Quantitative Cross-National Studies of Economic Development: A Comparison of the Economics and Sociology Literatures

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For more than two decades, economists and sociologists have pursued parallel cross-national quantitative investigations of the determinants of economic development. These investigations have proceeded in mutual ignorance despite the often large overlap in statistical methods and data employed. Apparently contradictory findings have resulted, especially regarding the impacts of international trade and foreign direct investment. We find that there are two factors that account for these inconsistent results. One key factor is the use of different variables to measure international trade and investment, the choice of which is in turn driven by underlying differences in theoretical motivations. A second important difference involves sociologists' greater preoccupation with more complex multivariate models versus economists' greater willingness to focus on individual variables in multivariate regressions while viewing others as "controls." A major finding of our survey is that when the *same* variables are used, the results of economists and sociologists tend to be consistent, rather than contradictory (as might have occurred, for example, because of the use of different samples of countries or time periods, or the use of other variables included in the regression equations). We also consider some studies whose purviews go beyond economic growth to consider factors such as income inequality, physical quality of life, demographic change, and basic needs provisioning.

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Introduction

Economic growth and development are the subjects of cross-national statistical studies in a number of disciplines. Each academic field has a distinctive approach, makes different explicit and implicit assumptions, and focuses on different dependent and independent variables. The purpose of this article is to compare and contrast cross-national quantitative literatures on economic development in economics and sociology. This goal is consistent with a recent call (Kalleberg 1995) for more communication and "boundary crossing" between the two disciplines.

For some time now, the two fields have been studying similar data and using similar statistical techniques, but they often arrive at seemingly contradictory conclusions as to what factors promote or inhibit economic growth. Cross-national quantitative research on comparative development arguably reached its heyday in sociology with the publication of a series of articles in the major journals in the late 1970s and early 1980s (see Chase-Dunn 1975; Bornschier, Chase-Dunn and Rubinson 1978; Delacroix and Ragin 1981). Nevertheless, this comparative survey takes on a certain urgency now, given the recent advent of "new" or "endogenous" growth theory in economics (see Romer 1986, 1990a and Lucas 1988 for the seminal contributions) that has generated an explosion of this type of research in apparent ignorance of the existing sociological literature, coupled with the recent questioning of the predominant paradigm in the sociology literature (see Firebaugh 1992; Firebaugh and Beck 1994). This review will show that there are many valuable opportunities for mutual learning that are currently unexploited.

Contemporary sociology's interest in global patterns of economic growth began in the 1950s and 1960s with domestic social and cultural factors that created obstacles to growth. This "modernization" paradigm in which "traditional" values and social ties constitute the principal obstacle to growth generated considerable quantitative work based on survey research (e.g., Inkeles and Smith 1974) but did not lend itself to quantitative cross-national work (for an exception, see Adelman and Morris 1973).

In the 1970s and 1980s, however, the rise of "dependency/world system" approaches, sometimes called "capital dependency theory," prompted sociologists to focus more on the ways in which "external" factors like international trade and foreign investment influenced growth. The dependency/world-system perspective has been the principal stimulus to the rise of quantitative cross-national research on growth by sociologists over the course of the last twenty years.

World-system theory suggests a hierarchy of states within an international division of labor. Historically, core states were the powerful industrialized countries, while peripheral states were those with primarily export economies based on extractive industry. Semi-peripheral states had a mix of core-like and peripheral features, and could be either on their way up or on their way down in the world system (Chase-Dunn 1989). The logic of capitalism encouraged expansion throughout the globe on the part of the more highly developed core nations. By the mid-twentieth century, these states looked to peripheral and semi-peripheral countries for both

cheap labor and inexpensive agricultural goods and raw materials, as well as markets for consumer goods. More recently a set of changes occurred that are associated with "global restructuring" (Henderson and Castells 1987) and the rise of a "new international division of labor" (Froebel, Heinrichs, and Kreye 1980). The essence of this transformation has been the "industrialization of the periphery" (Caporaso 1981), based on the ready availability of inexpensive workers. The need for both cheap labor and expanding markets has been filled by countries experiencing distorted- and/or under-development, characterized by extreme levels of income inequality. It is through external linkages, such as trade or foreign capital penetration, that this distortion occurs. Distortion results from "disarticulation," where strong links between exporting industries and foreign firms lead to the development of skewed infrastructure, internal markets, and class structure within peripheral countries (see Stokes and Anderson 1990). A country's world-system position, in a macro-structural sense, is considered the key determinant of the society's capacity for sustained economic growth and development. Those stuck on the lower rungs, the periphery and semi-periphery, are maintained in these subordinate positions through their integration into the world economy.

Work in the world-systems tradition is sometimes accused of ignoring the domestic factors that help determine rates of growth and shape each country's changing position in the world economy (see Zeitlin 1984 for one such critique). In most cases such criticisms are misplaced. Sociologists writing on global patterns of growth are usually very conscious of the arguments made in the "historical-structural" tradition of dependency analysts (as presented classically in Cardoso and Faletto 1979), who see world-system effects as operating through domestic class structures and domestic-international alliances at the local level. Nonetheless, the quantitative cross-national work in this tradition continues to focus on external variables, leaving the role of domestic factors largely implicit.[1]

In contrast, economists focus on internal causes of development, typically viewing growth in terms of the output of a given country's aggregate production function. Since output depends on the amount of inputs used and the level of technological knowledge involved in the production process, the growth of output naturally depends on the growth of inputs and the rate of technological progress. By inputs, economists mean services which explicitly contribute to the production of "value added," such as physical capital, human capital, and "raw" labor. Economists tend to take a rather broad view of technological progress, often including such notions as improvements in organization and management or the introduction of scale economies. Economists then look at government policies and, more recently, at institutional arrangements and ask whether they tend to promote or retard the accumulation of inputs and technological knowledge.

