FORUM

NOTES ON QUANTITATIVE HISTORY: FEDERAL EXPENDITURE AND SOCIAL CHANGE IN MEXICO SINCE 1910

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JAMES WILKIE'S *The Mexican Revolution: Federal Expenditure and Social Change Since 1910*[1] is an industrious attempt to get beneath the conventional wisdom about the changes wrought by the Mexican Revolution. The author's careful compilation of budgetary data should sharply challenge the longstanding and widespread assumptions that: (a) useful historical material from Latin America does not exist in statistical form, and (b) even if it did exist, the mystical qualities of Latin culture defy all efforts at measurement. Wilkie has shown that—with luck, perseverence, and imagination—data can be found. One hopes that his example will encourage other students of the area to seek out similar data and reap further intellectual benefits from quantitative analysis: hypothesis-testing, measurement of trends, and rigorous comparison.[2]

Precisely because of its path-breaking significance, Wilkie's book deserves the utmost scrutiny. It is a common misconception about quantitative history to assume that statistical data, neatly arranged, will "speak for themselves." This is not true. The analytical importance of measurable data varies greatly according to their reliability, their relevance to the issues at hand, and —above all—the way they are employed. In hopes of contributing to discussion about quantitative data and their use, particularly among historians, we offer these comments on the content and methods of the Wilkie study. In so doing we are following up the author's suggestion that his analysis be viewed "as a point of departure for discussion and further research" (p. xxix).

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SIGNIFICANCE AND LIMITATIONS OF THE DATA

Wilkie begins with a ten-page Introduction to this study of government policies from 1910 to 1963 and their "effectiveness . . . in bringing about social change." He carefully acknowledges the limitations of his analysis: with regard to federal expenditure, the concentration on the spending portion of fiscal policy, the lack of federal revenue, the inability to examine the "entire impact" of federal activity or the role of private enterprise; with regard to social change, the collective quality of his Poverty Index, the imperfections of census data, the exclusive concern with the lower sectors of society (esp. pp. xxiv-xxix). It would, of course, be impossible to furnish definitive data and interpretation for two such complex themes.[3] The recognition of methodological limitations is commendable. But as we shall try to make clear, Wilkie has sometimes forgotten the strictures of his own Introduction, misused the data, and come to conclusions which his figures cannot possibly support.

Then the author sets the context of federal expenditure in Mexico. Observers of Mexican history are familiar enough with the process by which a uniquely institutionalized official party grew out of civil war and violence. Attitudes toward the role of government underwent concomitant change. Porfirio Díaz and his *científico* advisers had given considerable thought to the economic role of the state, but mainly as a means of encouraging private investment. The Revolution brought forth a group of leaders who viewed political action as an instrument of socio-economic "justice" and power redistribution. Yet the vagueness of this notion allowed great flexibility in application; especially after 1930, national administrations gave increasing attention to the use of government in order to transform the country's economic structure. So one would expect to find notable changes in Mexican attitudes toward the economic role of the national government during the course of this century. It is the investigation of these changes which presents major difficulties, even though Mexico offers a substantial amount of solid economic data.

Dealing with this problem in Part One, Wilkie assembles detailed tables of actual annual expenditures in a number of different areas. As he disarmingly notes, this procedure makes it possible for readers to combine these individual totals into categories different from his own. Here Wilkie has performed a significant service. Hunting down data on *actual* government spending requires diligence. Most of these figures had been ignored by previous researchers in favor of the less reliable *projected* expenditures.[4]

Some of Wilkie's findings on the history of budget-making are highly suggestive. In Chapter I he furnishes a table comparing the budget requested by the President with the budget granted by Congress (pp. 18–19). The data show a significant trend away from congressional "resistance" under Juárez

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(whose requests in 1869–70 were cut back nearly 30 per cent) to notable "compliance" after 1917 (with little change in the proposed budget). Though Wilkie does not himself pursue it, this technique offers an excellent way of analyzing the development of presidential-congressional relations over time—it would be particularly applicable to countries like Chile and Argentina. He has also found sizable differences between "actual" and "projected" expenditures, data which clearly illustrate (and even measure) Executive power and autonomy in post-Revolutionary Mexico.

