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INCOME EQUALITY AND ECONOMIC DEVELOPMENT
IN GREAT BRITAIN, GERMANY, AND FRANCE
1850 to 1970

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ABSTRACT

Several recent writers have sought to identify a relationship between
economic development indicators and income equality through the use of
cross sectional data. An examination of time series evidence on Great
Britain, France, and Germany from 1850 to 1970 indicates no single simple
relationship between development indicators and income equality. A number
of reasons, both methodological and theoretical, are advanced for the
divergence of cross-sectional and time series findings. A case is made
for the greater value of time series approaches in the study of develop-
ment and equality.

Income Equality and Economic Development in Great Britain,

Germany, and France: 1850 to 1970

Recent literature on economic development and income equality has

identified several different forms of relationship between the two vari-

ables. Empirical works utilizing cross sections have tended to confirm

the existence of a curvilinear form of relationship between economic

development and equality that is either logarithmic or U-shaped.

There is always reason to be cautious in inferring the existence of

a dynamic causal relationship from cross-sectional data. In the case of

the economic development-equality relationship, this inference should not

be made. In this brief paper, the relationship is examined across time

for three Western European nations and some questions are raised about

the existence and form of the development-equality relationship.

A number of important recent works have identified various aspects

of economic development as major direct or indirect causes of change in

income distribution. Lenski (1966) and Adelman and Morris (1973), for

rather different reasons, identify a U-shaped pattern of relationship,

with equality reaching its lowest levels at intermediate stages of devel-

opment.[1] Jackman (1975),[2] in contrast, identifies a positive log linear

relationship between energy consumption per capita and several indicators

of equality. In Jackman's cross sections, increments at low levels of

energy consumption tend to be associated with larger positive changes

in equality than increments at higher levels of energy consumption.

Opposed to both of these findings are those of Kutznets (1966). In Modern

Economic Growth, Kuznets examines time series data on income shares in a

few nations and finds that equality tended to increase with economic

development; but importantly, the onset and degree of equalization

differed across the nations studied.[3]

These disparate conclusions are, by and large, based on inadequate

data. Lenski's prediction is a theoretical deducation and Kuznets has

access to data for only a very few nations over a short period of time.

Both Jackman's and Adelman and Morris's conclusions are drawn on the basis

of observations across nations at only one point in time. One can easily

sympathize with the methodological choice made by the latter two works.

Time series data for a period long enough to examine the hypothesis of a

dynamic causal relationship between development and equality are very

difficult to come by. However, if the relationship is dependent upon

time- and place-specific conditions, cross sections cannot adequately

represent the relationship, and cross-sectional results can lead to

incorrect policy inferences. In this paper the relationship between

development and equality is examined in time series for three nations.

This is a very small sample, and the data on equality are in many ways

inadequate, but the exercise does provide a sufficient basis to call into

question the cross-sectional results.

The histories of income distribution in Germany, Great Britain, and

France from 1850 to 1970 apparently are quite different. By and large,

the degree of equality in income distribution in France has not changed

dramatically; Great Britain has become more equal, beginning at about

1880-1890 and continuing to 1970; and Germany has experienced a number of

swings over the century with the net effect of a slight increase in

equality by 1970. The reconstruction of these trends is too lengthy to discuss here, but it is useful to provide some idea of how these conclusions were derived.

For Germany, a series of pre-tax individual income distributions were constructed on the basis of tax records reported in various secondary sources.[4] The tax systems of Prussia (and later unified Germany) are believed to be highly effective. These tax records capture the large majority of all individual money incomes over the period. Gini coefficients calculated from these materials at roughly decade points from 1853 to 1970 prove to be fairly consistent with less complete materials on wealth distribution,[5] relative wages,[6] and Pareto coefficients calculated from yearly tax returns.[7]

The British series is an extension of the work of Lee Soltow (1968), who constructed Gini coefficients for Great Britain at twelve time points-- from 1436 to 1960. These materials have been checked and supplemented from other sources.[8] Again, the resultant series of Gini coefficients for individual pre-tax incomes are broadly consistent with wealth distribution and relative wages materials.[9]

For France, one has considerably less data to work with. This is due to the ineffective administration of French income taxation. A very few reliable reports on income distribution by individual scholars (c. 1900, c. 1938, and 1962)[10] were pieced together with somewhat more complete materials on wealth distribution[11] and relative wages[12] to gain an overall picture of the level and trend in income distribution.

