

Special Report

What Is the Evidence on Taxes and Growth?

By

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Introduction

The idea that taxes affect economic growth has become politically contentious and the subject of much debate in the press and among advocacy groups. That is in part because there are competing theories about what drives economic growth. Some subscribe to Keynesian, demand-side factors, others Neo-classical, supply-side factors, while yet others subscribe to some mixture of the two or something entirely unique. The facts, historical and geographical variation in key parameters for example, should shed light on the debate. However, the economy is sufficiently complex that virtually any theory can find some support in the data.

For instance, the Congressional Research Service (CRS) has found support for the theory that taxes have no effect on economic growth by looking at the U.S. experience since World War II and the dramatic variation in the statutory top marginal rate on individual income.¹ They find the fastest economic growth occurred in the 1950s when the top rate was more than ninety percent.² However, their study ignores the most basic problems with this sort of statistical analysis, including: the variation in the tax base to which the individual income tax applies; the variation in other taxes, particularly the corporate tax; the short-term versus long-term effects of tax policy; and reverse causality, whereby economic growth affects tax rates. These problems are all well known in the academic literature and have been dealt with in various ways, making the CRS study unpublishable in any peer-reviewed academic journal.³

So what does the academic literature say about the empirical relationship between taxes and economic growth? While there are a variety of methods and data sources, the results consistently point to significant

¹ The top marginal tax rate is the rate that is paid on each additional dollar of income.

² Thomas Hungerford, Congressional Research Service, *Taxes and the Economy: An Economic Analysis of the Top Tax Rates since 1945 (Updated)* (Dec. 12, 2012),

<http://democrats.waysandmeans.house.gov/sites/democrats.waysandmeans.house.gov/files/Updated%20CRS%20Report%2012%3A13%3A12.pdf>.

³ William McBride, *CRS, At Odds with Academic Studies, Continues to Claim No Harm in Raising Top Earners' Tax Rates*, TAX FOUNDATION TAX POLICY BLOG, Dec. 14, 2012, <http://taxfoundation.org/blog/crs-odds-academic-studies-continues-claim-no-harm-raising-top-earners-tax-rates>.

negative effects of taxes on economic growth even after controlling for various other factors such as government spending, business cycle conditions, and monetary policy. In this review of the literature, I find twenty-six such studies going back to 1983, and all but three of those studies, and every study in the last fifteen years, find a negative effect of taxes on growth. Of those studies that distinguish between types of taxes, corporate income taxes are found to be most harmful, followed by personal income taxes, consumption taxes and property taxes.

These results support the Neo-classical view that income and wealth must first be produced and then consumed, meaning that taxes on the factors of production, i.e., capital and labor, are particularly disruptive of wealth creation. Corporate and shareholder taxes reduce the incentive to invest and to build capital. Less investment means fewer productive workers and correspondingly lower wages. Taxes on income and wages reduce the incentive to work. Progressive income taxes, where higher income is taxed at higher rates, reduce the returns to education, since high incomes are associated with high levels of education, and so reduce the incentive to build human capital. Progressive taxation also reduces investment, risk taking, and entrepreneurial activity since a disproportionately large share of these activities is done by high income earners.⁴

Some of these items are long-term mechanisms, particularly human and physical capital formation. Most of these empirical studies focus on the long-term effects, over a period of five years or more, but many investigate short-term dynamics as well. The evidence for short-term, demand-side effects of tax policy is less robust and less compelling, perhaps owing to the difficulty of disentangling short-term factors and matching events. However, there is some evidence that longer-term, supply-side effects occur sooner than previously thought, such as within the first few years of a policy change.

In any case, the lesson from the studies conducted is that long-term economic growth is to a significant degree a function of tax policy. Our current economic doldrums are the result of many factors, but having the highest corporate rate in the industrialized world does not help. Nor does the prospect of higher taxes on shareholders and workers. If we intend to spur investment, we should lower taxes on the earnings of capital. If we intend to increase employment, we should lower taxes on workers and the businesses that hire them.