In Part Two the author has made another important contribution with his Poverty Index. As a non-monetary measure of social welfare the Index merits close attention. We badly need new ideas on how to establish criteria for measuring changes in welfare levels, especially in developing countries. By isolating three items in the national censuses of 1910, 1921, and 1930, plus four additional items for 1940, 1950, and 1960, Wilkie has offered us an analytical tool. Furthermore his calculation of regional variations in his Poverty Index, along with changes in each region's position relative to its past, provides an imaginative basis for the comprehension of regional economies.

But for all their positive features, the Wilkie data exhibit serious limitations. There are two main categories of expenditure within the Mexican federal sphere:[5] (a) direct federal government expenditures; and (b) expenditures of the decentralized agencies and mixed public-private enterprises (*organismos descentralizados* and *empresas de participación estatal*). Wilkie has collected data on (a) but excluded (b) from his consideration on the grounds that data do not exist (pp. xxv-xxvi; 6–7). Yet partial data going back to the late 1930s have been published.[6] And available material indicates that omission of these entities is damaging indeed. When the Mexican government began to institute a unified system of national accounts in 1965, thus making it possible to analyze total public sector expenditure at the federal level with reasonable accuracy, it reported that spending by the decentralized agencies and mixed corporations was about *equal* to direct federal government spending.[7] In view of this rather staggering figure, it is regrettable that Wilkie makes no attempt to estimate the relative importance of direct federal expenditure within the total public sector for the period under study.

Wilkie also dismisses the *revenue* side of federal fiscal policy as a subject requiring "complex historical analysis in itself" which must be left for other scholars (p. xxv). By excluding federal income the author has gravely weakened his analysis of the connection between fiscal policy and social change. Tax policy can have great impact on income distribution as well as on the direction of investment and consumption. For instance, indirect taxation, commonly used in developing economies, tends to have a regressive effect on income distribution.[8]

There are other areas of federal economic policy, ignored by Wilkie, which have significant effects on social welfare. Exchange-rate policy can alter income distribution by its influence on the pattern of import consumption. The financing of foreign debts can greatly distort governmental policy toward income distribution. The effect of subsidies (or taxes) on the export sector may also assume overwhelming importance in developing countries.[9]

Given these omissions, Wilkie might have done well to estimate the relative impact of direct federal expenditure on the national economy. Neglect of this consideration provides the basis for some misleading assertions. At one point, for instance, the author seeks to document the idea that the Mexican government has played a major social role since the 1930s—that, in his terms, the concept of an "active" state came to replace the old administrative notion. In support of this view the author demonstrates that "economic" and especially "social" spending increased sharply under Lázaro Cárdenas (Table 4–1, p. 69).

Changing patterns in the composition of expenditure are undoubtedly significant, but they do not provide conclusive evidence of state activism. A more direct measure of governmental "impact" on society might be found in the portion of the Gross National Product accounted for by federal expenditures. Wilkie himself recognizes this fact, but goes on to assert that, since available

TABLE 1

Spending by Mexican Presidents:
Average Annual Federal Expenditures per Capita and as % of GNP

Administration		*Federal Expenditures* *Pesos of 1950 per capita*	*As % of GNP*	*Difference in % from Previous Administration*
Obregón	1921–24	55.8	5.35	------
Calles	1925–29	67.9	6.21	+0.86
Portes Gil	1929–30	61.5	6.20	—0.01
Ortiz Rubio	1931–32	56.4	6.27	+0.07
Rodríguez	1933–34	59.6	6.80	+0.53
Cárdenas	1935–40	82.2	7.96	+1.16
Avila Camacho	1941–46	103.0	7.67	—0.19
Alemán	1947–52	146.7	9.32	+1.65
Ruiz Cortines	1953–58	180.8	10.40	+1.08
López Mateos	1959–63	245.4	11.65	+1.25

Source: Data in Wilkie, *Mexican Revolution,* pp. 22–23, 36; and Enrique Pérez López, "The National Product of Mexico: 1895 to 1964," in *Mexico's Recent Economic Growth: The Mexican View,* trans. by Marjory Urquidi, intro. by Tom E. Davis (Austin, Texas, 1967), pp. 29–30. An earlier version of the Pérez López essay appeared in *México: 50 años de revolución,* Vol. I, *La Economía* (México, D.F., 1960), pp. 571–592. Apparently these estimates of GNP are now undergoing some revision.