In this article, we give a very broad overview of the theories and findings of the two lines of research. We do not pretend to give a full review of the theoretical background and assumptions. Rather, we present theory only to provide context for methods and results. We have taken a variable-oriented approach to the literature in which we discuss findings with respect to some selected explanatory variables used

instead of the individual papers in which they appear. Since each explanatory variable entered into a regression framework typically suggests an implicit hypothesis, this method allows us to easily compare the bivariate hypotheses and conclusions found in the literature.[2]

After a section on statistical methods, we begin the main section of our survey with two important categories of economic activity that commonly appear in both the economics and sociology literatures: international trade and investment. To better understand the different approaches to quantifying the effects of these activities on economic development, we first present a brief overview of predominant theories in the two types of literature. We then discuss the major results of each field's quantitative research and propose some possible reasons for the differences in findings. Our goal is to provide an overview and avoid detailed summaries of specific papers. A more detailed accounting of the explanatory variables used in the quantitative analyses, including references to the papers in which the variables appear, is provided in the appendices. (The appendices are matched to the appropriate subsections by letter, e.g., Appendix A corresponds to subsection a.) The main section concludes by applying the same approach to education and fiscal variables. There is less overlap between the economics and sociology literatures in these areas.

Statistical Methods

In both disciplines, the dominant mode of statistical analysis has been ordinary least squares regression,[3] where the number of observations is equal to the number of countries included in the analysis. As available time series have lengthened, use of pooled cross-sectional time series data has become increasingly widespread. One advantage of this method is that it allows for inclusion of country dummies that control for unobserved cross-country heterogeneity. We need not worry, then, that a certain explanatory variable is statistically significant because, say, it is proxying for the influence of geographic location. Probably the most crucial reason for using a research design that combines variation among national cases with change over time is that it allows more direct tests of hypotheses about *change* and firmer inferences about the direction of causation.

A simple measure of economic development found in both disciplines is the change in gross domestic product or GDP (less commonly, Gross National Product or GNP[4]) per capita over a specified period. More specifically, the dependent (left-hand side) variable typically used by economists is either the average annual rate of change of per capita GDP over the period or the difference between the logarithms of per capita GDP in the initial and final years of the period. Using lagged panel regression, in which the dependent variable at a recent point in time is regressed on itself and on independent variables measured earlier, the dependent variable typically used by sociologists is the logarithm of per capita GDP in the final year of the period, with the logarithm of per capita GDP in the initial year of the period being included as an *independent* (right-hand side) variable. Clearly, the two approaches are closest to equivalent when the estimated coefficient on the

initial year per capita GDP is statistically insignificantly different from one.[5] In both disciplines the other independent variables are usually measured using their initial year values, although sometimes an average over the entire period is employed.

Sociologists also use the technique of time series regression to study comparative national development (see Hammer and Gartrell 1986; Bradshaw 1987; Bradshaw, Kim and London 1993), where the data consist of temporal points for one country. One series is regressed on another in order to assess the effects of independent variables on changes in the dependent variable for a given country. Lagging of the independent variable to allow for non-immediacy of effects is common.[6]

Sociologists have been more sensitive than economists to the criticism that the change in per capita GDP is too simplistic a measure of development, particularly because it does not indicate whether growth was shared by a majority of the population or was concentrated in an elite group. A significant fraction of the quantitative cross-national sociology literature on economic development has therefore used income inequality or basic needs provisioning as the dependent variable. We briefly survey this work in the penultimate section of this article.

Before starting the main section of our survey, we should note that caution needs to be exercised in interpreting the results of cross-national regressions. Theoretical frameworks loom large in this task. Here we very much like what Levine and Renelt have to say in their 1991 survey of the economics literature in this area (pp. 9–10):

> [C]ross-country regressions may best be viewed as establishing patterns of correlations. Only theory provides us with a means of interpreting these patterns. Of course, different theories may have different explanations for any given set of correlations. By systematically expanding the set of stylized correlations, however, cross-country empirical studies may be able to favor some existing theories over others and broaden the requirements of future theories.

Theories and Results

A. International Trade

Theory. Neo-classical economic theory strongly suggests that openness to international trade supports the growth of economies by allowing for specialization in areas of comparative advantage and increasing the size of the market for tradable goods. Furthermore, such international openness should promote the flow of knowledge, which can be crucial for technological progress. A country's accessibility to free trade is measured in many different ways, including simply the amount of trade it conducts and the lack of official barriers to trade. One interesting theory in the literature proposes that the fewer barriers to trade a country imposes, the closer its domestic prices will be to world prices. Thus, many studies use measures of domestic prices relative to international prices to proxy for trade policy.

Where economists speak of "openness," sociologists speak of "dependence," and the contrast in predicted effects matches the contrast in tone between these two terms. International trade is argued to be one of the principal mechanisms through

which the peripheral and the semi-peripheral countries are structurally bound to their subordinate world-system positions. Trade dependence causes poor countries to be vulnerable to world price fluctuations, to concentrate on export industries to the exclusion of domestic industries, and to weaken the bonds between the two. Further, it promotes the development of an export-based elite class which maintains the status quo, creating a situation of highly unequal exchange in which the poor country is disadvantaged. Specialization in a small number of export commodities, especially if these are mostly primary commodities, weakens a country's ability to expand in terms of infrastructure, taxation, and internal linkages. Interestingly, this last point strikes a sympathetic chord with a long-running counter-theme in the economics literature, manifested most recently in the papers of Lucas (1988, section 5) and Young (1991). This sub-literature argues that trade may cause the poor countries to specialize in products in which they have a current comparative advantage but whose long-run growth prospects are poor.

The difference in approaches between the economics and sociology literatures is indicated by the remarkable lack of overlap between the two sets of trade variables listed in Appendix A. The only common variable is the ratio of trade to GDP or GNP, intended to proxy for openness in the economics literature and to measure the economic importance of trade (and hence the extent of trade dependence) in the sociology literature.

Results. Sociologists who have used cross-national regression analysis (such as Ray and Webster 1978, Delacroix and Ragin 1981, and Jaffee 1985) have almost always found either a positive relationship or no relationship at all between the ratio of trade (measured by exports) to GNP and growth. This is consistent with the findings of economists as reported here but at least superficially inconsistent with dependency theory. However, characteristics of trade such as high export price fluctuation and the tendency to export raw materials in exchange for manufactures are found to strongly retard growth, with smaller and sometimes statistically insignificant negative effects for high export commodity concentration and low levels of export processing. Some of these findings in support of dependency theory are contradicted by Ray and Webster (1978), who used a shorter time period (1960–1970) and a sample restricted to Latin American countries.

