

Kenworthy, Lane

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An Equality-Growth Tradeoff?

Lane Kenworthy

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An Equality-Growth Tradeoff?

Lane Kenworthy

Department of Sociology
Emory University
Atlanta, GA 30322
USA
Tel: 404-727-7538
Fax: 404-727-7532
E-mail: lkenwor@emory.edu
Homepage: www.emory.edu/SOC/lkenworthy

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This paper was written while I was a visiting scholar at the Max Planck Institute for the Study of Societies, Cologne, Germany. It is forthcoming as a chapter in Lane Kenworthy, *Egalitarian Capitalism? Incomes, Jobs, and Equality in Affluence Countries*, New York: Russell Sage Foundation, 2004.

An Equality-Growth Tradeoff?

For a long time conventional wisdom held that income inequality enhances investment and work incentives and thereby is good for economic growth. In the 1990s this view was turned on its head, as a number of empirical analyses found an association between inequality and slower growth across large samples of mainly less-developed nations. Researchers also identified various causal paths through which inequality might reduce growth. Recently, several studies focusing on rich countries have discovered an apparent growth-enhancing effect of inequality, consistent with the older view. My examination of 15 affluent countries over the 1980s and 1990s suggests no general tendency for inequality to influence economic growth in either direction. The same is true for the U.S. states in these two decades. Post-World War II longitudinal trends in the United States also offer no indication that inequality has had an effect on growth.

There are two opposing views about the effect of income inequality on economic growth. One holds that inequality is beneficial for growth. Arthur Okun's 1975 book, *Equality and Efficiency: The Big Tradeoff*, offers the classic expression of this perspective. In Okun's words: "Any insistence on carving the pie into equal slices would shrink the size of the pie. That fact poses the tradeoff between economic equality and efficiency." He professes that "Equality in the distribution of incomes ... would be my ethical preference. Abstracting from the costs and consequences, I would prefer more equality of income to less...." But he concludes that given the existence of a tradeoff between equality and growth, society ought to forego reduction of inequality in favor of a healthy economy (Okun 1975, pp. 47-48).

The mechanisms underlying this presumed effect are relatively straightforward (Aghion, Caroli, and García-Peñalosa 1999, p. 1620; Arrow 1979; Browning and Johnson 1984; Kaldor 1956, 1957; Letwin 1983; Mirrlees 1971; Okun 1975; Stiglitz 1969; Welch 1999). Investment, work effort, and skills are key sources of growth. First, those with higher incomes tend to save a larger share of their income than do those with moderate or low incomes; by necessity, the latter tend to spend most of their income. The wealthy thus are the principal source of investment in a capitalist economy. Consequently, the smaller the income share of the rich — i.e., the less inequality — the less investment there will be. Second, compressed earnings distributions and/or high tax rates used to fund redistributive programs reduce the financial gain from hard work and skill development. This may cause people to reduce their work effort and investment in skills. And those with limited labor market prospects may be tempted to live off government benefits rather than work.

Few dispute that a perfectly equal distribution of income would indeed have deleterious economic consequences. Complete distributive equality would virtually eliminate monetary incentives, which surely would substantially reduce work effort and investment. Skeptics, however, have pointed out that there is reason to question these hypothesized processes at actually-existing levels of inequality (Alesina and Rodrik 1994; Bénabou 1996; Birdsall, Ross, and Sabot 1995; Bowles and Gintis 1995; Clarke 1995; Gomez and Meltz 2001; Kenworthy 1995, chap. 3; Osberg 1984, chap. 12; Perotti 1996; Persson and Tabellini 1994; Slemrod 2003; Thurow 1981).

First, the savings-investment channel presumes a closed economy. If capital is available from foreign sources, as is increasingly the case, investment is less dependent upon the domestic savings rate. In addition, since the wealthy tend to save a higher share of their income than do the poor, greater inequality may yield weaker consumer demand. Demand can be just as important as investment in sustaining economic growth. Moreover, low demand might in turn lead to less investment, rather than more, due to a lower profit rate and less capacity utilization.

Second, individuals' response to higher tax rates is theoretically ambiguous. Some may reduce their work effort and/or skill development because the payoff is low, whereas others may increase them because doing so is necessary to attain the desired income.

In addition, high levels of inequality might be viewed by those at the middle and bottom of the income distribution as excessively unfair, thereby reducing worker motivation and workplace cooperation. Equity theory in social psychology posits that workers who perceive themselves as unfairly paid lower their work effort (Adams 1965). Theoretical work by economists builds on this notion to suggest, for example, that "equality is desirable on efficiency grounds. The compression of wages suppresses unwanted uncooperative behavior" (Lazear 1989, p. 563; see also Akerlof and Yellen 1990; Levine 1991; Schmid 1993; Solow 1990). A variety of empirical studies have found that when workers perceive their pay as unfair relative to others, they tend to resent it and may reduce their work effort and/or cooperation (see Akerlof and Yellen 1990; Cook and Hegtveldt 1983). Similarly, experiments indicate that people tend to care about being treated fairly and are willing to resist perceived unfairness even if doing so is costly to them (Kahneman, Knetsch, and Thaler 1991). Of course, fairness norms vary somewhat across countries (Kelly and Evans 1993). A particular degree of income inequality may be viewed as less objectionable by workers in the United States than by their counterparts in Sweden. But if norms regarding fair income distribution differ less across countries than do actual levels of inequality, which seems quite possible, then differing levels of inequality could result in differing degrees of work effort and workplace cooperation.

Third, higher levels of inequality may increase the share of the population that finds it difficult to invest in college education. This is particularly likely to be true in the United States. Even with substantial funds available for financial aid, many students from lower-income households are forced to pay a relatively large amount to

attend college. A recent study by the U.S. Census Bureau (2002, table 6a) found that among students from families with incomes below \$25,000, the average yearly cost of attending college as of 1996 was \$6,000. The average amount covered by financial aid was \$3,000, leaving the remaining \$3,000 to be paid by the student or her/his parents. Thomas Kane (2001) reports that in 1980, 55% of children from families in the top income quartile attended a four-year college, compared to 29% of those from families in the bottom quartile. By 1992, as income inequality increased, the difference had widened to 66% versus 28%. These quartile differences are smaller but still sizeable when parents' education and student test scores and high school rank are controlled for (Kane 2001).

Several additional reasons have been suggested for why inequality might be bad for growth. Fourth, the financial constraints and frustration generated by high levels of inequality may reduce trust, cooperation, civic engagement, and other growth-enhancing forms of social capital. Similarly, it may spur a greater amount of crime, leading to heightened expenditure on nonproductive "guard labor."

Fifth, higher levels of market inequality may generate popular demand for increased government spending, particularly on transfers, which might reduce growth. This does not appear to apply to affluent nations, however. In such nations, higher levels of market inequality are not associated with higher levels of government transfers. Instead, more unequal countries tend to have less generous welfare states; for the mid-1990s pretax-pretransfer income inequality and government transfers as a share of GDP correlate at -0.51 across the 15 affluent countries for which data are available.

Sixth, income polarization may foster extralegal demands for economic and/or political reform. Rebellions, revolutions, and other forms of violent collective action diminish political stability, which may adversely affect growth. However, this causal channel too seems unlikely to apply to affluent countries. Political stability in rich nations has not in recent decades been disrupted by violent collective action stemming from excessive inequality.

In the 1990s the then-conventional Okun view was called into question on empirical grounds, as a slew of analyses discovered that countries with more inequality tend to have slower rates of economic growth (e.g., Birdsall, Ross, and Sabot 1995; Clarke 1995; Perotti 1996; Persson and Tabellini 1994). However, less-developed countries account for the bulk of the cases in all of these studies. The findings may therefore offer little insight into processes in affluent economies.

Interestingly, several recent studies of rich countries have found evidence for a growth-enhancing effect of inequality (Barro 2000; Brandolini and Rossi 1998; Forbes 2000). Is the Okun view correct, then? Is income inequality beneficial for economic growth once nations reach a certain level of affluence?