GNP figures for Mexico are not accompanied by methodological explanations of the data compilation and conversion to 1950 prices, "it is not really possible to judge the impact of federal expenditure upon society; therefore," he continues, "our analysis concentrates on characterizing the government's concept of its role" (p. 7). This sort of characterization cannot help explain governmental "effectiveness in bringing about social change." Even allowing for the use of different deflators, a comparison of published GNP estimates with Wilkie's expenditure data shows an unmistakable upward trend; though Cárdenas indeed increased the governmental share of the GNP, it was Miguel Alemán who did the most to increase the impact of the state on the economy. There is a further implication: simply because of its growing impact on the GNP *any* government spending program, *regardless* of its composition, would be liable to gain "effectiveness" as time went on (see Table 1).

PROBLEMS OF MEASUREMENT

One of the most critical tasks in quantitative research involves the construction of indices. Since it is often impossible to obtain *direct* measures of the phenomena in question, social scientists resort to *indirect* measures. Changes in the price level, for example, are regarded by economists as a direct measure of "inflation," whereas participation in riots or elections offers only a crude approximation of "political consciousness." With an indirect measure, the validity of any interpretive inference depends entirely upon the validity of the index. Careful explanation of the logic behind index construction becomes, in this context, absolutely indispensable.[10]

In *The Mexican Revolution* Wilkie sets out to obtain an index for indirectly measuring the "style" or "ideology" of successive presidential administrations, and proceeds to analyze the distribution of budgetary expenditures for this purpose. Several assumptions remain unexplained. He does not define "ideology,"* which is commonly taken to deal with fundamental worldviews or values; he does not define "style," which has no generally accepted meaning. Nor does he clearly explain the rationale for his selection of this particular index. His most explicit reference to this problem begins with the declaration that Mexican "love of rhetoric . . . obfuscates the ideological terminology that Western society has developed to such a fine degree" and that, since political leaders have promised everything to everyone at one time or another, public statements do not provide an accurate indication of "actual" government policy. "By determining concrete actions in a manner that makes presi-

* We acknowledge our error in having stated that Professor Wilkie failed to define "ideology." As his reply points out, he does discuss its definition on pages 40–41.

dential programs easily comparable [through budgetary analysis], however, we can resolve the problem" (p. 4).

It appears that Wilkie has redefined the issues for the sake of his data. From his own statement one could understandably infer that *ideology,* in keeping with most definitions, has been quite constant in post-Revolutionary Mexico;[11] and that specific *policies* have undergone change. Wilkie's assumption that "actual" budgetary policy provides an index to ideological trends seems to contradict all common sense. We do not mean to say that "actual" economic decisions are unimportant; we merely think they do not measure ideology. And even if they did, Wilkie's interpretation is still suspect because, as shown above, he has excluded so many vital components of federal economic policy from his analysis.

Other conceptual problems stem from the attempt to use government expenditures as a quantitative measure of ideology. In his treatment of budgets, Wilkie makes fundamental distinctions among "social," "economic," and "administrative" expenditures. The definition of these categories deserves careful examination because Wilkie goes on to classify "ideological" trends according to the distribution of total expenditure among the three categories. As he explains, the distinctions come to little more than a consolidation of the seven "functional" classifications used by the Mexican government in 1954–63. These functional classifications, roughly similar to present-day federal budget breakdowns in the United States, represent a first step beyond the traditional listing of expenditure simply by ministry. Yet even these categories are of extremely limited use for analyzing the economic impact of government spending. They do *not* define expenditures according to their economic effects. For this reason economists in public finance have shown great caution in interpreting, for example, the welfare or income-redistributive effects of government spending.

Wilkie shows no awareness of this problem when he attempts to define the economic significance of his three expenditure categories. In Chapter I he explains that "social expenditure is classified differently from economic expenditure, for the former is long-term and its results are hard to measure. A dam may take ten years to build, but specialized education of youth may take twice as long, and even then there is no concrete [sic] result. Administrative expenditure includes only expenses devoted to governing society. This expenditure does not build the nation: it only maintains an orderly atmosphere in which development can take place" (p. 10).