Almost all of the studies in the empirical economics literature find a positive relationship between the various measures of openness and economic growth (see, e.g., Levine and Renelt 1991, 1992 and Harrison 1996). As these researchers discuss, however, this relationship will often not be significant depending on the other variables used in the regressions and the type of data used. Levine and Renelt (1991, 1992) find that the various trade measures are, in fact, positively related to economic growth indirectly since they also correlate with increasing levels of investment in the country. They argue that trade measures are imperfect proxies for internal policy variables which, when included in the regressions, reduce the effects of the trade variables to statistical insignificance. Similarly, Harrison (1996) shows that the time intervals of the data matter greatly for the significance of the effects of openness on growth. She argues that trade may provide large short-term gains, but

these effects diminish greatly over time. Studies that look at annual data find more significantly positive results than do studies that look at longer time horizons.[7]

Thus, there is substantial but not overwhelming evidence that trade openness in the aggregate promotes growth (as predicted by economists), but that certain types of trade, common among the world's less developed countries (i.e., monoexport of agricultural products and raw materials), are detrimental to growth (as predicted by world-system oriented sociologists [Steiber 1979; Stokes and Jaffee 1982; Smith and Nemeth 1988]). Jaffee (1985:102) provides the clearest summary, arguing that while a nation's export reliance is positively related to economic growth, the positive effect "is either reduced or reversed under conditions of export price fluctuation, raw material specialization, commodity concentration, and foreign capital penetration." Even if trade dependence is in fact positively associated with aggregate economic growth, it may have deleterious effects on the provision of basic human needs in less developed societies, as found by Ragin and Bradshaw (1992) (see section 4 of this article).

B. Domestic Investment and Foreign Direct Investment

Theory. Comparative sociologists tend to view foreign investment, either through financial means or, more recently, through the penetration of multinational corporations, as a hindrance to the economic growth of less-developed nations. Because foreign interests tend to concentrate on increasing profits and because they generally deal exclusively with the elite classes in underdeveloped countries, it is argued, they distort the economic climate, promote inequality and political strife, promote the use of inappropriate capital intensive production methods, depress potential domestic investment, exploit the resources of underdeveloped countries, drain away the surplus, and weaken the internal linkages among industries.

Unlike economists, sociologists have concentrated little on the effects of domestic investment. Although they frequently include this variable in their growth regressions, they seem to take for granted that it will have a positive effect on growth and devote little attention to it.

In sharp contrast to the sociology literature, the economics growth literature has primarily studied the role of domestic investment in stimulating growth. Clearly, domestic investment is a key factor in economic growth within the production function framework outlined in the introduction since it is the means by which a critical input, physical capital, is accumulated. A recent line of the literature on growth and domestic investment, however, has begun to look more closely at the direction of causality in this relationship (see Carroll and Weil 1994; and Blomström, Lipsey, and Zejan 1996). To a certain extent, it has become clear that economic growth may play a much greater role in stimulating savings and investment than investment plays in encouraging growth.[8] Thus, although few researchers would dispute that a positive relationship exists between domestic investment and economic growth, there is now some question in the economics literature as to whether investment really causes growth, or simply results from such growth.

Although economists have spent relatively little time studying the relationship between foreign direct investment and growth, a few theories do exist which suggest that foreign direct investment should stimulate growth in less-developed countries by facilitating transfers of technology. This dissemination of modern technologies should both increase production directly and lead to "spillover" effects in the host country. By "spillover" effects, economists mean that an increase in productivity and knowledge in the sector which is receiving the foreign investment can positively affect productivity in other related domestic firms and industries. Economic theory suggests, then, that foreign direct investment should help promote economic growth, either on its own or by augmenting domestic investment. As before, there is some question as to the direction of causality here. Some research does suggest that higher growth may be attracting the foreign investment. In any case, economic theory definitely predicts a positive relationship between both types of investment, foreign and domestic, and economic growth.

Results. Sociologists and economists agree that domestic investment is beneficial for economic growth. Both sets of researchers observe strictly positive relationships between the two whenever domestic investment is included in growth regressions, although economists have begun to question the direction of causality.

The two literatures tend to diverge, however, on the issue of whether or not foreign direct investment is good for growth in developing countries. While virtually all of the economics studies find a strictly positive relationship between foreign direct investment and growth (see, e.g., Borensztein et al. 1995), sociologists tend to find the opposite. Part of this apparent divergence may involve confusion about what sociologists mean by a "negative" effect. Sociologists using the world-system perspective generally claim that high foreign investment slows or reduces the rate of economic growth *as compared to investment of domestic capital.* In other words, a unit of foreign capital contributes less to growth than a unit of domestic capital, so, if the former displaces the latter, growth is reduced. The apparently contradictory results of the two disciplines also reflect differing theoretical assumptions that prompt economists and sociologists to use distinct measures of this form of investment. Because economists view foreign investment as a mechanism for the flow of knowledge among countries, they generally prefer to use flow variables. Since sociologists see foreign investment as an instrument for core countries to gain power and position in peripheral countries, they typically use stocks of foreign investment in growth regressions. Whereas foreign investment measured as a flow almost always induces at least a weakly positive relationship, foreign investment measured as a stock usually supports a negative relationship.[9]

Our survey confirms the earlier findings of Bornschier and Chase-Dunn (1985), who performed a comprehensive analysis of the literature on the subject of the impact of foreign investment on economic growth. Of the twenty-five studies they examined that used the stock form of foreign direct investment, sixteen found a negative relationship. Conversely, thirteen of the fourteen studies that used the flow form of the variable observed a positive relationship. Only five of the studies that exclusively used the stock form of the variable discovered a positive relationship,

and almost all of them limited their scope to specific geographical regions, i.e., Latin America and Africa. For reasons that are unclear, limiting the study to a specific region appears to skew the results. It certainly seems that the results one obtains from the study of the impact of foreign direct investment on economic growth depend heavily on whether one chooses to look at the flow of such investment or the stock.[10]

