growth is rejected at a 5 per cent level of significance. The increase in this rate seems significant enough for the positive hypothesis that an increase in the rate of G_c with relation to that of Y_c occurred after the Second War in the case of Sweden.

VI Summary of Statistical Observations and Hypothesis.

(1) A shift in the level of government expenditure with relation to per capita income (or the displacement effect) after

war (first and/or second) is observed in the case of each country included in our time-series analysis. By our statistical test of significance the null hypothesis that such a shift is not associated with war is found to be very unlikely in the case of each country except Sweden. The observed positive shifts are highly significant to suggest that a positive shift in the regression function of G_c on Y_c (or the displacement effect of war, which refers to the shift of such function) occurred after each war (first and/or second) in the case of each country except Sweden. In the case of Sweden, which did not take part in the war, the plausible conclusion we could reach is that either no such shift occurred (the observed shift being too small for the null hypothesis to be rejected) or the shift, if any, was too small to exert any significant impact on the time-pattern of public expenditure.

(2) Such a shift is also observed to be associated with the Great Depression in the case of the United States and Canada, which were most affected (in terms of the lowering of the per capita income and also possibly as regards the percentage people unemployed) by that social upheaval. By the same statistical test of significance, the corresponding null hypothesis that such a shift is not associated with the Great Depression either in the United States or in Canada, is found to be very unlikely, and, therefore, was rejected. The observed shifts are highly significant in indicating that a shift in the regression function of G_c on Y_c (or the 'displacement effect') is associated also with the Great

Depression in the case of the United States and Canada, which were severely affected by that upheaval.

(3) A change in the rate of growth of G_c with relation to that of Y_c is observed to be associated with major social upheavals in the case of each country included in our time-series study. By our statistical test of significance, the null hypothesis that a change in the rate of growth of government expenditure is not associated with either of those social upheavals is found to be very unlikely. We therefore rejected the null hypothesis. The observed changes in the rate of growth of G_c are highly significant in suggesting that they are associated with the social upheavals in the case of each country.

No generalization, however, can be made with regard to the direction of change in the rate of growth of G_c . It diminished after the shifts associated with world wars in the case of the United Kingdom. It diminished also in the case of Germany after the shifts associated with the first war and the social upheavals of the thirties and the second world war. In the case of the United States and Canada too, the change in the rate was in the negative direction after the shifts associated with the Great Depression. But the rate of growth of G_c increased after the second war in the case of Sweden, which did not participate in the war and where no 'significant' shift in level of government expenditure occurred. It also increased after the second war in the case of the United States and Canada.

(4) With regard to the similarities observed between different

countries with respect to the growth and time-pattern of public expenditure with relation to economic growth, they are more pronounced between the countries which are geographically close to each other.

In both the U.K. and Germany, not only did shifts in the level of government expenditure occur after the social upheavals, but also the rate of growth of G_c with relation to Y_c diminished after such shifts. We observe also almost the same rate of growth of G_c with relation to Y_c in both countries during the inter-war period and also for the post second war period, considered by us.

The similarities between the North American countries namely the United States and Canada are observed in many respects. In both countries, in contrast with others, we observe a shift in the level of government expenditure, associated with the Great Depression, which is of greater importance quantitatively than the shift associated with the second war in both Canada and U.S.A. For both countries the rate of growth of G_c with relation to that of Y_c diminished to a rate less than unity after the shift associated with the Great Depression. Such a rate of growth of government expenditure in contrast to that observed in Germany and the United Kingdom increased in both Canada and the United States after the shift associated with the second world war, and has been more than two in the post second war period.

The plausible analytical explanations of our statistical findings and the hypothesis are discussed in the next chapter, in which we also discuss the comparability of such findings and hypotheses obtained from a time-series approach as against those obtained from a cross-section approach.

CHAPTER FIVEEXPLANATIONS, COMPATIBILITIES AND SOME COMMENTS UPON THE
POSSIBILITIES OF FURTHER RESEARCH.

In the two preceding chapters, we arrived at two sets of statistical observations and hypotheses from two different approaches, viz., cross-section and time-series approaches. In this final chapter, in section I. and II., we attempt to provide some explanations for our statistical findings concerning the behaviour of public expenditure. The explanations offered are those which seem plausible on a priori grounds. Wherever possible, we provide also some justifications on empirical grounds, although the speculative nature of such explanations cannot be denied. Besides, they are not the only possible explanations. It may be possible to pick out other explanations which could equally satisfactorily or unsatisfactorily explain such statistical findings.

Furthermore, as our statistical analysis was pursued on the basis of two different approaches, we discuss in section III whether the statistical findings of, and technique employed by, one approach are compatible with those of the other approach. The plausible reasons for the differences in statistical findings for different countries included in time-series approach are, however, discussed in section II. Finally, in section IV, in the light of the limitations and usefulness of our study, some comments upon the possibilities of future research are given.

I. Plausible Explanations for the Statistical Observations and Hypotheses from the Cross-section Approach.

In chapter III, the statistical observation from our cross-section approach suggests the income hypothesis that government expenditure as a share of G.N.P. increases with a diminishing rate with the increasing level of economic development. It was also apparent from the scatter diagram given in chart No. 1 that the geographical location of a country also could be an important factor influencing the level of public expenditure. We discuss below in subsection (i) several plausible explanations for a diminishing rate of increase of G/Y with relation to that of Y_c . The explanations for the importance of geographical location are dealt with briefly in subsection (ii).

- (i) Explanations for a diminishing rate of increase of G/Y with relation to the rate of increase of Y_c :-
- (a) Hypothesis concerning the gap between the 'desirable' level of public expenditure and the 'tolerable burden' of taxation.

As was discussed in chapter II, section II, Peacock and Wiseman point out in their study that there is likely to be a gap between the people's ideas about the "desirable" level of public expenditure and the "tolerable burden" of taxation, because of the tendency to underestimate the "burden" and to over-estimate the "desirable" level of public expenditure on the part of an individual; but their main hypothesis is that people's ideas about the tolerable burden of taxation determine largely what the level of public expenditure will be.

It was argued in that chapter that the concept of the tolerable burden of taxation provides some explanation of the time pattern of public expenditure, when the shifts in the level of public expenditure are associated with some social upheaval like war during which people get accustomed to a higher burden of taxation, which continues even after such an upheaval is over. But if such a shift is associated with severe depression (such a shift is associated with the Great Depression in the case of the United States and Canada), during which time taxes tend to be reduced, then it cannot be said that such a shift occurred because people got accustomed to a higher burden of taxation. The shift may occur not because people have become accustomed to the high level of taxation during depression, but because of the increase in the gap between the 'desirable level' of public expenditure and the 'tolerable burden' of taxation. We will discuss in some detail the possible reasons for an increase in this gap in section II (i), while providing plausible explanations for a 'shift' associated with Great Depression in the case of the United States and Canada. It may, however, be sufficient to state that if people's attitude towards public expenditure changes, many 'new' expenditures which were previously not considered to be very desirable become highly desirable, and this increases such a gap. An increase in this gap, however, permits the acceptance of new taxes and the consequent increase

in the tolerable burden and a decrease in this gap.

Our hypothesis, therefore, is that if the gap between the desirable level of public expenditure and the tolerable burden of taxation increases, a government would attempt to decrease the gap by increasing the rate of growth of government expenditure and if the gap decreases a government has less incentive to raise finance necessary to maintain the previous rate of growth of public expenditure.

Now the question is whether the gap becomes larger or smaller with increasing real per capita income. If the gap increases, this would suggest an increasing rate of growth of government expenditure and if the gap diminishes it would suggest a diminishing rate of growth of government expenditure.

It is not possible to give any objective measurement of such subjective concepts; still one may consider the important factors which largely determine the 'tolerable burden' and the 'desirable level' of public expenditure at a particular time for different countries. The 'tolerable burden' is influenced by various economic, political and social factors; the level of real per capita income or G.N.P., however, is one of the most relevant factors which determines the tolerable burden. The notions about the 'desirable level'

of public expenditure are determined to a large extent independently of those of the tolerable burden. Such notions about the desirable level of public expenditure, e.g. education, health, roads, etc. to be provided by a government are largely determined by people's notions of a "good" government and by the standard of public services provided in other countries.

The gap between the 'tolerable burden' and the 'desirable level' would be much larger in an underdeveloped country than in a developed economy. The reasons are that the 'tolerable burden' in a developed economy would be much larger than in an underdeveloped country because of the vast difference in real per capita income; but the difference between the 'desirable level' of public expenditure in those countries would not be so great, such a 'desirable level' being determined to a great extent by the standard of public services provided in the developed countries themselves. Thus, the 'demonstration effect' is very prominent in this respect. It seems plausible therefore that such a gap narrows down with an increasing level of economic development; which therefore suggests, as already pointed out, a diminishing rate of increase of G/y with an increasing level of income.

(b) A hypothesis concerning the 'incidence'.

The hypothesis that with an increasing level of income and G/y the percentage of people compelled to bear tax incidence increases and/or the incidence of increase in tax revenue as a percentage of national output is likely to be relatively heavier on those on whom it had been hitherto lighter, together with the hypothesis of the maximisation of length of life for a government,¹ provides support for a diminishing rate of increase of G/y with relation to the rate of increase of real per capita income.

When public expenditure as a proportion of G.N.P. is a small proportion, as we notice in the case of less developed countries, the percentage of people who are brought into the tax net is usually relatively smaller than the similar percentage in a developed economy. In the case of the direct taxes such as income taxes and death and asset duties, the percentage of people who pay these is very small. As observed by Martin and Lewis, in their study, it is not only the low-income class, but also the whole of "middle-class", who are practically exempt from income taxes in the less developed

1. See Anthony Downs, An Economic Theory of Democracy, Harper and Brothers, New York, 1957, for a discussion of the vote maximisation hypothesis.

countries. In a country like India or Nigeria, as the above mentioned authors point out, "the man earning £200 a year usually escapes altogether", but "a man earning £200 a year is extremely well off in comparison with the average income of the population, which is only about £60 a year per person gainfully occupied. Even the £100 a year man is definitely "middle class", and a cut above his neighbours".¹

This could be due to various reasons. Firstly, on the grounds of administrative efficiency, the collection of small sums from large numbers of persons may not be feasible, especially when a majority of these are self-employed (either in agriculture or small cottage industries or the distributive trade) which makes it difficult to assess their income. On administrative grounds, therefore, exemption level has to be fixed at a high level, which exempts virtually the whole of the "middle class". Secondly, a large percentage of people have an income even below 'subsistence' level and the middle class (with an income of about £100) is also so close to subsistence that it is extremely difficult to persuade people with such an income to tolerate direct taxes like income tax. The levy of income tax on such people is also probably avoided to ensure the continuance of the incentives to work hard and save. Thus the

1. Martin and Lewis, op. cit., page 223.

percentage of people paying income taxes is usually much smaller than in a developed country.¹ The same is true for death and asset duties, because of the high exemption limits and the possession of wealth beyond that exemption limit by only a few. As far as indirect taxes such as excise duties and sales tax are concerned, a large percentage of people comparatively bear very little incidence. This is so because of the existence of large non-monetized sectors especially in rural areas in an underdeveloped country like India.²

A large percentage of production and consumption in the rural sector, where the majority of the people in a less developed country lives, usually takes place outside the money economy. The goods are either consumed by the producers themselves or given as wages in kind by them to the labourers, or exchanged for barter. The indirect taxes such as sales or excise tax

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1. "In the U.K. the number of people paying income tax is equal to just over 30 per cent of the population. In the U.S.A., where the allowances are greater, and where the gainfully occupied are relatively fewer, the number paying income tax equals 25 per cent of the population. The percentage in Jamaica is 2.1, in Trinidad 1.8, in British Guiana 1.4 and in Ceylon 0.6", quoted from Martin and Lewis, op. cit., p.223. For other less developed countries such percentages are likely to be very low for the reasons given in the text.
 2. In India, "for the economy as a whole, 37 per cent of total consumer expenditure is represented by imputed value. ... the extent of the non-monetised sector, as indicated by the percentage of imputed value to total expenditure is considerably higher in the rural sector than in the urban. ...45 per cent of total consumption in the rural sector is non-cash, only 10 per cent of urban expenditure is of this category, even this much of imputed value in the urban sector is mainly attributed to towns with population below 15,000 which are semi-rural in living conditions and organisations of production", quoted from Report of the Taxation Enquiry Commission, 1953-54, Vol. 1, Ministry of Finance, Government of India. pages 65-66.

practically cannot be collected on the goods of the non-monetized sector. Therefore, a large percentage of people living in rural areas virtually bears very little of the incidence of such taxes.

But, with an increasing level of economic development, urbanization and G/y , the percentage of people who are brought under the tax net increases and the 'incidence' of the increase in tax revenue as a share $G.N.P.$ is likely to be relatively higher on those who either escaped tax burden or on whom it had been hitherto lower. This is likely for various reasons. Firstly, it may happen because of the probable disincentive effects on saving and investment and the work of a further increase in tax rates for those who are already bearing a comparatively heavier tax "burden". This needs to be avoided in order to promote economic growth, one of the fundamental objectives of less developed countries. Secondly, very high taxation on a particular group of people is likely to arouse strong opposition and political pressure against such taxation through various means, e.g. by organising into pressure groups, the importance of which in moulding public policies will be discussed later in explanation (e). Thirdly, with the increasing level of economic development (without any substantial change in income distribution), and the higher efficiency in tax administration, it becomes easier to increase the percentage of people paying income tax.

Because, with increasing level of per capita income, the percentage of people earning incomes beyond the exemption level, assuming no change in the exemption limit, tends to increase. Besides the small scale scattered character of production tends to change in favour of larger units which facilitates efficient tax collection and makes evasion difficult. With higher efficiency in tax collection, exemption levels could probably also be lowered, which may further increase the percentage of people paying income tax. Furthermore, with increasing urbanization and monetization of the economy the "incidence" of sales and excise taxes tends to be borne also by people who either completely escaped such taxes or who on whom the 'burden' of such taxes was comparatively slight. Thus, due to various reasons, it is likely that with the increasing level of income and the consequent development in efficiency in tax administration, urbanization and monetization of the economy the percentage of people who are forced to bear the 'incidence' of different taxes increases, and/or the incidence of increase in G/y is likely to be relatively higher on those on whom it had been hitherto lower.

In the less developed countries where public expenditure as a proportion of G.N.P. is small, it is always in the interest of an overwhelming majority of voters to vote for rapid increases of public expenditure because the taxes needed

to finance such expenditure will not usually come out of their pockets and a government, in its interest of maximising the length of its life, will usually pursue policies of rapid increase in government expenditure. But as the ratio G/y increases, the taxes needed to finance an increase in G/y , start to hit some of the other groups of people which escaped taxation (or on whom the "burden" of taxation was comparatively slight) when the ratio was relatively small. Thus some of the groups which supported a rapid increase in G/y when such ratio was small would not support that rate of increase because then they would have to finance that increase. Therefore, as G/y increases, the people supporting the previous rate of increase of G/y decreases. The opposition and probably the disincentive effects being stronger, a government in its self-interest of maximising its length of its life would not pursue the previous rate of increase in G/y . Therefore, the rate of increase of G/y is likely to diminish with increasing G/y (or with increasing real per capita income which is shown to be associated with increasing G/y).

- (c) Difficulties encountered in finding new efficient sources of taxation and methods of tax collection, or to increase the rates of taxation on the existing sources.

With the increasing level of income and G/y , the rates of taxation increase, the sources of taxation expand and methods of tax collection improve, in order to be able to finance the

higher level of G/y . But the higher the rates of taxation, the greater is the exploitation of possible sources of taxation and adoption of efficient methods of tax collection, and the greater are the difficulties encountered by a government in increasing the rates of taxation on the existing sources and/or finding new efficient sources of taxation and methods of tax collection. Thus with the increasing level of income and government expenditure, it becomes increasingly difficult for a government to finance the previous rate of increase of G/y , which therefore also suggests the hypothesis of a diminishing rate of increase of G/y with relation to the rate of increase of real per capita income.

(d) The Productivity Lag and relative decline in income of public servants.

It is pointed out by several economists that productivity in the government sector is rising at a slower rate than in the private sector. For example, Kuznet's and Clark's studies on sectoral productivity suggest that the rate of increase of 'productivity' in service industries is less than that of manufacturing or even of agriculture; and because the public sector is characterised mostly by the former rather than the latter types of activities, the presumption is that the productivity in the public sector rises at a slower rate than

in the private sector. An increasing share of government expenditure is G.N.P., measured either at market value and/or money costs, therefore, would result with increasing real per capita income (or increasing average productivity).¹ If necessary adjustment could be made for the 'productivity lag', i.e. if both government expenditure and G.N.P. are measured in real quantities of goods and services, the increasing share of government expenditure in G.N.P. would be slowed down relatively.

It is practically impossible to measure such 'productivity' lags, and therefore we have made no adjustment for such lags. But the presumption that the 'productivity lag' leads to an increasing share of government expenditure in G.N.P. with increasing real per capita income, depends basically upon two assumptions; firstly, that the percentage of population required for public services varies directly with output; and secondly, that public servants are paid on average the same as other people, or the ratio of average income of public servants to that of other people remains constant (or increases).

1. See Jeffery G. Williamson, "Public Expenditure and Revenue: An International Comparison", op. cit., page 46, and S. Andic and J. Veverka, "The Growth of Public Expenditure in Germany since the Unification", op. cit.

There is no obvious reason to assume that the percentage of population required for different public services varies directly with real per capita income. For example, in the case of administration (police and justice) it is not necessary for the percentage of people required for such services to vary directly with the increasing level of income. With regard to education, even under the assumption that it is a "superior" good, the percentage of population employed as teachers need not vary because 'better and more' education could be provided by other means, i.e. better libraries, teaching by T.V. and films, etc., without increasing the percentage of people employed in teaching. Besides with increasing real per capita income and higher expectation of life, the ratio of children to population is likely to be smaller in the developed countries than in the developing economies. Thus, even the ratio of children to teachers could decrease with a constant percentage of people employed in teaching; therefore, whatever we may assume about the 'productivity lag' in the government sector, if the percentage of people employed in public services remains constant and if the ratio of the average income of public servants to that of other people does not increase, the government expenditure as a percentage of G.N.P. would not increase.

Secondly, even if the percentage of people employed in government services increases (either because of the productivity lag or because of the 'superior' nature of such services or because of some other reasons), as has been the case in many countries¹ (mostly for such services as maintaining roads or even in education and health), it may not increase government's share in G.N.P. if the public servants' income declines in relation to that of other people. In underdeveloped or semi-developed countries the relative difference between the average income of public servants and that of other people is usually greater than that found in developed countries. The relative difference is extremely high in cases of highly paid personnel in administration, and also in the case of engineers and scientists because of the great scarcity of such people with the necessary skill, qualification and experience. In most underdeveloped countries, e.g. Sudan, Nigeria, even an elementary school teacher or a clerk of subordinate grade, as pointed out by Martin and Lewis in their study, earn two to three times more than an average farmer. India is an exception because of her vast surplus of Arts graduates in relation to the jobs available. Whereas, in the developed countries, e.g. in U.K., such people in public services earn an income not very different from that of an average industrial worker or farmer.

1. See for instance, Moses Abramovitz and Vera Eliasberg, The Growth of Public Employment in Great Britain, op. cit.

But with the increasing level of economic development, and the concomitant spread of education and skill, the people who could perform those services increases, and as the relative scarcity of such people diminishes, the relative inequality of income between public and private or self-employers tends to diminish.

However, usually the percentage increase of people in public services is not completely offset by a relative decline in income of public servants and therefore G/y may rise. Nevertheless, there is a strong presumption that the 'productivity lag' in the government sector increases at a diminishing rate (or even diminishes) with rising levels of income, because of the increasing use of technological innovations in the public expenditure field, e.g. the use of expensive computers seems to be increasing in the government sector at a faster rate than in the private sector.