These distinctions are remarkably naive. The first two sentences imply that the principal difference between "social" and "economic" spending is the greater gestation period of the former. But a glance at the budgetary breakdown in Table 1–4 (p. 13) hardly substantiates this claim. *No* intelligent generalizations about the varying gestation periods of the listed items are possible

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without much more detailed knowledge of the specific expenditures. Even on first impression the distinction appears groundless. For example the gestation periods of expenditures in the National Housing Institute and the Social Security Institute ("social") do not, prima facie, seem very different from Communications and Public Works ("economic").

Furthermore Wilkie avoids explicit discussion of returns on investment, even by rule-of-thumb approximation, although the concept is implicit in his prose (e.g., the remark that administrative expenditure does not "build" the nation). He offers no distinction between current expenditures and capital expenditures. The latter *by definition* involve a lag because they are made for the purpose of increasing productive capacity. Thus any analysis of capital expenditures (investment) by the federal government would have to make *some* allowance for the differing gestation periods inherent in different types of investment. Wilkie consciously ignores this fundamental problem (p. xxviii), a basic issue in the field of public finance.[12] Indeed his only reference to investment *per se* (p. 147) appears to follow a narrow accounting definition of "investment" that excludes irrigation, public works, and communications (all of which must have included significant "investment" in the normal economic sense).[13]

Nor does Wilkie's concern with the differing gestation periods of his three expenditure categories lead him to consider the calculation of rates of return.[14] He fails to point out that the idea of differential returns, with which he is dealing, is useful *only* if one has previously determined exactly what welfare effects are to be studied. In other words, differing gestation periods are adjusted for by calculating (or estimating) the annual rate of return over the productive life of the investment. There is no difference in principle between an investment with a gestation period of one year and one of ten years if their total returns (discounted) are equivalent and bear equally upon the same objective.

Since the author's entire test of "ideology"—or, more accurately, the economic policies of Presidents—depends upon these distinctions, how can we evaluate the consequent generalizations about "the rise of the active state" (especially in Chapter 4)? What are we to make of all the tables showing variations in the relative shares of "social," "economic," and "administrative" expenditure? The answer, alas, is very little. Because the three categories have not been defined in such a way as to distinguish between "social" and "economic" spending for their economic effects, they cannot provide the basis for a useful interpretation of the economic impact of government policy. That is, expenditure has not been broken down in a manner that would make it possible to measure "effectiveness" by the ordinary yardsticks of economic analysis.[15]

The second theme Wilkie seeks to quantify is "social change," which he circumscribes narrowly. It does not refer to changes in income distribution *per se*, or to changes in the relative size of social classes (although this concept is mentioned once), or to changes in the middle and upper income ranges, or to changing gaps between Mexico's affluent sectors and the "culture of poverty."[16] In deceptively simple language the author poses an exceedingly complex question: "What social change has actually taken place for the masses?" (p. 203).

Instead of approaching this question through an analysis of the relative command over goods and services enjoyed by any income-defined portion of the population, Wilkie has devised a composite Poverty Index. With data taken from national censuses, the index defines "social change" as the rate at which Mexicans have ceased to: (1) be illiterate, (2) speak only in Indian language, (3) live in towns of less than 2500 inhabitants, (4) go barefoot, (5) wear sandals, (6) eat tortillas instead of wheat bread, and (7) lack sewage-disposal facilities in their homes. (Only the first three measures were contained in the censuses from 1910 through 1930). The arithmetic average of these various percentages constitutes the absolute Poverty Level for any region (or the nation) at any point in time; from these figures the construction of a relative Poverty Index (1940=100) then makes it possible to analyze rates of change.

The Poverty Index merits close examination. Wilkie has set out to study "basic deprivations" of the "masses." This is a difficult task. Historical data on income distribution, by far the most direct criteria, apparently do not exist (though it is surprising that Wilkie does not discuss Ifigenia Navarrete's well-known work on the subject).[17] In search of other measures, the author has turned to the census. Within limits, these categories would seem to provide a reasonable indication of the standard of living in Mexico.[18]

Nevertheless, one might ask whether the first three (illiteracy, knowledge of only an Indian language, residence in towns under 2500) do not differ radically from the other four in that they restrict an individual's mobility and therefore his "life chances" in a much more fundamental way. Curiously enough Wilkie gives *equal* weight to each of the seven elements. It is worth noting that this index would measure as exactly equal the "social change" induced by one tortilla-eater taking to bread and one illiterate learning to read and write. Meanwhile there is no social change if a barefoot man dons sandals, but there is social change if a sandal-wearer puts on shoes!