In an influential critique, Firebaugh (1992) calls into question the conclusion that the negative coefficient on the stock of foreign direct investment reflects a negative impact of foreign direct investment on economic growth. He notes that studies with this finding typically include the flow of foreign direct investment in the same equation as the variable that is increasing in its stock. A positive coefficient on the flow and a negative coefficient on the stock variable are consistent with a positive effect of the *rate* of foreign direct investment (flow divided by stock) on growth. Firebaugh then shows, using the same data and variables as some of the studies surveyed by Bornschier and Chase-Dunn but replacing the flow and stock foreign direct investment variables by the rate of foreign direct investment, that the rate has a positive coefficient. He also finds that when the rate of domestic investment and the rate of foreign investment are both included in a growth regression, both have positive coefficients but the coefficient on domestic investment is larger.[11]

Firebaugh's critique is viewed by a number of sociologists as a decisive blow, debunking and delegitimating a number of the most important quantitative world-system studies of the 1980s. His careful examination of the measures and reanalysis of the data are valuable to the extent that they help to clarify previous results and remind us that there is a mathematical relationship between measures of "stock" and "flow" examined over time. However, there are two basic problems with Firebaugh's argument. First, his sweeping claims about the fundamental "illogic" of the quantitative studies he attacks is actually based on very narrow mathematical grounds. He ignores theoretical claims that variables measuring transnational capital penetration are tapping much more complex phenomena, and he sets up a precarious "straw argument" in his suggestions that world-system analysts always claim that "foreign investment actually is bad for the Third World—and not that it is 'less good' than domestic investment" (Firebaugh 1992:108). Second, Firebaugh's entire critique is implicitly based on the assumption that foreign investment causes growth. If the economists discussed above are correct about growth Granger-causing investment, this undermines the entire thrust of his critique and forces sociologists to rethink, once again, the implications of the relationship between transnational capital penetration and economic development.

This reevaluation is now underway. The most important exchange of views appears in a very recent issue of the *American Sociological Review,* which features a critique of Firebaugh's argument by Dixon and Boswell and a debate on the merits of their criticism (Dixon and Boswell 1996a, b; Firebaugh 1996). Dixon and Boswell (1996a) argue that previous research on foreign capital penetration (contra Firebaugh 1992) did *not* necessarily claim that it absolutely "reduced" economic growth, but only that foreign investment was "less productive" than local investment and led to

"negative externalities" (548). They propose moving beyond Firebaugh's criticism by developing two clearer measures of foreign capital penetration: foreign capital stock divided by the total stock of investment capital, and foreign capital stock divided by GDP. Using these measures, Dixon and Boswell find that foreign capital penetration, as opposed to investment, is less productive than domestic capital. Firebaugh (1996) describes this as "higher penetration levels return lower growth rates" (553). Growth is slowed in two ways: through direct decapitalization, or the hindrance to domestic capital formation caused by penetration, and through indirect decapitalization, or the limits on domestic capital formation through decreased growth (556).

This recent exchange clarifies the current consensus in the sociological literature. Firebaugh's criticism of previous measures of foreign capital penetration has forced cross-national researchers to reexamine the way this variable is operationalized and interpreted, and debunks simplistic interpretations of its "negative" effects. Instead, it is now clear that while all forms of investment (foreign and domestic) seem to lead to economic growth (leaving aside Granger causality), the research *does* provide evidence of "differential productivity," in which high ratios of foreign to domestic capital may have deleterious effects on economic growth rates.[12]

C. Education

Theory. Economists see education as a form of investment analogous to investment in physical capital. Hence, education is said to form "human capital," which in turn is argued to benefit growth in two ways. First, human capital acts as a complement to physical capital, thereby stimulating investment in the latter. Second, human capital helps to assimilate knowledge that contributes to technological progress.

Not unlike economists, sociologists argue that education provides a workforce with the skills and training necessary in the development of modern production techniques. Education is argued to have an additional positive effect on growth through "socialization" of a country's population. Weede and Tiefenbach (1981) and Weede (1983) argue that the military participation ratio in a country is just as valuable an indicator of the extent to which the workforce is socialized and disciplined as, say, the secondary school enrollment ratio. Confronted with external threats, countries develop larger, more combat-ready militaries. This response not only unites the national population against the threat but instills discipline into a larger fraction of the population. Military participation tends to make citizens both better managers and better employees in the economic environment. Cohesion and discipline in a society, it is argued, help to promote economic conditions favorable for growth.

Results. Research in both economics and sociology confirms that education is beneficial to the growth process. Economists and sociologists generally find a positive correlation between human capital variables and economic development. Many sociologists find a very strong positive relation between education and growth (see Jaffee 1985, London 1988, and Weede 1983), though some have found that includ-

ing variables that indicate the relative world-system position of a country (see the block-modeling examples in Nemeth and Smith 1985, and Snyder and Kick 1979) tends to reduce some of the explanatory power of these variables. Although some researchers (see Weede 1983) tout the added contribution which military participation ratios can make to the theory of the role of socialization in growth, the results with regard to this variable are disappointing. This variable generally has a positive sign, but the magnitude of its contribution is usually smaller than expected.

The most commonly used education variable in both literatures is the secondary school enrollment ratio. However, this is a measure of *change* in the educational attainment of the population, whereas most of the theoretical discussion suggests that the *level* of education of the workforce is the key variable for development. Economists have measured this level with both the literacy rate and the average number of years of schooling in the population. It turns out (not surprisingly) that the initial year values of these level measures and the secondary school enrollment ratio are highly correlated across countries, so this distinction has not mattered much for the results yielded by the regression framework described in section 2 of this article. Benhabib and Spiegel (1994) have found, however, that when both the initial level of education *and* the change in the average number of years of schooling over the entire period are included as independent variables, the latter does not have a statistically significant effect on growth. They interpret this as evidence against economists' view of human capital as a factor of production analogous to physical capital, and in favor of the view that the primary contribution of education to economic growth is that it helps to assimilate knowledge and thus contribute to technological progress. Since average years of schooling at five-year intervals are now available for most countries from the data set compiled by Barro and Lee (1993), future sociological studies should also be able to more precisely operationalize education in theoretically grounded ways.