Literature Review

Nearly every empirical study of taxes and economic growth published in a peer reviewed academic journal finds that tax increases harm economic growth. In my review, I examine twenty-six such studies going back to 1983, as shown in Table 1. All but three of those studies, and every study in the last fifteen years, find a negative effect of taxes on growth. The table shows summaries of each study's findings, but the most recent and influential studies will be discussed here in more detail.

⁴ William McBride, *The Great Recession and Volatility in the Sources of Personal Income*, TAX FOUNDATION FISCAL FACT NO. 316 (June 13, 2012), <http://taxfoundation.org/article/great-recession-and-volatility-sources-personal-income>.

Most of the recent studies distinguish by type of tax, rather than using some broad measure of taxes. The most prominent exception is by David and Christina Romer,⁵ who look at the overall U.S. federal tax burden as a share of GDP since World War II. They analyze the narrative record of federal tax changes, including presidential speeches, congressional reports, etc., to identify legislated “tax shocks,” such as efforts to reduce an inherited budget deficit or promote long-run growth. This technique allows them to minimize the statistical problem of reverse causality by removing from analysis legislated tax changes that are the result of economic changes, such as countercyclical actions and those tied to government spending. They find much larger negative effects of taxes as compared to earlier studies that lump all tax changes together. Particularly, they find that a tax increase of 1 percent of GDP lowers real GDP by about 3 percent after about two years. The largest effect is from tax changes meant to promote economic growth, and the main channel is investment. These results are robust to various specifications, including controlling for the state of the economy, monetary policy, and the behavior of government spending.

Another set of studies looks at episodes of fiscal consolidation (efforts to reduce deficits) and fiscal stimuli and in the process estimate how tax policy affects economic growth. Alesina and Ardagna cover a large number of such episodes occurring in OECD countries between 1970 and 2006.⁶ They find that fiscal stimuli based upon tax cuts are more likely to increase growth than those based upon spending increases. Also, fiscal consolidations based upon spending cuts and no tax increases are more likely to succeed at reducing deficits and debt and less likely to create recessions as compared to fiscal consolidations based upon tax increases. Similarly, the IMF analyzes 170 cases of fiscal consolidation in fifteen advanced countries over the last thirty years and finds that spending cuts are much less damaging to short term growth than are tax increases.⁷ They find a 1 percent spending cut has no significant effect on growth, whereas a 1 percent tax increase reduces GDP by 1.3 percent after two years. Fiscal consolidation studies by Goldman Sachs and others come to similar conclusions.⁸

A number of researchers have looked at taxes and growth in U.S. states, but one of the most thorough and robust is by Reed.⁹ He uses panel data, taking advantage of variation in taxes and growth across U.S. states and over time, averaging over five year periods between 1970 and 1999. He finds a robust negative effect of the tax burden on economic growth, where the tax burden is defined as the ratio of state and local tax revenues to personal income. He finds this result is robust for both “contemporaneous” changes in the tax burden, i.e., within the five year period, and the initial level of the tax burden. When he runs the same specification using annual data, he finds the contemporaneous effect is actually positive, while the lagged effects from tax burden changes in the four prior years are all negative. He argues that annual data, at least at the state level, suffers from measurement error and misspecification of lagged effects and may prevent findings of a robust relationship between taxes and growth:

⁵ Christina Romer & David Romer, *The macroeconomic effects of tax changes: estimates based on a new measure of fiscal shocks*, 100 AMERICAN ECONOMIC REVIEW 763-801 (2010).

⁶ Alberto Alesina & Silvia Ardagna, *Large changes in fiscal policy: taxes versus spending*, in TAX POLICY AND THE ECONOMY, Vol. 24 (Univ. of Chicago Press, 2010).

⁷ International Monetary Fund, *Will it hurt? Macroeconomic effects of fiscal consolidation*, in WORLD ECONOMIC OUTLOOK: RECOVERY, RISK, AND REBALANCING (2010), <http://www.imf.org/external/pubs/ft/weo/2010/02/pdf/c3.pdf>.