This paper offers a reassessment of this issue. Theoretical expectations are indeterminate, so the question can only be answered empirically. I conduct three sets of analyses. I begin by examining the effect of inequality on growth across 15 rich

countries in the 1980s and 1990s. I then conduct a similar analysis for the U.S. states. Finally, I explore longitudinal trends in the United States since World War II. In each case I examine both the aggregate relationship between inequality and growth and the hypothesized causal mechanisms.

Four of the six mechanisms through which inequality is hypothesized to reduce growth may apply with greater force to poverty. If a large share of the population has very low incomes, this may be particularly likely to undercut consumer demand, reduce motivation to work, limit opportunities for education, and breed frustration and social disharmony. In the final section of the paper I therefore reexamine the cross-country, cross-state, and over-time U.S. analyses to see if a focus on poverty rather than inequality alters the findings.

Research on inequality's effect on growth has implicitly presumed that growth of economic output is of considerable importance for societal well-being. Yet a reasonable argument can be made that growth of *incomes* — as indicated by the median income, or the income level at lower points in the distribution — is a much more relevant concern. While I am quite sympathetic to this view, the level of economic output does establish the upper limits for incomes. It is therefore likely to have considerable bearing on real income levels. Indeed, among the affluent countries I examine here there is a very strong association between mid-1990s levels of gross domestic product (GDP) per capita and median posttax-posttransfer household income (adjusted for household size): $r = .89$. I therefore bracket this issue and follow the lead of prior researchers who have focused on growth of output as the outcome of interest.

Cross-Country Patterns

Findings suggesting that less egalitarian countries grow more rapidly are consistent with the tenor of much recent commentary about the European and U.S. economic "models." During the 1990s concern grew among researchers, policy makers, and citizens about the seemingly excessive generosity of European welfare states and the apparent rigidities of European labor markets (see Esping-Andersen and Regini 2001; Pierson 2000). The less regulated and less egalitarian U.S. economy was increasingly viewed as better-suited to achievement of rapid economic growth.

In this section I examine the effect of income inequality on growth across 15 rich OECD countries in the 1980s and 1990s. I use the Luxembourg Income Study (LIS) database as the source of data on income inequality. The three recent studies that find a growth-enhancing effect of inequality in affluent countries rely on data from the Deininger and Squire (1996, n.d.) data set, which includes more observations but at the expense of cross-country comparability (Atkinson and Brandolini 2001). The LIS database includes data for years prior to the 1980s for only a few countries. Thus, my analysis is confined to the period 1980-2000. I include 15 nations for which LIS

income inequality data are available circa 1980: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom, and the United States. I use the Gini coefficient for posttax-posttransfer income to measure inequality. Gini coefficients range from 0 to 1, with larger numbers indicating greater inequality. Economic growth is measured as the average annual rate of change in real gross domestic product (GDP) per capita. Definitions and data sources for all variables are listed in the Appendix.

My approach to analyzing the effect of income inequality on growth is similar in a number of respects to that of Robert Barro (2000) and many of the other recent growth analyses by economists. First, whatever impact income inequality may have on economic growth, it is almost certain to be primarily a long-run effect rather than a short-run one. The hypothesized causal mechanisms described earlier likely take a while to play out. For instance, suppose a lower level of inequality boosts educational attainment. This may lead to faster growth, but only after at least a decade or more. Two of the recent cross-national studies that find a positive effect of inequality on growth analyze relatively short-run effects: Brandolini and Rossi (1998) find such an effect using annual data, and Forbes (2000) does so using five-year periods. These time periods are so short as to cast doubt on the plausibility of the apparent relationship. When Forbes extends her analysis to 10-year periods, the inequality variable is no longer statistically significant. I examine the effect of inequality on growth over a 20-year period covering the 1980s and 1990s.

Second, most of the variation in income inequality is across countries rather than over time. The coefficient of variation for Ginis across the 15 countries circa 1980 is .14, while the average coefficient of variation for Ginis within each country during the 1980s and 1990s is only .05. Thus, analyses with a cross-sectional focus are more likely to yield informative estimates of causal effects than are analyses with a longitudinal emphasis (Jackman 1985, pp. 173ff.). In addition, cross-sectional analyses are appropriate for analyzing long-run effects (Firebaugh and Beck 1994, p. 636).

Third, the specified relationship is between levels of inequality and growth of real output per capita. Reverse causality (simultaneity) is a potential concern, as a variety of studies in the Kuznets (1955) tradition suggest a possible effect of economic growth on the level of inequality (e.g., Alderson and Nielsen 2001; Barro 2000). To reduce the likelihood of simultaneity bias, I measure inequality at the beginning of the period being analyzed, around 1980. This would be problematic if inequality changed a substantial amount over time and there was significant cross-country variation in the degree of change. Although there was indeed an increase in inequality in many of these nations, this did not alter the cross-country variation in levels very much. The correlation across the 15 countries between posttax-posttransfer income inequality circa 1980 and circa 1995 is .85.¹

¹ For five countries the earliest available observation is in the mid-1980s: Austria 1987, Belgium 1985, Denmark 1987, Finland 1987, Italy 1986. Given the stability of cross-country differences

Fourth, when comparing growth performance it is critical to take into account each country's initial level of per capita GDP. Among the affluent OECD nations there has been a strong "catch-up" process operating since World War II, whereby poorer nations grow faster than richer ones because the former are able to benefit from technological developments and larger markets in the latter (Baumol, Nelson, and Wolff 1994; Hicks and Kenworthy 1998). In a regression of 1980-2000 growth rates on 1979 levels of per capita GDP, the initial per capita GDP variable has a standardized coefficient of $-.56$ and an absolute t -statistic larger than 2.00 . I use the residuals from this regression as the dependent variable in the analyses here. They represent growth rates adjusted for catch-up effects.

Figure 4.1. Catchup-Adjusted Economic Growth 1980-2000 by Income Inequality circa 1980, 15 Countries

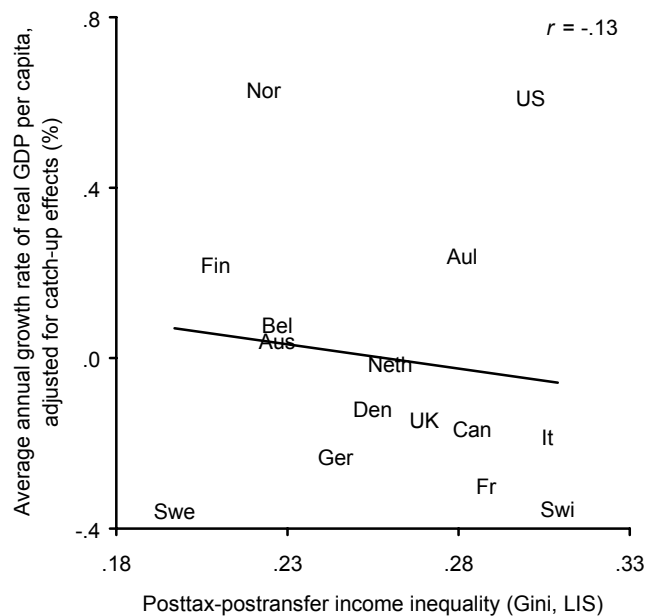


Figure 4.1 plots 1980-2000 catchup-adjusted growth rates by 1980 levels of income inequality. The pattern suggests a possible negative effect of inequality on growth, but it is a very weak effect at best. The most heavily populated portion of the chart is the lower-right corner, which corresponds to higher inequality and lower growth. But to the extent there is a pattern of inverse association between the two variables, it is substantially weakened by the strong growth performance of the high-inequality United States and the poor growth performance of low-inequality Sweden.

over time, this too does not seem likely to be unduly problematic.