In short, we do not understand what this index is supposed to indicate. To say that it deals with "social change" among the "masses" hardly clarifies the situation. To what kind of "social deprivation" does it refer? Does it seek to estimate the extent of what Oscar Lewis has called the "culture of poverty" —which apparently involves more than command (or lack of it) over goods and services? Because of these uncertainties it is particularly distressing that, in one oblique reference to Navarrete's work on income distribution, Wilkie steps far beyond the conceivable bounds of his data: "The worker psychologically walked with more pride after Cárdenas, but though he was beaten down between 1940 and 1960, he was ready to take advantage of the ideology of economic revolution's new opportunities. The Poverty Index began to decline rapidly after 1940" (p. 277). If there is anything this index does *not* measure, it is the status and outlook of "the worker" or the working class. What it does measure is, in our view, a moot point. At the least, historians should note that Wilkie is faced here with a problem familiar to economists who study social welfare: the task of finding income proxies. Since any solution involves difficulties of conceptualization and measurement, the historian, as well as the economist, must take care to explain the rationale for the proxies he constructs.

CAUSALITY, ASSOCIATION, AND DISAGGREGATION

Finally, we come to the obvious question of the connection between Parts One and Two of the book. It seems inevitable that the juxtaposition of federal expenditure and social change will lead many readers to assume that there must be some causal relationship. The experienced Mexican specialist Howard Cline, for instance, has drawn precisely this inference: "whatever its limitations," says Cline, "the [Poverty] Index does give us one measure of how the national investment in social improvement has *produced* net gains in welfare, even in the face of a population explosion" (Foreword, p.x.; our italics).

Wilkie's own approach to this problem is ambiguous. With notable caution—especially appropriate since direct government spending accounted for less than one-tenth of the GNP until the 1950s—he acknowledges the importance of the private sector. "However," he continues, "the government creates the climate within which private enterprise operates. The government sets policy, consciously or unconsciously, which is a major determinant in what role the private sector will be able to play. Therefore when this study asserts that any federal policy has resulted in a given amount of social and economic change, it intends to say not that the change came from government policy itself, but that it came from the over-all climate which the attitude of the government engendered" (p. xxvi).

So the causal process takes three steps: government spending produces an "over-all climate," whatever that may be; the climate produces patterns of total investment; and total investment, in turn, produces social change. This three-part hypothesis obviously does not lend itself to statistical examination. Yet it should be feasible to test the author's basic proposition: that changes in the level or composition of total federal expenditure are *associated,* or positively and highly correlated, with declines in the Poverty Index.

Wilkie has not made any such test; he has not discussed the desirability of a statistical test; he has not presented the data in such a way as to facilitate a test. Exceedingly crude correlations, nevertheless, can be drawn from ten-year averages. One problem with this procedure lies in the necessity of working with decennial data—since the Poverty Index is measured by decade, this yields only five sets of observations. Another problem stems from the reliance on merely two variables, governmental expenditure and the Poverty Index. There is no opportunity to deal with counter-hypotheses, e.g., that industrialization or agricultural mechanization have been primarily responsible for decreasing poverty. Another problem is the likelihood of spurious correlation between secular trends. Still another is the inability to look for lagged effects by adjusting the time series. For such reasons it would have been understandable for Wilkie to consider and then reject the possibilities of correlation; less understandable is the straightforward assertion of conclusions when tests have not been made.

One might, for example, explore the relationship between the *level* of government spending and declines in the Poverty Index. A product-moment correlation between federal expenditure (in per capita pesos of 1950, by ten-year averages) and declines in the Index comes out to 0.91. Despite the possible use of differing deflators, a similar correlation between the Poverty Index and federal expenditure as a percentage of the GNP comes out a bit higher at 0.95. As hypothesized, a positive relationship clearly exists.