To examine the relationship between equality and economic development, the development concept must also be operationalized. Three indicators,

common in the literature, were chosen: real G.N.P. per capita,[13] energy

consumption per capita at contemporary efficiencies,[14] and the proportion

of the labor force engaged in mining and industry.[15] These three indi-

cators tap somewhat complementary dimensions of the development concept,

but are hardly an accurate representation of its entire conceptual meaning.

Be this as it may, the three indicators used do tap some of the important

economic aspects of development, and correspond to indicators used in

cross-sectional studies.

To examine the relationship between the indicators across both

nations and time, each development indicator is scatter plotted against

the equality indicator (1 - Gini coefficient). In these plots (Figures

1 to 3), the sequential time points within each nation are connected

so that nation-specific trends can be seen, as well as overall patterns

of relationship.

Figures 1, 2, and 3 about here

In Figure 1, real G.N.P. per capita indexed to 1970 within each

nation and the measure of income equality are plotted. There is no

single clear relationship between the variables. Within France over time,

the lack of significant change in income distribution for the 120-year

period of the data precludes any association. For Great Britain the

relationship is positive, linear or sigmoidal; and in Germany a more

complex pattern is observed. The best simple fit to the German history

would seem to be Jackman's log model, but at low levels of real G.N.P. per

capita the U-shaped pattern predicted by Adelman and Morris is also evident.

Figure 1. Income equality and real G.N.P. per capita:
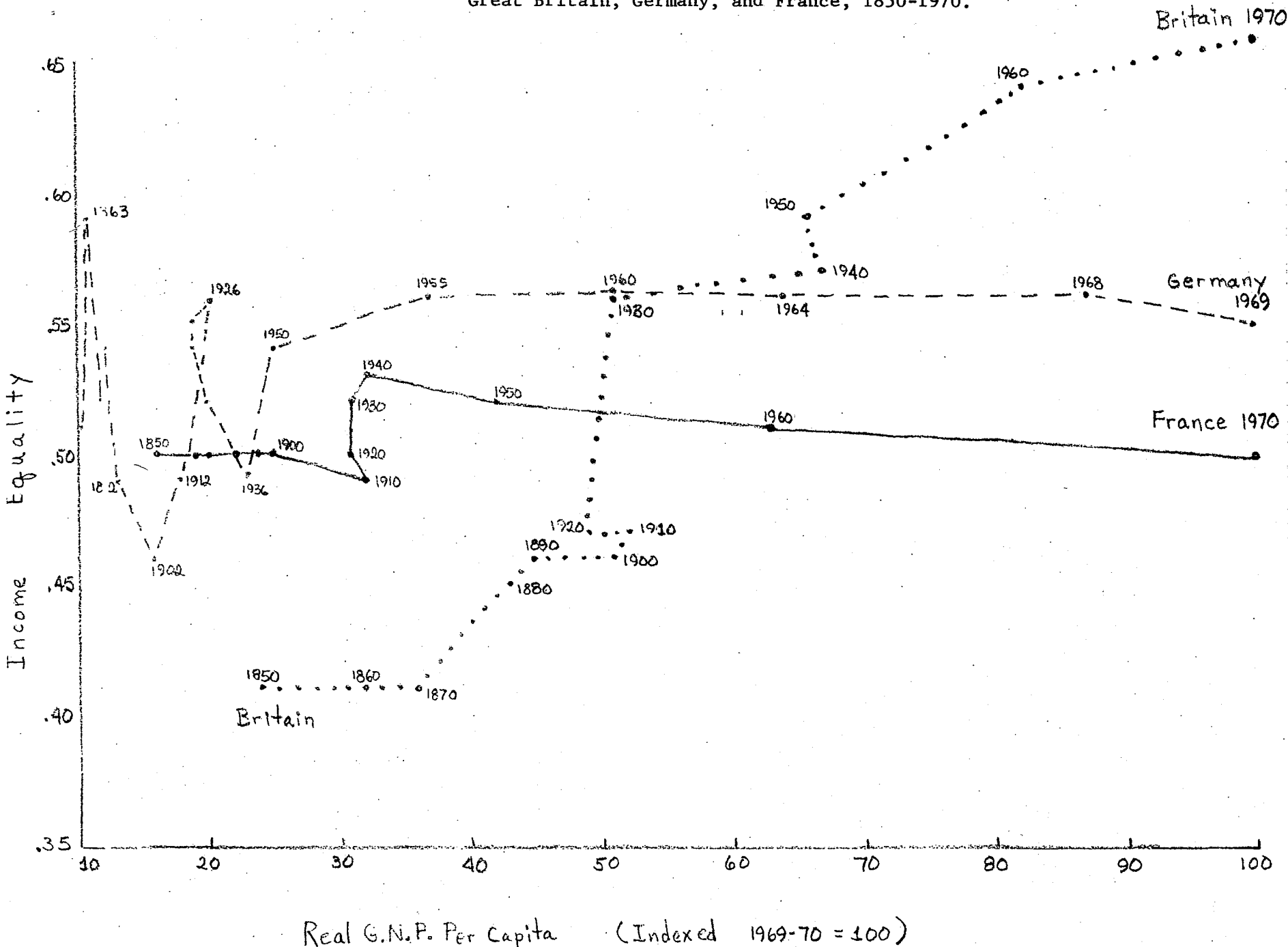Great Britain, Germany, and France, 1850-1970.