D. Fiscal Variables

Theory. When focusing on the role of government in economic growth, economists tend to distinguish between public investment and public consumption spending. Recent theory predicts that government investment expenditures, by providing public goods such as infrastructure, education, and defense, could have a positive role in stimulating the productivity of the private sector. On the other hand, traditional theory suggests that government consumption spending crowds out vital private investment, reducing growth potential and possibly resulting in distortionary deficits. Similarly, the taxation required to finance public goods could distort savings decisions by reducing the return to private capital. It should be noted here that economic theory does not provide us with a prediction of the effects of government expenditures taken as a whole.

The most common use of fiscal variables in growth regressions in the sociology literature is as a measure of the government's size, strength, and capacity for intervention in the economic and social climate. Delacroix and Ragin (1981) found that

the amount of direct taxation "indicates (1) the ability of a state to direct and redirect national resources and to control economic behavior indirectly through devices such as tax incentives and disincentives, and (2) the success of the state in penetrating social and economic life, in general" (p. 1325). Sociologists argue that the more influence the government has in this way, the greater will be the growth potential of the country. Their rationale is that the contemporary poor countries of the world, in particular, need "developmental states" to promote economic transformation (e.g., Evans 1995).

For similar reasons, sociologists have shown considerable interest in foreign debt as a determinant of economic growth, arguing that such debt is harmful because it weakens the power of the state and other national-level actors. Economists have devoted relatively little time to investigating the impact of foreign debt on long-run growth.

Results. Barro (1991) has popularized the use by economists of the GDP share of government consumption spending net of defense and education as a measure of the drag on private sector economic activity exerted by the central government. He and other economists have found this variable to be negatively associated with growth in per capita GDP. However, in their comprehensive survey of the effects of fiscal variables on economic growth, Easterly and Rebelo (1993) find that the statistical significance of this variable is not robust to inclusion of certain other explanatory variables. They find that the fiscal variables with the most robust positive association with growth are the GDP share of transport and communication investment by all levels of government (including public enterprises), the GDP share of general government investment, and the GDP share of the central government's budget surplus.

There are only a few cross-national quantitative studies in the sociological literature that address this issue, and the results obtained have been ambiguous. Bradshaw, however, in a series of studies that emphasize the interplay between external global and internal societal forces, investigates how state growth and policies influence the complex process of economic development. Bradshaw (1985) finds that the "expansion of the state," as measured by the difference between the percentage of total central-government revenue collected through direct taxation in 1977 and the percentage of total central-government revenue collected through direct taxation in 1960, does promote economic growth. Bradshaw and Tshandu (1990) examine the effects of increasing state size as measured by the percentage increase in total current central government revenue as a proportion of GNP between 1966 and 1985, increasing state expansion as measured by the percentage increase in direct taxation for the same years, and increasing state consumption as measured by the percentage increase in general government consumption as a proportion of GDP for approximately the same years. Consistent with the earlier results, they find that the expansion of the state, as well as the increase in state size, has strong positive effects on growth, but they report that state consumption spending, with an insignificant, negative coefficient, is unimportant for economic development. In contrast, Bradshaw and Wahl (1991) find weakly negative effects of government revenue/GDP on economic development and strong negative effects of direct taxation as a

percentage of central government revenue on growth, contradicting their original hypotheses and breaking from the findings of the previous literature.

Turning to the results on foreign debt in the sociology literature, Chase-Dunn's 1975) study provides strong evidence that debt dependence in less developed countries is negatively associated with growth of GNP per capita. The idea that debt dependence impedes economic growth is further supported in Bradshaw and Wahl (1991), although their findings do not hold for sub-Saharan Africa. However, Bradshaw and Tshandu (1990), focusing on the relationship between foreign debt and both economic development and the physical quality of life (PQLI) index, find a negative relationship between debt dependence and state size in sub-Saharan Africa. Coupled with their results on state size and economic growth, which suggest that a larger state is in a better position to support programs that enhance local development, this finding implies that debt dependence impedes growth through its negative effect on the state. Similarly, recent studies find debt dependence in the developing world to be correlated with political instability resulting from IMF-imposed austerity programs (Walton and Ragin 1990) and with increased mortality and decreased nutrition for children (Bradshaw, Noonan, Gash, and Sershen 1993), factors associated with unbalanced growth and development.

Many of the previous studies highlight sociologists' distinct interest in building more elaborate models that specify causal ordering, path relationships between variables, and the significance of interaction effects. For example, Bradshaw (1985), in a comparative study of Africa, finds that the stock of foreign direct investment (FDI) is strongly positively correlated with state expansion (p. 202), and that state expansion has a positive relationship with economic growth to such a degree that measures earlier found to be important—primary product specialization and export concentration—are insignificant once state growth is factored into the equation. This leads Bradshaw to conclude that it is the state which is the "crucial intervening variable in the process of economic dependency in black Africa. Stock of private foreign investment has a positive impact on expansion of the state, which, in turn, has a positive effect on both economic growth and development of the modern sector of the economy" (Bradshaw 1985: 203). What Bradshaw is describing is "dependent development," with the state taking a strong lead in the relative absence of a local private sector. The state mediates the process, redirecting FDI in such a way that growth is facilitated.

Though the problems of comparability make a general summary of results across the two disciplines difficult, a couple of specific points can be made. First, it is commonly found (and confirmed by Easterly and Rebelo 1993) that the share of central government revenue in GDP increases with income (Wagner's Law) and that the share of international trade taxes in government revenue decreases with income. In light of these regularities it is not surprising that the measures of increase in state size and expansion of the state used by Bradshaw and Tshandu (1990) are positively correlated with growth. Second, the robust positive associations found by Easterly and Rebelo (1993) are not inconsistent with the hypothesis that state "strength" is important for growth.

