# The Impact of Economic Growth, Tax Policy and Economic Freedom on Income Inequality

**J.R. Clark**
University of Tennessee at Chattanooga

**Robert A. Lawson**
Auburn University

**Abstract**
Considerable disagreement exists about how economic growth, taxes, and other policies affect the distribution of income from both a theoretical and empirical perspective. This short paper attempts to shed some light on the empirical debate about the role of tax policy in determining economic growth and the distribution of income.

## I. Introduction

Considerable disagreement exists about how taxes and other economic policies affect the distribution of income from both a theoretical and empirical perspective. The received wisdom with regard to the impact of taxes on the distribution of income is fairly settled. Inasmuch as the tax system is progressive, it should serve to equalize somewhat the distribution of income in a society. Certainly, this is one of the major arguments in favor of progressive taxation, at least for those who value a more equal income distribution.

But there is theoretical debate. One complication is that economic policy, including tax policy, may impact economic growth as well as the distribution of income and that, in turn, economic growth and income inequality may be related. Disentangling these various forces is no easy task. This paper attempts to shed some light on the empirical side of the debate about the role of tax and other economic policies in determining the distribution of income.

## II. Economic Growth

Modern growth theory comprises at least three competing strands. The neoclassical theory of economic growth, based on the work of Robert Solow (1956), focuses in the inputs of physical and human capital into the production process, and on technological advances, as the determinants of economic performance. Alternative explanations for growth are based on geographical factors. Jeffrey Sachs (2001), for example, argues that locational factors such as a temperate climate and access to markets are the keys to growth.

The institutional approach characterized by Douglass North (1990) emphasizes the importance of market institutions as the foundation for economic prosperity. Obviously, any discussion of the importance of tax policy on economic growth falls within this institutional approach. It is important to note that these three explanations for growth are not logically inconsistent with each other, so all might play a role, and any empirical examination of economic growth must attempt to control for all of these factors.

## III. The Distribution of Income

It is assumed that progressive taxation should lead toward more income equality and regressive taxation should lead to more income inequality. Indeed, the static data on the distribution of income in the United States, for example, indicate that the after-tax distribution of income is more equal than the pre-tax distribution of income. This is consistent with the view that the U.S. has a progressive tax code that acts to equalize the distribution of income.

Despite this, many have suggested that it is difficult, if not impossible, to redistribute income via the tax code (or otherwise) in the long run. In the long run, the egalitarian effect of progressive taxes may be muted by various market adjustments. Let's say we attempt to use tax policy to redistribute income from one group of people to another. Market adjustments will lead to reduced supply and hence higher rates of return in the most-taxed areas, and increased supply and hence lower rates of return in the least-taxed areas. The ultimate impact on the distribution of income is likely to be much more limited as a result (Gwartney and Long, 1985). This is just another example of Gordon Tullock's (1975) transitional gains trap.

Simon Kuznets (1955) suggested that economic growth may involve a trade-off with income equality, so this dimension needs to

be considered as well. But if various strands of economic theory indicate that (1) economic policy affects economic growth, (2) economic policy affects income equality, and (3) and economic growth affects income equality, it all gets very complicated.

## IV. Data and Analysis

The metric for the degree of income equality is the Gini coefficient, which takes a value between 0 and 100, with higher values indicative of greater income inequality. Countries report Gini coefficients only sporadically, so the data reflect a range of years primarily between 1990 and 2000 (World Bank, 2004). Inasmuch as the distribution of income is relatively stable, this should not impact our analysis in any great way.

The neoclassical approach to growth focuses on the capital and labor inputs into the production process, and on technological advances that might affect the functional form of the production function to generate more output with the same inputs. Our measure of physical investment is gross capital formation (investment) as a share of GDP (World Bank, 2004) from national income accounts. Human capital investment measures changes in the years of schooling per worker, adjusted for the demographic composition of the work force (Baier, Dwyer, and Tamura, 2003). In addition, we include the GDP level per capita at the beginning of the period to account for the convergence hypothesis suggested by standard growth theory.

We take account of two geographic factors as suggested by Sachs (2001). Tropical location is measured as the percentage of a country's land area located in the tropics, and the percentage of population within 100km of the coast is utilized as a measure of the access to ocean transportation.

The measures of the institutional and policy environment are derived from the Economic Freedom of the World (EFW) index produced by Gwartney and Lawson (2004). This measure is widely used in empirical cross-country studies (Berggren, 2003; De Haan, Lundström, and Sturm, 2006).

The EFW index is made up of five area ratings: Size of Government, Legal Structure, Sound Money, International Trade, and Regulation. In turn, each area is composed of various component and sub-component parts. For example, the Size of Government area is composed of four components representing government

consumption expenditures, government transfers, government investment, and marginal tax rates.

All EFW ratings are on a 0-10 scale. Countries receive higher ratings when government interference in the form of taxes, spending, and regulations are lower, and also when government does a reasonably effective job in enforcing property rights and providing a stable monetary regime.