What happens when we turn to multivariate analysis? I include a variety of variables that have been found relevant in prior cross-country growth studies (Barro 2000; Garrett 1998, chap. 5; Gemmell 1996; Hall and Gingerich 2001; Hicks and Kenworthy 1998; Levine and Renelt 1992; Olson 1982; Sala-i-Martin 1997). These variables, with expected direction of effect in parentheses, are: non-working-age (under 15 or over 64) share of the population (–); real long-term interest rates (–); government tax revenues as a share of GDP (–); left government (+); inflation (–); trade (\pm); terms of trade, measured as the ratio of export prices to import prices (+); union concentration (+); institutional coherence (+); firm-level economic cooperation (+). Several other potential controls — change in terms of trade, unionization, change in unionization, and business concentration — are not included because they are too highly correlated with income inequality ($r > \pm.65$). Four additional variables are added separately because they represent possible channels through which inequality may affect growth: investment as a share of GDP (+); labor force participation as a share of the working-age population (+); educational attainment, measured as the share of persons age 25 to 64 with a tertiary education (+); social capital, measured using survey data on the degree of trust (+). All of the control variables are measured as stocks (levels), using a period average. For those for which there is a theoretical rationale and available data, I also include a flow (change) measure.

Table 4.1 shows the regression results. Economic growth adjusted for catch-up effects is the dependent variable. Due to the small number of cases (15) relative to the number of explanatory factors, I estimate a series of regressions that include all possible combinations of three or fewer of the independent variables (for discussion see Kenworthy 2004, chap. 2). The table shows the minimum, median, and maximum standardized coefficients for the inequality variable and for the control variables that are consistently signed and have t -ratios larger than 1.00 (in absolute value) in at least half of the regressions in which they are included. I then estimate models that include various combinations of the surviving variables and report the models that explain the largest share of the cross-country variation in economic growth.

The inequality coefficient is negatively signed in almost all of the regressions, suggesting an adverse effect on growth. And in the best overall and three-variable regressions (fourth and fifth columns), the standardized coefficient is fairly large. In many of the models, however, the t -statistic for the inequality coefficient is smaller than 1.00, which suggests a great deal of variability in the estimated effect. More important, the consistent negative signs for the inequality coefficients are sensitive to the inclusion/exclusion of Norway. Norway had one of the lowest levels of inequality among the 15 countries along with one of the fastest catchup-adjusted growth rates. But Norway's strong growth performance arguably was much more a product of its oil resources than of its low inequality. When Norway is omitted from the regressions, the sign for the inequality coefficient turns positive in some of the specifica-

tions and its t -statistic is always very small. This suggests that inequality probably had no effect on the cross-country variation in growth in the 1980s and 1990s.

Table 4.1. Regression Results: Effect of Income Inequality and Other Variables on Catchup-Adjusted Economic Growth, 1980-2000, 15 Countries

	All possible models of ≤ 3 variables			Best models	
	Minimum	Median	Maximum	1	2
Income inequality (posttax-posttransfer), circa 1980	-.57 (1.84)	-.22 (.78)	.01 (.11)	-.44 (2.14)	-.47 (2.30)
Other variables					
Government tax revenues	-.71 (2.30)	-.67 (2.25)	-.39 (1.44)	-.38 (1.58)	-.39 (1.79)
Terms of trade	.17 (.65)	.52 (1.95)	.59 (2.24)	.13 (.56)	
Educational attainment	.55 (2.46)	.68 (3.00)	.70 (3.08)	.48 (1.67)	.55 (2.44)
Inequality coefficient when investment is added	-.50 (1.56)	-.13 (.51)	.03 (.10)		
Inequality coefficient when Δ investment is added	-.43 (1.43)	-.07 (.25)	.05 (.15)		
Inequality coefficient when labor force participation is added	-.56 (1.73)	-.14 (.41)	-.04 (.14)		
Inequality coefficient when Δ labor force participation is added	-.58 (1.73)	-.30 (.99)	-.17 (.67)		
Inequality coefficient when educational attainment is added	-.47 (2.30)	-.24 (.98)	-.16 (.65)		
Inequality coefficient when social capital is added	-.39 (1.21)	-.01 (.04)	.05 (.19)		

Note: Standardized coefficients, with absolute t -ratios (based on heteroskedasticity-robust standard errors) in parentheses. OLS regressions. Results in "all possible models" columns are from regressions using all possible combinations of three or fewer of the independent variables (298 regressions). Variables included in the regressions but not reported here due to inconsistent signs and lack of absolute t -ratios greater than 1.00 in at least half of the regressions are: non-working-age share of the population, Δ non-working-age share of the population, real long-term interest rates, left government, inflation, trade, Δ trade, union concentration, institutional coherence, firm-level economic cooperation. "Best models" regressions are those with the largest adjusted R^2 . The results in the lower portion of the table are from regressions with income inequality, the variable listed for the particular row of the table (e.g., investment), and each of the other 12 control variables (12 regressions). Aside from income inequality, all levels variables are measured as period averages. Change (Δ) variables are measured as the average annual rate of change. Minimum and maximum R^2 : .02, .55. $N = 15$.

These analyses are vulnerable to country fixed effects bias. That is, there may be unmeasured country-specific features, such as culture, which are correlated with the level of income inequality and which have an impact on growth. The coefficient for the inequality variable could be picking up what actually are the effects of some such

features. However, it is difficult to say which direction such bias might work in. If the unmeasured traits of low-inequality countries such as Sweden and Finland are good for growth whereas those of high-inequality countries such as the United States and Switzerland are good for growth, then the inequality coefficient is biased in favor of finding a negative effect of inequality on growth. If the reverse is true, then the inequality coefficient is biased in favor of finding a positive effect of inequality on growth. I do not think there are strong a priori reasons to favor one or the other of these two possibilities. I therefore suspect that any bias resulting from unmeasured country-specific traits is likely to be relatively small.

The results shown in the lower portion of the table test the purported causal channels through which inequality might affect growth. (Data on tertiary education are not available over a long enough period of time to create a measure of change in educational attainment. The same is true for social capital.) If an effect on growth were found, adding a variable that represents a true causal channel should reduce the size of the coefficient for the inequality variable. However, because there is no robust impact of inequality in the regressions reported in the top portion of the table, these tests are superfluous. As it turns out, the coefficient for the inequality variable is not affected at all by the addition of investment, labor force participation, or social capital. Nor are these variables themselves related to growth. Educational attainment, by contrast, appears to have a strong positive association with growth. However, it is only weakly correlated with inequality and in the "wrong" direction ($r = .18$). Moreover, when educational attainment is added to the regression, the coefficient for the inequality variable gets larger — the opposite of what we would expect if educational attainment were a mechanism through which inequality reduced growth. The lack of evidence for a causal mechanism reinforces the conclusion that inequality had no effect on economic growth across the 15 countries.

On the other hand, one of the variables that *is* consistently related to growth performance in these regressions is government tax revenues. This variable is negatively signed, suggesting that a larger tax share reduces economic growth. And the standardized coefficients are relatively large. Since high tax levels are a prerequisite for extensive redistribution, which is one of the principal means of achieving low inequality, perhaps this provides indirect evidence of a growth-enhancing effect of inequality. In other words, perhaps low inequality itself did not impede growth, but the chief strategy for generating low inequality did. This, however, turns out not to be the case. The strong growth-reducing results for the tax revenues variable are a function of two things: (1) multicollinearity, as it is relatively closely correlated with income inequality ($r = -.59$); (2) the influence of the United States. When the inequality variable is dropped from the regressions, the tax revenues variable sometimes turns positive and has consistently small *t*-statistics. The same is true if the United States, whose growth performance was on par with Norway's, is omitted. Did the United States have strong growth performance *because* of its low taxes? Possibly, but the U.S. also had comparatively low taxes in the several decades preceding the

1980s and 1990s, and its growth performance then was among the weakest in this group of countries (Kenworthy 1995, chap. 4).

Cross-State Patterns

One of the recent studies reporting a positive effect of inequality on growth in affluent countries, by Brandolini and Rossi (1998), found this effect to exist only among the Anglo nations. This suggests that it may be worthwhile to examine the relationship in this more limited subset of countries. It seems plausible to suspect that, if inequality does have a growth-enhancing effect, the effect is most likely to hold in countries with more individualistic cultures. The problem, for purposes of analysis, is that there are only a few Anglo countries. Brandolini and Rossi deal with this limitation by conducting a pooled time-series analysis with annual observations. As suggested earlier, this is far too short a period for an informative exploration of inequality's effect on growth.