Other Variables

Economists have devoted a good deal of attention in their cross-national quantitative studies of economic development to the role of financial and monetary variables, such as the ratio of the money stock to GDP and the rate of price inflation. We did not find any use of these variables in the sociological literature, however, so we do not present any comparative analysis here. Both sociologists and economists have made extensive use of political variables such as whether a country is a "democracy" and various measures of "political instability" (despite sonic real concerns about the cross-national comparative validity of the measures of these concepts). In fact, at present, the effects of these variables may be the most active area of investigation by economists working in this field. We have chosen not to do a comparative analysis of the theories and results of the economics and sociology literatures for this set of variables because we would have to omit an equally large or larger literature in political science. Instead, we refer the interested reader to three surveys by sociologists, political scientists, and economists, respectively: Bollen and Jackman (1985), Przeworski and Limongi (1993), and Alesina and Perotti (1994).

Income Inequality and Basic Needs Provisioning (BNP) as Dependent Variables

Theory

The inability of developing countries to meet the basic welfare needs of their populations is an area of study related in certain respects to the literature discussed above and can be seen as another distorting aspect of dependency in its various forms. Many sociologists are concerned with transnational capital penetration and such factors as the distribution of income, infant mortality rates, fertility rates, and life expectancy, in addition to growth more narrowly conceived. Such measures are an attempt to understand the human component of growth and the possibility of differential effects of growth on a population. While neo-classical economic theory predicts that basic needs provisioning (BNP) goes up with openness to trade and foreign investment, some sociologists suggest that such openness shows, in developing countries, a negative relationship with BNP. This effect is thought to be a result of the income inequality seen in many developing states (Wimberley 1990), as well the inability of a capital- and debt-dependent state to provide basic services to its populace (Bradshaw and Tshandu 1990).

The distribution of income is frequently measured by the percentage of national income accruing to each quintile of the population, although sometimes a summary index such as the Gini coefficient is employed. Two of the most commonly used measures of basic needs provisioning are the physical quality of life index (or PQLI, taken from Morris 1979) and the index of net social progress (or INSP, from Estes 1984). The PQLI is a composite measure incorporating infant mortality, life expectancy at age one, and adult literacy rates, while the INSP includes a range of forty-one factors, such as health status, status of women, defense effort, demographic condi-

tions, welfare effort, and political stability and participation. Therefore, while the PQLI can be seen as a measure of results, the INSP can be seen as a measure of effort.

Economists rarely use basic needs provisioning as a dependent variable (for an exception see Raut 1993). Use of income distribution as a dependent variable is more common, but is almost invariably connected with investigation of Kuznets's (1955) hypothesis that there is a general tendency for income inequality to first rise and then fall with economic development. Since economists' thinking about the Kuznets hypothesis is quite disjoint from their thinking about the determinants of the rate of economic growth, this work is beyond the scope of our survey. However, it is worth mentioning the recent interest in the quantitative cross-national economics literature with income distribution as an *independent* variable. In a move away from the 1950s view that inequality was good for growth because the rich save more, the recent literature has argued that inequality is bad for growth because it shrinks the size of the domestic market, leads to political instability, or leads to greater taxation of investment. Rather than cover the results of this literature in the next subsection, we simply note here that the two most prominent studies in this recent literature (Alesina and Rodrik 1994, and Persson and Tabellini 1994) both find that income inequality is negatively associated with growth.

Results

Studies indicate that world-system position is a strong predictor of a high degree of income inequality (Nemeth and Smith 1985; Bollen and Jackman 1985). Those states in the semi-periphery and the periphery, according to these studies, show significantly greater levels of income inequality than do core states. Two mechanisms which contribute to this situation are debt dependence (Chase-Dunn 1975) and dependence on foreign direct investment (Bornschier and Chase-Dunn 1985; Chan 1989). Chan's (1989) study further indicates that those states which see high growth rates also exhibit high levels of income inequality.[13] Evans and Timberlake (1990) note that investment dependence contributes to both inequality and growth in the tertiary sector of the economy (which offers lower wages than the other sectors), and that change in the tertiary sector negatively impacts the poorest income quintile. They conclude that growth of the tertiary sector is an intervening mechanism through which investment dependence exacerbates inequality, "because the capitalist accumulation it fosters is so strongly exclusionary and inegalitarian" (Evans and Timberlake 1980:546–547). On the other hand, studies that do not lag the dependent variable or incorporate time series data (Bollen and Jackman 1985) or that make no distinction between dependent, poor states and states in the core (Weede and Tiefenbach 1981), reveal no relationship between world-system position or foreign direct investment penetration, respectively, and the level of income inequality.

Studies using BNP as a dependent variable are more uniformly in agreement in their findings. London and Williams (1988, 1990), for example, find that trade dependence, investment dependence (i.e., openness to trade and foreign capital),

and position in the world system are all negatively correlated with basic needs provisioning. Similar studies (e.g., Bradshaw and Wahl 1991; Ragin and Bradshaw 1992) find a negative relationship between openness (outside the core) and BNP. Further, Wimberly (1990) finds that transnational capital penetration correlates with relatively high mortality rates, while London (1988) finds it is associated with higher fertility rates. The impact of disarticulation—the distortion of Third World economies which results from underdevelopment—is shown by Stokes and Anderson (1990) to increase both child mortality rates and crude death rates and to decrease secondary school enrollment.

Conclusion

For more than two decades, economists and sociologists have pursued parallel cross-national quantitative investigations of the determinants of economic development. These investigations have proceeded in mutual ignorance despite the often large overlap in statistical methods and data employed. Apparently contradictory findings have resulted, especially regarding the impacts of international trade and foreign direct investment. There are two factors that account for these inconsistent results. One key factor is the use of different variables to measure international trade and investment, the choice of which is in turn driven by underlying differences in theoretical motivations. A second important difference involves sociologists' greater preoccupation with more complex multivariate models versus economists' greater willingness to focus on individual variables in multivariate regressions while viewing others as "controls." A major finding of our survey is that when the *same* variables are used, the results of economists and sociologists tend to be consistent, rather than contradictory (as might have occurred, for example, because of the use of different samples of countries or time periods, or the use of other variables included in the regression equations).

In this article, we also consider some studies whose purview goes beyond economic growth to consider factors such as income inequality, physical quality of life, demographic change, and basic needs provisioning. This approach is consistent with a broader sociological conception of "development" (see Portes 1976). A more holistic view of the process and outcome of socioeconomic transformations in Third World countries is particularly important if we are interested in teasing out policy implications of comparative research. Planners and policy makers need to consider the political, social, and human dimensions of their strategies as well as the effects they may have on the growth of aggregate output.