Figure 2. Income equality and energy consumption per capita: Great Britain, Germany, and France, 1850-1970.
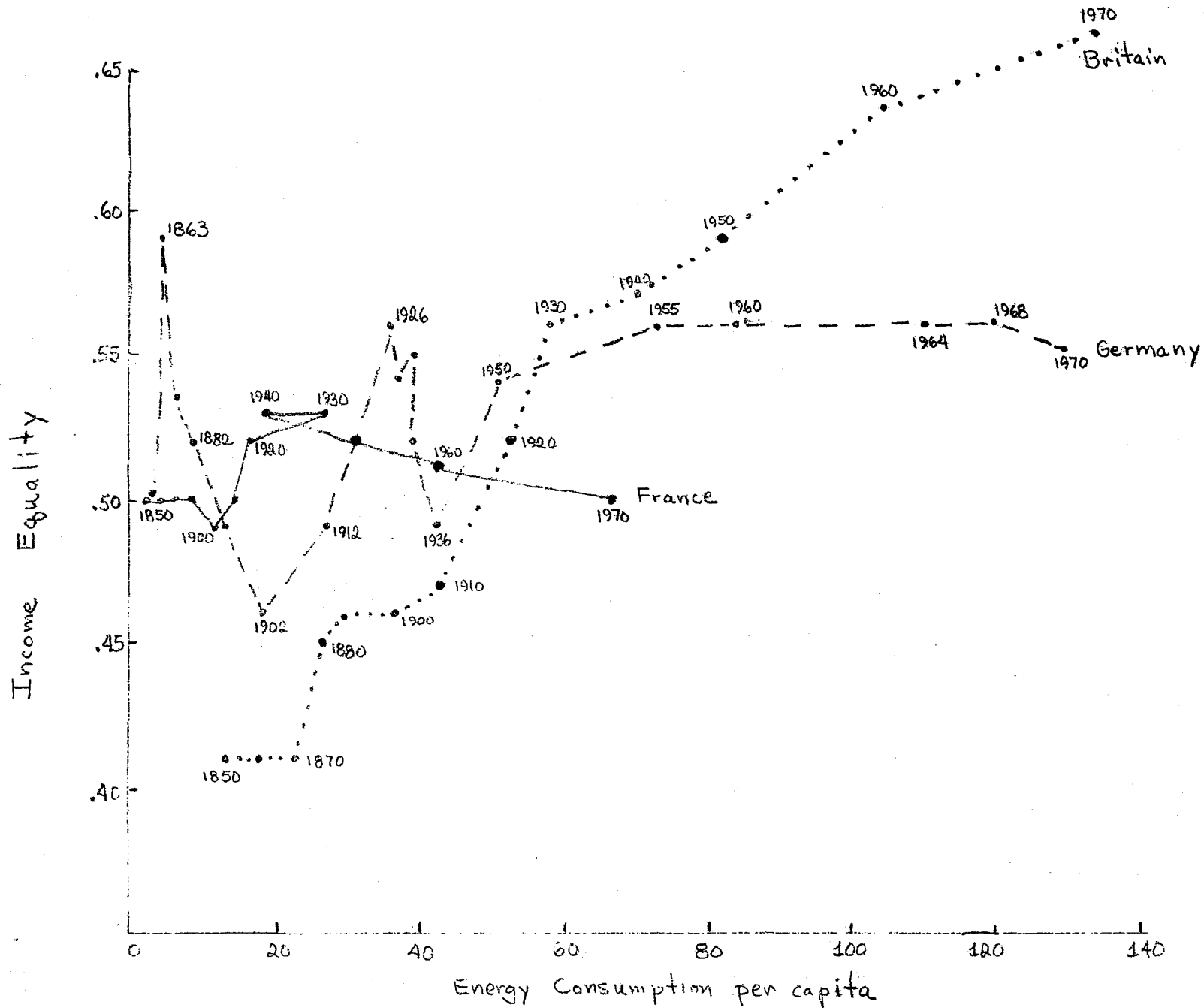
9