⁸ For a summary, see David Logan, *The proper role of taxes in deficit and debt reductions*, TAX FOUNDATION FISCAL FACT NO. 278 (July 29, 2011), <http://taxfoundation.org:81/article/proper-role-taxes-deficit-and-debt-reduction>.

⁹ Robert Reed, *The robust relationship between taxes and U.S. state income growth*, 61 NATIONAL TAX JOURNAL 57-80 (2008).

My analysis suggests that tax policies take time to work its full effects on the economy. When the specification is sufficiently general to pick up these effects, a negative relationship between taxes and income growth emerges.¹⁰

Reed's is a thorough analysis with numerous robustness checks. However, the tax burden measure does not include federal taxes, the burden of which is twice as large as the burden of state and local taxes. Also, the federal burden is extremely progressive, such that taxpayers in high income states face a much larger federal tax burden than do taxpayers in low income states.¹¹

As mentioned, most recent studies distinguish between different types of taxes on the basis that they have different effects on the economy. Corporate and shareholder taxes should mainly affect investment and capital formation, while income taxes affect labor and saving by individuals as well as investment by non-corporate business owners.¹² Consumption taxes, such as sales taxes, affect suppliers of labor and capital, but neutrally. Corporate and personal income taxes are not neutral, as they represent essentially additional, double taxes on future consumption. These empirical studies typically find that corporate and personal income taxes are the most damaging to economic growth, followed by consumption taxes and property taxes.

Mertens and Ravn do a Romer-style narrative analysis of post-war tax changes in the U.S. but also distinguish between personal and corporate income taxes.¹³ They find that personal income tax cuts more immediately boost GDP but lose revenue, while corporate tax cuts generate growth in the long run and expand the tax base such that revenues are unchanged. Particularly, they find a 1 percentage point cut in the average personal income tax rate raises real GDP per capita by 1.4 percent in the first quarter and by up to 1.8 percent after three quarters. They find a 1 percentage point cut in the average corporate income tax rate raises real GDP per capita by 0.4 percent in the first quarter and by 0.6 percent after one year. The effect of the corporate tax is actually larger per dollar of revenue than that of the personal income tax, since the corporate tax raises about one-quarter of the revenue that the personal income tax does. In terms of "multipliers," i.e. how revenue or spending changes affect GDP, their estimates of tax multipliers exceed most estimates of spending multipliers.

In a series of OECD working papers,¹⁴ summarized by Arnold et al.,¹⁵ OECD affiliated economists have determined a ranking of the most harmful taxes for economic growth. They find that corporate taxes are the

¹⁰ *Id.*

¹¹ See, e.g., William McBride, *Tax Freedom Day 2012*, TAX FOUNDATION SPECIAL REPORT NO. 198 (Apr. 2, 2012), <http://taxfoundation.org/article/special-report-no-198-tax-freedom-day-2012>.

¹² Scott Hodge & Alex Raut, *Individual tax rates also impact business activity due to high number of pass-throughs*, TAX FOUNDATION FISCAL FACT NO. 314 (June 05, 2012), <http://taxfoundation.org/article/individual-tax-rates-also-impact-business-activity-due-high-number-pass-throughs>.

¹³ Karel Mertens & Morten Ravn, *The dynamic effects of personal and corporate income tax changes in the United States*, AMERICAN ECONOMIC REVIEW (forthcoming) (2012).

¹⁴ Åsa Johansson, Christopher Heady, Jens Arnold, Bert Brys, Cyrille Schwellnus, & Laura Vartia, *Tax and economic growth*, OECD Economics Department Working Papers No. 620 (2008).