A useful way to get around the problem of too few Anglo nations is to examine the U.S. states. Of course, the states differ notably from affluent countries in that state boundaries are highly porous with regard to the movement of capital, labor, and technology. Shifts of plants across state borders were already common by the late 1800s, when textile mills began moving from New England to the South. Financing can easily be obtained from outside state borders. Labor mobility across states is sufficiently unimpeded that the country's labor market was characterized as truly "national" in scope by the 1960s (Wright 1987). And there are no major barriers to the flow of technology between states. This degree of economic integration calls into question the relevance of state-level features as determinants of state growth rates. National boundaries, although they have been eroded somewhat by globalization over the past two decades, remain less porous in this respect (Helliwell 1998).

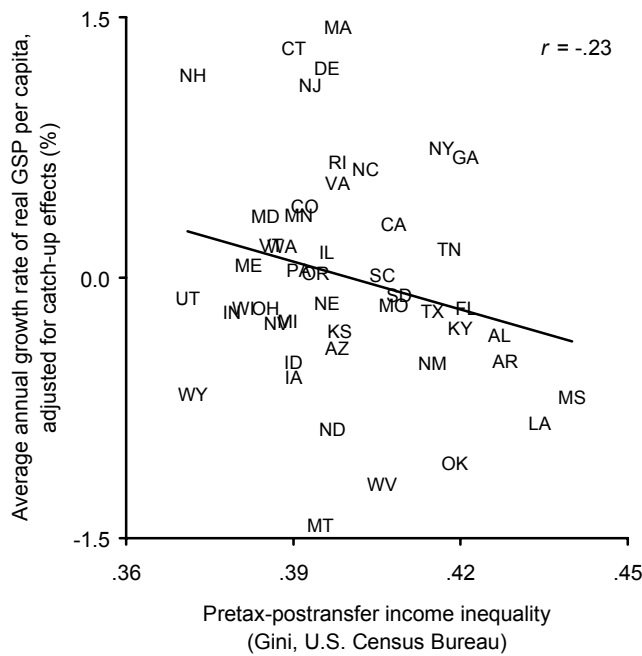
However, despite the potential for such integration to eliminate state differences in economic conditions and thus in performance outcomes, the states do differ a great deal in their economic structures, policy choices, and performance patterns (Kenworthy 1999). Most relevant for my purposes here, the states continue to vary considerably in their rates of economic growth, and prior studies have found a statistically and substantively significant impact of state-level factors on that variation (e.g., Brace 1993; Gray and Lowery 1988). The states thus seem a suitable unit of analysis for assessing the growth effects of factors such as income inequality.

For consistency with the country-level analysis, I again focus on the 1980s and 1990s. Like most state-level analyses of economic performance, I exclude Alaska and Hawaii. Growth is measured as the average annual rate of change in real gross state product (GSP) per capita. Here too I adjust the growth rates for catch-up effects. A regression of 1980-2000 growth on 1979 levels of real per capita GSP yields a standardized coefficient of $-.38$ with a t -statistic larger than 2.00. I use the residuals

from this regression as the dependent variable in the analyses. I utilize income inequality data for 1979 from the U.S. Census Bureau. Unlike the LIS data, those available from the Census Bureau do not include capital gains, taxes, or the value of non-cash transfers such as food stamps. A Gini coefficient for each state can be calculated from the LIS data, but there is no state identifier in the 1979 LIS U.S. data set. The earliest LIS year for which state Ginis can be tabulated is 1986. These Ginis for post-tax-posttransfer income correlate at .65 with the 1979 Census Bureau Ginis. Because this correlation is only moderately strong, I tried substituting the LIS data in the analyses. Doing so did not substantively alter the results.

Figure 4.2 plots catchup-adjusted growth over 1980-2000 by 1979 levels of income inequality. The pattern is similar to that for affluent countries (Figure 4.1). It suggests a possible growth-reducing effect of inequality, but again the effect is at best a relatively weak one.

Figure 4.2. Catchup-Adjusted Economic Growth 1980-2000 by Income Inequality circa 1980, U.S. States



As with the cross-country analyses, the next step is to introduce a set of control variables likely to be related to both inequality and growth, to see if they alter the estimate of inequality's effect. Inflation, trade, and terms of trade cannot be included because no state-level data exist for these variables. I include the following variables that were used in the cross-country analyses: non-working-age share of the population (-); government tax revenues as a share of GSP (-); left government, measured

as the proportion of the period in which the Democratic party controlled both houses of the state legislature and the governorship simultaneously (+); unionization (-); union concentration (+); business concentration (+). I also include several additional variables. One is a dummy for "sunbelt" states (+), since firms and workers may have a greater proclivity to start up in or move to warmer climates. The second is a measure of economic development policies (sometimes called "industrial policies") such as technology transfer, support for research and development or for employee training, facilitation of cooperation among firms, export assistance, and the like (+). The third is federal military contracts and payroll expenditures as a share of GSP (+); these are allocated variably across the states and may help to boost growth. Once again some of the control variables are measured only as stocks, using a period average, while others are measured as both stocks and flows.

To test the causal mechanisms I again include variables representing the labor force participation rate (+), educational attainment (+), and social capital (+). Educational attainment is measured here as the share of persons age 25 and over with a four-year college degree. Social capital is measured with an index based on 14 indicators such as trust, participation in groups and community activities, and voter participation, among others. There are no state-level investment data. The savings-investment channel is unlikely to hold in the state context in any case; investment flows so freely across state borders that the savings rate within a particular state is not likely to have a strong impact on investment within that state. The same is true for the consumption-investment channel; when a reasonably large share of the goods and services produced in a state are sold outside the state, as is certainly the case in the contemporary American economy, there is little reason to suspect that the level of investment within a state is determined to any noteworthy degree by consumption within that state.

Table 4.2 reports the regression results. With a state-level analysis the number of cases increases to 48, so it is possible to follow the more traditional procedure of starting with a large number of independent variables and removing those that are statistically irrelevant. I began with a regression that included inequality and all of the control variables. Stepwise deletion of variables with the smallest absolute t -value resulted in the equation reported in column 1. In these regressions and a variety of others that include various combinations of the controls, the income inequality coefficient always has a negative sign and has reasonably large t -statistics, suggesting an adverse impact on growth. This result is not fully robust, however. Utah (UT) is among the states with the lowest levels of inequality. If it is removed, the inequality coefficient drops to just -.08 and the t -statistic falls to .63 (in absolute value). Still, the coefficient does remain negatively signed, suggesting a possible negative impact — albeit a very weak one.

As with the cross-country analysis, it is possible that these findings are biased by unmeasured state-specific characteristics. Here too, though, it is not clear in which direction such a bias might work.

Table 4.2. Regression Results: Effect of Income Inequality and Other Variables on Catchup-Adjusted Economic Growth, 1980-2000, U.S. States

	1	2	3	4	5	6
Income inequality (pretax- (posttransfer), 1979)	-.18 (1.56)	-.04 (.26)	-.17 (1.39)	-.03 (.20)	-.22 (1.85)	-.21 (1.37)
Other variables						
Non-working-age population	-.45 (3.65)	-.45 (3.65)	-.51 (3.28)	-.38 (3.12)	-.47 (3.81)	-.43 (2.87)
Government tax revenues	-.18 (1.55)	-.12 (1.01)	-.17 (1.46)	-.12 (1.04)	-.14 (1.22)	-.18 (1.55)
Business concentration	.14 (1.41)	.09 (.79)	.13 (1.16)	.05 (.42)	.13 (1.21)	.15 (1.20)
Economic development policies	.14 (1.85)	.24 (2.03)	.19 (1.54)	.12 (1.04)	.15 (1.16)	.23 (1.81)
Military expenditures by the federal government	.19 (1.61)	.18 (1.51)	.18 (1.46)	.05 (.36)	.18 (1.56)	.19 (1.60)
Labor force participation		.21 (1.20)				
Δ Labor force participation			.08 (.61)			
Educational attainment				.37 (2.36)		
Δ Educational attainment					.18 (1.51)	
Social capital						-.04 (.23)
R^2	.50	.51	.50	.56	.52	.50

Note: Standardized coefficients, with absolute t -ratios (based on heteroskedasticity-robust standard errors) in parentheses. Other independent variables were included but were inconsistently signed and had absolute t -ratios smaller than 1.00 in more than half of the regressions: Δ non-working-age population, left government, unionization, Δ unionization, union concentration, sunbelt, Δ military expenditures. Aside from income inequality, all levels variables are measured as period averages. Change (Δ) variables are measured as the average annual rate of change. $N = 48$.