But what does it mean? The vagueness of the Index itself makes the association difficult to interpret. Perhaps more insight could be gained by correlating total federal expenditure with any one of the component parts of the Index. What is the correlation between federal expenditure and declines in the percentage of the population living in towns of less than 2500? Is it higher or lower than the correlation between government spending and decreases in illiteracy?

The next logical step would be to study relationships between changes in the Poverty Index (or its component parts) and the *composition* of government spending. The problem here is fundamental: how to break down (disaggregate) expenditure figures in a logical and systematic fashion. We have already examined the limitations of Wilkie's distinctions among "social," "economic," and "administrative" spending. How else can one define and disaggregate the portions of federal expenditure to be correlated with the Poverty Index—or, perhaps more specifically, with declines in the percentage of people in small rural towns? In principle it seems impossible. But the disaggregation problem is less severe for some components of the Poverty Index than for others. Why not, for instance, correlate the decline in illiteracy with expenditure for education?

Wilkie does not face this problem squarely. At one point he quite correctly warns that no method of disaggregation will estimate the "costs" of "social change" (p. 259). Soon thereafter, nonetheless, he makes an implicit effort to gauge the impact of one type of expenditure upon one component of the Poverty Index by presenting a table showing the "population affected by federal potable water and sewage disposal programs, 1946–1963" (Table 10–10, p. 271).

The most striking illustration of this inconsistency appears in Table 10–5, which demonstrates rates of change in the Poverty Index during successive "ideological" phases of the Revolution—"administrative," "social," and "economic" (p. 258). From this Wilkie concludes that the most intensive "social change" has taken place during the era of "economic" emphasis since 1940. Yet he does not take this to mean that "economic" expenditure has directly brought about social change; government policy has simply established a "climate" conducive to change.

This notion of "climate" or "indirect impact" offers scant methodological refuge. Any attempt to link Part One (federal expenditure) with Part Two (social change) necessarily involves disaggregation. Or if for some reason we are not to correlate specific government expenditures with specific changes in components of the Poverty Index, then why make even a qualitative correlation between the behavior of the total Index and "administrative," "social," and "economic" shares of spending (Table 10–5)?Is there any common-sense reason to believe these types of expenditure would affect the Index in perceptible and different ways? We think not. Then why the correlation? The author cannot have it both ways. He cannot disavow efforts at disaggregation and then covertly introduce a disaggregation technique without explicit justification.

Another part of Wilkie's analysis leads to the implicit assertion that rapid social change after 1940 reduced regional differences in poverty. As he concludes at one point: "The era of emphasis on industrialization and increased agricultural production during the 1940's opened the door to social change in all regions, especially in the South and East Central portions of the country which has seen little change during the 1930's" (p. 242). In this section Wilkie has presented some of his most suggestive data, relating change in the Poverty Index to various parts of the country and producing a "geo-social" classification of Mexican regions.

But this information does not offer any systematic view of the *relationship* between the poor and rich regions, surely a fundamental problem. In this regard it is worth noting that the rank order of the 32 "federal entities" according to absolute Poverty Level has undergone very little change since 1910: by this criterion the richest states have tended to stay richest, the poorest have tended to stay poorest. The greatest alteration in the regional disribution of poverty occurred between 1910 and 1920, in the era of revolutionary violence. The rank order which differed most from that of 1910 came in 1940—at the end of Cárdenas' presidential term, not during the succeeding decades.[19]

The table below further illustrates the regional variations by presenting successive rank-order correlations between the absolute Poverty Levels of the 32 entities in specified years and the change in the relative Poverty Index during the subsequent decade. The question is whether the poor areas or the rich areas were eliminating poverty at a faster rate. As computed here, positive correlations would mean that relative poverty was decreasing more rapidly in the poorer areas; negative correlations, that relative poverty was decreasing more rapidly in the richer areas.

TABLE 2

Regional Rank-Order Correlations Between Poverty Level and Decline in Poverty Index

1910–21	—0.13
1921–30	—0.31
1930–40	—0.76
1940–50	—0.56
1950–60	—0.36

The results show consistently *negative* relationships. The 1910–21 index comes closest to being positive, again revealing the regional importance of revolutionary violence. The 1930–40 index is most negative; subsequent indices shows a positive trend, supporting Wilkie's contention that such poor areas as the South and East Central portions began making notable strides after 1940. But the most important point, which does not appear in Wilke's analysis, rests upon the generally negative relationship. Ever since the Mexican Revolution it has been the rich states, not the poor ones, which have been eliminating poverty at relatively faster rates.