Of particular interest in this study is the component measuring marginal tax rates. This component computes the marginal tax rate applying to the highest income earners, including any applicable state and local income taxes. For ease of interpretation, the actual top marginal tax rate instead of the 0-10 rating is used in the analysis below; the results are not sensitive to this choice.

In addition to the marginal tax rate, this analysis includes controls for some of the other areas covered by the EFW index. A composite rating based on the Government Consumption Component of the Size of Government Area, the Legal Structure Area, the Sound Money Area, and the International Trade Area is used. The Regulation Area rating is not included because its availability is limited in the earlier years under consideration.

## Table 1:  Descriptive Statistics

| Variable | Mean | StDev | Min | Max |
|---|---|---|---|---|
| Annual Growth in real GDP per capita, 1980-2002 | 0.010 | 0.020 | -0.049 | 0.082 |
| Real GDP per capita, 1980 (PPP$) | 7023.000 | 6847.000 | 561.000 | 41053.000 |
| Gini Coefficient | 40.730 | 10.670 | 24.440 | 70.660 |
| Investment/GDP, 1980-2002 (%) | 22.021 | 5.322 | 9.054 | 37.078 |
| Human Capital Formation, 1980-1999 | 1.558 | 0.709 | -0.003 | 3.597 |
| Percentage of Population Near Coastline | 0.516 | 0.377 | 0.000 | 1.000 |
| Percentage of Land in Tropics | 0.493 | 0.478 | 0.000 | 1.000 |
| Top Marginal Tax Rate, 1980-2002 | 49.39 | 10.55 | 15.00 | 68.00 |
| Change in Top Marginal Tax Rate, 1980-2002 | -15.62 | 24.81 | -55.00 | 69.00 |
| Composite Economic Freedom Rating, 1980-2002 | 6.31 | 0.93 | 4.31 | 8.56 |
| Change in Composite EF Rating, 1980-2002 | 0.30 | 0.69 | -1.68 | 2.46 |

Tax policy and other government policies are likely to impact both economic growth and income inequality, which in turn may be related to each other. Including both the policy variables and economic growth in an income equality regression is likely to bias the standard errors on the coefficient estimates upward. To deal with this, we are employing a type of 2SLS model. First, we will estimate a standard growth model without the inclusion of any policy variables. The fitted values from this model will be used in the income distribution regressions along with the policy variables. By doing this, the policy variables will be able to exert their full impact on the income distribution without the confounding influence of economic growth.[1]

Table 1 reports descriptive statistics for the variables of interest. Tables 2 and 3 report the regression results of the empirical models of economic growth and income equality. Regression (1) shows a growth regression that includes the neo-classical variables for investment in physical and human capital, the initial level of income to account for the convergence hypothesis, and two geographical variables. These results are all fairly standard. Regression (2) is a simple regression examining the relationship between the GINI coefficient and economic growth as explained from Regression (1). Here we find evidence that increased economic growth, at least the portion of economic growth correlated with the variables in Regression (1), corresponds to lower GINI coefficients, i.e., more income equality. The coefficient is relatively small, however, indicating that a two percentage point increase in economic growth, about one standard deviation, correlates with a three unit decrease in the GINI coefficient, which is only about one-third of a standard deviation. Regression (3) adds the square of economic growth to the previous model. This inclusion increases the magnitude of the level of economic freedom variable, but is itself insignificant.

Regressions (4) through (7) examine various measures of tax policy and economic freedom more generally. Regression (4) shows that a ten percentage point increase in top marginal tax rates, about one standard deviation, corresponds to a four point reduction in the GINI coefficient. This result is statistically significant, fairly sizeable,

---

[1] Even this approach will not capture the full impact of economic policies if they are correlated with investment (Gwartney, Holcombe, and Lawson, 2006), but dealing with this is beyond the scope of this paper.

and robust across the ensuing specifications. Regression (5) adds the change in top marginal tax rates during the period, but this result is small and appears not to impact the other results, so it is dropped from any remaining analysis. The bottom line is that these data are consistent with the argument that higher marginal tax rates contribute to increased levels of income equality.

**Table 2: Results from Economic Growth Regression (1)**

| Dependent Variable: | Annual Growth in real GDP per capita, 1980-2002 (%)* |
|---|---|
| **Independent Variables:** | |
| Intercept | -0.033 |
| Real GDP per capita, 1980 (Thousands PPP$) | -0.057 |
| | (1.92) |
| Investment/GDP, 1980-2002 (%) | 0.241 |
| | (7.04) |
| Human Capital Formation, 1980-1999 | 0.230 |
| | (0.83) |
| Percentage of Population Near Coastline | 0.670 |
| | (1.56) |
| Percentage of Land in Tropics | -1.357 |
| | (3.49) |
| Adjusted $R^2$ | 56.2 |
| Number of Observations | 70 |

*T-stats are in parentheses.