What the studies we have reviewed herein highlight, perhaps more than anything else, are the need to avoid simplistic theoretical formulations and the virtue of drawing upon the existing and related work of various disciplines. The combination of internal and external ties and institutions is not fully captured by existing theory, and it is this interplay which seems to be of particular importance in the process of economic development. Case studies must continue to supplement quantitative cross-national analysis in order to make further progress in understanding how

international structural conditions interact with the state and other local institutions in the process of development. We hope that this survey will aid the analysis of this interplay by helping to lower the barriers between the disciplines of economics and sociology in the economic development field.

Notes

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1. For one attempt at the theoretical integration of domestic factors into a world-system perspective, see McMichael (1990).
2. There seem to be some disciplinary differences regarding the importance of variables versus models. Virtually all of the quantitative cross-national research in sociology explicitly addresses fairly complex multivariate models which specify causal ordering, path relationships between variables, and the significance of interaction effects. On the other hand, economists are more willing than sociologists to focus on individual variables in multivariate regressions while viewing others as "controls," rather than considering them as interrelated parts of a unified model. Perhaps the disciplinary distinction may be linked to contrasting styles. Using language developed by Baron and Hannan (1994), Kalleberg (1995: 1214) suggests, "sociologists develop arguments 'horizontally' (by bringing various kinds of arguments from their 'tool kit' to bear on a problem), while economists operate 'vertically' (by pushing the implications of a single line of argument as far as possible)."
3. When endogeneity of the right-hand side variables is believed to be a problem, two-stage least squares (instrumental variables) regression is sometimes employed, especially in the economics literature.
4. GDP is a measure of the value of all economic activity within the borders of a given country, while GNP is a measure of the value produced by firms and citizens of a given country regardless of their location. As the concern of economic growth studies is with economic activity within a country rather than beyond its borders, GDP is the preferred measure.
5. Sometimes economists also include the logarithm of the initial year per capita GDP as an independent variable in an attempt to determine whether richer or poorer countries tend to grow faster, all else being equal. This, in turn, is related to an extensive recent economics literature on the question of whether there is a long-run trend toward "convergence" of countries' per capita incomes (see Barro and Sala-i-Martin 1995).
6. A relatively new technique in the sociological repertoire, Qualitative Comparative Analysis (QCA), could be utilized to study comparative development. This methodology was pioneered by Charles Ragin (1987) as a way to meld the advantages of quantitative and qualitative comparative research. It uses a Boolean algebra approach to analyze similarities and differences on contextual and combinational variables drawn from qualitative descriptions of particular cases (see Drass and Ragin 1989, for computer package). While some studies of cross-national phenomena have already used QCA (Griffin, Botsko, Wahl and Issac 1991; Wickham-Crowley 1991), this methodology has great (but thus far untapped) potential to reveal general patterns of national and regional development while preserving the rich nuances of case studies (for a discussion in the context of development in Africa, see Bradshaw, Kaiser, and Ndegwa 1995).
7. This pattern is intriguingly parallel to Bornschier and Chase-Dunn's (1985) argument about the short-term positive effects of the "flow" of foreign investment, contrasted with the longer-term negative impact of the "stock" of foreign investment (see below).
8. Specifically, growth has been found to "Granger-cause" investment but not vice-versa, meaning roughly that growth is useful for statistical forecasting of investment, but investment is not useful for predicting growth.
9. Bornschier and Chase-Dunn (1985) suggest that stock and flow representations of foreign investment may be indicating long-term and short-term effects, respectively. They contend that, according to sociological research, foreign direct investment initially stimulates an economy by providing valuable capital but eventually distorts the economy and causes a reduction in growth in the long run. Because flow variables indicate the amount of investment taking place at a particular time, the use of these variables should yield a more short-run result. On the other hand, the use of stock variables, which indicate the foreign capital that has accumulated over many years, suggests more long-term implications. They predict, then, that the flow of foreign capital should indeed have a positive effect on growth because it

demonstrates a short-run phenomenon, and that the stock of capital should have a negative effect because it represents accumulated foreign control which leads to long-term distortions in the economy.

10. However, in some single-country studies (see Bradshaw 1993, and Bradshaw, Kim, and London 1993), high foreign investment is correlated with both increased manufacturing sector growth and high levels of income inequality. In these cases (Kenya and South Korea, respectively), the authors suggest that the states are experiencing not dependency per se, but dependent development, with the state intervening through, for example, high taxation rates on foreign capital and the promotion of foreign trade, to direct in some ways the growth process.
11. Interestingly, Firebaugh's analysis is similar to "growth accounting" in economics, where the growth of output is regressed on the growth of inputs.
12. Dixon and Boswell (1996a) also show that "negative externalities" of foreign capital penetration lead to higher income inequality and economic disarticulation.
13. This reversal of the sign of the association between income inequality and growth when their positions as dependent and independent variables are reversed (relative to the economists' studies cited above) could have many causes, including different temporal relationships and different control variables.

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APPENDIX A

Trade Variables (Sociology)

* value of foreign trade to GNP ratio; Delacroix and Ragin (1981)
* ratio of the value of primary product exports to total exports; Delacroix and Ragin (1981)
* ratio of value of five [three] most important export commodities to total exports; Delacroix and Ragin (1981); Ray and Webster (1978)
* average level of processing of top five export commodities; Jaffee (1985)
* average annual export price fluctuation; Jaffee (1985)
* index for extent to which country exports and imports processed goods as opposed to raw materials; Ray and Webster (1978)
* value of trade to the largest partner as a percentage of total trade; (Ray and Webster 1978)
* value of trade to the largest partner as a percentage of GNP; Ray and Webster (1978)
* dollar value of imports and exports; Snyder and Kick (1979)

Trade Variables (Economics)