Figure 3. Income equality and proportion of the labor force in mining and industry: Great Britain, Germany, and France, 1850-1970.
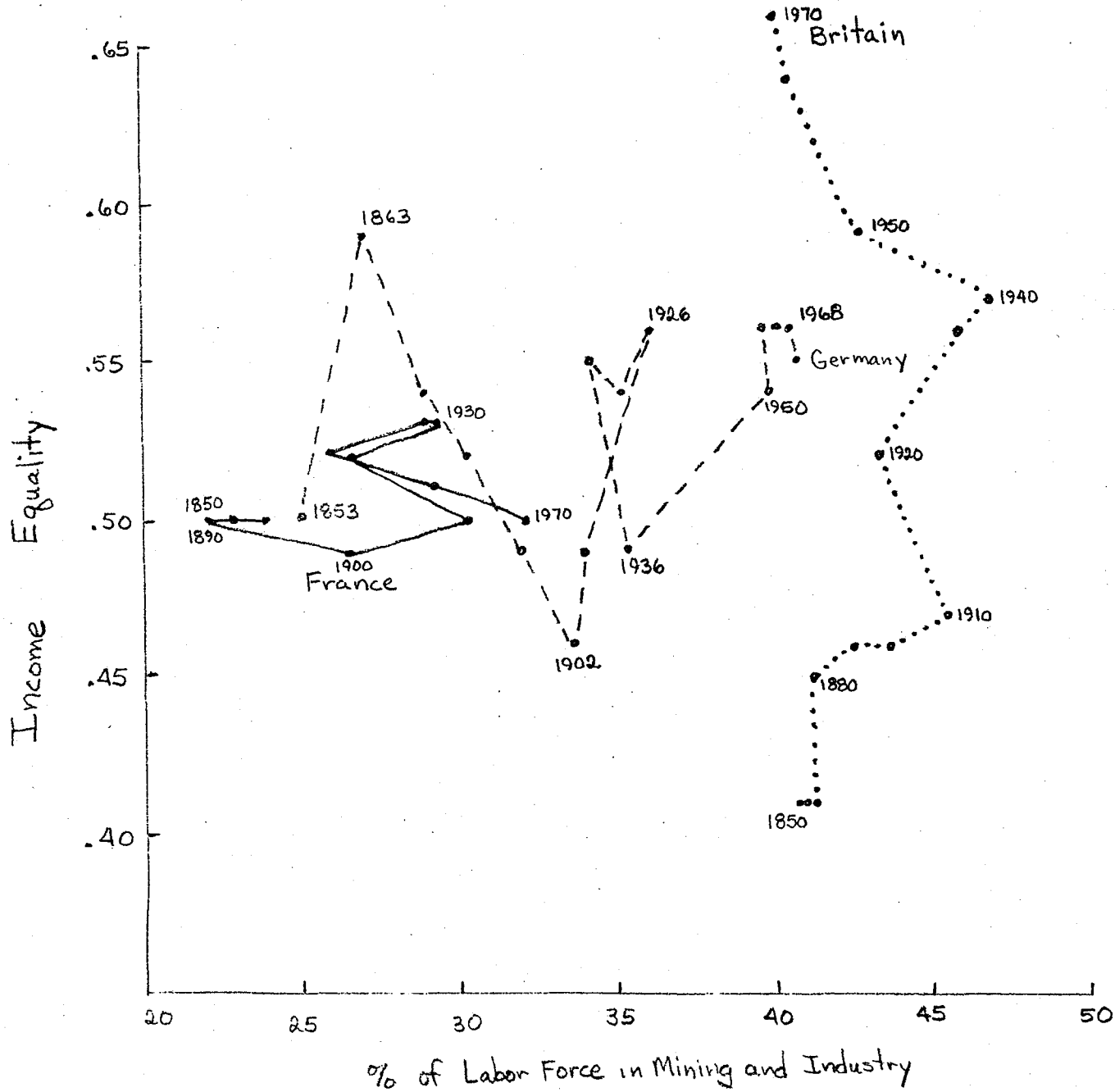
Figure 2 is a scatter plot of energy consumption per capita against the income equality measure. Unlike Figure 1, the values of the independent variable, energy consumption, are not indexed. The level of equality at a given level of energy consumption can thus be directly compared across nations. The same essential picture emerges as in Figure 1, and we note contradictory trends between France and Germany with regard to the U-shaped phenomenon at low levels of development. Also notable is the increasing divergence of Britain and Germany during the very rapid post-World War II expansion in energy consumption.