¹⁵ Jens Arnold, Bert Brys, Christopher Heady, Åsa Johansson, Cyrille Schwellnus, & Laura Vartia, *Tax Policy For Economic Recovery and Growth*, 121 ECONOMIC JOURNAL F59-F80 (2011).

most harmful, followed by personal income taxes, consumption taxes, and, finally, property taxes, particularly property taxes levied on households rather than corporations. They look at twenty-one OECD countries from 1971 to 2004 and control for various factors including measures of physical and human capital accumulation, population growth, and time and country specific effects. They also control for the overall tax burden in each country as a share of GDP. This allows them to isolate the effect of different types of taxes based on the share of tax revenue that comes from each tax on a revenue- and spending-neutral basis.¹⁶ They find that a 1 percent shift of tax revenues from income taxes (both personal and corporate) to consumption and property taxes would increase GDP per capita by between 0.25 percent and 1 percent in the long run. They also find progressivity of personal income taxes reduces economic growth.¹⁷ The authors find further support for their results by looking at industry¹⁸ and firm level¹⁹ measures of investment and productivity growth. They find corporate taxes, both in terms of the statutory tax rate and depreciation allowances, reduce investment and productivity growth. They also find that raising the top marginal rate on personal income reduces productivity growth, stating that “a reduction in the top marginal [individual] tax rate is found to raise productivity in industries with potentially high rates of enterprise creation. Thus reducing top marginal tax rates may help to enhance economy-wide productivity in OECD countries with a large share of such industries....”²⁰ The U.S. is one such country with a large share of entrepreneurship and non-corporate businesses.²¹

Barro and Redlick construct a time series of average marginal income tax rates (AMTR) from 1912 (one year prior to the advent of the federal income tax) to 2006, including federal and state income taxes as well as the social security payroll tax on employers and employees.²² To do this, they bring many sources of data together, including IRS data and the National Bureau of Economic Research TAXSIM program, which calculates average marginal tax rates and accounts for numerous complexities, such as the alternative minimum tax, earned income tax credit, phase outs of exemptions and deductions, and the deductibility of state income taxes.²³ They estimate the effect of annual changes in the AMTR on the following year’s per capita GDP growth, controlling for changes in defense spending as well as unemployment and credit conditions. They find that a cut in the average marginal tax rate of 1 percentage point raises next year’s per

¹⁶ They use a Pooled Mean Group estimator, which “allows a selective treatment of variables—and of the speed of adjustment into equilibrium—with respect to whether its coefficient should be constrained to equality across all countries or left country-specific.” See Arnold et al., *supra* note 15.

¹⁷ Jens Arnold, *Do tax structures affect aggregate economic growth? Empirical evidence from a panel of OECD countries*, OECD Economics Department Working Papers No. 643 (2008).

¹⁸ Laura Vartia, *How do taxes affect investment and productivity? Industry level analysis of OECD countries*, OECD Economics Department Working Papers No. 656 (2008).

¹⁹ Cyrille Schwellnus & Jens Arnold, *Do corporate taxes reduce productivity and investment at the firm-level? Cross-country evidence from the Amadeus dataset*, OECD Economics Department Working Papers No. 641 (2008).

²⁰ See Johannson et al., *supra* note 14, at 9.

²¹ See Hodge & Raut, *supra* note 12.

²² Robert Barro & C.J. Redlick, *Macroeconomic Effects of Government Purchases and Taxes*, 126 QUARTERLY JOURNAL OF ECONOMICS 51-102 (2011).

²³ This is a merged series of data, which is based on adjusted gross income (AGI) until 1983 but AGI minus capital income after 1983. These are clearly two very different concepts of income, but the authors argue that average marginal tax rates based on the two measures of income are highly correlated. State marginal rates prior to 1979 are based on BEA data on per capita state personal income and a program by Jon Bakija called IncTaxCalc, which the authors suspect is less accurate but justifiable based on the fact that state income taxes are a small share of total income taxes.

capita GDP by around 0.5 percent. In terms of multipliers, the tax multiplier is -1.1 while the defense spending multiplier ranges from 0.4 to 0.8. This implies that defense spending financed by additional tax revenue reduces GDP.