Income inequality is inversely correlated with levels of labor force participation, educational attainment, and social capital ($r = -.66, -.39, -.55$), which is consistent with the hypothesis of a negative effect of inequality on growth. Columns 2, 4, and 6 of the table show the results when each of these variables, respectively, is added to the regression. Adding the social capital variable has only a minor impact on the inequality coefficient, but the addition of labor force participation and educational attainment causes the coefficient to drop to almost zero. The labor force participation variable itself is positively signed, but it is fairly small, both in absolute size and in relation to its standard error. Nor does it improve when other combinations of the

control variables are tried. Educational attainment, by contrast, is strongly related to growth, and this relationship holds up in a variety of alternative model specifications. This suggests that inequality may have contributed to slower growth across the U.S. states by reducing college-level educational attainment.

Perhaps, however, the apparent link between college completion and growth in the U.S. states merely reflects the fact that the best-educated migrate to where the economy is growing most quickly. There very likely is some of that going on. Yet cross-state differences in levels of educational attainment have been relatively stable over time. The correlation between college completion in 1980 and in 2000 is fairly strong ($r = .81$). And the regression results for the educational attainment variable are only slightly weaker if I use a 1980 measure of college completion rather than a 1980-2000 period average. This suggests that reverse causality — growth attracting larger numbers of college graduates, rather than college graduates contributing to growth — was not the main process at work. Furthermore, the association between college completion and growth is consistent with that found in the cross-country analysis, where migration of the college-educated is unlikely to have played a role.

That the distribution of income might affect college-level educational attainment is certainly plausible, for the reasons outlined at the beginning of this paper. Yet there is reason to question the apparent link between income inequality and differences in college-level educational attainment across the states. As just noted, state differences in the share of those age 25 and over with a college degree have been fairly stable over time. If inequality had a dampening effect on college completion during the 1980-2000 period, then that effect should be apparent when the initial level of college educational attainment is controlled for. In other words, there should be a negative correlation between 1979 levels of income inequality and 1980-2000 *change* in the share of persons age 25 and over that have a college degree. But that is not the case. Instead, the correlation is positive (though fairly weak): $r = .21$.

Thus, the ostensible link between inequality and college-level educational attainment, and hence with growth, is likely spurious. In other words, lower inequality is associated with faster growth, but that is because lower inequality is associated with a larger share of college graduates, and it is the latter that has the true causal effect. Since inequality does not seem to have impeded college completion in the 1980s and 1990s (see also Mayer 2001), the most reasonable conclusion is that inequality's apparent effect on growth is not genuine.

Even if the link *is* genuine, it is not particularly strong. The unstandardized coefficient for the inequality variable in the regression reported in column 1 of Table 4.2 is -7.07. This suggests that, on average, a difference between two states of one standard deviation (.0165) in income inequality was associated with a difference in annual (catchup-adjusted) growth rate of real per capita GSP of about one-tenth of a percentage point. Sustained over a very long period of time, that could amount to a sizeable effect. But for a period of 20 years, it is a relatively small one.

The finding for the American states in the 1980s and 1990s is thus similar to that for affluent countries: inequality likely had little or no impact on economic growth.

The U.S. Case

Another way to explore the effect of inequality on growth is to examine longitudinal trends within countries. Because any such effect presumably is a relatively long-term one, it is best to have data stretching over a lengthy period of time. We also need a country in which there has been a nontrivial amount of variation in inequality over time. The United States is a good candidate on both counts, as data are available for many of the relevant variables for the whole of the post-World War II period and the level of income inequality changed markedly during a portion of this period.

Here again I use income inequality data from the U.S. Census Bureau. In addition to the limitations noted earlier, these historical data are potentially problematic in that they do not encompass single-person households; they are available only for "families," which are defined as households that include at least two related persons. How misleading a picture might we get from these data? Probably not very misleading, since the focus here is on the trend over time rather than the level of inequality at a particular point in time. For the seven years for which LIS data are available for the United States — 1974, 1979, 1986, 1991, 1994, 1997, and 2000 — the correlation between the Census Gini for pretax-posttransfer family income and the LIS Gini for posttax-posttransfer household income is .95. An additional measure of inequality is the income share of the top 10%. These data have been compiled by Picketty and Saez (2001) based on tax return records. They include capital gains and corporate income and employer payroll taxes, but not individual income and employee payroll taxes.

Figure 4.3 shows the over-time trends in income inequality in the United States. Both measures reveal a slight decline from the end of World War II through the early 1970s, followed by a fairly sharp rise beginning in the late 1970s/early 1980s. If inequality is good for growth, then savings, investment, work effort, and/or educational attainment should have declined a bit between the late 1940s and the late 1970s and then risen sharply beginning sometime around the early- to mid-1980s. If inequality is bad for growth, the trends for these indicators should have been in the opposite direction. The trend for economic growth, in turn, is expected to be a function of these trends.

Figure 4.4 shows the trends for savings (personal savings as a share of personal disposable income) and investment (net private fixed investment as a share of GDP). Because the values fluctuate so much from year to year, the chart includes trend lines that represent 5-year moving averages. For savings, the pattern favors the notion that inequality is bad for growth. Savings increased up to the mid-1970s and then dropped sharply beginning in the mid-1980s. By the end of the 1990s, it had fallen to a quar-

ter of its 1973 level. Yet to my knowledge there is no theoretical rationale for why an increase in income inequality would cause a decline in savings. For investment the pattern is very similar, except that, after falling throughout the 1980s, investment began to rise again in the 1990s. I return to this below.

Figure 4.3. Income Inequality in the United States, 1947ff.

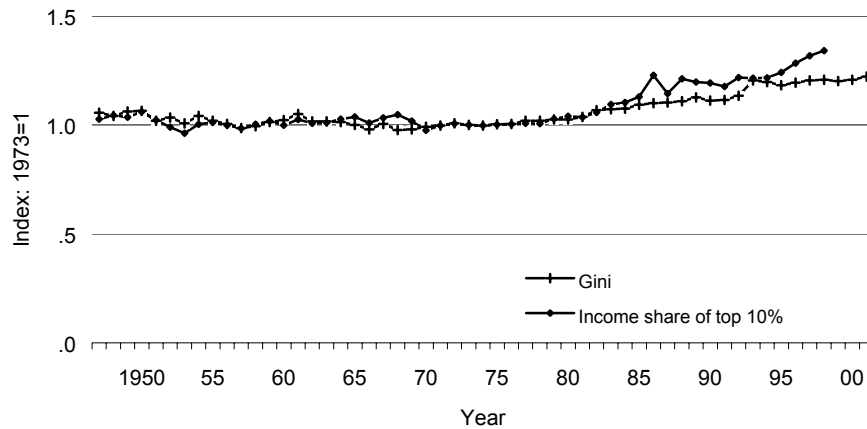
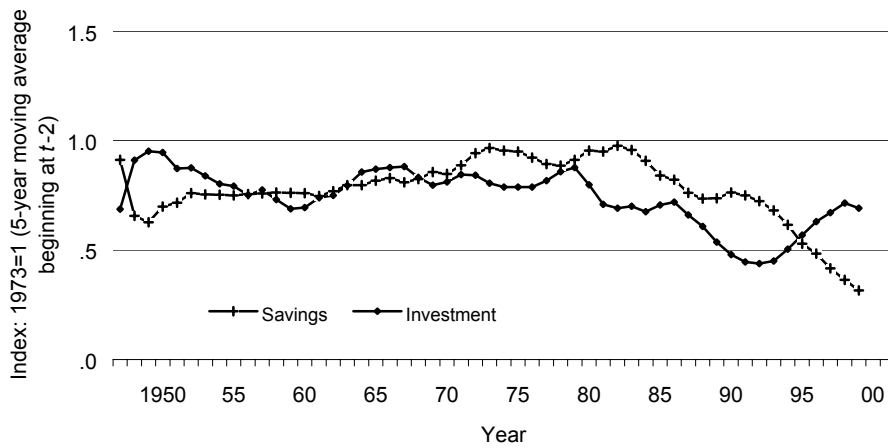


Figure 4.4. Savings and Investment in the United States, 1947ff.