In Figure 3 the relationships between the proportion of the labor force in mining and industry--another indicator of industrialization-- and income equality are plotted. Great Britain had completed its industrial revolution before 1850 by this crude measure, and consequently displays little variation in the independent measure. Again, there is no discernible relationship within France and the U-shaped pattern emerges rather clearly for Germany.

It is very difficult to sustain the proposition that any general relationship exists between economic development and income equality on the basis of the histories of Great Britain, France, and Germany from 1850 to 1970. An examination of the possible reasons for the divergence of this finding from the results of Adelman and Morris and of Jackman may provide some clues, both theoretical and methodological, that will be of some service in improving future studies of long-run changes in income distribution.

Neither sampling differences, narrowly considered, nor differences in indicators of development can explain the divergent results of the recent cross-sectional studies from those reported here. By 1970 Germany, France, and Great Britain clearly had very different mean levels of economic development from those in the samples used by Jackman and Adelman and Morris. At 1850, however, France and Germany at least had levels of real G.N.P. per capita, energy consumption, and industrialization not vastly different from many contemporary L.D.C.'s (less developed countries). The specific indicators of development chosen here are undoubtedly less than perfect, but this cannot explain the differences in results between the cross sections and the time series approaches, because the same indicators have been used in both.

Why then do the results differ? Is there no general relationship between economic development and equality? Are the cross-sectional results spurious? I think not. Rather, the inconsistency of findings indicates that theory is underdeveloped--additional variables must be included that intervene in the relationship between development and equality. A somewhat broader consideration of the differences between the samples of the cross-sectional and time series studies is helpful in identifying a number of these possible missing variables.

Industrialization in Western Europe in the nineteenth century occurred under conditions that are in many ways quite different from those facing L.D.C.'s today. Some of the differences may be identified, but it must remain for future work to determine if they are directly relevant to the relationship between development and equality. Among the possible factors

explaining the inconsistency between the time series and cross-sectional results are the following: the rate of growth and/or capital investment, the structure of the world economic system, levels of "political development" and "modernism," cultural factors, and different physical technologies and levels of knowledge.

What the difference in the results between world cross sections at 1960 and three nations over a century suggests is that one or more of the following factors is important in explaining the development-equality relationship. The economic growth of the European nations occurred over longer periods of time with, perhaps, lower average annual rates of capital investment; the European nations were dominant in the world system at the time of their growth, not dependent; levels of "political development" were higher in that stable nation-state formations existed at the time growth commenced; "capitalist" values may have been more consistent with preexisting belief systems; the physical technologies available in early industrialism in Europe were not as inconsistent with prevailing forms of social organization as are the physical technologies available to nations attempting to industrialize today; and ideologies and ways of understanding the world by the masses were perhaps more malleable in Europe over the past century than in contemporary L.D.C.'s (e.g., did industrialism commence prior to or after the writings of Marx). Reasonable arguments can be made that these factors, individually and interactively, mediate the relationship between development and equality.