Secondly, the relative decline in income of public servants seems to proceed at a faster rate with the increasing level of economic development. The ratio of the real per capita income of underdeveloped countries (e.g. Tanganyika, Sudan and Nigeria, whose real per capita incomes are about \$99, \$120 and \$134 respectively) to that of semi-developed countries (e.g. Malaya, Greece, Spain, Italy whose real per capita incomes are \$552.4, \$613.0, \$514, \$897 respectively) is about 1 : 6 and the ratio of the real per capita income of semi-developed countries to that

of developed countries (e.g. U.K., France, Belgium, Sweden, Canada, U.S.A., etc.) is about 1 : 2½. The ratio of relative difference between the average income of public servants and the average income of other people for underdeveloped countries to that of semi-developed countries could be 3 : 2, whereas the ratio of such a relative difference for semi-developed countries to that of developed ones may be about 2 : 1.25. By comparing such ratios (i.e. for real per capita income; and for the relative difference between average income of public servants and that of other people) we notice that the relative difference in real per capita income between semi-developed and underdeveloped countries is about five to six times, but the relative decline in average income of public servants is only about 50 per cent; whereas the relative difference between real per capita income between developed and semi-developed countries is only about two and a half times, but the relative decline in average income of public servants is about 60%. There could be large margins of error in these estimates; however, these margins are not likely to be so great as to falsify our hypothesis that the relative decline in income of public servants proceeds at a faster rate with increasing level of economic development.

Thirdly, the 'productivity lag' in the government sector is relevant only for government purchases of goods and services. In case of transfer payments by a government, purchases of goods and services are usually left to the individual's choice; and there is

no obvious reason to assume that persons receiving 'transfers' spend such money on goods and services, for which productivity increases at a slower rate. Transfer payments, as a percentage of total government expenditure, however, seem to increase with increasing levels of per capita income, which is evident from different case-studies. Or, the purchase of goods and services as a percentage of total government expenditure decreases with increasing per capita income. Therefore, the proportion of total government expenditure for which the concept of 'productivity lag' is relevant diminishes with increasing levels of economic development.

The various reasons given above, i.e. a diminishing rate of increase of the 'productivity lag', the relative decline in income of public servants, increasing share of transfer payments in total public expenditure with increasing level of per capita income, give strong support to our hypothesis of a diminishing rate of increase of G/y in relation to the rate of increase of real per capita income.

(e) The effects of urbanisation and industrialisation.

Economic growth or rising real per capita income is usually associated with a transfer of labour force from primary industries (agriculture, fishing, forestry) to tertiary industries (transport and communication, commerce, etc.) with the related movement of

people from rural to urban areas.¹ Urbanisation, however, seems to increase at a diminishing rate (increasing rate of increase is likely for very low-income countries) with an increasing level of economic development.²

What are the possible effects of urbanisation on the size of public expenditure? It may affect government expenditure in various ways.

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1. Dr. Mesmer in his study, op. cit., has in fact used the share of male labour force in primary and tertiary industries and the share of population living in cities of 20,000 or more as his measures of economic growth. As we already mentioned in chapter III, section I, we do not think that such shares can be substituted for the usually accepted measure of economic growth, i.e. real per capita income. We think, however, that there is a high correlation between such shares and level of economic development.
 2. Kinsley Davis in his article, "The Origin and Growth of Urbanisation in the World", The American Journal of Sociology, LX. March 1955, points out "a diminution in the rate of urbanisation in the other industrial countries has been noted, a diminution that is being compensated by an increase in the rate of urbanisation". Mrs. Andic and Dr. Veverka in their study of 'Growth of Public Expenditure in Germany', op. cit., also point out "there is a strong presumption that the influence of these permanent factors (i.e. urbanisation and productivity lag) diminishes once a certain level of income has been achieved. Urbanisation tends to slow down in the latter phases of industrial expansion, and even the 'productivity lag' may diminish as the total weight of services, both private and public, in total output increases" page 19).

First, the need for certain government expenditures, e.g. water, street lighting, police for traffic control, sewage supply, public parks, transport and communications, etc. to meet the particular needs of urban life, increases with urbanisation. Therefore, government expenditure for such services is likely to increase, and this will also affect the absolute level of total public expenditure.

Second, industrialisation and urbanisation tend to break down the joint family system as well as dissolve many voluntary rural organisations. The joint family system (also, in some cases, voluntary organisations in villages through mutual co-operation) provides a sort of informal social security for old age, sickness or unemployment. The redistribution of income within the family for contingent needs due to sickness or unemployment, or for permanent needs due to old age or other causes of incapacity to work, or a lower capacity to earn than other members of the family, or to even out to some extent the difference in the earning capacity of an individual during his life time (e.g. person earns less during the training period and more afterwards), reduces the need for a redistribution of income for such purposes through fiscal means. As industrialisation and urbanisation tend to break down the joint family system and also tend to dissolve voluntary welfare organisation of villages, the formal social security system provided through

fiscal system takes the place of the disappearing informal social security of joint family and rural organisations. The redistribution of income through fiscal means for contingent or permanent needs or to even out differences in earnings over life takes the place of the disappearing redistribution of income within the family for such purposes, so that the 'economic status' of an individual is preserved.¹ This again would increase the level of public expenditure. One may, however, argue that the breaking down of the joint family does not necessarily create the need for public provision of such services. Some of these services, e.g. old age pensions, unemployment or sickness benefits, could as well be provided by market mechanism through private insurance schemes. We do not deny this possibility, but complete reliance on market mechanism seems less likely both because of the objective of communal responsibility for such service assumed by a society and because the opportunity costs of private provision as compared to the public provision of such services may be considered too high.

Third, greater political influence of urban population, as opposed to rural population, could also be a factor in influencing the level (and also pattern) of government expenditure.

1. See Mrs. Andic and Dr. Veverka, op. cit., page 221.

Industrial and urban areas provide better scope and opportunities for organisation of pressure groups, trade-unions, and other groups whose preferences are weighted at a higher rate by a government than the rate at which the preferences of the other voters are weighted. The preferences of the interest groups receive greater weight, because such groups may mould public opinion through persuasion or public demonstrations or agitations. In an uncertain world with imperfect knowledge many voters are usually not informed about the facts necessary for their voting decisions and therefore could be influenced in their voting decisions by persuasion through propaganda campaigns or through public demonstrations, just as consumers with imperfect knowledge could be persuaded to buy a certain product through general advertisement.¹

Therefore, a government in its self interest of maximisation of its length of life would not like to dissatisfy the prominent interest groups. The activities of interest groups, however, are motivated by the desire to derive some discriminatory benefits for themselves, through government policies. The conferring of special benefits by a government usually involves the spending of more public monies for specific purposes financed by some general taxation. In non-democratic countries the influence of interest groups on government policies is

1. See Anthony Downs, An Economic Theory of Democracy, op. cit., part II, chapters 5 and 6.

likely to be even greater; in the absence of the right to vote, the organised group could only communicate and assert their preferences. Thus the increasing activities of interest-groups, with increasing urbanisation, usually lead to increasing levels of public expenditures.

We have discussed above the different reasons why urbanisation is likely to increase the level of government expenditure. Dr. Mesmer's simple correlation exercise, as pointed out in chapter II, Section I, shows a high significant positive correlation between government expenditure as a percentage of G.N.P. and the degree of urbanisation; and it appears from his scatter diagram showing the relationship between G/y and the degree of urbanisation, that the rate of increase of G/y with relation to that of degree of urbanisation can at its extreme be constant, if not diminishing. As already mentioned, urbanisation seems to increase at a diminishing rate with increasing level of income. Therefore, our hypothesis of a diminishing rate of growth of G/y with an increasing level of income is highly likely.

(f) Diminishing rate of growth of capital expenditures.

The economic development of a country depends on various factors. Growth of real per capita income, as has been suggested by various growth theorists, depends upon various factors besides

capital, i.e technological changes, supply of natural resources, entrepreneurial initiative, mobility of labour, fiscal and monetary policy pursued, political conditions, social institutions, rate of growth of population, etc. Nevertheless, it is usually accepted by the policy makers as well as by the economists that capital formation is one of the most important determinants of economic growth.¹

In an underdeveloped economy, voluntary saving and capital formation in the private sector would be much lower than they would be in a developed economy, because of various reasons to be discussed below.

Since the level of real per capita income in an underdeveloped economy is low, the margin of income which people would save after satisfying the minimum necessities of life is likely to be very low. As the propensity to save is very low, the amount of saving available for capital formation is, therefore, also extremely low.

1. "Capital is a necessary but not sufficient condition of progress". R. Nurkse, Problems of Capital Formation in Underdeveloped Countries, Oxford, Basil Blackwell, 1955, page 1.

One may argue, however, that because of the existence of a greater inequality of income in underdeveloped countries, the volume of saving available for capital formation should be high. But usually most of the people belonging to the highest income group earn their income from non-entrepreneurial sources, such as rents earned by letting their land for cultivation by land-less labourers, and interest gained by usurious money-lending to small agriculturists for the purpose of meeting their emergency consumption needs, e.g. due to marriage, religious festivals or due to natural calamity of flood or drought, etc. The unearned income from rent and interest is disposed of to a considerable extent in conspicuous consumption and the rest, which is saved, is invested to a considerable extent in "unproductive" purposes, e.g. to increase the money-lending to small agriculturists for consumption needs, to invest further in land by purchasing land from people who need to sell their land for emergency consumption needs, etc.

In an underdeveloped country, the industrial profits after tax-payments, constitute a much lower percentage of national income than in developed economies. A considerable proportion of such industrial profit is usually re-invested in the industry giving rise to this profit, or in some other productive investment. In England, for example, in the 19th Century, it was the increasing volume of industrial profit in the private sector, arising mainly from the maintenance of low wage rates and from

the low taxation of profits (probably because the workers had very little political influence as the universal suffrage and trade unions were lacking) which played an important role in the formation of capital during the industrial revolution. The course of action taken by Britain in the 19th Century, however, is not possible because of the political consciousness and influence of low-income groups, nor would it be considered "desirable" by the policy makers of the underdeveloped countries.

The accumulation of saving, as already noted, is very low in an underdeveloped country, and that alone does not create the most "productive" investment which promotes economic growth. The saving could be used for less "productive" investments, the rate of return (money or psychic) for which may be higher for the individual than the rate of return from more "productive" investments, because of the divergence of social benefits from private benefits.¹

As has already been discussed above, the savings of landlords and village money lenders are usually invested in "unproductive" investments or in investments for which the social marginal productivity is very low. Secondly, investment of saving in low "productive" investments takes place because of the lack of entrepreneurial initiative, know-how and skill.

1. By 'productive investment' we mean investment where marginal social productivity is greater than zero, and the extent of productivity is measured by such a rate of marginal productivity. Unproductive investments are those for which such rate is less than zero.

Thirdly, the uncertain potentialities in an underdeveloped country make it extremely difficult to make reasonable estimates of the future costs and demand conditions. This, therefore, increases the borrower's risk and reduces the prospective yields of capital. Fourthly, the low incentive to invest is also due to the lack of external economies, e.g. lack of skilled workers, auxiliary industries, transport and communications, etc. The investment in social and economic overheads, which will create external economies and provide incentives to private enterprise, would not be undertaken by many individuals, because of the great divergence between social and private productivity.

Thus, domestic voluntary saving in an underdeveloped country is very low and productive investments by the domestic private sector, which would promote rapid economic growth, is likely to be even lower.

Besides, the inflow of foreign private capital, which would not be reflected in governments' budgets (and thus would not increase government expenditure as a share of G.N.P.) to the developing economies has been relatively very

stagnant because of the various reasons.¹

It may be argued that the inflow of foreign private capital to the developing countries would be relatively high because of the availability of cheap labour and unexploited natural resources. Because of these factors it may be thought that capital-output ratio would be smaller in a developing economy than a similar ratio in a developed economy; and therefore capital would be attracted to the developing economies.

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1. "The unsatisfactory rate of growth of exports of less developed countries in recent years has been accompanied by a similar trend in the inflow of private long-term capital to these countries. For the post-war period as a whole, the inflow of such capital shows a clearly rising trend, it reached a peak in 1956-57 as a result of some extraordinary investment in the Venezuelan oil industry. If Venezuela is excluded (and also some countries in the overseas franc area for which data is not available) the annual rate of inflow of private long-term capital into less developed countries is slightly higher in 1961-62 than in either 1956-57 or the five year period 1956-60, reaching a total of about \$1.4 billion. While private long-term investment has not risen appreciably, there has been a very substantial increase in the inflows on account of government grants and loans". The quotation comes from "The Annual Report of the International Monetary Fund" as quoted in Mr. D. Horwitz's article "Accelerated Growth and the Pattern of Government Expenditure". Mr. Horwitz also provides several reasons for such relatively small and stagnating flow of private foreign capital to the developing economies. See D. Horwitz, "Accelerated Growth and Pattern of Government Expenditure", incorporated in Government Finance and Economic Development, edited by Alan T. Peacock and G. Hauser, O.E.C.D., Paris, 1965.

But the economies due to the availability of cheap labour and/or unexploited natural resources may be more than outweighed by the lack of external economies, e.g. lack of transport and communication, auxiliary industries, skilled workers, technical facilities, etc. This, therefore, reduces the incentive to invest in the developing economies. Second, the risk of nationalisation of foreign industries, restrictions imposed on the repatriation of profits, political instability, etc. further reduces incentives to invest in the developing countries. Third, the lack of developed money and capital markets and stock exchanges in the under-developed countries reduces the flow of private foreign capital to those countries. Fourth, the uncertain potentialities already mentioned, also reduces the incentives to invest. Fifth, in the developed economies besides the existence of the above-mentioned facilities in which the developing economies are deficient, various other factors provide incentives to invest in already industrialised countries. To mention a few, the technological changes, e.g. the introduction of automation which works in two directions, i.e. "(a) quicker obsolescence and a need for re-equipment of whole industries; and (b) a higher unit of fixed capital per worker",¹ and the

1. D. Horwitz, op. cit., pages 63-64.

expanding and diversified market due to increasing standards of living and population increases, have enormously increased the demand for capital. The fast growth in population even in the developed economies, with a few exceptions, also increases the demand for capital equipment for its integration in the machinery of production. Whereas, the probable reduction in unequal distribution of income seems to decrease the share of income saved (the marginal propensity to save of higher income group is usually assumed to be higher than that of the lower income groups) and available for investment. All these different factors provide an incentive to invest in already developed countries and retard the flow of private foreign capital to the developing economies.

As has been already said, it is usually accepted by the policy makers that capital formation is one of the most important determinants of economic growth and at the same time rapid economic growth is accepted as one of the main objectives to be achieved. But, as shown above, voluntary saving in an underdeveloped economy is likely to be very low and 'productive investments' which would promote rapid economic growth would be even lower. The inflow of private foreign capital which would not be reflected in government budgets and expenditures, has been relatively very low and stagnant. Under

these circumstances, a government, in order to achieve high rate of capital formation, would resort on the one hand to the device of forced savings through different methods, and on the other hand would try to attract foreign aid (loan or grants) from governments of developed countries and/or international institutions, both of which would be reflected in the government budget and would increase government expenditure as a share of G.N.P.

As regards the device of forced saving, a government may adopt various methods, i.e. high taxation by the imposition of new taxes or increases in the rates of existing taxes, public borrowing at some positive rate of interest or zero rate of interest (i.e. deficit financing through new money creation), and direct physical controls. Each of these has its advantages and disadvantages. Usually a combination of these different methods is used, depending upon the circumstances and objective function to be maximised by the policy-makers. How should a government choose a particular combination of such methods? Can a government succeed in providing 'more and better' capital investments? Do the problems due to the lack of enterprise, administrative ability, know-how and skill etc., make the government investment equally (or even more) inefficient? These questions are outside the scope of our study and no attempt, therefore, is being made to provide

answers to them. We intend simply to point out that the device of forced saving resorted to to achieve high capital formation usually raises government expenditures.

Similarly, the questions regarding the optimum level and distribution of foreign aid to underdeveloped countries, are outside the scope of this study, and so we do not intend to discuss them. We intend simply to point out that the flow of governmental aid (loans or grants) from the developed countries and international institutions, e.g. I.B.R.D., to the underdeveloped countries has increased enormously in the last decade.¹ Such aid is usually channelled through the governments of developing countries, and therefore, increases their government budgets or expenditures.

But with an increasing level of real per capita income some of the factors which are responsible for the very low level of domestic or foreign private capital formation, and which therefore necessitates the financing of capital expansion through fiscal means, become less and less significant. For example, with increasing real per capita income, voluntary saving is likely to increase unless one assumes that marginal propensity to consume is equal to or greater than one. With

1. "The flow of governmental capital from the highly developed and industrialised countries under the aegis of Development Assistance Committee of O.E.C.D. to developing countries throughout the world rose from \$3.2 billion in 1956 to \$6 billion in 1961, while private investment stagnated during the same period at some \$2.5 billion per annum." Horwitz op. cit., page 63.

the increasing spread of education, the upper income groups' income from non-entrepreneurial sources, such as interest gained by money lending at a very high rate of interest to the small agriculturists or to other low-income groups to meet their emergency consumption needs, e.g. due to marriages or religious festivals, diminishes. With the spread of irrigation and flood-control projects, the money-lending to small agriculturists for the natural calamies of floods or drought also diminishes. The psychic rate of return on investments in land or gold ornaments, which usually provide 'social status' in an underdeveloped country, seems to diminish with the increasing level of economic development and education. As the demand and rate of return on such very low 'productive investment' diminishes, inducement to invest in some more productive investment increases. To a large extent, know-how, skill and enterprise are increasing functions of the level of economic development and education. Increasing availabilities of external economies (e.g. transport and communication, auxiliary industries, skilled workers, etc.), developing money and capital markets and stock exchanges would provide an increasing incentive to private (domestic or foreign) investments, with the increasing level of real income. Thus, some of the factors which necessitate the

financing of capital expenditure through fiscal means in an underdeveloped country become less and less significant; and, therefore, the incentive to a government for the public financing of some of the capital expenditures would diminish with increasing levels of economic development. Besides, foreign governmental aid as a proportion of G.N.P., which increases governmental expenditure, by and large seems to diminish with increasing real per capita income (though such aid depends largely on political factors). Furthermore, foreign aid as a proportion of G.N.P. diminishes even if the per capita aid remains constant or even if it increases, if the rate of increase of such aid is lower than the rate of increase of per capita income.

On both grounds, therefore, there is a strong presumption that the rate of growth of capital expenditures by a government is a decreasing function of the level of economic development, and, because of this, a diminishing rate of increase of G/y with relation to the rate of increase of real per capita income may operate.

(g) "Private Opulence" and "Public Squalor".

Professor Galbraith in his "The Affluent Society" observes the ever-increasing disparity between the flow of private and public goods and services with increasing affluence in the American economy, where "public poverty completed on the whole successfully, *with* the stories of ever-increasing opulence in privately produced goods".¹ Several fascinating examples are given to show how the supply of public goods and services has been neglected with increasing private opulence.

Professor Galbraith gives several reasons for distortions in 'social balance' - defined as 'a satisfactory relationship between the supply of privately produced goods and services and those of the state'.² But the causes of "social imbalance" viz., 'the truce on equality and the tendency to inflation'³ could apply not only to an affluent society but also equally well to an underdeveloped economy with very low per capita income; because of which, statements such as '.... wealth in privately produced goods is, to a marked degree, the cause

1. J. K. Galbraith, The Affluent Society, Hamish Hamilton, London, June, 1961, page 196.

2. Ibid., page 198.

3. Ibid; page 203.

of crises in the supply of public services',¹ and 'the inherent tendency will always be for public services to fall behind private production'² do not necessarily follow from his analysis of 'social imbalance'. In what follows, we have rephrased some of his arguments and have added some others to show that 'inherent tendency'.