As indicators of work effort I include the rate of labor force participation and the level of productivity (real GDP per hour worked). The trends are shown in Figure 4.5. The labor force participation rate has increased steadily since the early 1960s, and productivity did so throughout most of this period. Neither indicator of work effort appears to have been responsive to trends in income inequality.

Figure 4.6 shows the trend in the share of persons age 25 and over with a four-year college degree. There is no indication that developments in income inequality had any impact, as the trend moved steadily upward during the periods of both falling and rising inequality. There was a slight acceleration in the rate of increase in the early 1970s, but this appears to have been due to the massive expansion in the supply of college slots in the mid-to-late 1960s coupled with Vietnam War deferments, rather than to any effect of income inequality (Kane 2001).

Figure 4.5. Work Effort in the United States, 1947ff.

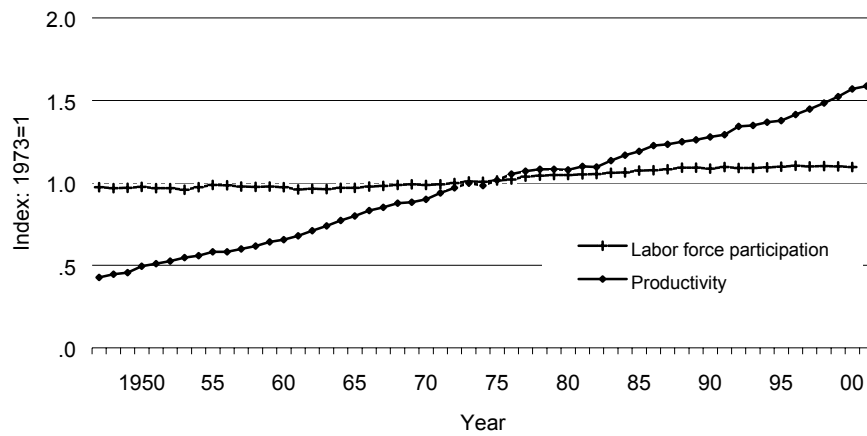
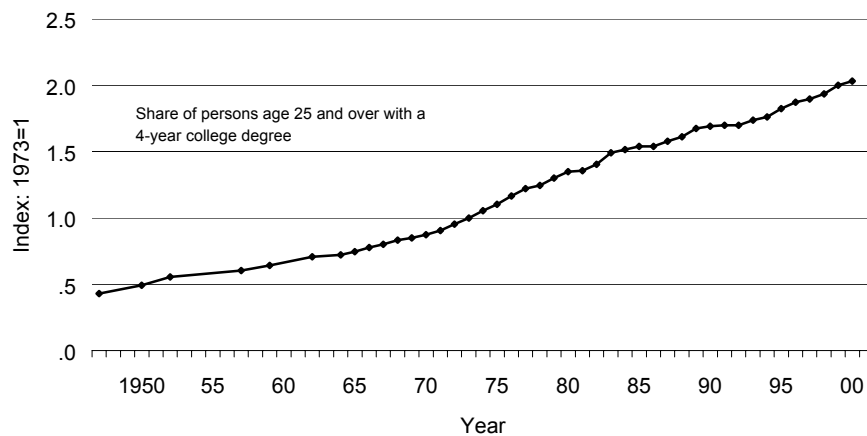


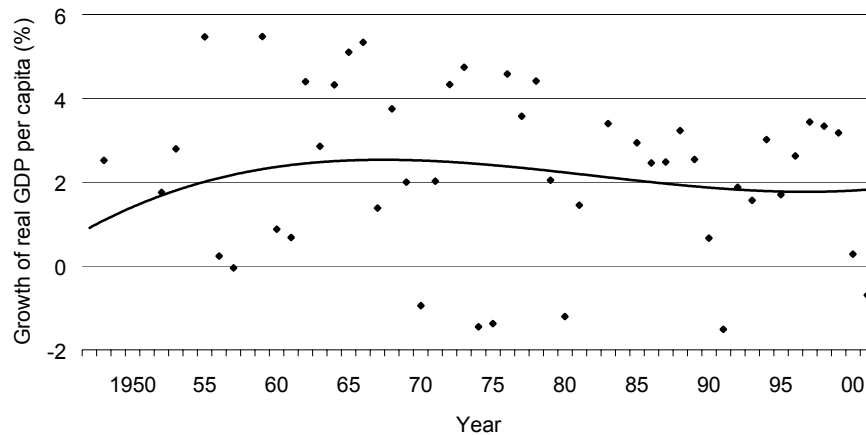
Figure 4.6. Educational Attainment in the United States, 1947ff.



Lastly, Figure 4.7 shows the postwar trends for economic growth. I include a trend curve to summarize the general pattern. There is little indication of an effect of

inequality on growth in either direction. Indeed, the year-to-year correlation between income inequality (Gini coefficient, as shown in Figure 4.3) and economic growth over the period 1947-2000 is just $-.01$. Lagging the inequality variable up to 10 years or using an average for earlier years yields correlations no larger than $-.12$. The growth rate increased in the period from the mid-1950s to the mid-1960s, which could conceivably have been affected by the declining level of inequality during the preceding two decades. But that decline in inequality was so minimal that it seems extremely unlikely to have had an impact. After the mid-to-late 1960s the average rate of growth was a bit lower. Inequality was higher during much of this period (Figure 4.3), but the downturn in growth preceded the rise in inequality by nearly a decade. This suggests reason for skepticism that the substantial rise in inequality since the mid-1970s had any appreciable effect on the rate of growth (see also Burtless 2001; Burtless and Jencks 2003).

Figure 4.7. Economic Growth in the United States, 1947ff.

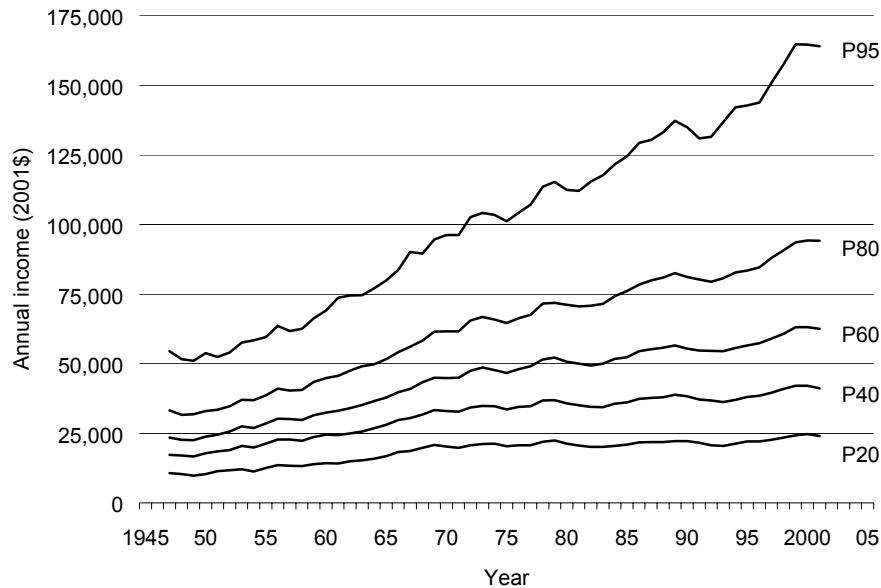


The reasonably strong U.S. growth performance in the 1980s and 1990s is particularly interesting in light of the significant decline in savings during this period (Figure 4.4). Investment, too, declined in the 1980s, and though it increased for much of the 1990s it nevertheless was at historically low levels for the bulk of that decade (Figure 4.4). By most accounts U.S. growth during these two decades was driven more by consumption than by investment. This is inconsistent with the Okun-type view, which holds that high investment is critical to strong growth performance. Nor is it consistent with the newer approach to the inequality-growth relationship, which contends that higher inequality might be bad for growth because it reduces consumption. The increase in inequality in the United States did not reduce consumption.