In light of the current results, such arguments must be taken seriously, yet time series tests of their validity are still largely lacking. Evidence has been gathered with regard to the question of the

conditions under which a tradeoff exists between investment and equality.[16] Careful studies of the effects of the other factors mentioned above are rare, and mostly cross-sectional. Unfortunately, such cross-sectional tests are as likely to mislead as are the cross-sectional attempts to establish a single relationship between economic development and equality. Cross-sectional tests of relationships that are probably both dynamic and interactive are appropriate only where the causal model is fully understood, and such is not the case with the development-equality question.

To be fair, the work of Jackman and of Adelman and Morris makes attempts to consider the effects of a number of the possible intervening variables. The present results indicate that such a concern for control is well founded. There may be, within a given nation across time, no relationship at all (as in France), a fairly clear and single relationship (as in Great Britain), or several different relationships at different points in time (as in Germany). Attention should therefore be focused on establishing the conditions under which one or another form of relationship can be expected, rather than attempting to identify a single, universal pattern. In this regard, time series approaches provide better insights than do the partial correlations from a cross section.

In attempting to identify the variables that intervene between development and equality, simple graphs such as the figures presented here are quite helpful. For periods during which certain forms of relationship exist, attention is focused on the presence or absence of exogenous variables. The places and points in time when a transition from one form of relationship to another occurs are identified as critical junctures in the histories of nations, and are singled out for

further study. Cross-sectional methodologies offer none of these heuristic advantages.

The divergence between the findings of the current exercise and those of the cross-sectional studies indicates that the relationship between economic development and equality may be very complex; it argues for both further theoretical work and extreme caution in policy recommendations based on any supposed "general law." The "general law" of the relationship between economic development and income equality is still to be discovered.

NOTES

[1]Gerhard E. Lenski, _Power and Privilege: A Theory of Social Strati-fication_ (N.Y.: McGraw Hill, 1966) argues that sociological and political feedbacks from industrial and post-industrial transformations are able to arrest or reverse an inherent tendency toward greater inequality. Irma Adelman and Cynthia Taft Morris, _Economic Growth and Social Equity in Developing Countries_ (Stanford: Stanford University Press, 1973) question the importance of these political processes, and tend toward a development-equality tradeoff position.

[2]See Robert W. Jackman, _Politics and Social Equality: A Comparative Analysis_ (N.Y.: John Wiley and Sons Inc., 1975), particularly pages 38 through 42.

[3]See Simon Kuznets, _Modern Economic Growth: Rate, Structure, and Spread_ (New Haven and London: Yale University Press, 1966), particularly pages 206 et seq. Kuznets's generalizations are based only on upper-income groups' post-tax shares from the pre-war to the post-World War II periods in the United Kingdom, Sweden, and the United States.

[4]On income distribution in Germany, see especially Paul Jostock, "The Long-Term Growth of National Income in Germany" (_Income and Wealth_: series 5, 1955); Albert Jeck, _Wachstum und Verteilung des Volkseinkommes: Untersuchungen und Materialien zur Entwicklung der Einkommensverteilung in Deutschland 1870-1913_ (Tübingen: J.C.B. Mohr, 1970); Albert Jeck, "The Trends of Income Distribution in West Germany" in Jean Marchal and Bernard Ducros (eds.), _The Distribution of National Income_ (N.Y.: St. Martin's Press, 1968); Felix Paukert, "Income Distribution at Different Levels of Development: A Survey of Evidence" (_International_

Labour Review: August-September, 1973); and United Nations Economic Commission for Europe, Incomes in Post-War Europe (Geneva: United Nations, 1967).

[5] Restratification in wealth distribution in Germany during the National Socialist period is shown by David Schoenbaum, Hitler's Social Revolution (Garden City, N.Y.: Doubleday, 1966), which corresponds closely to movements in income distribution in the same period.

[6] On relative wages in Germany, see: Jeck, op. cit.; Jostock, op. cit.; Walther G. Hoffmann with Franz Grumbach and Helmut Hesse, Das Wachstum der Deutschen Wirtschaft seit der Mitte des 19. Jahrhunderts (Berlin, Heidelberg, and N.Y.: Springer Verlag, 1965) and; United Nations, op. cit.

[7] Walther G. Hoffmann, op. cit., presents Pareto coefficients of incomes for a number of Länder, yearly from 1850 through 1913.