As has been already shown in our previous discussions, the public goods and services are usually different in nature from the private goods and services. The private goods and services are usually supplied on a quid pro quo basis and the transactions in the private sector are voluntary. But no such quid pro quo relationship exists for most of the public goods and services because of the indivisible nature of the benefits provided by public expenditure, so that they are not subject to the 'exclusion principle',³ and also because of the redistribution considerations. The payments made by an individual to finance provision of public goods and services are also usually compulsory, because no one would pay for such services voluntarily since his payment or non-payment would hardly affect the total provision of public goods and services.

1. Ibid., page 195.

2. Ibid., page 203.

3. R. A. Musgrave, The Theory of Public Finance, op. cit.

Therefore, because of the quid pro quo relationship in the private sector, when an individual buys certain goods or services, he usually knows the costs and benefits of such transaction. He is also quite aware of the costs or taxes which he individually pays for financing the provision of public goods and services, taxes being considered as a 'burden' because of their compulsive nature, and because of the absence of a direct quid pro quo. People are well aware of the "direct" taxes paid by them; and even the "indirect" taxes cannot be imposed and collected without being noticed and felt by the people, although to some extent they may be 'hidden'. Firstly, the producers and retailers or wholesalers who collect such indirect taxes are fully aware of such taxes and they also bear to some extent the "incidence"; and secondly, because the consumers, when charged higher prices for the taxed products, are being persuaded by the sellers in an attempt to justify the fact that increases in prices are due to such taxes, so becoming aware of the existence and 'burden' of such taxes. In contrast to the costs and benefits of private transactions and taxes raised to finance public expenditure, of which people are to a large extent aware, they are usually quite ignorant of the benefits, especially the remote and intangible ones, derived from such expenditure.

This is so, firstly because of the absence of a quid pro quo relationship for public goods and services, and secondly because the opportunity cost in money or time of gathering information about benefits, especially the remote ones, of vast and complex public expenditures is too high.¹ Besides, whatever information they gather about such benefits are likely to be discounted at a very high rate, particularly where the remote benefits are concerned. The information gathered is usually free and so is likely to be highly biased or persuasive in character. The high probability of being falsely informed, and also the uncertainty about the continuation of a government's policy (either because of the change of a governing party or because of some other contingencies), the continuation of policy being necessary for the provision of some future or remote benefits (e.g. the recent scrapping of T.S.R.2. by labour government in the U.K.), lead to the people's heavy discount of remote benefits of government expenditures. A government therefore, in its self-interest of maximisation of its life, would neglect public expenditures as a whole and especially curtail those expenditures which provide remote benefits.²

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1. Anthony Downs, An Economic Theory of Democracy, part II, and "Why the Government Budget is too small in a Democracy", World Politics, vol. XII, July 1960.
 2. See also Anthony Downs, "Why the Government Budget is too small in a Democracy", op. cit., and Andic and Veverka, op. cit.

This would be the case with both developed and underdeveloped economies. But with increasing levels of income, the increasing role of advertisement in the private sector and the increasing 'remoteness' of benefits from government expenditure as are discussed below, would tend to slow down the rate of growth of government expenditure.

In an underdeveloped economy, private wants largely consist of wants for the minimum necessities of life, and to a large extent such wants are satisfied by goods produced either at home or bartered locally. In the non-monetized sector, advertisement has virtually no role to play. In the monetized sector also, the goods which are vulnerable to advertisement for sale are very few. Therefore, advertisement in the private sector is negligible. But in a developed economy, advertisement is the basis of mass production and sale. Even private goods which provide remote benefits, or benefits over a long period, are advertised in such a way as to make their benefits appear immediate; their purchase also is facilitated by highly advertised hire-purchase systems. But no government, either in a developed or underdeveloped economy, could afford to spend its revenue on advertising the benefits from public expenditures, because such advertisement would lead to charges of wastage of public money. Nor can a

government link the taxes with the benefits received because of the reasons already stated. The increasing importance of advertisement for private goods and services only, therefore, tends to slow down the growth of public expenditures in relation to the increasing level of income.

Second, with the increasing level of real per capita income, the social and economic structure grows more complex, mainly because of specialisation about the division of labour which also increases productivity and per capita income. But as pointed out by Downs, as society grows more complex the "remoteness" of benefits from public goods and services increases. To quote Downs, 'this tendency is most obvious in international affairs..... it becomes harder and harder for even experts to keep well-informed on possible benefits to be gained from government policies, including those on the local scene, it also makes each field of action more remote from the ken of the average man. Faced with a gigantic maze of government agencies, each grappling with incredibly intricate problems..... he wraps himself in a mantle of rational ignorance, insulated from knowledge of increasingly important remote benefits by the increasingly high cost of finding about them.'¹ But as already mentioned, it is in the self-interest

1. A. Downs, "Why the Government Budget is too Small in a Democracy", op. cit., pages 561-562.

of a government to neglect especially those expenditures which provide remote benefits because people are usually ignorant about them. However, the taxes which would be required to finance the provision of "hidden" remote benefits cannot be hidden, and no one likes to pay taxes. Thus, as the remoteness of benefits of public goods and services tends to increase with increasing levels of economic development and with higher G/y , the relative growth of public expenditure with relation to that of per capita income tends to diminish.

Therefore, the factors discussed above, i.e. the effects of the increasing role of advertising and increasing remoteness of benefits of public expenditures, also provide strong support for our hypothesis of a diminishing rate of growth of G/y with an increasing level of real per capita income.

(ii) Explanations for the importance of geographical location.

From the scatter diagram of the cross-section data, given in chapter III, it is apparent that the geographical location of a country could influence the level of public expenditure. We observed that the Latin American countries are usually below the regression curve fitted in chart No. 1, whereas the Asian and African countries are usually above the curve. In our time-series approach too, the similarities, with respect to the growth and time pattern of public expenditure, between different countries are found to be more pronounced between

the countries which are geographically close to each other.
(See chapter IV, section VI (4)).

The explanation of the importance of geographical location seems to be that the "demonstration effect" is very strong amongst the neighbouring countries. A government's policies are likely to be more influenced by the policies pursued in the neighbouring countries than by the policies pursued by distant countries. The political attitude towards government expenditure could also be an important factor. The Asian and African countries probably are more 'socialistic' than the Latin-American countries, which again could be due to their "geographical location" and "demonstration effect".

II. Plausible Explanations for the Statistical Observations and Hypotheses from Time-Series Approach.

(i) Explanations for the 'shifts' in the level of government expenditure associated with War and/or the Great Depression.

In the last chapter, our statistical observations suggested a significant positive shift in the regression function of G_c on Y_c (or a 'displacement effect') associated with World War (1st and/or 2nd) in the case of each country included in our example which took direct part in War. Such a shift was also observed to be associated with the Great Depression in the case of the United States and Canada, which were most affected by that social upheaval. Now the question is: what could be the plausible explanations for such shifts?

As regards the shifts associated with the wars, Peacock's and Wiseman's explanation of the "displacement effect" (which relates to such shifts), based basically on the concept of the tolerable burden of taxation seems reasonable. We discussed the concept of the tolerable burden of taxation in some detail in Chapter II, Section II, and accepted that such a concept provides a plausible explanation for a 'shift', if that shift is associated with a social upheaval, such as war, during which people get accustomed to a higher burden of taxation which continues even after the disappearance of that upheaval.

But as was argued in the above-mentioned chapter, and also emphasised in section I(i) of this chapter, the 'shift' associated with the Great Depression in the case of the United States and Canada cannot be explained by that concept. Taxes are rather cut down during severe depression and the concept of the tolerable burden of taxation, in that case, would suggest a 'shift' in the downward direction.

It seems highly likely that the 'shift' associated with Great Depression occurred because of the change in the attitude towards public expenditure. Many 'new' expenditures which were not considered very desirable became highly 'desirable' due to the 'inspection process' generated by the Great Depression. The deficiencies in the social services of which government and people were not conscious, were brought to

direct public notice. Besides, the adverse effects of depression were not limited to a particular sector of the community but hit almost everybody. The Depression like the World Wars produced a feeling of community and thus encouraged expansion of the public sector which was accepted as a measure to cure deficiency in aggregate demand and the consequent mass unemployment. Thus, there were radical changes in the accepted ideas about the proper role of a government.

Because of the shift in the attitude towards public expenditures many 'new' expenditures especially in the field of welfare services, subsidies and assistance came to be regarded by people and also by the government as highly desirable. A similar shift in the tolerable burden of taxation is unlikely to have occurred during depression, the increased expenditure during depression being financed mostly by deficit financing.¹

1. See G. Colm and M. Helzner, "The Structure of Government Revenue and Expenditure in Relation to the Economic Development of the United States", in L'Importance et la Structure des Recettes et des Depenses Publiques, International Institute of Public Finance, Brussels, 1960. The authors point out the importance of War and Great Depression for the time pattern of growth of expenditure in the United States. Their explanation in this respect, is similar to ours. They state that "the traditional resistance to central government control has weakened only in times of war or serious depression. Thus, government functions do not always respond gradually to the needs of an industrial and urban (suburban) society. An increase in government activity or responsibility often depends on events happening which dramatise the need for such measures and help to overcome traditional resistance", page 60-61, quoted from Peacock and Wiseman, op. cit., page xxxi.

In other words, it may be said that there was a big increase in the existing gap between the 'desirable' level of public expenditure and 'tolerable' burden of taxation during the Depression, since a shift in the desirable level of public expenditure occurred without a corresponding shift in the tolerable burden of taxation. An increase in this gap seems to have permitted the acceptance of new taxes and the consequent increase in the tolerable burden (and thus a decrease in the 'gap') after the Depression was over, which explains partly the continuance of a level of public expenditure higher than that prevalent before the Depression. Besides, debt financing also contributed to the prevalence of a higher level of public expenditure during the thirties in the case of the United States and Canada.

Although Peacock's and Wiseman's explanation of the displacement effect of war is basically founded on the concept of the tolerable burden of taxation, they also recognise the importance of other factors such as changes in the attitude towards public expenditure and technical innovations in the revenue-raising activities because of an 'inspection effect' of war. It is argued that wars, by generating an inspection process, have been the means of directing public attention to the deficiencies in public

services such as education and health, of which citizens as well as government were formerly less conscious. Besides, war generates community feeling which encourages expansion of the public sector. Thus wars often change the attitude towards public expenditure and many 'new' public expenditures (e.g. National Health Service in the case of Britain during World War II) become highly desirable due to the inspection process. The same process, because of the urgent need to increase government revenues, produces improvement in tax administration and widens tax opportunities for a government (e.g. the pay-as-you-earn system of income tax and purchase tax were introduced during World War II in Britain). Such changes in the tax system improve the government's permanent revenue-raising potentialities.

Thus the displacement effect of war (or a shift in the level of public expenditure with relation to economic growth) could have occurred due to various factors operating through both the revenue and expenditure side of the fiscal system. During war people accept new tax levels and methods of raising tax revenues, formerly considered intolerable, and this acceptance remains even after the upheaval has disappeared because people get accustomed to the new burden of taxation. Such a shift in peoples' ideas about tolerable burden of taxation provides opportunities for a government to

undertake new expenditures which otherwise it would not dare to undertake. But at the same time, the consequence of the changes favourable attitudes towards public expenditures because of the 'inspection process' generated by war, could not be neglected. The changed ideas about public expenditure undoubtedly facilitated the continuance of higher post-war levels and new methods of taxation and thus the higher levels of public expenditure.

Thus our explanations of the displacement of effect of war are not incompatible with those of the displacement effect of the Great Depression.¹ The forces operating through the revenue and expenditure side of the fiscal system are basically the same in both cases. The difference lies only in degree. A shift in people's ideas about tolerable burden of taxation is possibly of greater significance for a displacement effect of war; but at the same time as shown above, the changed favourable attitude towards public

1. It may also be said that, as in the case of Duesenberry's consumption function, there is a 'ratchet effect' operating also for the behaviour of public expenditure. (See J. S. Duesenberry: Income, saving and the Theory of Consumer Behaviour, Harvard University Press, 1949). Once the government expenditure is shifted to a higher level, due to whatever reasons (such as war and/or Depression), it never comes back to the previous level. This 'ratchet effect' could be due to the reasons such as habituation to new tax levels and/or changed favourable attitude towards public expenditure.

expenditure due to an inspection process generated by war cannot be ignored. For the displacement effect of the Great Depression a shift in people's ideas about the desirable level of public expenditure, because of the inspection process generated by Depression, could be considered of greater significance, but as argued in chapter II, section II, the implementation of such ideas was possible, because of the feasibility of incurring higher expenditures without increasing the total 'burden' of financing such expenditures. A substantial part of total financing was met by debt financing, the 'burden' or opportunity cost of which may be considered almost zero during the period of severe depression. Thus, by expanding the concept of the tolerable burden so as to include not only that of taxes but also that of other methods of financing, it can be maintained that the public expenditures are determined largely by the burden of financing such expenditures.

In the previous paragraphs, our possible explanations of a displacement effect are founded basically on a priori grounds. We provide below some justification for our explanation on empirical grounds.

Recently, Eva Mueller has tried to measure people's attitudes towards government expenditures and taxes on the basis of several sample surveys, in each of which a nationwide cross-section of households in the United States was selected for interview.¹ Her sample surveys, like any others, have obvious limitations (such as sampling errors, the answers received being influenced by the wordings of the questions, etc.) Her findings are confined to the attitude of American citizens only which makes it difficult to draw clear cut conclusions about the attitudes of peoples of other countries with different political, social and economic structures. Nevertheless, it may be pointed out here that her empirical findings (although strictly speaking limited to the attitudes of American households) provide some support to the analytical explanations given above.

First, it is shown by her empirical investigation that people usually have favourable attitude towards government expenditure. A substantially large majority of people like

1. See Eva Mueller, Public Attitude toward Fiscal Program, Quarterly Journal of Economics, May 1963, pages 210-235.

to have higher government expenditure.¹

Although there is a strong desire for the extension of government expenditure for a number of government activities, only a small minority of the people interviewed would like to tolerate additional taxes.² The coexistence of favourable attitudes toward additional expenditures with the dislike of additional taxes has been recently verified in Germany and Sweden too by Gunter Schmolders.³

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1. To quote Eva Mueller, 'The enquiry began by handing respondents a card showing a list of eleven "things on which the government spends money". only 6 per cent of the people interviewed did not think that any of the government programs enumerated should be enlarged. Sixteen per cent checked the answer "more" only once or twice, about half checked it three to six times, and a fourth checked it seven times or more. these distributions of answers clearly point to widespread support for many government programs'. Page 213-214, op. cit.
 2. The explanation that each citizen would prefer less spending for some government programs in order to allow greater spending for others, in which he is interested, is contradicted by Eva Mueller's findings, which show (Table II of her study) that for "only three out of fourteen major government programs is there a sizeable group of people who advocate a reduction in spending, while for the remaining eleven programs the group favouring increased spending is much larger than the group favouring out-backs."
 3. See Gunter Schmolders, Das Irrationale in der Offentlichen Finanzwirtschaft (Hamburg: Rowohlt, 1960,) quoted from footnote 2 on page 223 of Eva Mueller's study, op. cit.

Thus, as argued above, a gap usually exists between the people's notions about the 'desirable' level of public expenditure and the 'tolerable' burden of taxation.

Secondly, it was argued above that the displacement effect of war was mainly due to the acceptance of the new higher tax levels of war-time even after the disappearance of the upheaval because people got accustomed to the new burdens of taxation. Eva Mueller's empirical findings provide support for this view. She states that the prevailing levels of taxes in the United States could be due to 'habituation'. Her empirical observation runs as follows: 'Congress enacted a tax increase in September 1950. Although this increase was occasioned by war, 40 per cent of the people were of the opinion in June 1951 that taxes should be reduced, and another 40 per cent argued that no further increases should be made. Most significantly, about 60 per cent explained spontaneously in 1951 that "taxes already are high". This figure stands in sharp contrast to the 20 per cent who gave a similar response in 1961'. It is shown that such habituation exists also for the prevailing levels of debts, although dislike for an increase in deficits exists as well.

Thirdly, our a priori arguments suggested that a separation between people's ideas about the 'tolerable' burden of taxation and the desirable level of public expenditure cannot always be made. People's ideas about the 'tolerable' burden are determined partly by their views about the 'desirability' of public expenditures. Eva Mueller's empirical findings, while providing evidence for the existence of a gap between two sorts of ideas, clearly points to 'some willingness to accept tax increases' (or a higher tax burden) for the programs which are viewed as "important" (or highly desirable). The findings summarised in Table I of her study "show that half of the people interviewed said that they were prepared to pay additional taxes in order to make possible large outlays on two or more government programs", "with 41 per cent favouring greater outlays on education, even if these additional outlays would require tax increases".¹

Our explanation of the displacement effect of the Great Depression is basically in terms of a shift in the attitude towards public expenditure. We argued that, because of the

1. See Eva Mueller, *op. cit.*, pages 22, and 217. It is apparent from her findings that "people's reactions to any proposed tax change would be strongly influenced by the reasons for the tax change and the political and economic circumstances under which it occurred". (Page 224).

inspection process generated by that upheaval, many new expenditures came to be regarded as highly desirable by the people. The radical change in the accepted ideas about the role of government could have inspired willingness to accept tax increases after the recovery started.¹ This seems to us a plausible explanation for the continuance of a level of public expenditure higher than that experienced before the Great Depression. Eva Mueller's empirical findings, with regard to people's attitude toward taxes, discussed in the previous paragraph, provide some support for our explanation.

(ii) Explanations for changes in the rate of growth of G_c with relation to that of Y_c

In our time-series analysis in chapter IV, we observed also a significant change in the rate of growth of G_c with relation to Y_c associated with each major social upheaval in the case of each country included in our study. However, with regard to the direction of change in the rate of growth G_c , no generalisation can be made. It diminished after the shifts associated with World Wars in the case of the United Kingdom. In the case of Germany also it diminished after

1. It is also demonstrated in Eva Mueller's study, op. cit., that "certain aspects of the preference system for public goods and services are not clearly crystallised in the consumer's mind; hence these attitudes have elements of inconsistency and may change easily under the impact of new information or new circumstances", page 211.

the shifts associated with the 1st World War and the social upheaval of the thirties and the second World War. It diminished also after the shift associated with the Great Depression in the case of the United States and Canada. But the rate of growth of G_c increased after the second war in the case of Sweden, the United States and Canada. What could be the plausible explanations of these different statistical findings, with regard to the change in the rate of growth of G_c with relation to that of Y_c , for different countries?

In what follows, we discuss first the plausible explanations for a decrease in the rate of growth G_c after the shifts associated with world wars in the case of the United Kingdom and Germany.¹ Some of the explanations already put forth in section I (i), for the hypothesis of a diminishing rate of growth of G/y with an increasing level of Y_c , suggested by a cross-section approach in chapter III, could apply equally well to the statistical observation, mentioned above, from the time-series analyses.

1. In the case of Germany, as was shown in chapter IV, section V (ii), the second major shift is associated with the social upheaval of the thirties and the second war. The shift could be attributed to the consequences of the Great Depression, Hitler regime and the second world war, which all consecutively exerted their influence as major social upheaval.