This finding lends further reinforcement to our strictures about the causal implications of the book. One could properly surmise that, if poverty decreased most rapidly in the wealthy areas, the trend might have been due to wealth itself—rather than the pattern or extent of federal expenditure. This hypothesis makes *a priori* sense but cannot be tested here. In any case Wilkie's own proposition does not find support in these data.

SUMMARY

Our conclusions may be summarized as follows:

1. Wilkie has collected valuable data in two areas previously neglected by economic historians of Mexico: (a) actual federal government budgetary expenditures; and (b) non-monetary indices of social welfare. Thanks to Wilkie these data are now available for analysis by other researchers.

2. Wilkie's book cannot offer a test of the welfare effects of federal policy (despite the author's frequent implications to the contrary) because: (a) a significant portion of public sector spending has been excluded; and (b) changes in the author's Poverty Index offer but one very narrow criterion of "social change."

3. Wilkie has marred his statistical labors by: (a) failing to provide an analytically logical definition of his categories of budgetary expenditure; (b) failing to allow for "lagged" effects of capital expenditures; (c) introducing correlations based on an improper approach to the central problem of disaggregation.

4. Because of these methodological errors and because of the author's incomplete description of his own analysis, Wilkie has misled the reader as to the possible causal relationships inherent in the data presented.

NOTES

1. James W. Wilkie, *The Mexican Revolution: Federal Expenditure and Social Change Since 1910* (Berkeley and Los Angeles, 1967).

2. For examples and discussion of quantitative history see Don Karl Rowney and James Q. Graham, Jr., eds., *Quantitative History: Selected Readings in the Quantitative Analysis of Historical Data* (Homewood, Ill., 1969); and Seymour Martin Lipset and Richard Hofstadter, eds., *Sociology and History: Methods* (New York and London, 1968).

3. For an earlier study of a Latin American country, see Henry C. Wallich and John H. Adler, *Public Finance in a Developing Country: El Salvador—A Case Study* (Cambridge, Mass., 1951). Wallich and Adler attempted to survey the *total* effect of fiscal policies (including, for example, counter-cyclical effects), while Wilkie has focused on a limited number of welfare effects. A bibliographical inventory including works on public finance and social welfare may be found in William Paul McGreevey, "Recent Research on the Economic History of Latin America," *Latin American Research Review,* III (No. 2, Spring 1968), pp. 89–117.

4. Nonetheless, Wilkie's actual expenditures (Table 1–8) match precisely those in Aniceto Rosas Figueroa and Roberto Santillán López, *Teoría general de las finanzas públicas y el caso de México* (México, D.F., 1962), Anexo 6, for the years 1936, 1937, 1948–56 and 1958–60. The discrepancy for most of the other years (Rosas Figueroa and Santillán Lopéz go back only to 1935) is not very great.

5. Concentration on the *federal* level excludes other principal sources of expenditure from consideration—the Federal District, the state governments, and the local governments (*municipios*).

6. Rosas Figueroa and Santillán López give income and expenditure figures for thirteen of the largest decentralized agencies and state enterprises between 1939 and 1959, unfortunately excluding at least two of the most important agencies—the *Comisión Federal de Electricidad* and *Petróleos Mexicanos* (PEMEX). *Teoría general,* Anexo 18, p. 232. A general idea of the growing significance of these entities can be gained from their investment record, summarized in Secretaría de la Presidencia, Dirección de Inversiones Públicas, *México: Inversión pública federal, 1925–1963* (México, D.F., 1964).

7. As noted by Wilkie, *The Mexican Revolution,* pp. 5–6.

8. There is an attempt to measure the "redistribution of National Income through the budget" in the El Salvadorean case study: Wallich and Adler, *Public Finance in a Developing Country,* pp. 185–90. This analysis included an investigation of taxation as well as expenditure.