Lee and Gordon look at seventy countries over the period 1980 to 1997 and find corporate taxes are robustly associated with lower economic growth, while other taxes do not have a robust statistical association.²⁴ In their baseline cross-sectional growth regressions, they find that a cut in the statutory corporate rate of 10 points raises annual GDP growth per capita by about 0.7 to 1.1 points. The high end of these estimates comes from the use of instrumental variables to control for reverse causality (economic growth causing changes in tax rates). The authors also estimate the effects using panel data, which includes the variation over time as well as across countries, providing many more observations. Rather than using year by year variation, the authors average over five year periods, so as to smooth out business cycle effects and account for longer term effects of the variables. For the panel data they use ordinary least squares (OLS) regression as well as a fixed effects model that controls for country-specific factors. Their results suggest that a cut in the corporate rate of 10 points would raise annual GDP growth per capita by about 0.6 to 1.8 points. Again, the high end of these estimates comes from the use of instrumental variables. Specifically, they use neighboring tax rates as an instrumental variable to control for the effect of local economic growth on local tax rates. Lee and Gordon also provide some evidence that corporate taxes reduce growth by reducing entrepreneurial activity.

Ferede and Dahlby update and confirm the results of Lee and Gordon, using data on statutory tax rates in the Canadian provinces over the period 1977 to 2006, averaging over five year periods.²⁵ Similar to Lee and Gordon, they find cutting the corporate rate by 10 points raises the annual per capita growth rate by 1 to 2 points. The authors note that this is a temporary boost, as their specification is based on a Neo-classical growth model which eventually returns to a steady state rate of growth determined by technological change. However, long-run output is “substantially increased.” They also find no significant relationship between personal income tax rates and growth when controlling for provincial fixed effects. Non-intuitively, they find raising the sales tax rate increases growth, apparently because it tends to replace taxes on investment. While most growth studies compare countries, Ferede and Dahlby argue that subnational state comparisons make it easier to identify the effects of taxes on growth since states are more similar than nations. Canadian provinces also use similar tax bases, unlike many countries.

Finally, Gemmell et al. use a data set covering seventeen OECD countries between the early 1970s and 2004.²⁶ They relate economic growth to major fiscal variables, including: “distortionary” taxes, which are taxes on income and profit; “non-distortionary” taxes, which are taxes on goods and services; productive expenditures (e.g., public investments); unproductive expenditures (e.g., transfer payments); and deficits.²⁷

²⁴ Young Lee & Roger Gordon, *Tax Structure and Economic Growth*, 89 JOURNAL OF PUBLIC ECONOMICS 1027-1043 (2005), <http://www.aiecon.org/advanced/suggestedreadings/PDF/sug334.pdf>.

²⁵ Ergete Ferede & Bev Dahlby, *The Impact of Tax Cuts on Economic Growth: Evidence from the Canadian Provinces*, 65 NATIONAL TAX JOURNAL 563-594 (2012).

²⁶ Norman Gemmell, Richard Kneller, & Ismael Sanz, *The Timing and Persistence of Fiscal Policy Impacts on Growth: Evidence from OECD Countries*, 121 ECONOMIC JOURNAL F33-F58 (2011).

²⁷ Like Arnold et al., they use “heterogeneous panel” econometric methods, known as Mean Group and Pooled Mean Group techniques.

They find that distortionary taxes are most damaging to economic growth over the long run, followed by deficits, and non-distortionary taxes. As they state, “distortionary and other taxes have more damaging effects on growth than deficits so that simultaneously reducing the latter and raising these taxes is bad for growth in net terms.”²⁸ They also find that the long run adjustment to fiscal policy occurs in a relatively short period of a few years.

Conclusion

This review of empirical studies of taxes and economic growth indicates that there are not a lot of dissenting opinions coming from peer-reviewed academic journals. More and more, the consensus among experts is that taxes on corporate and personal income are particularly harmful to economic growth, with consumption and property taxes less so. This is because economic growth ultimately comes from production, innovation, and risk-taking.

This review of empirical studies also establishes some standards by which a tax system may be judged. If we apply these standards to our national tax system, the U.S. has probably the most inefficient tax mix in the developed world. We have the highest corporate tax rate in the industrialized world. If it came down 10 points—still higher than most of our trading partners—it would add 1 to 2 points to GDP growth and likely not lose tax revenue, because the tax base would expand from in-flows of foreign capital as well increased domestic investment, hiring, and work effort. The preponderance of evidence is such that virtually everyone agrees that the corporate rate should come down, although many continue to claim, opposite the evidence,²⁹ that such a move would lose revenue.