Firstly, our hypothesis concerning the gap between the 'desirable level of public expenditure' and the 'tolerable burden' of taxation (see Section I (i) (a)) may again provide a plausible explanation. It is argued elsewhere that a gap usually exists between 'the desirable level of public expenditure' and the 'tolerable burden of taxation'; but if such a gap is narrowed, a government in its self interest of maximising its length of life, would have less incentive to raise finance to the extent necessary to maintain the previous rate of growth of government expenditure. In section II (i) it was pointed out that although the changed attitude towards public expenditures due to the insurrection effects of war cannot be ignored, a shift in the people's ideas about the 'tolerable burden' of taxation is of greater significance for the displacement effect of war. Because of such a significant shift in people's ideas about the tolerable burden of taxation, it is highly likely that the gap between the desirable level of public expenditure and the 'tolerable burden' was narrowed which therefore suggests, as was observed in the case of the United Kingdom and Germany, a decrease in the rate of growth of G_c with relation to that of Y_c .

Secondly, the explanation given in section I (i) (c), concerning the difficulties encountered in finding new efficient sources of taxation and methods of tax collection or in increasing the rates of taxation on the existing sources when the taxes are already high, may also provide an explanation.

During the wars, possible sources of taxation were exploited and efficiency in the tax collection was achieved to the extent that it was possible during that period. Most of these taxes and methods of collection continued even after the wars. It did not seem possible to find new efficient sources of taxation and methods of collection or even to increase greatly the rates of taxation on the existing sources, when the taxes were already high, so as to finance the previous rate of growth of government expenditure.

Besides, during the wars although elastic sources of revenue, for example income tax, were utilised as far as possible, it seems that great reliance was also placed on the indirect taxes (i.e. commodity taxes such as purchase taxes which were introduced during world war II in the U.K.) by imposing new indirect taxes or increasing the rates of the existing ones. Most of these indirect taxes continued after the war. But as most of them are usually less elastic

than the direct taxes, the income elasticity of the tax structure as a whole became less than it was before the war. Thus the rate of growth G_c with relation to that of Y_c ~~also~~ possibly ^{therefore} declined after the war.

Thirdly, the hypothesis that with an increased level of government expenditure with relation to national output, the percentage of people forced to bear tax 'incidence' increases and/or the incidence of increases in tax revenue as a percentage of national output is likely to be relatively heavier on those on whom it had hitherto been lighter, together with the vote maximisation hypothesis for a government, again may provide a plausible explanation.

The public expenditure as a percentage of G.N.P. increased significantly because of the "shifts" in the level of government expenditure with relation to national output associated with wars. With such positive shifts in this ratio the percentage of people bearing the tax 'burden' increased and/or some people on whom this burden had hitherto been lower were compelled to bear a relatively higher burden of the increase in tax revenue as a share of G.N.P. This was so probably because of the disincentive effects of very high taxation on particular groups of people and/or because of the strong opposition and political pressure against the non-taxation of other groups and also

because of the increased efficiency in administration and methods of tax collection due to the exigencies of war which enabled the general revision and considerable widening of the tax system. In the United Kingdom, for example, as pointed out by Peacock and Wiseman "experience obtained during World War I in the techniques and administrative problems of assessing lower income groups for income tax provided the foundation for the permanent extension of that tax. Similarly, the pay-as-you-earn system, through which a considerable proportion of the population now has income tax deducted at source, was introduced during World War II. It was during this later period that the purchase tax was first introduced".¹ Thus it seems highly likely that with the positive shifts in the ratio of public expenditure to G.N.P., the percentage of people bearing tax 'incidence' increased and/or the tax 'burden' of the increase in the ratio became relatively heavier on those on whom it had formerly been lighter.

As was argued in section I (i) (b) of this chapter, when public expenditure as a percentage of G.N.P. is a small proportion, as it was in the pre-1st World War period in the U.K., and also in Germany, an overwhelming majority of voters

1. Peacock and Wiseman, op. cit., pages 67-68.

will prefer rapid increase of public expenditure because the taxes needed to finance such expenditure will not usually be borne by them and a government in its self-interest of maximising the length of its life will usually pursue policies of rapid increase in government expenditure. As was shown in the case of the U.K. in chapter IV, section V (a), the rate of growth of G_c with relation to that of Y_c was even more than four times that during the pre 1st war period when the ratio G/y was relatively very small. But after the 1st war, this expenditure increased by about 27%. The ratio G/y being higher than it was in the pre-1st war period, the taxes needed to finance an increase in G/y were to hit some other people too who either escaped taxation or on whom the 'burden' was relatively lighter. Thus some of those people who supported a rapid increase in G/y could not support the previous rate of increase because then they probably would have to finance a substantial proportion of that increase, but still there was a large majority of voters which could gain from a rapid increase in government expenditure. The number of voters supporting the increase, however, was smaller than it was during the pre-1st war period; and the opposition and the disincentive effects being stronger, a government in its self interest of maximising its length of life could not pursue that rate of

increase in G/y which prevailed during the pre-1st war period, and the rate of growth of G_c with relation to that of Y_c decreased from 4.6 to 2.1.

It can be said that for the same reasons, the rate of growth of government expenditure decreased after the 2nd War. In the case of the 2nd World War, the "shift" was relatively large, and accounted for about 73% of the increase in government expenditure in the United Kingdom. The shift being much greater, and the G/y being much higher, the relative decrease in the rate of growth of G_c with relation to Y_c was even greater after the 2nd World War. It became almost unity (1.2).

The explanation which we have given above for the negative change in the rate of growth G_c with relation to that of Y_c in the case of the United Kingdom, could equally apply in the case of Germany.

Fourthly, the concept of a productivity lag may also provide some explanation, if one thinks that this lag diminished after each World War.

It is argued that the "productivity lag" in the government services, although it is practically impossible to measure such a lag, would account for an important part of the growth of government expenditure with relation to

national output when both are deflated by indices of prices of private output which assumes almost identical productivity changes in both the private and public sectors. As pointed out by Mrs. Andic and Dr. Veverka, "the 'productivity lag' adds to the relative growth of government expenditure directly through a higher relative cost of providing a given output, and indirectly through a transfer of unprofitable sector under public control".¹ It could, therefore, be considered to be one of the important factors contributing towards the growth of government expenditure with relation to national output.

It seems, however, likely that such a lag for government expenditure, as a whole, diminished after each world war mainly because of two reasons. Firstly, it seems likely because of the technological innovations in the public expenditure field during the wars which were due to the urgent need to increase efficiency or minimise costs in the provision of public goods. Secondly, it seems probable because of the increased share of transfer payments in total public expenditure after the shift associated with war.

1. Mrs. Andic and Dr. Veverka, op. cit., page

It was shown by Peacock-Wiseman and Andic-Veverka in their respective studies that the displacement effect for a transfer payment was more prominent than for the purchase of goods and services.¹ As was argued in section I (i) (d), the concept of 'productivity lag' is relevant only for government purchases of goods and services. There is no reason to assume that the people receiving the transfer payments spent such payments on goods and services for which productivity is lagging behind. Thus, as the percentage of total public expenditure for which such lag may operate diminished, its importance as a growth factor for the government expenditure as a whole is likely to have become less significant. On both grounds, therefore, it is likely that the 'productivity lag' for government expenditure as a whole, which could account for an important part of the growth of G_c with relation to Y_c , would diminish after the wars and this could also be one of the reasons for the decrease in such rate of growth of government expenditure after wars.

The explanations offered below for a decrease in the rate of growth of G_c with relation to Y_c , after the shift associated with the Great Depression in the case of the United States and Canada, are basically the same as those given above.

1. See Peacock and Wiseman, *op. cit.*, chapter 5, and Andic and Veverka, *op. cit.*, Table A.13 and section IV.

The first plausible explanation again could be that the gap between the "desirable" level of public expenditure and the "tolerable burden" of taxation was narrowed after the "shift" associated with the Great Depression. Such a "shift" was explained in the previous section mainly in terms of a shift in the people's ideas about desirable level of public expenditure because of the inspection process generated by the Great Depression. This suggests rather an increase in this "gap" during the Depression. But, as was argued in that section, the continuance of a higher level of public expenditure after the recovery than that prevalent before the Depression was due to the possible reason that such an increased 'gap' permitted the acceptance of new taxes and the consequent increase in the 'tolerable burden', which thus could have decreased the 'gap'. The reason which seems more important, however, is that with recovery there was an automatic decrease in some "welfare" expenditures (e.g. unemployment benefits, poor reliefs, etc.). Besides, the desirability of public projects, designed specifically to provide employment or public expenditures undertaken to provide incentives to private sector diminished with recovery. Thus, there was some decrease in the 'desirable' level of public expenditure with recovery,

which again decreased the 'gap'. A decrease in this gap, as argued previously, might possibly have lead to a decrease in the rate of growth of government expenditure after the shift associated with the Great Depression.

Besides, with recovery, there was a gradual decrease in debt financing. Usually, especially in the United States, as was shown by Eva Mueller in her study, negative attitudes towards additional deficits have been prevelant.¹ Because of this gradual decrease in deficit financing, in order to maintain the pre-depression rate of growth of government expenditure, the rate of growth of tax revenue had to be even higher than the rate during the pre-depression time-period. Although a favourable change in the attitude towards public expenditure permitted the acceptance of some new taxes, a rate of increase in tax revenue, even higher than that during the previous time period so as to compensate for a decrease in debt financing, which would have enabled the maintenance of (or even increase in) the previous rate of growth of G_c with relation to Y_c , would have imposed a 'burden' too high to be accepted by the people at the time when per capita income was still lower than it was towards the end of the 1920's. Besides, on the grounds

1. Eva Mueller, op. cit., page 21.

of disincentive effects, such taxation could not have been attempted. These, therefore, could be other possible reasons for a decrease in the rate of growth of government expenditure after a "shift" associated with Depression in the case of the United States and Canada.

Again, it seems likely that with a positive "shift" in the level of public expenditure, associated with Depression, and a gradual acceptance of 'new' taxes because of the desirability of many 'new' expenditures due to the inspection process, the percentage of people bearing the tax 'burden' increased and/or some people on whom such burden had been previously relatively lower were compelled to bear a relatively higher burden of the increase in tax revenue because of the widening of the tax system. This, in conjunction with the hypothesis of maximisation of length of life for a government, as explained earlier, provides a plausible explanation also. The concept of a productivity lag may again provide some explanation. It seems likely that such a lag could have diminished for government expenditure as a whole because of the increased share of transfer payments (specifically social insurance payments) in total public expenditure during and after the Great Depression, which could be another reason for a decrease in the rate of growth of G_c with relation to Y_c after a major "shift" in the level of public expenditure associated with Great Depression.

In contrast to the negative change in the rate of growth of G_c with relation to Y_c after the shifts associated with major social upheavals, discussed above for particular countries, there was a positive change in this rate of growth of G_c after the second World War in the case of Sweden, the United States and Canada. How could this difference be explained?

In the case of Sweden, which did not participate in the war, there was no 'significant' shift in the level of government expenditure after the war. The acceptance of a higher tolerable burden of taxation which appeared in other countries fighting the war and gave rise to such 'shift', did not happen in Sweden.

As has been already explained, such a shift was one of the principal causes diminishing the rate of growth of government expenditure. It may be said that in Sweden, the gap between the desirable level of public expenditure and the tolerable burden of taxation was not narrowed because no shift in the tolerable burden occurred. She did not have the 'benefits' of a displacement effect. Rather such a gap seemed to increase due to a "demonstration effect" of the high level of government expenditure in the neighbouring countries and also because of a change in the attitude

towards public expenditures partly due to the Keynesian revolution and also because of the acceptance of the ideas of 'Social Welfare State' and of the objective of rapid economic growth thought to be achieved by an expansion of the public sector.

Thus, the forces which seemed to decrease the rate of growth of government expenditure in the U.K. and Germany after wars were either absent or operating in the opposite direction in Sweden. And the government expenditures could increase at a faster rate after the war because of the political stability and the expansion of welfare expenditures (such as old age, unemployment, sickness benefits, medical care, education, etc.) which helped to circumvent the resistance to an increased taxation.

Our explanations for the increase in the rate of growth of G_c with relation to Y_c after the second World War in the case of the United States and Canada are the following.

Firstly, in both countries such a rate of growth of government expenditure before the second World War was much less than unity, i.e. the government expenditure as a share of G.N.P. was falling with increasing real income. In the United Kingdom and Germany, where the rate of growth of G_c declined after the "shift" associated with the Wars, it has been well above unity, even after such decline, during the

post second war period, i.e. government expenditure as a share of G.N.P. has been rising with increasing real income, although at a rate much lower than in the previous time-periods. A further decline in the rate of growth of G_c with relation to Y_c , which was already less than unity, after the second war in the case of Canada and the United States would have accelerated the rate of decrease of government expenditure as a share of national output. The obvious question which arises is: why did it not happen?

Although there was a displacement effect of the second World War in the case of United States and Canada, as in the United Kingdom, the 'shift' in the level of government expenditure was much smaller than in the case of the United Kingdom. The 'shift' accounts for only a 32% and 34% increase in G_c with relation to Y_c after the second World War in the case of the United States and Canada respectively, whereas for the United Kingdom it accounts for about a 73% increase. The government expenditure as a percentage of G.N.P. after the 'shift' was much smaller in the United States and Canada than the percentage after the second World War in the case of the United Kingdom or West Germany. A 'demonstration effect' would suggest an increase, rather than a decrease, in such percentage, i.e. a rate of growth of G_c with relation to Y_c more than one.

Besides there was a comparatively large expenditure for defence, because of the additional costs of the cold war with Soviet Russia, especially in the case of the United States where approximately two dollars out of three are spent by the federal government on defence; and the emergence of new expenditure, e.g. on space research and military and economic aid to the newly independent countries, which again could be partly due to the demonstration effect from Russia; and the expansion of welfare programmes such as help of old and needy people, hospital and medical care, etc., have led to increase in the rate of growth of G_c . In the case of the United States, this increased rate of growth of G_c is mainly due to the warlike federal spending necessitated by the competitive coexistence with Russia,¹ although there has been also some increase in spending for services such as highways and welfare services.

As shown by Eva Mueller in her study of the attitudes of American people toward fiscal programmes, a large majority of American people have favourable attitudes towards major government expenditures programmes. In addition to the intensification of public concern about national security and 'status' which provides wide support for the huge

1. Ansel M. Sharp and Bernard F. Sliger, Public Finance, chapter III, The Dorsey Press, Homewood, Illinois, 1964.

expenditures on defence, space research, military aid, etc., the favourable public attitude for these and other expenditure programmes are closely connected with the 'widely held belief' that in order to maintain Keynesian full employment level government expenditure 'should' go on increasing. The attitudes of the Canadian people and government toward fiscal programmes one would not expect to be very different from those in its neighbouring country. The Canadian tax and expenditure policies are likely to be highly influenced by those of the United States, because of the close link between the two countries, not only geographically, but also with regard to trade and social background, and also because of the great similarities between them as regards the economic and socio-political structure.

The increase in the different expenditure programmes so as to make the rate of growth G_c with relation to Y_c more than two has been, however, possible because of the higher income elasticity of the tax structure as a whole. It was during World War II that there was considerable broadening of the income tax base and an increase in tax rates, which increased the elasticity of the tax structure as a whole. Besides, even the import duties are highly income elastic in the case of Canada because of the high propensity to import (especially investment goods). The high income

elasticity of the tax structure seems to have facilitated the high rate of growth of G_c with relation to Y_c in both countries without a substantial increase in tax rates, i.e. without a significant increase in the 'tolerable burden' of taxation, if such a burden refers to tax rating.

III. Compatibility of the Statistical Findings and Techniques used in two different approaches.

Our study is based on two independent approaches, viz., cross-section and time-series approaches, the objectives of which are different. As already noted, in the cross-section approach we were primarily concerned with an examination of the relationship between government expenditure as a share of G.N.P. and real per capita income; whereas in the time-series studies the primary objective was to study the time-pattern of public expenditure with relation to economic growth or to examine the effects of social upheavals on the level and rate of growth of public expenditure with relation to economic growth. The objectives were different and our statistical analysis led to two different sets of statistical findings and inductive hypotheses.

There are also differences in the statistical findings for different countries included in our time-series approach. One cannot expect the effects of different social upheavals to be identical for each country irrespective of different economic and socio-political structures. The explanations

offered in the preceding section for the statistical findings in the case of each country included in the time-series studies provide some plausible reasons for the difference in findings for different countries.

In this section we discuss below whether the results obtained and the statistical technique employed by one approach are compatible with those of the other approach.

The regression function used for cross-section analysis was a polynomial double-logarithmic function which showed that the average relationship is that of a diminishing rate of increase of G/y with relation to the rate of increase of real per capita income. But in our time-series we used a linear double-logarithmic function which measures a constant rate of increase of government expenditure with relation to that of real per capita income. Could such different functions, used for different approaches, be considered logically compatible? The complex polynomial function, of course, was not used in our time-series studies because of the small size of our sample (i.e. the number of pairs of observations of G_c and Y_c) for each sub-period into which the whole time-period was divided. Such a function, even if it had been fitted, statistical justification of which lies in the explanation of significant additional

variance, would hardly have been justified on the basis of the statistical tests. Besides, the use of a polynomial function would have made the measurement and tests of significance of the "effects" of social upheaval highly complex. We chose, therefore, the linear (in terms of logarithms) function for the time-series studies. Nevertheless, the different functions chosen for different approaches could be considered compatible on the following grounds.

In the time-series studies, where the linear double logarithmic function was used for different sub time-periods into which the whole time-period for a country was divided, each sub-period for a country covers only a short span of the level of economic development whereas the cross-section sample, for which a polynomial double logarithmic function was chosen, includes countries from different stages of economic development. The span or the range of the level of economic development covered by the cross-section sample is very large. A function depicting a changing rate (in our cross-section sample, a diminishing rate) of increase of G/y with relation to the rate of increase of real per capita income, which is found appropriate for a cross-section sample covering a large span of the level of economic development, is not incompatible with a function showing a constant rate

of such an increase in G/y for a short span of the level of economic development. Besides, the curvature of the relationship in the cross-section sample (see chart 1, chapter III), although statistically significant for a large span of economic development, is quite small, so that it could be neglected for the short span of economic development covered by each sub-period in our time-series studies.

It could also be argued that (as in the case of consumption function) the cross-section samples tend to give long-run parameters, whereas the time-series samples give short-run parameters. For example, the income parameters estimated from Engel curves in a cross-section sample of family budgets are long-run because it takes time to adopt new habits of spending, and as stated by Professor Klein, "it is only in the long-run that we can expect a's spending to be patterned after that of b's when its income changes to b's level. Thus we generally expect to estimate long-run relationships from this (cross-section) type of data".¹ The same arguments could apply for the estimates of parameters from a cross-section sample of government expenditure for different countries; and to an even greater extent, because

1. Lawrence R. Klein, An Introduction to Econometrics, op. cit., page 54.

it is not easy to persuade people to accept higher 'burden' of taxation. The estimates of long-run parameters need not be identical with those of short-run parameters. Thus a polynomial function which may be considered to estimate a long-run relationship from a cross-section sample is not incompatible with the linear function which may give a short-run relationship from different time-series samples for each country.