9. A brief consideration of the welfare effects of some of these factors may be found in Raymond Vernon, *The Dilemma of Mexico's Development* (Cambridge, Mass., 1963), pp. 97–8, 106–7, 110.

10. See Eugene J. Webb, *et al., Unobtrusive Measures: Nonreactive Research in the Social Sciences* (Chicago, 1966).

11. On this point see Frank Brandenburg, *The Making of Modern Mexico* (Englewood Cliffs, N. J., 1964), pp. 7–18.

12. See, for example, the relevant section in a representative textbook: James Buchanan, *The Public Finances: An Introductory Textbook,* rev. ed. (Homewood, Illinois, 1965), pp. 224–35. A breakdown of federal expenditures between current and capital items (with a relatively large "undetermined" category) is given in Rosas Figueroa, *Teoría general,* Anexo 5, which covers the period from 1935 to 1961.

13. The identification of investment expenditure within general budgetary accounts is one of the most difficult problems in public finance. See Gerhard Colm, *Essays in Public Finance and Fiscal Policy* (New York, 1955), pp. 268–70.

14. For an example of the application of benefit-cost analysis to public investment in the United States, see Julius Margolis' study of the Bureau of Reclamation: "Secondary Benefits, External Economies, and the Justification of Public Investment," in William L. Henderson and Helen A. Cameron, eds., *Public Finance: Selected Readings* (New York, 1966), pp. 193–210.

15. Other definitions of the categories offer little assistance to the baffled reader. One notable example of a circular definition, in Chapter 6, describes "economic" expenditures as "all the federal funds including capital investment allocated to agencies or budgetary categories which deal directly with the economic life of the nation" (p. 125). There is no explicit definition of "social" expenditure in Chapter 7. Indeed, the term "social" is used very differently in Part Two of the book, where "social change" means a change in the Poverty Index. In Part One, on the other hand, "social expenditure" refers to the arbitrary budgetary classification of Table 1–4. The temptation to draw unwarranted causal implications from this ambiguity is obvious.

16. For a widely-read analysis of the evolution of social class structure see Arturo González Cosío, "Clases y estratos sociales," in *México: 50 Años de Revolución,* II: *La vida social* (México, D.F., 1960), pp. 31–77. A synthetic account may also be found in Pablo González Casanova, *La democracia en México* (México, D.F., 1965), Chapter VI: "Estratificación y movilidad social."

17. Ifigenia M. de Navarrete, *La distribución del ingreso y el desarrollo económico de México* (México, D.F., 1960). There exists a very detailed income distribution survey for 1958: Secretaría de Industria y Comercio, Departamento de Muestro, *Ingresos y egresos de las familias en la República Mexicana: Julio 1958* (México, D.F., 1960).

18. Wilkie may have been unduly ethnocentric in choosing the indicators for his index. Are "Indian" characteristics perhaps overemphasized? Most observers would appear to agree with the implied emphasis upon the rural poor. Nonetheless, other indices have been offered and should be viewed as possible alternatives. Figures on life expectancy, mortality

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from specific diseases, and the population covered by or assisted by the Social Security Institute system are given in Presidencia de la República, *50 Años de Revolución Mexicana en cifras* (México, D.F., 1963), pp. 162–8. An interesting table of "indicators of the regional availability of basic public services" for 1960 is given in William O. Freithaler, *Mexico's Foreign Trade and Economic Development* (New York, 1968), p. 31. Freithaler includes the following six indicators: (1) functional literacy rate, (2) teachers per thousand children aged 6–14, (3) percentage of dwellings with running water, (4) percentage of dwellings with sewer connections, (5) percentage of dwellings with gas or electricity, (6) percentage of population covered by the Social Security system.

It should also be noted that González Casanova, attempting to estimate changes in the size of the "marginal" population, employs many of the measures later used by Wilkie: *La democracia,* esp. Chapter V, "La sociedad plural."

19. These statements are based on Spearman correlations between the rank order in Poverty Level of the 32 entities in 1910 and in every other census year. The results: 1910–1910 = 1.0; 1910–1921 = 0.86; 1910–1930 = 0.86; 1910–1940 = 0.82; 1910–1950 = 0.84; 1910–1960 = 0.83. Raw data in Wilkie, *The Mexican Revolution,* p. 236.