We are also threatened with a fiscal cliff that would give us the highest dividend rate and nearly the highest capital gains rate in the industrialized world. Most studies do not look separately at shareholder taxes, due to the fact that they raise relatively little revenue and many countries have no such taxes.³⁰ However, shareholder taxes represent additional, double taxes on corporate income and therefore have the same type of detrimental effects on investment and economic growth that are now widely attributed to corporate taxes.

The fiscal cliff would also push the top marginal rate on personal income to over 50 percent in some states, such as California, Hawaii, and New York—higher than all but a few of our trading partners.³¹ We already have the most progressive tax system in the industrialized world, according to the OECD, and this would make it more so. The OECD finds such steeply progressive taxation reduces productivity and economic growth.³² Further, the U.S. is unique in that a majority of businesses and business income are taxed under these progressive individual rates, businesses such as sole-proprietorships, partnerships, and S corporations.³³

²⁸ *Id.*

²⁹ See Mertens & Ravn, *supra* note 13.

³⁰ Robert Carroll and Gerald Prante, *Corporate Dividend and Capital Gains Taxation: A Comparison of the United States to other Developed Nations*, Ernst & Young, February 2012.

http://www.theasi.org/assets/EY_ASI_Dividend_and_Capital_Gains_International_Comparison_Report_2012-02-03.pdf

³¹ Gerald Prante & Austin John, *Top marginal effective tax rates by state and by source of income, 2012 tax law vs. 2013 scheduled tax law*, Working Paper, Nov. 15, 2012, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2176526.

³² See Arnold et al., *supra* note 15.

³³ See Hodge & Raut, *supra* note 12.

One study finds that increasing the average income tax rate by 1 percentage point reduces real GDP per capita by 1.4 percent in the first quarter and by up to 1.8 percent after three quarters.³⁴

In sum, the U.S. tax system is a drag on the economy. Pro-growth tax reform that reduces the burden of corporate and personal income taxes would generate a more robust economic recovery and put the U.S. on a higher growth trajectory, with more investment, more employment, higher wages, and a higher standard of living.

Table I: Empirical Studies on the Effects of Taxes on Economic Growth

	Reference	Method/Data	Effects	Summary of Findings
1	Ergete Ferede & Bev Dahlby, <i>The Impact of Tax Cuts on Economic Growth: Evidence from the Canadian Provinces</i> , 65 National Tax Journal 563-594 (2012).	Canadian provinces (1977-2006)	Negative	Reducing corporate income tax 1 percentage point raises annual growth by 0.1 to 0.2 points.
2	Karel Mertens & Morten Ravn, <i>The dynamic effects of personal and corporate income tax changes in the United States</i> , AMERICAN ECONOMIC REVIEW (forthcoming) (2012).	U.S. Post-WWII exogenous changes in personal and corporate income taxes	Negative	A 1 percentage point cut in the average personal income tax rate raises real GDP per capita by 1.4 percent in the first quarter and by up to 1.8 percent after three quarters. A 1 percentage point cut in the average corporate income tax rate raises real GDP per capita by 0.4 percent in the first quarter and by 0.6 percent after one year.
3	Norman Gemmill, Richard Kneller, & Ismael Sanz, <i>The Timing and Persistence of Fiscal Policy Impacts on Growth: Evidence from OECD Countries</i> , 121 ECONOMIC JOURNAL F33-F58 (2011).	17 OECD countries (Early 1970s to 2004)	Negative	Taxes on income and profit are most damaging to economic growth over the long run, followed by deficits, and then consumption taxes.
4	Jens Arnold, Bert Brys, Christopher Heady, Åsa Johansson, Cyrille Schwellnus, & Laura Vartia, <i>Tax Policy For Economic Recovery and Growth</i> , 121 Economic Journal F59-F80 (2011).	21 OECD countries (1971 to 2004)	Negative	Corporate taxes most harmful, followed by taxes on personal income, consumption, and property. Progressivity of PIT harms growth. A 1 percent shift of tax revenues from income taxes (both personal and corporate) to consumption and property taxes would increase GDP per capita by between 0.25 percent and 1 percent in the long run. Corporate taxes, both in terms of the statutory rate and depreciation allowances, reduce investment and productivity growth. Raising the top marginal rate on personal income reduces productivity growth.
5	Robert Barro & C.J. Redlick, <i>Macroeconomic Effects of Government Purchases and Taxes</i> , 126 Quarterly Journal of Economics 51-102 (2011).	U.S (1912 to 2006)	Negative	Cut in the average marginal tax rate of one percentage point raises next year's per capita GDP by around 0.5%.
6	Christina Romer & David Romer, <i>The macroeconomic effects of tax changes: estimates based on a new measure of fiscal shocks</i> , 100 American Economic Review 763-801 (2010).	U.S. Post-WWII (104 tax changes, 65 exogenous)	Negative	Tax (federal revenue) increase of 1% of GDP leads to a fall in output of 3% after about 2 years, mostly through negative effects on investment.