Furthermore, the statistical findings concerning the rate of growth of G_c with relation to that of Y_c obtained from time-series studies, which pertain to the situation of income change, would not be expected to be identical with that obtained from a cross-section study, which refers to the situation of income differences.¹

Their compatibility could also be considered on the basis of the explanations offered in sections I and II. Although the statistical observations and hypotheses suggested by one approach are not identical with those suggested by the

1. For a discussion of the limitation of transferring data about income differences to the situation of income change, for the study of consumption behaviour, see Gardner Ackley, Macroeconomic Theory, The Macmillan Company, New York, 1961, pages 223-224. If it is not only the absolute income but also the relative income that influences the level of expenditure, the cross-section and time-series analyses would provide different findings.

other, and differences are also observed in the statistical findings for different countries included in our time-series study, some of the explanations offered for one could also explain the other. The explanations offered for such observations are not mutually exclusive; rather an inter-relationship exists between some of these explanations. For example, the explanations offered for a diminishing rate of increase of G/y with an increasing level of economic development (the statistical observations and hypotheses suggested by the cross-section approach) viz., I (i) (a) to (d) are basically the same as those offered for a decrease in the rate of growth G_c with relation to Y_c after the 'shifts' associated with world wars, in the case of the United Kingdom and Germany, and the Great Depression in the case of the United States and Canada. Again our explanations of the 'displacement effect' of war and Great Depression, which were shown to be compatible in section II (i), are closely linked with some of the explanations referred to above, particularly I (i) (a) and the corresponding explanation in II (ii), emphasis being on the people's notions about 'desirable' level of public expenditure and the 'tolerable burden'. The explanation of the non-existence of a 'significant' shift in the level of government expenditure

after the War in Sweden, which did not take part in the War, follows directly from the explanation of the existence of such shifts in those countries which participated in the War, and that of the increase in the rate of growth of G_c in Sweden after the Second World War is again based on the explanation I (i) (a) and the corresponding explanation in section II, concerning the gap between the 'desirable' level of public expenditure and the 'tolerable burden' of taxation. The explanations offered for an increase in the rate of growth of government expenditure after a 'shift' associated with the second War in the case of the United States and Canada, which again emphasise the importance of a favourable attitude towards public expenditure, the tolerable burden, and the 'demonstration effect' are also not incompatible with the explanations offered for other observations.

It may be noted again that the importance of geographical location as a factor influencing the level of public expenditure was evident not only from the scatter diagram of our cross-section data, but also in the time-series

approach where we observed that the similarities between countries, with regard to the growth and time pattern of G_c with relation to Y_c , are more pronounced between the countries which are geographically close to each other.

Thus, on the various grounds discussed above, although the statistical findings and technique employed in one approach are not identical with those of the other, they are not incompatible.

IV. Concluding Remarks

In the courses of our statistical analysis in Chapters III and IV, the conceptual and statistical difficulties involved in our statistical measures, the inadequacies of our data (from the point of view of accuracy, consistency, and comparability), and the limitations of the statistical technique applied are dutifully detailed, which creates doubts about the validity of our statistical findings and the hypotheses deduced from our observations.

Besides, in both the time-series and cross-section analyses, the statistical technique employed by us is an application of a bivariate regression function, in which we considered real per capita income as the only explanatory variable. But besides income, there are various other variables - economic, socio-political, demographic, geographical location, etc., which affect the level of public expenditure. The importance of geographical location, however, has been shown in the course of our analysis. It has not been possible to study the effects of such other variables because of the problems of evaluation, and other technical problems such as multicollinearity, lack of statistical data, and also because of the time-factor.

However, depending upon the possibility of some quantitative measurement of the variables being considered relevant and the availability of the necessary statistical data and resources, future research in the study of the behaviour of public expenditure could possibly be carried on with the help of a polynomial

multi-variate regression analysis of government expenditure with relation to various variables. Such an analysis could be pursued for both the cross-section and time-series approaches, each of which provides independent information. In the case of a time-series approach, depending upon the size of the sample (i.e. the number of years for which the necessary statistical data could be available), further sophisticated techniques (as was pointed out in chapter IV, section IV (iii)), according to which a new set of transformed variables are to be computed each time until a random set of residuals result, could be adopted. If the sample in further research could be sufficiently large ($N = 100$ or more), one might even be able to test whether 'residuals' conform to the normal distribution or some other probability distribution.

The relationship between government expenditure and one or more explanatory variables is sometimes non-linear. Linearity is only convenience and should at times be abandoned for reality. For example, the marginal real income effect (i.e. the rate of growth of G_c with relation to that of Y_c) varies, as was shown in our cross-section approach, making the regression equation polynomial in real per capita income. This may also be true for some other variables (e.g. degree of urbanisation.) Therefore, it may be worthwhile to use polynomials, i.e. to use a function which is non-linear in variables, thereby achieving a higher degree of realism. Of course, the necessary statistical tests should show whether the use of second or higher powers of a

variable (and also the introduction of particular variables) in the polynomial function is relevant (i.e. whether the use of each additional constant has significantly reduced the variance). Besides, the use of polynomials is more useful as an explanatory tool because then it is not necessary to have a very precise hypothesis concerning the relationship from the outset; which, however, hardly exists because of the lack of a priori economic analysis of the complex behaviour of government expenditure. It may thus help to discover the relationships (or theories) hitherto unsuspected from a priori arguments alone.

Obviously several problems arise for such an analysis. In addition to the problems of evaluation or quantification of the relevant variables and of obtaining the necessary statistical data, the technical problems such as multicollinearity in a multi-variate analysis are quite formidable. Inter-correlation or multi-collinearity is frequently unavoidable in time-series multi-variate regression models, and also would appear in cross-section analysis if the selected explanatory variables are e.g. population density, degree of urbanisation, per capita income, or occupational distribution.¹ When there is an inter-correlation

1 See Roy W. Bahl, Jr., and Robert J. Saunders Determinants of changes in State and Local Government Expenditure, National Tax Journal, March 1965, vol. XVIII, No. 1. The authors of that study in their cross-section analysis of changes in state and local government per capita spending in the United States employ a linear multi-variate regression function. The selected explanatory variables are changes in per capita income, population density, urban population, federal grants and public school enrollment. It is highly unlikely that the selected variables are independent as assumed by them, and, therefore, the estimated coefficients are likely to be plagued by multicollinearity.

between such explanatory variables, it is not possible to isolate the separate influences of each variable and a tendency towards indeterminacy arises, although absolute indeterminacy may not arise unless inter-correlation is larger than the multiple correlation among all the variables simultaneously. However, the complications due to the technical problems,¹ may to some extent be avoided by a careful choice of the explanatory variables and by pooling properly and carefully time-series and cross-section samples.

With the increasing availability and reliability of statistical data, because of the increased work and research put into compilation of data by individual countries and international organisations and the possibility of quantifying some relevant variables which have not been amenable to quantitative measurement (e.g. some index of political democracy or ideologies can be roughly constructed, and the influence

1 For a simple exposition of the specific technical problems which suggest the pooling of time-series and cross-section samples and the mechanism of such pooling see Lawrence R. Klein, An Introduction to Econometrics, op. cit., pages 61-75. The problems and pooling procedure suggested by Professor Klein, on the basis of other studies* are mainly with reference to demand analysis. Although technical problems are almost the same in government expenditure analysis, pooling procedure would not be useful to the same extent. For example, if one chooses per capita income and degree of urbanisation as the two explanatory variables for government expenditure (see Bahl and Saunderson, op. cit.), they both not only usually vary together over time, but also usually vary directly in a cross-section sample, because of which multicollinearity cannot be "skirted" by estimating the parameter for one explanatory variable from a cross-section sample and for the other from that of time-series. A careful choice of explanatory variable is rather more important in this respect.

*(R. Stone, et al., Consumers' Expenditure and Behaviour in the United Kingdom, 1920-1938, 195, H. Wold and L. Jureen, Demand analysis 1951.)

such factor then could also be studied), it would be possible in time to make a rigorous statistical study on the lines suggested above, of the effects of various variables on the behaviour of a government's expenditure. The problems of constructing an exhaustive model, by incorporating all the possible variables (which is also non-linear in variables, if not in parameters), for the study of the behaviour of government expenditure are highly complex, which shows the need for further research in this field. At the present state of development of social science, for a variety of such problems, either conceptual or technical, the solutions to be adopted are bound to be rough and approximate. Therefore, any generalisation one would make about the behaviour of public expenditure is also bound to be rough and approximate - the difference lying only in degree.

Furthermore, our analyses (cross-section and time-series) have been confined only to the aggregate of government expenditure. Although analyses of government expenditure classified into different economic categories, functions, and by levels of authority, were intended to be carried out at the beginning of this project, it was decided later to drop such analyses from this study, in view of the lack of readily available necessary data for many countries included in our sample, and also because of the enormous work and time which such analyses would require. It may, however, be mentioned that such analyses and also the analysis of government receipts (total and classified into different

categories) would reveal further facts about the actual behaviour of government expenditure.

The limitations of our study, listed in the earlier chapters and emphasised again in this section, may make one sceptical about our statistical observations and the hypotheses suggested by such observations. The explanations offered are also, by and large, speculative; and some other explanations could also be equally appropriate. But, "the social scientist", to quote Professor Musgrave, "unlike the astronomer, cannot postpone judgement until a wholly conclusive proof can be given. Short of the limiting case of complete ignorance, the economist is called upon to produce as good a hypothesis as may be developed, even though it be less than perfect".¹

¹ R. A. Musgrave, The Theory of Public Finance, op. cit., page 364.

Appendix A.Table and Sources of data used in Cross-Section Study

This appendix provides the statistical table and the sources (for public expenditure, G.N.P., and per capita real G.N.P.) data used in our cross-section study in chapter III.

We utilised a large variety of sources for public expenditure data. The sources and the major divergences, if any, from the concept of public expenditure adopted in our cross-section study in the case of each country included in our sample are noted below.

Government expenditure figures are for fiscal years ending at different dates for different countries. Such figure noted in our table for a year refers to the fiscal years ending in that particular year. But the G.N.P. estimates are usually for calendar years. We have not made any adjustment for this discrepancy for the countries which have different calendar and fiscal years. It was not considered worth-while because the conversion to calendar year estimates of fiscal year government expenditure data, usually ^{based} on the assumption that there ~~are~~ ~~is~~ ~~no~~ seasonal variation, would hardly change the ratios of government expenditure to G.N.P., when both the numerator and denominator are averaged over several years.

The source utilized for G.N.P. estimates for most of the countries is the United Nations' Year Book of National Accounts, in which the estimates conform, with some exceptions, to the definition recommended by S.N.A.,¹ and every effort has been made to present the estimates of the various countries in a form designed to facilitate international comparability.² Important differences in concept, scope and coverage are described in the General Notes and footnotes to the relevant tables in the Year Book. Therefore, we have noted below only the adjustments, if any, done by us in the case of a particular country or if any other source utilised for a country.

For per capita real G.N.P. data, we have used Rosenstein-Rodan's estimates. The adjustments, if any, done by us in the case of a particular country are noted below.

ASIA

1. Ceylon

Sources: Statistical Yearbooks 1962 and 1963; Economic Survey of Asia and Far East, 1963, United Nations. The figure for 1962 is taken from Economic Survey because figure given in Survey is that of Account, whereas the figure in Yearbook for that year is that of Estimate.

G.N.P. at market prices are estimated by adding Net Factor

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- 1 A system of National Accounts and Supporting Tables, Studies in Methods, Series F, No. 2, Rev. 2, United Nations, New York, 1964.
- 2 Year Book of National Accounts Statistics, 1963, United Nations, page VII.

Income from abroad to G.D.P. at market prices. (Sources are: Economic Survey of Asia and Far East and Yearbook of National Accounts Statistics, U.N. 1963).

2. India

Source: Combined Finance and Revenue Accounts of the Central and State Governments of India for the years 1958-1963. Appropriation for reduction and avoidance of debt is excluded from public expenditures.

Figures of National Income are increased by 14.1 per cent and then indirect taxes are added in order to obtain the estimates of G.N.P. at market prices. (See Rodestein-Rodan's article, op. cit. Table 2-A-2 for relation between G.N.P. and National Income.)

3. Indonesia

Sources: Statistical Yearbook, 1963, United Nations, Economic Survey of Asia and Far East, op. cit; Statistical Pocket Book of Indonesia, Biro Pust, Statistik Djakarta.

Total expenditure is shown before deduction of 'revenue directly related to expenditure' i.e. (a) certain receipts from sale of commodities such as rice (b) the internal sales of government supply departments (c) fees and charges and (d) other receipts of related nature.

Indirect taxes are added to G.D.P. at factor costs in order to obtain a reasonable estimate at market prices.

The real per capita G.N.P. for 1961, i.e. \$147.9 is reduced to \$137.34, assuming 3.9 per cent average annual rate of growth. See

Table 2A of Yearbook of National Accounts Statistics, 1963 for average annual rate of growth of real gross domestic product for different countries.

4. Iran

Source: Survey of Asia and Far East, 1963, U.N.

G.N.P. figures at factor costs, from the above mentioned source, are increased by the amount of the indirect taxes. Statistical Yearbook, 1963, U.N. provides the necessary figures for the indirect taxes. G.N.P. for 1962 is estimated from that of 1961 on the basis of the assumption of 4 per cent rate of growth per annum.

5. Israel

Source: Statistical Yearbook, 1963, United Nations.

6. Japan

Source: Statistical Yearbooks, 1962 and 1963, Bureau of Statistics, Office of the Prime Minister, Japan.

Total public expenditure includes expenditure of both general and Special Accounts, net of internal transactions. It excludes debt redemption (except for 1957 and 1960 for which 'national debt' figures which include interest payments are 35.18 and 26.46 billion yens respectively.)

7. Malaya, Federation of

Sources: Statistical Yearbook, 1963, United Nations, and Economic Survey of Asia and Far East, op. cit.; Monthly Statistical Bulletin of the Federation of Malaya, January 1963, Department of Statistics, Federation of Malaya, Kuala Lumpur.

The real per capita G.N.P. for 1961, i.e. \$552.4 is reduced to \$531.15 for 1960, assuming 4 per cent rate of growth per annum.

8. Pakistan

Source: Statistical Yearbook, 1963, U.N.

Total public expenditure figures refer to the combined expenditure of central government (including railway budget) and state governments after excluding transfers, and loans and advances to the States by the central government. The year 1959 is excluded because for that year figures refer to 15 months ending 30 June, 1959.

National Income figures are increased by 11.1 per cent and indirect taxes are then added in order to estimate G.N.P. figures at market prices. Such adjustment is made on the basis of Table 2-A-2 'Relation between G.N.P. and National Income' for different countries as given in Usi and Hagen, World Income 1957 quoted in the appendix of Rodestein-Rodan's 'International Aid for Underdeveloped Countries', op. cit. page 122.

9. Phillipines

Source: Economic Survey of Asia and Far East 1961-63, United Nations, op. cit.

10. Thailand

Sources: Economic Survey of Asia and Far East, 1962, United Nations, Table 34, Major Components of Government Expenditure. Asian Economic Statistics; Statistical Yearbook, 1963, United Nations.

Total government expenditure includes gross expenditure of water supply, electricity and posts and telegraph up to 1959.

11. Turkey

Source: Annuaire Statistique 1960-1962, Institut National de la Statistique, Presidence du Conseil Republique Turque.

AFRICA12. Ethiopia

Source: Statistical Abstract of Ethiopia, 1963.

Figures of G.N.P. at market prices are not available. G.D.P. at factor costs for 1958 was estimated from Table 3A (page 321) of Yearbook of National Accounts Statistics, 1963, United Nations, to which we added the indirect taxes in order to obtain a reasonable estimate of G.N.P. at market prices. A similar figure for 1962 was estimated with the help of the average annual rate of growth estimated from the Table 3B of the above mentioned publication and by adding the indirect taxes.

13. Ghana

Sources: Quarterly Digests of Statistics, December 1962 and December 1963 and Statistical Yearbooks 1960-1963, Central Bureau of Statistics, Accra. The total public expenditure figures are estimated after the necessary exclusion of the repayment of debt and refund of revenues.

14. Federal Republic of Nigeria

Source: Digest of Statistics, Volume 13, Number 2, April 1964, Federal Office of Statistics.

Total Public expenditure includes both federal and regional governments' expenditures, excluding grants and allocations of federal government to the regions.

G.D.P. estimates at factor costs (at 1957 prices) only are

available. To such figures we have added indirect taxes in order to get reasonable estimates at market prices.

15. Sudan

Statistical Yearbook, 1963, United Nations and Economic Survey, 1962, The Republic of Sudan, Ministry of Finance and Economics, Khartoum.

The real per capita G.N.P. of 1961, i.e. \$120 is reduced to \$117.07 for 1960, assuming 2.5 per cent rate of growth per annum. See Rodestein-Rodan's 'International Aid for Underdeveloped Countries, Table 2-A-1 page 119, op. cit. for average annual rate of growth for different countries for the period 1961-66.

16. South Africa

Source: "Public Expenditure in South Africa" by T. Van Waasdijk, Witwaterstrand University Press, 1964.

Total public expenditure figures are estimated from Table 10, i.e. current expenditure of Central Government (including Social Insurance Fund), Table 11, i.e. Central Government's capital expenditure; Table 16, i.e. Expenditure of Provinces. The total excludes subsidies and loans to provinces by Central Government. We have also excluded "interest and redemption" in the case of the expenditure of the provinces, because it was not possible to obtain separate figures for interest and redemption of debt. However, the amount spent on interest and debt redemption was very small for our time-period (51.5 million Rand for 1958-1962).

17. Tanganyika

Sources: Statistical Abstracts, 1961 and 1962, Statistical Division, the Treasury.

Since figures of G.N.P. at market prices are not available, figures of G.D.P. at market prices are taken.

The real per capita G.N.P. for 1961, i.e. 230.2 is reduced to 212.2 for 1959, assuming a 4 per cent rate of growth per annum.

18. U.A.R.

Source: Statistical Yearbook, 1963, United Nations.

Total public expenditure figures are for ordinary budget (including gross transaction of public enterprise) plus development budget.

National Income figures are increased by 20.1 per cent in order to derive an approximate estimate of G.N.P.

NORTH AMERICA

19. Canada

Source: National Accounts Income and Expenditure 1961 and 1963, Dominion Bureau of Statistics, Canada.

20. Costa Rica

Source: Statistical Yearbook, 1963, United Nations.

21. Guatemala

Source: Statistical Yearbook, 1963, United Nations.

Total public expenditure includes gross figures of public enterprises (post, telecommunication, etc.)

22. Honduras

Source: Anuario Estadística, Dirección General De Estadística Y Censo, Secretaría de Economía Y Hacienda.

23. El Salvador

Source: Anuario Estadística 1960-1962, República De El

Salvador, C.A., Ministerio De Economics, Direccion General De Estadistica Y Censon; and Statistical Yearbook, United Nations.

Total public expenditure includes debt redemption. The expenditure on debt service, i.e. debt redemption and interest payment, however, are negligible. (3.5% of the total public expenditure for 1958-1962.)

24. Haiti

Source: Statistical Yearbook, 1963, United Nations.

Figures of 1960 and 1961 are not taken because each refers to a ten-month period ending 30th September. We have, therefore, taken only an average of public expenditures for 1959 and 1962.

Average G.N.P. at market prices is estimated roughly from the Tables 3A and 3B of Yearbook of National Accounts Statistics, United Nations, adjustment being also made for the indirect taxes.

25. Mexico

Source: Compendio Estadistico, 1960, Secretaria De Industraria Y Conecrio, Direccion General De Estadistica.

Total public expenditure includes expenditures of federal and state governments excluding debt redemption. The figure of total expenditure of federal government is taken from Statistical Yearbook, 1963, United Nations.

The real per capita income figure of 1961, i.e. \$415.4 is reduced to \$380.39 for 1959 on the assumption of ^a4.5 per cent of growth per annum.

26. Panama

Source: Statistical Yearbook, 1963, United Nations.

27. Puerto Rico

Source: Statistical Yearbooks, 1961 and 1962, Puerto Rico.

G.N.P. figures are also taken from the same source.

The real per capita income figures for 1961, i.e. \$771.6 is reduced to \$749.126 for 1960, on the assumption of 3% rate of growth per annum.

28. U.S.A.

Sources: Statistical Abstract of United States, 1963, U.S. Department of Commerce, Bureau of Census; Statistical Yearbook, 1963, United Nations.

Figures refer to the combined expenditure of the federal and state governments, excluding grants from the federal government to the state governments. Total expenditure includes grants to local governments by federal and state governments for various functions.