* average ratio of imports of machinery and transport equipment to GDP; Blomström, Lipsey, and Zejan (1992)
* index of the distortion between domestic and international prices; Dollar (1990)
* Leamer's intervention index; Edwards (1989)
* discrepancies between observed trade and the predictions of the Heckscher-Ohlin model; Edwards(1989), Havrylyshyn (1985)
* export growth times the share of exports in GDP; Feder (1983)
* average tariff rates; Harrison (1996)
* percentage of imports covered by trade barriers; Harrison (1996)
* percentage of product categories that are subject to import licenses; Harrison (1996)
* relative price of a country's tradables to international prices, Harrison (1996)
* relative domestic price of investment goods to international prices, Harrison (1996)
* effective rate of protection in manufacturing; Harrison (1996)
* movement towards international prices; Harrison (1996)
* indirect bias against agriculture from industrial sector protection and overvaluation of the exchange rate; Harrison (1996)
* differences in the fraction (or differences in the growth rate of the fraction) of exports to GDP; Levine and Renelt (1991)
* ratio of exports or imports (trade) to GDP; Levine and Renelt (1991)
* measure of overall trade intervention; Levine and Renelt (1992)
* measure of overall trade openness; Levine and Renelt (1992)
* ratio of import taxes to imports; Levine and Renelt (1992)

* measure of openness based on import penetration; Levine and Renelt (1992)
* dummy for outward orientation based; Levine and Renelt (1992)
* ratio central government export tax revenue to exports; Levine and Renelt (1992)
* black market exchange rate premium; Levine and Renelt (1992)
* standard deviation in black market exchange rate premium; Levine and Renelt (1992)

APPENDIX B

Foreign and Domestic Investment Variables (Economics)

* growth rate of capital stock; Benhabib and Spiegel (1992)
* average ratio of fixed capital formation to GDP; Blomström, Lipsey, and Zejan (1992)
* ratio of the inflow of foreign direct investment to GDP; Blomström. Lipsey, and Zejan (1992)
* investment share of GDP; Levine and Renelt (1992)
* foreign aid; Levine and Renelt (1991)
* foreign investment; Levine and Renelt (1991)

Foreign and Domestic Investment Variables (Sociology)

* number of transnational subsidiaries in a country; Bornschier and Chase-Dunn (1985)
* amount of profits paid to foreign direct investment; Bornschier and Chase-Dunn (1985)
* ratio of total direct private foreign investment to GNP; Bradshaw (1985)
* "Debits on investment income" expressed in U.S. dollars. Chase-Dunn (1975)
* total amount of direct investment by OECD nations; Evans and Timberlake (1980)
* percentage increase in capital stock; Firebaugh (1992)
* continuous time annual rate of change in capital stock expressed as a percentage; Firebaugh (1992)
* Multinational Corporate Penetration (measured as the square root of the product of the ratios of the stock of capital from foreign direct investment to the total capital stock and the stock of capital from foreign direct investment to the total population); London (1988)
* gross domestic investment; London and Smith (1988)
* mean yearly percentage change in net direct investment; Rothgeb (1986)
* total stock of foreign investment in mining; Rothgeb (1986)
* total stock of foreign investment in manufacturing; Rothgeb (1986)
* proportion of total investment in mining from largest foreign source; Rothgeb (1986)
* proportion of total investment in manufacturing from largest foreign source; Rothgeb (1986)
* rate of physical capital formation; Wimberley (1990)

APPENDIX C

Education Variables (Sociology)

* primary school enrollment ratio as percentage of primary school age population; Weede (1983); London (1988)
* military participation ratio—military on duty per 1,000 working age population; Weede (1983); Weede and Tiefenback (1981)
* secondary school enrollment as percentage of secondary school age population or as percentage of total population; Wimberley (1990); Weede (1983); Stokes and Anderson (1990); Jaffee (1985); Nemeth and Smith (1985); Snyder and Kick (1979); Delacroix and Ragin (1981)

Education Variables (Economics)

* ratio of number of students enrolled in secondary education to the numbers in population in the appropriate age groups; Blomström, Lipsey, and Zejan (1992)
* the change (1960–85) in the labor force participation rate, the ratio of labor force to total population; Blomström, Lipsey, and Zejan (1992)
* initial secondary school enrollment rate; King and Levine (1992)
* literacy rate in 1960; Levine and Renelt (1992)
* average years of schooling of labor force 1980; Levine and Renelt (1991)
* weighted index for shares of relevant age groups enrolled in primary, lower secondary, higher secondary, and tertiary schools; Persson and Tabellini (1994)

APPENDIX D

Fiscal Variables (Economics)

* government expenditures on capital goods (or ratio to growth of . . .); Barro (1989, 1990, 1991) and Diamond (1989)
* government expenditures on education (or ratio to growth of . . .); Barro (1989, 1990, 1991) and Diamond (1989)
* government expenditures on defense; Barro (1989, 1990, 1991) and Diamond (1989)
* government consumption spending less defense and education payments; Barro (1989, 1990, 1991) and Diamond (1989).
* "marginal" income tax rate with respect to GDP; Easterly and Rebelo (1993)
* ratio of individual income taxes to personal income; Easterly and Rebelo (1993)
* ratio of domestic taxes to (consumption + investment); Easterly and Rebelo (1993)
* tax to GDP ratio ("average" tax); Koester and Kormendi (1989)
* average growth rate of the ratio of government consumption spending to GDP; Kormendi and McGuire (1985)
* growth of the share of government; Levine and Renelt (1992)
* government capital formation deflated with SH prices; Levine and Renelt (1992)
* ratio central government corporate income tax revenue to GDP; Levine and Renelt (1992)
* central government gross capital formation; Levine and Renelt (1992)
* ratio social security taxes to GDP; Levine and Renelt (1992)
* ratio central government deficit to GDP; Levine and Renelt (1992)

Fiscal Variables (Sociology)

* % of total central government revenue collected through direct taxation; Bradshaw (1985)
* % increase in total central government revenues; Bradshaw and Tshandu (1990)
* value of direct taxation per capita; Bradshaw and Tshandu 1990)
* % increase in total government consumption; Bradshaw and Tshandu (1990)
* ratio of total current central government revenue to GDP; Bradshaw and Wahl (1991)
* ratio of direct taxation to total current central government revenue Bradshaw and Wahl (1991)
* % of GNP accounted for by central government expenditures averaged over a 3 year period London and Williams (1990)