One possible interpretation is that the rise in U.S. inequality was mainly a product of accelerating incomes at the top, and that (contra the Okun logic) these were largely consumed rather than saved. However, as Figure 4.8 indicates, that interpreta-

tion is at best only partially correct. The chief source of rising income inequality in the United States since the mid-1970s was stagnant incomes in the bottom half of the distribution. This is what distinguishes the 1980s and 1990s from earlier years. Although incomes at the top did increase, the rate of increase for the 95th percentile in the 1980s and 1990s was no faster than in previous decades. Then again, this chart does not include the incomes of those at the very top, which do indeed appear to have grown more rapidly than they did prior to the 1970s (Picketty and Saez 2001). For instance, the compensation of CEOs relative to that of an average production worker increased moderately leading up to the 1980s, but since then has skyrocketed (Michel, Bernstein, and Boushey 2003, p. 213).

Figure 4.8. Family Income Trends in the United States, 1947ff.



There seem to be three main reasons why consumption was strong in the 1980s and 1990s despite stagnant incomes for the segment that tends to consume a higher portion of its income. First, in the 1980s government spending played a key role, as the U.S. government ran record deficits. Second, a cultural change glorifying consumption occurred (Schor 1999). Third, there was a substantial expansion of access to credit, which allowed middle- and low-income households to continue to increase their consumption even when income growth did not support such an increase. The consumption boom in the 1990s was fueled to a significant degree by personal debt. Among families in the middle quintile of the income distribution, for example, average personal debt increased by \$12,000 between 1989 and 1998 (Applebaum 2000).

None of these three processes is consistent with a story in which rising inequality plays a prominent role in either boosting or reducing economic growth.

On the whole, then, over-time developments in the United States suggest a conclusion similar to that reached in the cross-country and cross-state analyses: income inequality appears to have had little or no effect on economic growth.

Effects of Poverty on Growth

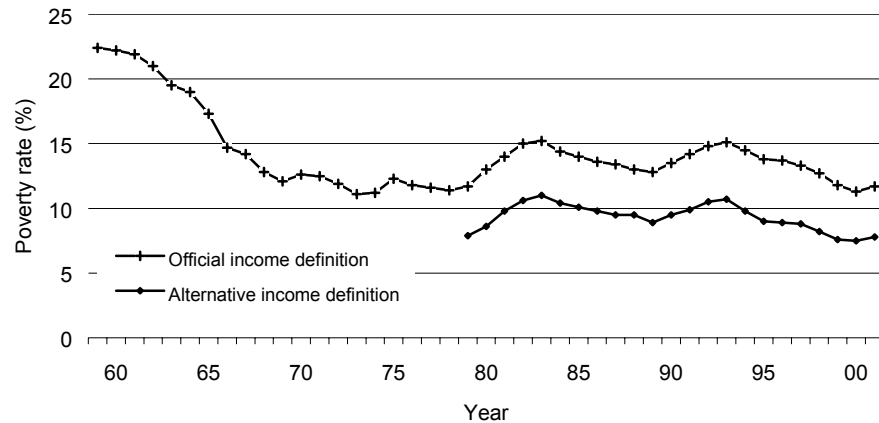
As I noted in the paper's introductory section, several of the mechanisms through which inequality is hypothesized to adversely affect economic growth would seem to apply with even greater force to poverty. Those at the bottom of the income distribution are the most likely to consume all of their income. The lower their incomes are, the less they have to spend. Lower incomes also reduce the ability to pay for college education. Those in poverty may also be more likely to become discouraged and give up on the prospect of gainful employment. Rather than being spurred to work by their low income, in other words, they may react by withdrawing from the labor market altogether. Some may turn to crime or other socially destructive behavior. The likelihood of this is accentuated to the extent that poverty-level incomes are accompanied by social exclusion. Thus, countries or states with greater poverty may have slower economic growth.

Data are available to explore the impact of poverty on growth. Country-level data are again from the Luxembourg Income Study. State-level data and over-time data for the United States are again from the U.S. Census Bureau. Across countries, the correlation between inequality (Gini) and poverty is .70. Across the U.S. states, the correlation is .86.

It turns out that poverty performs very similarly to inequality in multivariate regressions (not shown here). There is no indication of either a positive or negative effect of poverty on growth in the cross-country analyses. In the state-level analyses there again is an apparent growth-reducing effect, but it too appears almost certain to be spurious.

Figure 4.9 shows trends in the national U.S. poverty rate over time. According to the official measure, the poverty rate dropped by half between the late 1950s and the mid-1970s. Since then there has been some fluctuation but no sustained upward or downward movement. The same is true using a more comprehensive alternative definition of income for which the Census Bureau has data beginning in 1979. That measure includes capital gains, taxes, noncash government transfers, and noncash benefits provided by employers (such as health insurance). These trends in poverty appear to correspond neither to that for economic growth nor to those for the various mechanisms through which inequality is suspected to affect growth.

Figure 4.9. Poverty in the United States, 1959ff.



Conclusion

The debate about inequality's impact on economic growth has shifted back and forth. For many years the dominant view — based entirely on theoretical reasoning, rather than empirical findings — was that inequality is beneficial for growth. New theorizing coupled with a host of relatively consistent empirical results led to a reversal in the 1990s. The notion that inequality is bad for growth became the dominant perspective among researchers in this field. Since the late 1990s, however, several studies have challenged this view. Strikingly, they find evidence of a growth-enhancing effect of inequality specifically in affluent countries (Barro 2000; Brandolini and Rossi 1998; Forbes 2000).

Given the indeterminacy of theoretical expectations, surprisingly few participants in the debate have taken the position that inequality is unrelated to growth — though that is likely in part an artifact of the bias against "non-findings" in social science journals. A lack of effect is exactly what the data suggest for the world's richest nations in the 1980s and 1990s. There was no general tendency for inequality to influence growth in either direction. Across the U.S. states there is an association between low inequality and faster growth, but this association is weak in magnitude, sensitive to the inclusion/noninclusion of one low-inequality state, and very likely spurious in any case. Post-World War II trends in the United States also offer no indication that developments in inequality mattered for growth. Finally, despite some reason to suspect that it might be poverty more than inequality that affects growth, the cross-country, cross-state, and over-time findings for poverty turn out to be similar to those for inequality.

There surely is some point at which the distribution of income in a country or region might become too egalitarian to be compatible with a desirable rate of economic growth. But the experience of the past two decades suggests that such a point has yet to be reached. Yes, egalitarian Sweden had very poor growth performance in the 1980s and 1990s (Figure 4.1). But so did relatively unequal Switzerland. Egalitarian Norway and Finland did much better, and Austria and Belgium did better than most. There are, of course, particular equality-enhancing institutions and policies in particular countries that may have growth-impeding effects. But the analyses here turn up no indication of a general equality-growth tradeoff over the past two decades.

Appendix: Variables

Comparative Country Data

Educational attainment. Share of persons age 25 to 64 with a tertiary education.

Source: OECD (2001, table A2.1b, tertiary-type A and advanced research programmes).

Firm-level economic cooperation. Index of four types of cooperation between and within firms: strategic alliances among competing firms; long-term partnerships among companies and their suppliers; cooperation among workers in the form of participatory work teams; cooperation among functional divisions within firms in the form of multidivisional project teams. Source: Hicks and Kenworthy (1998, p. 1642).

Government tax revenues. Current receipts of government as a share of GDP. Source: OECD (various years).

Growth of real GDP per capita. Source: OECD (various years).