SOUTH AMERICA29. Brazil

Sources: Anuario Estadístico De Brasil, No. 24 1963, IBGE, Conselho Nacional De Estadística; Statistical Yearbook, 1963, United Nations.

Total public Expenditure includes expenditures of the federal government, including that of public enterprise on gross basis, plus expenditure of the states and federal districts.

The real per capita income figure for 1961, i.e. \$374.6 is reduced to \$359.3 for 1960 on the assumption of 4.25% average rate of growth per annum.

30. British Guiana

Source: Quarterly Statistical Digest, June 1964, The Statistical Bureau, Ministry of Development and Planning, Georgetown.

31. Chile

Source: Statistical Yearbook, 1963, United Nations.

In order to exclude debt redemption, we have subtracted expenditure on debt service from and added interest payments to the figures of total public expenditure given in the above mentioned source. The figure for interest payments are taken from Yearbook of National Accounts Statistics, 1963, United Nations, page 584.

32. Columbia

Source: Anuario General De Estadistica, 1961, Departamento Administrativo Nacional De Estadistica Colombia. Expenditure figures include expenditure of public departments. Adjustment for debt redemption has been made by subtracting public debt figures from and adding interest payments (Source: Statistical Yearbook, U.N.) to figures of total expenditure.

33. Equador

Source: Statistical Yearbook, 1963, United Nations.

34. Paraguay

Source: Boletin Estadistico del Paraguay, Ministerio De Hacienda, Direccion general De Statistica Y Censon, Asuncion.

The real per capita income figure for 1961, i.e. \$193.2 is reduced to \$182.1 for 1959 on the assumption of ^a3% rate of growth per annum.

35. Peru

Source: Boletin De Estadistica Perunama, Ministerio De Hacienda Y Comerico Direccion Nacional De Estadistica Y Censon, 1961.

The real per capita income of 1961, i.e. \$265.8 is reduced to \$250.65 on the assumption of ^a3.5% rate of growth per annum.

36. Venezuela

Source: Statistical Yearbook, United Nations.

Total public expenditure includes gross figures of public enterprises (post and telegraph services, radiocommunication and salt works).

EUROPE37. Austria

Source: Statistical Yearbook, 1963, United Nations.

The real per capita G.N.P. figure for 1961 is estimated from the figure at money exchange rate of per capita G.D.P. at factor cost given in Table 3A in Yearbook of National Accounts Statistics, 1963, adjustment being made for G.N.P. at market prices and by increasing the adjusted figure by 30.5%. For Western Europe, per capita real G.N.P. estimates are about 30.5% more than such estimates at money exchange rate.

38. Belgium

Source: Statistical Yearbook, 1963, United Nations.

Total expenditure includes expenditure under the ordinary and the extraordinary budget~~6~~ and the Special funds.

39. Finland

Sources: Tilastokatsauksia Statistica var sikter; Bulletin of

Statistics, Helsinki, No. 1, 1961 and No. 2 1964, Central Statistical Office.

40. France

Source: Statistical Yearbook, 1963, United Nations.

41. Greece

Sources: Statistical Yearbook, 1961, Monthly Statistical Bulletin, Feb. 1963, National Statistical service of Greece, Kingdom of Greece.

Total expenditure includes expenditure under ordinary and investment budget and the extrabudgetary Special Accounts.

42. Italy

Public Expenditure figures are based on data collected by Dr. Cassadio. Source: Relazionali Generala Sula Situazione Economica D el Paesa, Rome. Our figures also include transfer to local governments (SOURCE: Statistical Yearbook, 1963, United Nations.)

The real per capita income for 1959 has been estimated from that of 1961, on the assumption of ^a 5% rate of growth per annum.

43. Ireland

Source: National Income and Expenditure, 1962, C.S.O. Dublin.

The real per capita income figure for 1961 is estimated from figure at money exchange of per capita G.D.P. at factor cost. The adjustment is based on the procedure outlined above in case of Austria.

44. Netherlands

Sources: The Netherlands Budget Memorandum, 1963 and 1964, Ministry of Finance; Statistical Yearbook, 1963, United Nations.

Total expenditure figures are estimated after adjustments being made for debt redemption.

45. Norway

Source: Statistical Yearbook, 1962 and 1963, United Nations.

46. Portugal

Source: Estatisticas Financeiras, 1962, Instituto Nacional De Estatistica: Statistical Yearbook, 1963, United Nations.

The real per capita income figure for 1961, i.e. \$513.6 is reduced to \$498.06 for 1960 on the assumption of 3% rate of growth per annum.

47. Spain

Source: Anuario Estadistica, Espana, 1961 and 1962.

Total public expenditure includes expenditure under general budget and that of autonomous institutions, contributions from government to such institutions are subtracted from the total.

The real income figure for 1960 is estimated from that of 1961 on the assumption of 3% rate of growth per annum.

48. Sweden

Source: Statistical Yearbook, 1962 and 1963, United Nations.

49. Switzerland

Sources: Botschaft des Bundesrates an die Bundesversammlung zur Staatsrechnung für das Jahr 1963, Seite 54; Eidgenössisches Statistisches Amt, Statistisches Jahrbuch der Schweiz; Eidgenössisches Statistisches Amt, Finanzen und Steuern von Bund, Kantonen und Gemeinden.

Total government expenditure refer to combined expenditure of

central and state governments after excluding tax transfer to the states.

50. U.K.

Source: National Income and Expenditure, 1964, C.S.O.

51. West Germany

Sources: Statistisches Jahrbuch für die Bundesrepublik, 1960-1964, Deutschland.

OCEANIA

52. Australia

Source: Australian National Accounts National Income and Expenditure, 1948-1949 to 1961-1962, Commonwealth Bureau of Statistics, Canberra.

Our estimate of real per capita G.N.P. is 1810.7 (see explanatory notes for Table 1-A and 1-B in Rodestein-Rodan's paper, op. cit., and Table 3A in Yearbook of National Accounts Statistics, 1963, United Nations.)

53. New Zealand

Source: Statistical Yearbook, 1963, United Nations.

The real income figure estimate for 1961 is 1954. (See Explanatory Notes 1-A and 1-B in Rodestein-Rodan's Article, op. cit.)

Table A.1

Government Expenditure, Gross National Product, and Per Capita Real G.N.P. of Countries included in Cross-section Sample.

Country	Year	Currency Units	Govt. Expenditure (G)	Gross National Product at Market Prices (Y)	G/Y %	Per Capita Real GNP \$ (Yc)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>ASIA</u>						
1. Ceylon	1958	million	1,444.2	5,622.4		
	1959	rupees	1,656.4	6,295.3		
	1960		1,740.8	6,448.8		
	1961		1,880.9	6,543.1		214.5
	1962		1,850.0	6,742.0		
			Total	8,572.3	31,651.4	27.08
2. India	1958	million	19,901.1	140,114.8		
	1959	rupees	20,945.0	154,605.5		
	1960		23,323.0	159,740.0		
	1961		25,813.1	174,915.3		139.8
	1962		28,002.4	184,157.4		
			Total	117,984.6	813,533.0	14.50
3. Indonesia	1956	thousand)	17.297	171.47		
	1957	millions)	21.912	201.28		
	1958	rupiah	31.696	212.96		137.34
	1959		40.432	247.88		
			Total	111.346	833.59	13.36
4. Iran	1958	thousand	39.660 PR	281.73		
	1959	millions	47.920 PR	319.05		
	1960	rials	52.594 PR	332.70		
	1961		54.761 PR	344.17		180.4
	1962		54.667 PR	357.94		
			Total	249.602	1,635.587	15.26
5. Israel	1959	million	1,184.3	3,834		
	1960	Israeli	1,296.7	4,320		
	1961	pounds	1,442.4	5,124		1,026.8
	1962		1,755.3	6,120		
			Total	5,678.7	19,398	29.27

(1)	(2)	(3)	(4)	(5)	(6)	(7)
6. Japan	1958	billion	2,463.0	9,972.9		
	1959	yen	2,592.5	12,038.7		
	1960		2,860.9	14,065.3		
	1961		3,257.9	17,203.0		613
	1962		3,729.0	18,995.8	20.62	
			Total	14,903.3	72,275.7	
7. Malaya, Federation of	1957	million	988.7	4,942		
	1958	dollars	1,043.5	4,750		
	1959		1,062.4	5,306		
	1960		1,057.4	5,843		531.15
	1961		1,208.7	5,891		
			Total	5,360.7	26,732	20.05
8. Pakistan	1958	million	3,610.5	28,800.7 E		
	1960	rupees	4,312.3	34,323.5		
	1961		4,585.6	37,760.8		124.8
	1962		4,544.8	37,875.2		
			Total	17,053.2	138,760.27	12.29
9. Phillipines	1958	million	1,086	10,684		
	1959	pesos	1,045	11,369		
	1960		1,233	12,126		
	1961		1,494	13,427		282.3
	1962		1,576	14,835		
			Total	6,434	62,441	10.30
10. Thailand	1958	million	6,013.0	43,452		
	1959	baht	6,441.8	48,347		
	1960		6,710.4	55,088		202.4
	1962		8,157.5	63,059		(for 1961)
			Total	27,322.7	209,946	13.01
11. Turkey	1958	million	4,977.1	38,506		
	1959	L.T.	6,728.0	47,727		
	1960		7,320.3	50,970		
	1961		11,382.6	53,720		333.7
	1962		9,172.2	60,738		
			Total	39,580.2	251,661	15.73

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>AFRICA</u>						
12. Ethiopia	1958	million	175.5	2,039.8		
	1959	Ethiopian	212.9			
	1960	dollars	157.6			
	1961		213.1			129
	1962		253.1	2,349.9		
		Total	<u>1,012.25</u> = 202.44	<u>4,389.2</u> = 2,194.8	9.22	
13. Ghana	1958	million	59.824	381		
	1959	£G	77.692	432		
	1960		87.388	464		
	1961		112.182	490		210
	1962		115.633	530		
		Total	<u>452.719</u>	<u>2,297</u>	19.71	
14. Federal Republic of Nigeria	1958	million	104.367	961.7		
	1959	£	124,547	1,008.7		
	1960		152,464	1,033.7		
	1961		188.104	1,101.5		134
	1962		187.745	1,123.5		
		Total	<u>757.227</u>	<u>5,231.1</u>	14.48	
15. Sudan	1959	million	56.50	379.6		117.07
	1960	(L.S.)	57.24	387.6		
	1961		65.48	430.0		
		Total	<u>179.22</u>	<u>1,197.2</u>	14.97	
16. South Africa	1959	million	984.7	5,034		
	1960	rand	954.9	5,373		
	1961		994.4	5,571		180
	1962		1,087.5	5,942		
		Total	<u>4,021.5</u>	<u>21,920</u>	18.35	
17. Tanganyika	1957	million	23.046	170.9		
	1958	£	24.426	176.1		
	1959		24.995	187.6		
	1960		25.983	197.4		123.3
	1961		30.482	200.2		
		Total	<u>128.932</u>	<u>932.2</u>	13.83	

(1)	(2)	(3)	(4)	(5)	(6)	(7)
18. U.A.R.	1958	million	309.56	1,524.83		
	1959	(L.E.)	308.31	1,695.80		212.83
	1960		387.76	1,808.96		
		Total	1,005.63	5,029.59	19.99	
<u>NORTH AMERICA</u>						
19. Canada	1958	million	8,012	32,906		
	1959	dollars	8,498	34,904		
	1960		9,103	36,249		
	1961		9,862	37,383		2,048
	1962		10,588	40,359		
		Total	46,063	181,806	25.34	
20. Costa Rica	1958	million	310.7	2,522.2		
	1959	colones	322.9	2,624.6		
	1960		357.4	2,779.9		
	1961		386.4	2,852.5		361.6
	1962		444.6	3,131.7		
		Total	1,822.0	13,910.0	13.10	
21. Guatemala	1959	million	108.2	651.2		
	1960	quetzales	95.8	674.3		
	1961		88.5	685.1		257.7
	1962		101.2	698.5		
		Total	393.7	2,709.1	14.53	
22. Honduras	1958	million	74.0	715.8		
	1959	Lempiras	78.3	749.4		
	1960		81.6	779.0		
	1961		85.5	793.2		251.7
	1962		92.7	836.8		
		Total	412.1	3,874.2	10.64	
23. El Salvador	1958	million	184.7	1,240.6		
	1959	colones	165.3	1,188.9		
	1960		161.2	1,219.8		
	1961		173.4	1,271.4		267.5
	1962		173.8	1,566.6		
		Total	858.4	6,487.3	13.23	

(1)	(2)	(3)	(4)	(5)	(6)	(7)
24. Haiti	1959	million	192.0			
	1962	gourdes	152.7			149.2 (for 1961)
		Total	344.7			
		Average	172.35	1,910	9.02	
25. Mexico	1958	million	14,089.3	127,152		
	1959	pesos	14,923.3	136,200		380.39
	1960		19,622.5	154,137		
		Total	48,635.1	417.489	11.65	
26. Panama	1958	million	59.1	371.2		
	1959	balboas	66.7	390.3		
	1960		70.7	409.4		
	1961		87.8	455.5		371.0
	1962		85.4	491.4		
		Total	369.7	2,117.8	17.46	
27. Puerto Rico	1958	million	319.935	1,383.7		
	1959	dollars	364.016	1,481.9		
	1960		409.365	1,644.6		749.13
	1961		450.503	1,794.3		
		Total	1,543.819	6,304.5	24.49	
28. U.S.A.	1958	thousand)	106.784	446.287		
		millions)				
	1959	dollars	115.914	484.194		
	1960		117.688	503.561		
	1961		126.694	519.463		279.0
	1962		134.694	556.190		
		Total	601.592	2,509.694	23.97	
<u>SOUTH AMERICA</u>						
29. Brazil	1958	thousand)	258.311	1,300.0		
	1959	millions)	307.012	1,774.3		
	1960	cruzeiros	458.789	2,363.6		359.3
	1961		736.817	3,499.0		
		Total	1,787.929	8,936.9	20.01	
30. British Guiana	1957	million	43.073	229.3		
	1958	B.W.I.	46.510	220.4		
	1959	Dollars	45.507	225.9		
	1960		50.691	249.3		343.69
	1961		57.012	256.8 E		
		Total	242.793	1,402.8	17.31	

(1)	(2)	(3)	(4)	(5)	(6)	(7)
31. Chile	1958	million	438.9	2,927.5		
	1959	escudoes	602.6	4,077.3		
	1960		850.9	4,739.4		
	1961		947.4	5,342.0		452.9
	1962		1,245.4	6,361.0		
			Total	4,085.2	23,447.2	17.423
32. Columbia	1958	million	2,294.6	20,267.4		
	1959	pesos	2,424.1	23,150.9		
	1960		2,981.5	26,162.2		357.32
	1961		4,250.4	29,637.8		
			Total	11,950.6	99,218.3	12.04
33. Ecuador	1958	million	1,308	12,053		
	1959	suces	1,415	12,624		
	1960		1,803	13,662		
	1961		2,058	14,612		222.7
	1962		1,794 PR	15,390		
			Total	8,378	68,341	12.26
34. Paraguay	1958	million	2,407.5	21,051		
	1959	guarani	2,627.6	23,303		182.11
	1960		2,740.6	25,034		
			Total	7,774.7	69,388	11.21
35. Peru	1956	million	5,960.0	31,626		
	1957	soles	5,532.5	33,716		
	1958		6,307.3	36,936		
	1959		7,282.4	42,196		250.65
	1960		7,869.4	51,183		
			Total	32,951.6	195,651	16.84
36. Venezuela	1958	million	6,093.1	22,488		
	1959	bolivares	6,615.1	23,668		
	1960		6,407.2	23,443		
	1961		6,269.2	24,185		644.5
	1962		5,334.4	25,927		
			Total	30,719.0	119,711	25.67
<u>EUROPE</u>						
37. Austria	1958	thousand	38.883	136.2		
	1959	million	39,296	143.2		
	1960	schillings	42.155	161.4		
	1961		45.899	176.1		1,275.04
	1962		51.044	186.6		
			Total	217.277	803.5	27.04

(1)	(2)	(3)	(4)	(5)	(6)	(7)
38. Belgium	1958	thousand	116.100	521.9		
	1959	million	131.851	535.9		
	1960	francs	135.612	572.2		
	1961		133.034	601.2		1,658
	1962		147.774	637.2		
			Total	664.371	2,868.4	23.16
39. Finland	1958	million	2,946	11,825		
	1959	markka	3,288	12,558		
	1960		3,553	14,294		
	1961		3,960	15,901		1,286.5
	1962		4,451	17,021		
			Total	18,198	71,599	25.42
40. France	1958	thousand	55.07	244.7		
	1959	million	64.47	267.4		
	1960	francs	65.85	296.2		
	1961		71.11	319.7		1,444.5
	1962		77.61	353.6		
			Total	334.11	1,481.6	22.55
41. Greece	1958	million	15,835.0	87,454		
	1959	drachuras	17,514.0	90,597		
	1960		19,038.5	96,962		
	1961		21,279.8	110,140		613.1
	1962		22,689.4	117,643		
			Total	96,356.7	502,796	19.16
42. Italy	1957	thousand	3,600.2	15,992		
	1958	million	3,943.2	17,114		
	1959	Lire	4,433.1	18,290		813.38
	1960		5,016.2	19,937		
			Total	16,992.7	71,733	23.69
43. Ireland	1958	million	157.826	586.5		
	1959	£	149.406	623.4		
	1960		160.349	658.4		
	1961		177.790	704.5		956.72
	1962		199.262	761.0		
			Total	844.633	3,333.8	25.34
44. Nether- lands	1958	million	7,721.3	35,930		
	1959	guilders	8,454.0	38,443		
	1960		8,967.7	42,732		
	1961		10,572.4	44,800		1,478.5
	1962		10,873.7	47,550		
			Total	46,589.1	209,455	22.24

45. Norway	1958	million	5,440.0	28,658	
	1959	krona	5,586.5	30,417	
	1960		5,876.2	32,340	
	1961		7,245.7	35,241	1,578.75
	1962		8,029.1	37,771	
		Total		32,177.5	164,427
46. Portugal	1958	million	8,161.9	59,021	
	1959	escudos	9,161.9	62,092	
	1960		10,653.2	68,864	372.2
	1961		12,767.9	74,198	
		Total		40,744.9	264,175
47. Spain	1958	thousand	78.08	574.8	
	1959	million	87.78	580.2	
	1960	pesotas	101.40	615.1	498.06
	1961		114.38	696.9	
		Total		381.64	2,467.0
48. Sweden	1958	million	13,774	55,202	
	1960	kronor	16,137	58,477	
	1961		17,092	63,884	
	1962		18,296	69,608	2,024
	1963		21,001	75,272	
		Total		86,299	322,443
49. Switzerland	1958	thousand	4.907	32.0	
	1959	million	4.976	33.6	
	1960	Swiss	5.224	36.8	
	1961	francs	6.354	41.5	1,944.5
	1962		6.737	46.3	
		Total		28.198	190.2
50. U.K.	1958	million	6,705	22,912	
	1959	£	7,327	23,976	
	1960		7,497	25,375	
	1961		8,072	27,057	1,749.5
	1962		8,501	28,184	
		Total		38,102	127,504
51. West Germany	1958	million	56,058	231,500	
	1959	Deutsche	60,315	250,900	
	1960	mark	70,248	296,800	
	1961		76,706	326,400	1,591.5
	1962		85,512	355,100	
		Total		348,839	1,460,700

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>OCEANIA</u>						
52. Australia	1957	million	1,407.863	5,695		
	1958	£A	1,504.908	6,084		
	1959		1,637.446	6,736		
	1960		1,749.992	7,099		1,810.7
	1961		1,886.551	7,205		
		Total	8,186.76	32,819	24.95	
53. New Zealand	1958	million	346.3	1,135		
	1959	£N.Z.	366.5	1,217		
	1960		402.2	1,305		
	1961		416.2	1,352		1,954
	1962		451.1	1,444		
		Total	1,982.3	6,453	30.72	

Appendix BTables and Sources of Data used in Time-series Studies.