[8] Materials from a number of sources were used to check and expand the data given by Lee Soltow, "Long-run Changes in British Income Inequality" (Economic History Review: Vol. 21, 1968), including Mulhall, Progress of the Nation (London (?): 1879, pg. 113); Mulhall's Dictionary (London (?): 1899, pg. 747); L.G. Chiozza Money, Riches and Poverty 1910 (London: Methuen and Co. Ltd., 1911); Paukert, op. cit.; United Nations, op. cit.; Great Britain Central Statistical Office, Social Trends 1973 (London: HMSO, 1973); A.B. Atkinson, "Poverty and Income Inequality in Britain" in Dorothy Wedderburn (ed.), Poverty, Inequality and Class Structure (London: Cambridge University Press, 1974).

[9] On wealth distribution, see Mulhall, op. cit.; Money, op. cit.; Social Trends 1973, op. cit.; A.B. Atkinson, Unequal Shares: Wealth in Britain (Baltimore: Penguin Books Ltd., 1972); and Euan Cooper-Willis,

Toward Equality: A Study of the Ownership of Wealth (London: Fabian Publications Ltd., 1950). On relative wages, see Jeck, op. cit.; United Nations, op. cit.; C.H. Feinstein, "Changes in the Distribution of the National Income in the United Kingdom since 1860" in Marchal and Ducros (eds.), op. cit.

[10] On income distribution in France, see Jacques Lecaillon, L'Inegalite des Revenues: Le conflit entre l'efficacite economique et justice sociale (Paris: Cujas, 1970); Jacques Lecaillon, "Changes in the Distribution of Income in the French Economy" in Jean Marchal and Bernard Ducros (eds.), op. cit.; H. Brochier, Finances publiques et redistribution des revenues (Paris: A. Colin, 1950).

[11] See especially Adeline Daumard, Les fortunes Francaises an XIXe siecle (Paris and LeHavre: Mouton, 1973) and Andre Babeau, "La fortune des Francaise dans l'inflation" (Le Monde: 18 October, 1977).

[12] See United Nations Economic Commission for Europe, op. cit.; Jurgen Kuczynski, A Short History of Labour Conditions under Industrial Capitalism: Vol. IV: France 1700 to the Present Day (London: Frederick Muller Ltd., 1946); Henri Mercillon, La Remuneration des Employes (Paris: A. Colin, 1955); Francois-Henri de Virieu, "Le Prix d'un Francaise" (Le Nouvel Observateur: no. 514-517, 1974); Annuaire Statistique de la France 1961 (Paris: Imprimerie Nationale, 1962).

[13] Real G.N.P. per capita was calculated from current G.N.P. data by use of an extrapolated and interpolated G.N.P. deflator series from E.H. Phelps Brown with Margaret H. Brown, A Century of Pay (London: St. Martin's Press, 1968). Current G.N.P. for Germany was taken from Hoffmann, op. cit., and Brian Mitchell's European Historical Statistics

1750-1970 (N.Y.: Columbia University Press, 1975). British current G.N.P. data are taken from Mitchell, ibid., and French G.N.P. data from Annuaire Statistique de la France 1966 (Paris, Imprimerie Nationale, 1968) and subsequent years. Population data were drawn from Hoffmann, op. cit., for Germany prior to 1871, and from the standard statistical yearbooks of the nations at other points in time.

[14] Energy consumption per capita at contemporary efficiencies are taken from the author's estimates. These estimates are based on the consumption of wood, hard and soft coal, petroleum, and natural gas. Raw data were taken largely from Brian Mitchell, op. cit. Consumption of these items was converted into heat values at total system energy efficiencies estimated from Sam H. Schurr and Bruce Netschert, et al., Energy in the American Economy 1850-1975 (Baltimore: The Johns Hopkins Press, 1976).

[15] Interpolated data series were created based on summaries of occupational censuses presented by Paul Bairoch, et al., The Working Population and Its Structure (Brussels and N.Y.: 1968). For Germany prior to 1871, data were taken from Hoffmann, op. cit.

[16] Jeffrey G. Williamson, in "Inequality and Accumulation: 19th Century American Evidence and the Great Trade-Off Debate" (Madison, Wisconsin: mimeo, 1977) finds no evidence of a substantial tradeoff in the United States. Soltow, op. cit., argues that no tradeoff between development and inequality occurred in Britain.