However, economic policy is about more than just tax policy. Property rights, monetary policy, trade policy, and general government spending may also matter. Regressions (6) and (7) add the level and changes of economic freedom as measured by the combined EFW ratings for legal structure and property rights, sound money, freedom to trade, and government consumption. The results indicate that for every one unit in higher average economic freedom, the GINI coefficient goes down by 4.5 points, and for every one unit increase over time in the level of economic freedom, a 3.7 point reduction occurs in the GINI coefficient. These results very strongly indicate that increases in the level of economic freedom correspond to increased income equality.

In addition, it is interesting to note that economic growth (and its square) no longer appears to impact income inequality after

controlling for the tax and other policy variables. In a simple regression, countries that grow more quickly were shown to have less inequality. However, in the multiple regressions, GDP growth has no effect. The reason appears to be that policies consistent with economic freedom both reduce income inequality and increase growth.

**Table 3: Results from Income Equality Regressions (2-7)**

| Dependent Variable: | Gini Coefficient, 1980-2002 Average** | | | | | |
|---|---|---|---|---|---|---|
| **Independent Variables:** | (2) | (3) | (4) | (5) | (6) | (7) |
| Intercept | 43.980 | 45.290 | 64.588 | 64.617 | 91.718 | 89.896 |
| Annual Growth in real GDP per capita, 1980-2002 (%)* | -1.495 | -3.853 | -2.992 | -2.973 | -0.542 | 0.348 |
| | (1.67) | (2.00) | (1.72) | (1.63) | (0.32) | (0.21) |
| Annual Growth in real GDP per capita, 1980-2002 (%)-SQUARED* | | 0.558 | 0.449 | 0.4455 | 0.116 | -0.096 |
| | | (1.38) | (1.24) | (1.17) | (0.34) | (0.03) |
| Top Marginal Tax Rate, 1980-2002 | | | -0.409 | -0.409 | -0.427 | -0.381 |
| | | | (4.06) | (4.02) | (4.70) | (4.31) |
| Change in Top Marginal Tax Rate, 1980-2002 | | | | 0.002 | | |
| | | | | (0.04) | | |
| Composite Economic Freedom Rating, 1980-2002 | | | | | -4.514 | -4.547 |
| | | | | | (3.89) | (4.11) |
| Change in Composite EF Rating, 1980-2002 | | | | | | -3.726 |
| | | | | | | (2.66) |
| Adjusted R² | 2.7 | 4.0 | 23.0 | 21.7 | 37.3 | 43.0 |
| N | 66 | 66 | 66 | 66 | 66 | 66 |

* Fitted values from Table 2.
** T-stats are in parentheses.

## V. Conclusions

Disentangling the impact of tax and other economic policies on income inequality is no easy task, either theoretically or empirically. One of the primary complications is that economic policies affect economic growth, and economic growth may in turn affect income equality. This study attempts to deal with this problem by determining the impact of progressive marginal income taxes and other economic policies on income inequality. The results indicate that progressive taxation, as measured by high top marginal tax rates, does in fact appear to work in the direction of increased income equality. However, equalitarian advocates of economic intervention should heed another lesson from this study. Measures of private property rights, sound money, trade openness, and government size correlate very strongly with increased income equality. While some degree of progressive income taxation may be a useful strategy for those who desire increased income equality, broader economic interventionism is not consistent with their desired goal.

## References

Baier, Scott L., Gerald P. Dwyer, and Robert Tamura. 2003. "How Important Are Capital and Total Factor Productivity for Economic Growth?" Federal Reserve Bank of Atlanta Research Department Working Paper.

Berggren, Niclas. 2003. "The Benefits of Economic Freedom: A Survey." *The Independent Review*, 8: 193–211.

De Haan, Jakob, Susanna Lundström, and Jan-Egbert Sturm. 2006. "Market-Oriented Institutions and Policies and Economic Growth: A Critical Survey." *Journal of Economic Surveys*, 20: 157–81.

Gwartney, James, Randall Holcombe, and Robert Lawson. 2006. "Institutions and the Impact of Investment on Growth." *Kyklos,* 59(2): 255–276.

Gwartney, James and Robert Lawson. 2004. *Economic Freedom of the World: 2004 Annual Report*. Vancouver: The Fraser Institute.

Gwartney, James, and James Long. 1985. "Is the Flat Tax a Radical Idea?" *Cato Journal*, 5: 407–432.

Kuznets, Simon. 1955. "Economic Growth and Income Inequality." *American Economic Review*, 45: 1–28.

North, Douglass C. 1990. *Institutions, Institutional Change, and Economic Performance.* Cambridge: Cambridge University Press.

Sachs, Jeffrey D. 2001. "Tropical Underdevelopment." NBER Working Paper 8119.

Solow, Robert M. 1956. "A Contribution to the Theory of Economic Growth." *Quarterly Journal of Economics*, 70: 65–94.

Tullock, Gordon. 1975. "The Transitional Gains Trap." *Bell Journal of Economics*, 6: 671–78.

World Bank. 2004. *04 World Development Indicators CD-ROM.* Washington: The World Bank.