This appendix provides the statistical tables and the sources of those tables used in our analysis of the growth of public expenditure with relation to economic growth on the basis of time-series approach. It is not intended here to discuss the conceptual and statistical problems, and the methods of computation of the statistical series provided in the tables. Such problems, concepts and methods of calculation for each series are discussed in the corresponding source or sources given below. The ones which relate particularly to our statistical findings and analysis, e.g., the major divergences, if any, from the concept of government expenditure adopted for time-series analysis, the adjustments made to government expenditure and GNP series (such as for war-related expenditure, the population and price effects) in the case of each country are pointed out in chapter IV. The sources given below concern only those publications from which we have obtained our statistical series, but not the sources on the basis of which such series were originally computed.

Table B - 1 U.K.

The series of per capita gross national product at 1900 prices for the period 1890 - 1955 is taken from Table A.2 in *the* appendix of The Growth of Public Expenditure in the United Kingdom by Professors Peacock and Wiseman. For the years 1956 - 1962, our estimates are computed from Table B - 3 and B - 4 given in this appendix, the sources of which are given below.

Table B - 2 U.K.

The series of government expenditure other than for war-related purposes, per head of population, at 1900 prices, for the period 1890 - 1955 is taken from Table A.10 given in ^{the} appendix of Peacock-Wiseman study. For the years 1956 - 1962 such estimates of per capita government expenditure are derived from Table B - 3 and B - 5, the sources of which are given below.

Table B - 3 U.K.

The figures of total population for the period 1956 - 1962 are taken from Annual Abstract of Statistics, 1964, published by Central Statistical Office. The figures are that of de facto population and are mid-year estimates.

Table B - 4 U.K.

Statistics of gross national product at factor cost of the United Kingdom at 1958 prices are taken from the official estimates given in the Central Statistical Office's Blue Book on National Income and Expenditure, 1964, which are divided by the population figures for the corresponding years given in Table B - 3 in order to compute the per capita estimates at 1958 prices. The index implicit in the official estimates of national product at current and constant 1958 prices was spliced with the Peacock-Wiseman index for the period 1890 - 1955 with 1900 as base year, which was then used to obtain per capita GNP estimates at 1900 prices.

Table B - 5 U.K.

Figures of total public expenditure and of expenditure for war-related purposes (viz., national debt, war pensions, and war damage compensation) at current prices for the period 1956 - 1962 are taken from Central Statistical Office's Blue Book on National Income and Expenditure, 1964. The category of War Pensions includes war pensions and service grants paid to the residents, and national insurance and war pensions paid to non-residents. Figures of war pensions and national insurance paid to non-residents are both given under one category in the Blue Book, because of which national insurance paid to non-residents is also included in our category of war pensions. The amount paid for national insurance to non-residents, however, is quantitatively unimportant.

Table B - 6 U.K.

The indices of prices for consumer goods and services and for fixed assets for the period 1956 - 1962 with 1900 as base year are computed by splicing such indices having 1958 as base year, given in the C.S.O's Blue Book on National Income and Expenditure, 1964 respectively with the Peacock-Wiseman indexes of Prices for current goods and services and for government fixed capital formation for the period 1890 - 1955 with 1900 as base year.

Table B - 7 U.K.

Figures of total government expenditure other than for war-related purposes for the period 1956 - 1962 at current prices are derived from the Table B - 5, those of government gross fixed capital formation are taken from Blue Book, 1964. The figures of government gross capital formation at 1900 prices are computed by deflating the corresponding estimates at current prices by the index of prices of fixed assets given in Table B - 6; the rest of government expenditure is deflated by index of prices for consumer goods and services given also in Table B - 6.

Table B - 8 Germany

The series of per capita gross national product at 1900 prices for the period 1881 - 1958 is taken from Table A.5 in the appendix of the study, "The Growth of Government Expenditure in Germany since the Unification" Finanzarchiv, January 1964 by Mrs. Suphan Andic and Dr. Jindrich Veverka.

Table B - 9 Germany

The per capita total government expenditure figures at 1900 are obtained from Tables A.35 (after rounding) and A.6 given in the appendix of the above mentioned study by Mrs. Andic and Dr. Veverka.

Table B - 10 Germany

War-related expenditures as percentages of government expenditures are estimated from Table A.30 of Mrs. Andic and Dr. Veverka's study. War-related expenditure include war-damage compensation (including reparation), war-related social assistance and national debt. Defence expenditures are not included in the war-related expenditures.

Table B - 11 Germany

The per capita figures of government expenditure other than for war-related purposes, at 1900 prices, are estimated from our Tables B - 9 and B - 10.

Table B - 12 U.S.A.

The series of total population for the period 1923 - 1957 is taken from Historical Statistics of United States, Colonial Times to 1957, Bureau of the Census. For the years 1958 - 1961, the total population figures are taken from Statistical Abstract of the United States, 1963, Bureau of the Census. The estimates are as of July 1st. Total population includes armed forces overseas for the period 1930 - 1957.

Table B - 13 U.S.A.

The series of gross national product, total and per head, at current and at 1929 prices for the period 1923 - 1955 are taken from the Historical Statistics of the United States mentioned above. Figures of G.N.P., total and per capita, at current prices for 1956 and 1957 are also obtained from that publication. For the years

1958 - 1961, such figures at current prices are obtained from Statistical Abstract of the United States, 1963. The G.N.P. estimates, total and per capita, at 1929 prices for the period 1956 - 1961 are computed by us from the G.N.P. series at 1954 dollars for that period. The index implicit in the official estimates of G.N.P. at current and 1954 prices was spliced with the implicit index in ^{the} series prior to 1955 at 1929 prices, which was then used to obtain G.N.P. estimates at 1929 prices.

Table B - 14 U.S.A.

For the years 1923 - 1955, the price index implicit in the estimates of gross national product at current and 1929 prices are taken from the Historical Statistics of the United States, quoted above. For the years 1956 - 1961, the index is computed by splicing the index implicit in the G.N.P. series at 1954 prices to that implicit in the series for the period prior to 1955 with 1929 as base year.

Table B - 15 U.S.A.

In the case of federal government expenditure (including that of Trust Accounts), the basic data for the fiscal years 1932 - 1962 were taken from Historical Summary of Government Finances in the United States, 1957 and Historical Statistics on Government Finances and Employment, 1962, both published by Bureaus of the Census. Several adjustments discussed in detail in section V of chapter IV are made to the census data in order to obtain a series of government expenditure which is conceptually akin, as far as possible, to our definition. Federal grants-in-aid to state and local governments,

and 50 per cent of expenditure under 'Non-Highway Transportation' and 'other and unallocable direct general expenditures' (50 per cent of the corresponding items for the period 1957 - 1962) are deducted from federal government total expenditure figures in the census publications. The other adjustments made consist of the conversion to calendar year estimates of fiscal year data, and interpolation between biennial estimates until 1950. For the years 1923 - 1931, the federal government expenditure data are taken from Table D.7 given in appendix of the study, The Trend of Government Activity in the United States since 1900 by Solomon Fabricant and Robert E. Lipsey, N.B.E.R., 1952, (after adjustment being made for conversion of fiscal year data to calendar year estimates).

In the case of state and local government expenditure data for the fiscal years 1932 - 1962, the basic data are taken from the above mentioned census publications. In their case, the adjustments consist of the exclusion of 'Utility and Liquor store expenditures' and 50 per cent of 'Non-Highway Transportation' and 'other and unallocable direct general expenditures', and also conversion of fiscal year estimates to calendar year estimates and interpolation between biennial estimates for the missing years until 1949. For the years 1929 - 1931, state and local government expenditure figures are taken from the following sources: National Income, 1954 edition, A supplement to the survey of current business, Table 9, published by the National Income Division of the Office of Business Economics, Department of Commerce. For the fiscal years 1922 and

1927, the adjusted census data is taken and for the missing years the figures are estimated by relying on straight line interpolation on a semi-log graph between the available adjusted census benchmarks.

Table B - 16 U.S.A.

Figures for interest on federal debt, at current prices, for the period 1932 - 1961 are obtained from the aboved census publications, after adjustments which consist of conversion of fiscal years estimates to calendar year estimates and interpolation between biennial estimates until 1950.

Table B - 17 U.S.A.

Government expenditures other than for interest on federal debt, total and per capita, at current prices are computed with the help of our tables B - 15, B - 16 and B - 12. Per capita figures for such expenditures at 1929 prices are computed by deflating the corresponding estimates at current prices by price index given in Table 14.

Table B - 18 Canada

The series of total population of Canada for the period 1926 - 1961 is taken from Series A.1 given in Historical Statistics of Canada, 1965, edited by M. C. Urquhart and K. A. H. Buckley. The figures apply to 1st June.

Table B - 19 Canada

The series of total gross national expenditure at 1949 prices for the whole period is taken from series F.45 of the above mentioned publication, Historical Statistics of Canada. The per capita estimates are computed by dividing the above series by the population series given in Table B - 18.

1927, the adjusted census data is taken and for the missing years the figures are estimated by relying on straight line interpolation on a semi-log graph between the available adjusted census benchmarks.

Table B - 16 U.S.A.

Figures for interest on federal debt, at current prices, for the period 1932 - 1961 are obtained from the aboved census publications, after adjustments which consist of conversion of fiscal years estimates to calendar year estimates and interpolation between biennial estimates until 1950.

Table B - 17 U.S.A.

Government expenditures other than for interest on federal debt, total and per capita, at current prices are computed with the help of our tables B - 15, B - 16 and B - 12. Per capita figures for such expenditures at 1929 prices are computed by deflating the corresponding estimates at current prices by price index given in Table 14.

Table B - 18 Canada

The series of total population of Canada for the period 1926 - 1961 is taken from Series A.1 given in Historical Statistics of Canada, 1965, edited by M. C. Urquhart and K. A. H. Buckley. The figures apply to 1st June.

Table B - 19 Canada

The series of total gross national expenditure at 1949 prices for the whole period is taken from series F.45 of the above mentioned publication, Historical Statistics of Canada. The per capita estimates are computed by dividing the above series by the population series given in Table B - 18.

Table B - 20 Canada

The series of government purchases of goods and services, transfer payments and subsidies are taken from series F.98 - 100 of the above mentioned source.

Table B - 21 Canada

For figures of interest on federal debt, the following sources are used:

- 1926 - 1949: Government Transactions Related to the National Accounts, 1926 - 1951, (supplement No. 1 to the National Accounts), Dominion Bureau of Statistics, Ottawa, Canada, December, 1952.
- 1950 - 1960: National Accounts Income and Expenditure, 1947 - 1961 and 1961, Dominion Bureau of Statistics.

For the series of other war-related expenditures (viz., World War pensions and War Veterans' allowance) the same sources namely Government Transactions Related to the National Accounts and National Accounts Income and Expenditure (1961) were used for the period 1926 - 1951 and 1955 - 1960 respectively. For the missing years 1952 - 1954, we have relied on straight line interpolation on a semi-log paper between the years 1951 and 1955, for which such figures were available.

Table B - 22 Canada

Consumer Price Index, 1926 to 1960, with 1949 as base year is taken from the Series J. 147 of the Historical Statistics of Canada.

Table B - 23 Canada

The series of government expenditure on goods and services at 1949 prices is obtained from Series E.28 of the Historical Statistics of Canada. The series of government expenditure on transfers and subsidies other than for war-related (given in Table B - 21) at current prices is deflated by a consumer price index (given in Table B - 22) in order to obtain the series of such expenditures at 1949 prices. Table B - 18 which provides series of total population for the corresponding period was used in order to obtain the per capita estimates.

Table B - 24 Sweden

The series of total population in Sweden for the period 1929 - 1958 is obtained from Statistisk Arsbok for Sverige (Statistical Abstract of Sweden) for various years published by Central Bureau of Statistics, Stockholm.

Table B - 25 Sweden

Wholesale price index for Sweden for the period 1929 - 1958 with (1881 - 1885) as base period is obtained by splicing the indices with 1935 as base year for the period 1945 - 1954 and other with 1949 as base year for the period 1953 - 1958 to such index for the period 1920 - 1949 with 1881 - 1885 as base period. The above mentioned indices with different base year (or period) were obtained from Statistisk Arabok for Sverige for several years.

Table B - 26 Sweden

The series of gross domestic product at current prices is obtained from the following sources:

1920 - 1950: Sveriges National Produkt, 1861 - 1951 (The Gross Domestic Product of Sweden 1861 - 1951), Meddelanden Fran Konjunkturinstitutet, Serie B:20.

1952 - 1958: National Accounts 1950 - 1964, National Bureau of Statistics, Stockholm, Sweden; and Yearbook of National Accounts Statistics, 1963, United Nations.

Net income from abroad (given in Table B - 27) taken from the latter source is subtracted from the G.N.P. provided by the former source in order to obtain G.D.P. The per capita G.D.P. estimates at current and constant prices are computed with the help of the Tables B - 24 and B - 25 respectively.

Table B - 27 Sweden

Source: Yearbook of National Accounts Statistics, 1963, United Nations.

Table B - 28 Sweden

The series of 'adjusted' total government expenditure is taken from the Table 1 of the study "Den offentliga Sektorns expansion" by Erik Höök, Almqvist and Wiksells Boktryckeri AB, Uppsala 1962. The per capita estimates at current prices are computed with the help of the series of total population given in Table B - 24. Such estimates at constant (1881 - 1885) prices are computed by deflating the estimates at current prices by the price index given in Table B - 25.

Table B-1

Gross National Product of the United Kingdom, per
Head of Population, at 1900 Prices, 1890 - 1962.

<u>Year</u>	<u>£</u>
1890	40.2
1895	42.5
1900	47.2
1905	45.5
1910	45.8
1913	49.8
1923	46.4
1924	47.4
1925	48.2
1926	46.5
1927	51.0
1928	50.2
1929	51.8
1930	50.1
1931	48.7
1932	48.1
1933	51.1
1934	53.2
1935	56.2
1936	57.7
1937	58.6
1938	59.6
1947	56.4
1948	57.5
1949	59.3
1950	60.3
1951	60.8

/Continued ...

Table B-1 (Continued)

<u>Year</u>	<u>£</u>
1952	62.1
1953	64.6
1954	67.9
1955	68.8
1956	70.06
1957	71.05
1958	70.75
1959	72.68
1960	75.64
1961	77.59
1962	77.48

Government Expenditure Other Than for War-Related Purposes of the United Kingdom, per head of population, at 1900 Prices, 1890-1962

<u>Year</u>	<u>£</u>
1890	3.0
1895	3.8
1900	6.3
1905	5.0
1910	5.5
1913	5.8
1923	7.2
1924	7.1
1925	7.7
1926	7.9
1927	8.2
1928	8.2
1929	8.4
1930	9.2
1931	10.0
1932	9.9
1933	9.8
1934	10.0
1935	10.6
1936	11.3
1937	12.2
1938	15.0
1947	19.1
1948	19.1
1949	19.8
1950	20.0
1951	21.5
1952	22.4
1953	23.0
1954	22.5

/Continued ...

Table B-2 (Continued)

<u>Year</u>	<u>£</u>
1955	22.2
1956	23.29
1957	23.57
1958	23.98
1959	25.55
1960	26.88
1961	28.43
1962	29.39

Table B-3

Population of the United Kingdom, 1956-1962
(number in thousands)

1956	51,184
1957	51,430
1958	51,652
1959	51,956
1960	52,352
1961	52,816
1962	53,341

Table B-4

Gross National Product of the United Kingdom at 1958
and 1900 Prices, 1956 - 1962

<u>Year</u>	<u>G.N.P. at 1958 Prices</u>		<u>G.N.P. at 1900 Prices</u>	
	<u>Total</u> <u>£ million</u>	<u>Per Head</u> <u>£</u>	<u>Per Head</u> <u>£</u>	
1956	19,909	388.81	70.06	
1957	20,279	394.30	71.05	
1958	20,281	392.65	70.75	
1959	20,959	403.40	72.68	
1960	21,978	419.81	75.64	
1961	22,744	430.63	77.59	
1962	22,938	430.03	77.48	

Table B-5

Total Government Expenditure and Expenditure for War-Related Purposes of the United Kingdom at Current Prices, 1956 - 1962

Year	Total Govt. Expenditure £ million	National Debt £ million	War Pensions £ million	War Damage Compensation £ million
1956	6,714	725	93	23
1957	6,978	707	90	21
1958	7,373	782	103	18
1959	7,812	776	102	12
1960	8,378	867	100	9
1961	9,138	906	105	7
1962	9,807	887	107	6

Table B-6

Index of Prices (1900 = 100), 1956 - 1962, U.K.

<u>Year</u>	<u>Consumer Goods and Services</u>	<u>Fixed Assets</u>
1956	475.6	641.3
1957	490.8	661.8
1958	506.0	682.2
1959	506.0	675.4
1960	511.1	682.2
1961	526.2	695.9
1962	546.5	716.3

Table B-7

Government Expenditure Other Than for War-Related Purposes
of the United Kingdom at Current and 1900 Prices, 1956-1962

Year	At current prices			At 1900 Prices			Per Head £ (7)
	Total £ mn. (1)	Govt. Gross Fixed Capital Formation £ mn. (2)	Others (1) minus (2) £ mn. (3)	Govt. Gross Fixed Capital Formation £ mn. (4)	Others £ mn. (5)	Total (4) + (5) £ mn. (6)	
1956	5,873	787	5,086	122.72	1,069.39	1,192.11	23.29
1957	6,160	815	5,345	123.15	1,089.04	1,212.19	23.57
1958	6,470	780	5,690	114.34	1,124.51	1,238.85	23.98
1959	6,922	819	6,103	121.26	1,206.13	1,327.39	25.55
1960	7,409	865	6,544	126.80	1,280.38	1,407.18	26.88
1961	8,120	901	7,219	129.47	1,371.91	1,501.38	28.43
1962	8,807	1,016	7,791	141.84	1,425.62	1,567.46	29.39

Table B-8.Gross National Product, per Head of Population, at
1900 prices, Germany, 1881 - 1958

<u>Year</u>	<u>DM.</u>
1881	418.7
1891	476.0
1901	584.5
1907	626.2
1913	673.3
1925	598.4
1926	616.5
1927	673.1
1928	700.5
1929	693.4
1930	672.0
1931	607.3
1932	547.5
1950	781.9
1951	844.9
1952	902.0
1953	956.6
1954	1,017.4
1955	1,125.2
1956	1,193.4
1957	1,258.3
1958	1,286.9

Table B-9

Government Expenditure of Germany, per Head of
Population, at 1900 prices, 1881 - 1958

<u>Year</u>	<u>DM.</u>
1881	37
1891	53
1901	77
1907	90
1913	103
1925	150
1926	167
1927	184
1928	206
1929	212
1930	225
1931	216
1932	200
1950	319
1951	341
1952	370
1953	387
1954	415
1955	439
1956	480
1957	531
1958	567

Table B-10War-Related Expenditure as a Percentage of
Government Expenditure, Germany, 1881 - 1958

<u>Year</u>	<u>%</u>
1881	0.71
1891	1.76
1901	1.77
1907	2.02
1913	1.88
1925	19.60
1926	18.09
1927	17.97
1928	18.81
1929	17.90
1930	16.92
1931	13.84
1932	11.78
1950	16.14
1951	15.02
1952	13.66
1953	15.42
1954	16.08
1955	14.81
1956	14.44
1957	13.42
1958	12.50

Table B-11

Government Expenditure Other Than for War-Related Purposes,
per Head of Population, at 1900 prices, Germany, 1881-1958.