Income inequality. Gini coefficient for posttax-posttransfer household income. Income adjusted for household size using the square root of the number of persons in the household as the equivalence scale. Incomes top-coded at 10 times the unequivalized median and bottom-coded at 1% of the equivalized mean. Source: My calculations from Luxembourg Income Study data (variable: DPI).

Inflation. Percentage change in the consumer price index. Source: OECD (various years).

Institutional coherence. Factor scores, adjusted to vary between 0 and 1, from a factor analysis of six indicators, each measured as of the early- or mid-1990s: (1) shareholder power (legal protection and likely influence over firms of ordinary shareholders relative to managers or dominant shareholders); (2) dispersion of control (how many firms in the country are widely held relative to the number with controlling shareholders); (3) size of the stock market (market valuation of equities on the stock exchanges of a nation as a percentage of its gross domestic product); (4) level of wage-setting coordination; (5) degree of wage-setting coordination; (6) labor turnover (number of employees who had held their jobs for

less than one year as a percentage of all employees). High and low scores on this index indicate institutional coherence; intermediate scores indicate incoherence. I have rescaled the index by subtracting scores below .50 from 1.00. This allows the variable to range linearly from low to high institutional coherence. Source: Hall and Gingerich (2001, table 2).

Investment. Gross fixed capital formation as a share of GDP. Source: OECD (various years).

Labor force participation. Labor force participants as a share of the population age 15 to 64. Source: OECD (various years).

Left government. Left party cabinet portfolios as a share of total cabinet portfolios, cumulative from 1946 forward. Source: My calculations from data in Huber, Ragin, and Stephens (2001, variable: LEFTCABCUM).

Non-working-age population. Share of the population under age 15 or over age 64. Source: My calculations from data in OECD (various years).

Poverty. Share of persons in households with posttax-posttransfer incomes below the poverty line. Poverty line set at 50% of the median within each country. Income adjusted for household size using the square root of the number of persons in the household as the equivalence scale. Incomes top-coded at 10 times the unequivalized median and bottom-coded at 1% of the equivalized mean. Source: My calculations from Luxembourg Income Study data (variable: DPI).

Real long-term interest rates. Source: My calculations from data in OECD (2003).

Social capital. Percentage responding "Most people can be trusted" to the question "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?" Measured in 1981 only. Source: Knack and Keefer (1997, data appendix, using World Values Survey data).

Terms of trade. Ratio of export prices to import prices. Source: My calculations from data in OECD (2003).

Trade. Exports plus imports as a share of GDP. Source: My calculations from data in OECD (2003).

Union concentration. Average of standardized values for two measures of concentration: (1) Herfindahl index of union concentration across union confederations. This indicates the extent to which union members belong to a single confederation rather than being divided among multiple confederations. (2) Approximate Herfindahl index of union concentration for affiliates of the largest union confederation, using the membership of the three largest affiliates and the total number of affiliates. This indicates the extent to which the membership of the largest union confederation is concentrated within a small number of affiliates rather than being spread out across a large number of affiliates. Source: Golden, Lange, and Wallerstein (1997, variables: HERF, APPHRF1).

Comparative U.S. States Data

Business concentration. Coded 1 if there is a single business peak association in the state and 0 otherwise. Source: (Leicht and Jenkins 1998, table 1).

Earnings inequality among households. Gini coefficient for household earnings. Households with heads age 25 to 59 only. Earnings adjusted for household size using the square root of the number of persons in the household as the equivalence scale. Earnings top-coded at 10 times the unequivalized median and bottom-coded at 1% of the equivalized mean. Source: My calculations from Luxembourg Income Study data (variable: EARNING).

Economic development policies. Number of state government programs (out of 37 for which data are available) providing financial assistance, tax incentives, or special services to firms and industry. Source: My calculations from data in *Industrial Development and Site Selection Handbook* (various years).

Educational attainment. Share of persons age 25 and over with a four-year college degree. Source: U.S. Bureau of the Census (various years).

Employment. Employment as a share of the population age 18 to 64. Source: My calculations from data in U.S. Bureau of Labor Statistics (n.d.); U.S. Bureau of the Census (various years).

Government tax revenues. Government tax revenues as a share of GSP. Source: My calculations from data in U.S. Bureau of the Census (various years); U.S. Bureau of Economic Analysis (n.d.).

Growth of real GSP per capita. Average annual rate of change in real gross state product per capita. Source: My calculations from U.S. Bureau of Economic Analysis data, www.bea.doc.gov/bea/regional/data.htm.

Income inequality among households. Gini coefficient for pretax-posttransfer household income. Source: U.S. Census Bureau, www.census.gov/hhes/income/histinc/state/state4.html.

Labor force participation. Labor force participants as a share of the population age 16 and over. Source: My calculations from data in U.S. Bureau of Labor Statistics, unpublished data; U.S. Bureau of the Census (various years).

Left government. Share of years in which the Democratic party controlled both houses of the state legislature and the governorship simultaneously. Source: My calculations from data in U.S. Bureau of the Census (various years).

Military expenditures. Federal military contracts plus payroll expenditures as a share of gross state product. Source: My calculations from data in U.S. Bureau of the Census (various years).

Non-working-age population. Share of the population under age 16 or over age 64. Source: My calculations from data in U.S. Bureau of the Census (various years).

Poverty. Share of persons in households with (size-adjusted) incomes below the official U.S. government poverty line. Pretax-posttransfer. Does not include capital gains or noncash transfers. Source: U.S. Bureau of the Census, www.census.gov/hhes/poverty/histpov/cphl162.html.

Social capital. Index of 14 indicators, such as attitudes toward trust, participation in groups and community activities, and voter turnout. Source: "Bowling Alone" website, www.bowlingalone.com.

Sunbelt. Dummy variable coded 1 for 17 "sunbelt" states (AL, AZ, AR, CA, CO, FL, GA, LA, MS, NV, NM, NC, SC, TN, TX, UT, VA) and 0 for others.

Unionization. Union members as a share of the employed labor force. Source: Hirsch and Macpherson (various years).

Over-Time Data for the United States

Educational attainment. Share of the population age 25 and over with a four-year college degree. Source: U.S. Bureau of the Census (various years).

Family income. Real family income at various percentiles of the distribution: P20, P40, P60, P80, P95. Pretax-posttransfer. Does not include capital gains or non-cash transfers. Source: U.S. Bureau of the Census, www.census.gov/hhes/income/histinc/f01.html.

Income inequality among families. Gini coefficient for family income. Pretax-posttransfer. Does not include capital gains or noncash transfers. Source: U.S. Bureau of the Census, www.census.gov/hhes/income/histinc/f04.html.

Income share of the top 10%. Income share of the top 10% of tax units. Includes capital gains and corporate income and employer payroll taxes, but not individual income and employee payroll taxes. Source: Picketty and Saez (2001, table A3, column 1).

Investment. Net private fixed investment as a share of GDP. Source: U.S. Bureau of Economic Analysis, www.bea.gov/bea/dn/nipaweb/Index.asp.

Labor force participation. Labor force participants as a share of persons age 16 to 64. Source: U.S. Bureau of Labor Statistics, www.bls.gov/data.

Poverty (official income definition). Share of persons in households with (size-adjusted) incomes below the official U.S. government poverty line. Pretax-posttransfer. Does not include capital gains or noncash transfers. Source: U.S. Bureau of the Census, www.census.gov/hhes/poverty/histpov/hstpov2.html.

Poverty (alternative income definition). Share of persons in households with (size-adjusted) incomes below the official U.S. government poverty line. Includes regular sources of income plus capital gains, taxes, noncash government transfers, and noncash employer benefits. Source: U.S. Bureau of the Census, www.census.gov/hhes/poverty/histpov/rdp06.html, definition 14.

Productivity. Real gross domestic product per hour worked. Business sector only (excludes government and nonprofits). Source: U.S. Bureau of Labor Statistics, stats.bls.gov/lpc/home.htm#data.

Savings. Personal savings as a share of personal disposable income. Source: U.S. Bureau of Economic Analysis, www.bea.doc.gov/bea/dn1.htm.

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