³⁴ See Mertens & Ravn, *supra* note 13.

7	Alberto Alesina & Silvia Ardagna, <i>Large changes in fiscal policy: taxes versus spending</i> , in <i>Tax Policy and the Economy</i> , Vol. 24 (Univ. of Chicago Press, 2010).	OECD countries (fiscal stimuli and fiscal adjustments, 1970 to 2007)	Negative	Fiscal stimuli based upon tax cuts more likely to increase growth than those based upon spending increases. Fiscal consolidations based upon spending cuts and no tax increases are more likely to succeed at reducing deficits and debt and less likely to create recessions.
8	International Monetary Fund, <i>Will it hurt? Macroeconomic effects of fiscal consolidation</i> , in <i>World Economic Outlook: Recovery, Risk, and Rebalancing</i> (2010).	15 advanced countries (170 fiscal consolidations over the last 30 years)	Negative	1% tax increase reduces GDP by 1.3% after two years.
9	Robert Reed, <i>The robust relationship between taxes and U.S. state income growth</i> , 61 <i>National Tax Journal</i> 57-80 (2008).	U.S. states (1970-1999, 5 year panels)	Negative	Robust negative effect of state and local tax burden. Multi-year panels mitigate misspecified lag effects, serial correlation, and measurement error.
10	N. Bania, J. A. Gray, & J. A. Stone, <i>Growth, taxes, and government expenditures: growth hills for U.S. states</i> , 60 <i>NATIONAL TAX JOURNAL</i> 193-204 (2007).	U.S. states	Negative	Taxes directed towards public investments first add then subtract from GDP.
11	Young Lee & Roger Gordon, <i>Tax Structure and Economic Growth</i> , 89 <i>Journal of Public Economics</i> 1027-1043 (2005).	70 countries (1980 - 1997, cross-sectional and 5 year panels)	Negative	Reducing corporate income tax 1 percentage point raises annual growth by 0.1 to 0.2 points.
12	Randall Holcombe & Donald Lacombe, <i>The effect of state income taxation on per capita income growth</i> , 32 <i>Public Finance Review</i> 292-312 (2004).	Counties separated by state borders (1960 to 1990)	Negative	States that raised income taxes averaged a 3.4% reduction in per capita income.
13	Marc Tomljanovich, <i>The role of state fiscal policy in state economic growth</i> , 22 <i>Contemporary Economic Policy</i> 318-330 (2004).	U.S. states (1972 to 1998, multi-year panels)	Negative	Higher tax rates negatively affect short run growth, but not long run growth.
14	Olivier Blanchard & Robert Perotti, <i>An Empirical Characterization Of The Dynamic Effects Of Changes In Government Spending And Taxes On Output</i> , 107 <i>QUARTERLY JOURNAL OF ECONOMICS</i> 1329-1368 (2002).	U.S. Post-WWII (VAR/event study)	Negative	Positive tax shocks, or unexpected increases in total revenue, negatively affect private investment and GDP.
15	F. Padovano & E. Galli, E., <i>Tax rates and economic growth in the OECD countries (1950-1990)</i> , 39 <i>ECONOMIC INQUIRY</i> 44-57 (2001).	23 OECD countries (1951 to 1990)	Negative	Effective marginal income tax rates negatively correlated with GDP growth.
16	Stefan Folster & Magnus Henrekson, <i>Growth effects of government expenditure and taxation in rich countries</i> , 45 <i>European Economic Review</i> 1501-1520 (2001).	Rich countries (1970 to 1995)	Negative	Tax revenue as a share of GDP negatively correlated with GDP growth.
17	M. Bleaney, N. Gemmell & R. Kneller, <i>Testing the endogenous growth model: public expenditure, taxation, and growth over the long run</i> , 34 <i>CANADIAN JOURNAL OF ECONOMICS</i> 36-57 (2001).	OECD countries (1970 to 1995)	Negative	Distortionary taxes reduce GDP growth. Consumption taxes are not distortionary.
18	R. Kneller, M. Bleaney & N. Gemmell, <i>Fiscal Policy and Growth: Evidence from OECD Countries</i> , 74 <i>JOURNAL OF PUBLIC ECONOMICS</i> 171-190 (1999).	OECD countries (1970 to 1995)	Negative	Distortionary taxes reduce GDP growth.