<u>Year</u>	<u>DM.</u>
1881	36.74
1891	52.06
1901	75.64
1907	88.18
1913	101.06
1925	120.60
1926	136.80
1927	150.30
1928	167.25
1929	174.06
1930	186.94
1931	186.11
1932	176.44
1950	267.51
1951	289.78
1952	319.46
1953	327.32
1954	348.27
1955	373.99
1956	410.68
1957	459.74
1958	496.11

Table B-12Population of the United States, 1923 - 1961 (in thousands)

1923	111,950	1944	138,397
1924	114,113	1945	139,928
1925	115,832	1946	141,389
1926	117,399	1947	144,126
1927	119,038	1948	146,631
1928	120,501	1949	149,188
1929	121,770	1950	151,683
1930	123,188	1951	154,360
1931	124,149	1952	157,028
1932	124,949	1953	159,636
1933	125,690	1954	162,417
1934	126,485	1955	165,270
1935	127,362	1956	168,174
1936	128,181	1957	171,229
1937	128,961	1958	174,149
1938	129,969	1959	177,135
1939	131,028	1960	179,983
1940	132,122	1961	183,043
1941	133,402		
1942	134,860		
1943	136,739		

Gross National Product, Total and per Head of Population,
U.S.A., at Current and at 1929 Prices, 1923 - 1961.

Year	Current Prices		1929 Prices	
	Total Billion Dollars	Per Capita Dollars	Total Billion Dollars	Per Capita Dollars
1923	86.1	769	85.8	766
1924	87.6	768	88.4	775
1925	91.3	788	90.5	781
1926	97.7	832	96.4	821
1927	96.3	809	97.3	817
1928	98.2	815	98.5	817
1929	104.4	857	104.4	857
1930	91.1	740	95.1	772
1931	76.3	615	89.5	721
1932	58.5	468	76.4	611
1933	56.0	446	74.2	590
1934	65.0	514	80.8	639
1935	72.5	569	91.4	718
1936	82.7	645	100.9	787
1937	90.8	704	109.1	846
1938	85.2	656	103.2	794
1939	91.1	695	111.0	847
1940	100.6	761	121.0	916
1941	125.8	943	138.7	1,040
1942	159.1	1,180	154.7	1,147
1943	192.5	1,408	170.2	1,245
1944	211.4	1,527	183.6	1,327
1945	213.6	1,526	180.9	1,293
1946	210.7	1,490	166.8	1,179
1947	234.3	1,626	165.6	1,149
1948	259.4	1,769	174.4	1,189
1949	258.1	1,730	171.1	1,147

/Continued ...

Table B-13 (Continued)

Year	Current Prices		1929 Prices	
	Total Billion Dollars	Per Capita Dollars	Total Billion Dollars	Per Capita Dollars
1950	284.6	1,876	187.1	1,233
1951	329.0	2,131	199.9	1,295
1952	347.0	2,210	206.7	1,317
1953	365.4	2,289	215.3	1,349
1954	363.1	2,236	212.6	1,309
1955	397.5	2,405	230.8	1,396
1956	419.2	2,493	235.5	1,400.3
1957	440.3	2,572	238.0	1,390.0
1958	44.5	2,552	235.2	1,351.3
1959	482.7	2,725	250.1	1,411.9
1960	503.4	2,797	256.8	1,426.8
1961	518.7	2,823	262.0	1,431.4

Price Index Implicit in the Estimates of Gross National Product
at Current and 1929 Prices, 1923 - 1961 U.S.A. (1929 = 100).

1923	100	1944	115
1924	99	1945	118
1925	101	1946	126
1926	101	1947	141
1927	99	1948	149
1928	100	1949	151
1929	100	1950	152
1930	96	1951	165
1931	85	1952	168
1932	77	1953	170
1933	75	1954	171
1934	80	1955	172
1935	79	1956	178
1936	82	1957	185
1937	83	1958	189
1938	83	1959	193
1939	82	1960	196
1940	83	1961	198
1941	91		
1942	103		
1943	113		

Table B-15

Government Expenditure by Levels of Government, at Current Prices,
1923 - 1961, United States. (All figures in millions of dollars)

Year	Federal Government	State and Local Government	Total Government Expenditure
1923	2,565	5,400	7,965
1924	2,570	5,760	8,330
1925	2,655	6,145	8,800
1926	2,720	6,560	9,280
1927	2,820	7,005	9,825
1928	2,975	7,100	10,075
1929	3,195	7,700	10,895
1930	3,470	8,380	11,850
1931	4,120	8,450	12,570
1932	4,025	7,490	11,515
1933	4,465	7,230	11,695
1934	5,470	7,215	12,685
1935	7,035	7,440	14,475
1936	7,645	7,875	15,520
1937	7,290	8,515	15,805
1938	7,470	9,030	16,300
1939	8,185	9,415	17,600
1940	14,715	9,565	24,280
1941	27,065	9,490	36,555
1942	49,060	9,310	58,370
1943	80,705	9,025	89,730
1944	88,535	9,630	98,165
1945	72,555	11,130	83,685
1946	56,685	13,375	70,060
1947	40,925	16,370	57,295
1948	35,205	19,430	54,635
1949	39,520	22,555	62,075
1950	43,655	24,785	68,440

/Continued ...

Table B-15 (Continued)

Year	Federal Government	State and Local Government	Total Government Expenditure
1951	56,815	26,120	82,935
1952	72,005	27,655	99,660
1953	74,885	30,220	105,105
1954	71,590	33,575	105,165
1955	70,520	36,460	106,980
1956	74,245	39,625	113,870
1957	78,508	44,359	122,867
1958	83,016	49,394	132,410
1959	87,329	52,683	140,012
1960	92,445	56,391	148,836
1961	99,902	60,761	160,663

Table B-16

Interest on Federal Debt, at Current Prices,
1932 - 1961, U.S.A.
(in millions of dollars).

<u>Year</u>	
1932	615
1933	691
1934	729
1935	720
1936	747
1937	809
1938	854
1939	933
1940	980
1941	994
1942	1,307
1943	1,869
1944	2,579
1945	3,436
1946	3,979
1947	4,208
1948	4,342
1949	4,383
1950	4,312
1951	4,241
1952	4,562
1953	4,829
1954	4,820
1955	5,077
1956	5,403
1957	5,806
1958	5,830
1959	6,602
1960	7,573
<u>1961</u>	<u>7,324</u>

Government Expenditure Other Than for Interest on Federal Debt,
Total and Per Capita, at Current Prices; and Per Capita, at
1929 Prices, 1923 - 1961, U.S.A.

Year	At Current Prices		At 1929 Prices
	Total (millions of dollars)	Per Capita (dollars)	Per Capita (dollars)
1923	7,965	71.15	71.15
1924	8,330	73.00	73.74
1925	8,800	75.97	75.22
1926	9,280	79.05	78.27
1927	9,825	82.54	83.37
1928	10,075	83.61	83.61
1929	10,895	89.47	89.47
1930	11,850	96.19	100.20
1931	12,570	101.25	119.12
1932	10,900	87.23	113.29
1933	11,004	87.54	116.72
1934	11,956	94.53	118.16
1935	13,755	108.00	136.71
1936	14,773	115.25	146.55
1937	14,996	116.28	140.10
1938	15,646	120.38	145.04
1939	16,667	127.20	155.12
1940	23,300	176.35	212.47
1941	35,561	266.57	292.93
1942	57,063	423.13	410.81
1943	87,861	642.55	568.63
1944	95,596	690.74	600.64
1945	80,249	573.50	486.02
1946	66,091	467.44	370.98
1947	53,087	368.34	261.23
1948	50,293	342.99	230.19
1949	57,692	386.71	256.01

/Continued ...

Table B-17 (Continued)

Year	At Current Prices		At 1929 Prices
	Total (millions of dollars)	Per Capita (dollars)	Per Capita (dollars)
1950	64,128	422.78	278.14
1951	78,694	509.81	308.98
1952	95,098	605.61	360.48
1953	100,276	628.15	369.50
1954	100,345	617.82	361.30
1955	101,903	616.58	358.48
1956	108,467	644.97	362.34
1957	117,061	683.65	369.54
1958	126,580	727.23	384.78
1959	133,410	753.17	390.24
1960	141,263	784.87	400.44
1961	153,339	837.72	423.09

Population of Canada, 1926 - 1960
(Thousands)

<u>Year</u>	<u>Total Population</u>	<u>Year</u>	<u>Total Population</u>
1926	9,451	1949	13,447
1927	9,637	1950	13,712
1928	9,835	1951	14,009
1929	10,029	1952	14,459
1930	10,208	1953	14,845
1931	10,376	1954	15,287
1932	10,510	1955	15,698
1933	10,633	1956	16,081
1934	10,741	1957	16,610
1935	10,845	1958	17,080
1936	10,950	1959	17,483
1937	11,045	1960	17,870
1938	11,152		
1939	11,267		
1940	11,381		
1941	11,507		
1942	11,654		
1943	11,795		
1944	11,946		
1945	12,072		
1946	12,292		
1947	12,551		
1948	12,823		

Gross National Expenditure, Totals and per Head of
Population, at 1949 Prices, 1926-1960, Canada.
(millions of dollars)

Year	Total	Per Head
1926	7,576	801.61
1927	8,270	858.24
1928	9,037	918.86
1929	9,061	903.48
1930	8,679	850.22
1931	7,567	729.28
1932	6,798	646.81
1933	6,359	598.04
1934	7,127	663.53
1935	7,678	707.98
1936	8,022	732.60
1937	8,820	798.55
1938	8,871	795.46
1939	9,536	846.37
1940	10,911	958.70
1941	12,486	1,085.08
1942	14,816	1,271.32
1943	15,357	1,301.99
1944	15,927	1,333.25
1945	15,552	1,288.23
1946	15,251	1,240.73
1947	15,446	1,230.66
1948	15,735	1,227.09
1949	16,343	1,215.36
1950	17,471	1,274.14

/Continued ...

Table B-19 (Continued)

Year	Total	Per Head
1951	18,547	1,323.93
1952	20,027	1,385.09
1953	20,794	1,400.74
1954	20,186	1,320.46
1955	21,920	1,396.36
1956	23,811	1,480.69
1957	24,117	1,451.96
1958	24,397	1,428.40
1959	25,242	1,443.80
1960	25,849	1,446.50

Table B-20

Government Expenditure by Component, all
Governments, at Current Prices, 1926-1960, Canada
(millions of dollars)

Year	Purchases of Goods and Services (1)	Transfer Payments (2)	Subsidies (3)	Total Government Expenditure. (1) + (2) + (3) = (4)
1926	488	305	2	795
1927	531	311	3	845
1928	560	318	5	883
1929	640	328	5	973
1930	721	356	7	1,084
1931	688	394	18	1,100
1932	584	435	9	1,028
1933	462	464	8	934
1934	503	504	8	1,015
1935	542	501	23	1,066
1936	544	501	14	1,059
1937	619	510	10	1,139
1938	666	492	62	1,220
1939	683	504	17	1,170
1940	1,116	480	53	1,649
1941	1,635	485	74	2,194
1942	3,674	532	93	4,299
1943	4,177	581	211	4,969
1944	4,978	682	267	5,927
1945	3,656	1,058	262	4,976
1946	1,796	1,660	236	3,692
1947	1,541	1,398	177	3,116
1948	1,797	1,420	75	3,292
1949	2,127	1,520	77	3,724
1950	2,344	1,575	63	3,982

/Continued ...

Table B-20 (Continued)

Year	Purchases of Goods and Services (1)	Transfer Payments (2)	Subsidies (3)	Total Government Expenditure (1) + (2) + (3) = (4)
1951	3,271	1,585	128	4,984
1952	4,279	1,939	100	6,318
1953	4,432	2,071	110	6,613
1954	4,461	2,303	86	6,850
1955	4,792	2,406	82	7,280
1956	5,386	2,480	123	7,989
1957	5,722	2,815	116	8,653
1958	6,180	3,419	146	9,745
1959	6,490	3,718	205	10,413
1960	6,769	4,215	235	11,219

Table B-21

Interest on Federal Debt and Other War-related
Expenditures at Current Prices, 1926-1960, Canada.
(Millions of dollars)

Year	Interest on Federal Debt (1)	Pension World War I and II, and War Veteran's Allowance (2)	Total (1) + (2) (3)
1926	113	33	146
1927	112	35	147
1928	106	37	143
1929	102	36	138
1930	101	42	143
1931	102	45	147
1932	114	41	155
1933	119	39	158
1934	118	40	158
1935	116	40	156
1936	119	40	159
1937	119	39	158
1938	113	40	153
1939	118	41	159
1940	120	41	161
1941	133	42	175
1942	153	42	195
1943	218	44	262
1944	276	53	329
1945	355	59	424
1946	420	85	505
1947	431	94	525
1948	431	112	543
1949	439	111	550
1950	427	114	541

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Table B-21 (Continued)

Year	Interest on Federal Debt (1)	Pension World War I and II, and War Veteran's Allowance (2)	Total (1) + (2) (3)
1951	427	114	541
1952	441	122	563
1953	461	132	593
1954	504	144	648
1955	494	158	652
1956	524	163	687
1957	519	177	696
1958	544	196	740
1959	678	199	877
1960	753	200	953

Table B-22Consumer Price Index, 1926 to 1960, Canada.
(1949 = 100).

1926	75.8	1944	74.6
1927	74.5	1945	75.0
1928	74.8	1946	77.5
1929	75.7	1947	84.8
1930	75.2	1948	97.0
1931	67.8	1949	100.0
1932	61.6	1950	102.9
1933	58.7	1951	113.7
1934	59.5	1952	116.5
1935	59.9	1953	115.5
1936	61.1	1954	116.2
1937	63.0	1955	116.4
1938	63.7	1956	118.1
1939	63.2	1957	121.9
1940	65.7	1958	125.1
1941	69.6	1959	126.5
1942	72.9	1960	128.0
1943	74.2		

Government Expenditure Other Than for War-Related,
by Components, Total and per Head of Population,
at 1949 Prices, 1926 - 1960, Canada.

Year	Government Expenditure on Goods and services. (1)	Transfer + Subsidies - War-related. (2)	Total (1) + (2) (3)	Per Head. (4)
	(million \$)	(millions \$)	(millions \$)	\$
1926	792	212.4	1,004.4	106.27
1927	868	224.2	1,092.2	113.33
1928	908	240.6	1,148.6	116.79
1929	1,027	257.6	1,284.6	128.09
1930	1,178	292.6	1,470.6	144.06
1931	1,160	390.9	1,550.9	149.47
1932	1,041	469.2	1,510.2	143.69
1933	842	534.9	1,376.9	129.49
1934	916	595.0	1,511.0	140.68
1935	971	614.4	1,587.4	146.37
1936	961	582.7	1,543.7	140.98
1937	1,056	574.6	1,630.6	147.63
1938	1,127	629.5	1,756.5	157.50
1939	1,156	519.0	1,675.0	148.66
1940	1,794	566.2	2,360.2	207.38
1941	2,531	551.7	3,082.7	267.90
1942	5,189	589.8	5,778.8	495.86
1943	5,714	714.3	6,428.3	545.00
1944	6,499	831.1	7,330.1	613.60
1945	4,542	1,194.7	5,736.7	475.20
1946	2,294	1,794.8	4,088.8	332.64
1947	1,850	1,238.2	3,088.2	246.05

/Continued ...

Table B-23 (Continued)

Year	Government Expenditure on Goods and Services (1)	Transfer + Subsidies - War-related. (2)	Total (1) + (2) (3)	Per Head (4)
	(millions \$)	(Millions \$)	(millions \$)	\$
1948	1,902	981.4	2,883.4	224.86
1949	2,127	1,047.0	3,174.0	236.04
1950	2,242	1,066.1	3,308.1	241.26
1951	2,806	1,030.8	3,836.8	273.88
1952	3,516	1,267.0	4,783.0	330.80
1953	3,517	1,374.9	4,891.9	329.53
1954	3,415	1,498.3	4,913.3	321.40
1955	3,563	1,577.3	5,140.3	327.45
1956	3,794	1,622.4	5,416.4	336.82
1957	3,833	1,833.4	5,666.4	341.14
1958	4,093	2,290.2	6,383.2	373.72
1959	4,155	2,407.9	6,562.9	375.39
1960	4,197	2,729.7	6,926.7	387.62

Population of Sweden, 1920-1958

<u>Year</u>	<u>Population</u>
1920	5,904,489
1922	5,987,520
1924	6,036,118
1926	6,074,368
1928	6,105,190
1930	6,142,191
1932	6,190,364
1934	6,233,090
1936	6,266,888
1938	6,310,214
1940	6,370,538
1942	6,458,200
1944	6,597,348
1946	6,763,685
1948	6,924,888
1950	7,041,829
1952	7,150,606
1954	7,234,664
1956	7,338,991
1958	7,429,675

Table B-25Wholesale Price Index, 1920-1958, Sweden.
(1881-1885 = 100)

1920	403
1922	188
1924	180
1926	167
1928	167
1930	134
1932	117
1934	124
1936	135
1938	149
1940	200
1942	235
1944	236
1946	233
1948	251
1950	267
1952	373
1954	349
1956	381
1958	385

Gross Domestic Product, Totals and per Head of Population,
at Current Prices, and per Head of Population at (1881-1885)
Prices, 1920-1958, Sweden

Year	At Current Prices		At (1881-1885) Prices
	Total (Millions of Kroner)	Per Head (kroner)	Per Head (kroner)
1920	12,222	2,069.95	513.64
1922	7,665	1,280.17	680.94
1924	7,911	1,310.61	728.12
1926	8,336	1,372.32	821.75
1928	8,794	1,440.41	862.52
1930	9,307	1,515.26	1,130.79
1932	7,923	1,279.88	1,093.91
1934	9,047	1,451.44	1,170.52
1936	10,421	1,662.86	1,231.75
1938	12,143	1,924.34	1,291.50
1940	14,000	2,197.62	1,098.81
1942	16,680	2,582.76	1,099.05
1944	19,183	2,907.68	1,232.08
1946	23,338	3,450.49	1,480.90
1948	27,834	4,019.41	1,601.36
1950	31,763	4,510.64	1,689.38
1952	41,573	5,813.92	1,558.69
1954	44,963	6,214.94	1,778.24
1956	52,845	7,200.58	1,889.91
1958	59,339	7,986.76	2,074.48

Table B-27

Net Factor Income From Abroad, at Current Prices,
1948 - 1962, Sweden.

<u>Year</u>	(Millions of Krona)
1948	19
1952	70
1953	65
1954	95
1955	90
1956	130
1957	152
1958	152
1959	142
1960	152
1961	146
1962	194

Government Expenditure, Totals and per Head of Population,
at Current Prices; and per Head of Population, at (1881-1885)
Prices, 1920-1958, Sweden

Year	At Current Prices		At (1881-1885) Prices
	Total (millions of kroner)	Per Capita (kroner)	Per Capita (kroner)
1920	1,373.4	232.60	57.72
1922	1,374.6	229.58	122.18
1924	1,210.4	200.53	111.41
1926	1,259.6	207.33	124.15
1928	1,310.9	214.72	128.57
1930	1,405.5	228.83	170.77
1932	1,528.9	246.98	211.09
1934	1,543.2	247.58	199.66
1936	1,744.1	278.30	206.15
1938	2,156.4	341.73	229.35
1940	4,311.1	676.73	338.36
1942	5,077.9	786.27	334.58
1944	5,253.1	796.25	337.39
1946	4,682.3	692.27	297.11
1948	6,618.2	955.71	380.76
1950	7,729.3	1,097.63	411.10
1952	10,813.1	1,512.19	405.41
1954	12,451.8	1,721.12	492.45
1956	15,031.0	2,048.10	537.56
1958	18,180.8	2,447.04	635.59

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