19	Howard Chernick, <i>Tax progressivity and state economic performance</i> , 11 <i>ECONOMIC DEVELOPMENT QUARTERLY</i> 249-267 (1997).	U.S. states (1977 to 1993)	Negative	Progressivity of income taxes negatively affects GDP growth.
20	Enrique Mendoza, G. Milesi-Ferretti, & P. Asea, <i>On the Effectiveness of Tax Policy in Altering Long-Run Growth: Harberger's Superneutrality Conjecture</i> , 66 <i>JOURNAL OF PUBLIC ECONOMICS</i> 99-126 (1997).	18 OECD countries (1965-1991, 5 year panels)	None	Estimated effective tax rates on labor and capital harm investment, but effect on growth is insignificant. Effective consumption taxes increase investment, but not growth. Overall tax burden levels have no effect on investment or growth.
21	Stephen Miller & Frank Russek, <i>Fiscal structures and economic growth: international evidence</i> , 35 <i>ECONOMIC INQUIRY</i> 603-613 (1997).	Developed and developing countries	Negative	Tax-financed spending reduces growth in developed countries, increases growth in developing countries.
22	John Mullen & Martin Williams, <i>Marginal tax rates and state economic growth</i> , 24 <i>REGIONAL SCIENCE AND URBAN ECONOMICS</i> 687-705 (1994).	U.S. states (1969 to 1986)	Negative	Higher marginal tax rates reduce GDP growth.
23	William Easterly & S. Rebelo, <i>Fiscal Policy and Economic Growth: An Empirical Investigation</i> , 32 <i>JOURNAL OF MONETARY ECONOMICS</i> 417-458 (1993).	Developed and developing countries	None	Effects of taxation difficult to isolate empirically.
24	Reinhard Koester & Roger Kormendi, <i>Taxation, Aggregate Activity and Economic Growth: Cross-Country Evidence on Some Supply-Side Hypotheses</i> , 27 <i>Economic Inquiry</i> 367-86 (1989).	63 countries	Negative	Controlling for average tax rates, increases in marginal tax rates reduce economic activity. Progressivity reduces growth.
25	Jay Helms, <i>The effect of state and local taxes on economic growth: a time series-cross section approach</i> , 67 <i>REVIEW OF ECONOMICS AND STATISTICS</i> 574-582 (1985).	U.S. states (1965 to 1979)	Negative	Revenue used to fund transfer payments retards growth.
26	Claudio J. Katz, Vincent A. Mahler & Michael G. Franz, <i>The impact of taxes on growth and distribution in developed capitalist countries: a cross-national study</i> , 77 <i>AMERICAN POLITICAL SCIENCE REVIEW</i> 871-886 (1983).	22 developed countries	None	Taxes reduce saving but not growth or investment.

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